ENVIRONMENT PLAN

JACK-UP TURRUM PHASE 3 DRILLING

Esso Australia Resources Pty Ltd

AUKT-EV-EMP-001

Esso Australia Resources Pty Ltd acknowledges Aboriginal and Torres Strait Islander people as the Traditional Custodians of the land and acknowledges and pays respect to their Elders, past and present. Esso Australia Resources Pty Ltd is committed to safe and inclusive workplaces, policies and services for people of LGBTIQ+ communities and their families.

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ABBREVIATIONS

Abbreviation	Definition
AEP	Australian Energy Producers (formerly APPEA)
AHO	Australian Hydrographic Office
AHTS	Anchor Handling Towing Support
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
API	American Petroleum Industry
APPEA	Australian Petroleum Production and Exploration Association Limited
ASL	Above Sea Level
ASOG	Activity Specific Operating Guidelines
ATBA	Area To Be Avoided
BBMT	Barry Beach Marine Terminal
BIA	Biologically Important Area
BOP	Blow-Out Preventor
BSCZSF	Bass Strait Central Zone Scallop Fishery
BWM	Ballast Water Management
CASA	Civil Aviation Safety Authority
Cd	Cadmium
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CHARM	Chemical Hazard and Risk Management
CM	Control Measure
CMP	Control Measure (Project-specific)
CMPBW	*Conservation Management Plan for the Blue Whale 2015–2025* (Department of the Environment, 2015)
CO_2	Carbon Dioxide

Abbreviation	Definition
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea 1972
CTS	Commonwealth Trawl Sector
DAWR	Department of Agriculture and Water Resources
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEECA	Department of Energy, Environment and Climate Action
DJPR	Department of Jobs, Precincts and Regions
DP	Dynamic Positioning
DWH	Deep Water Horizon
EAC	East Australian Current
EAPL	Esso Australia Pty Ltd
ECDTS	East Coast Deepwater Trawl Sector
EMBA	Environment That May Be Affected
EMP	Environmental Management Plan
e-NGO	Environmentally Focused Non-Government Organisation
EP	Environment Plan
EPBC	Environment Protection and Biodiversity Conservation
EPO	Environmental Performance Outcomes
EPS	Environmental Performance Standards
ERP	Emergency Response Plan
ESD	Ecologically Sustainable Development
ESG	Emergency Support Group
Esso	Esso Australia Resources Pty Ltd a.k.a EAPL
ETBF	Eastern Tuna and Billfish Fishery
FDA	Food and Drug Administration
GAB	Great Australian Bight
GBJV	Gippsland Basin Joint Venture
GHG	Greenhouse Gas

Abbreviation	Definition
GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation
GoM	Gulf of Mexico
HFC	High-Frequency Cetaceans
Hg	Mercury
HLV	Heavy Lift Vessel
HSE	Health, Safety and Environment
IACS	International Association of Classification Societies
IBRA	Interim Biogeographic Region for Australia
ICS	Incident Command System
IMCA	International Marine Contractors Association
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
IMO	International Maritime Organisation
IMS	Invasive Marine Species
IMT	Incident Management Team
IPA	Indigenous Protected Areas
ITOPF	International Tanker Owners Pollution Federation Limited
JASCO	JASCO Applied Sciences (Australia) Pty Ltd
JRCC	Joint Rescue Coordination Centre
JUR	Jack-Up Rig
KCl	Potassium Chloride
KEF	Key Ecological Feature
LFC	Low-Frequency Cetaceans
LOC	Loss Of Containment
LOWC	Loss Of Well Control
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
MDO	Marine Diesel Oil
MFO	Marine Fauna Observer

Abbreviation	Definition
MMO	Marine Mammal Observer
MEPC	Marine Environment Protection Committee
MLC	Marlin Complex
MMO	Marine Mammal Observer
MNES	Matters of National Environmental Significance
MOC	Management of Change
MODU	Mobile Offshore Drilling Unit
NaBr	Sodium Bromide
NaCl	Sodium Chloride
NAF	Non-Aqueous Fluid
NIW	Nationally Important Wetland
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NRDA	Natural Resource Damage Assessment
NSW	New South Wales
OA	Operational Area
OCNS	Offshore Chemical Notification Scheme
OGUK	Oil and Gas UK
OI	Operations Integrity
OIMS	Operations Integrity Management System
OPEP	Oil Pollution Emergency Plan
OPGGS	Offshore Petroleum and Greenhouse Gas Storage
OSAT	Operational Science Advisory Team
OSMP	Operational and Scientific Monitoring Plan
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OSRL	Oil Spill Response Limited

Abbreviation	Definition
PAH	Polycyclic Aromatic Hydrocarbons
PAM	Passive Acoustic Monitoring
PBW	Pygmy Blue Whale (*Balaenoptera musculus brevicauda*)
PCE	Pressure Control Equipment
PK	Peak Sound Level
PMS	Preventative Maintenance System
PMST	Protected Matters Search Tool
PSZ	Petroleum Safety Zone
PTS	Permanent Threshold Shift
Ramsar	Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971
ROC	Residual Oil on Cuttings
ROV	Remotely Operated Vehicle
RP	Recommended Practice
RRT	Regional Response Team
SBT	Southern Bluefin Tuna (*Thunnus maccoyii*)
SBTF	Southern Bluefin Tuna Fishery
SCB	Source Control Branch
SCERP	Source Control Emergency Response Plan
SEL	Sound Exposure Level
SELcum	Cumulative Sound Exposure Level
SESSF	Southern and Eastern Scalefish and Shark Fishery
SETFIA	South East Trawl Fishing Industry Association
SGSHS	Shark Gillnet and Shark Hook Sectors
SHS	Scalefish Hook Sector
SIMOPS	Simultaneous Operations
SMPEP	Shipboard Marine Pollution Emergency Plan
SOLAS	International Convention for the Safety of Life at Sea

Abbreviation	Definition
SPF	Small Pelagic Fishery
SPL	Sound Pressure Level
SRW	Southern Right Whale (*Eubalaena australis*)
SSHE	Safety, Security, Health, Environment
SSJF	Southern Squid Jig Fishery
TEC	Threatened Ecological Communities
TSS	Traffic Separation Scheme
TSSC	Threatened Species Scientific Committee
TTS	Temporary Threshold Shift
USBL	Ultra-Short Base Line
WBM	Water based mud
WCDS	Worst-case discharge scenario
WOMP	Well Operations Management Plan

UNITS

Abbreviation	Unit
"	Inch
µg	Microgram
µPa	Micropascal
API	API gravity – The method used for measuring the density of petroleum as defined in American Petroleum Institute standards
B	Billion
bbl	Standard barrel
cP	Centipose
dB	Decibel
g	Gram
ha	Hectare
Hz	Hertz

Abbreviation	Unit
kg	Kilogram
kHz	kiloHertz
kJ	Kilojoule
km	Kilometre
km^2	Square kilometre
kn	Knots
ksi	Kilopound per square inch
kW	Kilowatt
L	Litre
m	Metre
m^2	Square metre
m^3	Cubic metre
Mbbl	Thousand barrels
MMbbl	Million barrels
MMscf	Million standard cubic feet
%	Percent
MT	Metric tonnes
nm	Nautical mile
°C	Celsius Degrees
PJ	Petajoule
ppg	Pounds per gallon
ppm	Parts per million
psu	Practical salinity unit
RMS	Root-mean-squared
Tcf	Trillion cubic feet

1 Introduction

Esso Australia Resources Pty Ltd (Esso) is the operator of joint ventures for the exploration, development and production of oil and gas from Bass Strait, Victoria. The offshore Bass Strait production network is comprised of 421 wells, 19 offshore platforms and six subsea facilities that are inter-connected by over 800km of pipelines. Esso has been producing oil and gas in Bass Strait since 1969 and in this time has supplied over 50% of Australia's crude oil and liquids and over 40% of all of Eastern Australia's natural gas, hence contributing significantly to the national economy and supporting growth in industry and employment. Although the Bass Strait production network has been producing energy for more than 50 years, it remains today the largest single source of gas supply to the Australian east coast domestic market and has the potential to continue supplying one third of southeast Australia's domestic gas demand through to the end of this decade.

After delivering energy to Australia for over 50 years, many of the Bass Strait fields are now reaching the end of their productive life.

Turrum Phase 3 production drilling activities involve drilling up to five additional wells on the existing Marlin B platform, being the next stage of the planned development of the Turrum gas field in Petroleum Production Licences VIC/L03 and VIC/L04. The Marlin B platform was designed with additional well slots available, contemplating the future installation the additional Turrum wells to supplement hydrocarbon production. The production facilities at the Marlin complex (MLC) have additional connection points available to connect these additional wells to the existing hydrocarbon production equipment.

The drilling and completion activity will be undertaken using a jack-up rig (JUR) which will connect to the Marlin B platform. All impacts and risks associated with these activities have been assessed and controls put in place to ensure the risks are as low as reasonably practicable (ALARP) and acceptable.

1.1 Scope

Esso has developed this Environment Plan (EP) in accordance with the requirements within the applicable legislation, to manage the environmental impacts and risks associated with Turrum Phase 3 production drilling campaign, to be completed by a JUR, and installed at the Marlin B platform within the Petroleum Safety Zone (PSZ) at the MLC in the Gippsland Basin.

The Turrum Phase 3 production drilling Operational Area (OA) for the purposes of this EP lies within Production License VIC/L03 and is defined by the existing 500m PSZ around the MLC. The activities (as included in the scope of this EP are described in detail in Section 2 and include JUR positioning, conductor installation (if conductors were not able to be installed as part of prior activities permissioned under the JUR P&A EP (AUGO-PO-EMP-069) , drilling, completion installations, support vessels activities, remotely operated vehicle (ROV) activities and use of helicopters.

Activities excluded from the scope of this EP are all vessels transiting to or from the OA. Vessels transiting are deemed to be operating under the *Commonwealth Navigation Act 2012* (Cth) and not performing a petroleum activity.

1.2 Titleholder details

Petroleum Production Licenses VIC/L03 (the location of the Marlin B platform) and VIC/L04 (which together cover the Turrum reservoir) (Figure 2-1) are held by Esso and Woodside Energy (Bass Strait) Pty Ltd as co-venturers in the Gippsland Basin Joint Venture (GBJV). Esso, a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is the designated operator of the production licenses, in accordance with the GBJV Operating Agreement. Esso is also the designated operator of the GBJV.

Esso receives services, including personnel, from its wholly owned subsidiary, Esso Australia Pty Ltd (EAPL), which is also a wholly owned subsidiary of ExxonMobil Australia Pty Ltd.

The Petroleum Production Licences VIC/L03 and VIC/L04 locations are shown in Figure 2-1.

The nominated registered office for the proponent is:

Esso Australia Resources Pty Ltd (ACN 091 829 819)
Level 9, 664 Collins Street, Docklands VIC 3008

The environmental contact for this activity is:

Louise Mayboehm, Offshore Risk, Environment and Regulatory Supervisor
Esso Australia Pty Ltd for and on behalf of Esso
Telephone: (03) 9261 0000
Email: EAPL.Regulatory@Exxonmobil.com

The National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA) will be notified of a change in titleholder, a change in the environmental contact or a change in the contact details for either the titleholder or the environmental contact in accordance with Regulation 23(3) of the Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2023 (Cth), referred to herein as the Environment Regulations.

1.3 Legislative framework

The principal offshore legislation for production activities beyond 3nm to the outer extent of the Australian Exclusive Economic Zone at 200nm is the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGS Act). The OPGGS Act is administered by NOPSEMA.

1.3.1 Relevant legislation

In accordance with Regulation 21(4) of the Environment Regulations, relevant Commonwealth legislation as it applies to the operation of facilities and petroleum pipelines and projects is provided in Table 1-1.

No part of the activity is located within Victorian, NSW or Tasmanian State waters (between the low water mark and the 3nm limit) and as such, no environmental approvals for the activity are required from the Victorian or other State governments. State legislation would be relevant in the unlikely case of a large hydrocarbon release, as the Environment that May Be Affected (EMBA) intersects State waters, therefore legislation relevant to marine pollution in Victoria, is detailed in

Table 1-2. Legislation relevant to marine pollution in NSW, is detailed in Table 1-3. Legislation relevant to marine pollution in Tasmania, is detailed in Table 1-4.

Table 1-1 Key Commonwealth legislation

Legislation	Coverage and applicability to activity	Enacted by	International Convention enacted	Administering authority
OPGGS Act Environment Regulations	The OPGGS Act addresses all licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and recovery operations extending beyond the 3nm limit. The Environment Regulations ensures that petroleum activities are carried out in a manner; consistent with the principles of ecologically sustainable development set out in Section 3A of the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act); and by which the environmental impacts and risks of the activity will be reduced to ALARP and will be of an acceptable level.	All Gippsland facilities operate under an accepted EP in accordance with the Environment Regulations.		NOPSEMA
EPBC Act	This Act focuses on Matters of National Environmental Significance (MNES), streamlines the Commonwealth environmental assessment and approval process and provides an integrated system for biodiversity conservation and management of protected areas. MNES are world heritage properties; Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (Ramsar) wetlands; listed threatened species and communities; migratory species under international agreements; nuclear actions and the commonwealth marine environment. On 28 February 2014, NOPSEMA became the sole designated assessor of petroleum and greenhouse gas (GHG) activities in Commonwealth waters in accordance with the Minister for the Environment's endorsement of NOPSEMA' s environmental authorisation process under Section 146 of the EPBC Act.	Relevant MNES are covered in Appendix A Description of the Environment. EPBC Act Protected Matters Search Tool (PMST) utilised to identify relevant data. Approved conservation advice and management plans relating to listed species or threatened ecological communities have been identified and considered where appropriate.	1992 Convention on Biological Diversity & Agenda 21. Convention on International Trade in Endangered Species of Wildlife and Flora 1973. Japan/Australia Migratory Bird Agreement 1974. China/Australia Migratory Bird Agreement 1986. Republic of Korea-Australia Migratory Bird Agreement 2006. International Convention on Whaling 1946. Convention on the Conservation of Migratory	Department of Climate Change, Energy, the Environment and Water (DCCEEW). For petroleum activities in Commonwealth Waters, NOPSEMA.

Legislation	Coverage and applicability to activity	Enacted by	International Convention enacted	Administering authority
			Species of Wild Animals 1979 (Bonn Convention). Convention Concerning the Protection of the World Cultural and Natural Heritage 1972.	
Environment Protection (Sea Dumping) Act 1981 (Cth)	Act prevents the deliberate disposal of wastes (loading, dumping, and incineration) at sea from vessels, aircraft, and OAs.	Activities described in this plan are controlled to prevent actions that would contravene this Act. Relevant control measures, as well as the implementation strategy is described in this EP.	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention). International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL).	DCCEEW
Australian Maritime Safety Authority Act 1990 (Cth)	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. Requirements are given effect through the Australian Maritime Safety Authority (AMSA).	Oil spill preparedness and response plans for dealing with a potential worst case scenario spill is described in Section 8.16 including consultation and coordination of activities with AMSA.	International Convention on Oil Pollution Preparedness, Response and Co-operation) 1990.	AMSA
National Environment Protection Council Act 1994 (Cth)	Council develops (in conjunction with other State authorities) through the Intergovernmental Agreement on the Environment, consistent environmental standards to be adopted between states. These requirements take the form	Reporting of emissions required by the National Pollutant Inventory is conducted annually for all Esso operated activities.		National Environment Protection Council

Legislation	Coverage and applicability to activity	Enacted by	International Convention enacted	Administering authority
and *National Environment Protection Measures (Implementation) Act 1998* (Cth)	of National Environment Pollution Measures such as National Pollutant Inventory.			
National Greenhouse and Energy Reporting Act 2007 (Cth)	Provides for the reporting and dissemination of information related to GHG emissions, GHG projects, energy production and energy consumption.	Annual submission covering Gippsland activities provided to Clean Energy Regulator.	United Nations Framework Convention on Climate Change,1992, and the Kyoto Protocol, 1997.	Clean Energy Regulator
Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth)	Regulates ship-related operational activities and invokes certain requirements of MARPOL relating to discharge of noxious liquid substances, sewage, garbage, air pollution etc.	Activities described in this plan are controlled to prevent actions that would contravene this Act. Relevant control measures and the implementation strategy is described in this EP.	MARPOL, including the incorporation of all of the amendments that have been adopted by the Marine Environment Protection Committee (MEPC) and have entered into force, up to and including the 2000 amendments (as adopted by Resolution MEPC.89 (45) 2000.	AMSA
Biosecurity Act 2015 (Cth) and associated regulations including the Biosecurity Amendment	The Act is about managing diseases and pests that may cause harm to human, animal or plant health or the environment. It empowers authorities to monitor, authorise, respond to and control biosecurity risks for the movement of goods, vessels and people to prevent the introduction,	The risk of introduction of Invasive Marine Species (IMS) is considered and managed for all vessels covered under this activity as described in this EP.	International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004. United Nations Convention on the Law of the Sea 1982.	Department of Agriculture, Fisheries and Forestry.

Legislation	Coverage and applicability to activity	Enacted by	International Convention enacted	Administering authority
(Biofouling Management) Regulations 2021 (Cth).	establishment or spread of diseases or pests affecting human beings, animals, or plants.		Convention on Biological Diversity 1992.	
Navigation Act 2012 (Cth)	Regulates ship-related activities and invokes certain requirements of MARPOL convention relating to equipment and construction of ships.	Vessels operating within the permit areas comply with the requirements of the Act. Specifically in relation to environment protection, activities relating to control of discharges are discussed in this EP.	MARPOL (certain sections). Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGs).	Department of Infrastructure, Transport, Regional Development, Communications and the Arts.
Coastal Waters (State Powers) Act 1980 (Cth)	This Act transferred constitutional power over coastal waters, and title to seabed minerals within territorial limits, from the Commonwealth to the States.	Consultation, reporting and other matters impacting coastal waters are addressed with State authorities as described in this EP.		Geoscience Australia (Maritime Boundaries Advice Unit)
Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 (Cth)	Regulates the use of harmful anti-fouling systems employed on vessels and their effects on the marine environment.	The risk of introduction of IMS is considered and managed for all vessels covered under this activity as described in this EP. This includes consideration of appropriate antifouling systems.	International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001.	AMSA
Native Title Act 1993 (Cth)	Allows for recognition of Native Title through a claims and mediation process and sets up regimes for obtaining interests in lands or waters where Native Title may exist.	Native Title within the Bass Strait operations Described Area is identified and recognised in Section 1.3.3.		Attorney-General's Department

Legislation	Coverage and applicability to activity	Enacted by	International Convention enacted	Administering authority
Underwater Cultural Heritage Act 2018 (Cth)	Provides for the protection of Australia's shipwrecks and has broadened protection to sunken aircraft and other types of underwater cultural heritage including Australia's Aboriginal and Torres Strait Islander Underwater Cultural Heritage in Commonwealth Waters. Projects that damage or interfere with a historic shipwreck or relic in Australian waters or with a submerged aircraft or associated artefacts in Commonwealth waters requires a permit.	There are no known shipwrecks, relics, submerged aircraft, or associated artifacts relevant to this EP.		DCCEEW
Civil Aviation Act 1988 (Cth) and associated regulations including Civil Aviation Safety Regulations 1998 (Cth)	The Act sets up a Civil Aviation Safety Authority (CASA) with functions to regulate the safety of civil aviation, including the carrying of dangerous goods, airworthiness standards for aviation, maintenance; general operational and flight rules; and aerial application operations.	Rotary wing aircraft servicing the Gippsland facilities operate under the requirements of CASA. This contributes to safe operation and transport of goods thereby reducing risk of incidents which could have environmental impacts as described in this EP.	Chicago Convention 1944.	CASA

Table 1-2 Key Victorian legislation

Legislation	Coverage
Environment Protection Act 2017 (Vic)	This Act is the key Victorian legislation regulating emissions to the environment within Victoria (relevant for waste transfer and disposal, National Pollutant Inventory reporting). Administered by the Victorian Environment Protection Authority.
Pollution of Waters by Oil and Noxious Substances Act 1986 (Vic)	This Act is the Victorian state legislation giving effect to the requirements of MARPOL within State waters. Administered by the Victorian Environment Protection Authority.

Legislation	Coverage
Emergency Management Act 1986 (Vic)	This Act ensures that the components of emergency management (prevention, response and recovery) are organised to facilitate planning, preparedness, operational coordination and community participation. Administered by Department of Justice and Community Safety Police and Emergency Management Victoria.
Port Management Act 1995 (Vic)	Under this Act all managers of local and commercial ports must prepare a Safety Management Plan and Environmental Management Plan (together known as SEMPs). Administered by Ports Victoria.
Marine Safety Act 2010 (Vic)	This Act provides for safe marine operations in Victoria. Administered by Safe Transport Victoria.
Heritage Act 2017 (Vic)	This Act is the Victorian state legislation which protects the heritage values of shipwrecks and relics within State waters. Administered by the Heritage Victoria.
National Parks Act 1975 (Vic)	This Act provides for the protection, use and management of Victoria's national and other parks. Administered by the Department of Energy, Environment and Climate Action (DEECA).
Radiation Act 2005 (Vic)	This Act provides for licencing for use and management of radioactive sources and conducting radiation practice (including radiation testing). Administered by the Victorian Department of Health.
Catchment and Land Protection Act 1994 (Vic)	This Act sets up a framework for the integrated management and protection of catchments. Administered by DEECA.
Marine and Coastal Act 2018 (Vic)	This Act provides for co-ordinated strategic planning and management for Victorian coast, the preparation and implementation of management plans for coastal Crown land and a co-ordinated approach to approvals for use and development of coastal Crown land. DEECA administers this Act.
Land Titles Validation Act 1994 (Vic)	This Act validates past acts, provides for compensation rights for the holders of Native Title which has been affected by past acts, and confirms certain existing rights. The Act also confirms ownership by the Crown of natural resources, the right to regulate water flows and existing fishing rights under State law; and public access to waterways, beds and banks of waterways, coastal waters, beaches and public areas.
Dangerous Goods Act 1985 (Vic)	This Act, the associated *Dangerous Goods (Storage and Handling) Regulations 2012* and the *Code of practice for the storage and handling of dangerous goods* (Victoria, 2013) promotes the safety of persons and property in relation to the

Legislation	Coverage
	manufacture, storage, transfer, transport, sale, purchase and use of dangerous goods and the import of explosives and other dangerous goods. The Act is administered by the Department of Treasury and Finance, WorkSafe Victoria.
Offshore Petroleum and Greenhouse Gas Storage Act 2010 (Vic) and Offshore Petroleum and Greenhouse Gas Storage Regulations 2011 (Vic)	This Act and Regulations applies to petroleum operations effectively within 3nm of the Victorian coast and address licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and development operations. Waters greater than 3nm offshore from the coast are Commonwealth Waters and are covered by Commonwealth legislation (i.e. OPGGS Act). The Commonwealth and Victorian legislation are, by agreement, very similar with regard to petroleum.

Table 1-3 Key NSW legislation

Legislation	Coverage
Protection of the Environment Operations Act 1997 (NSW)	This is the main piece of NSW environmental legislation covering water, land, air and noise pollution and waste management. Administered by the New South Wales Environment Protection Authority.
Marine Pollution Act 2012 (NSW)	This Act is the NSW State legislation giving effect to the requirements of MARPOL within State waters. Administered by Transport for NSW.
Ports and Maritime Administration Act 1995 No 13 (NSW)	This Act provides for the provision of marine safety services and emergency environment protection services for dealing with pollution incidents in NSW waters. Administered by Transport for NSW.
Heritage Act 1977 No 136 (NSW)	This Act provides for the identification, registration, and interim protection of items of State heritage significance (including shipwrecks within State waters) in NSW. Administered by Heritage Council of NSW.
National Parks and Wildlife Act 1974 No 80 (NSW)	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. Administered by the New South Wales Office of Environment and Heritage.
Wilderness Act 1987 No 196 (NSW)	This Act affords declared wilderness the most secure level of protection, requiring it to be managed in a way that will maintain its wilderness values and pristine condition by limiting activities likely to damage flora, fauna and cultural heritage. Administered by the New South Wales Department of Planning and Environment.

Legislation	Coverage
Marine Parks Act 1997 No 64 (NSW)	This Act provides for the protection and management of marine areas. Administered by the New South Wales Marine Parks Authority.

Table 1-4 Key Tasmanian legislation

Legislation	Coverage
Environmental Management and Pollution Control Act 1994 (Tas)	This is the primary environment protection and pollution control legislation in Tasmania. Administered by the Environment Protection Authority Tasmania.
Pollution of Waters by Oil and Noxious Substances Act 1987 (Tas)	This Act is the Tasmanian State legislation giving effect to the requirements of MARPOL within State waters. Administered by Environment Protection Authority Tasmania.
Emergency Management Act 2006 (Tas)	This Act establishes the Tasmanian emergency management framework which operates at state, regional and municipal levels.
Marine and Safety Authority Act 1997 (Tas)	This Act establishes Marine and Safety Tasmania as the authority responsible for the safe operation of vessels in Tasmanian waters and managing its marine facilities.
Historic Cultural Heritage Act 1995 (Tas)	This Act provides for the identification, assessment, protection and conservation of places having historic cultural heritage significance (including shipwrecks within State waters) in Tasmania. Administered by Tasmanian Heritage Council and Historic Heritage Section of Parks and Wildlife Service Tasmania (shipwrecks).
National Parks and Reserves Management Act 2002 (Tas)	This Act provides for the management of national parks and other reserved land. Administered by the Parks and Wildlife Service Tasmania.

1.3.2 Federal Court decisions

On 21 September 2022, the Federal Court of Australia ruled in the *Tipakalippa vs NOPSEMA (No. 2)* [2022] FCA 1121 case to set aside NOPSEMAs decision to accept an EP (the Santos Barossa Development Drilling and Completions EP) on the basis NOPSEMA could not be reasonably satisfied that the EP met the criteria specified in the Environment Regulations. This ruling specifically related to the undertaking of relevant person consultation, as required by Regulation 25 of the Environment Regulations. A subsequent appeal to this decision, *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193, was dismissed by the Federal Court on the 2 December 2022. From this date, the appeal decision represents the law regarding requirements for consultation in accordance with the Environment Regulations. Following the Federal Court decisions, NOPSEMA has developed *Consultation in the course of preparing an environment plan* (NOPSEMA, 2023) as a guideline for industry.

1.3.3 Native Title

The landmark judgements in *Mabo v Queensland (No 2)* (1992) 175 CLR 1 was the first time Indigenous people's assertions of inherited rights to land were recognised by Australian law. The judgements of the High Court overturned the legal fiction of terra nullius (land belonging to no one), and acknowledged that Indigenous people had, and still have, laws and cultural practices, relating to land ownership, management and resource use that survived the process of British colonisation. This recognition of Indigenous 'Native Title' was then formally embraced in statutory law through the *Native Title Act 1993* (Cth).

On 22 October 2010, the Federal Court recognised that the Gunaikurnai people hold Native Title over much of Gippsland.

On the same day, the State entered into an agreement with the Gunaikurnai people under the *Traditional Owner Settlement Act 2010* (Cth). The agreement between the State and the Gunaikurnai people was the first to be made under the *Traditional Owner Settlement Act 2010* (Cth).

The agreement area extends from West Gippsland, near Warragul, east to the Snowy River and north to the Great Dividing Range. It also extends 200m offshore. The determination of Native Title under the *Native Title Act 1993* (Cth) covers the same area. Both the agreement and the Native Title determination only affect Crown land within this area.

As part of the agreement, the Gunaikurnai people will be able to undertake traditional activities such as hunting, fishing and gathering for traditional, non-commercial, domestic or communal purposes. This will involve recreational fishing and game hunting without a licence, as long as the Gunaikurnai people comply with relevant laws and regulations (including any catch limits).

Native title also provides the Gunaikurnai people with the right to negotiate with anyone seeking to carry out activities that might affect their rights. These rights do not impact access for existing users of the area, such as recreational fishers and hunters. The agreement does not provide the Gunaikurnai people with any commercial hunting, fishing or forestry rights.

However, in Akiba on behalf of the *Torres Strait Regional Seas Claim Group v Commonwealth of Australia* [2013] HCA 33, the High Court said that the Native Title claim group had the right 'to take for any purpose resources in the Native Title areas'. This meant that the Native Title holders could continue to sell and trade fish as they had done under their traditional laws. It was the first time that Native Title rights were found to include commercial rights.

As a prescribed body corporate under the Native Title (Prescribed Body Corporate) Regulations 1999 (Cth), the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is empowered to make Native Title decisions and negotiate agreements on behalf of the Gunaikurnai Native Title holders. GLaWAC must undertake a process of consultation and consent with Native Title holders as part of that agreement-making process.

The Gunaikurnai people lodged a Native Title determination application in the Federal Court on 9 December 2014 under the *Native Title Act 1993* (Cth). The application included the land and waters west of the Gunaikurnai determination area to the Tarwin West River, including Wilsons Promontory and Cape Liptrap. The Gunaikurnai name for this area, Yiruk, means rocky place. In September 2019, the Gunaikurnai withdrew the claim.

Esso acknowledges that, despite the claim withdrawal, the Gunaikurnai people hold strong connections to Yiruk with a long history of association with and caring for country, and they will continue to assert their rights and interests over this area.

As part of the Gunaikurnai people's Native Title, the following national parks and reserves are classified as Aboriginal title and subject to joint management between the State and the Gunaikurnai Traditional Owner Land Management Board:

- The Knob Reserve, Stratford
- Tarra Bulga National Park
- Mitchell River National Parks
- Lakes National Park
- Gippsland Lakes Coastal Park
- New Guinea Cave (within Snowy River National Park)
- Lake Tyers Catchment Area
- Buchan Caves Reserve
- Gippsland Lakes Reserve at Raymond Island
- Corringle Foreshore Reserve.

1.3.4 Sea Country

In April 2021, the Sea Country Indigenous Protected Areas (IPA) Program was established by the Australian Government to strengthen the conservation and protection of Australia's unique marine and coastal environments, while creating employment and economic opportunities for Indigenous Australians. Under the program, grant funding will be provided to Indigenous organisations to expand existing IPAs and create new IPAs. The Government will also support delivery of the program, including the development of a Sea Country IPA monitoring and evaluation system and the holding of a conference of Indigenous land and sea managers so they can share knowledge and experiences.

On 7 May 2022, 10 successful Sea Country IPA consultation projects were announced, including the Nanjit to Mallacoota Sea Country IPA managed by GLaWAC.

The Nanjit to Mallacoota Sea Country IPA is in coastal waters of the Gippsland region in Victoria from Nanjit, east of Wilsons Promontory, to Mallacoota, on the Victoria/NSW border. The area comprises numerous marine and coastal parks and includes the Ramsar-listed Gippsland Lakes and Raymond Island.

A Nanjit to Mallacoota Sea Country IPA Management Plan is being developed to support First Nations people to identify cultural and natural values, including the condition and any threats to these values, and plan for the conservation and management of these values.

GLaWAC is partnering with Monash University and the Arthur Rylah Institute to undertake specific research into culturally significant areas and species that occur along the coast.

While the plan is being developed, Esso has anticipated the values and sensitivities regarding Sea Country to potentially include:

- geographical features
- places with cultural and/or spiritual significance
- flora and fauna species that have a cultural and/or spiritual significance
- cultural harvesting and use of flora and fauna.

Esso has registered an interest to participate in the Nanjit to Mallacoota Sea Country IPA consultation project and understands that once the First Nations peoples' consultation phase has completed, commercial participants will be approached.

1.3.5 Minamata Convention

The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from emissions and releases of mercury and mercury compounds caused by humans. Australia ratified the convention on 7 December 2021. Countries that have ratified the convention are bound to put controls in place to manage the discharges, emissions and disposal or mercury and mercury compounds. In Australia, the convention is regulated via the *Recycling and Waste Reduction Act 2020 (Cth).* In particular, the Recycling and Waste Reduction (Mandatory Product Stewardship – Mercury-added Products) Rules 2021 made under the Act give effect to Australia's obligations under Article 4(5) of the Minamata Convention on Mercury.

Mercury is a toxic heavy metal that can harm the immune system, brain, heart, kidney and lungs of humans and animals, and cause serious harm to ecosystems through bioaccumulation. The effects of mercury exposure can occur at very low concentrations. For this activity, the Minamata Convention on Mercury applies to trace quantaties of mercury that may be contained within drilling fluids. This is addressed in Section 6.10 of this EP.

1.4 Environment Plan Summary

This EP has been structured in accordance with the Environment Regulations, Regulations 35(6) and 35(7) as outlined in Table 1-5.

Table 1-5 EP Summary

EP Summary requirement	Section of EP
The location of the activity	Section 2.1
A description of the receiving environment	Section 3 and Appendix A
A description of the activity	Section 2
Description of the environmental impacts and risks	Section 6 and Section 7
The control measures for the activity	Section 6 and Section 7 and Appendix H
The arrangement for ongoing monitoring of the titleholder's environmental performance	Section 8.11
Response arrangements in the Oil Pollution Emergency Plan (OPEP)	Attachment 2
Consultation already undertaken and plans for ongoing consultation	Section 4
Details on the titleholder's nominated liaison person for the activity	Section 1.2

2 Description of the activity

Turrum Phase 3 production drilling activities will utilise JUR *Valaris 107* to drill up to five gas production wells. The drilling will take place at the Marlin B platform located in the Petroleum Production Licence VIC/L03. The completed wells will be connected to the existing hydrocarbon production processing equipment located on the Marlin B platform. Note the reservoir is located in VIC/L03 and VIC/L04.

2.1 Location

The Marlin B platform is connected to the Marlin A platform via a walkway platform, and together forms the MLC, which is located within Petroleum Production License VIC/L03 located in the Gippsland Basin in the eastern area of Bass Strait. The Marlin B platform is in 59m of water, and approximately 42km from the Gippsland coastline as shown in Figure 2-1. The specific location coordinates of the Marlin B platform slots are contained within Table 2-1. There are six slots available for the five wells to be drilled. The sixth slot will only be utilised in the event there is an issue with one of the first five slots.

The Marlin B platform is located within the existing MLC PSZ which is comprised of two overlapping circles of 500m radius centred on each platform. The PSZ was proclaimed in March 2011 and requires marine vessels to stay outside the defined area. This will provide a safe separation between all other marine users and MLC activities.

Table 2-1 Location details of Turrum Phase 3 wells (WGS84)

Well	Associated facility	Licence	Bottom hole location	Gas field	Latitude	Longitude	Water depth (m)	Distance to nearest onshore location (km, direction, location)
MLB01	Marlin B	VIC/L03	VIC/L03	North Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42
MLB02	Marlin B	VIC/L03	VIC/L03	North Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42
MLB08	Marlin B	VIC/L03	VIC/L04	North Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42
MLB07	Marlin B	VIC/L03	VIC/L03	Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42
MLB014	Marlin B	VIC/L03	VIC/L03	Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42
MLB013	Marlin B	VIC/L03	VIC/L03	Turrum	38° 13′ 54″ S	148° 13′ 16″ E	59	42

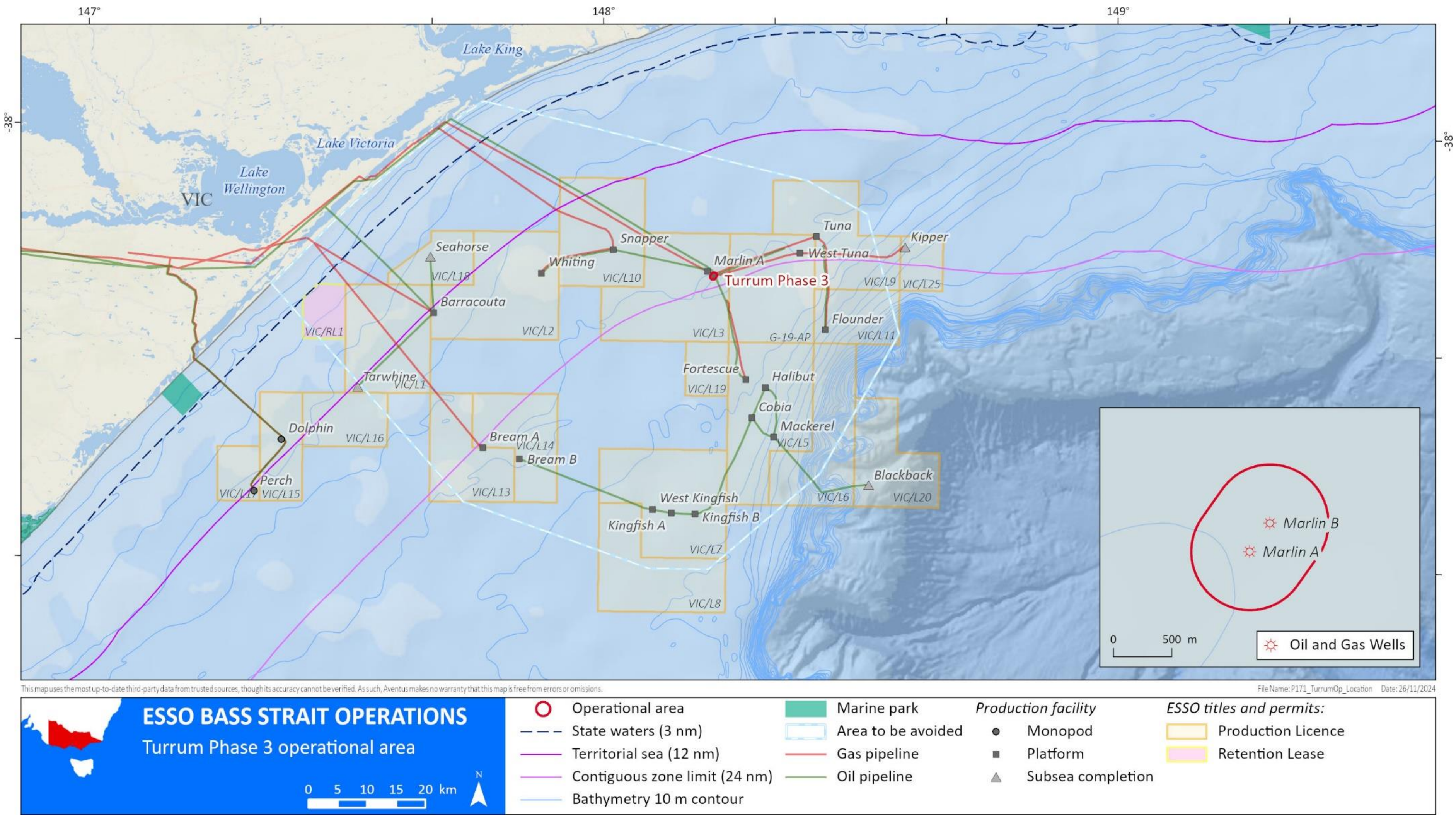

Figure 2-1 Turrum Phase 3 OA

2.2 Timing of the activities

The earliest date of commencement of Turrum Phase 3 production drilling activities is expected to be third quarter 2025 when the rig completes previously scheduled activities. It is expected that the drilling and completion of up to five gas production wells will take approximately 300 days inclusive of JUR positioning activities (approximately 60 days per well including the possibility of conductor installation at the facility), dependent on weather, scheduling and well conditions.

To account for potential weather and operational delays or schedule changes, the environmental assessment accounts for the activity occurring over a full year.

Operational delays or schedule changes from other prior programs using the JUR will impact the commencement of Turrum Phase 3 production drilling activities. It is therefore required that this EP will be valid for 3 years from the date of acceptance.

2.3 Marlin B platform facility infrastructure

Marlin B platform is an eight-leg steel piled jacket. Marlin B and Marlin A platforms are connected by an upper and lower walkway bridge. The Marlin B platform has 18 conductor slots, with seven conductors and five wells drilled.

The Marlin B platform wells include oil production wells, gas production wells and gas re-injection wells.

There are no accommodation facilities on Marlin B platform (all accommodation is located on the Marlin A platform).

2.4 Turrum fluid composition

Table 2-2 provides a high-level overview of the Turrum fluids composition (based on previous analysis). The gas from this reservoir is a 'wet' gas. The produced fluid composition is expected to become leaner (i.e. increased methane content) with production due to retrograde condensation in the reservoir as pressure declines in the absence of strong water drive. Each reservoir interval within the T urrum field has a different composition with key differences being in the carbon dioxide (CO_2) mol% and liquid yield. The changes to composition over time due to pressure depletion are minor and within the uncertainty of the blend of reservoir intervals over time.

Table 2-2 Turrum fluid composition

Composition	Mol %	Composition	Mol %
CO_2	15.1	C3	3.3
H_2S	<20ppm	C4	1.4
N_2	0.7	C5	0.6
C1	71.9	C6+	1.23
C2	5.8		

2.5 Turrum well drilling and completions activities

An indicative overview of the well design and drilling methodology is provided in this Section. This process is subject to change and the detailed well design will be finalised in the Well Operations Management Plan (WOMP) for the Turrum Phase 3 production drilling activities which is to be accepted by NOPSEMA prior to the JUR arrival on location.

The following activities will be undertaken as part of the Turrum drilling operations and Figure 2-2 shows a preliminary Turrum well schematic:

- Move in, jack-up and cantilever out over location
- Install and clean out conductors (if required)
- Drill 17-1/2″ surface hole and run and cement 13-3/8″ (or 13-5/8″) casing
- Skid rig to next well slot for batch drilling of surface holes
- Install blow-out preventor (BOP) and pressure test
- Displace water-based mud (WBM) to non-aqueous fluids (NAF)
- Drill 12-1/4″ hole section
- Run and cement 9-5/8″ liner
- Drill 8-1/2″section to total depth
- Run and cement 7″ liner
- Skid rig to next well slot for batch drilling of intermediate and production holes
- Displace NAF to completions brine.
- Circulate and clean wellbore.
- Perforate production interval
- Run completion
- Remove BOP
- Move JUR out

After running and cementing the 13-3/8″ (or 13-5/8″) surface casing, the Turrum wells will be constructed with 9-5/8″ intermediate/production casing/liner. A 7″ production liner may also be set. The well will be completed via cased hole perforations across the production interval and production packer(s) will be installed.

Drilling fluids (or muds) will be used during the Turrum Phase 3 production drilling activities to provide a range of functions, including:

- control of formation pressures (i.e. providing a hydrostatic head by managing mud density maintains overbalance to the reservoir pressure and prevents a hydrocarbon influx into the wellbore)
- wellbore stability through mud weight and chemical inhibition
- transport of drill cuttings out of the hole to the surface via the JUR
- maintenance of the drill bit and assembly (i.e. lubrication, cooling, and support)
- sealing of permeable formations to prevent formation invasion.

Water-based drilling fluids will be used wherever practicable. The base case drilling methodology as outlined in Table 2-3 proposes using a combination of WBM and NAF.

Table 2-3 Summary of base case Turrum Phase 3 drilling methodology

Hole size	Cuttings discharge location	Fluid type to drill section
Conductor clean-out and 17-1/2″ surface	Sea surface	WBM
12-1/4″ intermediate	Sea surface	NAF
8-1/2″ production	Sea surface	NAF

The surface hole section(s) will be drilled with WBM. The WBM additives are either inert in the marine environment, are naturally occurring benign materials or are organic polymers that are readily biodegradable in the marine environment. Drilling additives typically include sodium chloride (NaCl), potassium chloride, bentonite (clay), cellulose polymers, guar gum, barite and calcium carbonate.

Below the upper well section there is a greater potential for technical challenges during drilling including clay hydration, lost circulation, and hole stability issues. At the Turrum drilling location(s), the potential for hole instability has been recognised due to the presence of the reactive shale formations, and high wellbore inclinations.

The current well design includes the use of NAF to drill the intermediate and production hole sections for the following reasons:

- manage the washout and hole instability problems within reactive shales

- increase lubricity of mud and reduce friction for drilling and casing running operations
- improve hydraulic performance to reduce equivalent circulation density while drilling and cementing, reducing the risk of losses.

The proposed NAF(s) will be a synthetic based mud per Table 6-61. The blend has been shown to require less inventory than conventional drilling fluids due to a reduction in downhole mud losses and pump pressures. The proposed base oil for the drilling fluid provides greater biodegradability, lubricity and reduced toxicity than other conventional synthetic-based fluids. The preferred base oil systems have an aerobic degradability in sea water and low toxicity and the system's components are selected using the Esso drilling chemical selection processes.

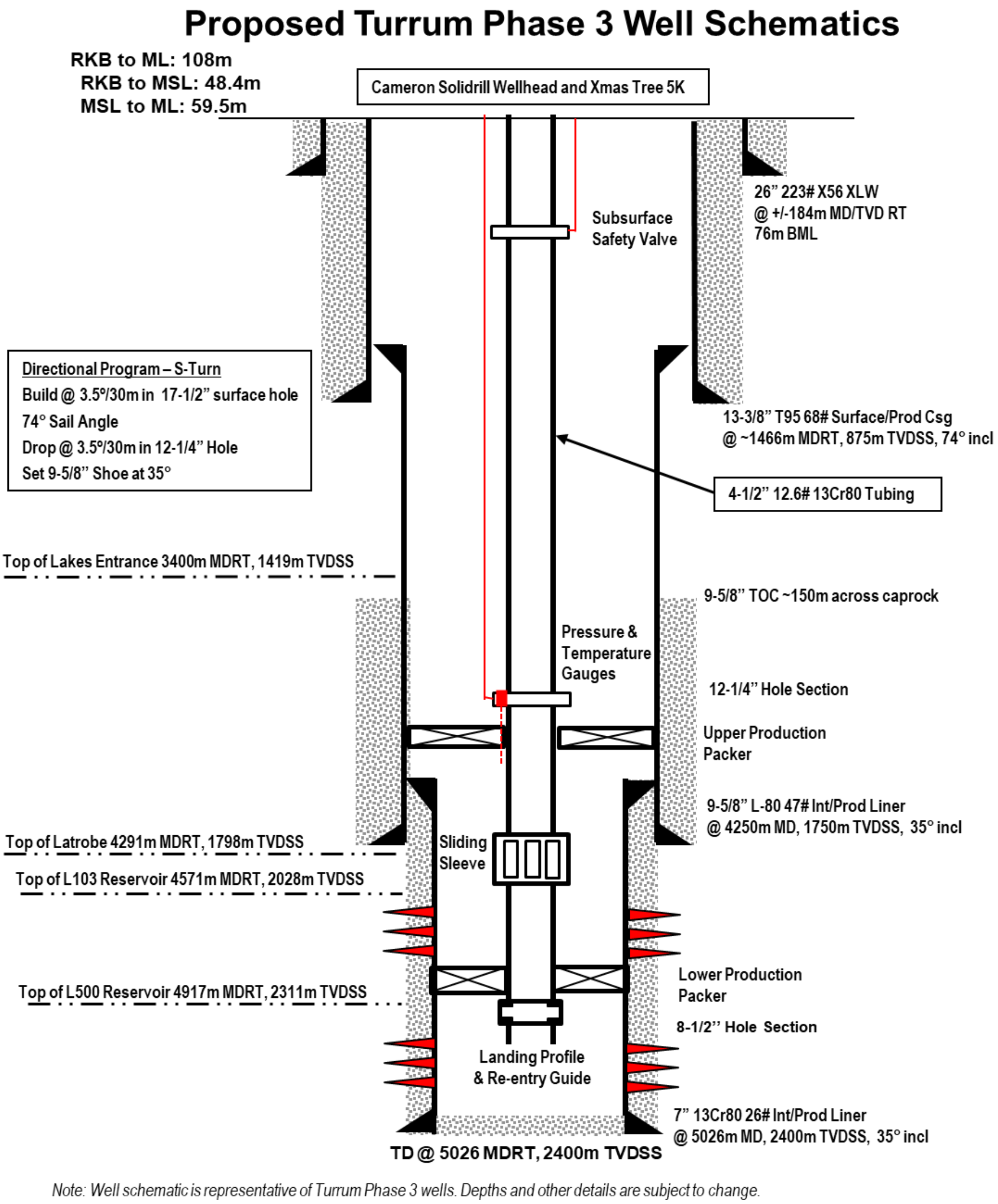

Figure 2-2 Indicative Turrum Phase 3 preliminary well schematic

2.5.1 Cutting discharge

Consistent with industry practice, all cuttings generated from drilling will be returned directly to the seabed, where they will be deposited in the vicinity of the JUR and Marlin B platform.

The surface hole sections will be drilled using a WBM drilling fluid system. The fluids returned with the drilled cuttings will initially pass through a shale shaker where most of the mud will be separated from the cuttings.

The lower hole sections will be drilled using a NAF mud recirculating drilling fluid system. The muds will be treated to remove formation solids and will be recycled and recovered while drilling. The fluids returned with the drilled cuttings will initially pass through a shale shaker where most of the mud will be separated from the cuttings. To minimise the retention of synthetic fluid on cuttings and allow the additional recovery of drilling fluid, a cuttings dryer system can be used to also process the cuttings prior to discharge and return the mud back to the active mud system.

While the majority of used NAF muds will be returned to shore for reconditioning and future use, not all the drilling fluid (muds) can be removed from the cuttings, and a coating of residual drilling fluid will remain. Discharges of NAF into Bass Strait waters are confined to this material adhering to the surfaces of the cuttings.

Following treatment with the shakers and/or cuttings dryer the synthetic fluid retained on cuttings, or residual oil on cuttings (ROC) will be less than 6.9% by dry weight averaged over each hole section. The ROC is monitored by on-board testing conducted once every twelve-hour period.

No bulk NAF discharges (e.g. tank dumps) will be permitted during Turrum Phase 3 production drilling activities.

2.5.2 Cementing operations

Cements will be transported as dry bulk to the JUR by support vessels. The dry bulk storage tanks on the JUR will vent excess compressed air to atmosphere. This venting process will carry small amounts of cement which will be discharged below the JUR's elevated hull.

Following the completion of the drilling of the upper hole sections, casing will be installed and the annulus between the casing and the hole will be cemented. The final cement plan will be confirmed once a cementing service provider is selected.

An indicative outline of the Turrum Phase 3 well cementing program is outlined in the following sections.

2.5.2.1 Surface casing

Surface casing is anticipated to be cemented with a 12.5ppg or heavier lead slurry and a 15.8ppg tail slurry, with returns to the MLC or JUR. Final formulation of the cement slurry will be included in the well program.

2.5.2.2 Intermediate/production casing

Intermediate/production casing will be cemented to meet WOMP criteria. Specifically, designed top of cement will be near the top of Lakes Entrance formation to provide sufficient primary cement for a future rock-to-rock combination abandonment plug in excess of 150m. A 15.8ppg cement slurry will be placed at the shoe and a lighter lead slurry may be used depending on the required cement column height and expected equivalent circulating density and formation strength. Final design and formulation of the cement slurry will be included in the well program.

Cement is mixed as required to ensure minimal wastage. In the event that operational issues arise during the cementation which may put the cement barrier integrity at risk, the partially pumped liquid cement slurry may be completely displaced from the well and discharged overboard. The cementing operation would then be repeated.

Upon completion of each cementing activity, the cementing head and blending tanks are cleaned which results in a release of diluted cement slurry to the ocean.

If feasible, excess dry cement remaining at the completion of the Turrum Phase 3 production drilling activities will be carried to the next operator for use, however this may not be possible (due to differences in cement specifications) in which case, Esso will evaluate if it can be used in other operations, used downhole, transferred onshore if feasible and if n o other options remain the cement will be mixed with water into a slurry, and then discharged overboard.

2.5.3 Completions operations

Completion operations in the Turrum wells consist of perforation of the production interval and installation of completion equipment/tubing.

2.5.3.1 Completions (cased hole perforations)

Following total depth, a 9-5/8" or 7" production liner will be run and cemented across the production interval. The well will then be cleaned out and the NAF drilling fluid will be circulated out and replaced with completion brine.

The well will be perforated across the production interval. The production packer(s) and upper completion will be run on tubing and the Xmas tree will be installed.

2.5.3.2 Well evaluation

During drilling, it is necessary to gather formation information or samples for ongoing drilling operations or to influence the effective recovery of hydrocarbons from the reservoir. Where possible this information is gathered real-time from 'logging while drilling' tools. It may be required that additional formation information, that cannot be gathered from 'logging while drilling' tools, will be obtained using wireline conveyed or pipe conveyed logging tools. The logging tools may include potential radioactive sources.

There are no plans for Vertical Seismic Profiling surveys in Turrum Phase 3 production dilling activities.

2.5.3.3 Fluid returns handling

Once the wells are completed and connected to the MLC – all fluids produced from the wells will be managed by the fluid handling systems in accordance with the requirements in the accepted Bass Strait Environment Plan (AUGO-EV-EMM-002) (Esso Australia Resources Pty Ltd, 2021).

Any remaining NAF from the drilling campaign will be returned to shore for future reuse or disposal. Remaining WBM at the conclusion of the surface hole intervals will be discharged. See table Table 6-60 for estimated volumes.

2.5.3.4 Overview of compliance with Section 572

In accordance with Section 572 (3) of the OPGGS Act, Esso commits to remove from the relevant title areas structures and all equipment and other property that is neither used nor to be used in connection with the operations, in accordance with Esso's approach to decommissioning as described in the in the Bass Strait EP (AUGO-EV-EMM-02).

As this program is based at the platform, there is no identified equipment associated with Turrum Phase 3 production drilling activities that requires storage on the seafloor.

In the unlikely event of a dropped object that cannot be immediately retrieved, it will be added to the subsea materials register to be tracked and managed in accordance with the ongoing property removal process outlined in the Bass Strait Operations EP Volume 2 Section 2.4.4.3 (AUGO-EV-EMM-002).

2.6 Drilling support operations

2.6.1 Jack-up rig specifications

A JUR will be used for the proposed campaign. The JUR *Valaris 107* specifications are provided Table 2-4.

As the JUR does not have any propulsion capability, it will be towed onto location by up to three support vessels.. After the legs are lowered to the seafloor the hull can be elevated above the surface of the sea.

At the completion of Turrum Phase 3 production drilling activities, the JUR will lower itself, retract the legs and be towed away.

Table 2-4 JUR technical specifications

Rig name	*Valaris 107*
Owner	Valaris

Design	Keppel Fels Mod V Enhanced B Class, non-propelled, self-elevating (jack up)	
Built	Singapore	
Class	ABS A1 Self Elevating Drilling Unit	
Registry	Monrovia, Republic of Liberia	
Principal dimensions	Lightship, elevated	8102MT
	Lightship, afloat	11,889MT
	Length between perpendiculars	71.3m
	Length including helideck	95.7m
	Width, overall	68.8m
	Height, overall	7.78m
	Maximum operating water depth	122m
	Maximum drilling depth	9,144m
Draft and displacement	Load line displacement (spud cans flooded)	14,657MT
	Load line displacement (spud cans buoyant)	15,994MT
	Load line draft	4.88m
Accommodation	112 persons on board	
Fluid capacities	Preload (seawater)	10,536m^3
	Diesel fuel	538m^3
	Lubrication oil	3.5m^3
	Drill water	3,194m^3
	Brine	325m^3
	Liquid mud	619m^3
	Potable water	326m^3
	Base oil	162m^3
	Bulk cement	151m^3
	Bulk barite/bentonite	171m^3
	Bilge	537m^3

	Waste oil	$19.5m^3$
Well control equipment	Annular preventer	1x 18-3/4", 5ksi
	Ram preventers	2 x 18-3/4", 10ksi double cavity 1 x 18-3/4", 10ksi single cavity
	Diverter	1.193m pass through; fixed

2.6.2 Support vessels

The JUR will be serviced by the existing Esso chartered vessels which may include supply vessels, multipurpose support vessels and potentially other vessel types. These will primarily operate out of Barry Beach Marine Terminal (BBMT) for routine supply operations although other ports in the region, such as Eden, Bell Bay, Burnie, Melbourne, Geelong, Hastings, or others may be used.

Support will also include anchor handling tow and support (AHTS) vessels, towing vessels, platform supply vessels or multi-purpose support vessels. These will primarily operate out of BBMT for routine supply operations although other ports may be used in the region. Support vessels will primarily operate on dynamic positioning (DP) when loading and unloading activities alongside the JUR, with their anchors secured. Vessels will not use their anchors when supporting operations at the worksite. There is the potential that use of anchors may be required during manouevering and positioning. This may involve pre lay or tandem pre-lay anchors to support the safe positioning of the JUR for this activity given the close proximity to the platform. Vessels engaged in towing do not utilise DP in routine tow operations.

All vessels supporting the Turrum Phase 3 Drilling activities will be specified and operated in accordance with International and Australian regulatory requirements. All vessels will be subject to ExxonMobil's Marine Quality Assurance Best Practice and will be certified following international maritime legislative requirements by a Classification Society registered with International Association of Classification Societies (IACS) or by AMSA.

Vessel support activities could include:

- positioning the JUR on location
- supplying provisions including food, bulk chemicals, and diesel fuels, and other cargo to the JUR and removal of waste to shore
- deployment of ROVs or other subsea equipment, including pre-laid anchor mooring systems
- surveys and other subsea activities including but not limited to crane operations and subsea deployment and recovery of equipment from the seabed
- transferring personnel
- standby duties (if required)
- monitoring and maintaining the 500m PSZ or any additional safety zones (if required)
- marine fauna observations via watchkeeper
- emergency response and rescue.

2.6.3 Helicopter support

Helicopter support will be provided from Esso's Longford heliport or alternate, to support the activities as follows:

- personnel transfers between shore and the rig for crew changes
- optional freight helicopter support, when required
- emergency response, including medivac, evacuation, and search and rescue.

Non-emergency helicopter operations will be limited to daylight hours and will usually entail one return flight each weekday but can occur on weekends if required.

Helicopter operations are performed in accordance with CASA regulations. Helicopter type, suitability, and performance criteria are contractually controlled, aligned with ExxonMobil Aviation Services Aviation Operations Guide minimum requirements, as are minimum flight and engineering crew qualifications and experience levels.

2.6.4 Remotely operated vehicles

During Turrum Phase 3 activities a ROV (work class or observation class) may be deployed from either (or both) the JUR and support vessel and can be fitted with various tools and sensors that can assist with subsea operational requirements, including camera systems which can be used to capture imagery of the environment and operations. ROV's may also be used for inspection, monitoring, seabed clearance surveys, recovery of minor debris, spud can monitoring, to assess the risk of scour and other tasks required to support operations within the capability of the ROV.

2.6.5 Conductor driving

Conductor driving activities will only be required if they have not been completed under the previously accepted JUR P&A EP (AUGO-PO-EMP-069)

The activity will include the installation of 20" (508mm) and 26" (660mm) well conductors at the Marlin B platform. It is estimated up to six conductors will be installed. The conductors will be installed using a hydraulic pile driving hammer. Modelling commissioned by Esso for the conductor driving (see Section 6.4.4.2) indicates the following broadband SEL levels at each of the modelled pile penetration depths at a horizontal range of 10m:

- at 15.3m penetration depth – 165.5dB re 1μPa^{2}s
- at 40.0m penetration depth – 165.0dB re 1μPa^{2}s
- at 64.7m penetration depth – 167.1dB re 1μPa^{2}s.

The modelling results and impact assessment are provided in Section 6.4.4.

The conductors will be installed using a hydraulic pile driving hammer using the JUR to hold the hammer in place.

3 Description of the environment

In order to set the environmental context required to assess impacts and risks associated with the petroleum activities described in this EP, the two areas have been identified as:

- Operational Area (OA) – Where the petroleum activities will take place. The existing 500m PSZ area around the MLC where the production drilling activities will take place see Figure 2-1.
- Environment That May Be Affected (EMBA) – Determined by oil spill modelling and is the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, as a result of a worst case spill from the activities. The description of the EMBA is provided in Appendix A.

3.1 Environment that May Be Affected

Oil spill modelling is used to determine the total area that could be exposed to hydrocarbons, including trace concentrations of oil in the water column, as a result of any spill. This is known as the EMBA and is used for planning purposes to ensure that all social and environmental sensitivities are acknowledged, described, and considered in the development of the EP.

Using the results of the oil spill modelling report (RPS, 2024), the boundary of the EMBA is defined as:

> *The combined extent of hydrocarbon exposure to the sea surface (≥1g/m^2), accumulated on shorelines (≥10g/m^2), entrained in the water column (≥10ppb) and dissolved in the water column (≥10ppb) as a result of an approximate 270,300m^3 Loss of well control (LOWC) from the Marlin B platform, tracked for 98 days using annualised metocean conditions.*

The EMBA is shown in Appendix A. Further information on the hydrocarbon thresholds, or exposure levels used to define the EMBA are shown in Table 3-1.

Table 3-1 Thresholds used to define the EMBA (NOPSEMA, 2019)

Exposure level	Threshold	Description
Surface – Low exposure	1g/m^2	Approximates the range of socioeconomic effects and establishes the planning area for scientific monitoring.
Shoreline – Low exposure	10g/m^2	Predicts potential for some socioeconomic impact.
In-water (dissolved) – Low exposure	10ppb (instantaneous)	Establishes the planning area which may be considered for scientific monitoring based on the potential for exceedance of water quality triggers.
In-water (entrained) – Low exposure	10ppb (instantaneous)	Establishes the planning area which may be considered for scientific monitoring based on the potential for exceedance of water quality triggers.

3.2 Values and sensitivities

The values, sensitivities and receptors found within the OA are described in Table 3-2.

The values, sensitivities and receptors found within the EMBA are described in Appendix A.

EPBC Act listed species identified for the OA and EMBA are provided in Appendix B.

EPBC Act PMST Reports for the OA and EMBA are presented in Appendix C and Appendix D respectively.

Table 3-2 Values and sensitivities within the OA

Value/sensitivity	Receptor	Description
Protected matter		
World Heritage	-	World Heritage-listed Properties are examples of sites that represent the best examples of the world's cultural and heritage values, of which Australia has 20 properties (DCCEEW, 2023a). In Australia, these properties are protected under Chapter 5, Part 15 of the EPBC Act. There are no World Heritage Properties within or adjacent to the OA. The closest World Heritage Property is the Royal Exhibition Building and Carlton Gardens (onshore), which is located approximately 288km northwest of the OA. World Heritage-listed places intersected by the EMBA are described in Section 1.1.1 of Appendix A.
National Heritage	-	The National Heritage list is Australia's list of natural, historic, and Indigenous places of outstanding significance to the nation (DCCEEW, 2023b). These places are protected under Chapter 5, Part 15 of the EPBC Act. There are no National Heritage-listed places within or adjacent to the OA. The closest National Heritage Place is the Australian Alps National Parks and Reserves (onshore), which is located approximately 76km north the OA. National Heritage-listed places intersected by the EMBA are described in Section 1.1.2 of Appendix A.
Wetlands of International Importance (Ramsar wetlands)	-	Australia has 67 Ramsar wetlands that cover more than 8.3Mha (DCCEEW, 2023c). Ramsar wetlands are those that are representative, rare, or unique wetlands, or are important for conserving biological diversity, and are included on the List of Wetlands of International Importance developed under the Ramsar Convention. These wetlands are protected under Chapter 5, Part 15 of the EPBC Act. There are no Ramsar wetlands within or adjacent to the OA. The closest Ramsar wetland is the Gippsland Lakes, which is located approximately 42km northwest of the OA. Ramsar wetlands intersected by the EMBA are described in Section 1.1.4 of Appendix A.
Nationally Important Wetlands (NIWs)	-	NIWs are considered significant for a variety of reasons, including their importance for maintaining ecological and hydrological roles in wetland systems, providing important habitat for animals at a vulnerable or particular stage in their life cycle, supporting 1% or more of the national population of any native plant or animal taxa or for its outstanding historical or cultural significance (DCCEEW, 2023d). There are no NIWs within or adjacent to the OA. The closest NIW is Lake Bunga which is located approximately 43km north of the OA. The NIWs intersected by the EMBA are described in Section 1.1.5 of Appendix A.

Value/sensitivity	Receptor	Description	
Listed threatened species and Listed migratory species (Listed in Appendix B, described in Appendix A)	Fauna	Threatened species (Appendix C)	
		Total threatened species Critically endangered Endangered Vulnerable Conservation dependent	43 2 10 25 6
		Listed migratory species	
		Fish – Bony (Appendix B, Table B-1) Fish – Cartilaginous (Appendix B, Table B-2)	- 5
		Birds (Appendix B, Table B-3)	24
		Mammals – Cetaceans - (Appendix B, Table B-4) Mammals – Pinnipeds (Appendix B, Table B-5) Mammals – Sirenia (Appendix B, Table B-6) Mammals – Reptiles (turtles) (Appendix B, Table B-7)	10 - - 3
Biologically Important Areas (BIAs)	Marine fauna	BIAs are areas where a protected species display biologically important behaviours such as breeding, foraging, resting and migration. These areas serve to highlight parts of a marine region that are particularly important for the conservation of protected species (DCCEEW, 2023e). The two shark BIAs do not directly overlap the BIA, but it is acknowledged that the migratory patterns may intersect the OA. The following nine BIAs are within the OA. The BIAs within the EMBA are outlined in Appendix A.	
		Species	BIA type
		Birds (Appendix B, Table B-3)	

Value/sensitivity	Receptor	Description	
		Black-browed albatross (Figure 3-1)	Foraging
		Buller's albatross (Figure 3-1)	Foraging
		Campbell albatross (Figure 3-1)	Foraging
		Indian yellow-nosed albatross (Figure 3-1)	Foraging
		Shy albatross (Figure 3-2)	Foraging
		Wandering albatross (Figure 3-2)	Foraging
		Common diving-petrel (Figure 3-2)	Foraging
		Whales (Appendix B Table B-4)	
		Pygmy blue whale (PBW) (Figure 3-3)	Foraging
		Southern right whale (SRW) (Figure 3-4)	Migration
		Great white shark	-
		Grey nurse shark	-
Listed Threatened Ecological Communities (TECs)	-	An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. TECs are a MNES under the EPBC Act. TECs provide wildlife corridors and/or habitat refuges for many plant and animal species, and listing a TEC provides a form of landscape or systems-level conservation (including threatened species) (DCCEEW, 2023f). There are no TECs within or adjacent to the OA. The closest TEC is the Subtropical and Temperate Coastal Saltmarsh, which has a patchy distribution along the coastline adjacent to the OA. The TECs intersected by the EMBA are described in Section 1.1.6 of Appendix A.	

Value/sensitivity	Receptor	Description
Australian Marine Parks (AMPs)	-	AMPs are areas established help conserve marine life. AMPs have natural, cultural, heritage and socio-economic values. The natural values of marine parks refer to the habitats, species and ecological communities within them, and the processes that support their connectivity, productivity, and function (Australian Marine Parks Science Atlas, 2023). There are no AMPs within or adjacent to the OA. The closest AMP is Beagle AMP which is located approximately 136km southwest of the OA. AMPs intersected by the EMBA are described in Section 1.1.7 of Appendix A.
Key Ecological Features (KEFs)	Upwelling East of Eden (Figure 3-5)	KEFs are components of te marine ecosystem that are considered to be important for biodiversity or ecosystem function and integrity of a Commonwealth marine area (DCCEEW, 2023e). The Upwelling East of Eden is present along the eastern Victorian and southern NSW coast. Dynamic swirls of the East Australian Current (EAC) cause episodic productivity events when they interact with the continental shelf and headlands. The episodic mixing and nutrient enrichment events drive phytoplankton blooms that are the basis of productive food chains including zooplankton, copepods, krill, and small pelagic fish. Therefore, the key value of the KEF is its high productivity and aggregations of marine life (Commonwealth of Australia, 2015). The upwelling contributes to regionally high primary productivity which supports 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, that are known to arrive when significant krill aggregations form. The area is also important for seals, other cetaceans, sharks, and seabirds (Commonwealth of Australia, 2015). The KEFs intersected by the EMBA are described in Section 1.1.8 of Appendix A.
Other protected areas		
Social/cultural/ conservation	National parks and reserves	There are no national parks or reserves within the OA. The closest protected area is Beware Reef which is located approximately 66km north east of the OA. National parks and reserves intersected by the EMBA are listed in Section 1.1.9 of Appendix A.
Commonwealth Heritage Listed places	Heritage listed places	Commonwealth Heritage Listed places are Indigenous, historic, and natural heritage places owned or controlled by the Australian Government. These include places connected to defence, maritime safety, communications, customs, and other government activities that also reflect Australia's development as a nation (DCCEEW, 2023g). There are no Commonwealth Heritage listed places within the OA. Commonwealth Heritage-listed places intersected by the EMBA are described in Section 1.1.3 of Appendix A.

Value/sensitivity	Receptor	Description
Historic maritime	Historic shipwrecks (Figure 3-6)	Historic shipwrecks are located all along the Australian coastline with numerous shipwrecks located within the Gippsland region. There are no shipwrecks within the OA: The closest shipwrecks to the OA are: • *Levan Lass* (1854) • *Favourite* (1852) • *Talark* (n.a) No shipwreck protection zones are within the OAs. The closest protection zone is the SS *Glenelg*, which is approximately 100km west southwest of the OA.
Environmental values – Other		
Physical environment	Climate and meteorology	Climate statistics from 1991 - 2020 at Lakes Entrance (Victoria) (the closest town to the OA) has average monthly minimum temperatures ranging from 6.9°C – 15.2°C and average monthly maximum temperatures ranging from 14.6°C - 23.5°C with January hosting the hottest temperatures and July the coolest. Mean rainfall ranges from 40.4mm in August (lowest) to 71.2mm in November (highest) (BoM, 2024). Wind speeds for Lakes Entrance between 1991-2020 range from 11 - 15.1km/hour in the morning and 13.3 – 19.9km/hour in the afternoon. Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Occasionally, intense meso-scale low-pressure systems occur in the region, bringing very strong winds, heavy rain and high seas. These events are unpredictable in occurrence, intensity and behaviour, but are most common between September and February (McInnes & Hubbert, 2003)
	Oceanography	Wind driven currents in Gippsland Basin can be caused by the direct influence of weather systems passing over Bass Strait (wind and pressure driven currents) and the indirect effects of weather systems passing over the Great Australian Bight (GAB) (GEMS, 2005). The eastern parts of the region are strongly influenced by the EAC that flows southward adjacent to the east coast of NSW, Victoria, and Tasmania, carrying warm equatorial waters and forming eddies which in turn cause upwellings. At the shelf break east of Bass Strait, nutrient-rich waters rise to the surface in winter as part of the processes of the Bass Strait Water Cascade creating an area of high productivity.

Value/sensitivity	Receptor	Description
		Further offshore currents are driven by the Sub-Antarctic Water movement, coming from the south, and the Bass Strait Water movement from the west (Tomczak M. , 1985) Rochford, 1975; in (Gibbs, Arnott, Longmore, & Marchant, 1991).
	Bathymetry (Figure 3-7)	The OA is located in water depth of 59m in the Gippsland Basin. The bathymetry contours generally run parallel to the coast, though this pattern is less pronounced in waters deeper than 50m.
	Benthic habitat	The Gippsland Basin is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock, and consolidated sediment. The sandy plains are only occasionally broken by low ribbons of reef; however, these reefs do not support the large brown seaweeds characteristic of many Victorian reefs, but instead are inhabited by resilient red seaweeds and encrusting animals that can survive the sandy environment (Esso, 2009). Benthic fauna present on the soft sediment can be broadly divided into two groupings (Parry, Campbell, & Hobday, 1990): Epibenthos which includes sessile species such as sponges and bryozoans, hydroids, ascidians, poriferans and mobile fauna including hermit crabs, sea stars and octopus. Infauna which includes a diverse range of species such as amphipods, shrimps, bivalves, tubeworms, small crustaceans, nematodes, nemerteans, seapens, polychaetes and molluscs.
Economic environment	Commercial fishing (See Section 1.6 of Appendix A for a description of fisheries)	Commonwealth fisheries overlapped by the OA: • Bass Strait Central Zone Scallop Fishery (BSCZSF)- 0.0007% overlap with the OA (see Figure 3-8) • Eastern Tuna and Billfish Fishery (ETBF) – 0.00003% overlap with the OA (see Figure 3-9) • Small Pelagic Fishery (SPF) – 0.00004% overlap with the OA (see Figure 3-10) • Southern and Eastern Scalefish and Shark Fishery (SESSF) - 0.00004% overlap with the OA (see Figure 3-11) Section 1.6.2 of Appendix A details the sub sectors of the fishery that have jurisdiction to fish in the OA and EMBA • Southern Bluefin Tuna Fishery (SBTF) – 0.00002% overlap with the OA (see Figure 3-12) • Southern Squid Jig Fishery (SSJF) - 0.00005% overlap with the OA (see Figure 3-13) State Fisheries – Victoria overlapped by the OA: • Abalone Fishery - 0.001% overlap with the OA (see Figure 3-14) • Eel Fishery – Data unavailable for this fishery • Giant Crab Fishery – 0.001% overlap with the OA (see Figure 3-15) • Rock Lobster Fishery – 0.001% overlap with the OA (see Figure 3-15) • Pipi Fishery – 0.001% overlap with the OA (see Figure 3-16)

Value/sensitivity	Receptor	Description
		• Wrasse Fishery - 0.0007% overlap with the OA (see Figure 3-17) • Sea Urchin Fishery – 0.001% overlap with the OA (see Figure 3-18) • Scallop Fishery – no overlap with the OA (see Figure 3-19) • Octopus Fishery – 0.001% overlap with the OA (see Figure 3-20) • Ocean (general) – 0.0005% overlap with the OA • Trawl (inshore) – 0.0005% overlap with the OA. Note - As the OA is an existing PSZ, the OA is already excluded from fishing activities.
	Oil and gas	Other than the Esso permit areas in the Gippsland Basin there are 11 other permit areas held by other operators: • Cooper Energy (VIC/L21, VIC/L32, VIC/RL13, VIC/L14, VIC/L15, VIC/P72) • SGH Energy (VIC/L29) • Carnarvon Hibiscus (VIC/L31, VIC/P57) • Emperor Energy/Shell Energy (VIC/P47) • Lanberis Energy (VIC/P71).
	Shipping	The southeast coast of Australia has high shipping activity. This traffic includes international and coastal cargo trade, and passenger and ferry services (Figure 3-21).
	Defence	The Australian Defence Force conducts a range of training, research activities, and preparatory operations in Australian waters. These activities may include transit of naval vessels, training exercises, shipbuilding and repairs, hydrographic survey, surveillance and enforcement, demolition, use of explosives, use of radar, sonar, sonobuoys, flares, sensors and other equipment, and search and rescue. There are no known defence activities within the OA.
	Tourism	In East Gippsland, primary tourist locations are the Gippsland Lakes (the largest inland waterway in Australia), Lakes Entrance, Marlo, Cape Conran, and Mallacoota. The area is renowned for its nature-based tourism (e.g. Croajingolong National Park), recreational fishing and water sports (lake and beaches). The South Coast region includes all the towns from Wollongong south to the Victorian border.
	Renewable energy	The OA is located 4.4km east of Australia's first offshore area declared available for renewable energy projects (OEI-01-2022 Part 1) See Figure 3-22. The closest site is the High Sea wind project located 102km southwest of the OA.

Value/sensitivity	Receptor	Description
Cultural	Native Title determinations and claims	A determination of Native Title is a decision on whether Native Title exists in relation to a particular area of land or waters. An approved determination of Native Title is a determination of Native Title made by the Federal Court of Australia, the High Court of Australia, or a recognised State/Territory body within its jurisdictional limits (Australian Government, 2023). Native Title claims are claimants whose applications (for a determination) have been accepted for registration. A claim application is made by a Native Title claim group that claims they hold Native Title rights and interests in an area of land and/or water, according to their traditional laws and customs (Australian Government, 2023); (NNTT, 2023). There are no Native Title determinations or claims within the OA. Native Title determinations or claims intersected by the EMBA are described in Section 1.5 of Appendix A.
	Sea Country	'Gunai/Kurnai' is the name of the Indigenous group who have inhabited the Gippsland region for at least 18,000 years (Ramahyuck, 2023). The Gunaikurnai Land and Waters Aboriginal Corporation (GLAWAC, 2023) describe their Country as: *The land, the rivers and the ocean, the people, and the stories, the past and the future. All of it is connected. All of it is important to us. Country heals us and connects us to our ancestors, our culture and our history.* Country can be broadly categorised (although interconnected) into Land and Sea Country. Sea Country, also known as Saltwater Country, is of particular importance for this activity, as the OA may exist within known areas of Sea Country. 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. The sea, like the land, is integral to the identity of Indigenous 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 & Isherwood, Protecting sea country: Indigenous people and marine protected areas in Australia. Big, Bold and Blue: , 2016). There has been recent momentum regarding Sea Country in Australia, which can be seen in the Australian Government's $11.6 million commitment to the Sea Country IPA Program. The program seeks to increase the area of sea in IPAs to strengthen the conservation and protection of Australia's marine and coastal environments, while creating employment and economic opportunities for Indigenous Australians (DCCEWW, 2023h). As part of the program, GLaWAC signed an agreement with the Federal Government to start the process of establishing a Sea Country IPA from Nanjet, east of Wilsons Promontory, to Mallacoota, on the Victorian/NSW border. The proposed area is located within the coastal waters of the Gippsland region, comprising of numerous marine and coastal parks and includes the Ramsar-listed Gippsland Lakes and Raymond Island, a highly significant cultural site (both sites are outside of the OA).

Value/sensitivity	Receptor	Description
Social environment	Recreational fishing, boating and leisure	Recreational fishing along the Gippsland coast typically targets snapper, King George whiting, flathead, bream, sharks, tuna, calamari, and Australian salmon. Recreational fishing and boating are largely confined to the Gippsland Lakes approximately 60km northwest of the OA and nearshore coastal waters. The Gippsland Lakes Fishing Club is a well-known active recreational fishing club within the region.

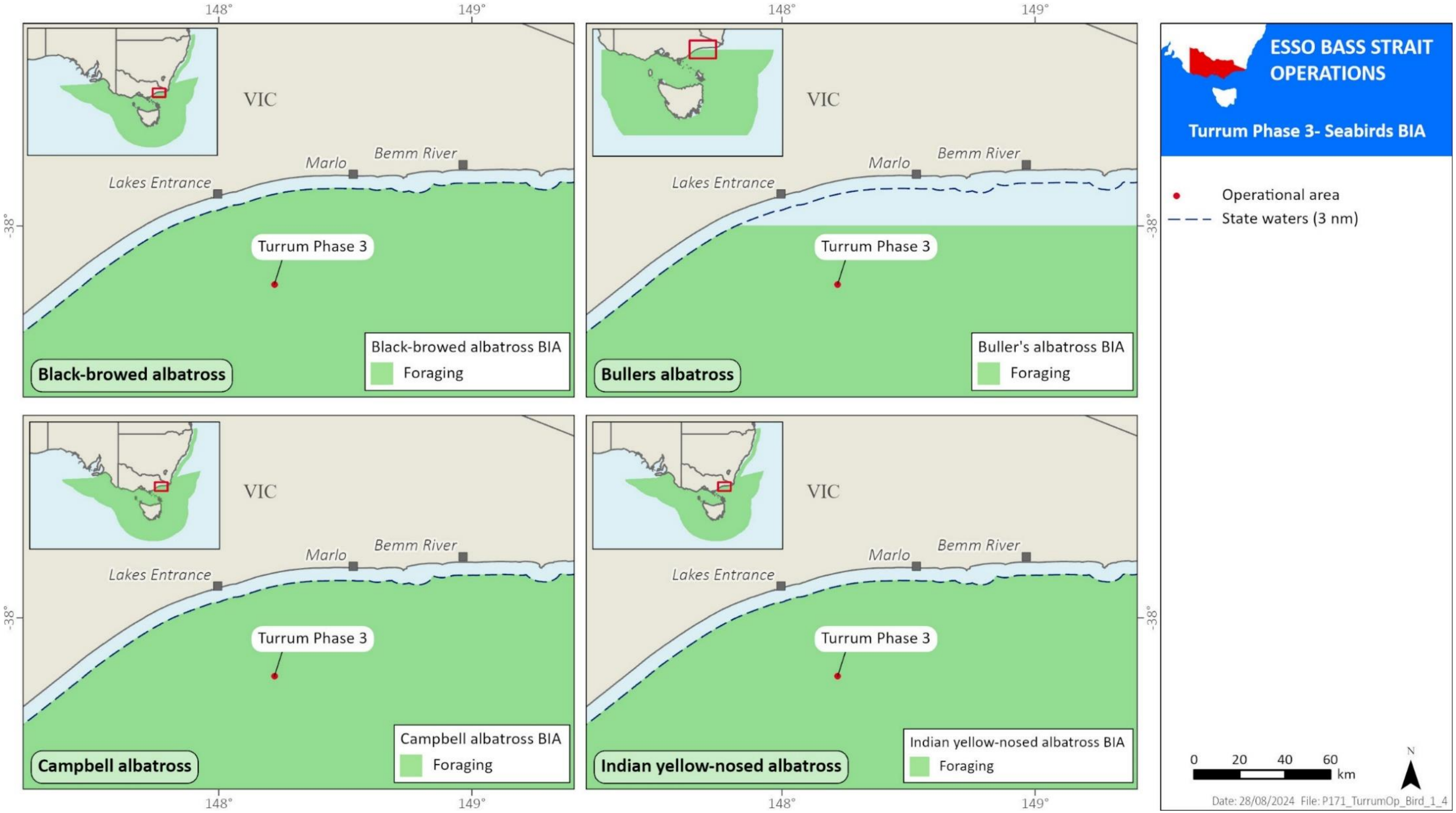

Figure 3-1 BIAs for the black-browed albatross, Buller's albatross, Campbell albatross and Indian yellow-nosed albatross overlapped with the OA

Figure 3-2 BIAs for the shy albatross, wandering albatross and common diving petrel overlapped with the OA

Figure 3-3 BIA for the PBW overlapped with the OA

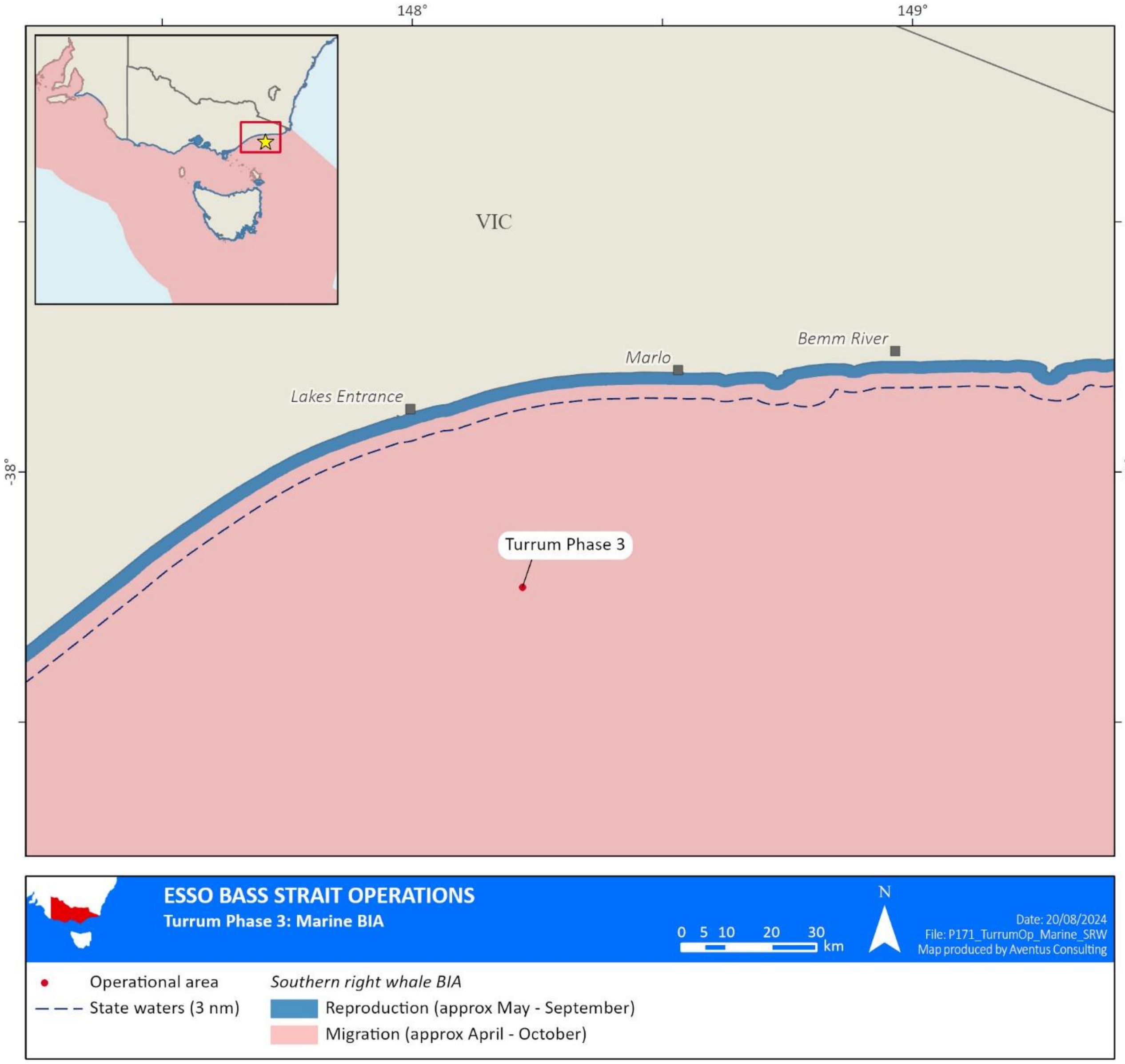

Figure 3-4 BIA for the SRW overlapped with the OA

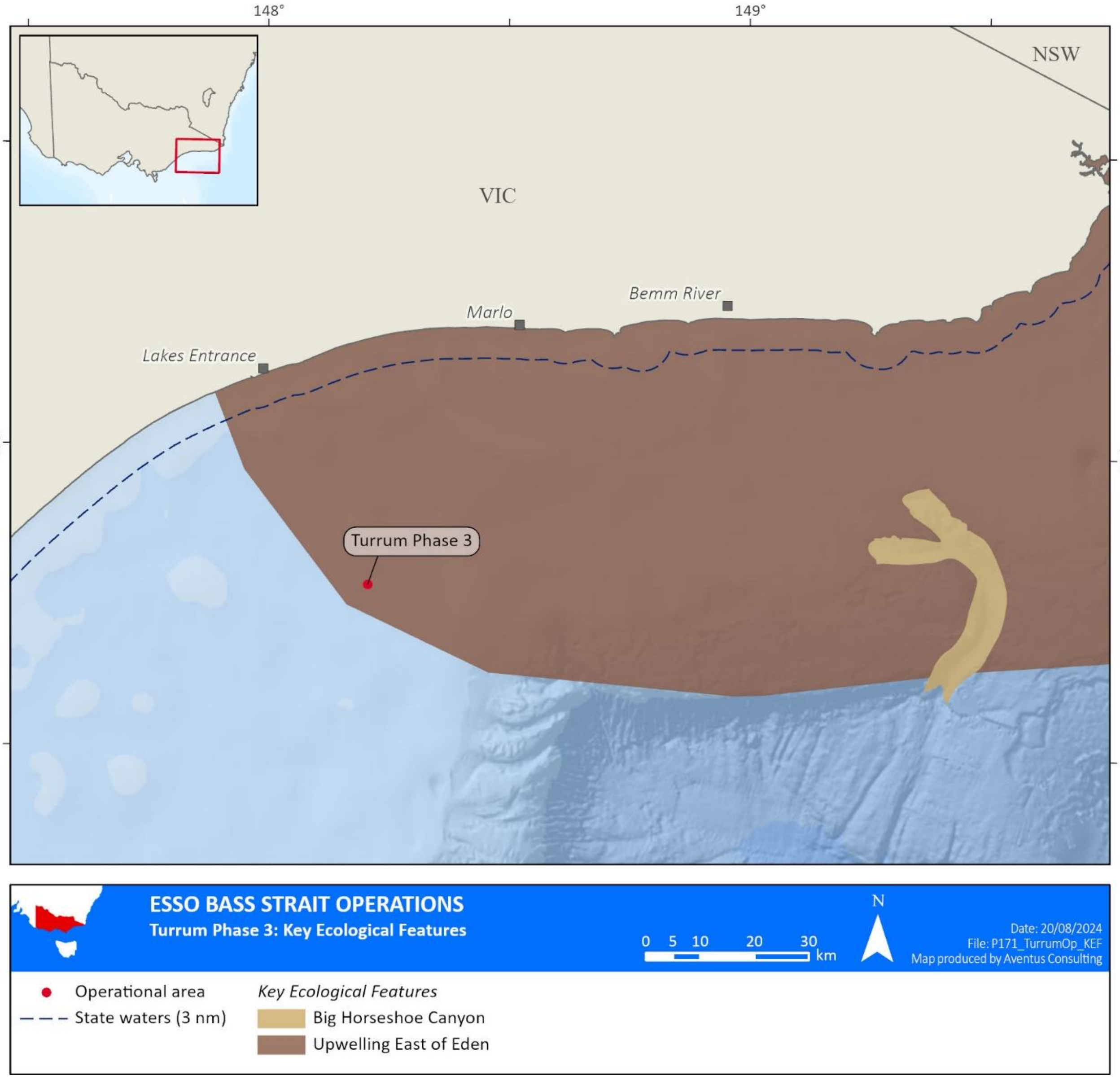

Figure 3-5 KEFs within the OA

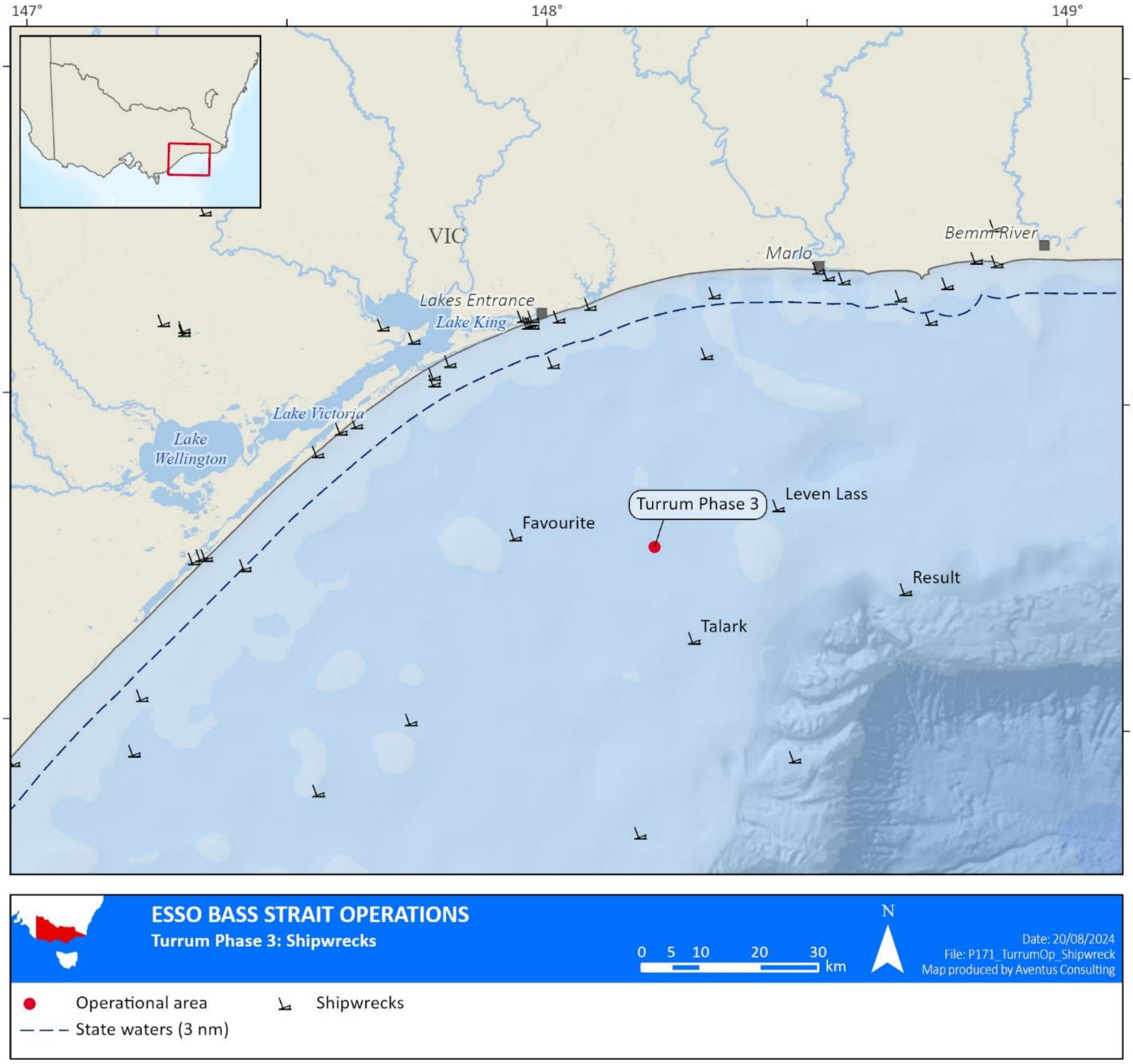

Figure 3-6 Shipwrecks within the OA

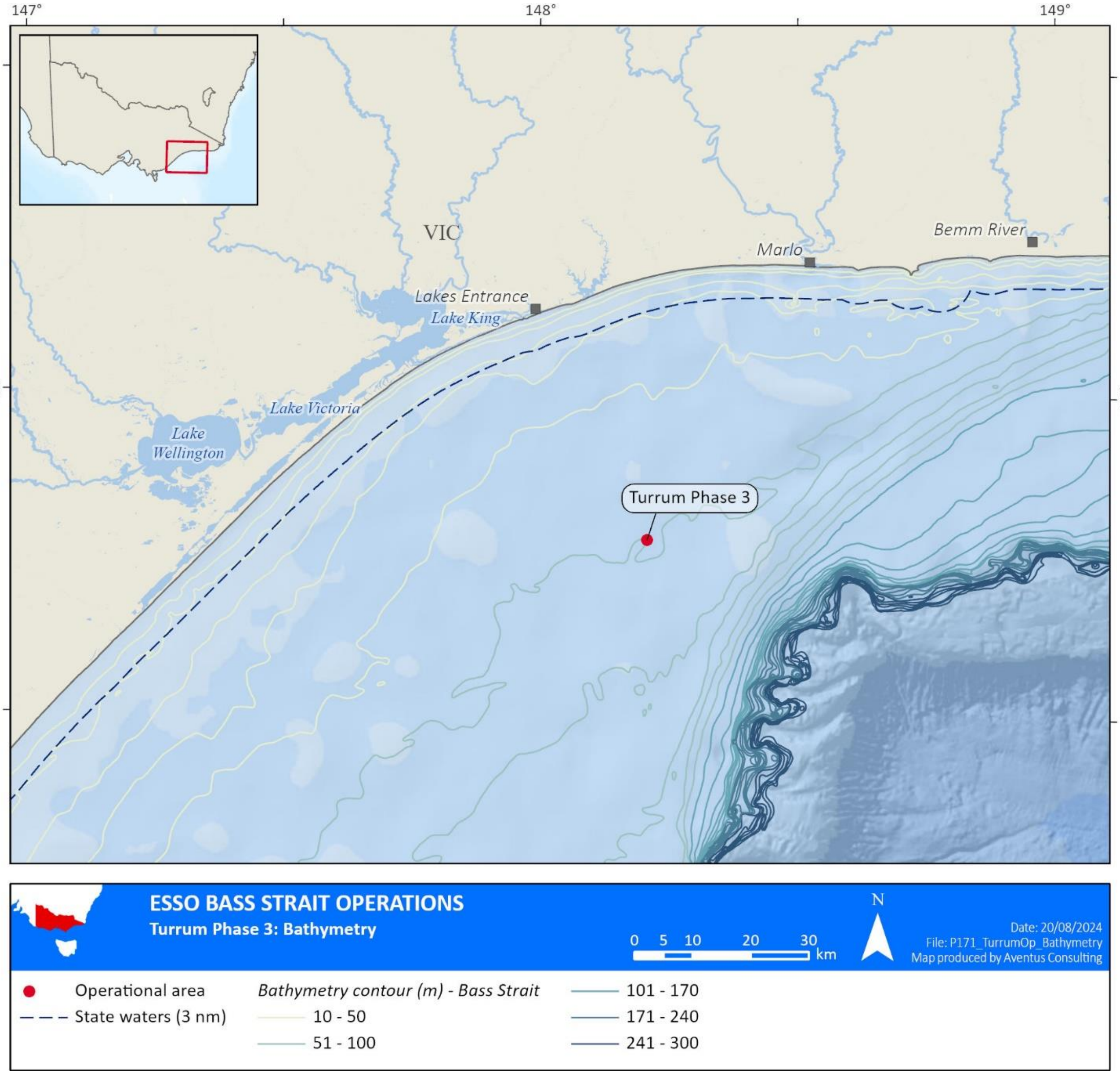

Figure 3-7 Bathymetry within the OA

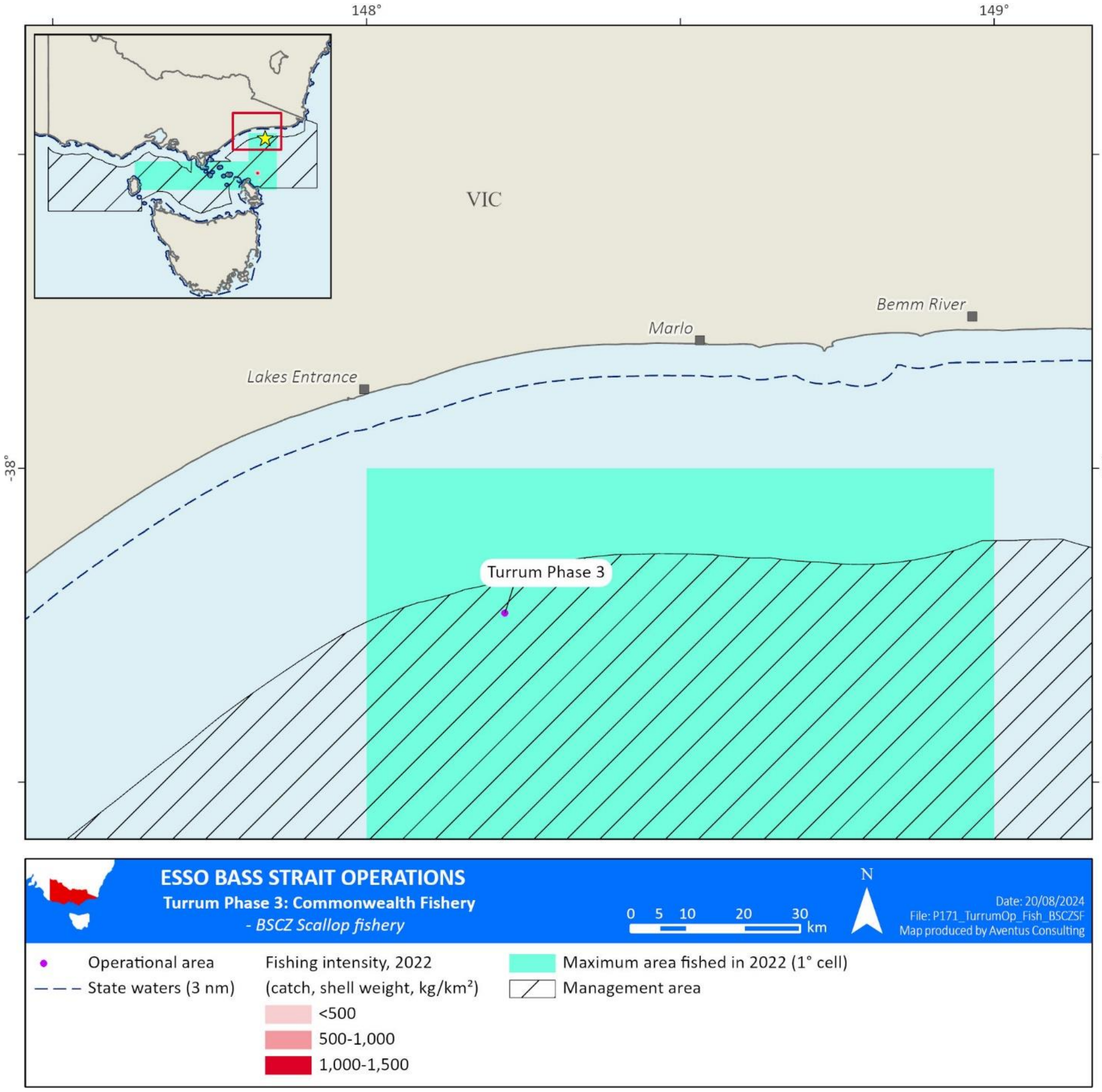

Figure 3-8 BSCZSF jurisdiction and 2020 fishing intensity overlapped by the OA

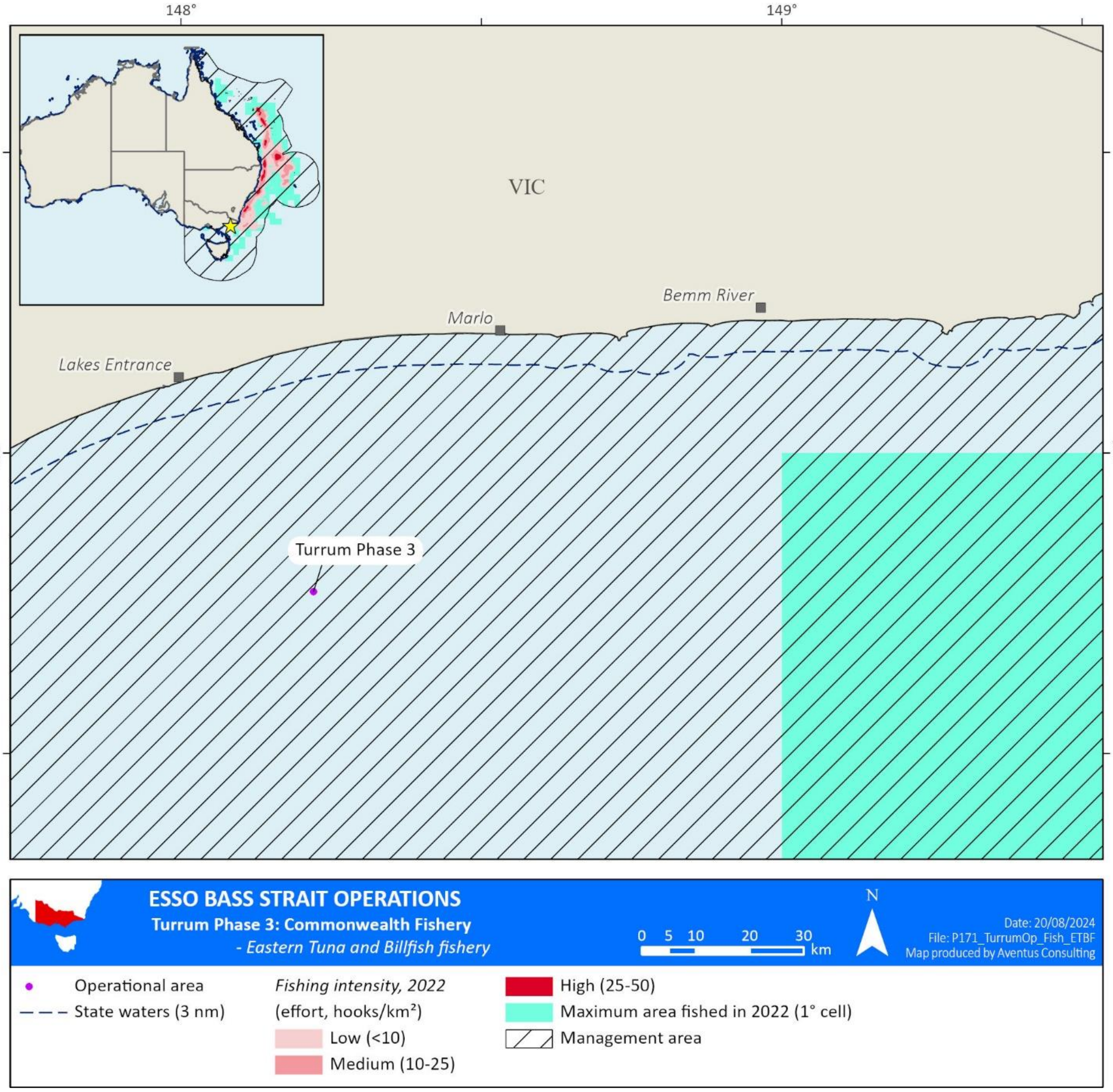

Figure 3-9 ETBF jurisdiction and 2020 fishing intensity overlapped by the OA

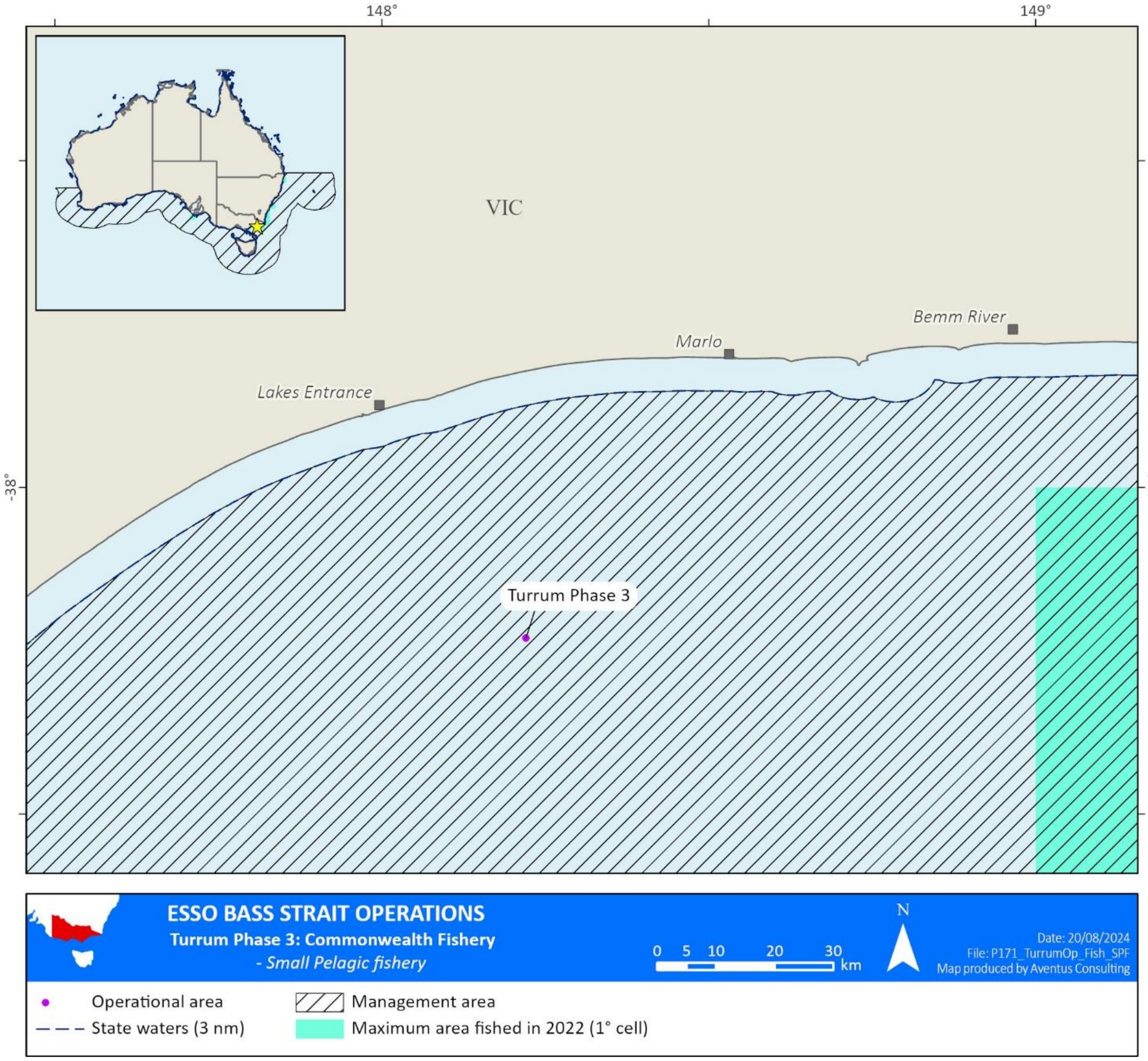

Figure 3-10 SPF jurisdiction and 2022 fishing intensity overlapped by the OA

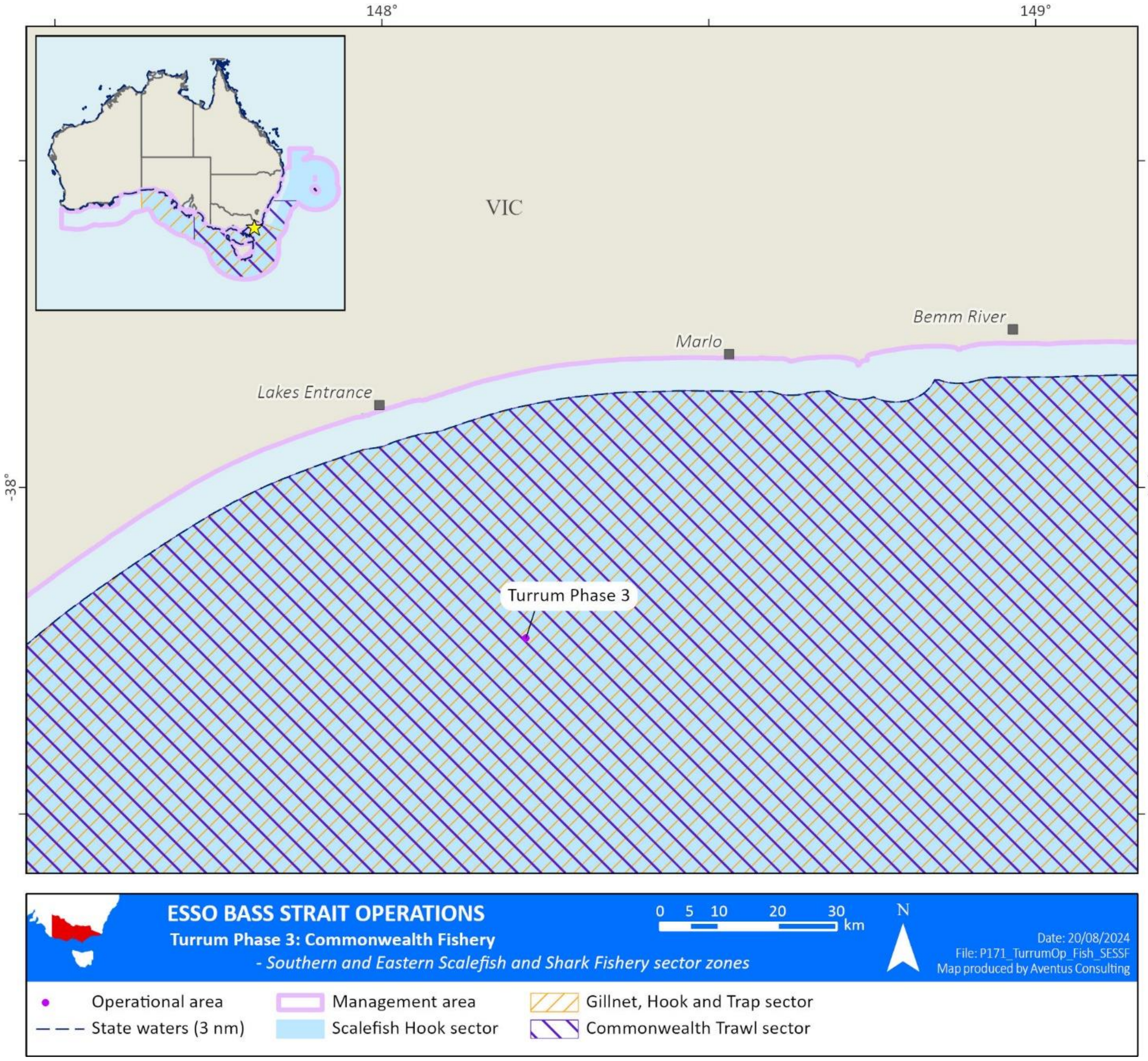

Figure 3-11 SESSF jurisdiction overlapped by the OA

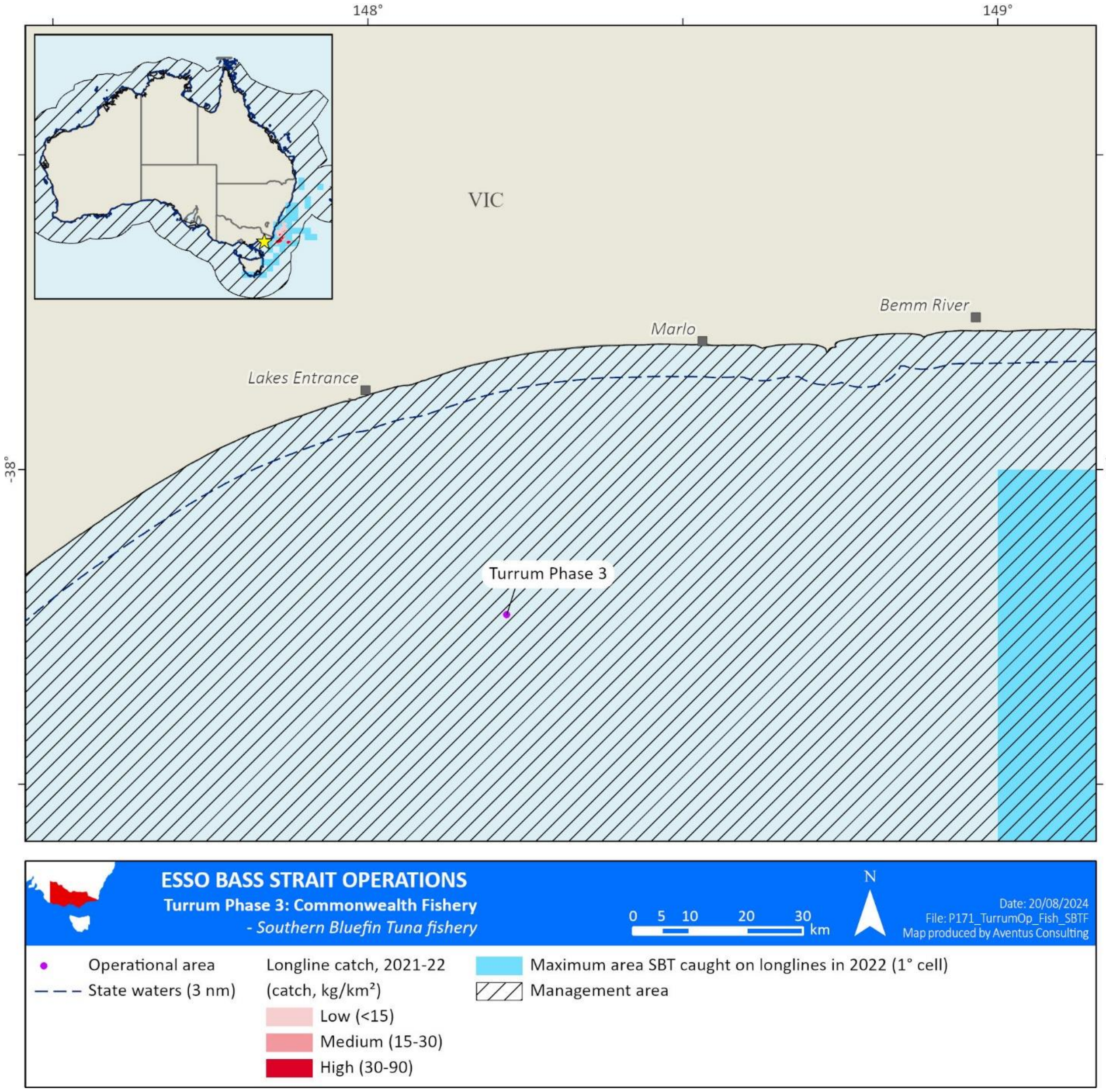

Figure 3-12 SBTF jurisdiction and 2020 fishing intensity overlapped by the OA

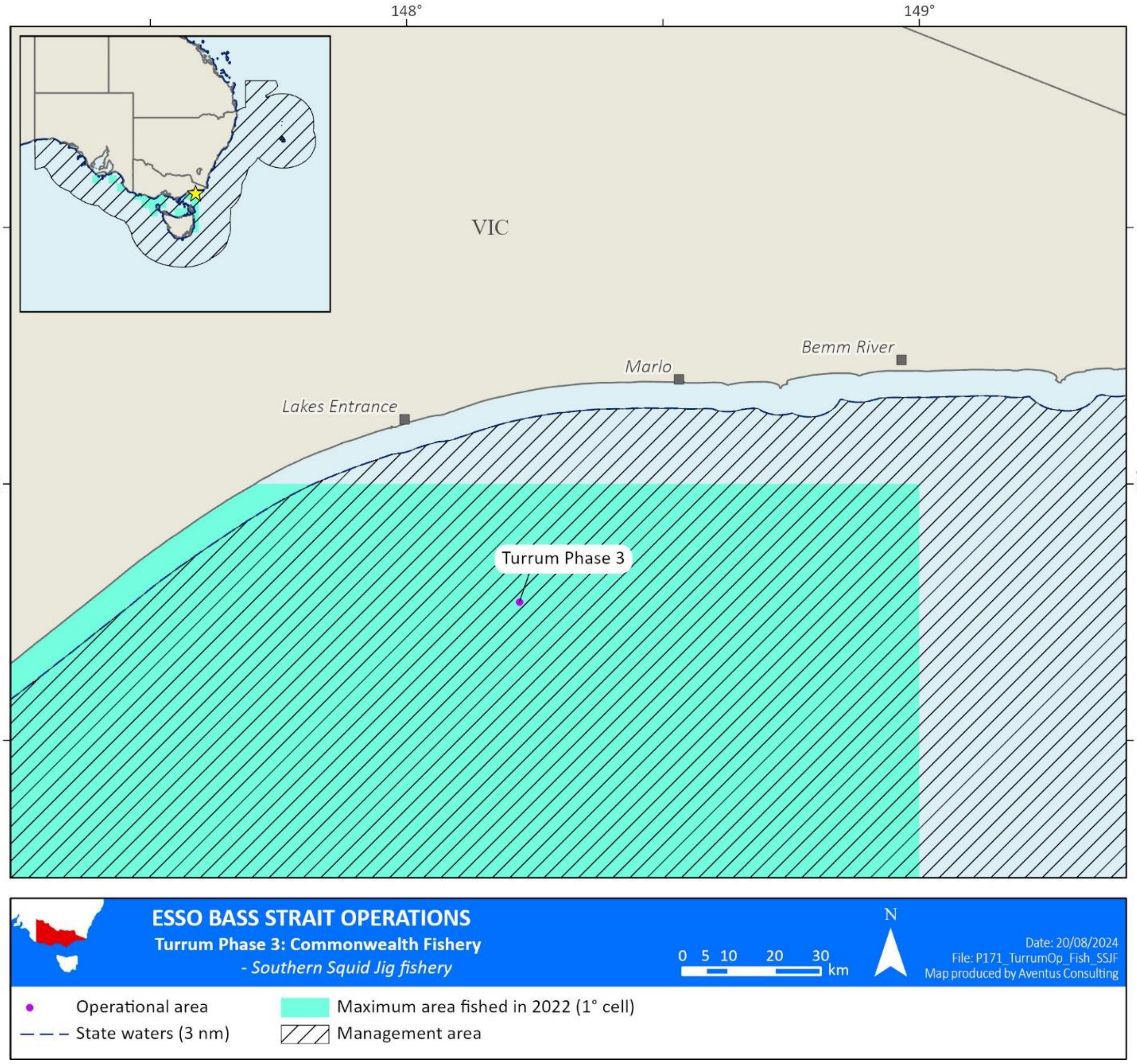

Figure 3-13 SSJF jurisdiction and 2020 fishing intensity overlapped by the OA

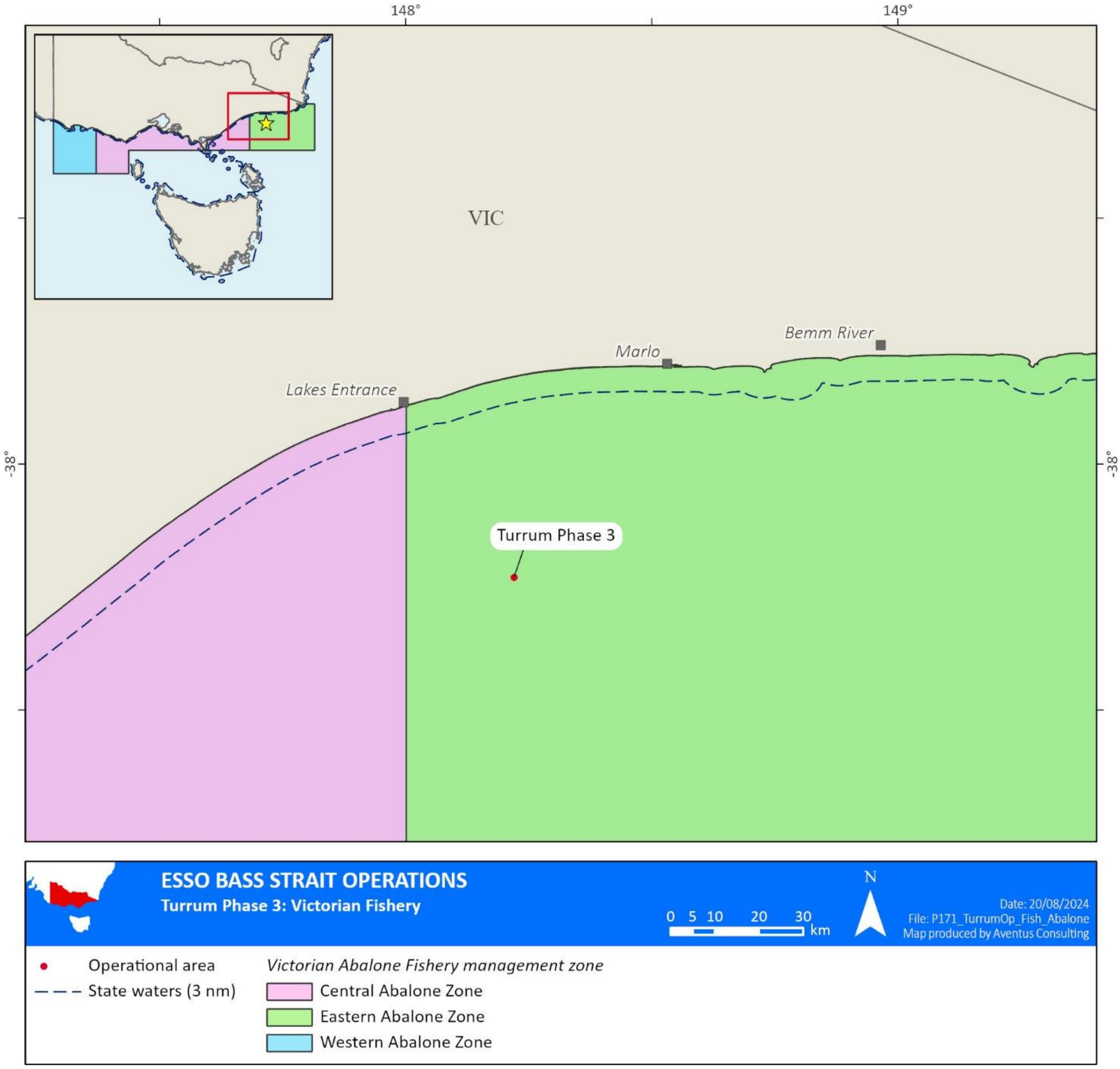

Figure 3-14 Victorian abalone fishery overlapped by the OA

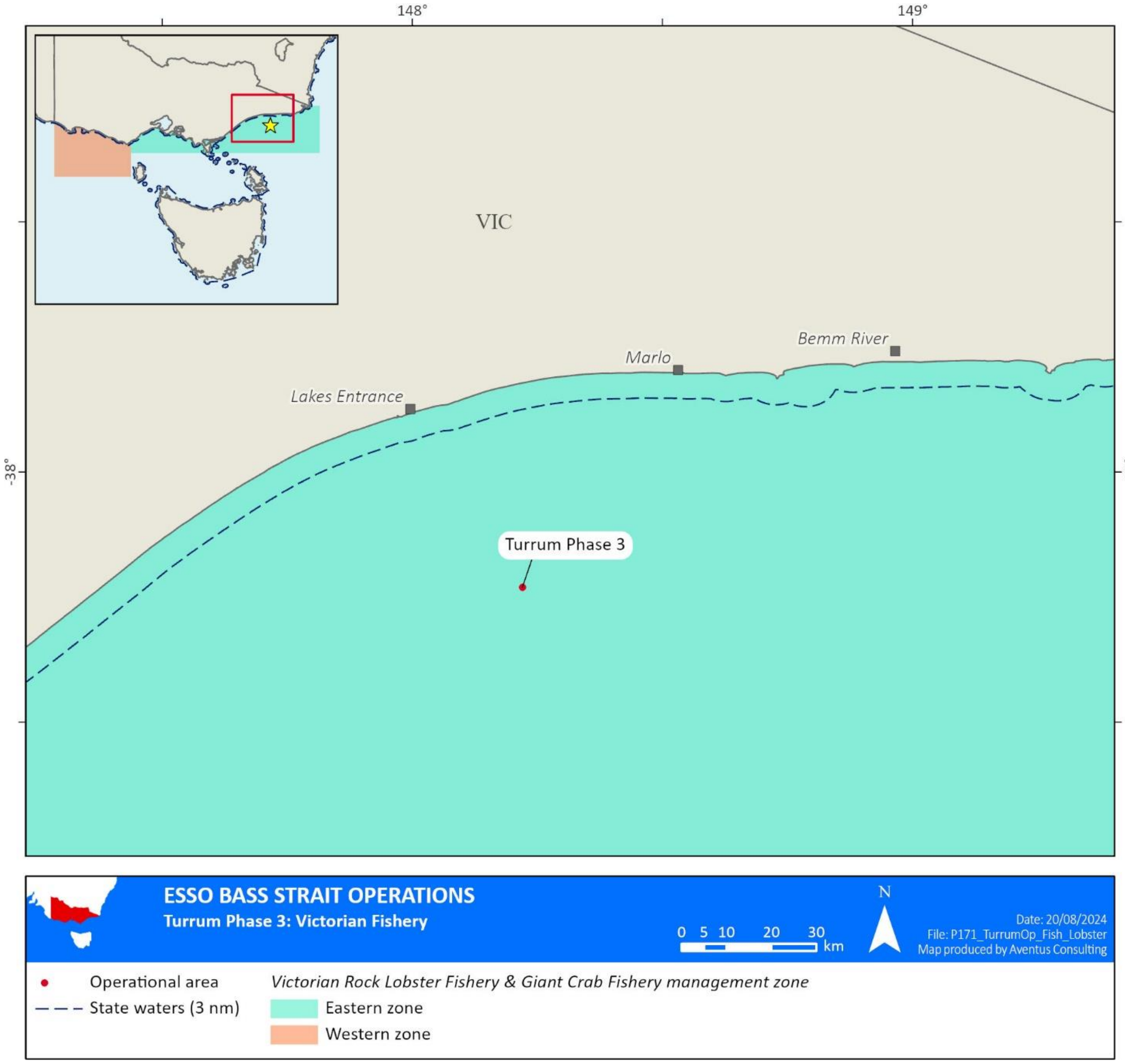

Figure 3-15 Victorian rock lobster and giant crab fishery overlapped by the OA

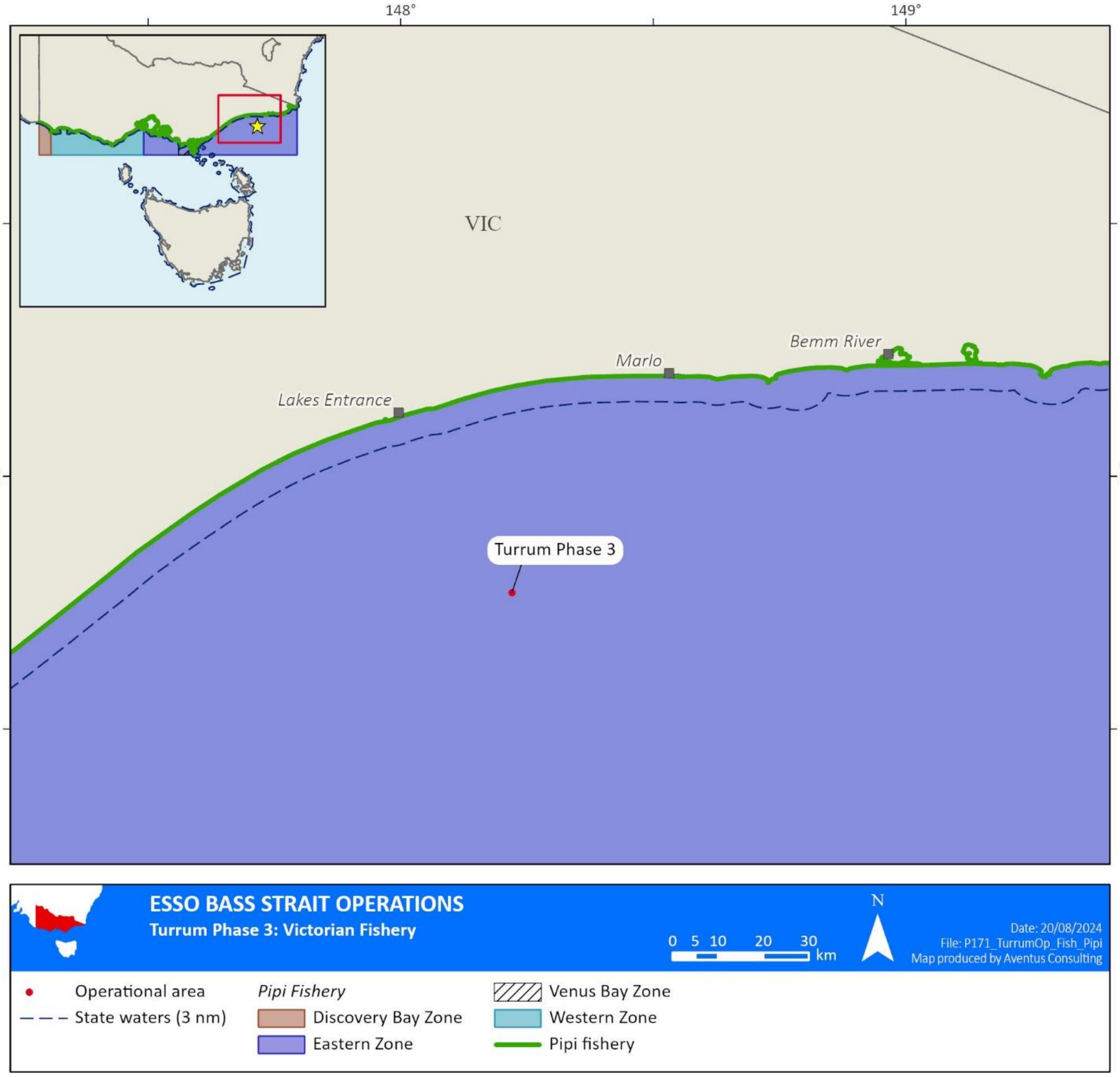

Figure 3-16 Victorian pipi fishery overlapped by the OA

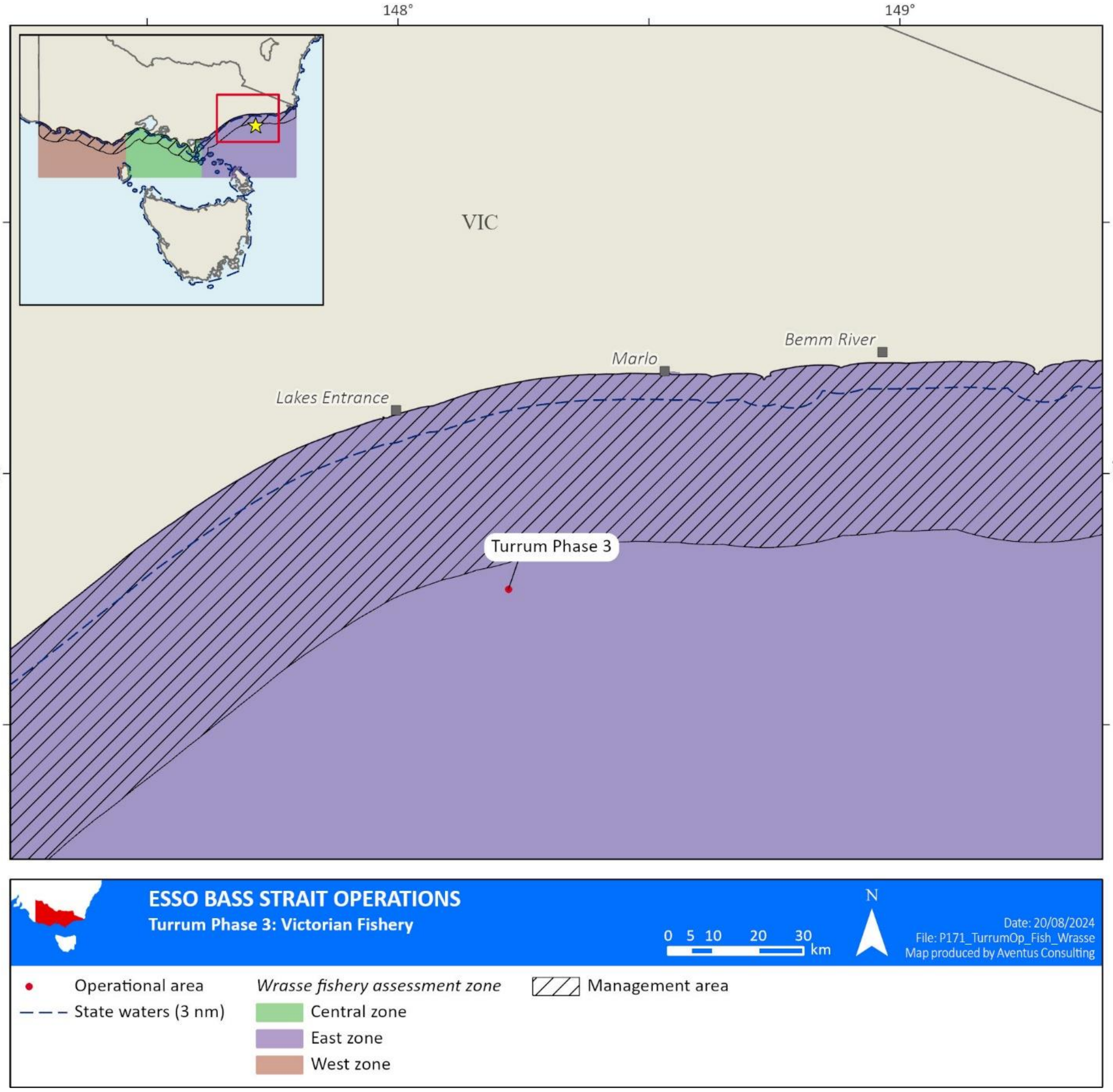

Figure 3-17 Victorian wrasse fishery overlapped by the OA

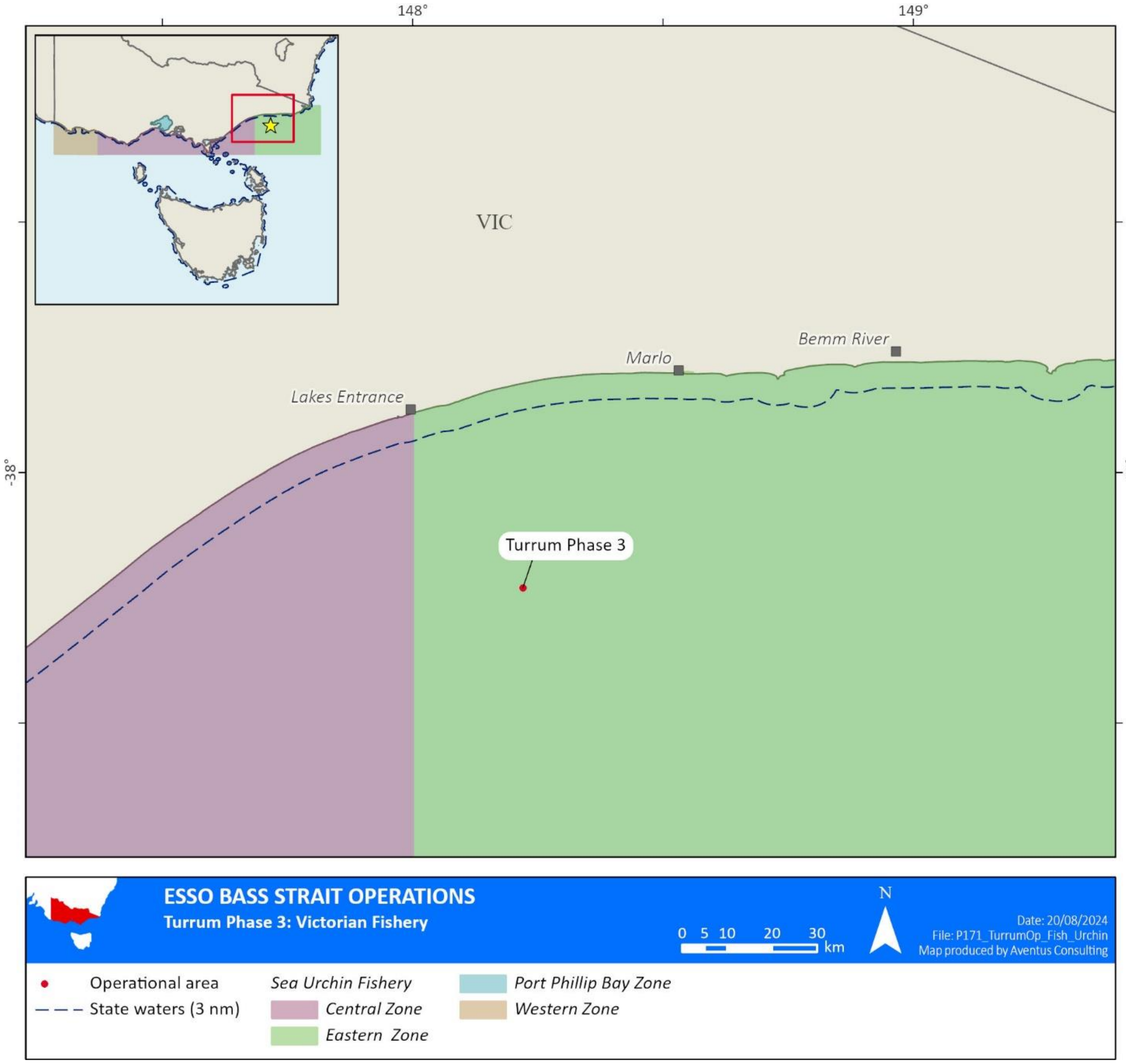

Figure 3-18 Victorian sea urchin fishery overlapped by the OA

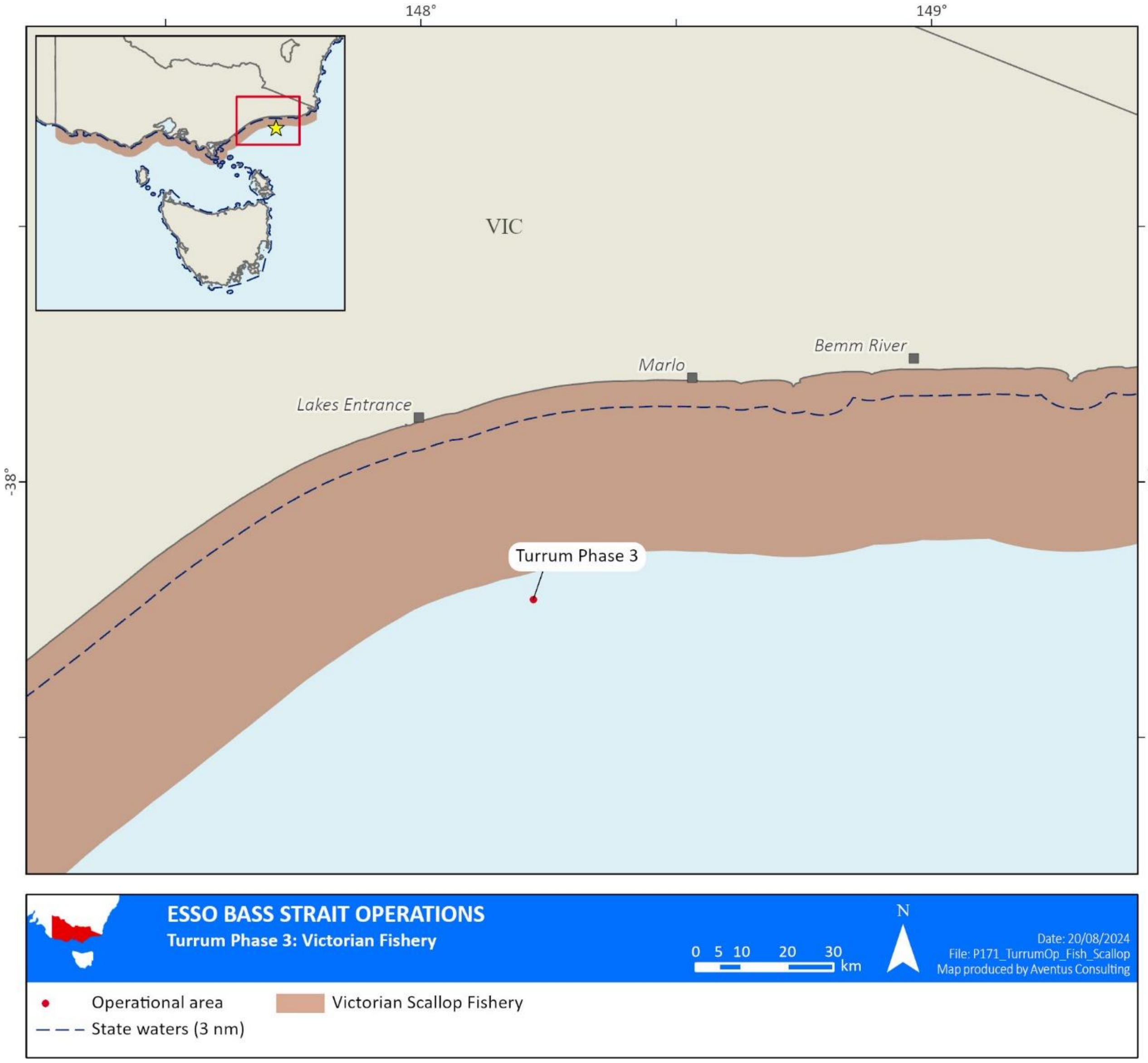

Figure 3-19 Victorian scallop fishery overlapped by the OA

Figure 3-20 Victorian octopus fishery overlapped by the OA

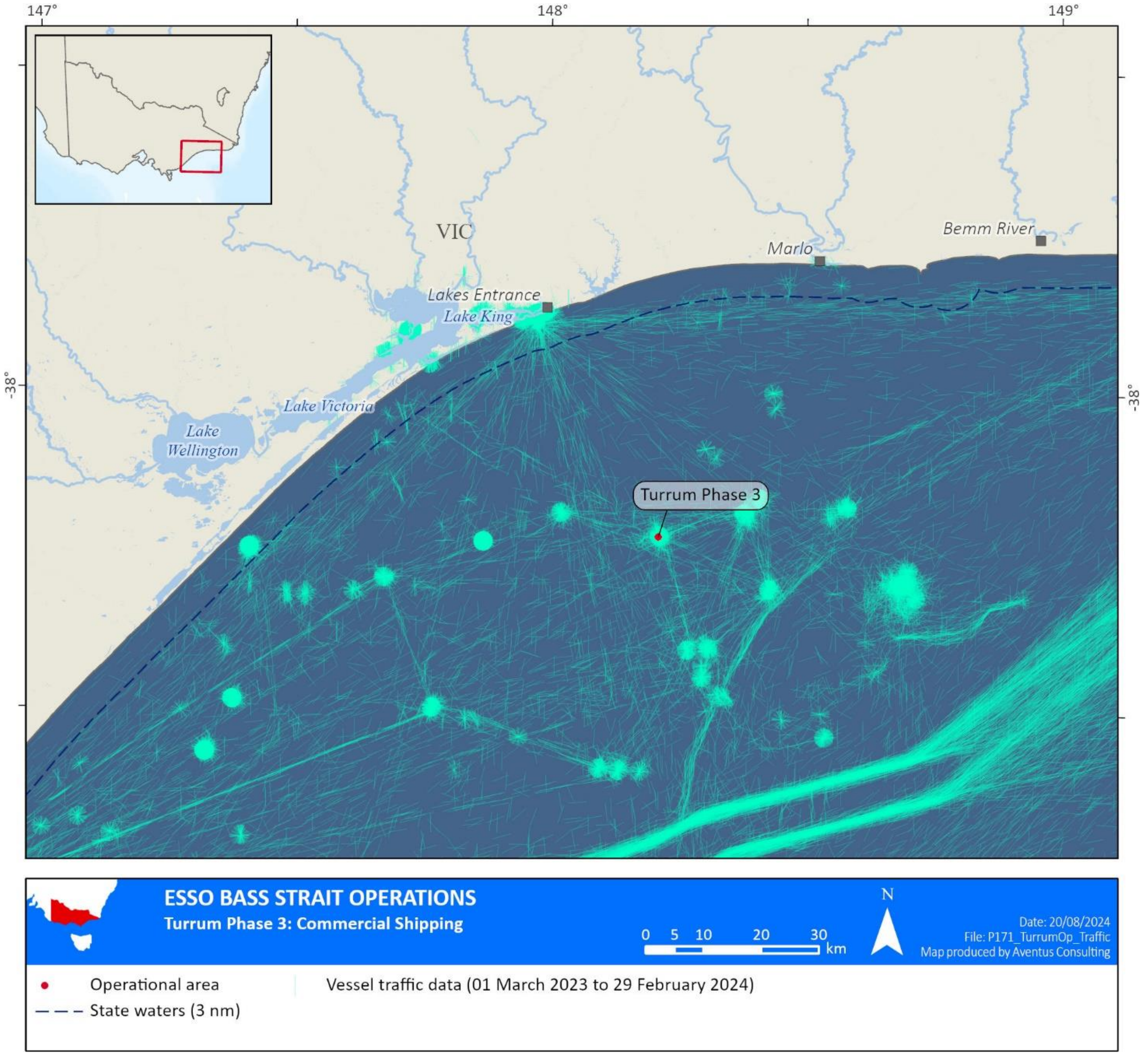

Figure 3-21 Shipping traffic within the OA

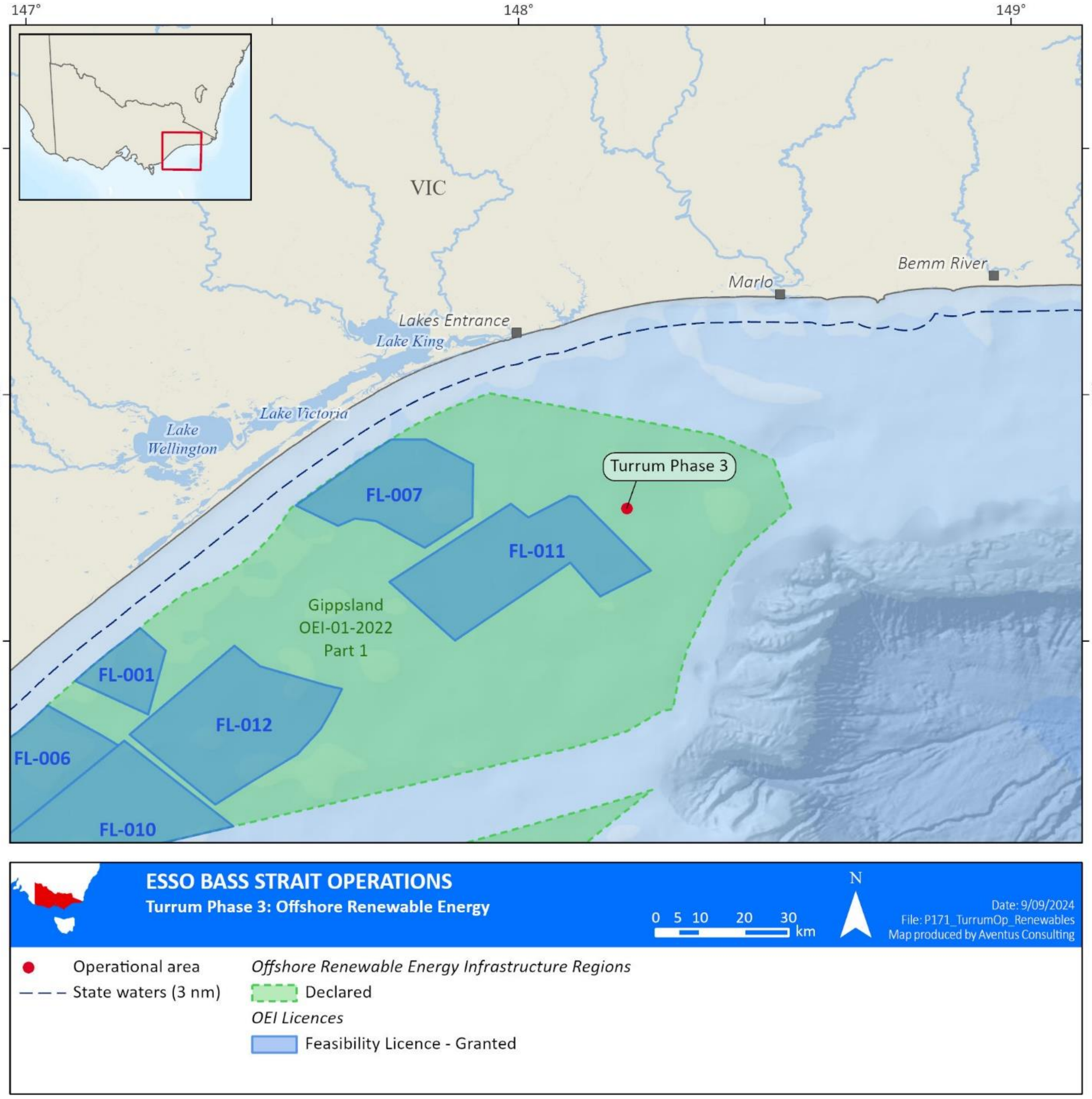

Figure 3-22 Offshore renewable energy infrastructure regions overlapped by the OA

4 Relevant person's consultation

Esso has undertaken consultation in the course of preparing this EP in accordance with Regulation 25 of the Environment Regulations.

The judgements of the Federal Court of Australia Decision (Tipakalippa v National Offshore Petroleum Safety and Environmental Management Authority (No 2), 2022) and Appeal (Santos NA Barossa Pty Ltd v Tipakalippa, 2022) represents the law regarding requirements for consultation in accordance with the Environment Regulations.

Following the Appeal and the Federal Court of Australia decision in Cooper v National Offshore Petroleum Safety and Environmental Management Authority (No 2) (2023) on 28 September 2023, Esso revised its methodology (refer to Section 4.2) to better reflect the intent of the judgements.

This Section provides the outcomes of consultation conducted up to and including information received prior to submission. During the consultation process which commenced on 8 October 2023, no feedback or requests for further information were received.

Over the past 50 years of operations in Bass Strait, Esso has established relationships with relevant persons identified in the Bass Strait Environment Plan (AUGO-EV-EMM-002) and activity-specific EP submissions, as well as the broader public and other interested parties.

Esso recognises and respects the important contribution of relevant persons, including First Nations people, throughout offshore petroleum activities. Esso is committed to ensuring that relevant persons are identified and given sufficient information and reasonable time for consultation to allow them to make an informed assessment of the possible consequences of a proposed petroleum or GHG activity on them.

The consultation process outlined in this EP allows Esso to ascertain, understand and address all the environmental impacts and risks that might arise from its proposed activity. The consultation process also allows Esso to receive information that the Company might not otherwise receive, and to use this information to enhance understanding of the environment, people, communities, heritage values, and social and cultural features that may be affected by the proposed activities and to inform decision-making.

For the purposes of this EP, Esso defines consultation as a process of communication that leads to a decision where the views of relevant persons have been taken into account. Whereas engagement aims to build long term relationships by exchanging information. While Esso is required by legislation to consult with relevant persons, Esso is also committed to engaging with relevant persons and continuing to further develop relationships already established.

Esso will consider and adopt appropriate measures, in response to the matters raised by relevant persons, in the management of environmental impacts and risks as part of the EP development process.

This Section describes Esso's approach to consultation and engagement, and the steps taken to develop and maintain consistent, constructive and effective relationships with relevant persons associated with this EP.

More specifically, this Section outlines in detail:

- Section 4.1 Consultation requirements – Outlines the applicable consultation and engagement standards and legislative requirements, including Esso's definition of relevant persons
- Section 4.2 Esso's consultation methodology – Describes Esso's methodology used to identify and consult with relevant persons for any EP
- Section 4.3 Methodology as applied to the scope of this EP – Details how Esso has applied the methodology (as described in Section 4.2) for this specific EP and the activities it proposes. This includes:
    - the relevant persons identified under the scope of this EP and the verification process applied
    - communication and consultation methods used to ensure sufficient information is provided in relation to the scope of this EP
    - how the consultation process is planned and tailored as appropriate to the nature and scope of this EP
    - a description of consultations undertaken to-date
    - a summary of how feedback received to-date has been considered, addressed and communicated.

4.1 Consultation requirements

Esso is committed to undertaking all consultation and engagement activities in accordance with applicable Australian legislation and ExxonMobil standards.

4.1.1 Legislative requirements

For each EP, Esso undertakes consultation in accordance with legislative requirements, including case law. As such, Esso's consultation processes are designed to meet obligations specified in Section 280 and Section 460 of the OPGGS Act and in the context of the objects of Regulation 4 of the Environment Regulations.

Consultation-specific requirements are covered in several of the Environment Regulations, as discussed in the following sections.

4.1.1.1 Regulation 25

Esso categorises relevant persons into five categories aligned to Regulation 25(1)(a)-(e), as shown in Table 4-1.

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.

Per Regulation 25(2), Esso defines 'sufficient information' to include:

- sharing information that is tailored to a relevant persons' needs
- detailing the proposed activity and any impacts and risks that may be relevant to them
- describing the control measures proposed to manage the potential impacts to them.

Esso considers the functions, interests or activities of relevant persons and the impacts and risks that affect them when determining information requirements and acknowledges that information may need to be provided in an iterative manner.

Following guidance provided in *Consultation in the course of preparing an environment plan* (NOPSEMA, 2023), Esso acknowledges that:

> *The phrase 'functions, interests or activities' in Regulation 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 ESD14.*
>
> *Functions: Refers to 'a power or duty to do something'.*
>
> *Activities: To be read broadly and is broader than the definition of 'activity' in Regulation 5 of the Environment Regulations and is likely directed to what the relevant person is already doing.*
>
> *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'.*

In accordance with Regulation 25(3), Esso determines a reasonable period for consultation in relation to this EP, as discussed in Table 4-1.

In accordance with Regulation 25(4), Esso will inform each relevant person that they may request that particular information they provide in the consultation not be published. Esso is committed to honouring this request and will not publish information subject to such a request.

4.1.1.2 Regulation 26

In accordance with Regulation 26(8), sensitive information relating to relevant persons and the full text of any response by a relevant person to consultation under Regulation 25 in the course of preparation of the EP, will only be included in the 'sensitive information part' and not anywhere else in the EP. The 'sensitive information part' is removed prior to publication in accordance with Regulation 28(1).

4.1.1.3 Regulation 34

In accordance with Regulation 34(g), this Section is intended to demonstrate how Esso has carried out the consultations required by Division 3. In developing this EP, Esso has also considered the guidance provided in Environment Plan Assessment (NOPSEMA, 2020), Environment Plan decision making (NOPSEMA, 2021) and Environment plan content requirement (NOPSEMA, 2020).

4.1.1.4 Regulation 22

In accordance with Regulation 22(15), Esso ensures appropriate consultation is conducted with relevant departments, authorities and ministers through their identification as relevant persons under Regulation 25(1)(a), (b) and (c). Refer to Section 4.2.4.1.

Other persons or organisations with functions, interests or activities are identified as relevant persons under Category 25(1)(d). Refer to Section 4.2.4.2.

In addition, Esso may categorise any other person or organisation as a relevant person under Regulation 25(1)(e). Refer to Section 1.1.1.1.

Esso also conducts broad-based information sharing engagements as outlined in Section 4.3.6.

4.1.1.5 Regulation 24

In accordance with Regulation 24(b), Esso provides a report on all consultations undertaken with any relevant person in accordance with Regulation 25 (see Appendix E). The report contains:

- a summary of each response made by a relevant person, and
- an assessment of the merits of any objections or claim about the adverse impact of each activity to which the environment plan relates, and
- a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and
- a copy of the full text of any response by a relevant person.

4.1.1.6 Case law

The judgements from the Decision (Tipakalippa v National Offshore Petroleum Safety and Environmental Management Authority (No 2), 2022) and Appeal (Santos NA Barossa Pty Ltd v Tipakalippa, 2022) are considered law and constitute the legal requirements of consulting with relevant persons.

This Section is intended to demonstrate how Esso has consulted, in a way that complies with the judgements made in the Decision and the Appeal.

In the Appeal (Paragraphs 96 and 104), The Federal Court of Australia has noted that there is no shortage of guidance in decisions on consultation processes under the *Native Title Act 1993* (Cth), which is illustrative of how a seemingly rigid statutory obligation to consult persons holding a communal interest may operate in a workable manner. The *Native Title Act 1993* (Cth) authorities require reasonable notice to group members, but not exhaustive communications with each and every person.

Esso also implements the guidance outlined in Consultation in the course of preparing an environment plan (NOPSEMA, 2023), which was revised to incorporate the judgements.

4.1.2 ExxonMobil standards

In accordance with ExxonMobil Operations Integrity Management System (OIMS) System 10-1, Esso has developed a consultation and engagement methodology that enables Esso to:

- ensure every effort is made to identify relevant persons
- undertake a verification process to ensure all representatives of relevant persons are a true representation/advocate of the views of their constituents and can be relied upon to faithfully communicate the results of engagements back to their constituents
- ensure relevant persons, especially those who are directly impacted, are consulted on matters that may affect them
- ensure that consultation is genuine and provides a meaningful two-way dialogue to develop and maintain consistent and constructive relationships with relevant persons to further understand potential environmental, social and economic impacts

- pursue engagement with relevant persons using a level of effort commensurate with the nature and scale of the activity
- keep relevant persons informed with respect to their specific functions, interests or activities
- encourage relevant persons to assess the information provided to them and respond to Esso with any feedback including questions, issues, concerns, suggestions, objections and/or claims
- maintain confidence of relevant persons in Esso and its activities through ongoing open, informative, inclusive and timely communications, wherever possible.

Implementation of the consultation methodology provides a mechanism by which Esso can:

- meet regulatory obligations and align with industry best practice consultation and engagement methods
- review and update the consultation methodology to reflect any changes to applicable laws, best practices or standards
- provide meaningful information in a format and language that is readily understood and tailored to the needs of relevant persons and groups
- provide information within an adequate timeframe to inform decision-making
- ensure consultations are based on open communication that is transparent, collaborative, inclusive and are conducted with integrity to foster respect and trust
- disseminate information in formats, methods and locations that make it easy for relevant persons to access
- respect local traditions and the relevant person's preferred ways of doing things
- establish two-way dialogue that gives all relevant persons the opportunity to exchange views and information, to listen, and to have their feedback heard and addressed
- seek inclusiveness in representation of views, including minority and special interest groups
- develop clear mechanisms for receiving, documenting, and responding to feedback
- incorporate feedback from relevant persons into the program design and providing clear and transparent reporting back to relevant persons in a reasonable timeframe.

Esso recognises First Nations people as the Traditional Custodians of the land and waters in which the Company operates and acknowledges and pays respect to their Elders – past, present and emerging.

Esso understands that First Nations people see no distinction between the land and the sea, considering it all as a part of their Country. This understanding aligns with the regulatory guidance (NOPSEMA, 2024), which states:

> ...a connection of traditional owners with Sea Country may constitute an interest for the purposes of regulation 25(1)(d).

Esso continues to identify and attempt consultations with environmentally focused non-government organisations (eNGOs) and other environmental protection and advocacy groups.

4.2 Esso's consultation methodology

This Section provides a detailed methodology for identifying and consulting with relevant persons, which has been followed in preparing this EP.

It covers the process for identifying relevant persons applicable to an offshore activity that requires a new EP or a revision to an EP under the Environment Regulations, including:

- the process for classification of relevant persons based on their functions, interests or activities
- preparation of appropriate consultation materials and forms of consultation for each relevant person identified
- the process of consultation including assessment of information and responses received.

For specific information on how this process was undertaken in relation to this EP, refer to Section 4.3.

4.2.1 Definition

To ensure a consistent approach to identifying and consulting with relevant persons in relation to offshore EPs, the definitions included in Table 4-1 have been used as the basis for this methodology.

Table 4-1 Definitions

Term	Definition
Activities	In relation to Regulation 25(1)(d), activities are considered to be what other persons or organisations are already doing.
Area To Be Avoided (ATBA)	The boundary which commences at the most easterly intersection of the coastline of the State of Victoria at mean low water by the parallel of latitude 38° 14′ 54.50″ S and runs thence southeasterly along the geodesic to the point of latitude 38° 34′ 54.49″ S, longitude 147° 44′ 04.61″ E and then along the coastline of the State of Victoria at mean low water to the point of commencement.
Claims	Evidence provided that suggests there are potential adverse impacts from the petroleum or GHG activities to which the EP relates.
Consultation	Targeted and tailored information provided to enable effective consultation on a specific planned activity within a defined timeframe.
Consultation period	Esso generally defines the consultation period during the development of an EP as being 30 days, subject to the nature and scale of the proposed activity.
EMBA	Oil spill modelling is used to determine the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, as a result of any spill and is used for planning purposes to ensure that all social and environmental sensitivities are acknowledged, described and considered in the development of the EP.
Engagement	Ongoing relationship building or general engagement not related to a specific activity or defined timeframe.
Environment	The Environment Regulations defines this as: (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 places; and includes (e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).
Functions	In relation to Regulation 25(1)(d), functions refer to a power or duty to do something.
Geographical consultation boundary	The geographical areas (OA, ATBA and EMBA) used as the basis for identifying relevant persons.
Interests	In relation to Regulation 25(1)(d), interests represent a connection to the values described in the EP. 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. An interest does not extend to general public interest in an activity.
Objection	A reason or argument that asserts that there are potential adverse impacts arising from the petroleum or GHG activities to which the EP relates.

Term	Definition
OA	500m PSZ around platforms subsea installations.
Petroleum/GHG activity	A planned offshore petroleum or GHG activity for which an EP is required. This also includes activities undertaken in the event of an emergency condition such as oil spill response.
Reasonable period	A reasonable time for relevant persons to identify the effect of a proposed activity on their functions, interests or activities and make a response detailing their objections or claims. Esso generally defines a reasonable period for a relevant person to review and provide an initial response (i.e. the consultation period) as being 30 days, subject to the nature and scale of the proposed activity. Where engagement with relevant persons is ongoing after this period, Esso will continue to engage with these persons until Esso believes that it has provided sufficient evidence/justification to close the consultation (i.e. they have been provided sufficient information and reasonable time).
Relevant person	Can be a person, organisation, department or agency that falls within one of the classifications defined by Regulation 25(1) of the Environment Regulations.
Stakeholder	Stakeholder is a general use term and includes any person, group or organisation with an interest or concern in something. It includes those that may be affected in an immaterial or negligible way. Esso uses this terminology in general terms when describing those persons/organisations not deemed to be relevant persons e.g. a stakeholder database containing a broad and diverse range of relevant and non-relevant persons for multiple activities.
Unplanned activity/event	Accidental release e.g. loss of containment (LOC) of refined oils (collision) or LOC of reservoir hydrocarbons. Covered by the OPEP.

4.2.1.1 Petroleum activity (planned activity)

The Environment Regulations require that consultation be undertaken to ensure that persons who may be affected by a petroleum activity are given the opportunity to inform the titleholder how they may be affected and to allow the titleholder to assess and address any objections or claims about that activity in the preparation of environment submissions.

Regulation 5 of the Environment Regulations defines a petroleum activity as:

"any operations or works in an offshore area carried out for the purpose of:

- *(a) exercising a right conferred on a petroleum titleholder under the Act by a petroleum title, or*
- *(b) discharging an obligation imposed on a petroleum titleholder by the Act or a legislative instrument under the Act."*

When identifying relevant persons, Esso considers which stakeholders perform a function in relation to – or have a function, interest or activity that may be affected by – the planned activity.

Therefore, in determining who is a relevant person for consultation, Esso sought to identify and consult with persons whose functions, interests or activities could be affected by the activities described in detail in Section 2 of this EP.

4.2.1.2 Unplanned event/activity (emergency conditions)

Relevant persons who may perform a function in Esso's planning for, or management of an unplanned activity, and whose information is integral to the development of emergency management plans, are engaged during the development of this EP and the OPEP.

Persons whose functions, interests or activities are within the EMBA for the unplanned activity are provided with broad, high level information such as activity information bulletins and information regarding EMBA and oil spill modelling.

If requested, consultation may include face-to-face engagements, phone calls, community meetings, specialist group meetings, community drop-in sessions. If no response is received no further consultation is required.

4.2.1.3 Geographical boundaries

Esso uses the following geographical boundaries to define EP consultation:

- OA: 500m PSZ around platforms subsea installations (as described in Section 3)
- Bass Strait ATBA: As described in Schedule 2 of the OPGGS Act
- EMBA: As described in Section 3.1.

4.2.2 Esso's approach to consultation

Esso's approach to consultation with relevant persons involves steps undertaken across four consultation Levels, as shown in Figure 4-1.

If Esso identifies a group of relevant persons that may be potentially affected, but is unable to confirm individual contact details as these are not ascertainable through normal mechanisms (e.g. website, associated government agencies, organisations or groups who hold these details or who can advise who these individuals are), the opportunity exists for such persons to contact Esso via the publicly accessible Esso Consultation Hub, consultation email or phone. Newspaper advertisements are also used to highlight activities so that individuals or groups can self-identify to Esso.

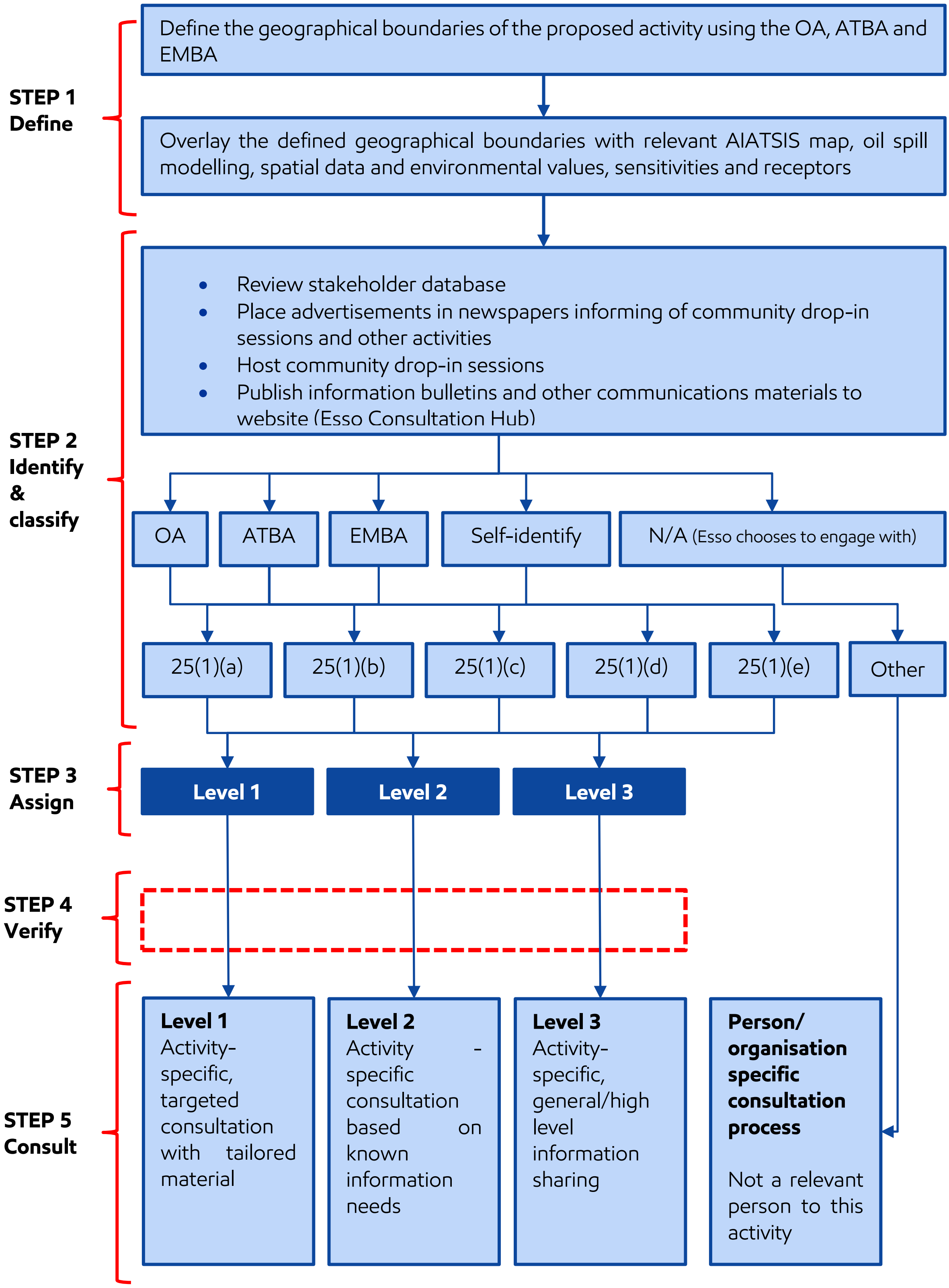

Figure 4-1 **Esso's approach to consultation**

4.2.3 Step 1 – Define

When preparing for consultation for each new petroleum activity, Esso first identifies the geographic boundaries of the EP. These geographic boundaries are the:

- OA
- ATBA
- EMBA.

Each of the defined geographical boundaries are then overlayed with relevant Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) map, oil spill modelling, spatial data and environmental values, sensitivities and receptors.

Esso must also outline the EP specifications for:

- activity description, which is compared to previous consultations undertaken for other Esso activities and/or facilities
- scope of the EP, taking into consideration factors such as planned and unplanned impacts to environmental factors including air and water emissions, culturally sensitive areas, Sea Country and marine environments; and potential socioeconomic impacts including job creation throughout the supply chain
- environmental values and sensitivities of the proposed activity, including cultural heritage (world, national and local), Sea Country, wetlands of international significance (Ramsar), listed threatened species and listed migratory species, listed threatened ecological communities and Commonwealth marine areas
- timing of the proposed activity, including any seasonal changes.

After considering these specifications, Esso then identifies the anticipated key functions, interests and activities of relevant persons.

4.2.4 Step 2 – Identify and classify

Esso acknowledges that 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 (NOPSEMA, 2024).

The approach to consultation involves using the defined OA, ATBA and EMBA to identify relevant persons by geographical boundary. They are then classified in accordance with the regulatory definitions in Regulation 25(1)(a)-(e) which includes five relevant persons classifications as follows:

- Regulation 25(1)(a) – Each Commonwealth, State or Northern Territory agency or authority to which the activities to be carried out under the EP may be relevant. For Esso's operations in Bass Strait, this includes any Commonwealth department or agency that has responsibility for managing or protecting the marine environment from pollution. It may also include those with responsibilities for environmental and fisheries management, defence and communications, maritime/navigational safety, marine parks, and Native Title
- Regulation 25(1)(b) – The Department or the responsible State Minister, if the plan relates to activities in the offshore area or a State
- Regulation 25(1)(c) – The Department of the responsible Northern Territory Minister – if the plan relates to activities in the Principal Northern Territory offshore area. This is not applicable for Esso Bass Strait activities
- Regulation 25(1)(d) – A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP. A connection of traditional owners with Sea Country may constitute an interest for the purposes of Regulation 25(1)(d) classification. For Esso's operations in Bass Strait this includes First Nations groups, non-government organisations, worker unions and fishing groups. It may also include community groups and individuals
- Regulation 25(1)(e) - Any other person or organisation that the Esso considers relevant
- Specific processes for the identification of relevant persons are outlined in the following sections.

4.2.4.1 Methodology for identification of Regulation 25(1) (a)-(c) relevant persons

Regulation 25(1)(a)-(b) requires the identification of relevant persons in Commonwealth or State government departments or agencies who may have responsibilities either related to or impacted by the activities to be carried out under the EP.

Regulation 25(1)(c) requires Esso to identify the department of the responsible State Minister.

Esso has a history of extensive and ongoing consultation for offshore activities in the Bass Strait spanning more than 50 years, meaning that most, if not all, Regulation 25(1)(a)-(c) relevant persons are known to Esso.

The first step in identification is to review Esso's existing stakeholder database. This review involves comparing the activity description to previous Esso activities and/or facilities to identify past consultations of a similar nature. This is then used to filter Esso's stakeholder database, providing a list of relevant persons for all past activities of a similar nature.

If Commonwealth or State departments, agencies or ministers change, Esso leverages existing relationships to ensure consistency of consultation.

4.2.4.2 Methodology for identification of Regulation 25(1)(d) relevant persons

Identification of relevant persons consistent with Regulation 25(1)(d) requires their functions, interests or activities to be understood and applied broadly taking into account how potential risks and impacts of the EP activity may affect them. This is achieved via several methods as outlined in the following sections.

4.2.4.3 Review of relevant persons previously identified for other activities

Given Esso's extensive history of consultation in the area, identification of relevant persons starts with a review of Esso's existing relevant persons database to generate a list of any persons, groups, and organisations with functions, interests or activities matching those defined for the EP.

4.2.4.4 Actively seek out new relevant persons

To ensure the broad capture of ascertainable persons and organisations who may have their functions, interests or activities affected by the activity (Santos NA Barossa Pty Ltd v Tipakalippa, 2022), Esso seeks to identify any new relevant persons through:

- using local knowledge of existing relationships to identify marine users and interest groups active in the area (e.g. Indigenous groups, commercial fisheries, recreational fishers, other energy producers, local business, etc.)
- providing a link to the Esso Consultation Hub and Esso Consultation Questionnaire with existing relevant persons and asking them to share it with anyone who may be interested in Esso's activities
- seeking the advice of First Nations groups such as land councils and prescribed body corporates 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
- searches of internet sources, including search engines, websites, social media platforms etc.
- members of the Company's local workforce providing suggestions of other potentially impacted relevant persons
- identified relevant persons providing recommendations of other potentially impacted relevant persons, through direct engagement and/or the Esso Consultation Questionnaire
- guidance from the Regulator, other government agency/department, industry associations or bodies about other potentially relevant persons
- advertisements in newspapers and other relevant news sources (e.g. Koori Mail, local papers)
- hosting community drop-in sessions where members of the public can attend and review materials relevant to Esso's activities and ask questions of staff
- a review of legislation applicable to petroleum and marine activities
- active participation in industry bodies and collaborations e.g. Australian Energy Producers ((AEP) formerly APPEA), Centre for Decommissioning Australia, National Energy Resources Australia, and the National Decommissioning Research Initiative
- leveraging existing relationships with relevant Commonwealth and State departments and agencies to identify other relevant stakeholders

- reviewing the relevant persons identified for other oil and gas EPs in the area
- conducting a search of the National Electronic Approvals Tracking System to access publicly available information concerning offshore electricity infrastructure licences under the *Offshore Electricity Infrastructure Act 2021* (Cth).

Relevant persons identified through these means are added to the list generated by the review of the relevant persons database (per Section 4.2.4.1).

4.2.4.5 Self-identification through broad-based information sharing

As part of the Company's own commitments to consultation and engagement, Esso regularly conducts broad-based information sharing designed to reach both relevant persons identified for any EP and a broad range of other interested parties. This broad-based information sharing allows Esso to create awareness of its activities and encourages potentially relevant persons to make themselves known to the Company (NOPSEMA, 2023). Any persons or organisations who self-identify are added to the list generated by the ongoing review of the relevant persons database (per Section 4.2.4.1).

4.2.4.6 Specific identification processes for certain groups

FIRST NATIONS PEOPLES

Esso's consultation approach is consistent with Regulation 25, incorporating guidance provided by the Appeal ruling (Santos NA Barossa Pty Ltd v Tipakalippa, 2022). The consultation methodology includes sufficient time for each stage of the consultation process, including identification of First Nations groups as well individuals within the community, information sharing, receipt of feedback and assessment of merit.

Identification commences with a review of the relevant person database (as described in Section 4.2.4.1). Additional potentially relevant First Nations peoples are identified using the AIATSIS map of Indigenous Australia, overlaid with the geographical information of the OA, ATBA and EMBA, followed by an assessment of whether there will be any impacts from Esso's planned activities affecting the functions, interests or activities. Government resources such as State Government spatial data sets are also utilised to identify potentially relevant Aboriginal Land Councils, Registered Aboriginal Parties and Registered Aboriginal Community Organisations.

The Commonwealth Heritage List (DCCEEW, 2023g) is a list of Indigenous, historic and natural heritage places owned or controlled by the Australian Government which have a significant heritage value to the nation have been reviewed as described in Appendix A.

The Nanjit to Mallacoota Sea Country IPA consultation project, which extends from Corner Inlet to the Victoria/NSW border has also been reviewed as described in Appendix A.

Esso reviewed the Gunaikurnai Whole-of-Country Plan (GLaWAC, 2015) and the Position Statement: Offshore Renewable Energy Infrastructure Area (GLaWAC, 2022) with particular regard to Sea Country mapping.

Currently, there is no Sea Country mapping in Esso's ATBA available. Esso will continue consulting with GLaWAC as a Level 1 relevant person to allow opportunity to discuss Sea Country in the development of future EPs.

LOCAL COUNCILS

Identification commences with a review of the stakeholder database (as described in Section 4.2.4.1). Additional potentially relevant local government/councils are identified using government resources such as State Government spatial data overlaid with the geographical information of the OA, ATBA and EMBA.

COMMERCIAL FISHING

Esso has a long-standing relationship with Bass Strait commercial fishing operators' representative bodies and their members. Esso meets with South East Trawl Fishing Industry Association (SETFIA), Lakes Entrance Fishermen Limited and Seafood Industry Victoria on a quarterly basis to discuss all upcoming and current offshore activities including any potential risks and how/if an activity may impact their members.

Where it is identified that an activity may affect their members, various strategies can be implemented including:

- distribution of SMS (text message) updates to the eastern fishing fleet advising of vessel movements, activities being performed outside the PSZ, coordinates of survey work, etc. Messages may be sent as often as daily during an activity, if appropriate

- updating Esso chartered vessel plotters to show where commercial fishing equipment is to avoid that area
- commercial fishers may choose to relocate their equipment for the duration of the activity
- Esso also attends representative board meetings and any members meetings to consult directly with members on any proposed activities as requested.

While fishing is prohibited in any PSZ, reminders about PSZs are provided to all local fishing groups every 6 months. The most recent reminder was provided to SETFIA, SIV, LEFL, GFAV and GLFC to share with their members on 16 December 2024.

OFFSHORE WIND INDUSTRY

In December 2022 the Minister for Climate Change and Energy declared the offshore Gippsland area in Victoria (Commonwealth area only) as suitable for offshore electricity infrastructure. This declaration does not grant exclusive rights to use the area. As of July 2024, the Australian Government has granted 12 feasibility licences for offshore wind projects off Gippsland's coast in Victoria (DCCEEW, 2024).

Esso began consultation in July 2024 to establish if these offshore wind licence holders' feasibility stage functions, interests or activities have the potential to be affected by the Turrum Phase 3 production drilling activities and may be relevant persons.

Figure 4-2 Victoria's offshore wind zone

4.2.4.7 Methodology for identification of Regulation 25(1)(e) relevant persons

Where Esso chooses to consult with persons that would not be considered a relevant person in accordance with Regulation 25(1)(a)-(d), the provisions of Regulation 25(1)(e) allow for Esso to nominate these persons/organisations, at their discretion.

4.2.4.8 Persons or organisations who self identify

As part of the Company's own commitments to consultation and engagement, Esso regularly conducts broad-based information sharing designed to reach both relevant persons identified for any EP and a broad range of other interested parties. This broad-based information sharing allows Esso to create awareness of its activities and encourages potentially relevant persons to make themselves known to the Company (NOPSEMA, 2024). Any persons or organisations who self-identify are added to the list generated by the ongoing review of the stakeholder database (as described in Section 4.2.4.1).

Esso will undertake advertising and publish information on a proposed activity to help identify any other relevant persons that may not have been identified by the process.

Esso will place advertisements in newspapers informing people of community drop-in sessions and directing them to the Esso Consultation Hub to seek out anyone else who may be relevant based on the defined geographical area of the activity.

Where a person, organisation, department or agency identifies themselves to Esso via these campaigns, Esso will apply the methodology as defined in Figure 4-1 to assess if the person, organisation, department or agency is a relevant person, for the purposes of the EP and assign the relevant consultation Level.

The advertisements will also act as a means for sharing information to identified relevant persons and providing an ongoing mechanism for feedback.

4.2.4.9 Persons or organisations Esso chooses to contact

Over the past 50 years of operations in Bass Strait, Esso has established relationships with relevant persons identified in the Bass Strait Environment Plan (AUGO-EV-EMM-002) and activity-specific EP submissions, as well as the broader public and other interested parties.

Esso recognises and respects the important contribution of stakeholders and is committed to maintaining and developing further these important relationships.

In addition to consulting with relevant persons under Regulation 25(1), there may be persons or organisations that Esso chooses to contact in relation to a proposed activity. For example, these are persons or organisations:

- that are not relevant pursuant to Regulation 25(1), but that Esso has chosen to contact potentially for additional guidance, for example to update contact information or obtain the correct contacts
- that are not relevant pursuant to Regulation 25(1), but that Esso have contacted as a result of consultation requirements changing or updated guidance from the Regulator
- where it is unclear what their functions, interests and activities are, or whether they may be affected. In this circumstance, engagement is required to inform relevance under Esso's consultation methodology
- Esso wishes to maintain and continue to develop a relationship with.

4.2.5 Step 3 – Assign

Once each relevant person has been identified and classified as per Regulation 25(1)(a)-(e), the consultation Level is assigned during workshop(s) held with Esso consultation advisors and relevant subject matter experts. The more complex the activity, the more discussions are needed to ensure all matters are considered appropriately.

In assigning a consultation Level, the following considerations are taken into account:

- the location of the activity (OA, ATBA or EMBA) and whether or not their functions, interests and activities are impacted by the planned or unplanned activity
- if any impact, the degree of that impact, for example – level of EMBA overlap with a known fishery
- the functions, interests and activities of the person(s) or organisation
- persons or organisations known to Esso and previously recorded in the stakeholder database

- relevant persons/organisation's known preferred methods of communication and any specific information needs
- Esso's relationship with the relevant person/organisation e.g. when did Esso last engage with them? On what topic? What is their level of interest? Is Esso currently consulting with them on other activities?
- the environmental values and sensitivities and whether or not the persons functions, interests and activities are impacted by the activity; if any impact, the degree of that impact
- if the relevant person/organisation can provide any information that will assist the design or management of the planned activities
- the duration of the activity.

The output of the workshop is recorded in a register of all relevant persons related to the activity including the justifications and reasons for the assigned consultation Level, this information is then provided in the relevant EP.

Esso notes that throughout the consultation process the assigned Level of consultation may be adjusted based on feedback received from the relevant persons, for example a relevant person may request more or less information and may therefore move to a higher or lower Level of consultation.

4.2.6 Step 4 – Verify

For Regulation 25(1)(a)-(c) relevant persons, the verification process confirms the details of the department/agency are correct. This involves checking for departmental restructures, name changes, staff/contact person changes, contact information changes etc.

For Regulation 25(1)(d)-(e) relevant persons, verification aims to ensure that:

- the functions, interests and activities used to evaluate and categorise the person or organisation as a relevant person are confirmed
- identified representatives are a true representation/advocate of the views of their constituents and can be relied upon to faithfully communicate the results of engagements back to their constituents
- relevant persons have been provided with the Esso Consultation Questionnaire to confirm they are willing to participate in the consultation process.

Verification processes for Regulation 25(1)(d)-(e) relevant persons are further detailed in the following sections.

4.2.6.1 Verifying functions, interests and activities

In order to verify functions, interests and activities, Regulation 25(1)(d)-(e) relevant persons (or their verified representative) will be provided with:

- an information bulletin (or similar) providing sufficient information on the activity proposed in the EP
- Esso Consultation Questionnaire to verify functions, interests and activities.

The information bulletin aims to ensure all relevant persons are provided with sufficient information at the outset of the consultation process so they can make informed decisions about their participation or otherwise. This information bulletin will be in the form of a brochure or link to a specific webpage.

One aim of the Esso Consultation Questionnaire is to verify the functions, interests and activities of each relevant person. This is achieved through providing a tailored list of functions, interests and activities (relevant to the EP) so that the relevant person can select one or more items. Esso updates the relevant persons database and may re-evaluate the person's/group's status as a relevant person.

In some cases, relevant persons have developed guidance detailing their own functions, interests or activities and how and when they wish to be consulted on activities (NOPSEMA, 2023), which will be considered throughout the process. This includes, for example:

- *Consultation with Commonwealth agencies with responsibilities in the marine area* (NOPSEMA, 2022)
- *Engage Early: Guidance for proponents on best practice Indigenous engagement for environmental assessments under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* (Department of Environment, 2016).

If the functions, interests or activities of a person/s have not been advised directly to Esso via the above methods, an assessment is made based on available information relating to the person/s or organisation/s, as per NOPSEMA functions, interests and activities definitions.

4.2.6.2 Verifying true representation

The Esso Consultation Questionnaire is also used to determine the group participation of individual relevant persons. This information is used to develop a list of group members that Esso can engage with directly to seek verification that the right group representatives have been identified. This ground-truthing of views of the designated representatives is essential to confirm they will provide a comprehensive and accurate representation. The Esso Consultation Questionnaire also allows for individual relevant persons to choose whether they want to be consulted with directly or if their preference is for Esso to consult with the group representative on their behalf.

4.2.6.3 Confirming participation

Provision is made in the Esso Consultation Questionnaire to allow for a relevant person to opt out of the consultation process. Esso will respect the wishes of the relevant person should they choose to opt out.

Where the Esso Consultation Questionnaire has not been completed and returned, this will not be considered opting out and Esso representatives will seek to make further contact with the relevant person to obtain a response, as appropriate.

Relevant persons can also notify Esso via the Consultation email to opt in or out of communications on specific activities.

It is recognised that in any community consultation there will inevitably be persons who cannot participate for various reasons, however the absence of their participation would not invalidate the process provided reasonable efforts are made to identify the relevant persons and to consult with them (NOPSEMA, 2024).

4.2.7 Step 5 – Consult

Esso seeks to consult with relevant persons so that each relevant person has sufficient information to understand the activity and to help them make an informed assessment of possible consequences associated with the EP activities pursuant to their own functions, interests or activities. Esso acknowledges that what constitutes sufficient information as part of a consultation process may differ depending on the relevant person/s (NOPSEMA, 2024). As such, Esso seeks to consult in a way that is appropriate for each relevant person and adapted to the nature of the relevant persons to be consulted.

To achieve this, Esso consults with relevant persons in accordance with their assigned consultation Level. The consultation methods for each Level are outlined in Sections 4.2.7.1 to 4.2.7.3.

Each consultation has the overarching goals of:

- further strengthening foundation relationships with existing relevant persons
- developing relationships with new relevant persons
- facilitating genuine two-way dialogue between Esso and relevant persons
- building upon preceding consultations (where applicable) to further a relevant person's understanding of the activity.

Throughout the consultation process, relevant persons are invited to correspond with Esso if they have concerns or require clarifications. Follow-up verbal discussions occur where required or if requested.

Esso also provides avenues for relevant persons to contact Esso outside of formal engagement activities if they have any questions or concerns. If needed, Esso will provide support or assistance to relevant persons in relation to understanding the technical data.

All relevant persons are given the opportunity to nominate how they would like to be consulted. As appropriate, direct engagement with relevant persons e.g. First Nations groups, will include co-design of their consultation methodology. This may require consultation over an extended period of time.

Relevant persons are not obligated to respond to a titleholder's requests to participate in the consultation process. In cases where no response has been received from a relevant person, and where sufficient information and reasonable period has been afforded to the relevant person, Esso will consider consultation closed for the purposes of the preparation of the EP.

The assigned consultation Levels and associated rationale for each relevant person are included in the relevant EP.

4.2.7.1 Consultation Level 1

Relevant persons assigned with consultation Level 1 will be provided with targeted and tailored activity-specific information to enable an effective consultation process. This can include meetings, presentations, workshops, forums, phone calls and specific information such as mapping. Consultation Level 1 is the highest level of engagement with relevant persons and may require consultation over an extended period of time.

Consultation Level 1 is generally applied to relevant persons whose functions, interests or activities are located in the OA of the planned activity or if the relevant person has indicated that this is the level of consultation they prefer.

Relevant persons will be provided with sufficient information (in a variety of formats, i.e. written, face to face, telephone etc.) and a reasonable period (generally 30 days, but can be more according to the activity complexity) to respond.

4.2.7.2 Consultation Level 2

Relevant persons assigned with consultation Level 2 will be provided with specific information based on known information needs (e.g. published industry guidance notes or proformas outlining what information a relevant person wishes to receive).

This may include meetings, presentations, workshops, forums, phone calls and specific information such as mapping. This may require consultation over an extended period of time.

Consultation Level 2 is generally applied to relevant persons whose functions, interests or activities are located in the ATBA of the planned activity or if the relevant person has indicated that this is the level of consultation they prefer.

Relevant persons will be provided with sufficient information (in a variety of formats, i.e. written, face to face, telephone etc.) and a reasonable period (generally 30 days, but can be more according to the activity complexity) to respond.

4.2.7.3 Consultation Level 3

Relevant persons assigned with consultation Level 3 will be provided with activity-specific information but at a broader, level. This can include: activity-specific information bulletins including the impacts, risks and the mitigative controls in place, information regarding EMBA and oil spill modelling, and/or links to the Esso Consultation Hub and Esso Consultation Questionnaire.

If requested, consultation can include face-to-face engagements, phone calls, community meetings, specialist group meetings or community drop-in sessions.

Consultation Level 3 is generally applied to relevant persons whose functions, interests or activities are located in the EMBA and may be affected by unplanned activities associated with the planned activity or if the relevant person has indicated that this is the level of consultation they prefer.

Relevant persons will be provided with sufficient information (in a variety of formats, i.e. written, face to face, telephone etc.) and a reasonable period to respond (generally 30 days, but can be more according to the activity complexity). If no response is received, no further consultation will be undertaken but Esso will continue to provide broader, high level information.

4.2.8 Relevant persons responses

Esso makes ongoing efforts to obtain responses through consultation. Esso is committed to considering all input and/or responses received from relevant persons in the development of EPs. Relevant person responses may be received in various ways.

Esso accepts responses and engages in consultation in order to understand the responses. Esso clearly identifies and addresses each matter raised by relevant persons, and if applicable to the activity to which the EP relates:

- demonstrates that the risk or impact in question has been reduced to ALARP and will be of an acceptable level

- provides a statement that addresses each element of the objection or claim made by a relevant person and where control measures are implemented to resolve objections and claims, will clearly communicate this to the relevant person
- provides copies of all written responses provided by a relevant person to NOPSEMA.

Responses received from relevant persons, throughout the development of an EP and its subsequent revisions, is considered and addressed as appropriate. A summary of responses, objection and/or claim, as well as Esso's assessment of the merits of feedback, objections and/or claim, and Esso's response, are provided in the EP.

4.2.9 Ongoing engagement

Esso recognises the importance of ongoing engagement with stakeholders as it is an opportunity to review and update Esso's current relevant persons functions, interests and activities, and as a forum for enquiry, objections or claims to be raised during an EPs activity.

In the case that a response is received following the submission of this EP, the response will be considered for any implications to the proposed activity and clearly communicated to the relevant person.

4.2.10 Consultation reporting

Esso maintains a Gippsland-wide stakeholder database. Communications, including meetings, calls, distribution of communications materials, emails etc. with relevant persons are logged in the database, detailing any feedback received, including questions, issues, concerns, suggestions, objections and/or claims, and any actions/responses. Actions are tracked and responses are provided to relevant persons as required.

During all communications, Esso encourages relevant persons to provide feedback through:

- emailing the consultation@exxonmobil.com email address
- accessing the Esso Consultation Hub
- calling +61 3 9261 0000
- or writing to GPO Box 400 Melbourne VIC 3001.

A report on all consultations between the Company and any relevant person is included in the relevant EP.

4.3 Methodology as applied to the scope of this Environment Plan

This Section demonstrates how Esso applies its consultation methodology specifically to this EP and how the Company ensured the consultations were appropriate and adapted to the nature of the interests of the relevant persons.

During the course of consultation for this EP which commenced on 8 October 2023 until submissionthere have been no claims or objections received.

4.3.1 Step 1 - Define

For Turrum Phase 3 production drilling activities, Esso has outlined the following specifications, which were the basis for determining the anticipated key functions, interests and activities of each relevant person's category and defining criteria to determine categorisation as a relevant person within the scope of this EP:

- Activity description: Refer to Section 2
- Scope: Refer to Section 1.1
- Timing: Refer to Section 2.2
- Values and sensitivities: Refer to Section 3.2

Geographic location: For the purposes of consultation, the facility location used to determine relevant persons includes the OA, ATBA and EMBA as shown in Appendix A (Figure A-1).

The planned activity for the Turrum Phase 3 production drilling activities EP is to complete a drilling campaign using a JUR within the PSZ at the Marlin B platform in the Gippsland Basin. The activities include JUR positioning, drilling, completion installations, support vessel activities, and use of helicopters.

Therefore, in determining who is a relevant person for consultation, Esso sought to identify and consult with persons whose functions, interests or activities could be affected by the of activities described in Section 2 of this EP.

4.3.2 *Step 2 - Identify and classify*

A complete list of all relevant persons that may be affected from either the planned activities or the unplanned activities, including the assessment of their relevance, their assigned relevant person category, their functions, interests and activities and subsequent consultation Level is provided in Appendix E.

4.3.2.1 Regulation 25(1)(a)-(c) relevant persons

To identify relevant persons in accordance with Regulation 25(1)(a)-(c), Esso use the methods as outlined in Table 4-2. The full list of Regulation 25(1)(a)-(c) relevant persons is shown in Appendix E-1.

Table 4-2 Relevant persons identification methods

Method	Description
Relevant persons previously identified for other activities	
Review of Esso's existing relevant person database	Identify existing relevant persons based on Regulation 25(1)(a-c) and the: • activity description • scope • geographic location.
Actively seek out new relevant persons	
Regulation 25(1)(a)-(c)	Search for any Commonwealth or State departments, agencies or ministers related to any of the values and sensitivities listed in Section 3.2 and located in either the OA, ATBA or EMBA.

4.3.2.2 Identification of Regulation 25(1)(d) relevant persons

To identify relevant persons in accordance with Regulation 25(1)(d), Esso used the methods as outlined in Table 4-3. The full list of Regulation 25(1)(d) relevant persons is shown in Appendix E-1

Table 4-3 Regulation 25(1)(d) Relevant persons identification methods

Method	Description
Relevant persons previously identified for other activities	
Review of Esso's existing relevant person database	Identify existing relevant persons based on Regulation 25(1)(d) and: • area of planned activities and geographic location of potentially affected areas from unplanned activities • reasonably ascertainable functions, interests or activities • provide information bulletins, Consultation Hub and Esso Consultation Questionnaire.
Actively seek out new relevant persons	
Local knowledge	Use local knowledge of existing relationships to identify marine users and interest groups active in the area.
Existing relevant persons	Ask existing relevant persons to share information bulletins, Esso Consultation Hub and Esso Consultation Questionnaire with anyone they consider may be interested.

Method	Description
Seek advice of First Nations groups	Esso Consultation Hub including information bulletin and Esso Consultation Questionnaire provided to all First Nations groups identified in the EMBA. Potentially relevant First Nations peoples are identified using the AIATSIS map of Indigenous Australia, overlaid with the geographical information of the OA (and EMBA if applicable). Government resources such as State Government spatial data sets are also utilised to identify potentially relevant Aboriginal Land Councils, Registered Aboriginal Parties and Registered Aboriginal Community Organisations. Continued engagement with GLaWAC.
Community sessions	Consider the attendees of community information sessions.
Recommendations	Consider recommendations received from relevant persons via responses provided in the Esso Consultation Questionnaire or through consultation with them.
Searches of internet sources	Google, social media platforms using the geographical boundaries of the EMBA. Search for any potentially relevant persons related to any of the values and sensitivities listed Section 3.2. Search using methodology in Section 4.2.4.1.
Advertisements in newspapers and other relevant news sources	Advertised in national, state, regional and local papers using the geographical boundaries of the EMBA including *Koori Mail*. Community sessions advertised on Instagram (exxonmobil_aus).
Review of legislation applicable to petroleum and marine activities	Following on from (Santos NA Barossa Pty Ltd v Tipakalippa, 2022) Esso conducted a further review of worker unions, eNGOs, First Nations groups and communities within the geographic boundary of the EMBA.
Offshore wind industry	Search of the National Electronic Approvals Tracking System to access publicly available information concerning offshore electricity infrastructure licences under the *Offshore Electricity Infrastructure Act 2021* (Cth).
Self-identification	
Broad-based information sharing	Relevant persons self-identify in response to Esso's broad-based information sharing mechanisms, such as the Esso website, *Connection* magazine, advertisements etc.
Other means	Relevant persons self-identify.

4.3.2.3 Identification of Regulation 25(1)(e) relevant persons

To identify relevant persons in accordance with Regulation 25(1)(e), Esso has reviewed the existing stakeholder database to see if there are any other persons or organisations that Esso believes are relevant. These persons were added to the list of relevant persons and assigned an appropriate consultation Level. The full list of Regulation 25(1)(e) relevant persons is shown in Appendix E-1.

4.3.2.4 Persons or organisations Esso chooses to contact

As part of Esso's ongoing stakeholder relationship management activities, Esso may choose to contact other persons and organisations that did not meet the Regulation 25(1) categories. For the purposes of consultation, they may not be relevant persons.

The persons and organisations in this category may include those who:

- do not have a function, interest or activity that overlapped with either the OA, ATBA or the EMBA and were not going to be impacted by the activities outlined in this EP
- have an interest in Esso's other activities (e.g. onshore facilities in Longford or Hastings) and were notified as part of our ongoing communications with them
- have a broader industry interest and are included in our broader communications
- Esso approached to clarify what their functions, interests and activities are, or whether they may be affected.

4.3.3 Step 3 - Assign

In order to confirm the appropriate Regulation 25(1) category and assign the appropriate consultation Level to each identified relevant person, a consultation workshop was held on 20 May 2024 with Esso consultation advisors and relevant subject matter experts.

Factors considered in the workshops, specific to the Turrum Phase 3 production drilling activities, include:

- the OA is within the existing 500m PSZ
- the well sites are located within existing Commonwealth fisheries that may be used by commercial fishers
- the 500m PSZ is pre exisiting
- there may be recreational fishing in the area but unlikely to be significant given the existing PSZ in place and the location is within the existing ATBA
- the duration of the work, estimated to be 300 days
- there is no known Sea Country mapping currently available
- relevant government departments are known
- the functions, interests and activities of the relevant person(s) or organisations identified and their known preferred methods of communication
- Esso's relationship with the relevant person or organisation e.g. when did Esso last engage with them? On what topic? What are their levels of interest? Is Esso currently consulting with them on other activities?
- the environmental values and sensitivities have been assessed in the impact and risk assessment as risk category 3 or 4 per Section 5 and 6 of this EP
- if the relevant person/organisation can provide input to the design of the or management of the planned activities have been identified.

A complete list of all identified relevant persons, their assigned consultation Level and the justification for the consultation Level, as per the process outlined in Section 4.2.5 is provided in Appendix E-1.

4.3.4 Step 4 - Verify

A link to the Esso Consultation Questionnaire was emailed to every person in the stakeholder database to verify:

- which Esso activities they wish to be consulted on
- how they would prefer Esso to communicate with them
- which functions, interests or activities that may apply to them
- any group(s) they are represented by a member of, or participate in
- if they wish to be consulted through their representative.

Esso confirmed representation for the groups outlined in Table 4-4.

Table 4-4 Relevant person representatives

Relevant person	Representative for
South East Trawl Fishing Association	Incorporated association representing commercial fishers in Commonwealth South East Trawl Sector, Scalefish Hook Sector (SHS), Shark Gillnet and Shark Hook Sectors (SGSHS), and small pelagic fishery.
Seafood Industry Victoria	Representative peak body for the Victorian seafood industry, from professional fishers, through to wholesalers, processors, and retailers, predominately in State waters.
Lakes Entrance Fishermen Limited	Represents Lakes Entrance commercial fishing by providing a full-service unloading facility to the local fishing fleet. From here, fresh seafood is distributed to local shops.

4.3.5 Step 5 - Consult

Turrum Phase 3 production drilling activities consultations began in October 2023 using various methods and continued until submission of this EP in December 2024.

4.3.5.1 Consultation timing

For the nature and scale of the activity described in this EP, Esso determined the minimum 30 days would provide a reasonable period for relevant persons to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.

All relevant persons were consulted for a minimum of 30 days and some up to several months. Esso has met the requirement to provide a reasonable period for consultation.

4.3.5.2 Provision of sufficient materials

Esso developed an information bulletin to provide each relevant person with sufficient information, in accordance with Regulation 25(2), by providing an overview of the proposed activity including information on the activity description, scope, timing, location, risks, impacts, mitigation measures and EMBA information. This information bulletin, as shown in Appendix F-1, was issued in October 2023. A revision of this information bulletin (as shown in Appendix F-2) was shared with stakeholders on 14 May 2024 and remains accessible via the Esso Consultation Hub. Previous revisions of the information bulletin were shared with stakeholders as listed below.

Esso undertook the following consultations with all relevant persons.

- October 2023: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling.
- December 2023: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling.
- February 2024: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling.
- March 2024: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling.
- April 2024: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling.
- May 2024: Email to stakeholders requesting feedback on current and proposed offshore activities including JUR Turrum Phase 3 Drilling with updated Information Bulletin including option of gravel bed.
- June 2024: Follow up email sent to JUR Turrum Phase 3 Drilling EP Classification Level 1 Relevant Persons requesting feedback.
- July 2024: Information Bulletin and request for feedback provided to feasibility licence holders for offshore wind projects off Gippsland's coast.

- August 2024: JUR Turrum Phase 3 Drilling Quick Reference Guide provided to state response agencies requesting feedback.

Esso acknowledges that what is considered sufficient information may vary from relevant person to relevant person. As such, the information bulletin was accompanied with the Esso Consultation Questionnaire, which provides relevant persons with a mechanism to communicate what they consider sufficient information.

4.3.5.3 Community sessions

Over the course of the consultation period for this activity Esso also provided 14 community sessions in the Gippsland area of Victoria:

- Session 1: 7 December 2023, 5.30pm-6.30pm at 201 Esplanade, Lakes Entrance
- Session 2: 29 February 2024, 5.30pm-6.30pm at 201 Esplanade, Lakes Entrance
- Session 3: 29 May 2024, 5:00pm-6:00pm at The Criterion Hotel, 90 Macalister Street, Sale
- Session 4: 30 May 2024, 5:00pm-6:00pm at 201 Esplanade, Lakes Entrance
- Session 5: 21 August 2024, 5:00pm-6:00pm at The Criterion Hotel, 90 Macalister Street, Sale
- Session 6: 22 August 2024, 5:00pm-6:00pm at Off The Wharf café, Bullock Island, Lakes Entrance
- Session 7: 27 August 2024, 5:00pm-6:00pm at Welshpool Memorial Hall, 49 Main Street, Welshpool
- Session 8: 28 August 2024, 5:00pm-6:00pm at Manna Gum Community House, 33 Station Street, Foster
- Session 9: 25 September 2024, 10:00am-1:00pm at Welshpool Memorial Hall, 49 Main Street, Welshpool
- Session 10: 25 September 2024, 3:00pm-7:00pm at South Gippsland Trade Skills Alliance (SGBLLEN) 71 Ogilvy St, Leongatha
- Session 11: 26 September 2024, 3:00pm-7:00pm at Manna Gum Community House, 33 Station Street, Foster.
- Session 12: 22 October 2024, 5:00pm-7:00pm at Yarram Hub, 156 Grant St, Yarram
- Session 13: 23 October 2024, 5:00pm-7:00pm at Manna Gum Community House, 33 Station Street, Foster
- Session 14: 24 October 2024, 5:00pm-7:00pm at South Gippsland Trade Skills Alliance (SGBLLEN) 71 Ogilvy St, Leongatha

To ensure every effort was made to reach relevant persons the community sessions were advertised in various news outlets as shown in Table 4-5 . Examples of advertisements for each session are provided in Appendix G.

In addition to the above activities, in December 2023 and April 2024, Esso staffed a booth and engaged with a wide variety of people at the Sale Community Festival and Air Show in west Sale respectively and provided a Gippsland Basin Activities information bulletin including Turrum Phase 3 Drilling EP information and links to the Esso Consultation Hub.

Table 4-5 Community information session advertisements

News outlet	Session 1 7/12/23	Session 2 29/2/24	Session 3 29/5/24	Session 4 30/5/24	Session 5 21/8/24	Session 6 22/8/24	Session 7 27/8/24	Session 8 28/8/24	Session 9 25/9/24	Session 10 25/9/24	Session 11 26/9/24	Session 12 22/10/24	Session 13 23/10/24	Session 14 24/10/24
Bairnsdale Advertiser	✓	✓	✓	✓	✓	✓	N/A	N/A	✓	✓	✓	N/A	N/A	N/A
Lakes Post	✓	✓	✓	✓	✓	✓	N/A	N/A	✓	✓	✓	N/A	N/A	N/A
Snowy River Mail	✓	✓	✓	✓	✓	✓	N/A	N/A	✓	✓	✓	N/A	N/A	N/A
Koori Mail	✓	✓	✓	✓	✓	✓	N/A	N/A	✓	✓	✓	N/A	N/A	N/A
Herald Sun	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Gippsland Sentinel Times	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The Australian	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Latrobe Valley Express	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Gippsland Voices	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The Bridge, Yarram	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓
Foster Community Online	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓
Prom Coast News	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓
Gippsland Times, Sale	N/A	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

A total of 81 people attended all community sessions with no attendees expressing an interest in the JUR Turrum Phase 3 Drilling activities. The Esso Consultation Questionnaire QR Code was available at the sessions.

Esso also conducts regular meetings with organisations and/or agency representatives of Regulation 25(1)(a)-(c) relevant persons and with groups and/or group representatives identified under Regulation 25(1)(d). Details of these meetings are recorded in the relevant persons database and presented in the Consultation report (Summary) provided in Appendix E-2.

No objections or claims were received from relevant persons, either through face-to-face, email or phone requests, or through responses provided in the Esso Consultation Questionnaire for the Turrum Phase 3 Drilling activities. All communications are recorded in the relevant persons database and presented in the Consultation report (Summary) provided in Appendix E-2.

4.3.5.4 Consultation with First Nations people

The Esso Consultation Hub and Esso Consultation Questionnaire, which provides activity-specific information to the public, was launched and communicated to GlaWAC in July 2023. GLaWAC provided a response to the Esso Consultation Questionnaire nominating to be consulted on specific activities including the South East Australia Carbon Capture and Storage Project and decommissioning activities (not including the JUR Turrum Phase 3 Drilling activities).

Esso commenced JUR Turrum Phase 3 Drilling activity-specific consultation with GLaWAC in October 2023 providing an activity overview (description, location, impacts and risks) and seeking feedback. Engagement with GLaWAC is an ongoing exercise via monthly consultation meetings, emails and phone calls, and includes discussions on Esso's offshore activities and sharing information related to:

- production activities
- decommissioning
- carbon capture and storage.

Specific key messages material was produced and provided by Esso as requested by GLaWAC for use during consultation in February 2024 (including reference to JUR Turrum Phase 3 Drilling).

GLaWAC were provided an opportunity to nominate to be consulted on JUR Turrum Phase 3 Drilling activities but did not make this nomination.

In relation to Traditional Custodian relevant persons, Esso has discharged its duty under Regulation 25. Esso considers that consultation under Regulation 25 is complete. This is on the basis that despite the provision of detailed information, GLaWAC did not nominate to be consulted on the JUR Turrum Phase 3 Drilling activities, nor has GLaWAC requested any further information in relation to the JUR Turrum Phase 3 Drilling activities since consultation commenced in October 2023.

General engagements (beyond the JUR Turrum Phase 3 Drilling activities) with GLaWAC are ongoing:

- AEP facilitated National Sea Country Alliance Summit (Darwin, 6-7 November 2023), which were also attended by GLaWAC representatives
- Esso's discussions (via phone, email and in person) with GLaWAC have included Sea Country mapping, with an offer from Esso to share geospatial and other information which may assist GLaWAC in mapping Sea Country for their IPA application
- a meeting was conducted in GLaWAC offices in December 2023 to discuss GLaWAC's IPA application and identify potential opportunities for Esso to share information that might support this application. A follow-up workshop was held in Esso's Sale office (April 2024) to review potential information to be shared. Esso and GLaWAC are continuing to work together to progress this initiative.

Esso considers these activities as valuable relationship building, as well as facilitating information sharing.

4.3.5.5 Offshore wind industry

Feasibility licences for the offshore wind industry have recently been granted to companies in the Gippsland region. Esso began consultation in July 2024 to establish if these licence holders functions, interests or activities have the potential to be affected by the JUR Turrum Phase 3 Drilling activities and may be relevant persons.

4.3.6 *Broad-based information sharing*

As part of Esso's commitment to engaging with relevant persons to build lasting long-term relationships, a range of broad-based information sharing mechanisms are used. Identified relevant persons can also choose to opt in to distribution lists through the Esso Consultation Questionnaire.

Esso's broad-based information sharing mechanisms are outlined in Table 4-6.

Table 4-6 Broad-based information sharing mechanisms

Mechanism	Description
Periodic updates	Esso uses email distribution to provide updates about Esso's offshore operations and activities, reports or information bulletins to relevant persons as appropriate.
Esso Consultation Hub	A Consultation Hub has been developed and shared with all relevant persons to provide access to information on all offshore activities and the opportunity to request further information and consultation preferences.
Esso Consultation Questionnaire	A Consultation Questionnaire has been developed and shared with all relevant persons to allow Esso to consult with relevant persons based on their preferences: • Which of the following Esso activities would you like to be consulted on? • How would you prefer Esso communicates with you? • Please select any functions, interests or activities that may apply to you • Please select any group(s) you are represented by a member of, or participate in • Do you wish to be consulted through your representative? • How did you hear about our activities?
Connection magazine	Esso's monthly newsletter, which is distributed via email and accessible on the Company website. The magazine provides relevant persons with regular updates on Esso's activities.
Esso website	Esso's website is an online portal that gives broader groups of relevant persons up-to-date information on various facets of our business and provides an opportunity for relevant persons to make enquiries about our offshore activities and projects. The website is updated periodically to reflect new information and activity progress.
Annual Decommissioning Report	Accessible from Esso's website, this Report provides technical, yet accessible, insight into Esso's decommissioning plans and yearly progress. The Report is emailed directly to all relevant persons and shared more broadly with other interested relevant persons.

4.4 Relevant persons feedback

Throughout the consultation process, all relevant persons had the opportunity to contact Esso's consultation and engagement team by emailing consultation@exxonmobil.com, completing the Esso Consultation Questionnaire, calling Esso's Head Office on +61 3 9261 0000 or writing to GPO Box 400 Melbourne VIC 3001.

Esso provides a summary of all responses, objections and/or claims, as well as Esso's assessment of the merits of these and Esso's response in Appendix E-2.

No objections or claims were received from relevant persons, either through face-to-face, email or phone requests, or through responses provided in the Esso Consultation Questionnaire for the scope of this EP.

During the community drop-in sessions, Esso did not receive any feedback from attendees.

Esso considers it has discharged its obligations for consultation under Regulation 25(1) having provided a reasonable period, sufficient information and opportunity for relevant persons to provide feedback, objections and/or claims.

4.5 Ongoing consultation

Following the submission of this EP, Esso will continue communicating with relevant persons to provide activity updates. Updates will include activities within the scope of this EP as well as broader Esso operations. Table 4-7 outlines the ongoing consultation plans for this EP.

In the case that a response is received following the submission of this EP, the response will be considered for potential implications to the EP and feedback clearly communicated to the relevant person.

Table 4-7 Ongoing consultation plan

Relevant person(s)	Planned ongoing consultation mechanism	Timing
All	Information-sharing materials regarding the outcome of this submission. Continuing to respond to specific feedback received via email, phone or meetings. Ensuring the Esso website is maintained and kept up to date. Continuing to develop and distribute regular newsletters and issues of Connection magazine.	As required
Regulation 25(1)(a)-(c)	Conducting regularly scheduled meetings with Commonwealth and State government departments and agencies.	As scheduled
Commercial Fishing Representatives	Meetings to provide updates on all activities.	Quarterly
Relevant persons identified as marine users and relevant Government departments and agencies	Notifications of vessel activities via text message or email where appropriate.	During activity
NOPSEMA	Regulatory notification of start of activity.	10 days prior to activity commencing
	Regulatory notification of cessation of activity.	Within 10 days of activity completion
Newly identified relevant persons	Periodic review of relevant persons using the methods outlined in Step 2 of Esso's methodology (refer to Section 4.2.4) to ensure new relevant persons are identified and consulted. If a new relevant person is identified, consultation will commence by providing an information bulletin containing details of the activity, including information on the potential environmental impacts and risks associated with the activities.	6 monthly

4.6 Reporting

In accordance with Regulation 24, Esso has included within this EP reports on all consultations under Regulation 25 undertaken with any relevant person identified in this EP.

A summary report on all Turrum Phase 3 Drilling-specific consultations undertaken up to the date of submission of this EP is included as Appendix E-2. The summary report is intended to be made public with this EP and does not contain any sensitive information.

Sensitive information relating to relevant persons and the full text of any response by a relevant person to consultation under Regulation 25 in the course of preparation of the EP, also referred to as the 'sensitive information part', is also provided to NOPSEMA as Attachment 1. However, in accordance with Regulation 28(1), the 'sensitive information part' is removed prior to publication.

5 Environmental impact and risk assessment methodology

5.1 Overview

Environmental impact assessment is concerned with activities that are reasonably certain to occur (such as planned discharges to the air or water), while environmental risk assessment is concerned with unplanned events that may possibly occur (such as hydrocarbon spills, introductions of marine pests, loss of waste overboard).

Environmental impacts result from the proposed activity and will result in a change to the environment or a component of the environment, whether adverse or beneficial.

Environmental risks resulting from unplanned activities are those where a change to the environment or component of the environment may occur (i.e., there may be impacts if the event occurs). Risk is a combination of the impact or consequence of an event and the associated likelihood (probability) of the event occurring. For example, a hydrocarbon spill may occur if a support vessel's fuel tank is punctured by a collision during the activity. The risk of this event is determined by assessing the consequence or environmental impact (using factors such as the type and volume of fuel and the nature of the receiving environment) and the likelihood of this event happening (which may be determined qualitatively or quantitatively).

Impacts and risks associated with the proposed activity were identified in an environmental risk workshop held in the Esso offices in February 2024 and March 2024 with the required subject matter experts and in accordance with ExxonMobil's *Environmental Aspects Guide* (ExxonMobil, 2024). This ExxonMobil Guide is consistent with the approach outlined in *ISO 14001 Environmental Management Systems*, *ISO 31000:2018 Risk Management* and *HB203:2012 Environmental Risk Management – Principles and Process*.

From the risk workshop, a risk register is produced which details the outcomes from the risk assessments against each of the aspects against the environmental and socio-economic dimensions outlined in Section 5.4.

5.2 Definitions

Table 5-1 describes terms relevant to the impacts and risk assessments completed.

Table 5-1 Definitions

Term	Definition
Activity	An activity refers to a component or task within a project which results in one or more environmental aspects.
Aspect	An environmental aspect is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental aspects can cause environmental impacts.
Impact (HB203:2012)	Any change to the environment or a component of the environment, whether adverse or beneficial, wholly, or partly resulting from an organisation's environmental aspects.
Risk (HB203:2012)	The effect of uncertainty on objectives. The level of risk can be expressed in terms of a combination of the consequences and the likelihoods of those consequences occurring.
Receptor	The term receptor refers to a feature of the natural and human surroundings that can potentially be impacted. This includes air, water, land, flora, and fauna including people.
Consequence	The consequence of an impact is the outcome of the event on affected receptors. Consequence can be positive or negative.
Likelihood	The likelihood of an impact is the chance (probability) of the impact occurring.

5.3 Identification and characterisation of environmental aspects

In order to undertake meaningful impact and risk assessment, a clear understanding of the context of the assessment is required, by defining the activity and the receiving environment, and understanding any requirements (legislative or other) which are relevant to either the activity or the environment.

All components of the activity have been identified and described in Section 2. After describing the activity component, an assessment of the associated environmental aspects was carried out during the environmental impact and risk assessment workshops to identify environmental receptors and potential interactions between the activity and the receiving environment. The existing environment in the region is described in Section 3. The interactions, or environmental aspects associated with this activity have been identified as shown in Table 5-2.

Based upon an understanding of the environmental aspects, impacts and risks were defined and ecological and social receptors identified enabling a systematic evaluation to be undertaken. Feedback received during relevant person consultation (as detailed in Section 4) has been incorporated into the aspects, receptors, impacts and risks identification and evaluation.

Table 5-2 Activity and aspect matrix

Activity	Physical presence – Seabed disturbance	Physical interaction – Other marine users	Sound emissions	Emissions to air	Light emissions	Planned discharge – Drilling fluid and cuttings	Planned discharge – Treated bilge and deck drainage	Planned discharge – Sewage and food waste	Planned discharge – Cement	Planned operation discharge – Subsea	Planned operation discharge – Operational surface	Physical interaction – Marine fauna	Physical interaction – Introduction of invasive mairne species	Accidental release – Dropped objects	Accidental release – Waste	Accidental release – LOC: hazardous/non-hazardous substances	Accidental release – LOC: refined oils (collision)	Accidental release – LOC: reservoir hydrocarbons
	Planned Activity Environmental Aspects									Unplanned Event Environmental Aspects								
Contingency conductor installation	-	Yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cutting discharge	-	-	-	-	-	Yes	-	Yes	Yes	-	-	-	-	-	-	-	-	-
Cementing operations	-	-	-	-	-	-	-	Yes	Yes	-	-	-	-	-	-	-	-	-
Well evaluation	-	-	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Completion operations	-	-	-	-	-	-	-	-	-	-	Yes	-	-	-	-	-	-	-
JUR operations	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	-	-	-	-	Yes	Yes	Yes	Yes	-	-
Support vessel operations	-	Yes	Yes	Yes	Yes	-	Yes	Yes	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	-
ROV operations	Yes	-	-	-	-	-	-	-	-	-	-	-	-	Yes	-	Yes	-	-
Helicopter operations	-	-	Yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.4 Environmental impact assessment

Environmental impacts, or consequences, are evaluated in terms of the degree of the effects and the sensitivity of the environment and the community. Esso evaluates three environmental effects dimensions (scale, duration, and intensity) (Table 5-3 and Table 5-5) and three environmental sensitivity dimensions (irreplaceability, vulnerability, and influence) (Table 5-4 and Table 5-6) (ExxonMobil, 2024).

The determination of impact severity involves evaluating each dimension as lower, moderate, or higher based on qualitative descriptions. Once each dimension is evaluated, results for effect and sensitivity are compared against criteria to define the overall environmental and public impact consequence level (Table 5-7). These determinations are made during the Environmental Impact and Risk Assessment Workshops (ENVIDs).

Table 5-3 Evaluation of environmental effects dimensions

Effect dimension	Value	Description
Duration	Short-term (lower)	Hours to days; effects highly transitory.
	Medium-term (moderate)	Weeks to months. Trigger/cause is temporary; effects decline over time. For chemicals, consider persistence, breakdown product, and bioaccumulation potential in determining effects duration.
	Long-term (higher)	Years: effects are ongoing. For chemicals, consider persistence or bioaccumulation potential in determining effects duration.
Size/scale	Localised (lower)	Within or near an operational site, facility, etc.; affecting an area similar to or smaller than a typical operational site (for small and/or mobile sources); effects are physically contained/controlled; not a significant portion of any sensitive area.
	Moderate	Affecting an area significantly larger than a typical operational site, facility, etc.; a significant portion of a habitat, watershed or single ecological area; a significant portion of the range or occurrence of a population of a species.
	Widespread (higher)	Encompassing entire ecosystems, watersheds, or bioregions (landscape-scale); affecting most of the global range or occurrence of a species; having a noticeable impact on corporate-level environmental performance reporting.
Intensity	Minor (lower)	Minor changes to wildlife, habitat, water occurrence/drainage, or vegetation; low density. For chemical effects: low concentration or hazard* potential.
	Moderate	Moderate or partial changes to habitat, water occurrence/flow, ground cover, ground stability, vegetation or wildlife. For chemicals, moderate concentrations, bioaccumulation or hazard[1] potential; sub-lethal, non-reproductive direct or indirect effects on organisms.
	Significant (higher)	Notable changes to, fragmentation of, or elimination of habitat, water drainage/features, ground cover, ground stability, vegetation, and/or wildlife; for chemicals, high concentrations, bioaccumulation, or hazard[1] potential. Significant direct or indirect survival and/or reproductive effects on organisms.

Table 5-4 Evaluation of sensitivity dimensions

Sensitivity dimension	Value	Description (applies to species, ecosystem, and/or ecosystem features/functions/services, all at same scale as consequence)
Irreplaceability	Lower	Common, plentiful.
	Moderate	Less common or plentiful, but not rare or unique.
	Higher	Unique or rare.
Vulnerability	Lower	Healthy, resilient, unthreatened, undamaged, or no remaining natural elements (such as some industrial settings).
	Moderate	Moderately resilient, existing stress or damage not significantly impairing function. Sustainable demand on resources/services.
	Higher	Not resilient or capable of recovery, highly stressed, threatened and/or endangered, functions/services failing (such as collapsing fishery).
Influence	Lower	Providing few or no services (supporting, regulating, provisioning, cultural).
	Moderate	Considered moderately important, providing a range of ecological, cultural, social, or commercial services for humans and biodiversity.
	Higher	Highly productive and/or biodiverse, critical for human well-being (such as subsistence), functions/services provide critical support for key human/biological communities (such as clean water), considered highly important by public.

In addition to the environmental impact evaluation, Esso also evaluates the severity of impacts on socioeconomic receptors such as fisheries and cultural heritage, using the community impact severity interpretation outlines in Table 5-5 and Table 5-6.

The determination of community impact severity involves evaluating each dimension as lower, moderate, or higher based on qualitative descriptions. Once each dimension is evaluated, results for effect and sensitivity are compared against interpretive criteria to define the overall environmental and public impact consequence level (Table 5-7).

This process is also undertaken as part of the ENVID.

Table 5-5 Evaluation of community effect dimensions

Effect dimension	Value	Description
Duration	Short term (lower)	Hours to days; effects highly transitory.
	Medium term (moderate)	Weeks to months. Trigger/cause is temporary; effects decline over time.
	Long term (higher)	Years; effects are ongoing, persistent.
Size/scale	Localised (lower)	Limited to the close surroundings of an operating site, facility, etc.; affecting an area similar to or smaller than a typical operational site (for small and/or

Effect dimension	Value	Description
		mobile sources); effects are physically contained/controlled; affecting less than 100 people.
	Moderate	Affecting an area significantly larger than a typical operating site, facility; affecting between 100-1000 people.
	Widespread (higher)	Affecting a large portion of the community of several communities; affecting more than 1000 people.
Intensity	Minor (lower)	Minor changes to local demographics; low level of immigration; no or small number of resettlements (less than approximately 10 households/businesses); no or minor changes to social status, education, livelihood/income and/or community safety and security; minor effects on availability/accessibility of local goods and services; minor changes to natural and/or cultural resources (water supply, fisheries, foraging/hunting grounds, erosion protection, recreational, spiritual or cultural heritage sites, etc.) no or minor changes to local customs, traditions and lifestyles.
	Moderate	Moderate changes to local demographics; moderate level of immigration; moderate number of resettlements (less than approximately 10-100 households/businesses); moderate changes to social status, education, livelihood/income and/or community safety and security not significantly affecting lifestyle; moderate effects on availability/accessibility of local goods and services; moderate changes to natural and/or cultural resources not significantly affecting functionality (water supply, fisheries, foraging/hunting grounds, erosion protection, recreational, spiritual or cultural heritage sites, etc.); moderate changes to local customs, traditions and lifestyles not significantly affecting cultural identity.
	Significant (higher)	Notable changes to local demographics; high level of immigration; high number of resettlements (greater than 100 households/businesses); significant changes to social status, education, livelihood/income and/or community safety and security notably affecting lifestyle; notable effects on availability/accessibility of local goods and services; notable changes to natural and/or cultural resources significantly affecting functionality (water supply, fisheries, foraging/hunting grounds, erosion protection, recreational, spiritual or cultural heritage sites, etc.); notable changes to local customs, traditions and lifestyles significantly affecting cultural identity.

Table 5-6 Evaluation of community sensitivity dimensions

Sensitivity dimension	Value	Interpretation (applies to communities or members of the community at the same scale as effect)
Irreplaceability	Lower	Average livelihood or income exceeds basic needs; diverse sources of livelihood/income (diverse commercial enterprises/jobs and/or diverse effective forms of agriculture/subsistence); essential goods and services readily available.
	Moderate	Average livelihood or income meet but do not significantly exceed basic needs; moderately diverse sources of livelihood/income (moderate diversity of commercial enterprises/jobs and/or of effective forms of

Sensitivity dimension	**Value**	**Interpretation (applies to communities or members of the community at the same scale as effect)**
		agriculture/subsistence); essential goods and services moderately available (quantity/accessibility moderately limited).
	Higher	Average livelihood or income barely meet or do not meet basic needs; Few or limited sources of livelihood/income (e.g. few if any commercial enterprises/jobs and/or few effective forms of agriculture/subsistence). Essential goods and services not or rarely available.
Vulnerability	Lower	No presence of marginalized or disadvantaged people, groups, or sub-groups (e.g. local Indigenous peoples); natural and/or cultural resources (water supply, fisheries, traditional hunting/foraging grounds, erosion barriers, cultural heritage/recreational areas, spiritual sites, etc.) are healthy, resilient and undamaged; local culture and heritage (cultural identity) well integrated into present lifestyle.
	Moderate	Presence of moderately marginalized or disadvantaged people, groups, or sub-groups (e.g. local Indigenous peoples); natural and/or cultural resources (water supply, fisheries, traditional hunting/foraging grounds, erosion barriers, cultural heritage/recreational areas, spiritual sites, etc.) show existing stressor damage not significantly impairing function; present lifestyle in moderate conflict with local culture and heritage (cultural identity).
	Higher	Presence of highly marginalized or disadvantaged or disadvantaged people, groups, or sub-groups (e.g. local Indigenous peoples); natural and/or cultural resources (water supply, fisheries, traditional agriculture/hunting/foraging grounds, erosion barriers, cultural heritage/recreational areas, spiritual sites, etc.) show existing stress or damage significantly impairing function (e.g. collapse of fisheries, eroded stormwater protection, etc.); present lifestyle in notable conflict with local culture and heritage (cultural identity at threat of dispersal).
Social structure	Lower	Homogeneous cultural identity: no pronounced social group structure or social groups are non-adverse/share common cultural identity; local hierarchy well established and stable; low crime rate; internal community conflicts addressed in a measured manner; social support and benefits (security, education, medical care, etc.) available and accessible via local offices/ institutions or designated representatives, etc.
	Moderate	Moderately homogeneous cultural identity; various cultural identities (e.g. tribes/clans) are well integrated and mostly non-adverse; moderate crime rate; internal community unrests/conflicts result in isolated confrontations without significant impairment to community safety; social support and benefits (security, education, medical care, etc.) moderately available and accessible via local offices/institutions or designated representatives, etc. and/or moderately effective (limited staffing, several hours travel time, moderate reliability, etc.)
	Higher	Highly inhomogeneous cultural identity: dominant cultural identities (e.g. tribes/clans) display significant confrontational tendencies; high crime rate; internal community unrests/conflicts significantly impair community safety; basic human rights for others not regarded; social support and benefits (security, education, medical care, etc.) mostly unavailable or inaccessible and/or mostly ineffective (multiple days travel time, low reliability, etc.)

During the ENVID the environmental and community effects are considered together and assessed to give the worst-case inherent consequence rating (impact or risk without controls in place). Controls are then established and recorded for each of the identified impacts and risks in Section 6 and Section 7 and the overall residual determination of the environmental and public impact consequence is recorded. The outcome of the assessment for each aspect is provided in the residual consequence assessment sub-section in Section 6 and Section 7 and summarised in Table 6-1 and Table 7-1. An impact or risk may have either an environmental consequence or a community (public impact) consequence, or both. If an impact or risk has both consequences, the higher (more conservative) of the two consequence levels is applied.

The controls adopted to reduce and manage the inherent consequence levels are listed for each impact and risk in Section 6 and Section 7 and then detailed with environmental performance objectives, standards and measurement criteria in Appendix H.

Socioeconomic (public impact) consequence (e.g. impact on commercial fisheries or cultural heritage) is defined in four Consequence Levels, I-IV as per the *Risk Matrix Application Guide* (ExxonMobil , 2018) by the scope of the disruption and the size of the population affected, summarised in Table 5-7.

Table 5-7 Determination of environmental and public impact consequence

Consequence Level	Environmental impact	Public impact	Interpretative examples of environmental consequence dimension considerations
I	Potential widespread, long term, significant adverse effects	• Extended (>3 months) national or international media coverage. • Large community disruption or evacuation (>1,000 people). • Closure of major transportation route >24 hours.	Sensitivity of receptors are higher. Effects are longer term and widespread and/or of a higher intensity.
II	Potential localised, medium term, significant adverse effects	• National media coverage. • Medium community disruption or evacuation (100–1000 people). • Closure of major transportation <24 hours.	Sensitivity of receptors are moderate or higher. Effects are medium to long term and/or have a moderate to higher intensity.
III	Potential short term, minor adverse effects	• Public complaints; small community impact (<100 people). • Closure of secondary transportation route <24 hours. • Tier 1 Process Safety Event.	• Sensitivity of receptors are lower to moderate. Effects are medium term and/or moderate intensity, or • Sensitivity of receptors is lower, but effects are longer term/higher intensity, or • Effects are localised, short term and/or low intensity, regardless of receptor sensitivity.
IV	Inconsequential or no adverse effects	• Public complaint. • Temporary closure of minor transportation route. • Minor inconvenience.	Sensitivity of receptors are lower. Effects are generally short term, localised and of low to moderate intensity.

5.5 Environmental risk assessment

5.5.1 Determination of consequence

When assessing the consequence of an unplanned event, the same methodology is used as for determining the consequence of a planned event (as described in Section 5.4).

5.5.2 Determination of likelihood

Once the most severe environmental consequence of an unplanned event is assessed, the probability of the unplanned event occurring is assessed. This is done by assessing the probability for each failure, event, or condition necessary to produce the impact.

In order to ensure that the highest possible risk is identified, scenarios with a lower severity consequence but higher probability and potentially a higher overall risk are also considered. The five categories of likelihood are as shown in Table 5-8.

Table 5-8 Likelihood categories

Likelihood category	Qualitative interpretation guidance	Quantitative interpretation guidance (probability of occurring per year of exposure)
A	Very likely Similar event has occurred once or more at site in the last 10 years. Has happened several times at site or many times in Company.	0.1 to 1
B	Somewhat likely Has happened once before at site or several times in Company.	0.01 to 0.1
C	Unlikely Has not happened before at site or has happened a few times in Company.	0.001 to 0.01
D	Very unlikely Have been isolated occurrences in Company or has happened several times in industry.	0.0001 to 0.001
E	Very highly unlikely Has happened once or not at all in Company. Has happened a few times or not at all in industry.	<0.0001

5.5.3 Determining significance of risk

The combination of consequence severity and likelihood of occurrence determines the level of risk. ExxonMobil's risk framework considers existing controls when determining risk. The overall risk category is given on the basis of the likelihood of the consequence occurring after application of the control measures. The effectiveness of control measures is considered when determining the likelihood of events with control measures in place, i.e. factors such as functionality, availability, reliability, survivability, independence and compatibility of control measures, are considered.

ExxonMobil classifies risk into four risk categories (refer to Figure 5-1). The significance of each Category is as follows:

- **Category 1 Risk:** A higher risk that should have specific controls established in the short term and be reduced as soon as possible.
- **Category 2 Risk:** A medium risk that should be reduced unless it is not reasonably practicable to do so. Reasonably practicable is:
  - the level of resource expenditure is not significantly disproportionate in relation to the resulting decrease of risk.
- **Category 3 Risk:** A medium risk that should be reduced if 'lower cost' options exist to do so. Lower cost denotes follow-up work that can be completed without:
  - allocating extensive engineering, technical, and operations resources, or
  - the need for unit shutdowns or activities which may introduce other risks or use resources that may be more appropriately used to address higher risk category items.
- **Category 4 Risk:** A lower risk that is expected to be effectively managed in base OIMS practices:
  - typically requires No Further Action.
  - risk control measures that are in place to manage the risks to maintain Risk Category 4 should be continued.

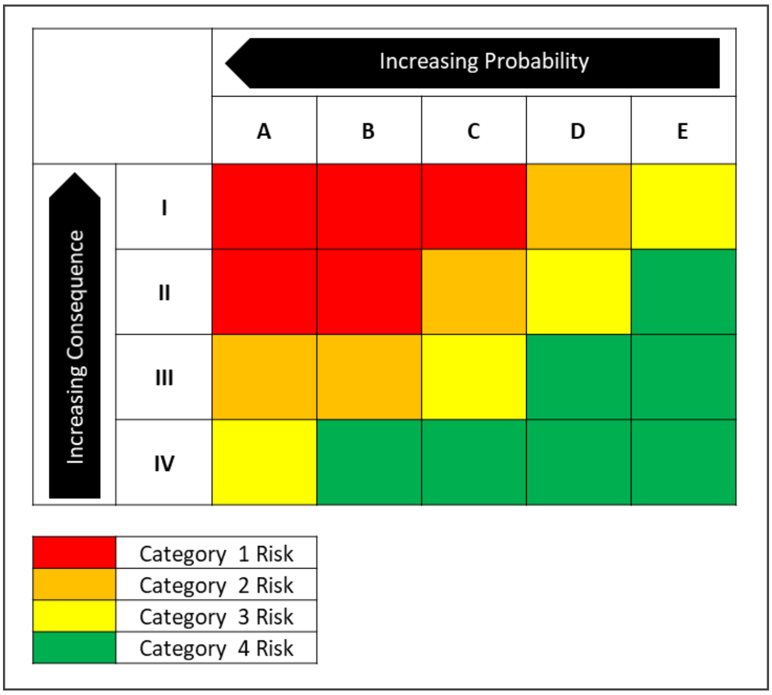

Figure 5-1 ExxonMobil risk matrix

5.6 Demonstration of As Low As Reasonably Practicable

Control measures are selected to reduce either the consequence of an impact or risk, or the likelihood of an unplanned event occurring. Control measures that are required by legislation are adopted regardless of the evaluated impact or risk level. In some cases, the risk or impact level will be so low that no control measures can be identified which reduce the consequence or probability further.

The Regulation 21(5)(c) of the Environment Regulations requires that the EP detail how the control measures will be used to reduce the impacts and risks of the activity to ALARP and to an acceptable level.

ALARP means that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP principle arises from the fact that infinite time, effort and money could be spent attempting to reduce a risk or impact to zero. Where good practice controls measures do not sufficiently reduce the risk or impact level, consideration of additional control measures may be required, including undertaking an assessment of impacts or risks, costs and environmental benefits for identified control measures.

NOPSEMA's guideline *Environment Plan decision making* (NOPSEMA, 2022) states that in order to demonstrate ALARP, a titleholder must:

> *"adopt additional control measures or increase effectiveness of existing control measures if the cost of doing so is not grossly disproportionate to the environmental benefit gained".*

There is no universally accepted guidance to applying the ALARP principle to environmental assessments. In alignment with NOPSEMA's guidance note *ALARP* (NOPSEMA, 2020), Esso has 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 5-2).

Specifically, the framework considers impact severity and several guiding factors:

- activity type
- risk and uncertainty
- relevant person influence.

Good practice controls, (as discussed in Section 5.6.1) are considered sufficient demonstration of ALARP in cases where the risk is relatively well understood, the potential impacts are low, activities are well practised, and there are no conflicts with Company values nor significant media interest. This is referred to as Decision Context A.

An engineering risk assessment is required to demonstrate ALARP in cases where there is greater uncertainty or complexity around the activity and/or risk, the potential impact is moderate, it may attract local media attention and some persons may object. This is referred to as a Decision Context B.

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

Decision Context

Factor	A	B	C
Type of Activity	Nothing new or unusual Represents normal business Well-understood activity Good practice well-defined	New to the organization or geographical area Infrequent or non-standard activity Good practice not well defined or met by more than one option	New and unproven invention, design, development or application Prototype or first use No established good practice for whole activity
Risk and Uncertainty	Risks are well understood Uncertainty is minimal	Risks amenable to assessment using well-established data and methods Some uncertainty	Significant uncertainty in risk Data or assessment methodologies unproven No consensus amongst subject matter experts
Stakeholder Influence	No conflict with Company values No partner interest No significant media interest	No conflict with Company values Some partner interest Some persons may object May attract local media attention	Potential conflict with Company values Significant partner interest Pressure groups likely to object Likelihood of adverse attention from national or international media

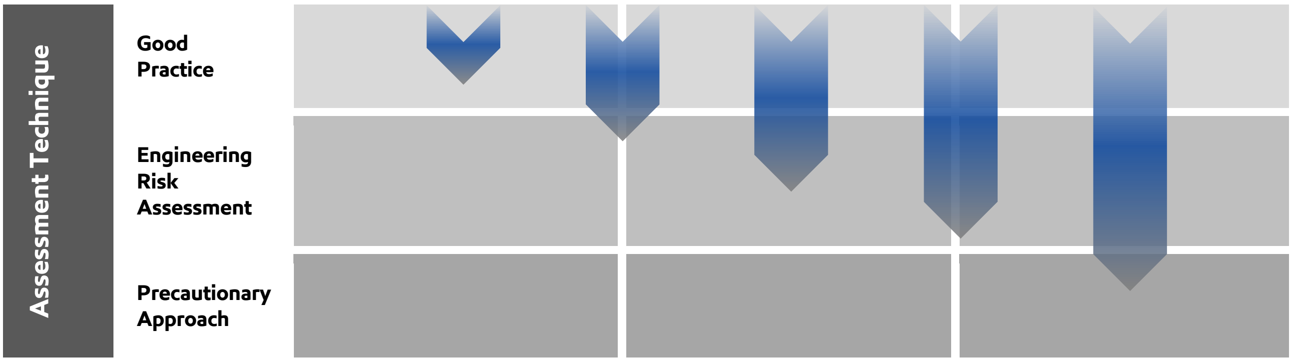

Figure 5-2 ALARP decision support framework, based on OGUK (OGUK, 2014)

The ALARP Decision Context has been identified for each aspect.

5.6.1 Good practice

OGUK (OGUK, 2014) defines good practice as:

> *"The recognised risk management practices and measures that are used by competent organisations to manage well-understood hazards 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
- relevant international conventions.

If the ALARP technique is determined to be good practice (Decision Context A), 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.

5.6.2 Engineering risk assessment

All impacts and risks that require further assessment are subject to an engineering risk assessment (OGUK, 2014) in which a comparative assessment of risks, costs, environmental and socioeconomic benefit is conducted. A cost-benefit analysis should show the balance between the environmental benefit and the cost of implementing the identified measure.

5.6.3 Precautionary approach

If the assessment, considering all available engineering and scientific evidence, is insufficient, inconclusive, or uncertain, then a precautionary approach to hazard management is needed (OGUK, 2014).

A precautionary approach will mean that environmental considerations are expected to take precedence over economic considerations, and a control measure that may reduce environmental impact is more likely to be implemented.

5.7 Demonstration of acceptable level

One of the objects of the Environment Regulations is to ensure that any petroleum activity carried out in an offshore area is carried out in a manner such that environmental impacts and risks will be of an acceptable level. This is also one of the key criteria for acceptance of an EP.

The acceptable level of environmental impact and risk for each receptor needs to be defined before the Environmental Performance Outcomes (EPOs) can be decided and the evaluation of those impacts and risks can take place.

An ‘acceptable level’ is the specified amount of environmental impact and risk that the activity may have which would not be inconsistent with relevant principles, not compromise management/conservation/protection objectives. The process involves the attainment of relevant person/wider-community views in defining acceptable levels.

Esso considers a range of factors when evaluating the acceptability of environmental impacts or risks associated with its activities. This evaluation works at several levels, as outlined in Table 5-9 and is based on NOPSEMA’s guidance note on *Environment Plan content requirement* (NOPSEMA, 2024).

These factors are used to demonstrate acceptability in Section 6 and Section 7.

Table 5-9 Demonstration of acceptability test

Factor	Demonstration of acceptability	
Risk assessment process for unplanned event	The level of environmental risk is either Category 2, 3 or 4.	
Consequence assessment for planned event	The level of environmental consequence Level III or below.	
Principles of Ecologically Sustainable Development (ESD)	Principles of ESD as per EPBC Act Section 3A.	Applicability to this EP.
	Decision making processes should effectively integrate both long term and short term economic,	This principle is inherently met through the EP assessment process. This principle is not considered separately for each acceptability evaluation.

Factor	Demonstration of acceptability	
	environmental, social and equitable considerations.	
	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.	An evaluation is completed to determine if the activity will result in serious or irreversible environmental damage. Where the activity has the potential to result in serious or irreversible environmental damage, further assessment is undertaken to determine if there is significant uncertainty in the evaluation.
	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.	Where the potential impacts and risk are determined to be serious or irreversible the precautionary principle is implemented to ensure the environment is maintained for the benefit of future generations.
	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	Impact assessment is used to assess whether there are significant impacts to relevant receptors to ensure that biological diversity and ecological integrity is conserved.
	Improved valuation, pricing and incentive mechanisms should be promoted.	Not relevant to this EP.
Legislative and other requirements	All good practice control measures have been identified for the aspect. Acceptable levels identified in relevant EPBC Act-listed species recovery plans or approved conservation advices have been considered. Impacts and risks (where applicable) considered to be consistent with the requirements, expectations and principles of the relevant plans. Impact and risk assessment considers if there are any MNES in the area of the activity and if so, undertakes the activity in a manner that will not have a significant impact on MNES as described by the significant impact criteria in Matters of National Environmental Significance - Significant impact guidelines 1.1 (Department of the Environment, 2013). This includes consideration of the activity in its broadest scope and where possible, adopts control measures to avoid or reduce impacts to MNES. Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the reasonable exercise of right conferred by the titles granted, per OPGGS Act Section 280.	
Internal context	All Esso management system standards and impact or risk control processes have been identified for the aspect.	
External context	Relevant person feedback has been considered during preparation of the EP.	

6 Environmental impact assessment

A discussion of the environmental impacts associated with the activity to be carried out under this EP, the assessed consequences and the control measures that will be implemented to reduce impacts to ALARP and acceptable levels, are presented in this section. Alternative controls identified and considered to ensure impacts are ALARP and comply with the acceptability criteria are also covered. EPOs, controls, Environmental Performance Standards (EPSs), and measurement criteria are provided for each aspect of the planned activities in Appendix H.

The following definitions are used in this EP, as defined in Regulation 5 of the Environment Regulations:

- EPO – 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 (i.e. a statement of the environmental objective
- EPS – a statement of the performance required of a control measure
- Measurement criteria (not defined in the regulations) – defines the measure by which environmental performance used to determine whether the EPOs and EPSs have been met.

A summary of the Impacts and risk assessment is provided in Table 6-1.

Table 6-1 Summary impact assessment

Identifier	Hazard	Inherent Consequence Level	Residual Consequence Level
1	Physical presence - Seabed disturbance	IV	IV
2	Physical interaction - Other marine users	IV	IV
3	Planned discharge- Sewage and food waste	IV	IV
4	Sound emissions	III	III
5	Light emissions	IV	IV
6	Planned discharge – Treated bilge and deck drainage	IV	IV
7	Emissions to air	IV	IV
8	Planned discharge- Cement	IV	IV
9	Planned discharge – Subsea	IV	IV
10	Planned discharge – Surface	III	IV

6.1 Physical presence – Seabed disturbance

6.1.1 Sources of seabed disturbance

Positioning the JUR on location will be undertaken in accordance with an approved JUR move procedure. Once the JUR is in the desired location, the support legs are lowered to contact the seabed and the JUR is jacked up out of the water.

There may be the potential to engage pre-lay or tandem pre-lay anchors to support the safe positioning of the JUR. In the event that anchors are required to be used, ROV pre-lay and post-lay surveys will be required to ensure the proposed location is free from seabed obstacles, including benthic features, identification of any pipelines in the area, and ensure that the JUR can be positioned away from any flowlines, umbilicals, hydraulic flying leads/electrical flying leads, jumpers or pipelines.

Each of JUR's three triangular open truss-type legs is fitted with a spud can-type footing. Sea water is used to ballast the JUR and load the legs to ensure the foundations are satisfactory and that all the spud cans have achieved the required/expected penetration and can adequately support the JUR for the duration of the activities at the site. The total area of seabed disturbance associated with spud can interaction with the seabed is approximately 0.06ha.

Movement of the JUR into position is restricted to favourable metocean conditions only. A predetermined 'soft pin' location of the JUR will be used if adverse metocean conditions arise during the movement of the JUR into position, soft pinning involves extending the legs to be in contact with the seabed (with no jacking load).

When the Turrum Phase 3 production drilling activities are finished and the JUR is to be moved on, the legs are retracted to re-float the vessel. In the unlikely event that difficulties are experienced when retracting the legs, a fixed water jet system can be activated at the top and bottom surface of the spud cans to aid in dislodging the spud cans from the seabed.

Seabed disturbance resulting from the discharge of drilling cuttings is addressed in Section 6.10.

6.1.2 Impacts of seabed disturbance

Impacts of seabed disturbance on receptors, including benthic habitats and assemblages and demersal fish, considered are:

- change in habitat (and smothering)
- change in water quality (increased turbidity in the water column near the seabed).

6.1.3 Impact assessment

6.1.3.1 Change in habitat and smothering.

The benthic habitat within the OA is characterised by a homogenous soft sediment and shelly seabed, infauna communities and sparse epibiotic communities. There are no known sensitive seabed features (such as reefs, sponge gardens, seagrass meadows or scallop beds), so positioning of the JUR will not result in a loss of sensitive habitats.

Any impact will be limited to the immediate vicinity of the Marlin B platform and thus the extent of potential impact is localised. The disturbance may result in the mortality of flora and sessile fauna within this footprint and potentially the mortality of benthic infauna associated with the habitat. However, the area that will be disturbed compared with the overall extent of this habitat in the region is small.

Following departure of the JUR, the soft sediment will be left indented, until seabed currents fill them, but will remain a viable habitat that would be expected to recolonise with benthic species within weeks to months following removal of the equipment (Currie & Isaacs, 2005). As the area that will be disturbed compared with the overall extent of this habitat in the region is small, and there is expected to be rapid recolonisation, there will be no long-term impact expected on the diversity and abundance of benthic fauna.

6.1.3.2 Change in water quality.

Turbidity may occur when seabed sediments are stirred up during placement and removal of spud cans, however this disturbance will settle quickly after the actions are completed (hours, not days).

Any turbidity created is likely to be within the limits of natural variability when considering the turbidity created by currents in the open-water environment of the OA and is not addressed further.

6.1.4 Controls

- CMP1: Pre-activity site inspection
- CMP20: JUR move procedure

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.1.5 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.1.6 *Demonstration of As Low As Reasonably Practicable*

Table 6-2 Decision Context and justification

Decision Context A
Seabed disturbance from offshore activities is a common occurrence both nationally and internationally. Removal of the equipment from the seabed (in this case, JUR legs and spud cans) is well understood and executed in a controlled manner which is accepted by industry. The area of disturbance is known and identified as Consequence Level IV (the lowest level). During consultation with relevant persons, no objections or claims regarding seabed disturbance were made. Esso believes ALARP Decision Context A should apply.

Table 6-3 Good practice controls

Good practice	Adopted	Control	Rationale
JUR site survey	✓	**CMP1:** Pre-activity site inspection	Esso will undertake a seabed ROV survey prior to field activities to confirm status of existing infrastructure, any obstructions in the area, including seabed conditions and anomalies as part of field planning.

Table 6-4 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.1.7 *Demonstration of acceptability*

Table 6-5 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The proposed activities align with the requirements of the OPGGS Act: • Section 280(2) – No interference with the conservation of the resources of the sea and seabed to a greater extent than is necessary for the exercise of the rights conferred by titles granted

Factor	Demonstration criteria	Criteria met	Rationale
			• Schedule 3 (occupational health and safety) of the OPGGS Act and Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 (Cth) (Safety Regulations) – Require the operator of each offshore facility to prepare a Safety Case for submission to NOPSEMA. Activities at a facility, including positioning and jacking operations, must be conducted in accordance with a Safety Case that has been accepted by NOPSEMA.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	Although there is no specific standard related to offshore (i.e. seabed) land use, the controls proposed meet the requirements of the Upstream Standard on Land Use specifically to "avoid use of land within environmentally or socioeconomically sensitive areas" and "site selection process considers impacts on the ecological and social environment".
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements, and • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner. JUR contractor will be selected in accordance with Esso's OIMS procurement processes.
External context	Relevant person concerns have been considered/addressed through the consultation process.	✓	No specific relevant person concerns have been raised concerning seabed disturbance.

6.2 Physical interaction – Other marine users

6.2.1 *Sources of interaction with other marine users*

The movement of vessels within the OA, and the physical presence of the JUR and support vessels has the potential to result in interactions with other marine users such as commercial and recreational fishing vessels, and merchant shipping vessels. The Turrum Phase 3 production drilling activities location is entirely within the MLC PSZ. Commercial vessels are unlikely to be encountered in the OA as the PSZ is within the existing ATBA. The presence of the JUR and associated supply vessels is expected to have minor impacts to commercial fishing while it is in the PSZ.

In order to manage shipping interactions, Esso maintains an ongoing dialogue with AMSA and the Australian Hydrographic Office (AHO) in order to minimise the risk of collisions during marine operations.

There will be no change to the interaction between fishing industry and the platform facility, as the MLC PSZ area will remain unchanged.

Removal of the MLC after production ceases in the future, will be considered as part of Esso's decommissioning program which is described in Esso Bass Strait Environment Plan (AUGO-EV-EMM-002).

This Section is specifically dealing with displacement or interference in a socioeconomic sense; collision risk (and potential diesel spill impacts) is addressed in Section 7.6.

Impacts of interaction with other marine users considered are:

- changes to the functions, interests, or activities of other users through disruption to commercial activities.

Disruption to commercial activities includes:

- diversion from navigation path (displacement of third-party vessels)
- loss of access to PSZ (exclusion from fishing grounds and subsequent loss of catch)
- obstacle to trawling (presence of infrastructure).

6.2.1.1 Change to the functions, interests, or activities of other users – Shipping

Displacement of third-party vessels by the JUR is considered highly unlikely to occur as the Turrum Phase 3 production drilling activities will be occurring inside the existing MLC PSZ, which is located inside the International Maritime Organisation (IMO) approved Bass Strait Traffic Separation Scheme (TSS). The TSS routes shipping traffic away from the OA in accordance with Rule 10 of COLREGs.

In addition, the JUR will be alongside the existing Marlin B platform, which is an already known location and highly visible meaning vessels will have navigation data indicating that there is a permanent facility, and so will have sufficient time to detect the entire operating facility (visually and by radar) and navigate around it (and the PSZ).

If diversion of shipping around the OAs was to occur, it would result in a negligible increase in travel time and fuel cost at most, but in the context of an entire journey, this is not considered significant.

6.2.1.2 Change to the functions, interests or activities of other users – Fisheries

As the OA is an existing PSZ, commercial fishing is prohibited from occurring in the area. Accidental entry of the area may occur.

Based on annual fishing records and the size of the fishing grounds, the proposed activities within the existing Marlin B PSZ are not expected to result in any significant impact to commercial fishing operations (via loss of catches, loss of fishing grounds or damage to fishing equipment) as the Marlin B PSZ is already in place and excludes commercial fishing vessels.

As the JUR will be alongside the Marlin B platform, its presence is not expected to result in any material change to the current likelihood of fishing gear being accidently caught on equipment.

On completion of Turrum Phase 3 production drilling activities, the risk will be unchanged from the current state, as the PSZ already exists, and there will be no additional infrastructure outside of the existing Marlin B platform footprint. The risk is assessed to be equal to the current state of impact upon other marine users which is assessed to be very low.

6.2.2 *Controls*

- CMP2: Petroleum Safety Zone
- CM36: Pre-start notifications

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.2.3 *Residual consequence assessment*

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.2.4 *Demonstration of As Low As Reasonably Practicable*

Table 6-6 Decision Context and justification

Decision Context A
Offshore petroleum operations are widely undertaken both locally, nationally and internationally. The impacts associated with marine user interactions are well managed via legislative control measures. These controls are understood and well implemented by the industry. The use of IMO approved TSSs in accordance with COLREGs have proven to be effective in managing vessel interactions. The Bass Strait TSS is well established. No concerns were raised during relevant persons consultation and the socioeconomic consequence was identified as Consequence Level IV (the lowest level). Esso believes ALARP Decision Context A should apply.

Table 6-7 Good practice controls

Good practice	Adopted	Control	Rationale
PSZs	✓	**CMP2:** Petroleum Safety Zone	NOPSEMA is responsible for administration of PSZs as provided for in the OPGGS Act. PSZs are specified areas surrounding petroleum wells, structures or equipment which vessels or classes of vessel are prohibited from entering or being present in.
Pre-start notifications	✓	**CM36:** Pre-start notifications	Under the *Navigation Act 2012* (Cth), the AHO is responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications including: • Notices to Mariners • AUSCOAST warnings. Details of the PSZ will be published in Notices to Mariners, thus enabling other marine users to plan their activities, and minimising disruption to exclusion zones. Relevant details will be provided to the Joint Rescue Coordination Centre (JRCC) to enable AUSCOAST warnings to be disseminated.

Table 6-8 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.2.5 *Demonstration of acceptability*

Table 6-9 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	Legislation and other requirements considered as relevant include: OPGGS Act: • Section 280 requires that a person carrying on activities in an offshore area under the permit, lease, licence, authority or consent must carry on those activities in a manner that does not interfere with navigation or fishing (among others) to a greater extent necessary than for the exercise of the rights conferred by titles granted. • Section 619 prohibits unauthorised vessels from entering a PSZ. The exclusion of fishing within the PSZ is considered an acceptable impact for safety reasons, in particular to avoid interaction between the subsea facilities and other marine users, a PSZ is required for Esso to exercise the rights conferred by the production title. • *Navigation Act 2012* (Cth) – Chapter 6 (Safety of Navigation) Part 6 deals with safe navigation including provisions about reporting of movement of vessels. Marine Orders are made under the: • Navigation Act 2012 (Cth) • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 (Cth)

Factor	Demonstration criteria	Criteria met	Rationale
			• Marine Orders 1 to 98 – Generally give effect to international obligations and standards and apply to regulated Australian vessels, foreign vessels, and some domestic commercial vessels • Marine Order 18 (Measures to enhance maritime safety) 2013 • Marine Order 27 (Safety of navigation and radio equipment) 2016 • Marine Order 30 (Prevention of collisions) 2016 • Rule 10 of COLREGs.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The proposed controls meet the requirements of the *ExxonMobil Upstream Socioeconomic Management Standard* (ExxonMobil, 2021a) specifically in relation to managing community relations.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 10-1 objective to maintain public awareness and confidence in the Operations Integrity (OI) of operations and facilities.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning interference with commercial activities. Esso consulted with AMSA regarding legislative control measures.

6.3 Planned discharge – Sewage and food waste

6.3.1 Sources of sewage and food waste discharges

Vessels and facilities used in the oil and gas industry vary in size but often include accommodation facilities for crew and passengers. The crew and passengers will generate wastes, including food wastes (or putrescibles), and the use of ablution, laundry and galley facilities will result in the generation of sewage and grey water which are treated before being routinely discharged to the marine environment.

The average volume of putrescible waste from each vessel depends on the number of persons on board and is estimated at 1 - 2kg/person/day (NERA, 2017). Total volumes of sewage and grey water (from the use of ablution, laundry and galley facilities) typically generated at offshore facilities ranges between 0.04 - 0.45m^3/person/day (NERA, 2017). Assuming 112 people working on the JUR each day (the maximum POB for the rig) and 15 people on a support vessel (a total of 127 people – maximum POB on the JUR and one support vessels), this equates to a range of 5.08 – 57.15m^3 of sewage and grey water discharged daily.

6.3.2 *Impacts of sewage and food waste discharges*

Impacts of the discharge of sewage or food waste considered are:

- change in water quality (temporary and localised increase in nutrients and biological oxygen demand)
- change in fauna behaviour (changing predator/prey dynamics from increased scavenging behaviours).

6.3.2.1 Change in water quality.

The PBW and several protected seabirds such as shearwaters, albatrosses and petrels have foraging habitat overlapping the OA and EMBA.

Sewage will be treated through sewage treatment plants to the MARPOL standard, so there are no potential impacts relating to the release of particulate matter, chemicals, and pathogens in untreated sewage.

Nutrients in sewage, such as phosphorus and nitrogen, may contribute to eutrophication of receiving waters (although usually only calm, inland waters) causing algal blooms, which can degrade aquatic habitats by depleting oxygen levels, reducing light levels and producing certain toxins, some of which are harmful to marine life and humans. Given the tidal movements and currents in deep open waters, eutrophication of receiving waters will not occur.

Discharges will disperse and dilute rapidly, with concentrations of wastes significantly dropping with distance from the discharge point. The effects of sewage and sullage discharges on the water quality at Scott Reef were monitored for a drill rig operating near the edge of the deep-water lagoon area at South Reef. Monitoring at stations 20m, 50m, and 100m downstream of the rig and at five different water depths confirmed that the discharges were rapidly diluted in the upper 10m water layer and no elevations in water quality monitoring parameters (e.g. total nitrogen, total phosphorous and selected metals) were recorded above background levels at any station (Woodside Energy, 2011).

The receptors with the greatest potential to be impacted are those in the immediate vicinity of the discharge. Given that sewage discharges from vessels and facilities are at or near the surface, and are buoyant discharges, the receptors with the potential to be impacted are also those within or on surface waters, for example, plankton, fish and other marine fauna.

Plankton forms the basis of all marine ecosystems, and plankton communities have a naturally patchy distribution in both space and time (ITOPF, 2011). They are known to have naturally high mortality rates (primarily through predation), however in favourable conditions (e.g. supply of nutrients), plankton populations can rapidly increase. Once the favourable conditions cease, plankton populations will collapse and/or return to previous conditions. Plankton populations have evolved to respond to these environmental perturbations by copious production within short generation times (ITOPF, 2011). However, any potential change in phytoplankton or zooplankton abundance and composition is expected to be localised, typically returning to background conditions within tens to a few hundred metres of the discharge location (Abdellatif, Ali, Khalil, & Nyonje, 1993) (Axelrad, et al., 1981) (Parnell, 2003).

Effects on environmental receptors along the food chain, namely, fish, reptiles, birds and cetaceans are therefore not expected beyond the immediate vicinity of the discharge in deep open waters.

6.3.2.2 Change in fauna behaviour.

The overboard discharge of macerated food wastes has the result of creating a localised and temporary food source for scavenging marine fauna or seabirds, whose numbers may temporarily increase as a result. This in turn can provide an increase in food source for predatory species. The rapid consumption of this food waste by scavenging fauna, and physical and microbial breakdown, ensures that the impacts of putrescible waste discharges are insignificant and temporary.

6.3.3 *Controls*

- CM9: Class certification

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.3.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.3.5 Demonstration of As Low As Reasonably Practicable

Table 6-10 Decision Context and justification

Decision Context A
Discharge of sewage, greywater and food waste offshore (from vessels and other facilities) is a commonly practised activity. The potential impacts are well regulated via various treaties and legislation, both nationally and internationally, which specify industry best practice control measures. These are well understood and implemented by the industry. Monitoring programs have been undertaken previously and a Consequence Level IV (the lowest level) identified. No objections or claims were raised by relevant persons with regard to the discharge of sewage and food waste. Esso believes ALARP Decision Context A should apply.

Table 6-11 Good practice controls

Good practice	Adopted	Control	Rationale
MARPOL Annex IV Regulations for the Prevention of Pollution by Sewage from Ships. MARPOL Annex V Regulations for the Prevention of Pollution by Garbage from Ships.	✓	**CM9:** Class certification	The vast majority of commercial ships are built to and surveyed for compliance with the standards (i.e. Rules) laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the International Convention for the Safety of Life at Sea (SOLAS), the 1988 Protocol to the International Convention on Load Lines and MARPOL. A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO Rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex IV Regulations for the Prevention of Pollution by Sewage from Ships specifically requires vessels (as appropriate to class) to hold an International Sewage Pollution Prevention certificate. Sewage treated in a MARPOL compliant sewage treatment plant may be discharged no less than three nm from shore, and untreated sewage no less than 12nm. MARPOL Annex V Regulations for the Prevention of Pollution by Garbage from Ships specifically requires that food waste is macerated or ground to particle size <25mm. Macerated food waste may be discharged no less than 3nm from shore and unmacerated food waste no less than 12nm (and not within the PSZ of fixed platforms).

Good practice	Adopted	Control	Rationale
			Note these requirements are applied to the JUR as well.

Table 6-12 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.3.6 *Demonstration of acceptability*

Table 6-13 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The requirements of MARPOL Annexes IV and V have been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of MARPOL in Australia: • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • *Navigation Act 2012* (Cth) – Chapter 4 (Prevention of Pollution) • Marine Order 96 (Marine pollution prevention — sewage) 2018 • Marine Order 95 (Marine pollution prevention — garbage) 2018.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The proposed controls meet the requirements of the ExxonMobil's Upstream Water Management Standards specifically "to comply with regulatory requirements and legally binding arrangements related to waste management" and "meet specified discharge criteria" including MARPOL requirements.

Factor	Demonstration criteria	Criteria met	Rationale
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning sewage and food waste discharges.

6.4 Planned emissions - Sound

6.4.1 *Sources of sound emissions*

Table 6-14 summarises the sources of sound that will be generated for this activity.

Table 6-14 Summary of underwater sound sources

Sound source	Impulsive sound?	Continuous sound?	Duration of sound
JUR	No	Yes – engines, onboard machinery, drill string	Duration of activity (300 days)
Support vessels	No	Yes – DP thrusters, onboard machinery	Duration of activity – while transiting in the PSZ (300 days)
ROV	No	Yes – small motor and propeller	Several hours periodically across the duration of the program
Helicopters	No	Yes – rotor operation	Approximately 15 minutes each trip while in the OA
Conductor pile driving (Marlin B contingency only)	Yes – operation of hydraulic driving hammer	No	15-30 days
Subsea positioning equipment (ultra-short base line (USBL) transponders	Yes – short 'chirps'	No	Duration of activity (300 days)

Table 6-15 defines the acoustic terms used throughout this Section.

Table 6-15 Acoustic terminology used in this impact assessment

Term	Definition
Sound	A time-varying pressure disturbance generated by mechanical vibration waves travelling through a fluid medium such as air or water.
Decibel (dB)	Sound is measured on a logarithmic scale that expresses the ratio of two values of a physical quantity. It is used to measure the amplitude or 'loudness' of a sound. As the dB scale is a ratio, it is denoted relative to some reference level, which must be included with dB values if they are to be meaningful. The reference pressure level in underwater acoustics is 1 micropascal (µPa), whereas the reference pressure level used in air is 20µPa, which was selected to match human hearing sensitivity. As a result of these differences in reference standards, sound levels in air are not equal to underwater levels. There are four main metrics for underwater sound (ISO/DIS 18405.2:2017) – SEL, SPL, PK and PK-PK, all described in this table.
Frequency	The rate of oscillation of a periodic function measured in cycles-per-unit-time. The reciprocal of the period. Unit: hertz (Hz). 1Hz is equal to 1 cycle per second.
Source level	A measure of sound pressure at a nominal distance of 1 m from a theoretical point source that radiates the same total sound power as the actual source. Source level can be expressed as an SPL, SEL or PK. Unit: dB re 1µPa^{2}m^2 (pressure level) or dB re 1µPa^{2}m^{2}s (exposure level).
Impulse/Pulse	The terms used to refer to the discharge of a sound source are impulse and pulse, therefore the terms used to describe a single discharge are per-impulse or per-pulse.
Sound exposure level (SEL)	A measure related to the sound energy in one or more pulses, or the ratio of the time-integrated squared sound pressure to the specified reference value. Unit: dB re 1µPa^{2}s.
Peak-to-peak sound pressure (PK-PK) Impulsive sounds	Sum of the peak compressional pressure (highest pressure variation) and the peak rare factional pressure (lowest pressure variation) during a specified time interval. PK-PK is the difference between the minimum and maximum instantaneous sound pressure levels in a stated frequency band attained by an impulsive sound. Unit: dB re 1µPa.
Zero-to-peak sound pressure (PK)	The greatest magnitude of the sound pressure during a specified time interval. The PK levels are modelled to assess mortality and potential mortality to fish larvae and eggs, fish and turtles. A simple sound wave and three common methods to characterise the loudness of sounds, including zero-to-peak sound pressure. Unit: dB re 1µPa.

Term	Definition
Root-mean-square 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 over the duration of the acoustic event (i.e. the duration of a single sound pulse). Because the SPL represents the effective sound pressure over the full duration of the acoustic event rather than the maximum instantaneous peak pressure (PK or PK-PK), it is regularly used to represent the effective or perceived loudness of a sound and to assess the potential for a behavioural response from marine fauna. Unit: dB re 1µPa.
Temporary threshold shift (TTS) in hearing	TTS is the temporary loss of hearing sensitivity caused by excessive noise exposure. Exposure to sufficiently intense sound may lead to an increased hearing threshold in any living animal capable of perceiving acoustic stimuli (Finneran, 2016). If this shift is reversed and the hearing threshold returns to normal, the effect is called a TTS. The onset of TTS is often defined as threshold shift of 6dB above the normal hearing threshold (Southall, et al., 2019). Impairment to the hearing apparatus of a marine animal may result from a fatiguing stimulus measured in terms of SEL, which considers the sound level and duration of the exposure signal. Intense sounds may also damage the hearing apparatus independent of duration, so an additional metric of PK is needed to assess acoustic exposure impairment risk.
Permanent threshold shift (PTS) in hearing	PTS is the permanent loss of hearing sensitivity caused by excessive noise exposure. It is considered an auditory injury. If a temporary threshold shift (TTS) does not return to normal, the residual shift is called a PTS.
Behavioural response	The context of sound exposure plays a critical and complex role in behavioural responses in marine mammals (Gomex, et al., 2016). For example, different species (and different individuals or groups within a species) may respond differently to varying levels of sound depending on their behaviours and motivation at the time (depending on whether they're foraging, socialising, resting or mating) and other factors such as the type of sound, duration of exposure, and the suddenness of the onset of the received sound (Ellison, Southall, Clark, & Frankel, 2012) (Gomex, et al., 2016). The National Marine Fisheries Service (a devision of NOAA) in the USA uses an impulsive noise criteria threshold of 160dB re 1µPa (SPL) for potential behavioural disturbance to marine mammals (NOAA, 2019). The threshold for behavioural response represents the level at which a moderate behavioural response may occur, such as changes in swimming speed, direction and dive profile, localised deviations in migratory patterns, brief to moderate shift in group distribution, short term cessation or modification of vocal behaviour (McCauley, et al., 2000) (Southall B. , et al., 2007) (Tyack, 2008). Avoidance, however, is not directly related to sound level thresholds but also influenced by the state of the individuals (e.g. their reproductive, health and foraging condition) and the context of exposure. It is considered that avoidance behaviour represents only a minor effect on either the individual or the species unless avoidance results in displacement of whales from areas of biological importance such as nursery, resting or feeding areas during an important period for the species. Higher received levels are not always associated with stronger behavioural responses and vice versa, and a clear dose-response relationship has not been identified (Southall B. , et al., 2007). In addition, a behavioural response does not necessarily equate to a significant avoidance or deviation in cetacean movements that would actually displace individuals or the population from the wider area. Similarly, proximity of the animal to the sound

Term	Definition
	source, irrespective of received level, has been identified as an influencing factor, with behavioural response in humpback whales being both dependent on the proximity of whale to the vessel source and also the received level (i.e. at the same received level no behavioural response was detected when the source was greater than 3km away) (Dunlop, 2016).
Masking	Acoustic masking may occur when a noise impedes the ability of an animal to perceive a signal (Erbe, Reichmuth, Cunnigham, Lucke, & Fooling, 2015) (Wood, Southall, & Tollit, 2012). For this to occur the noise must be loud enough, have similar frequency content to the signal, and must happen at the same time (Wood, Southall, & Tollit, 2012). Masking and the potential effects of masking on communication and listening space of marine mammals are not fully understood and remain an area of active research (Cunnigham & Mountain, 2014) (Tenneson, 2016) (Cholewiak, et al., 2018) (Dunlop, 2016) (Gabriele, Ponirakis, Clark, Wombe, & Vanselow, 2018) (Putland, Merchant, Farcas, & Radford, 2018). Currently, there are no specific received level thresholds for reliably assessing or regulating masking responses to underwater noise (Gomex, et al., 2016).

6.4.1.1 Jack-up rig

Fixed structures such as JURs have lower radiated sound levels than floating platforms (NCE, 2007) because they do not use thrusters or propellers to maintain station. Equipment operating onboard these facilities can contribute to marine environment sound however, airborne, and structure-borne (vibration) pathways are considered more significant on floating platforms where equipment can be located below the water line (NCE, 2007).

Underwater noise produced from structures standing on metal jack-up supports (legs and spud cans) is relatively low given the small surface areas available for sound transmission via the legs and 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) (NCE, 2007).

Quantitative analysis of fish and invertebrate assemblage dynamics in association with a North Sea oil and gas installation complex (Todd, Edward, Lavallina, & Macreadie, 2018) reported on the near-field recordings of underwater noise from the sides of a JUR during drilling operations in the North Sea (water depth of 40m). The reported decidecade received levels for drilling operations (25Hz to 12.5kHz) were back propagated in *Esso Bass Strait Operations Modelling: Assessing Marine Fauna Sound Exposures* (Matthews, Connell, & McPherson, 2023) (Appendix I) to provide conservative estimates of the Monopole Source Level. The spectrum was extrapolated by continuing the attenuation of the last decidecade, that is assuming a 10dB per decade at frequencies below 25Hz and 25dB per decade at frequencies above 12.5kHz. This was used to estimate the SPL of 172.9dB at 1μPa/m associated with JUR operations.

6.4.1.2 Support vessels

Support vessel activities are described in Section 2.6.2. A support vessel may at times be 'on standby' outside the 500m PSZ. When on standby, a support vessel will reduce to the minimum number of thrusters and power required for safe navigation. A support vessel will only come alongside the JUR (and remain alongside using DP) during loading/offloading which typically takes less than six hours. Only one support vessel will be alongside the JUR at any one time.

Underwater sound that radiates from vessels is produced mainly by propeller and thruster cavitation. The typical sound levels generated by vessels are broadband and typically increase with increasing vessel size. Sound levels tend to be the highest when thrusters are used to position the vessel (DP) and when the vessel is transiting at high speeds.

Vessels will operate under the *International Guidelines for The Safe Operation of Dynamically Positioned Offshore Supply Vessels* (IMCA, 2022) which means that normally, vessels operate at levels less than 50% capacity. These guidelines are used to develop the Activity Specific Operating Guidelines (ASOG) for each vessel and include safe operating limits (based on relevant factors and primarily include power consumption and thruster output levels).

Currently, Esso's support vessel fleet requirements are being met by the *Skandi Darwin*, *Skandi Feistein and Skandi Kvitsøy (Feistein and Kvitsøy* are sisterships*).* The Monopole Source Levels and the spectra for the *Skandi Feistein* were previously measured during a monitoring program conducted by JASCO Applied Sciences (Australia) Pty Ltd (JASCO) for Esso (Matthews, Connell, & McPherson, 2023) (Appendix I) and so would apply to the sistership the *Skandi Kvitsøy* (and be indicative of any other platform support vessel that may be used). As the *Skandi Darwin* has greater installed power than the *Skandi Feistein and Skandi Kivitsøy* (*Feistein* has 6,160kW; *Darwin* has 7,130kW) the *Skandi Darwin* was used in the modelling as a conservative approach. The acoustic source level and spectrum were scaled up to give an estimated broadband energy source level for the vessels of 173.8dB re 1μPa^{2}m^{2}s (Muellenmeister et al., 2023) to allow for appropriate assessments of the sound emissions for representative vessels that will be used in these activities.

Tow vessels will be used to assist with towing and positioning the JUR to a new location, they will not be in the OA at any other time. Support vessels are not used alongside the JUR while it is being towed or positioned. Tow vessels engaged in towing do not utlise DP in routine tow operations. Cumulative noise effects from towing vessels and support vessel is not credible as these operations do not occur concurrently.

6.4.1.3 Helicopters

Helicopters will be used to transport personnel and freight to the JUR, which is currently approximately 10per week. Helicopter operations produce strong underwater sounds for brief periods when the helicopter is directly overhead (Richardson, Greene, Malme, & Thomson, 1995). The received sound level underwater depends on the helicopter altitude and lateral distance, from the receiver depth and water depth.

Sound emitted from helicopter operations is typically below 500Hz and sound pressure is greatest at surface in the water directly below a helicopter, but this diminishes quickly with depth. Reports using the data for a Bell 214 helicopter (stated to be one of the noisiest) show it being audible in the air for four minutes before it passed over underwater hydrophones, and detectable underwater for 38 seconds at 3m depth and 11 seconds at 18m depth (Richardson, Greene, Malme, & Thomson, 1995). Noise from helicopter activities is therefore localised and infrequent.

Given this short duration of underwater detection and the limited number of flights each week, helicopter noise is not considered to be significant in contributing to potential impacts to marine fauna and is not considered to contribute to cumulative impacts of noise sources, and is therefore not assessed further in this EP.

6.4.1.4 Remotely operated vehicles

In recognition that there is little information about the acoustic signatures of ROV and other subsea vehicles, (Stimpert, Brijonnay, Madrigal, Wakefield, & Yoklavich, 2019) reported on a study undertaken to investigate the sound generated by an ROV. A continuously recording passive acoustic monitor was attached to a stationary surveillance platform in rocky habitat off southern California (120m water depth) and collected data over six days in October 2016 during which ROV activity was underway. Baseline ambient underwater noise in the area during the time of the experiment was estimated at 99 +/−3dB re 1μPa RMS (50–500Hz) with calm sea and wind conditions. This level of sound is below that which could cause behavioural effects on marine fauna.

Based on the results (Stimpert, Brijonnay, Madrigal, Wakefield, & Yoklavich, 2019), sound emanating from the automated underwater vehicle will have negligible impacts on marine mammals and fish, so it is not credible that sound generated from ROV operations in the water column or at the seabed would contribute to underwater sound levels to any discernible extent and is therefore not assessed further in this EP.

6.4.1.5 Subsea positioning equipment

Subsea positioning equipment consists of several transducers and receivers positioned on the subsea infrastructure and the JUR. Subsea positioning systems typically emit short pulses of medium to high frequency sound, normally within the range of 15 to 40kHz. The estimated SPL would be 180 to 206dB re 1μPa @ 1m (Jiménez-Arranz et al, 2020). Transmissions are not continuous but consist of short 'chirps' with a duration that ranges from three to forty milliseconds. Transponders will not emit any sound when on standby (Jiménez-Arranz et al, 2020).

The distances to SPL isopleths for a comparable USBL system in open water calculated the distance to 160dB re 1μPa (SPL)[1] to be 36m (Austin, Warner, & McCrodan, 2012). As subsea positioning equipment does not generate significant underwater noise, it is not considered further in this EP.

6.4.1.6 Existing Esso operations

The Turrum wells are located at the Marlin B platform. Operational platform facilities generate low levels of noise. As outlined in Volume 2, Table 6-1 of the Bass Strait Environment Plan (AUGO-EV-EMM-002), platform-generated noise reduces to ambient underwater sound levels (120dB RMS) within 130m of the platform, indicating that impacts will be highly localised (Richardson, Greene, Malme, & Thomson, 1995). Platform generated noise will be continuous throughout the life of the platform. Impacts are highly localised and will not result in a permanent change to ambient noise levels following completion of operations, therefore impacts will have no adverse effects. The combination of two or more sources of noise (e.g. platform operations, JUR and support vessels) will increase sound levels, though this is expected to be marginal, generally a few decibels. Cumulative underwater sound impacts associated with existing Esso operations are expected to be negligible, with noise generated by the support vessel expected to be the dominant sound source. Therefore, cumulative sound impacts are not assessed in this EP.

6.4.1.7 Conductor driving

Conductor driving activities (if required) include the installation of 20″ (508mm) and 26″ (660mm) well conductors at the Marlin B platform. It is estimated up to six conductors will be installed. The conductors will be installed using a hydraulic pile driving hammer. Modelling commissioned by Esso for the conductor driving (see Section 6.4.4.2) indicates the following broadband SEL levels at each of the modelled pile penetration depths at a horizontal range of 10m:

- at 15.3m penetration depth – 165.5dB re 1μPa^{2}s
- at 40.0m penetration depth – 165.0dB re 1μPa^{2}s
- at 64.7m penetration depth – 167.1dB re 1μPa^{2}s.

The modelling results and impact assessment are provided in Section 6.4.4.

The conductors will be installed using a hydraulic pile driving hammer using the JUR to hold the hammer in place.

6.4.2 Impacts of sound emissions

Drilling and vessels produce continuous noise. Continuous noise is a category of sound that is described by continual non-pulsed sound. Continuous noise can be tonal, broadband or both. Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (i.e. rapid rise -time) (Southall B. L., et al., 2007). Due to the continuous non-pulsed properties of continuous noise, the risks and severity of potential impacts to marine fauna is lower than that of impulsive noise.

The impacts and risks resulting from underwater sound are generally well understood with regard to potential mortality and/or physiological injury for species in the water column, however, uncertainty lies in understanding the spatial and temporal extents of behavioural disturbances and the potential effects on populations and requires the application of context-specific information. The potential environmental impacts to marine fauna from high levels of underwater sound are:

- physical injury to auditory tissues or other air-filled organs
- hearing impairment:
    - temporary threshold shift (TTS) – the temporary loss of hearing sensitivity caused by excessive noise exposure, or
    - permananent threshold shift (PTS) – a permanent loss of hearing sensitivity caused by excessive noise exposure, considered an auditory injury.

[1] 160dB re 1μPa (SPL) is the behavioural threshold for marine mammals for impulsive sounds.

- direct behavioural effects through disturbance or displacement, and consequent disruption of natural behaviours or processes (e.g. foraging, migration, resting, calving or spawning), and
- indirect behavioural effects by impairing/masking the ability to navigate, find food or communicate, or by affecting the distribution or abundance of prey species.

Specifically, underwater sound from the activity has the potential to adversely affect the following environmental values and sensitivities within and in the vicinity of the activity area, to varying degrees:

- plankton (including commercially important fish larvae/eggs)
- marine invertebrate assemblages
- fish:
  - mobile pelagic and demersal species that are likely to move away as sound levels increase
  - site-attached/dependent fish species associated with reef habitats. These species are less likely to move away and are expected to seek shelter within reef areas where present.
- cetaceans:
  - foraging, migrating and transient whales known to occur in the region (e.g. PBWs and SRWs)
  - dolphin species (e.g. bottlenose dolphin, common dolphin)
- pinnipeds - foraging habitat
- foraging habitat for seabirds
- target species for commercially important fisheries.

6.4.3 *The Environment That May Be Affected by underwater sound*

6.4.3.1 Jack-up rig

Esso commissioned JASCO Applied Sciences (Matthews, Connell, & McPherson, 2023) (Appendix I) to undertake underwater sound modelling for various scenarios in Bass Strait, two of which included a drilling campaign from a JUR, an attendant support vessel and a supply vessel (see Section 6.4.4.2). In these scenarios, the support vessel is assumed to be keeping station within a nominal 2km × 4km box, just outside the 500m PSZ around the JUR. The results of the study predict that for marine mammals, the distance to the TTS threshold extends to 245m from the JUR for low-frequency cetaceans (LFC) and 30m for high-frequency cetaceans (HFC), while PTS is not triggered. Behavioural thresholds in this study were only predicted with attendant support and supply vessels, not for the JUR on its own, so a distance to behavioural threshold for the JUR alone is not available from this study.

On this basis, emissions predominantly below 120dB re 1µPa with non-continuous (less than one second) levels exceeding this to a range of approximately 1.4km in the frequency band 8.9Hz to 44.7Hz (infrasonic and low frequency) as measured in the Marine Acoustics Inc study (2011) is expected to be indicative of the EMBA for low frequency sound levels emitted by the JUR during drilling activities.

Based on this information, and using marine mammals as the most sound-sensitive marine fauna, the EMBAs for underwater sound from a JUR are:

- behavioural threshold – 1.4km
- TTS – 245m
- PTS – not triggered.

6.4.3.2 Support vessels

McCauley (1998) measured underwater broadband noise of up to 182dB re 1 µPa at 1m from support vessels when holding position using DP alongside a drill rig, with levels decreasing by around 34dB within 50m, and dropping to around 120dB re 1µPa at approximately 3 - 5km from the source, depending on water depth, seabed composition and other factors.

Esso commissioned JASCO Applied Sciences (Matthews, Connell, & McPherson, 2023) (Appendix I) to undertake underwater sound modelling for various scenarios in Bass Strait, as outlined in the sub-section above, and the same TTS and PTS predictions apply to the support vessels as they do to the JUR. However, with regard to behavioural response, with a support vessel closest to the JUR and using DP thrusters, the greatest distances to the behavioural threshold for marine mammals was predicted to be 2.9km.

Note the only time a support vessel will be using DP thrusters is when it is alongside the JUR to undertake unloading/loading activities. This is expected to be two to three times per week.

Based on this information, and using marine mammals as the most sound-sensitive marine fauna, the EMBAs for underwater sound from a support vessel are:

- behavioural threshold – 2.9km (when support vessel is alongside JUR using DP thrusters only)
- TTS – 190m
- PTS – not triggered.

6.4.3.3 Conductor driving

Esso commissioned JASCO to undertake a modelling study of impulsive underwater sound emissions from conductor driving at Marlin B for these Turrum Phase 3 production drilling activities (Connell, Koessler, & McPherson, 2023) (Appendix J). Conductor driving activity is a contingency activity only as outlined in section 2.6.5

The underwater sound EMBA is the geographical area where noise levels are predicted to be above the relevant worst-case underwater noise thresholds.

Underwater sound modelling for conductor driving at Marlin B platform (impulsive sound) has been conducted to represent the worst-case scenario for underwater sound, despite the activity having a short duration of 15 - 30 days out of the 300 day activity duration. Other sources of underwater sound that are predominantly continuous sound sources from routine marine activities, described in previous sections, can be assessed using existing scientific literature, whereas the impact assessment for conductor pile driving is strongly influenced by project-specific engineering, water depth and seabed type, thereby making modelling essential to undertake an accurate impact assessment.

The results of the conductor driving (impulsive noise) predict that the largest distances to underwater noise thresholds are:

- behavioural response threshold (cetaceans): 450m for SPL
- TTS for LFCs: not reached for peak pressure level (PK), and 2.93km for SEL_{24hr}
- PTS for LFCs: not reached for PK, and 670m for SEL_{24hr}.

Specific impact thresholds for each species and/or hearing group are described in Section 6.4.4.

6.4.3.4 Other sound sources

Other sources of sound for the activities (ROV, USBL transponders and helicopters) will result in small EMBAs. Table 6-16 summarises the EMBAs, with the largest EMBA for continuous sound coming from the support vessel, and the largest EMBA for impulsive sound coming from conductor pile driving. As such, these other sources of sound are not assessed further in the EP.

Table 6-16 Summary of underwater sound EMBAs

Sound source	Sound type	EMBA
JUR	Continuous	Behaviour: 1.4km
Support vessels when alongside the JUR using DP thrusters	Continuous	Behaviour: 2.9km TTS: <50m
Conductor pile driving (Marlin B contingency only)	Impulsive	• Behaviour: 450m • TTS: 2.93km (SEL_{24h}) • PTS: 670m (SEL_{24h})
ROV	Continuous	Expected to be tens of metres
Helicopters	Continuous	Expected to be tens of metres

Sound source	Sound type	EMBA
Subsea positioning equipment (USBL transponders)	Impulsive	Expected to be tens of metres

6.4.4 Impact assessment – Conductor driving (contingency only)

Underwater sound modelling predicts the distances from operations at which underwater sound levels reach noise effect thresholds and criteria. Due to the variety of species considered, there are several different thresholds for evaluating effects, including: mortality, injury, temporary reduction in hearing sensitivity, and behavioural disturbance. The corresponding marine mammal thresholds include levels associated with behavioural response, PTS and TTS. The marine mammal functional hearing groups considered were low-, high- and very high-frequency cetaceans and otariid seals.

JASCO performed a modelling study of underwater sound levels associated with the impact driving of a conductor casing at the Marlin B platform (Connell, Koessler, & McPherson, 2023) (Appendix J). JASCO modelled a hydraulic hammer (IHC S-150 impact hammer) for use with driving a single conductor pile at one location. Estimated underwater acoustic levels were presented as SPLs (SPL, L_p); zero-to-peak pressure levels (PK, L_{pk}), and either single-strike (i.e., per-strike) or accumulated SELs (SEL, L_E) as appropriate for different noise effect criteria and noise sources. The duration period for SEL accumulation was defined as a 24-hour period over which sound energy is integrated; the level is specified with the abbreviation SEL_{24h}.

The total noise exposure (SEL) depends on the total number of hammer blows required to drive the pile. The drivability logs provided by Esso estimated that it would take approximately 5,956 blows (2.3 hour driving at 46 blows per minute) to drive the piles 77m into the substrate with a similar 150kJ hammer.

6.4.4.1 Noise effect criteria

The following thresholds and guidelines were chosen because they represent the best available science, and sound levels presented in literature for fauna with no defined thresholds:

1. Marine mammals (Table 6-17):
    a. Peak pressure levels (PK; $_{Lpk}$) and frequency–weighted accumulated SELs (SEL; $_{LE,24h}$) from Southall et al. (2019) for the onset of PTS and TTS in marine mammals for impulsive sources.
    b. Marine mammal behavioural thresholds based on the current interim U.S. National Oceanic and Atmospheric Administration (NOAA, 2019) unweighted criterion for marine mammals of 160dB re 1μPa (SPL; $_{Lp}$) for impulsive sound sources.
2. Fish, fish eggs, and larvae (Table 6-18):
    a. Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
3. Sea turtles (Table 6-19):
    a. Frequency–weighted accumulated SELs (SEL; $L_{E,24h}$) (Finneran, et al., 2017) for the onset of PTS and TTS in turtles for non–impulsive and impulsive sound sources.
    b. Sea turtle behavioural response threshold of 166dB re 1μPa (SPL; L_p) for impulsive noise, along with a sound level associated with behavioural disturbance 175dB re 1μPa (SPL; L_p) (McCauley, et al., 2000).

Table 6-17 Acoustic effects of impulsive noise on marine mammals: Unweighted SPL, SEL_{24h}, and PK thresholds

Hearing group	NOAA (2019)	Southall et al. (2019)			
	Behaviour	PTS onset thresholds* (received level)		TTS onset thresholds* (received level)	
	SPL (L_p; dB re 1µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1µPa²s)	PK (L_{pk}; dB re 1µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1µPa²s)	PK (L_{pk}; dB re 1µPa)
LFC	160	183	219	168	213
HFC		185	230	170	224
Very high frequency cetaceans		155	202	140	196
Otarid seals (in water)		203	232	188	226

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset.
L_p denotes sound pressure level and has a reference value of 1µPa.
L_{pk} denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1µPa.
$L_{E,24h}$ denotes cumulative sound exposure over a 24 hour period and has a reference value of 1µPa²s.

Table 6-18 Criteria for pile driving noise exposure for fish, adapted from Popper et al. (2014)

Type of animal	Mortality and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	>219dB SEL_{24h} or >213dB PK	>216dB SEL_{24h} or >213dB PK	>186dB SEL_{24h}	(N) Moderate (I, F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	210dB SEL_{24h} or > 207dB PK	203dB SEL_{24h} or > 207dB PK	>>186dB SEL_{24h}	(N) Moderate (I, F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	207dB SEL_{24h} or > 207dB PK	203dB SEL_{24h} or > 207dB PK	186dB SEL_{24h}	(N, I) High (F) Moderate	(N, I) High (F) Moderate
Fish eggs and fish larvae	> 210dB SEL_{24h} or > 207dB PK	(N) Moderate (I) Low	(N) Moderate (I) Low	(N) Moderate (I, F) Low	(N) Moderate (I, F) Low

Type of animal	Mortality and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
		(F) Low	(F) Low		

Peak sound pressure level: dB re 1µPa; SEL_{24h} dB re 1µPa²s.
All criteria are presented as sound pressure even for fish without swim bladders since no data for particle motion exist.
Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

Table 6-19 Acoustic effects of impulsive noise on sea turtles: Unweighted SPL, 24-hour SEL (SEL_{24h}), and PK thresholds

Effect type	Criterion	SPL (L_p; dB re 1µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1µPa²s)	PK (L_{pk}; dB re 1µPa)
Behavioural response	McCauley et al. (2000)	166	NA	
Behavioural disturbance		175		
PTS onset thresholds[1] (received level)	Finneran et al. (2017)	NA	204	232
TTS onset thresholds[1] (received level)			189	226

Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset.
L_p denotes sound pressure level and has a reference value of 1µPa.
L_{pk} denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1µPa.
$L_{E,24h}$ denotes cumulative sound exposure over a 24 hour period and has a reference value of 1µPa²s.

6.4.4.2 Modelling results

This Section presents the per-strike sound fields in terms of maximum-over-depth SPL, SEL, and PK. The different metrics are presented for the following reasons:

- SPL sound fields (Table 6-20) were used to determine the distances to marine mammal and turtle behavioural thresholds
- SEL sound fields (Table 6-21) are used as inputs into the SEL_{24hr} scenario
- PK metrics within the water column (Table 6-22) are relevant to thresholds and guidelines for marine mammals, sea turtles, fish, fish eggs and larvae.

Frequency-weighted SEL_{24h} sound fields were used to estimate the maximum distance and the area ($R_{max\ \%}$) to marine mammals and turtle PTS and TTS thresholds (Table 6-23), and to estimate maximum distance and the area to injury and TTS guidelines for fish (Table 6-24).

Table 6-20 Modelled maximum-over-depth per-strike SPL isopleths: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from each pile and for each penetration depth

SPL (L_p; dB re 1µPa)	Penetration depth 15.3m		40.0m		64.7m	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
200	–	–	–	–	–	–
190	–	–	–	–	–	–
180	–	–	–	–	–	–
175[1]	–	–	–	–	–	–
170	0.05	0.05	0.05	0.05	0.09	0.09
166[2]	0.12	0.12	0.12	0.11	0.15	0.15
160[3]	0.32	0.31	0.31	0.30	0.45	0.44
150	1.15	1.06	1.04	1.01	1.57	1.40
140	3.03	2.77	2.91	2.66	3.42	3.15
130	5.26	4.86	5.04	4.74	5.80	5.40

[1]Threshold for turtle behavioural disturbance from impulsive noise (McCauley et al. 2000).
[2]Threshold for turtle behavioural response to impulsive noise (McCauley et al. 2000).
[3]Marine mammal behavioural threshold for impulsive sound sources (NOAA 2019).
A dash indicates the threshold is not reached within the limits of the modelling resolution (20m).

Table 6-21 Modelled maximum-over-depth per-strike SEL isopleths: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from each pile and for each penetration depth

Per-strike SEL (L_E; dB re 1µPa²s)	Penetration depth (m) 15.3m		40.0m		64.7m	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
190	–	–	–	–	–	–
180	–	–	–	–	–	–
170	–	–	–	–	–	–
162[1]	0.04	0.04	0.02	0.02	0.06	0.06
160	0.07	0.07	0.06	0.06	0.11	0.10
150	0.34	0.33	0.33	0.32	0.49	0.48

Per-strike SEL (L_E; dB re 1µPa²s)	Penetration depth (m)					
	15.3m		40.0m		64.7m	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
140	1.41	1.22	1.28	1.12	1.75	1.57
130	3.29	3.03	3.17	2.91	3.77	3.47

[1]Startle response level for squid (Fewtrell and McCauley 2012).
A dash indicates the threshold is not reached within the limits of the modelling resolution (20m).

Table 6-22 Maximum (R_{max}) horizontal distances (in km) from the pile to modelled maximum-over-depth peak pressure level (PK) thresholds based on Southall et al. (2019) for marine mammals, and Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles, for relevant modelled site with water depth indicated

Hearing group	PK threshold (L_{pk}; dB re 1µPa)	Penetration depth (m)		
		15.3	40	64.7
		R_{max} (km)	R_{max} (km)	R_{max} (km)
PTS				
LFC	219	–	–	–
HFC	230	–	–	–
Very high frequency cetaceans	202	–	–	–
Sea turtles	232	–	–	–
TTS				
LFC	213	–	–	–
HFC	224	–	–	–
Very high frequency cetaceans	196	–	–	–
Sea turtles	226	–	–	–
Fish				
Fish I (also applied to sharks)	213	–	–	–
Fish II, III Fish eggs, and larvae	207	–	–	–

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.
A dash indicates the threshold is not reached within the limits of the modelling resolution (20m).

Table 6-23 Maximum-over-depth distances (in km) to frequency-weighted SEL_{24h} based PTS and TTS for marine mammals (Southall et al. 2019) and sea turtles (Finneran et al. 2017) considering the driving of the entire pile

Fauna group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1µPa²s)	Conductor pile	
		R_{max} (km)	Area (km²)
PTS			
LFC	183	0.67	1.25
HFC	185	–	–
Very high frequency cetaceans	155	0.08	0.02
Sea turtles	203	–	–
TTS			
LFC	168	2.93	24.6
HFC	170	–	–
Very high frequency cetaceans	140	1.02	2.81
Sea turtles	188	–	–

A dash indicates the threshold was not reached within the limits of the modelling resolution (20m).

Table 6-24 Distances to SEL_{24h} based fish criteria in the water column

Marine fauna group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1µPa²s)	Conductor pile	
		R_{max} (km)	Area (km²)
Fish I	219	–	–
Fish II, fish eggs and fish larvae	210	–	–
Fish III	207	–	–
Recoverable injury			
Fish I	216	–	–
Fish II, III	203	–	–
Temporary threshold shift (TTS)			
Fish I, II, III	186	0.63	0.85

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.
A dash indicates the threshold was not reached within the limits of the modelling resolution (20m).

6.4.4.3 Impacts to marine fauna

6.4.4.3.1 PLANKTON

Plankton is widely dispersed throughout the ocean and are transported by prevailing wind and tide driven currents. They cannot take evasive behaviour to avoid anthropogenic sound sources. However, the potential for impacts is limited due to their widespread distribution and rapid population growth rates.

Conductor driving at the maximum penetration depth of 64.7m had sound levels at 167.1 SEL_{24h} (1µPa²s), which did not exceed the criteria for impulsive sound at 210 SEL_{24h} (Table 6-18). Plankton had shown mortality and potential mortal injury when PK levels exceeded 207 dB re 1µPa (Table 6-18) (Popper, et al., 2014), however the results from the JASCO modelling have shown the maximum PK levels would not exceed 207dB re 1µPa (Table 6-22). Based on this evaluation, the impact consequence for plankton resulting from underwater noise generated by conductor driving is assessed as Consequence Level IV at an ecosystem and population level.

6.4.4.3.2 FISH

The effects of underwater sound on fish are expected to be limited to behavioural responses within several thousand metres of the Marlin B platform.

PHYSIOLOGICAL IMPACTS

All fish studied to date are able to detect sound, with the main auditory organs in teleost (bony) fish being the otolithic organs of the inner ear (Carroll, Przeslawski, Duncan, Gunning, & Bruce, 2017). Hearing in fish primarily involves the ability to sense acoustic particle motion via direct inertial stimulation of the otolithic organs or their equivalent. Many species also have the ability to sense sound pressure using an indirect path of sound stimulation involving gas-filled chambers such as the swim bladder (Carroll, Przeslawski, Duncan, Gunning, & Bruce, 2017).

Based on the modelling results in Table 6-22, it is expected that impacts to fish and sharks from conductor driving will be highly localised and have no lasting effect, with the main impact being temporary behavioural changes (avoidance) for those individuals that are close to the Marlin B platform at the time of the activity.

The physiological impacts to fish are assessed as Consequence Level IV, as fish will not have a prolonged exposure to sound emissions from this activity.

BEHAVIOURAL IMPACTS

Behavioural impacts to fish species are considered to be localised and temporary, with displacement of pelagic or migratory fish populations having insignificant repercussions at a population level (McCauley R. , 1994). Behavioural changes such as startle or alarm responses are expected to be localised and temporary, with displacement of pelagic or migratory fish likely to have insignificant repercussions at a population level (McCauley R. , 1994) (Popper, et al., 2015).

Limited research has been conducted on responses from elasmobranchs (sharks and rays, including juveniles) to underwater sound. This may be because sharks and rays differ from bony fish in that they have no accessory organs of hearing (i.e. a swim bladder) and therefore are unlikely to respond to acoustic pressure (Myrberg JR., 2001). Elasmobranchs sense sound via the inner ear and organs and as they lack a swim bladder it is thought that they are only capable of detecting the particle motion component of acoustic stimuli (Myrberg, 2001).

Fish behaviours are highly impacted within tens of metres to the sound source (Table 6-18). In this instance, conductor driving would produce a maximum 187dB re 1µPa²s (Connell, Koessler, & McPherson, 2023), which may temporarily displace fish as they tend to avoid sound sources >90dB (Nedwell, et al., 2007). This activity will not permanently change fish behaviour as conductor driving will occur for a short period of time and fish are expected to behave normally once noise has ceased (Ruggerone, Goodman, & Miner, 2008). Therefore, the impact of conductor driving to fish behaviour is assessed as Consequence Level IV.

6.4.4.3.3 TURTLES

Three EPBC Act-listed species of turtle may occur with the activity area (see Appendix B).

MORPHOLOGY

Morphological studies of green and loggerhead turtles (Ridgeway, Wever, McCormick, Palin, & Anderson, 1969) (Wever, 1978) (Lenhardt, Klinger, & Musick, 1985) found that the marine turtle ear is similar to other reptiles but has some adaptations for underwater listening. A thick layer of fat may conduct sound to the ear in a similar manner as the fat in jawbones of odontocetes (Ketten, Merigo, Chiddick, & Krum, 1999), but marine turtles also retain an air cavity that presumably increases sensitivity to sound pressure. Sea turtles have lower underwater hearing thresholds than those in air, owing to resonance of the middle ear cavity, and hence they hear best underwater (Willis, 2016).

Electrophysiological and behavioural studies on green and loggerhead turtles found their hearing frequency range to be approximately 50 – 2,000Hz, with highest sensitivity to sounds between 200 - 400Hz (Ridgeway, Wever, McCormick, Palin, & Anderson, 1969) (Bartol, Musick, & Lenhardt, 1999) (Ketten & Bartol, 2005) (Yudhana, Sunardi, Abdullah, & Hassan, 2010) (Piniak W. , Mann, Eckert, & Harms, 2011) (Lavender, Bartol, & Bartol, 2012) (Lavender, Bartol, & Bartol, 2014), although these studies were all conducted in-air. Underwater audiograms are only available for three species. One of these species, the loggerhead turtle (Martin, et al., 2012), demonstrated higher sensitivity at around 500Hz (Willis, 2016). Recent work on green turtles has refined their maximum underwater sensitivity to be between 200 - 400Hz (Piniak W. , Mann, Harms, Jones, & Eckert, 2016).

At very close distances to a sounds source, there is also the possibility of temporary hearing impairment or perhaps even permanent hearing damage to turtles. The greatest impact is likely to occur if sound pulses are generated in or near areas where turtles congregate, and in seasons when turtles are concentrated in these areas.

McCauley et al. (2000) found that the threshold for behavioural response, TTS and PTS for turtles to impulsive noise was not met for any sound greater than 175dB re 1 μPa (see Table 6-20). It was found that behavioural response for turtles would begin at 166dB re 1μPa (see Table 6-19), which may occur within 120m to the Marlin-B platform (see Table 6-20). However, the combination of the rare occurrence of turtles and the absence of turtle BIAs, nesting beaches or habitat critical to turtle species in Bass Strait, means that physiological and behavioural impacts to turtles from underwater sound associated with the activity is assessed as Consequence Level IV.

6.4.4.3.4 MARINE MAMMALS

Marine mammal species share basic hearing anatomy and physiology with their terrestrial ancestors but have broader hearing frequency ranges due to the much higher sound speed underwater compared to in air. Odontocetes (toothed whales and dolphins) hear best at higher frequencies, generally in the ultra-sonic range (>20,000Hz), with no responsive hearing below 500Hz (0.5kHz). Mysticetes (baleen whales, such as humpback, blue and SRW) hear better at lower frequencies (Wartzok & Ketten, 1999) (Mooney, Yamato, & Branstetter, 2012), generally at infrasonic frequencies as low as 10 - 15Hz (Park, Evans, Gallagher, & Fitzgerald, 2017). The optimal hearing frequency range for baleen whales is between approximately 20 - 1,000Hz (McCauley R. , 1994).

Sound is very important to whales and dolphins for effective hunting, navigation and communication. For example, mysticetes communicate at low frequencies (20Hz to approximately 5kHz) using predominantly tonal type calls. Odontocetes communicate using both tonal signals (up to approximately 30kHz) and echolocation clicks (peak frequencies range from approximately 40 – 130kHz), which they also use for hunting and navigation (Au, Popper, & Ray, 2000).

PHYSIOLOGICAL IMPACTS

Physiological impacts such as physical damage to the auditory apparatus (e.g. loss of hair cells or permanently fatigued hair cell receptors), can occur in marine mammals when they are exposed to intense or moderately intense sound levels and could cause permanent or temporary loss of hearing sensitivity. This is not expected to occur as a result of the proposed conductor driving, for the reasons outlined herein.

A TTS is hearing loss from which an animal recovers, usually within a day at most, whereas PTS is hearing loss from which an animal does not recover (permanent hair cell or receptor damage). TTS occurs at lower exposure levels than PTS. The cumulative effects of repeated TTS, especially if the animal receives another sound exposure near or above the TTS threshold before recovering from the previous sensitivity shift, could cause PTS. If the sound is intense enough, an animal could succumb to PTS without first experiencing TTS (Weilgart, 2007). While there are results from TTS and PTS studies on odontocetes exposed to impulsive sounds (Finneran, 2016), there is no data for mysticetes.

BEHAVIOURAL IMPACTS

Underwater sound may have non-physiological (i.e. behavioural) effects on cetaceans including:

- increased stress levels

- disruption to underwater acoustic cues
- masking
- behavioural changes
- displacement.

These aspects are discussed further in this Section.

Behavioural responses to underwater sound are difficult to determine because animals vary widely in their response type and strength, and the same species exposed to the same sound may react differently (Nowacek, Johnson, & Tyack, 2004) (Gomex, et al., 2016) (Southall, Nowaceck, Miller, & Tyack, 2016). An individual's response to a stimulus is influenced by the context in which the animal receives the stimulus and how relevant the individual perceives the stimulus to be. A number of biological and environmental factors can affect an animal's response—behavioural state (e.g. foraging, travelling or socialising), reproductive state (e.g. female with or without calf, or single male), age (juvenile, sub-adult, adult), and motivational state (e.g. hunger, fear of predation, courtship) at the time of exposure as well as perceived proximity, motion and biological meaning of the sound and nature of the sound source.

Animals might temporarily avoid anthropogenic sounds but could display other behaviours such as approaching novel sound sources, increasing vigilance, hiding and/or retreating, that might decrease their foraging time (Purser & Radford, 2011). Some cetaceans might also respond acoustically in a range of ways, including by increasing the amplitude of their calls (Lombard effect), changing their spectral (frequency content) or temporal vocalisation properties, and in some cases, cease vocalising (McDonald, Hildebrand, & Webb, 1995) (Parks, Clark, & Tyack, 2007) (Di Lorio & W., 2010) (Castellote, Clark, & Lammers, 2012) (Hotchkin & Parks, 2013) (Blackwell, et al., 2015). Masking can also occur (Erbe, Reichmuth, Cunningham, Lucke, & Dooling, 2015).

The EPBC Act PMST report for Marlin B platform found that five species of threatened cetaceans are likely to, or are known to occur at the Marlin B platform:

- blue whale (endangered)
- PBW (endangered)
- SRW (endangered)
- fin whale (vulnerable)
- sei whale (vulnerable).

These whales are also listed as migratory and are classified as LFCs with respect to the assessment of underwater noise impacts. There are also a number of listed migratory whales reported at Marlin B platform (Table 6-25) as well as a number of other species listed as cetaceans and/or marine species (including dolphins and seals).

Table 6-25 Listed migratory whales reported around Marlin B platform

Species	Presence	Hearing group
Pygmy right whale	Foraging, feeding or related behaviour likely to occur within area	LFC
Humpback whale	Species or species habitat known to occur within area	LFC
Bryde's whale	Species or species habitat may occur within area	LFC
Antarctic minke whale	Species or species habitat likely to occur within area	LFC
Sperm whale	Species or species habitat may occur within area	HFC
Killer whale, orca	Species or species habitat likely to occur within area	HFC
Dusky dolphin	Species or species habitat likely to occur within area	HFC

SEALS

Both the Australian and New Zealand fur seals may occur around the Marlin B platform. The otariid seal (Australian and New Zealand fur seals and Australian sea lion) PTS and TTS criteria were not reached within the limits of the modelled resolution (20m).

Impacts are predicted to be temporary avoidance of the immediate activity area. The consequence is assessed as Consequence Level IV from underwater sound on seals, as there are no biologically important behaviours or BIAs. Seals are observed to regularly haul-out on Esso's platform jackets in Bass Strait and anecdotally they do not appear perturbed by noise emanating from platform and vessel operations.

HIGH FREQUENCY CETACEANS

Neither the HFC PTS or TTS criteria were reached within the limits of the modelled resolution (20m). The PMST report for the activity area identified a number of migratory species (Table 6-25), several dolphin species, beaked and toothed whales, however, no BIAs or behaviours were identified around Marlin B platform and therefore they are not assessed further.

Impacts are predicted to be temporary avoidance of the immediate area of the activity. The consequence is assessed as Consequence Level III as there are no biologically important behaviours or BIAs identified around Marlin B platform.

LOW FREQUENCY CETACEANS

BIAs for PBW known foraging area, foraging (annual high use area) and SRW (migration and reproduction) occur within the wider region. Both the OAs and the behavioural EMBA overlap the foraging (annual high use area) BIA for PBWs and the migration BIA for SRWs.

The furthest distance to the PTS criteria is 670m and the furthest distance to the TTS criteria is 2.93km. Only the behavioural threshold for LFC is triggered by conductor pile driving, with the distance to effect being 450m.

The area affected by the behavioural threshold (0.64km^2) represents a small portion of the PBW foraging BIA (0.0003%). While TTS and PTS are not relevant because they are only triggered by the 24 hour SEL, theoretically the area affected by TTS (26.9km^2, being the largest area) represents a very small portion of the PBW foraging BIA (0.014%). Given these small spatial overlaps, if the activity has a temporal overlap with the presence and/or foraging of PBW, it is unlikely to result in behavioural changes that affect foraging.

For SRW, the area affected by the behavioural threshold does not reach the reproduction BIA and represents a small portion of the migration BIA (0.00002%).

The consequence level for SRW is also assessed in Section 6.4.5.2 against the *National Recovery Plan for the Southern Right Whale* (*Eubalaena* australis) (DCCEEW, 2024).

The consequence is assessed as Consequence Level III for PBWs as there is potential for the temporary displacement of PBWs from a small area if they are present. The consequence is also assessed as Consequence Level III for other LFCs as there are no biologically important behaviours identified around Marlin B platform.

6.4.5 Impact assessment – Continuous sound from support vessels

Support vessels typically emit low levels of sound from propeller cavitation (the dominant sound source), thrusters, hydrodynamic flow around the hull and from onboard machinery (Popper, et al., 2014). The support vessel will use DP to maintain position when it is alongside the JUR for loading/unloading operations; cavitation from the thrust propellers while in DP mode is a significant source of underwater sound. The JASCO modelling report included the representation of future drilling campaigns based upon a JUR with a support vessel, and focused on predicting impacts to marine mammals (Matthews, Connell, & McPherson, 2023).

Scenario 1 (Scenario 16 in the report) is a JUR drilling operation with a support vessel standing by in a nominal 2km × 4km box, 500m from the JUR. Scenario 2 (Scenario 17 in the report) adds a supply vessel alongside the JUR for periods of either two or eight hours. For both scenarios, the modelling site is a generic location between the Barracouta and Kingfish B platforms in a water depth of 60m.

There are several different thresholds for evaluating effects, including: mortality, injury, temporary reduction in hearing sensitivity, and behavioural disturbance. The corresponding marine mammal thresholds include levels associated with behavioural response, TTS and PTS. The marine mammal functional hearing groups considered were low-, high- and very high-frequency cetaceans and otariid seals.

6.4.5.1 Noise effect criteria

The following thresholds and guidelines were chosen because they represent the best available science, and sound levels presented in literature for fauna with no defined thresholds:

1. Marine mammals (Table 6-26):
    - PK levels (PK; L_{pk}) and frequency–weighted accumulated SELs (SEL; $L_{E,24h}$) from Southall et. al. (2019) for the onset of PTS and TTS in marine mammals for non-impulsive sources.
2. Fish, fish eggs, and larvae (Table 6-27):
    - Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
3. Sea turtles:
    - Sound exposure guidelines for turtles (Popper, et al., 2014)(Table 6-27).
    - Threshold criteria for continuous noise on turtles (Finneran, et al., 2017)(Table 6-28).

Table 6-26 Criteria for effects of non-impulsive noise exposure, including vessel noise, for marine mammals: Unweighted SPL and SEL_{24h} thresholds

Hearing group	NOAA (2019)	Southall et al. (2019)	
	Behaviour	PTS onset thresholds (received level)	TTS onset thresholds (received level)
	SPL (L_p; dB re 1 μ Pa)	Weighted SEL_{24hr} ($L_{E,24h}$; dB re 1 μ Pa^2s)	Weighted SEL_{24hr} ($L_{E,24h}$; dB re 1 μ Pa^2s)
LFC	120	199	179
HFC		198	178
Pinnipeds (including otariids) in water		219	199

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset.
L_p denotes sound pressure level and has a reference value of 1μPa.
L_{pk} denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1μPa.
$L_{E,24h}$ denotes cumulative sound exposure over a 24 hour period and has a reference value of 1μPa²s.

Table 6-27 Criteria for continuous sound exposure for fish, adapted from (Popper, et al., 2014)

Type of animal	Mortality and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	(N, I, F) Low	(N, I, F) Low	(N) Moderate (I, F) Low	(N, I) High (F) Moderate	(N, I) Moderate (F) Low
Fish: Swim bladder not involved in	(N, I, F) Low	(N, I, F) Low	(N) Moderate (I, F) Low	(N, I) High (F) Moderate	(N, I) Moderate (F) Low

Type of animal	Mortality and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
hearing (particle motion detection)					
Fish: Swim bladder involved in hearing (primarily pressure detection)	(N, I, F) Low	170 dB rms for 48h	158 dB rms for 12h	(N, I, F) High	(N) High (I) Moderate (F) Low
Fish eggs and fish larvae	(N, I, F) Low	(N, I, F) Low	(N, I, F) Low	(N) High (I) Moderate (F) Low	(N, I) Moderate (F) Low
Sea turtles	(N, I, F) Low	(N, I, F) Low	(N) Moderate (I, F) Low	(N, I) High (L) Moderate	(N) High (I) Moderate (L) Low

RMS sound pressure levels dB re 1 μPa.
All criteria are presented as sound pressure even for fish without swim bladders since no data for particle motion exist.
Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

Table 6-28 Acoustic effects of continuous noise on turtles, weighted SEL, Finneran et al. (2017)

PTS onset thresholds* (received level)	TTS onset thresholds* (received level)
220	200

* L_E denotes cumulative sound exposure over a 24 hour and has a reference value of 1μPa^2 s.

The sound levels and frequency characteristics of underwater sound produced by vessels are related to vessel size and speed. When idle or moving at slow speed between investigation sites, vessels generally emit low-level noise.

Injury (TTS and PTS) is very unlikely to occur in any marine species as a result of vessel operations. The sounds produced by the vessels during this activity will not be outside the range of other anthropogenic sound in the region, such as merchant shipping. Nevertheless, an assessment of the impacts of continuous sound from the support vessel on cetaceans is provided here using the EMBA based on the (Matthews, Connell, & McPherson, 2023) study described in Section 6.4.2 (TTS is <50m and behavioural response is 2.9km).

6.4.5.2 Modelling results

The results of JASCO (Matthews, Connell, & McPherson, 2023) predict distances to TTS of up to 190m around the JUR for LFC (eight hour scenario). This distance is only slightly influenced by the presence of a support vessel and does not change with the location of the support vessel.

The distance to behavioural response threshold, however, is largely influenced by the location of the support vessel on DP in relation to the JUR.

The last set of scenarios (Scenarios 1 and 2) considers the drilling operations of a jack-up rig, an attendant support vessel and a supply vessel. Here, the attendant support vessel is assumed to be keeping station within a nominal

2km × 4km box, just outside the 500m zone around the jack-up rig, whilst the OSV under DP is assumed alongside the rig for periods of 2 hours and 8 hours.

For the scenario most relevant to this activity (i.e. the support vessel attending the JUR whilst alongside using DP thusters with an attendant vessel closest to the JUR but outside the OA), the distance to the behavioural threshold is 2.945km from the JUR as shown in the last column of Table 6-29.

Table 6-29 All distances (in metres) are calculated from the centre of the platform

Effect thresholds			Scenario					
			1		2		2	
			JUR drilling with a support vessel standing by 500m from the JUR		JUR drilling with a supply vessel on DP alongside for 2 hours		JUR drilling with a supply vessel on DP alongside for 8 hours	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	-	-	-	-	-	-
		TTS	160	170	165	170	185	190
	HFC	PTS	-	-	-	-	-	-
		TTS	-	-	-	-	30	30
	Pinnipeds in water	PTS	-	-	-	-	-	-
		TTS	-	-	-	-	-	-
Behavioural response	Attendant vessel closest to the JUR		2,570	2,755	2,800	2,945	2,800	2,945
	Attendant vessel furthest from the JUR (considered less credible for this activity)		2, 840	3,670	2,950	3,700	2,950	3,700

6.4.5.2.1 CUMULATIVE SOUND FROM SUPPORT VESSELS

Having multiple vessels in the PSZ is unlikely to occur as no more than one support vessel is present during JUR activities. It is considered a highly unlikely scenario that the JUR support vessel and a platform supply vessel will be within the same PSZ at the same time. This is because having two vessels in this restricted space presents significant safety risks.

6.4.5.3 Marine fauna

Noise sources from drilling operations that are a continuous broadband (rather than impulsive sound such as piling) are related mostly to behavioural disturbances rather than injury or mortality.

6.4.5.3.1 PLANKTON

There is no data on mortality and potential mortal injury, impairment and behaviour on plankton (Popper, et al., 2014). Therefore, the guidelines provided in Popper et al. (2014) are considered for this activity (Table 6-27). There are low risks to plankton for impairment, behaviour, mortality and potential mortal injury. Based on this evaluation, the impact consequence for plankton resulting from underwater noise generated by support vessels has Consequence Level IV at an ecosystem and population level.

6.4.5.3.2 FISH

There is no direct evidence of mortality or potential mortality to fish from ship sound emissions. The risks of mortality and potential mortality, 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 may be a moderate risk at near distances (tens of metres) from the vessel (Popper, et al., 2014).

Behavioural impacts to fish from the activity will be limited to behavioural responses within metres of the noise source. Fish (including sharks and rays) may be temporarily displaced from the immediate vicinity of the sound source. Because DP is unlikely to occur over a period of 12 hours, and pelagic fish are unlikely to remain static (i.e. they generally swim away from the sound source), it is not anticipated TTS will be reached during DP and therefore, impacts from continuous sound from DP are likely to be insignificant to fish. Therefore, the consequence is assessed as Consequence Level IV.

For fish with a swim bladder involved in hearing, the risks of mortality and potential mortality impacts are low. As the range for support vessels is expected to be a maximum of 173.8db re 1 μPa, fish with a swim bladder may have impairment occur at 170dB RMS for 48 hours (Table 6-27). 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. Additionally, the sound emitted from support vessels would not exceed eight hours, therefore, not reaching the threshold criteria for fish and resulting in Consequence Level IV impacts to fish.

6.4.5.3.3 TURTLES

The Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017) 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) (Table 6-27). Popper et al. (2014) noted that there is no direct evidence of mortality or potential mortal injury to sea turtles from ship sound emissions.

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 (tens 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. Based on this information, turtles may exhibit avoidance behaviour within the OA. Revised thresholds for turtle PTS and TTS for continuous sound were subsequently developed (Finneran, et al., 2017) (Table 6-28). These thresholds were not reached in the current study, therefore the consequence for turtles is assessed as Consequence Level IV (Muellenmeister et al., 2023).

6.4.5.3.4 MARINE MAMMALS

Marine mammal physiological and behavioural impacts from underwater sound are detailed in Section 6.4.4.3.

Unlike the other marine fauna groups detailed in Section 6.4.4.3, marine mammals may express behavioural disturbances alongside injury and mortality. Drilling may cause masking of vocalisations of cetaceans due to the overlap in frequency range between signals and vocalisations. However, due to the limited propagation range of the relevant frequencies, the range at which the impact could occur will be small, within hundreds of meters.

The EPBC Act PMST report for around Marlin B platform (Appendix C) found that five species of threatened cetaceans are likely to, or are known to occur around the platform:

- blue whale (endangered)
- PBW (endangered)
- SRW (endangered)
- fin whale (vulnerable)
- sei whale (vulnerable).

These whales are also listed as migratory and are classified as LFCs with respect to the assessment of underwater noise impacts. There are also a number of listed migratory whales reported around Marlin B platform (Table 6-25) as well as a number of other species listed as cetaceans and/or marine species (including dolphins and seals).

SEALS

Both the Australian and New Zealand fur seals (otariid seals) may occur around Marlin B platform. Impacts are predicted to be temporary avoidance of the immediate area of the vessel. The consequence is assessed as Consequence Level IV from underwater sound on seals, as there are no biologically important behaviours or BIAs,. Seals are observed to regularly haul-out on Esso's platform jackets in Bass Strait and anecdotally they do not appear perturbed by noise emanating from platform and vessel operations.

HIGH FREQUENCY CETACEANS

The PMST report for the activity area identified several migratory species (Table 6-25), several dolphin species, beaked and toothed whales, however, no BIAs or biologically important behaviours were identified within the activity area and therefore they are not assessed further.

Impacts are predicted to be temporary avoidance of the immediate area of the activity. The consequence is assessed as Consequence Level III as there are no biologically important behaviours or BIAs identified around Marlin B platform.

LOW FREQUENCY CETACEANS

The furthest distance to the TTS criteria is 50m and the furthest distance to the behavioural criteria is 2.9km. PTS is not considered credible due to the extended duration (24 hours) for which an individual would need to remain in close proximity to the sound source. Both the OAs and the behavioural EMBA overlap the BIA for PBWs (Foraging – Possible foraging).

The area affected by the behavioural threshold (26km^2) represents a small portion of the PBW known foraging BIA (0.014%). While TTS and PTS are not relevant because they are only triggered by the 24 hour SEL, theoretically the area affected by TTS (0.113km^2, being the largest area) represents a small portion of the PBW foraging BIA (0.0001%). Given these small spatial overlaps, if the activity has a temporal overlap with the presence and/or foraging of PBW, it is unlikely to result in behavioural changes that affect foraging. The same negligible impacts apply to other marine mammals that are migrating through or foraging in the activity area at the time of the activity. For SRW, the area affected by the behavioural threshold is relatively small for the migration BIA (0.001%) and the TTS area for the migration BIA (0.000003%).

Given these extremely small spatial overlaps, if the activity has a temporal overlap with the presence of migrating and/or foraging PBW or the presence of migration SRW, underwater sound generated by the activity will not result in TTS and is unlikely to result in behavioural changes that affect foraging given the vastness of the ocean in which its foraging resources are available. The consequence is assessed as Consequence Level III for PBWs as there is potential for the temporary displacement of PBWs from a small area while foraging. The consequence is also assessed as Consequence Level III for other LFCs as there are no biologically important behaviours identified within the OA.

6.4.6 Impact assessment – Low frequency cetaceans of conservation significance

The key species of conservation significance in the OAs and EMBA are the PBW and SRW (LFC). As such, an assessment of the affects of under sound has been undertaken.

6.4.6.1.1 PYGMY BLUE WHALES

As PBWs are listed as endangered under the EPBC Act and have known biologically important behaviours within the behavioural EMBA, it is appropriate that the principles of ecologically sustainable development as described in Part 3A of the EPBC Act be applied. PBW are a subspecies of blue whales, therefore are considered under this guideline. In the context of potential impacts from underwater noise emissions from continuous sources from this activity, a precautionary approach has been taken in assuming that blue whales may be present, albeit in relatively low numbers, in the Gippsland Basin at any time of year.

The *Conservation Management Plan for the Blue Whale 2015–2025* (Department of the Environment, 2015) (CMPBW) requires that 'anthropogenic noise in BIAs be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area'. *Guidance on Key Terms within the Blue Whale*

Conservation Management Plan (DAWE & NOPSEMA, 2021) defines the requirements further "to ensure that any blue whale can continue to forage with a high degree of certainty in a Foraging Area, and that any blue whale is not displaced from a Foraging Area". Note that in the CMPBW, the OAs occur within an area defined as "possible foraging area" and that in the *Guidance on Key Terms within the Conservation Management Plan for the Blue Whale* (DAWE & NOPSEMA, 2021), the broader term 'foraging' encompasses 'Foraging Area', 'Known Foraging Area' and 'Possible Foraging Area.'

The *Guidance on Key Terms within the Blue Whale Conservation Management Plan* (DAWE & NOPSEMA, 2021) suggests a whale could be displaced from a foraging area if stopped or prevented from foraging, caused to move when foraging, or stopped or prevented from entering a foraging area. A whale is considered to be displaced from a foraging area if foraging behaviour is disrupted, regardless of whether the whale can continue to forage elsewhere within that foraging area.

Underwater sound impact is assessed as Consequence Level III for the blue whale and PBW as there is potential for their displacement while foraging. This is considered acceptable because:

- there is limited data available on the blue whale and PBWs within the region, a precautionary approach (ALARP Decision Context B) has been adopted in considering controls to minimise and/or mitigate potential impacts from underwater noise
- if blue whales or PBWs are present, they are unlikely to be in large numbers
- if blue whlaes or PBWs are present, they are assumed to be foraging
- the CMPBW states that:
  - shipping and industrial noise are classed as a 'minor' consequence (defined as: individuals are affected but no affect at a population level)
  - "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 vessel noise is a continuous noise source and does not have high intensity signals, it is unlikely that it would cause injury to foraging PBW
- the area of overlap for the behavioural threshold is 0.10% for the foraging BIA
- the OA is approximately 569km from the Bonney coast upwelling KEF, which is a known feeding aggregation area (Gill, et al., 2011) (McCauley R. , 1998).

Adopting the controls in Section 6.4.7 aim to prevent PTS, TTS and displacement impacts to blue whales or PBW that may be foraging. *Guidance on Key Terms within the Blue Whale Conservation Management Plan* (DAWE & NOPSEMA, 2021) regarding the definition of 'displaced from a foraging area' states that 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. The implementation of the control measures in Section 6.4.7 and EPS in Appendix H means that blue whale or PBW displacement from a foraging area is unlikely to occur. As such, the activity will be managed in a manner that is not inconsistent with the CMPBW, specifically Action Area A.2. The assessment of advice provided in the CMPBW is provided in Table 6-30.

Table 6-30 Assessment of Conservation Management Plan for the Blue Whale

Description	Justification
A1 - Maintain, implement, and improve efficacy of current legislative and management protection	
1. Continue or improve existing legislative management actions	The EP will implement the following Commonwealth legislation and management arrangements (as outlined in the the *Conservation Management Plan for the Blue Whale):* • Part 8 Division 8.1 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations) (CM8 Vessel Master) • Australian National Guidelines for Whale and Dolphin Watching 2017 (CM8 Vessel Master) • EPBC Act Policy Statement 2.1

Description	Justification
A2 – Assessing and addressing anthropogenic noise	
2. Assessing the effect of anthropogenic noise on blue whale behaviour	The use of JASCO reports and summarised underwater sound reports assist with the commitments that Esso has in relation to this EP.
3. 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	The controls in place (CM8 Vessel Master, CMP26 Fauna Observations and CMP33 Adaptive Management) will ensure that there are no activities undertaken if any blue whales are in the observation area. It is considered with these controls in place and the distance from the foraging BIA that the activities will not prevent any PBW from utilsing the area or cause auditory impairment. Even though there is a very low probability of PBW being present, Esso will apply the precautionary approach and apply the controls.
5. Ensuring behavioural impacts are considered when developing and updating policy documents on the management of cetaceans and anthropogenic noise	The PBW foraging BIA overlaps 0.1% of the OA (Figure 3-3). The incorporation of the BIA into this EP demonstrates that Esso have considered the impacts of the Turrum Drilling activities on PBW foraging. Esso has committed to control measures that will ensure that PBW have reduced impacts from drilling (Section 6.4.7).

6.4.6.1.2 SOUTHERN RIGHT WHALES

The OA and behavioural EMBA both overlap with the SRW migration BIA. The distance between the OA and the SRW reproduction BIA is 39km (see Figure 3-4).

There is the potential for SRWs to be present within the migration BIA at the time of the activity, particularly between April and October. The potential impacts were also assessed against the applicable Recovery Actions in the *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) (Table 6-32). Based on this assessment and controls in place, the sound impacts is assessed as Consequence Level III for SRW.

The SRW may avoid the area where the behavioural criteria are reached but there is no impediment to them continuing to and from coastal aggregation areas. The SRW is a highly mobile migratory species that travel thousands of kilometres between habitats used for essential life functions (DCCEEW, 2024). It is unlikely that calving SRWs would remain in the OA with water depths of 95m, as the whales prefer to occupy water depths of less than 10m during this life phase.

The *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) noted that along the Australian coast, individuals SRWs use widely separated coastal areas (1,600 – 3,800km apart) within a season, indicating substantial coast-wide movement. As such, avoidance of the area is unlikely to prevent or hinder them from undertaking their seasonal migrations.

Conductor driving will only occur at the Marlin B platform (40km away from reproduction BIA), therefore there are no direct effects of underwater sound from conductor driving within the reproduction BIA of SRW. JASCO modelled broadband SEL levels of conductor driving at a horizontal distance of 10m and found the loudest source at 167.1dB re 1uPa^{2}s at 64.7m penetration (Connell et al., 2023). It was found that the received sound level from conductor driving would be at the behavioural threshold (160dB SPL) at 450m (Connell et. al, 2023).

Although 160dB SPL is the recommended threshold for behavioural impacts (NOAA, 2019), there is uncertainty whether SRW have a lower sound threshold for other life stages such as reproduction cycle or juveniles. Therefore, SEL results from the JASCO report will be considered as the precautionary approach for SRW. TTS was reached at 2.93km and PTS was reached at 670m. As a precautionary approach, the observation zone for SRW will be increased up to 3km radius while conductor driving activities are undertaken. This will ensure that SRW (of any age) will not be impacted by underwater sound from conductor driving.

The *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) states that movements of SRW are important to the migrating population and habitat connectivity. The largest area covered by the behavioural EMBA is 0.27% of the SRW migration BIA and is therefore not likely to impede access to areas where biologically important behaviours are known to occur (i.e. reproduction areas in shallow coastal waters).

The *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) states the contribution to the marine soundscape occur mostly off the Gippsland coast of Victoria and the northern NSW coastline, where there is greater vessel traffic from domestic and international shipping transits. Table 6-31 outlines the analysis of the JUR Turrum activities against the *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) requirements.

Table 6-31 Analysis of JUR Turrum Activities against the *National Recovery Plan for the Southern Right Whale (Eubalaena australis)*

Description	Justification
A1 - Maintain, implement, and improve efficacy of current legislative and management protection for SRW	
1. Maintain, implement, and improve efficacy of existing legislation and management arrangements (e.g., Managements Plans and Guidelines) as listed under section 1.2 of the *National Recovery Plan for the Southern Right Whale.*	The EP will implement the following commonwealth legislation and management arrangements (as outlined in Section 1.2.1 of the the *National Recovery Plan for the Southern Right Whale):* • Part 8 Division 8.1 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations) (CM8 Vessel Master, EPS 13) • Australian National Guidelines for Whale and Dolphin Watching 2017 (CM8 Vessel Master, EPS 13) • EPBC Act Policy Statement 2.1 (see A5.4 below)
A5 - Assess, manage, and mitigate impacts from anthropogenic underwater noise.	
2. Actions within and adjacent to southern right whale BIAs and Habitat Critical to survival (HCTS) should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment.	<u>Continuous sound</u> The OAs and behavioural EMBA both overlap with the SRW migration BIA. The closest OA to the SRW reproduction BIA is located 11.3km away (see Figure 3-4). The potential for auditory impairment is when the support vessels are utilising DP thrusters for loading and unloading activities. The controls in place CM8 Vessel Master, CMP26 Fauna Observations and CMP33 Adaptive Management will ensure that there are no activities undertaken if any SRW's are in the observation area. See section 6.4.7 for full assessment and details of controls in place. It is considered with these controls in place and the distance from the migration and reproduction BIA that the activities will not prevent any SRW from utilsing the area or cause auditory impairment. <u>Conductor driving</u>

<table>
<tr><th>Description</th><th>Justification</th></tr>
<tr><td></td><td>Based on the JASCO modelling report, conductor driving activities reach the sound exposure threshold for PTS criteria at 670m and the TTS criteria at 2.93km. SPL thresholds for PTS and TTS were not met. Only the behavioural threshold for SPL for SRW is triggered by conductor pile driving, with the distance to behavioural effect being 450m.

Given the activities are adjacent to the HCTS and that the modelling is based on the behavioural response threshold of 160db SPL it is recognised that the recovery plan highlights the heightened sensitivity of SRW may impact reproductive behaviours. The current uncertainty regarding the effects of anthropogenic noise on SRW these behaviours and life history traits. Even though there is a very low probability of SRW being present, Esso will apply the precautionary approach and apply the following additional controls:
A dedicated platform based trained Marine Fauna Observer (MFO) will be in place for the duration of the conductor driving activities during peak migration season (April to October) which will cover the peak reproduction season (May to September) (See CMP26)
If the activities occur during November to March the trained platform personnel will undertake MFO (See CMP26)
The conductor driving impact EMBA shall be conservatively increased from 450 m to 3 km (covering the furthest distance to TTS threshold criteria) this will be applied to CMP33 and ensure that any SRW present in the larger EMBA adjacent to the HCTS will not be impacted as conductor driving activities will not begin or cease if a whale is present in the larger EMBA zone. (See CMP26)
The activities are not likely to impact the SRW utilising the reproduction BIA as there is no overlap and is not anticipated to inhibit the use of the migration BIA (0.00002% overlap).</td></tr>
<tr><td>3. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised.</td><td><u>Continuous Sound - Support vessels whilst utilsing DP</u>

The OAs and behavioural EMBA both overlap with the SRW migration BIA. The closest OA to the SRW reproduction BIA is located 11.3 km away (see Figure 3-4).

The potential for auditory impairment is when the support vessels are utilising DP thrusters for loading and unloading activities alongside the JUR.

The controls in place CM8 Vessel Master, CMP26 Fauna Observations and CMP 33, Adaptive Management will ensure that there are no activities undertaken if any SRW's are in the observation area. See section 6.4.7for full assessment and details of controls in place.</td></tr>
</table>

Description	Justification
	The activities will not impact the behaviours on SRW due to the controls in place and the distance from the migration and reproduction BIA. There is little overlap with the behavioural EMBA with migration BIA for SRW with 0.0001% overlap for continuous sound. *Conductor driving* The furthest distance to the PTS criteria is 670 m and the furthest distance to the TTS criteria is 2.93 km during conductor driving. Only the behavioural threshold for SRW is triggered by conductor driving, with the distance to behavioural effect being 450 m. Given the activities are adjacent to the HCTS and that the modelling is based on the behavioural response threshold of 160db SPL it is recognised that the recovery plan highlights the heightened sensitivity of SRW may impact reproductive behaviours. The current uncertainty regarding the effects of anthropogenic noise on SRW these behaviours and life history traits. Even though there is a very low probability of SRW being present, Esso will apply the precautionary approach and apply the following additional controls: • A dedicated platform based trained MFO will in place for the duration of the conductor driving activities during peak migration season (April to October), this also will cover the peak reproduction season (May to September) (See CMP 26 EPS17) • If the activities occur during November to March the trained platform personnel will undertake MFO (See CMP26 EPS 16) • The conductor driving impact EMBA shall be conservatively increased from 450 m to 3 km (covering the furthest distance to any TTS) this will be applied to CMP33 and ensure that any SRW present in the larger EMBA adjacent to the HCTS will not be impacted as conductor driving activities will not begin or cease if a whale is present in the larger EMBA zone. (See CMP26, EPS17) The activities are not likely to impact the SRW utilising the reproduction BIA as there is no overlap and is not anticipated to inhibit the use of the migration BIA (0.00002% overlap).
4. 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 SRW to the lowest possible level.	Although there are no seismic surveys in this operation, the control measures align with EPBC Act Policy Statement 2.1 by: • A2: Trained crew (CMP26) - Signed induction records - Verification of competency certificates • A3.1: Pre-start-up visual observations (CMP33) - 30 minutes prior start of works

Description	Justification

	• A3.3 Start-up delay procedure (CMP33)
	- Delay works if SRW is seen during the 30 minutes prior works to commence
	- Continue to delay once SRW has left observation zone or last seen minimum 30 minutes within the observation zone
	• A3.4: Operations procedure (CMP26)
	- Watchkeepers are consistently on the lookout for SRW and other marine megafauna while operations are in progress
	• A4: Compliance and Sighting reports
	- Esso's responsibility to notify DCCEEW within 3 days if there is a cetacean vessel strike (Table 8-9)
	• B4: Increased precaution zones and buffer zones
	- JASCO report has provided modelled distances for cetaceans (including SRW) responses from behavioural, masking, TTS and PTS (Appendix J)
	  - The observation zone is extended to 3km to ensure that juvenile SRW are not impacted by impulsive sound (conductor driving)
	• B.6: Adaptive management (CMP33)
	- Support vessels
	  - If an SRW is observed during loading/unloading operations whilst a support vessel is alongside the JUR, the support vessel will stop operations if safe to do so
	  - If unsafe to stop operations, reduce thrusters as low as possible and adjust heading
	- Conductor driving
	  - A dedicated MFO is on the platform during peak migration (trained observers during off peak season)
	  - The observation radius is extended from 450m to 3km as a precautionary method

5. Quantify risks of anthropogenic underwater noise to SRW, including studies aimed to measure physiological effects, behavioural disturbance, and changes to acoustic communication (e.g., masking of vocalisations) to whales.	Use of JASCO reports to provide modelling results, which assisted with deciding the control measures for this activity.
A6 - Manage, minimise, and mitigate the threat of vessel strike.	

Description	Justification
1. Assess risk of vessel strike to SRW in BIAs.	The Watchkeepers onboard the vessel, will reduce the risk of vessel strike and entanglement as they will be continuously observing for marine megafauna and other marine users. Section 7.1 details the assessment of physical interaction with marine fauna. The risk ranking is Risk Category 4 (the lowest category) as the Vessel Master (CM8): • will follow Part 8 Division 8.1 of the EPBC Regulations and the Australian National Guidelines for Whale and Dolphin Watching 2017 • ensure the vessel is not knowingly travelling faster than 6 knots within 300m of a whale or 150m of a dolphin • ensure the vessel is not knowingly getting closer than 100 m of a whale or 50m of a dolphin • ensure the vessel avoids rapid changes in engine speed or direction if a cetacean approaches the vessel within the above zones
3. Ensure environmental impact assessments and associated plans consider and quantify the risk of vessel strike and associated potential cumulative risks in BIAs and HCTS.	Vessel strike consequences was identified as 'major' in the National Recovery Plan for the Southern Right Whale, however the incorporation of the SRW recovery plan, national guidelines and modelling reports has reduced the likelihood of vessel strike. This is further detailed in Section 7.1.
5. Ensure all vessel strike incidents are reported in the National Ship Strike Database managed through the Australian Marine Mammal Centre, Australian Antarctic Division.	Watchkeepers report SRW vessel strike incidents to these authorities, additional to DCCEEW (Table 8-8).

6.4.7 Controls

- CMP4: Helicopter Pilot
- CM8: Vessel Master
- CMP26: Fauna observations
- CMP33: Adaptive management

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.4.8 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- Consequence Level IV for all marine fauna other than the SRW and PBW where the potential impacts have been conservatively considered to potentially have Consequence Level III.

6.4.9 Demonstration of As Low As Reasonably Practicable

Table 6-32 Decision Context and justification

Decision Context B
Impacts from underwater sound emissions are relatively well understood, however there is the potential for uncertainty in relation to the level of impact.

Decision Context B
Activities are well practised, and there are no conflicts with Company values, no partner interests and no significant media interests. Esso believes ALARP Decision Context B should apply.

Table 6-33 Good practice controls

Good practice	Adopted	Control	Rationale
Part 8 Division 8.1 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) (EPBC Regulations). Australian National Guidelines for Whale and Dolphin Watching 2017 (Commonwealth of Australia, 2017).	✓	CM8: Vessel Master CMP4: Helicopter Pilot	The Vessel Master or Helicopter Pilot has responsibility for ensuring the requirements of these Regulations and Guidelines are followed. The Guidelines describe strategies to ensure whales and dolphins are not harmed during offshore interactions with people. These Guidelines were developed jointly by all State and Territory governments through the Natural Resource Management Ministerial Council and, although more relevant for tourism activities, provide a list of requirements that are generally adopted by the oil and gas industry to minimise the risk of cetacean strike occurring; complying with these guildelines has the added benefit of minimising noise impactsbyensuring minimum distances are maintained from vessel propellers and helicopter rotor blades. Note: Both the lack of visibility of seals in the water and number of seals in close proximity to oil and gas offshore installations make applicability of these Guidelines to seals impracticable. Furthermore, fauna interaction management actions as described in the Guidelines will not prevent seals approaching vessels.

Table 6-34 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Do not undertake the activity	Eliminates underwater sound generation	This is not a feasible option.	Not adopted
Delaying rig moves and supply vessel movements if a PBW or SRW is observed.	Reduce underwater sound generation in behavioural zone.	Straightforward to implement and part of normal operations in accordance with Part 8 Division 8.1 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations). Australian National Guidelines for Whale and Dolphin Watching 2017 (Commonwealth of Australia, 2017).	Adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Trained vessel bridge crew undertake continuous observations	Allows for fauna observations and adaptive management to be undertaken as per CMP26 and CMP33	Bridge crew are trained and competent in whale observation and species identification as part of their normal requirements and ability to comply with Part 8 Division 8.1 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) (EPBC Regulations), which is implemented via the *Australian National Guidelines for Whale and Dolphin Watching 2017* (Commonwealth of Australia, 2017). • Trained bridge crew undertake continuous observations. • Vessels are required to always have two Watchkeepers on the bridge when operating near the facility. • One Watchkeeper is focused on the operational task at hand, the other is responsible for maintaining the safe navigation of the vessel including keeping compliance with COLREGs Rule 5 which requires that the vessel at all times maintains a proper look-out by sight, hearing and all available means appropriate to the prevailing circumstances and conditions, including marine fauna observations. • All Watchkeepers hold Certificates of Competency recognized by the vessel Flag State which can only be obtained by completing years of sea service, including understudy time on watch on the bridge. • All vessel operators are required to maintain compliance with the *EPBC Act* and other relevant conservation management plans. As such, vessel crews complete MFO training to ensure that obligations with respect to marine mammals are observed while they are in charge of the vessel. • Esso verifies the crew MFO training as part of pre-hire and routine EP compliance inspections.	Adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		• The vessels have multiple pairs of binoculars available to Watchkeepers. • Marine megafauna identification charts are posted onboard. JUR and support vessel bridge and vessel crew are also provided an EP-specific environmental awareness induction which further reinforces these requirements in whale observation, species identification, reporting requirements and adaptive management plan requirements (see CMP33). The Turrum Phase 3 Drilling induction includes: • Providing photos/pictures of the different megafauna expected in the area at the time of the activity, including in the form of posters for display on the vessel. • Instructions on the pre-start, requirements (as listed in CMP33). • Instructions on distance estimation, including the specification that marine binoculars with reticles are used. • Instructions on how to detect marine megafauna based on observations on the water surface and surrounds. • Instructions on data to be recorded for marine megafauna sightings, including time of observation, type and number of species observed and estimated location coordinated. • The JUR crew are able to provide observations whilst the vessel is entering the OA and while undertaking loading/unloading activities. • The JUR crew provide additional observations while the vessel is alongside undertaking unloading/loading activities and can implement CMP33 as required. The support vessel will be undertaking continual observations of the observation zone whilst on route to the OA and at the JUR position.	

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		Previous logs from Esso's Gudgeon and Terakihi operations demonstrate observations were able to be made up to 10km in favourable conditions. For the vessels that are to be used on this campaign, with an estimated bridge height of 14m, visual observations can be made up to 13 km.	
Only conduct activity outside of indicative peak PBW season (April to June)	Little benefit, given that PBW could be present at any time of the year	Not feasible. The activity is required to be undertaken at any time of year, so restricting operations to a certain period could add significant delays and cost to the campaign. The impact (in the event of whales being present) will be managed through controls in place. This control measure is not feasible and the costs of implementing it are grossly disproportionate to the environmental benefits.	Not adopted
Only conduct the activity outside of the SRW migration season (approximately April to October)	No benefit	According to revised BIA data for the SRW, the OA is within the migration BIA, which occurs between April to October (AMSIS, 2024). The Turrum Phase 3 production drilling activities may occur any time within the year, therefore, restricting operations to a certain period would add significant delays and cost to the campaign. In the event of the presence of whales in the observation zone during the activity, the proposed control measures will limit impacts. The cost of this control is grossly disproportionate to the additional benefits of implementing this control measure considering the distance between potential effects and the coastal migration corridor.	Not adopted
Shut down all DP thrusters on the support vessel if whales (particularly PBWs and SRWs) are sighted near the vessel	Reduces the potential for PTS, TTS and behavioural impacts	Shutting down all thrusters would result in the support vessel drifting off location and if this happened, it could collide with the JUR and lead to damage to the vessel and/or JUR and associated safety risks to personnel on both facilities. This may also	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		result in the potential for a hydrocarbon release. This control measure is not technically feasible and would lead to unacceptable safety risks.	
Limit power to the support vessel while inside the OA	Reduces the potential for PTS, TTS and behavioural impacts.	Power is maintained in a manner to safely operate the vessel. Depending on vessel operations and weather conditions, the thrusters will be maintained to as low as possible for safe operation. The support vessel must be able to hold station to safely undertake loading and unloading operations while alongside the JUR. Thruster power levels are optimised to the operating modes and conditions, and for efficiency reasons are maintained at the minimum power to safely maintain position. It is not safe to adjust thruster power outside of operationally defined ranges.	Not adopted
Use of competent (trained and experienced) marine mammals observers (MMOs)	Reduces potential displacement of whales	Two MMOs onboard the JUR and/or the support vessel, with at least one of these MMOs on shift during daylight hours, means that a trained expert is dedicated to search for whales and implement whale management procedures. Cost: Having two competent MMOs onboard the JUR is required to ensure each shift can be reliably completed. To adequately cover all of the possible supply vessels in the fleet this would require six MMOs to available all year round. MMOs would be contracted through a reputable consultancy that trains and provides MMOs on a range of projects around Australia or can provide the required training to dedicated personnel. This will add a negligible amount to the daily costs of the activity, Limitations: Given the 2.9km EMBA is only in effect when the supply vessel is alongside the JUR, using DP which is likely to occur up to three times a week for three to six hours and given the short distances to effect for LFC and the very small areas of	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		overlap with PBW and SRW BIAs, having MMOs onboard the JUR and/or support vessel is not supported.	
Undertake pre-activity aerial survey within the behavioural zone of impact for PBW and SRW.	Adopting this control measure can monitor the behavioural zone and increases the confidence that there are no foraging PBW or migrating SRW in the behavioural impact zone that could be displaced during the activity	Cost: Approximately $50,000 per flight, including MMOs. Limitations: Flights in small aircraft over open water introduce significant safety risks, and there is no guarantee that whales will be spotted. Given the short distances to effect for LFC and the very small areas of overlap with PBW and SRW BIAs, this control measure is not supported.	Not adopted
Undertake vessel-based observations for PBW and SRW while on route to the OA at the start of the activity and prior to or during rig moves.	Increases the confidence that there are no foraging PBW or migrating SRW in the behavioural zone that could be displaced upon the start of activities.	Cost: No additional costs. Bridge crew and personnel are trained in the process for visual observations of whales and will report any sighting as part of their ongoing compliance with the Part 8 Division 8.1 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations), which is implemented via the *Australian National Guidelines for Whale and Dolphin Watching 2017* (Commonwealth of Australia, 2017).. Limitations: Vessel-based observations do not guarantee that whales will be sighted, and the field of vision from the vessel (which depends on height of observation) only covers a small portion of the behaviour zone at any point in time. Observations can be hampered by the same reasons outlined for aerial flights (glare, rough seas, mist/fog).	Adopted
Undertake pre-activity and activity vessel-based observations for turtles (particularly leatherback turtles)	Understanding turtle abundance and distribution	There are no nesting beaches around the Marlin B platform or Bass Strait. The Recovery Plan for Marine Turtles in Australia (DoEE, 2017) details noise interference as a threat, however the absence of turtle BIAs in Bass Strait together with the known low abundance of turtles in Bass Strait, does not support the need to undertake pre-activity surveys for turtles.	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		Vessel-based observations will not guarantee that turtles will be sighted. Observations can be hampered by the same reasons outlined for aerial flights (glare, rough seas, mist/fog). Vessel-based observations take longer to complete than aerial observations.	
Undertake vessel-based observations for white shark (*Carcharodon carcharias)* and grey nurse shark (*Carcharias taurus*)	Understanding white shark and grey nurse shark abundance and distribution.	White sharks and grey nurse sharks do not have a swim bladder, therefore underwater sound is unlikely to impact this species. The *Recovery Plan for the White Shark (Carcharodon carcharias)* (DSEWPAC, 2013) and *Recovery for the Grey Nurse Shark (Carcharias taurus)* (DoE, 2014b) does not list underwater sound as a threat. The great white shark and grey nurse shark BIAs did not overlap with the OA, however their migration route may pass through the OA. The likelihood of occurrence in this area of overlap is low, as the OA does not overlap with inshore reefs (CSIRO, 2021), where white sharks are known to reproduce. Vessel-based observations will not guarantee that white sharks will be sighted. Observations can be hampered by the same reasons outlined for aerial flights (glare, rough seas, mist/fog).	Not adopted
Dedicated daily aerial surveys around the OA during the activity.	Adds to the knowledge of whale distribution in the region.	Cost: Estimated at $50,000/day. It also comes with environmental costs (e.g. GHG emissions from fuel use). Limitations: Adding additional aerial flights adds additional safety risks. While this control measure would add to the current paucity of data on PBW and SRW distribution and abundance in eastern Bass Strait, the costs and safety risks are grossly disproportionate to the potential environmental benefit for this activity given the very small area of underwater sound overlap with the PBW foraging BIAs and SRW migration BIA.	Not adopted
Move support vessel away from the JUR during unloading/ loading when the vessel	Reduces the potential for PTS, TTS and	If loading/unloading activities are able to be stopped safely and quickly, they will be ceased and the support vessel will move away from the JUR and cease using DP until the whale moves out of the	Adopted subject to safety considerations

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
is using DP if a PBW or SRW is observed	behavioural impacts	observation zone radius or when 30 minutes have lapsed since the last sighting. If a vessel is alongside the JUR undertaking loading/unloading and a whale is sighted, it may not be practicable or safe for the operation to cease and the vessel to move away (e.g. during diesel bunkering, or complex lifts). It may take some time to cease the activity of loading/unloading in a safe manner, by which time it is likely that an individual whale would have passed. If feasible, vessels in this scenario will reduce thrusters and adjust heading (CMP33: Adaptive management) and this will help minimise noise and disturbance.	
Undertake aerial surveillance with drones	Monitoring and detection	Drones have been considered as a method of increasing the observation distance of MMOs and monitoring the PTS, TTS and observation zones. Drone surveys have been carried out for cetaceans mainly in the nearshore marine environment via beach operations. Esso adopted the use of drones during Seahorse/Tarwhine plug and abandonment activities to extend the field of vision from the bridge. Observations were made by the MMO from the bridge in all circumstances, well before a drone could be launched. And in all cases, whale observations were confirmed by means of binoculars and photograph/video images from the bridge, rather than through use of a drone. Drone surveys have not proven to be effectively used as a real-time monitoring method. Drone effectiveness offshore is limited due to the following: • physical range of drones is only approximately 4-5km • drone operations are sensitive to wind, particularly gusting winds, and excessive wave action while launching and retrieving, which would limit the use of this equipment	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		• technical support and operators required. Any sightings are more readily observed from the bridge, using powerful binoculars, or even with the naked eye, rather than with a drone, even when it is equipped with a high-definition camera with remote display on the bridge.	
Use of Passive Acoustic Monitoring (PAM)	Monitoring and detection	As a cetacean detection method, PAM has been used to detect whales that vocalise at high frequencies/intensities such as HFC and very HFC (e.g. sperm whales) and, in conjunction with visual monitoring, can enhance cetacean detection effectiveness. PAM has the advantage of potentially detecting cetaceans during night hours and during periods of poor visibility when they cannot be visually detected. Although PAM can be a valuable tool in identifying the presence of cetaceans, the following factors limit its effectiveness: • most suitable for HFC and very HFC, which are generally of lower concern in this region compared to LFC. It is difficult for PAM to pick up vocalisations of LFC such as blue whales and SRW • bearing accuracy and range estimation is limited because it is not as accurate as visual observations. Observations by Vessel Masters and crew negate the need for using PAM given that LFC (which surface to breathe more regularly that deeper-water HFC and very HFC) will generally be able to be easily detected.	Not adopted
Whale observations Marlin B Platform during conductor pile driving.	Reduces the potential for PTS, TTS and behavioural impacts.	During conductor drive activities at Marlin B, crew trained in visual observation on the platform will commence visual observations of the extended 3 km observation zone for 30 minutes prior to undertaking conductor drive activities such that if a whale is observed in the observation zone, conductor piling will not commence until the whale has left the	Adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		observation zone and has not been observed for more than 30 minutes. Observations will continue during the activity and if at any time a whale is observed in the observation zone the conductor driving activity will cease until the whale has left the observation zone and not been observed for more than 30 minutes. During peak migration season (April to October) a dedicated trained MFO will be on board the Platform.	
Soft-starts for conductor pile driving	Reduces the potential for PTS, TTS and behavioural impacts	The predicted distances to effect for underwater sound modelled for conductor pile driving is predicted to result in a 0.014% overlap with the PBW foraging BIA. Gradually increasing the energy level of the piling sequence will add a short period of time to the piling activity and the increased time inherently adds cost to this activity. The pre-conductor pile driving control measure noted in the row above is considered sufficient in light of the small BIA overlaps.	Not adopted
Deploy bubble curtains around the conductor pile driving activity.	Reduces the potential for PTS, TTS and behavioural impacts.	Bubble curtains are sometimes utilised within offshore construction projects that involve piling or detonation of explosives. The bubble curtain (perforated hose) is deployed to the seabed and encompasses the noise source in an aim to obscure noise transmission, resulting in a reduction of received sound levels to receptors outside of the bubble curtain. Circa 15dB noise attenuation has been reported for impulsive noise from piling; efficacy is dependent on various factors. The deployment of bubble curtains for this activity is limited by the following factors: • Water depth – The maximum working depth of bubble curtains is typically <100m. Providing oil-free air to the seabed would require a large number of large diesel-run air compressors housed on at least one additional dedicated DP support vessel,	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		which would add more underwater sound. • Currents – Bubble curtains are drastically impacted by currents. Current speeds and directional shifts with wind and tide would result in bubble curtains being distorted and ineffective by the time bubbles rise from the seabed to surface. This control measure is not technically feasible at the activity location.	

6.4.10 *Demonstration of acceptability*

Table 6-35 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activity is not considered as having the potential to result in long term or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	Requirements of Part 8 Division 8.1 of the EPBC Regulations, although more relevant to tourism activities (e.g. whale watching), have been adopted. Noise interference is a recognised threat to the species in the following conservation management plans and advice. The proposed controls are consistent with conservation/management actions in: • CMPBW • *Conservation Advice for humpback whales* (TSSC, 2015) • *The National Recovery Plan for Southern Right Whales* (DCCEEW, National Recovery Plan of the Southern Right Whale (Eubalaena australis), 2024) • *Conservation Advice for sei whales* (TSSC, 2015) • *Conservation Advice for fin whales* (TSSC, 2015) • Recovery Plan for Marine Turtles in Australia, 2017-2027 (DoEE, 2017)

Factor	Demonstration criteria	Criteria met	Rationale
			• Recovery Plan for the White Shark (Carcharodon carcharias) (DSEWPAC, 2013) • Recovery Plan for the Grey Nurse Shark (Carcharias taurus) (DoE, 2014b) • Issues Paper for the Australian Sea Lion (Neophoca cinerea) (DSEWPAC, 2013).
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no standard related to sound emissions (except those associated specifically with marine geophysical operations) but the controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements; and • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning sound emissions.

6.5 Planned light emissions

6.5.1 *Sources of light emissions*

Both the JUR and support vessels are equipped with navigational and safety lights. It is expected that operations will be conducted 24 hours a day.

6.5.2 *Impacts of light emissions*

Impacts of light emissions considered are:

- change in fauna behaviour (attraction of light sensitive species affecting predator-prey dynamics; behavioural disturbance leading to injury/mortality).

6.5.2.1 Change in fauna behaviour

6.5.2.1.1 PLANKTON AND FISH

Fish and zooplankton 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, M. G., Wilson, S. G., Halford, A. and Retzel, A, 2001), with traps drawing catches from up to 90m (Milicich, M., Meekan, M. and Doherty, P., 1992). Lindquist et al. (2005) concluded from a study of larval fish populations around an oil and gas platform in the Gulf of Mexico (GoM) 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.

Overall, an increase in fish activity around the JUR and support vessels, may occur at night-time, but this is highly localised and short-term and therefore expected to have negligible impacts to the local and regional food web.

6.5.2.1.2 MARINE REPTILES – TURTLES

Light pollution can be an issue along, or adjacent to, turtle nesting beaches where emerging hatchlings orient to, and head towards, the low light of the horizon unless distracted by other lights which disorient and affect their passage from the beach to the sea (Commonwealth of Australia, 2017). It was discovered that in the absence of illumination from the moon the glow from tower flares may influence the orientation of turtles hatchlings at close range (30 – 100m) (Pendoley, 2000).

Three listed/threatened species of marine turtle may occur within the OA, although there are no BIAs or critical habitats, and all marine turtles are known to have a more northerly distribution. The *Recovery Plan for Marine Turtles in Australia, 2017 – 2027* (DoEE, 2017) lists light pollution as a key threat, however this relates specifically to turtle hatchlings and nesting sites. It is anticipated that the light emissions from the activities within the OAs do not impact on marine turtles.

6.5.2.1.3 BIRDS

Birds may be attracted to vessels at night due to light glow. Bright lighting can disorientate flying birds resulting in behavioural changes e.g. circling light sources leading to disrupted foraging and starvation, or exhaustion (leading ultimately to injury or mortality near the light source) (Wiese, et al., 2001).

Seabirds that are active at night while migrating, foraging, or returning to colonies that are directly affected include petrels, shearwaters, albatross, noddies, terns and some penguin species. Fledglings are more affected by artificial lighting than adults due to the synchronised mass exodus of fledglings from their nesting sites. They can be affected by lights up to 15km away (DCCEEW, 2023).

Artificial light can cause significant impacts on Procellariiforms (petrels, storm petrels, gadfly petrels, diving petrels and shearwaters) that breed in burrows and only attend breeding colonies at night (DCCEEW, 2023). Fledglings often become disoriented and grounded because of artificial light adjacent to rookeries as they attempt to make their first flight to sea, a phenomenon known as 'fallout'. The effects of artificial lighting from road lighting on short-tailed shearwater fledglings were investigated (Rodríguez, et al., 2014). The study established that, by removing the light source from nesting areas, there was a decrease in grounded fledglings and a corresponding reduction in bird fatalities. Less studied are the effects of light on the colony attendance of these nocturnal species which could lead to higher predation risks by gulls, skuas or other diurnal predators (DCCEEW, 2023).

The OA is approximately 45km offshore and overlaps foraging BIAs for black-browed albatross, Campbell albatross *(Thalassarche impavida),* Indian yellow-nosed albatross, wandering albatross, Buller's albatross *(Thalassarche bulleri)* and shy albatross. Light emissions are not identified as a threat for these species in the *National Recovery Plan for Threatened Albatrosses and Giant Petrels 2022* (CoA, 2022). The closest breeding BIAs for light-sensitive seabirds which may forage in the area, short-tailed shearwaters and common diving petrels *(Pelecanoides urinatrix),* are located on the Tasmanian islands of Bass Strait over 100km away from where the activities will be occurring.

Any impacts to migratory or foraging birds from light emissions will be highly localised and short-term (behavioural disturbance will cease once the light ceases). Injury/mortality of transient individuals disturbed by the presence of lighting from the JUR, or support vessels will not affect population levels.

6.5.2.1.4 MARINE MAMMALS

There is no evidence to suggest that artificial light sources adversely affect the migratory, feeding or breeding behaviours of cetaceans. Cetaceans predominantly utilise acoustic senses to monitor their environment rather than visual sources (Simmonds, Dolman, & Weilgart, 2003), so light is not considered to be a significant factor in cetacean behaviour or survival.

6.5.3 Controls

- CMP30: Lighting will be limited

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.5.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.5.5 Demonstration of As Low As Reasonably Practicable

Table 6-36 Decision Context and justification

Decision Context A
The use of navigational lights and other lights to enable 24-hour operations to be undertaken, are routine activities in the offshore petroleum sector and are required for the safety of the vessels and the crew. Other 24-hour vessel operations are not unusual in this area. Commercial fishing activities and merchant vessels in Bass Strait use similar navigational lights or other lights for safety purposes. Good practice measures, minimising external lighting to reduce exposure and incident reporting are implemented in accordance with the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023). The impacts associated with light emissions are well understood and the most significant impacts of light emissions are generally associated with operating within close proximity of shorelines that support light sensitive bird species. The impact assessment undertaken has identified that impacts are non-existent or inconsequential for all marine fauna other than several species of foraging seabird (albatross) which may be affected by a highly conservative Consequence Level III impact, due to their threatened/vulnerable status. No objections or claims were raised by relevant persons with regard to light emissions. Esso believes ALARP Decision Context A should apply.

Table 6-37 Good practice controls

Good practice	Adopted	Control	Rationale
National Light Pollution Guidelines for Wildlife (DCCEEW, 2023)	✓	**CMP30:** Lighting will be limited	Mitigation options relevant to the activities being undertaken have been adopted from the light management actions for seabirds and migratory shorebirds provided in the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023). Specifically: • reduce unnecessary lighting outdoor, deck lighting on all vessels (and permanent and floating oil and gas installations) in known seabird foraging areas at sea

Good practice	Adopted	Control	Rationale
			• report seabird interactions • reduce deck lighting to a minimum required for human safety (on vessels moored near nocturnal shorebird foraging and roost areas), and those vessels operating offshore • record migratory shorebird strike. Actions specifically related to breeding season have not been adopted due to the absence of breeding BIAs for light sensitive seabird species which may be foraging in the OA. Note: Reporting will be undertaken as per Section 8.11.

Table 6-38 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.5.6 *Demonstration of acceptability*

Table 6-39 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	Management actions for seabirds and migratory shorebirds contained in the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023). Including *Marine Turtles, Seabirds and Migratory Shorebirds* (DCCEEW, 2023) have been adopted where relevant for JUR/vessel-based activities. Light pollution is a recognised threat to turtles and the proposed activity is consistent with conservation/management actions in: • Recovery Plan for Marine Turtles in Australia, 2017-2027 (DoEE, 2017).

Factor	Demonstration criteria	Criteria met	Rationale
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no standard related to light emissions, but the activities proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning light emissions.

6.6 Planned discharge – Treated bilge water and deck drainage

6.6.1 Sources of treated bilge water and deck drainage

Bilge water consists of oily water that has accumulated in the lowest part of the vessel/JUR typically from closed deck drainage and machinery spaces. Bilge water is treated on board the vessel or JUR using the oily water separator to reduce the discharge to below the regulated level of less than or equal to 15ppm. Oily content exceeding the 15ppm set levels is routed back to the oily water separator, which recirculates treated water back to the hazardous drain holding tank. Oily water is recirculated until the oil content returns to below set levels. Sludge from the oily water separator is transferred to the sludge tank (refer to Section 3.2.3.2 of *JU-107 Safety Case* (Valaris, 2021)).

Deck drainage comprising seawater from waves/spray, rainwater, and deck wash water, may contain minor quantities of detergents, and oil and grease which has been spilled on the deck.

6.6.2 Impacts of treated bilge water and deck drainage discharge

Impacts of the discharge of treated bilge water and deck drainage considered are:

- change in water quality.

6.6.2.1 Change in water quality

A discharge of treated bilge or deck drainage is non-continuous and infrequent. Given the nature of bilge or deck washing discharges, marine fauna most susceptible to toxic impacts are mainly limited to less mobile fish embryo, larvae, and other plankton. There is potential for short-term impacts to species that rely on plankton as a food source. Any impact to prey species would be temporary as the duration of exposure would be limited, and fish larvae and other plankton are expected to rapidly recover as they are known to have high levels of natural mortality and a rapid replacement rate (UNEP, 1985).

6.6.3 Controls

- CM9: Class certification

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.6.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.6.5 Demonstration of As Low As Reasonably Practicable

Table 6-40 Decision Context and justification

Decision Context A
Discharge of treated bilge and deck drainage offshore (from vessels and other facilities) is a commonly practised activity. The potential impacts are well regulated via various treaties and legislation, both nationally and internationally, which specify industry best practice control measures. These are well understood and implemented by the industry. The consequence has been identified as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons with regard to the discharge of treated bilge water and deck drainage. Esso believes ALARP Decision Context A should apply.

Table 6-41 Good practice controls

Good practice	Adopted	Control	Rationale
MARPOL Annex I Regulations for the Prevention of Pollution by Oil. MARPOL Annex V Regulations for the Prevention of Pollution by Garbage from Ships.	✓	**CM9:** Class certification	The vast majority of commercial ships are built to and surveyed for compliance with the standards laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the SOLAS, the 1988 Protocol to the International Convention on Load Lines and MARPOL. A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO Rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex I Regulations for the Prevention of Pollution by Oil specifically require vessels (as appropriate to class) hold an International Oil Pollution Prevention certificate, are equipped with an approved oil discharge

Good practice	Adopted	Control	Rationale
			monitoring and control system which ensures that the oil-in-water content of treated bilge water is <15ppm and maintain an Oil Record Book. MARPOL Annex V specifically require vessels (as appropriate to class) to utilise deck cleaning products which are not a "harmful substance" in accordance with criteria in Appendix to MARPOL Annex III nor contain a component that is carcinogenic, mutagenic or reprotoxic.

Table 6-42 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.6.6 *Demonstration of acceptability*

Table 6-43 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The requirements of MARPOL Annexes I and V have been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of MARPOL in Australia: • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • *Navigation Act 2012* (Cth) – Chapter 4 (Prevention of Pollution) • Marine Order 91 (Marine pollution prevention – oil) 2014 • Marine Order 95 (Marine pollution prevention – garbage) 2018.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply

Factor	Demonstration criteria	Criteria met	Rationale
			responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The proposed controls meet the requirements of the Upstream Water Management Standard specifically "to meet regulatory requirements and legally binding agreements".
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning treated bilge water and deck drainage discharges.

6.7 Emissions to air

6.7.1 Sources of emissions to air

The use of fuel, specifically marine diesel oil (MDO) used to power engines, generators and mobile and fixed plant (e.g. ROV, cranes) will result in gaseous emissions of GHG such as CO_2, methane and nitrous oxide, along with non-GHG emissions such as sulphur oxides and nitrous oxides. Minor additional emissions from helicopter support operations will also occur as the helicopters transit the 500m PSZ to the JUR. Well testing (flaring) is not part of this drilling and completions activity, so is not addressed here.

As per the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (World Resources Institute and World Business Council for Sustainable Development, 2004), GHG emissions are classified as:

- Scope 1 – emissions that a company makes directly
- Scope 2 – emissions a company makes indirectly such as through the purchase of electricity
- Scope 3 – emissions associated, not with the company itself, but that the organisation is indirectly responsible for, up and down its value chain. For example, from buying products from its suppliers and the emissions associated with making the products, and from its own products when customers use them.

For the purposes of this activity, the following applies:

- Scope 1 – emissions associated with the activity (i.e. combustion of MDO from the vessel engines, generators and fixed and mobile deck equipment during the activity, and combustion of aviation gas used by the helicopters while in the PSZ). Since the JUR is owned by the contractor, these emissions will be reported by the JUR contractor rather than Esso
- Scope 2 – are not relevant to this activity as no electricity will be purchased
- Scope 3 – is not relevant for this activity as the production, transport and use of fuel is not included within the activity.

The following fuel combustion and gas venting data applies to this activity:

Table 6-44 Sources of GHG emissions from the activity

Source	Fuel type	Predicted volume of use	Duration of source of emissions	Total volume for activity
JUR	MDO	15m³/day while on location	300 days	4,500m³
Support vessel		7m³/day while operating (this is a conservative estimate considering time spent within the OA)		2,100m³
Helicopter*	Aviation gas	Based on using 7L/min and spending 15 minutes in the OA on approximately 10 flights per week, this is 105L (0.105 m³/day)	~428 flights throughout the 300 days10	45m³

*Note that calculations on helicopter fuel use are based on consumption rates recorded by helicopters used on an exclusive basis in the Esso fleet, based in Longford, Victoria..

6.7.2 *Impacts of atmospheric emissions considered are:*

- change in air quality (localised and temporary decrease in air quality)
- contribution to the global GHG effect.

6.7.2.1 Decrease in air quality

A recent review of the *National Environment Protection (Ambient Air Quality) Measure* (National Environment Protection Council, 2021) recommended that exposure to nitrogen dioxide (NO_2) on an hourly basis should be below 0.08ppm and on an annual average of less than 0.015ppm. BP Development Pty Ltd. has modelled NO_2 emissions from a mobile offshore drilling unit (MODU) power generation for an offshore project (BP, 2013). NO_2 is the focus of the modelling as this considered the main (non-greenhouse) atmospheric pollutant of concern, on account of the larger predicted emission volumes compared to the other pollutants, and the potential for NO_2 to impact on human health (as a proxy for environmental receptors). Results of this modelling indicated that even the highest hourly averages (0.00039ppm or 0.74μg/m³) were restricted to within approximately 5km from the offshore MODU (BP, 2013), which is also expected to apply to the JUR.

Potential receptors above the sea surface within 5km of the activity that may be exposed to reduced air quality include seabirds and marine fauna that surface for air (e.g. cetaceans and turtles). The OA is within the foraging BIAs for the PBW and some seabird species, however given that emissions will quickly dissipate, the potential for any exposure to reduced air quality is not expected to affect the health of these fauna.

The duration of helicopter operations in the PSZ and on the JUR only occurs for a very limited period and total volume of fuel consumed is low, so this activity is not expected to generate exposures significant enough to result in impact to any identified environmental receptors.

6.7.2.2 Contribution to the global greenhouse gases effect

The CO_2-e Scope 1 GHG emissions for the activity have been estimated using the National Greenhouse and Energy Reporting online calculator as presented in Table 6-45.

Table 6-45 Predicted GHG emissions from the activity

Source	Fuel type	Total volume for activity	Duration of source of emissions	Total CO_2-e emissions
JUR	MDO	4,500m^3	300 days	12,228t
Support vessel		2,100m^3		5,707t
Helicopter	Aviation gas	45m^3	428 flights	116t
		6,645m^3 total		**18,051t total**

In total, it is estimated that 18,051t CO_2-e of Scope 1 GHG emissions will be generated for the activity, which represents approximately 1.04% of ExxonMobil's Australian total Scope 1 emissions for the 2022-2023 financial year (ExxonMobil total is 1,738,130t CO_2-e per the National Greenhouse and Energy Reporting), which is the latest reporting year for which data is published (as of January 2025).

While these emissions add to the GHG load in the atmosphere, which adds to global warming effect, they are small on a state, national and global scale. The activity is similar to other industrial activities contributing to the accumulation of GHG in the atmosphere. Consequently, no further evaluation has been undertaken.

6.7.3 Controls

- **CM9:** Class certification

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.7.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.7.5 Demonstration of As Low As Reasonably Practicable

Table 6-46 Decision Context and justification

Decision Context A
Emissions to air from fuel combustion generated by vessels and other offshore facilities is a common occurrence both nationally and internationally. Managing the impacts from emissions to air is well understood with good practice controls that are well implemented by the industry. Emissions will dissipate rapidly, and the consequence of any impact assessed as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons with regard to emissions to air. Esso believes ALARP Decision Context A should apply.

Table 6-47 Good practice controls

Good practice	Adopted	Control	Rationale
MARPOL Annex VI Regulations for the Prevention of Air Pollution from ships.	✓	**CM9:** Class certification	The vast majority of commercial ships are built to and surveyed for compliance with the standards laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the SOLAS, the 1988 Protocol to the International Convention on Load Lines and MARPOL.

Good practice	Adopted	Control	Rationale
			A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex VI specifically requires vessels (as appropriate to class) hold an International Air Pollution Prevention certificate for each diesel engine of >130 kW; vessel engine NOx emission levels comply with Regulation 13; sulphur content of any fuel oil used on board is <0.5 %; and ongoing maintenance of engines, generators and deck equipment to ensure efficient operation. Note these requirements will be applied to the JUR as well.

Table 6-48 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

6.7.6 *Demonstration of acceptability*

Table 6-49 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The requirements of MARPOL Annex VI have been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of MARPOL in Australia: • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • *Navigation Act 2012* (Cth) – Chapter 4 (Prevention of Pollution)

Factor	Demonstration criteria	Criteria met	Rationale
			• Marine Order 97 (Marine pollution prevention – air pollution) 2013.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to qualify, evaluate and select contractors based on their ability to perform work in a safe, secure and environmentally sound manner.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning emissions to air.

6.8 Planned discharge – Cement

6.8.1 Sources of cement discharge

Cementing the well casing strings in place (sealing the annulus) will result in planned discharges of cement.

The estimated volumes of cement discharged to the environment include:

- small volumes of dry cement dust from the bulk transfer process may be blown overboard during pneumatic transfer operations
- cement returns at platform during cementing of surface casing. Typically, once quality cement returns are seen at the wellhead, cement mixing will cease and displacement will commence, with a minimal quantity of cement returned during the displacement. It is estimated that in the order of 150bbl (24m^3) per well may be discharged during this process
- washing the cementing pump, piping, and blending tanks with seawater to prevent curing, resulting in a release of cement/water mix (120bbl (18m^3) per well)
- no bulk discharge of dry (unmixed) cement
- potentially a small volume of mixed slurry at the end of the campaign in the event that it is the last well in the overall sequence of the JUR program of work and cannot be transferred for use in another Esso operation, cannot be transferred to another operator cannot pumped down hole and cannot be transferred onshore, subject to a feasibility analysis. The volume is expected to be a one off maximum 100m^3 (dry bulk volume) discharged pumped as a diluted, wet slurry.

The surface casing annulus cement, together with the surface casing, provides an important well barrier ensuring well integrity is maintained whilst drilling.. The integrity of this barrier must be verified post installation and therefore the operational success of the cementing operation is critical. In the event that operational issues arise during the cementation which may risk the cement barrier integrity, the partially pumped liquid cement slurry may be completely displaced from the well and discharged overboard. It is estimated that this contingency operation would result in a maximum of 150bbl of cement discharged at the sea surface. The cementing operation would be repeated to ensure an acceptable barrier is installed for well integrity assurance. Quality control, in particular cement quality, is an important consideration for well cementing activities, as the consequences of a failed cement job have considerable commercial and well integrity implications.

Cement is a hygroscopic material that actively absorbs moisture from the atmosphere. This process is accelerated in the moisture rich offshore environment. Cement will also absorb water from the compressed air used during the pneumatic transfer process to move cement from the bulk tanker to the vessel and from the vessel to rig, and from any residual moisture present in the transfer lines. For these reasons, cement sent offshore is typically sent in batches allocated for specific jobs in order to minimize the number of transfers and to minimize the amount of time that cement is held offshore before use.

Cement held offshore for an extended period and returned to shore is regarded as a contaminant and vessel storage tanks are required to be cleaned prior to new cement being added to those tanks. This is a complex process requiring confined space entry procedures and removes a vessel from service for the period of time in which the tanks take to be cleaned. Where the cement has absorbed enough water from the atmosphere and the transfer processes, cement may set in place in the transfer tanks of the vessel, forming large rocks which block the transfer systems, requiring disassembly of the system to clear the blockages. In extreme situations, cement may require removal by jack hammer and other percussive techniques.

The additional exposure time in which the cement is present in the moisture rich environment offshore, coupled with the additional transfer operations required to return unused surplus cement from a JUR back onshore for disposal, represents an increase in risk exposure when compared to the initial process of transferring newly manufactured cement to the vessel and subsequently on board the JUR for use.

As a drilling or abandonment program approaches completion, cement volumes are actively managed to reduce the amount of bulk cement product remaining on board. Contingency quantities of cement are required, so as to allow a job to be repeated in the event that difficulties are encountered during the initial cementation attempt.

In ideal circumstances, subject to weather conditions and sea states, this contingency will be held on the vessel such that it can be readily transferred to other Esso operations where possible without having to ship and transfer the cement from the vessel to the JUR and then back to the vessel. Where this contingency quantity is present on the rig and is not utilized in contingency operations, a small surplus of cement may be present at the end of the campaign.

The potential for excess cement being left on board the JUR as a consequence of activities associated with this EP, arises only in the event that scheduling considerations result in this activity being the last of the Esso activities prior to release of the rig to another operator.

Should the Turrum Phase 3 production drilling activities addressed in this EP represent the last operation with Esso as the rig operator, all efforts will be made to minimize the quantity of cement remaining on the JUR, and to negotiate with the next operator to accept the remaining quantity of cement on board. Whether the next operator will accept the cement remaining on board depends upon factors such as provenance and history of the cement, the period of time that the cement will potentially remain on board until the next operator can utilise it, whether the cement qualities and characteristics are consistent with the next operators cementing requirements, and whether the next operators cementing contractor will accept the use of the remaining cement in its programmed operations. Such factors are not directly within Esso's influence or control.

In the event that excess cement is not able to be transferred to the next operator, the last cementing job to be conducted under this EP will be the well completion activity. If all other alternative options for disposal have been unsuccessful, Esso will undertake a feasibility analysis of options to transfer product back to shore for onshore disposal. Discharge to the marine environment will only occur when there are no other safe or technically feasible options and therefore ALARP. This may result in a one-off discharge of this quantity of cement to the environment after the cement has been mixed and diluted with a substantial quantity of seawater such that any particles can be expected to disperse rather than aggregate as they settle due to normal wave and current action. The potential volume required to be discharged considers the minimum volume required to be held onboard to ensure the cementing process can be executed in accordance with the WOMP.

Note: It has been noted that trace amounts of mercury can be present in cement originating from the raw materials used in the process. The research indicates that the mean concentration expected in Portland cement is

0.01ppm, significantly below the 1ppm criteria as discussed in Section 6.10.2 for other bulk material selection (Krzysztof, Gorecki, & Burmistrz, 2021).

6.8.2 *Impacts of cement discharges*

Impacts of the planned discharge of cement on marine fauna considered are:

- change in water quality (increased turbidity of the water column and potential toxicity)
- change in habitat.

6.8.2.1 Change in water quality

6.8.2.1.1 INCREASED TURBIDITY IN THE WATER COLUMN

Cementing fluids are not routinely discharged to the marine environment at the surface; however, volumes of a cement-water mix may be released in surface waters during equipment washing. The cement particles will disperse under action of waves and currents, and eventually settle out of the water column; the initial discharge will generate a downwards plume, increasing the initial turbidity of receiving waters.

Modelling of the release of 18m^3 of cement wash water (De Campos, Paiva, Rodrigues, Ferreira, & Junior, 2017) indicate an ultimate average deposition of 0.05mg/m^2 of material on the seabed; with particulate matter deposited within the three-day simulation period. Given the low concentration of the deposition of the material, it is therefore expected that the in-water suspended solids (i.e. turbidity) created by the discharge is not likely to be high for an extended period of time, or over a wide area.

Modelling of larger cement discharges was undertaken by BP (BP, 2013), which is useful as a conservative comparison of the potential impacts from this activity. This modelling was undertaken for significantly larger discharges at surface, i.e. 480bbl/hour (equivalent to approximately 76m^3/hour) and intermittent surface discharge of cement (following flushing of lines and equipment) in shallower water depths. The BP modelling results provide a high level of conservatism and as such is considered appropriate to apply for this program. The modelling indicates that two hours after the start of discharge, plume concentrations are between 5 - 50mg/L with the horizontal and vertical extents of the plume approximately 150m and 10m respectively (BP, 2013). Four hours after the start of the discharge, the modelling indicates that the plume will have completely dispersed to concentrations of less than 5mg/L (BP, 2013).

The PBW has foraging habitat overlapping the OAs and the SRW migration BIA also overlaps the OAs. Research data detailing potential impacts from suspended solids to megafauna is scarce, however such megafauna is highly mobile, transitory, and able to avoid the plumes. The area of the turbidity plumes is regarded as a very small percentage of the foraging grounds of protected seabirds such as shearwaters, albatrosses, and petrels.

The environmental receptors with the potential for exposure and considered to be most sensitive to an increase in turbidity include pelagic fish species and plankton found in the area around the well locations.

Suspended sediments greater than 500mg/L are likely to produce a measurable impact upon larvae of most fish species (Jenkins & McKinnon, 2006). It is also indicated that levels of 100mg/L may affect the larvae of several marine invertebrate species and that fish eggs and larvae are more vulnerable to suspended sediments than older life stages.

Neither modelling (De Campos, Paiva, Rodrigues, Ferreira, & Junior, 2017) (BP, 2013) suggests that suspended solids concentrations from a discharge of the cement washing will be at or near levels required to cause an effect on fish or invertebrate larvae.

6.8.2.1.2 POTENTIAL TOXICITY

The potential for toxicity is associated with chemicals that are added to the dry cement mix; cement itself is classed as Poses Little or No Risk. Toxicity associated with the discharge of cement is limited to the surface discharge of cement slurry or equipment washings (not surface discharge of dry cement).

While the cementing program has not yet been finalised, cement additives will be assessed and approved for discharge in accordance with Esso's Environmental Chemical Discharge Assessment Process (AUGO-EV-PCE-013). The process uses the OCNS ranking in conjunction with toxicity, biodegradation, and bioaccumulation data to determine potential impacts to the environment and acceptability of planned discharges. The process is described as part of the Implementation Strategy outlined in Section 8.

Table 6-50 Indicative cement additives

Function	OCNS ranking[1]	
	CHARM	Non-CHARM
Antifoaming agent	Silver	-
Antifoaming agent/foam breaker	Gold/substitution warning	-
Cement	-	E
Cement additive	-	E
Cement retarder	Gold	-
Cement set enhancer	Gold	-
Dispersant	Gold/substitution warning	-
Dye	Gold	-
Expanding agent additive	-	E
Fluid loss additive	Gold	-
Gas migration control	Gold/substitution warning	-
Liquid accelerator	-	E
Liquid trifunctional additive	Gold	-
Lost circulation material	-	E
Low temperature liquid dispersant	Gold/substitution warning	-
Multi-temperature cement retarder	Gold/substitution warning	-
Retarder	-	E
Spacer additive	Gold/substitution warning	-
Spacer viscosifier	Gold/substitution warning	-
Well stimulation chemical	Gold/substitution warning	-

[1] The OCNS uses the Harmonised Mandatory Control Scheme developed through the OSPAR Convention. This ranks chemical products according to Hazard Quotient, calculated using the Chemical Hazard and Risk Management (CHARM) model.

The environmental receptors with the potential to be exposed and most at risk from an increase in toxicity include pelagic fish species and plankton.

6.8.3 Controls

- CM3: Chemical discharge assessment process
- CMP5: Cementing procedures

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.8.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.8.5 Demonstration of As Low As Reasonably Practicable

Table 6-51 Decision Context and justification

Decision Context A
The impacts of inert discharges such as cement are well known. Industry good practice control measures are considered sufficient to reduce the impacts and risks associated with this hazard to ALARP. The consequence of any impact associated with these discharges was assessed as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons with regard to the planned discharge of cement. Esso believes ALARP Decision Context A should apply.

Table 6-52 Good practice controls

Good practice	Adopted	Control	Rationale
Discharge of least environmentally hazardous chemical	✓	**CM3:** Chemical discharge assessment process	This risk control practice requires that new chemicals (including cement additives) must be approved prior to use. This practice assesses chemicals that have the potential to be discharged to the environment (i.e., not household chemicals) to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application.
No overboard discharge of unmixed bulk cement (dry cement)	✓	**CMP5:** Cementing procedures	It is a general industry standard that unmixed cement is not discharged offshore; this has also been applied to this program. There will be no discharge of unmixed cement.

Table 6-53 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Dust recovery system	Collects dust from vent lines of bulk storage silos/tanks and reduces the amount of cement emitted into the environment during pneumatic transport.	If space is available and fitting the equipment feasible (e.g. cyclones mounted on a secondary receiving vessel), the cost of retrofitting this equipment, combined with the additional time required during transfer to unload the collected product and transfer it back to the primary storage vessel, and the potential for costly delays due to blockage of	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		the vent lines is considered to outweigh the benefit gained.	
Minimise bulk inventory on board JUR	Eliminates the requirement for any marine discharges.	Stock on board will be managed to ensure that only the minimum amount required to undertake the successful operation is maintained	Adopted
Transfer to other operator	No planned discharge to the marine environment.	The primary option for excess bulk cement is to request the next operator to accept the remaining quantity of cement on board. Whether the next operator will accept the cement remaining on board depends upon factors such as provenance and history of the cement, the period of time that the cement will potentially remain on board until the next operator can utilise it, whether the cement qualities and characteristics are consistent with the next operators cementing requirements, and whether the next operators cementing contractor will accept the use of the remaining cement in its programmed operations. Such factors are not directly within Esso’s control.	Adopted
Transfer of excess cement to other Esso operations	No planned discharge to the marine environment.	In the event that cement cannot be transferred to another operator, retaining cement for other Esso operations will be assessed as the next option given the associated cost savings associated with the re-use of dry bulk products. Note that the cement may not meet the required technical specifications and hence may not be useable.	Adopted
Down hole disposal	No planned discharge to the marine environment.	Where cement cannot be used in other Esso operations or transferred to the next operator at the completion of the JUR campaign down hole disposal will be assessed. For this campaign, down hole disposal is not feasible as the well is a development well that will be used for production.	Not adopted
Transfer of unused dry cement back to vessel for onshore disposal	Transferring the unused dry cement back to the vessel for onshore disposal would eliminate the need to mix and discharge it overboard.	In the event that all other alternative options for disposal have been unsuccessful, Esso will undertake a feasibility analysis of options to transfer product back to shore for onshore disposal. Transferring excess cement onshore requires the product to be sent from the JUR back to a vessel. This process increases the risk of	Adopted subject to feasibility and risk assessment completed approximately 6 months

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
		moisture contamination of the product within the lines and tanks of the vessel. This risk is different to when the cement is transported to the JUR as the cement has not yet been exposed to moisture. Any moisture contamination of dry cement product within the vessel has the potential for costly impact to the vessel and therefore is not common in industry. In the event that cement was to be transferred from the rig back to shore, it would be via pneumatic processes from the vessel into a cement bulk trailer. Third party equipment is being evaluated to help address pressure limitations associated with these pneumatic processes. Disposal of cement from this trailer at an appropriate landfill facility will also require a pneumatic transfer process to get the bulk product out of the tanker. Land fill sites are typically not set up with facilities to handle pressurized delivery of bulk products further complicating the onshore disposal process. This combined with the additional time, vessel logistics and associated GHG emissions required to transfer the cement back to the vessel and then onshore is considered to outweigh the benefit gained. The activity does not intentionally carry excess cement and good management of bulk cement volumes on the JUR will minimize excess cement at the end of Drilling activities.	prior to the end of the activities.
Disposal of mixed slurry overboard	Minor discharge of excess slurry	In the event that none of the above options for disposal of excess bulk cement are available or feasible, the last option will be to mix the minor quantities of residual cement into a diluted slurry for discharge overboard. Discharge to the marine environment will only occur when there are no other safe or technically feasible options and therefore when ALARP. Esso are contractually required to ensure tanks on JUR are empty prior to demobilization.	Adopted

6.8.6 *Demonstration of acceptability*

Table 6-54 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	No environmental legislation or other requirements were deemed relevant to this particular impact.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no standard related to the discharge of cement, but the controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 7-1 objective to evaluate change against an established set of criteria and establish endorsement/approval levels • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning discharge of cement.

6.9 Planned discharge – Sea surface

6.9.1 Sources of operational sea surface discharges

The following activities have been identified as resulting in operational discharges:

- completions operations
- wellbore clean-up.

The wellbore clean-up pill used to displace NAF fluids consists of KCl/NaCl/NaBr brine (or similar) and additives including surfactants. Displaced NAF fluids are returned to the surface. All interfaces are monitored prior to discharge and clean NAF diverted back to the mud pits.

Table 6-55 Summary of operational discharges – Surface (per well)

Fluid type	Nature of release (infrequent/continuous etc)	Indicative volume (per well)
Wellbore clean-up pills (solvent/surfactant/viscosified brine spacers)	Infrequent	500bbl (80m^3)
Brine (clean-up/completion)	Infrequent	1500bbl (240m^3) brine
Diatomaceous earth (DE) material	One-off	25bbl (4m^3) diatomaceous earth

6.9.2 Impacts of operational discharges – Sea surface

Impacts of the planned discharge of brine, wellbore clean-up pills and diatomaceous earth material considered are:

- changes in water quality
- increased salinity
- potential toxicity.

6.9.2.1 Change in water quality

6.9.2.1.1 POTENTIAL TOXICITY

As these discharges will occur at the surface, it is anticipated that ecological receptors that have the potential to be exposed are those that use the surface waters for transit or foraging such as whales, turtles, fish and plankton. The OA is within a foraging BIA for the PBW.

All fluids will be assessed using Esso's Environmental Chemical Discharge Assessment Process (AUGO-EV-PCE-013) (refer to Section 8), which uses the OCNS ranking in conjunction with toxicity, biodegradation and bioaccumulation data to determine potential impacts to the environment and acceptability of planned discharges.

Discharges will be one-off or infrequent, and of small volumes which will disperse rapidly in the open ocean currents within the OA. It is therefore expected that any exposure will be limited in duration.

Early life stages of fish (embryos, larvae) and other plankton would be most susceptible to the potential toxic exposure from chemicals in the discharges, as they are less mobile and therefore can become exposed to the plume at the discharge point. However, these are expected to rapidly recover once the activity ceases, as they are known to have high levels of natural mortality and a rapid replacement rate (UNEP, 1985). As such, exposure of planktonic communities is not considered to result in significant impacts on population level of organisms that would affect ecological diversity or productivity within Commonwealth marine areas and therefore is considered to result in an undetectable or limited local degradation of the environment, rapidly returning to original state by natural action.

Pelagic species are mobile; in a worst-case scenario, it is expected that they would be subjected to very low levels of chemicals for a very short time if they are in proximity of the discharge plume. As such, transient species are not expected to experience any acute or chronic effects.

6.9.2.1.2 INCREASED SALINITY

Brine water will descend through the water where it will be rapidly mixed with receiving waters and dispersed by ocean currents. As such, any potential impacts are expected to be limited to the source of the discharge where concentrations are highest. This is confirmed by studies that indicate effects from increased salinity on planktonic communities in areas of high mixing and dispersion are generally limited to the point of discharge only (Abdul Azis, et al., 2003).

The receptors with the potential to be exposed to an increase in salinity include pelagic fish species and plankton found in surface waters within the OA. Changes in salinity can affect the ecophysiology of marine organisms. Most marine species are able to tolerate short-term fluctuations in salinity in the order of 20 - 30% (Walker & McComb, 1990). However, larval stages, which are crucial transition periods for marine species, are known to be more susceptible to impacts of increased salinity (Neuparth, Costa, & Costa, 2002). Mobile pelagic species may be subjected to slightly elevated salinity levels (approximately 10 to 15% higher than seawater) for a very short period which they are expected to be able to tolerate.

6.9.3 Controls

- CM3: Chemical discharge assessment process
- CMP6: Worksite Operations Safety Plan

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.9.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.9.5 Demonstration of As Low As Reasonably Practicable

Table 6-56 Decision Context and justification

Decision Context A
The surface discharge of fluids during drilling and well completion is common for this type of, both nationally and internationally. Small and infrequent releasesof brines and drilling and completion fluids are standard discharges and required for operational reasons. The consequence of any impact associated with these discharges was assessed as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons with regard to the planned operational discharges. Esso believes ALARP Decision Context A should apply.

Table 6-57 Good practice controls

Good practice	Adopted	Control	Rationale
Discharge of least environmentally hazardous chemical	✓	**CM3:** Chemical discharge assessment process	This risk control practice requires that new chemicals must be approved prior to use. This practice assesses chemicals that have the potential to be discharged to the environment (i.e. not household chemicals) to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application.

Good practice	Adopted	Control	Rationale
Reduce oil in water contents of interface fluids/tank washings	✓	**CMP6:** Worksite Operations Safety Plan	It is standard practice that the oil in water content of interface fluids/tank washing will be processed to <1% residual oil in water prior to discharge.

Table 6-58 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Onshore disposal	No planned discharge to the marine environment	Shipping fluids back to shore for onshore disposal has inherent environmental and safety risks. These include spill risk from bulk transfers to and from supply vessel, fuel consumption/air emissions from operating vessels, the increased risk of vessel collision from additional trips to and from ports and the impacts of the onshore disposal. These risks are eliminated with the offshore disposal of these low impact wastes.	Not adopted

6.9.6 Demonstration of acceptability

Table 6-59 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	Chronic chemical pollution is a recognised threat to the species in the following conservation management plans and advice; however no conservation/management actions are specified in relation to chemical discharges: • CMPBW • *Conservation Advice for sei whales* (TSSC, 2015) • *Conservation Advice for fin whales* (TSSC, 2015).
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply

Factor	Demonstration criteria	Criteria met	Rationale
			responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The controls proposed meet the strategic objectives of the Exxon Mobil Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 7-1 objective to evaluate change against an established set of criteria and establish endorsement/approval levels
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning planned operational discharges.

6.10 Planned discharge – Drilling fluids and cuttings

6.10.1 Sources of drilling fluid and cuttings discharges

Unrecoverable drilling fluids, NAF (i.e. synthetic-based muds) and cuttings will be discharged to the sea surface / seabed during the following activities:

- During intermediate and production hole sections, treated drill cuttings will be discharged just below the sea surface, resulting in dispersion of the cuttings and residual muds over a larger area as they sink to the seabed. NAF that is recovered will be retained onboard the JUR.

The calculated volumes of drill cuttings and associated fluids to be discharged associated with each well for the Turrum Phase 3 outlined in Table 6-60.

Table 6-60 Approximate Turrum well cuttings and fluid discharge volumes

Hole interval	Fluid type	Cuttings (bbl)	Mud discharges per well		Total mud discharges for five well program		Discharge point
			bbl	MT	bbl	MT	
17-1/2" surface	WBM	2000	2500	500	12500	2500	Sea surface
12-1/4" x 13-1/2" or 12-1/4" intermediate/production	NAF	2500	250	50	2,500	250	Sea surface
8-1/2" x 9-1/2" or 8-1/2" production	NAF	300	30	20	500	100	Sea surface

There will also be occasional discharges of interface fluids (generated during the displacement from WBM to NAF to brine and vice versa) and tank washings (e.g. at completion of the well to remove NAF residue) from the mud pits (approximately 100bbl per event).

There will be no direct discharge of recovered NAF. All recovered NAF will be transported back to the shore for disposal.

6.10.2 Minamata Convention on Mercury

The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from emissions and releases of mercury and mercury compounds caused by humans. Australia ratified the convention on the 7th December 2021. Countries that have ratified the convention are bound to put controls in place to manage the discharges, emissions and disposal or mercury and mercury compounds. In Australia, the convention is regulated via the *Recycling and Waste Reduction Act 2020* (Cth). In particular, the Recycling and Waste Reduction (Mandatory Product Stewardship – Mercury-added Products) Rules 2021 made under the Act give effect to Australia's obligations under Article 4(5) of the Minamata Convention on Mercury.

Mercury is a highly toxic heavy metal that can harm the immune system, brain, heart, kidney and lungs of humans and animals, and cause serious harm to ecosystems through bioaccumulation. The effects of mercury exposure can occur at very low concentrations. For this activity, the consideration for the Minamata Convention on Mercury requirements has been assessed for trace volumes of mercury that may be contained with circulation fluids and WBM (particularly barite).

Esso will ensure that the contaminant limit concentrations of barite are at or below a Mercury (Hg) concentration of <1 mg/kg (1 ppm) as outlined in the API standards .

6.10.3 Impacts of drilling fluid and cuttings discharges

Impacts of the planned discharge of drill cuttings and fluids considered are:

- change in water quality (increased turbidity of the water column, and potential toxicity and oxygen depletion)
- change in habitat.

6.10.3.1 Change in water quality

6.10.3.1.1 INCREASED TURBIDITY

The PBW has foraging habitat overlapping the OAs and the SRW migration BIA also overlaps the OAs. Research data detailing potential impacts from suspended solids to megafauna is scarce, however such megafauna is highly mobile, transitory, and able to avoid the plumes. The area of the turbidity plumes is regarded as a very small percentage of the foraging grounds of protected seabirds such as shearwaters, albatrosses, and petrels.

The environmental receptors with the potential for exposure and considered to be most sensitive to an increase in turbidity include pelagic fish species and plankton found in the area around the well locations.

Marine water column organisms are at a low risk of harm from cuttings discharges because of rapid dilution and dispersal. In some cases, decreased light penetration caused by the turbidity of the cuttings plume may temporarily decrease primary production of phytoplankton. Particles may clog the gills or digestive tract of zooplankton in the immediate area surrounding the discharge. Mobile pelagic species, such as fish and larger crustaceans, usually avoid or move away from plumes of suspended cuttings, thereby minimising the risk of harm.

Jenkins and McKinnon reported that levels of suspended sediments greater than 500mg/L are likely to produce a measurable impact upon larvae of most fish species, and that levels of 100mg/L will affect the larvae of some species if exposed for periods greater than 96 hours (Jenkins & McKinnon, 2006). They also indicated that levels of 100mg/L may affect the larvae of several marine invertebrate species, and that fish eggs and larvae are more vulnerable to suspended sediments than older life stages. Identifiable effects on recruitment would be difficult to discern given the high natural mortality of larvae and dispersive characteristics of the open water environment.

6.10.3.1.2 POTENTIAL CHEMICAL TOXICITY

Recent studies have shown that WBM have little or no toxicity to marine organisms (Jones, Hood, & Moiseychenko, 1996).

The compositional make up of NAF consists of a base fluid (e.g. Escaid 110), emulsified brine, soluble polymers and solids that allow the drilling fluid to have the specified engineering properties, including the correct density to maintain wellbore integrity.

Table 6-61 Indicative NAF constituents

Product	Function	OCNS ranking	
		CHARM	Non-CHARM
Base oil	Continuous phase	-	D or E
CaCl	Borehole chemical stability and hydrate inhibition	-	E
Emulsifier	Surfactant to stabilize emulsion and acting as wetting agent	Silver*	-
Lime	Alkalinity control	-	E
Viscosifying agent	Viscosifier to aid in hole cleaning and suspension	-	E
Filtration control	Reduce filtration properties	-	E
Barite	Borehole stability and pressure control	-	E
Calcium carbonate	Reservoir protection and filter cake	-	E
H2S scavenger	Remove H_2S	Gold	-
Corrosion inhibitor	Reduce corrosion rate	Gold	-
Oxygen scavenger	Remove oxygen	Gold	-
Bridging agent	For loss circulation control and wellbore strengthening	-	E

* Since the Esso 2020 drilling campaign OCNS have down-graded the non-charm rating of Ez Mul NT from a D to a C. Esso applied the environmental chemical discharge assessment process to determine if (1) use of the current stocks of NAF would represent an unacceptable environmental risk and (2) should an alternative product with a better OCNS rating be unavailable, could Ez Mul NT continue to be used. Ez Mul NT is calculated to have a hazard quotient of 13.46. This is considered a moderate risk to the environment and equivalent to a SILVER colour banding for CHARM assessment. This is determined acceptable by OCNS. As a result, it would be acceptable to use the existing stocks of NAF, with the emulsion stabiliser Ez Mul NT for the Turrum Phase 3 Drilling campaign. At the time of this assessment an alternative emulsion stabiliser is not available that has a better aquatic toxicity performance. Therefore, Ez Mul NT can be used for the remainder the Turrum Phase 3 Drilling campaign.

Current NAF systems typically have a low toxicity to water column and benthic organisms (IOGP, 2016). All drilling fluids will be assessed using the Esso Chemical Discharge Assessment Process which uses the OCNS ranking in conjunction with toxicity, biodegradation and bioaccumulation data to determine potential impacts to the environment and acceptability of planned discharges.

Barite, the most abundant particulate solid in the cuttings, has a very low solubility in natural seawater and is resistant to dissolution. Modern WBMs and NAFs are prepared with high quality barite obtained from sources with much lower trace metal content, than historical sources, with most metals of concern, being at concentrations similar to those of fine-grained marine sediments. Barite does include mercury, which studies indicate is in the form of sulphide minerals rather than as a substitution in the barite crystal lattice (Trefry & Smith, Forms of Mercury in Drilling Fluid Barite and Their Fate in the Marine Environment: A Review and synthesis, 2003).

Dissolved barium and any heavy metal contaminants present in the barite may slowly leach out of an anoxic cuttings pile (Neff, Hart, Ray, Lima, & Purcell, 2005). Breuer et al. in 2008 (Breuer, Shimmield, & Peppe, 2008) has also observed that metals in cuttings migrate either upward to the overlying water (Ba, Mn, and Fe) or diffuse downward (Cr, Cu and Pb), where they become incorporated into iron monosulfides. The exposure of these iron monosulfides to oxygen as a result of transport of oxygen into the cuttings via bioturbation or advection and/or pile resuspension may then lead to the release of the associated metals into the water column (Saulnier & Mucci, 2000) (Huerta-Diaz, Tessier, & Carignan, 1998).

In a stable cuttings pile with little physical disturbance or bioturbation, it is probable that the fraction of the total cuttings pile metals that is in the dissolved, bioavailable fraction remains low. It is probable that some dissolved metals diffuse into the overlying water column and escape from the pile, as identified by Neff et al in 2005 (Neff, Hart, Ray, Lima, & Purcell, 2005).

Mercury in the form of sulphide minerals that is in barite was experimentally found to have a very low solubility, and this showed that the extent of dissolution of mercury in barite into seawater or into solutions representing digestive tracks of animals was undetectable (Trefry & Smith, 2003). A study into total mercury and methylmercury in sediments near offshore drilling sites in the GoM concluded that mercury introduced with barite from offshore drilling cannot be directly linked to enhanced values of methylmercury in nearfield sediments (Trefry, Trocine, & McElvaine, 2007).

A number of field monitoring studies to assess impacts of drilling discharges have been completed in Bass Strait and around the world. In a stable cuttings pile with little physical disturbance or bioturbation, it is probable that the fraction of the total cuttings pile metals that is in the dissolved, bioavailable fraction remains low. The low solubility of NAF materials does not make it available for uptake and bioaccumulation, this has been confirmed by the fact that these base fluids have not been detected in tissues of marine organisms near NAF cuttings discharges (IOGP, 2016).

It is probable that some dissolved metals diffuse into the overlying water column and escape from the pile, as identified by Neff et al. in 2005 (Neff, Hart, Ray, Lima, & Purcell, 2005) However, this efflux is not sufficient to raise the concentration of metals above natural background levels to an ecologically significant extent. There is no indication that the levels of trace metals in fish and shellfish collected close to offshore installations are significantly above natural background concentrations (Bakke, Klungsoyr, & Sanni, 2013).

The monitoring in the various geological locations and depths, and using differences in base fluids and the literature indicates that there are minor differences in the impacts due to any of these variations (IOGP, 2016) (IOGP, 2003).

Biological effects of NAF cuttings discharges are mainly restricted to the benthic environment. Effects of treated Group III (negligible aromatic content) NAF cuttings accumulations in sediments are usually minor and biological recovery is often underway within a year of completion of discharge (IOGP 2016).

The recovery of the benthic community is depended upon several factors: type of affected community, thickness of impacted area, persistence of the cuttings (dependent upon both biodegradation and seafloor distribution), availability of colonising organisms. Independent of these factors, one year after the cessation of drilling and discharge of NAF, it is observed that the degradation of NAF and recovery of benthic diversity is substantially advanced (IOGP 2016).

Given this uniformity of observation, it seems most likely that smothering and organic enrichment during the biodegradation of NAFs are the primary causes of the observed impacts, regardless of any toxicity effects.

Research on NAF (Ellis, Fraser, & Russel, 2012) suggests that changes in benthic communities occur primarily due to the level of organic enrichment which causes oxygen depletion due to the biodegradation of the discharged NAF. This biodegradation results in predominantly anoxic conditions in the sediment (EPA, 2000). Where concentrations of NAF may be high enough to cause some toxic effect, such concentrations occur at the closest point to the discharge, mainly during discharge, is also where impacts of smothering and organic enrichment would also be highest.

Early life stages of fish (embryos, larvae) and other plankton would be most susceptible to the toxic exposure from drilling fluids, as they are less mobile and therefore can become exposed to the plume at the outfall. However, these are expected to rapidly recover once the activity ceases, as they are known to have high levels of natural mortality and a rapid replacement rate (UNEP, 1985). As such, exposure of planktonic communities is not considered to result in significant impacts on population level of organisms that would affect ecological diversity or productivity within Commonwealth marine areas and therefore is considered to result in an undetectable or limited local degradation of the environment, rapidly returning to original state by natural action.

Pelagic species being mobile and are expected to be subjected to very low levels of chemicals for a very short time as they swim near the discharge plume. As such, transient species are not expected to experience any acute or chronic effects.

6.10.3.2 Change in habitat

Discharges of drill cuttings can smother seabed habitat, flora, and fauna, resulting in an alteration in seabed substrate. The magnitude of the impact depends on cuttings volumes, discharge location and substrate within the OA.

The main environmental disturbance from discharging drilling cuttings and fluids is associated with the smothering and burial of sessile benthic and epibenthic fauna (Hinwood, et al., 1994) . The effects of WBM and NAF cuttings deposits on benthic communities are caused mainly by burial, changes in sediment texture, and low sediment oxygen concentrations that result from microbial degradation of organic matter (organic enrichment) (IOGP, 2016).

Many studies have shown that the effects on benthos from the discharge of drilling cuttings with WBM, from top hole drilling, are subtle, although the presence of drilling fluids in the seabed close to the drilling location (<500m) can usually be detected e.g. (Crammer, 1988), (Neff, Bothner, Macoilek, & Grassie, 1989), (Hyland, et al., 1994), (Daan, Booij, Mulder, & Van Weerlee, 1996), (Currie & Isaacs, 2005), (OSPAR, 2009), (Bakke, Klungsoyr, & Sanni, 2013).

Jones, Hudson and Betts (Jones, Hudson, & Bett, 2006) compared pre- and post-drilling ROV surveys and documented physical smothering effects from WBM cuttings within 100m of the well. Outside the area of smothering, fine sediment was visible on the seafloor up to at least 250m from the well. After three years, there was significant removal of cuttings particularly in the areas with relatively low initial deposition (Jones, Gates, & Lausen, 2012). The area impacted by complete cuttings cover had reduced from 90 – 40m from the drilling location, and faunal density within 100m of the well had increased considerably and was no longer significantly different from conditions further away.

The discharge of NAF to the environment is minimised by recycling the drilling fluid during operations through solids control and secondary processing equipment installed on the JUR. Discharges of NAF are confined to this material adhering to the surfaces of the cuttings. Neff (2010) suggests that NAF-coated cuttings, tend to clump and settle rapidly as large particles over a small area near the discharge point and tend not to disperse rapidly indicating that when drilling with NAF, extent of dispersion is expected to decrease, but thickness of cuttings piles can be expected to increase (Neff, Fate and Effects of Water Based Drilling Muds and cuttings in Cold-Water Environments for Shell Exploration and Production Company, 2010). Water cannot penetrate the oleophilic mass of cuttings, so they do not disperse as efficiently as cuttings from sections drilled with WBMs. The NAF cuttings discharged to water of less than 300 – 400m deep, usually is deposited in sediments within an area of approximately 100 – 200m radius around the discharge point (IOGP, 2016).

However, there have been several previous studies on NAF cuttings dispersion around fixed platforms in the Gippsland Basin which show that the physical seabed dispersion process evident in eastern Bass Strait will assist in both reducing the extent of smothering and increasing the rate of recovery.

A seabed monitoring program (Terrens, Gwyther, Keogh, & Tait, 1998) was undertaken around the Fortescue platform (73m water depth) in Bass Strait by taking seabed samples at sites along a transect following the predominant ocean current and at control sites, before, during and after the period in which NAF cuttings were discharged. The seabed sediments were analysed for various chemical components, including barium, and biological changes. The summary of the results of the monitoring program are as follows:

- impacts to benthos were observed at 100m
- patches of sand of normal appearance occurred between 100 and 200m from the platform

- patches of NAF decreased in size beyond 100m
- NAF patches were not observed beyond 200m
- chemical traces of NAF were not found beyond 500m
- recovery of benthos was evident within four months of completion of drilling.

Video taken two weeks after the completion of the drilling program at the Fortescue platform showed settled NAF cuttings as dark grey material covering the sandy substrate, but generally only in patches and not to sufficient depths to obscure seabed ripples or protruding shell fragments. There was also some evidence of bioturbation and bottom dwelling fish, hermit crabs and some sponges. The images confirmed the lack of any significant mounding and that the cuttings were confined to within 100 to 200m of the platform.

In the Snapper platform (55m water depth) study (Coffey, 2010) (also in Bass Strait) visual inspection of the seafloor using an ROV five months after drilling was completed concluded that the accumulation of cuttings was localised to a distance of just over 100m from the platform and that both the natural sediment and deposited cuttings had been recolonised by benthic infauna. The study showed a large number of small burrows and bioturbation mounds created by benthic infauna such as crustaceans and polychaete worms on natural sediment as well as within the cuttings.

In 2015, Marine Solutions conducted a visual seafloor investigation using an ROV around the Marlin B platform (59m water depth) approximately six months after the drilling campaign was completed (Marine Solutions , 2015). Cuttings covered an elliptical shaped area; in the northwest and southeast extending to approximately 260m and 40m respectively however, with the prevailing current, coverage was greater in southwest and northeasterly directions, where cuttings were detectable to a maximum distance of approximately 330m and 370m, respectively. Fish, invertebrate and algal species were all observed during the survey, indicating suitable conditions for colonisation and ongoing viability of various species adjacent to the cuttings on the sediment. Large areas of the surveyed seafloor exhibited bioturbation, indicative of the presence of an active infaunal community.

Apache Energy has also monitored the effects of discharge of NAF in shallow water (5 – 20m) platforms located offshore in Western Australia (Apachee Energy, 2008). Findings from these studies have been consistent with the general literature in that the observed impacts occurred mainly within 100m of Apache's platforms with substantial seafloor community recovery between one and two years after drilling.

In Ellis' 2012 paper, seven studies summarising information from wells in the North Sea and GoM were reviewed to assess environmental effects associated with NAF (Ellis, Fraser, & Russel, 2012). The area of detection and scale of biological effects resulting from discharged NAF were smaller than that resulting from the release of WBM. Maximum concentrations of synthetic tracers from NAF in sediments were detected at distances ranging from 100 - 2,000m from the discharge location. Biological effects associated with the release of NAF cuttings were generally detected at distances of 50 – 500m from well sites (Smith & May, 1991), (Candler, Hoskins, Churan, Lai, & Freeman, 1995), (De Blois, et al., 2005).

6.10.4 Controls

- CM3: Chemical discharge assessment process
- CMP27: Solids Controls Procedure
- CMP6: Worksite Operations Safety Plan

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.10.5 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.10.6 Demonstration of As Low As Reasonably Practicable

Table 6-62 Decision Context and justification

Decision Context A
The surface discharge of fluids during drilling and well abandonment activities is common for this type of, both nationally and internationally. Small and infrequent releases of brines and drilling and completion fluids are standard discharges and are requried for operational reasons. The consequence of any impact associated with these discharges was assessed as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons with regard to the planned operational discharges. Esso believes ALARP Decision Context A should apply.

Table 6-63 Good practice controls

Good practice	Adopted	Control	Rationale
Discharge of least environmentally hazardous chemical	✓	**CM3:** Chemical discharge assessment process	This risk control practice requires that new chemicals must be approved prior to use. This practice assesses chemicals that have the potential to be discharged to the environment (i.e. not household chemicals) to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application. This process also assesses known chemicals of concern such as: Hg, Cadmium (Cd), PFAS, lead and assesses their concentration levels. Esso will ensure that the contaminant limit concentrations for barite are at or below a Mercury (Hg) concentration of <1mg/kg (1ppm) dry weight in stock barite as outlined in the API standards.
Reduce oil in water content of circulated fluids/tank washings	✓	**CMP6:** Worksite Operations Safety Plan	It is standard practice that the oil in water content of circulated fluids/tank washings will be processed prior to discharge (<%1oil in water).
Cuttings treatment to reduce ROC	✓	**CMP27:** Solids Controls Procedure	It is industry standard practice to remove as much as practicable NAF muds from cuttings using a combination of shale shakers, centrifuges and/or dryers.
No Bulk discharge of NAF	✓	**CMP6:** Worksite Operations Safety Plan	Overboard drains from mud tanks are classified as critical valves i.e. locked and tagged. A Permit to Work will be required to unlock the valves. All bulk material is transferred to shore.
Cuttings discharged below the water line	✓	**CMP6:** Worksite Operations Safety Plan	Cuttings will be discharged just below the sea surface resulting in dispersion of the cuttings and residual muds over a larger area as they sink to the seafloor.

Table 6-64 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Use WBM for entire well (eliminate NAF)	WBM fluid systems are generally considered to be less toxic than NAF. As such this option could reduce the potential consequence associated with NAF toxicity. The effect would be limited to a localised decrease in impacts to the low densities of more sensitive marine benthic fauna.	Water-based drilling fluids will be used wherever practicable. The NAF has been selected for intermediate and production sections because it is technically preferred and increases well safety (reducing loss of well control (LOWC) risk). The technical reasons for selection of NAF are further detailed in Section 7.7. Use of WBM increases the volume of deposition on the seafloor, and the consumed WBM fluids would need to be disposed of at the end of the campaign given there is limited ability to recondition used WBM. The use of NAF reduces the overall waste generated (and discharged) due to better in-hole stability (less wall slumping and therefore less cuttings and fluids). The environmental benefit is minor and uncertain given the lower toxicity is offset by the greater volume of muds needed. Given the well-integrity and safety concerns this option is not adopted.	Partially adopted
Cutting reinjection	Prevents need to discharge cuttings to marine environment.	Reinjection involves slurrifying cuttings and then pumping them into a well specifically designed for reinjection. Under pressurised conditions, cuttings pass into targeted formations down the well. Offshore injection of cuttings from fixed well head platforms is well proven, but subsea injection from JUR is limited. The subsea injection equipment involved is very specialised (i.e. it requires a flexible injection riser and a specially designed well head). This method is known for high rates of failure due to loss of injectivity and/or broaching of cuttings at seabed. This is not considered feasible for this drilling campaign.	Not adopted
Cuttings treatment to further reduce adhered WBM	Using the solids control equipment on the cuttings with WBM would result in reduces volume of WBM remaining on cuttings and thereby reduce the overall volume of WBM	It has been shown that WBM have little or no toxicity to marine organisms. WBM additives are either inert in the marine environment, are naturally occurring benign materials or are organic polymers that are readily biodegradable in the marine environment. These additives are similar to those used in the sweeps during the open hole section drilling where cuttings are discharged directly to the	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
	discharged to the environment.	seabed. The additional environmental benefit of the reduced WBM on cuttings is minor as the impacts are predominantly a result of the physical formation of cuttings piles rather than the percentage of the WBM retained on the cuttings. The use of solids control on WBM cuttings is not a standard practice in the industry.	
Onshore disposal	Disposal onshore would eliminate cuttings discharge in the marine environment. However, disposal onshore (to landfill) carries additional onshore environmental impacts.	Transporting the volume of cuttings to shore would substantially increase the number of lifts required based on each skip being lifted onto a truck, from a truck to the dock, from the dock to a boat, from the boat to the rig deck, from the rig deck to the loading station and then back again. In addition to the increased health and safety risks associated with these lifts, there is the increased risk of vessel collision from additional trips to and from ports and additional vessel fuel consumption and associated air emissions (it is estimated that another support vessel would be required to support the additional waste onshore disposal option). These risks (and associated impacts) are eliminated with the offshore disposal of these low impact waste streams. This option was assessed as re-locating the impact of disposal of waste from the ocean to landfill sites at a significant cost for little or negative overall environmental benefit.	Not adopted
Exclusion of barite from drilling materials	Exclusion of barite excludes the heavy metal source in drilling muds.	Substitutes for barite in drilling mud include celestite, ilmenite, iron ore, and synthetic hematite. None of these substitutes have been effective at displacing barite as the preferred option. The substitutes are expensive or do not perform competitively, additionally they do not provide a reduction in mercury (e.g. iron ore).	Not adopted
Implement concentration limits for mercury and cadmium in barite	Limits the amounts of heavy metals of concern in the drilling muds, reducing the toxicity.	Minor cost increased in selection of barite with low mercury and cadmium concentrations and provides environmental benefit of ecotoxicity reduction.	Adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Use remaining drilling fluid solid additives in other Esso operations (unmixed bulk products – NAF and WBM)	Eliminates the requirement for any marine discharges.	If this well is not the last development well in the Esso JUR campaign it will be feasible to keep remaining stock and either store on shore and use in upcoming drilling operations or retain on the JUR while the JUR is under contract.	Adopted
Transfer stock to next operator	Eliminates the requirement for any marine discharges.	If Esso does not require the stock for future operations it may be possible to sell the unmixed stock to the next operator. This will depend on demand and commercial agreements.	Adopted
Minimise stock on board	Eliminates the requirement for any marine discharges.	Stock on board will be managed to ensure that only the minimum amount required to undertake the successful operation is maintained.	Adopted
Onshore disposal of cuttings	Disposal onshore would eliminate cuttings discharge in the marine environment. However, disposal onshore (to landfill) carries additional onshore environmental impacts.	Transporting the volume of cuttings to shore would substantially increase the number of lifts required based on each skip being lifted onto a truck, from a truck to the dock, from the dock to a boat, from the boat to the rig deck, from the rig deck to the loading station and then back again. In addition to the increased health and safety risks associated with these lifts, there is the increased risk of vessel collision from additional trips to and from ports and additional vessel fuel consumption and associated air emissions (it is estimated that another support vessel would be required to support the additional waste onshore disposal option). These risks (and associated impacts) are eliminated with the offshore disposal of these low impact waste streams. This option was assessed as re-locating the impact of disposal of waste from the ocean to landfill sites at a significant cost for little or negative overall environmental benefit.	Not adopted
Minimize hole sizes	Reduce volume of cuttings produced	Hole sizes selected are consistent with standard industry practices for proposed well construction and designed to ensure ability to maintain well integrity and minimize operational risks.	Adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
No discharge of bulk powders (barite/bentonite or any other dry bulk powders)	Eliminates the requirement for any marine discharges.	The Minamata convention requires best available techniques be adopted when considering discharge of wastes that contain any mercury content. Stock barite is known to contain low levels of naturally occurring mercury and barite stocks are tested to ensure they meet the limits prescribed by API standards (Mercury (Hg): max 1 mg/kg (<1ppm) dry weight in stock barite. This limit supports the use of barite as a necessary drilling operations material and the associated operational discharges. However as outlined above there will be no discharge of any dry bulk material.	Adopted

6.10.7 *Demonstration of acceptability*

Table 6-65 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met	✓	Chronic chemical pollution is a recognised threat to the species in the following conservation management plans and conservation advice, however no conservation/management actions are specified: • CMPBW • *Conservation Advice* for sei whales (TSSC, 2015) • *Conservation Advice* for fin whales (TSSC, 2015).
Internal context	Consistent with Esso's Environment Policy	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".

Factor	Demonstration criteria	Criteria met	Rationale
	Meets ExxonMobil Environmental Standards	✓	Proposed activity is consistent with the Upstream Waste Management Standard specifically: • using only NAF prepared and maintained with Oil and Gas Producers Group III Non-Aqueous Base Fluids • using equipment capable of reducing NAF on cuttings equal to or better than a cutting dryer • measuring the percentage ROC at 300m intervals and at least once per day when discharging to ensure solids control and fluids recovery equipment is operating as designed, and • never intentionally discharging whole NAF.
	Meets ExxonMobil OIMS Objectives	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 7-1 objective to evaluate change against an established set of criteria and establish endorsement/approval levels • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors.
External context	Concerns of relevant persons have been considered/addressed through the consultation process	✓	No relevant persons have raised concerns with regards to planned discharges of drilling fluids and cuttings.

6.11 Planned discharge – Cooling waters and reverse osmosis system

6.11.1 *Sources of cooling water and reverse osmosis discharges*

The following activities have been identified as resulting in surface discharges:

- seawater cooling system
- reverse osmosis system.

These fluids are typical discharges associated with operation marine facilities – cooling water discharged to the sea from the vessel or facility and the reverse osmosis system discharges brine as the byproduct of the production of potable water.

A discharge of cooling water or potable water generation waste is continuous. Given the nature of these discharges, marine fauna most susceptible to toxic impacts are mainly limited to less mobile fish embryo, larvae, and other plankton. There is potential for short-term impacts to species that rely on plankton as a food source. Any impact to prey species would be temporary as the duration of exposure would be very limited, and fish larvae and other plankton are expected to rapidly recover as they are known to have high levels of natural mortality and a rapid replacement rate (UNEP, 1985).

6.11.2 Impacts of cooling water and reverse osmosis discharges

Impacts of the planned discharge of brines and cooling waters are:

- change in water quality (increased salinity in the water column)
- change in the local water temperature and potential biofouling chemicals.

6.11.2.1 Change in water quality.

6.11.2.1.1 INCREASED SALINITY

Reverse osmosis systems create brine which is discharged to the sea as part of the process.

Brine water will descend through the water from the discharge point where it will be rapidly mixed with receiving waters and dispersed by ocean currents. As such, any potential impacts are expected to be limited to the source of the discharge where concentrations are highest. This is confirmed by studies that indicate effects from increased salinity on planktonic communities in areas of high mixing and dispersion are generally limited to the point of discharge only (Abdul Azis, et al., 2003).

The receptors with the potential to be exposed to an increase in salinity include pelagic fish species and plankton found in surface waters within the OA. Changes in salinity can affect the ecophysiology of marine organisms. Most marine species are able to tolerate short-term fluctuations in salinity in the order of 20 - 30% (Walker & McComb, 1990). However, larval stages, which are crucial transition periods for marine species, are known to be more susceptible to impacts of increased salinity (Neuparth, Costa, & Costa, 2002). Mobile pelagic species may be subjected to slightly elevated salinity levels (approximately 10 - 15% higher than seawater) for a very short period which they are expected to be able to tolerate.

it is anticipated that ecological receptors that have the potential to be exposed are those that use the surface waters for transit or foraging such as whales, turtles, fish, and plankton. The OA is within a foraging BIA for the PBW, but they would be required to be close to the vessel or JUR location.

6.11.2.2 Increased water temperature

The water discharged will be at a greater temperature to the surrounding seawater. Like the brine discharge the temperature will rapidly decrease due to the high mixing and dispersion until equilibrium with the ocean temperature is achieved.

It is anticipated that ecological receptors that have the potential to be exposed are those that use the surface waters for transit or foraging such as whales, turtles, fish and plankton. The OA is within a foraging BIA for the PBW, but they would be required to be close to the vessel or JUR location to be impacted.

6.11.2.3 Increased toxicity

Some heat exchange systems will have biofouling chemicals such as antifouling paints or have a system that doses with biofouling and anticorrosion chemicals. These will be in accordance with class requirements.

These are designed to provide protection for the system with the vessel and not to impact the environment.

6.11.3 Controls

- CM9: Class certification
- CM3: Chemical discharge assessment process

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

6.11.4 Residual consequence assessment

With the above controls in place, the residual potential consequence has been determined as:

- **Consequence Level IV**

6.11.5 *Demonstration of As Low As Reasonably Practicable*

Table 6-66 Decision Context and justification

Decision Context A
The surface discharge of fluids from cooling and reverse osmosis systems is common both nationally and internationally. The release of brines and cooling waters are standard discharges associated with vessels. The consequence of any impact associated with these discharges was assessed as Consequence Level IV (the lowest level). No objections or claims were raised by relevant persons about the planned operational discharges from vessels. Esso believes ALARP Decision Context A should apply.

Table 6-67 Good Practice Controls

Good practice	Adopted	Control	Rationale
Discharge of least environmentally hazardous chemical	✓	**CM3:** Chemical discharge assessment process	This risk control practice requires that new chemicals must be approved prior to use. This practice assesses chemicals that have the potential to be discharged to the environment (i.e. not household chemicals) to ensure the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements of the application.
Discharge of least environmentally hazardous chemical	✓	**CM9:** Class certification	MARPOL requirements require specific controls regarding discharges from vessels.

Table 6-68 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Electrochlorination	Requires less chemicals	Is technically possible but requires retrofitting to MARPOL requirements which require specific controls regarding discharges from vessels, which would be a significant cost which is not considered reasonable.	Not adopted

6.11.6 Demonstration of acceptability

Table 6-69 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Principles of ESD	No potential to affect biological diversity and ecological integrity	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met	✓	Chronic chemical pollution is a recognised threat to the species in the following conservation management plans and conservation advice; however, no conservation/management actions are specified: • CMPBW • *Conservation Advice* for sei whales (TSSC, 2015) • *Conservation Advice* for fin whales (TSSC, 2015).
Internal context	Consistent with Esso's Environment Policy	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards	✓	The controls proposed meet the strategic objectives of the Exxon Mobil Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 7-1 objective to evaluate change against an established set of criteria and establish endorsement/approval levels • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors.

Factor	Demonstration criteria	Criteria met	Rationale
External context	Concerns of relevant persons have been considered/addressed through the consultation process	✓	No relevant person concerns have been raised concerning planned operational vessel discharges.

7 Environmental risk assessment

This Section describes the outcome of the environmental risk assessment of unplanned events associated with activities described in this EP.

The purpose of the risk assessment is to ensure that all risks associated with the activity are identified and evaluated, and the resulting risks are demonstrated to be reduced to ALARP and acceptable levels in accordance with the Esso impact and risk assessment methodology outlined in Section 5.

Appendix H presents the EPOs, EPSs and measurement criteria required to support the controls identified in this Section.

A summary of the risk assessment is included in Table 7-1.

Table 7-1 Summary Risk Assessment

Identifier	Hazard	Inherent Consequence	Residual Consequence	Residual Likelihood	Risk Category
1	Physical interaction – Marine fauna	III	IV	D	4
2	Physical interaction – IMS	III	III	D	4
3	Accidental release – Dropped objects	IV	IV	D	4
4	Accidental release – Waste	IV	IV	D	4
5	Accidental release – LOC hazardous or non-hazardous substances	III	IV	D	4
6	Accidental release – LOC hazardous of refined oils	III	III	D	4
7	Accidental release – LOC of reservoir hydrocarbons	II	II	D	3

7.1 Physical interaction – Marine fauna

7.1.1 Causes of physical interaction with marine fauna

The movement of support vessels has the potential to result in collision with marine fauna.

Note: Within the 500m PSZs, support vessels will be under a JUR procedure to ensure that vessel handling is undertaken in a safe and controlled manner.

7.1.2 Risks of physical interaction with marine fauna

Interaction with marine fauna has the potential to result in:

- injury/mortality to marine fauna.

7.1.3 Risk assessment

7.1.3.1 Injury/mortality to fauna

Marine megafauna are most at risk from this hazard and thus are the focus of this evaluation.

Several marine turtle species including species listed as either threatened and/or migratory under the EPBC Act may occur within the OA, however no critical habitat or BIAs for turtles have been identified.

Several marine mammals (e.g. whales, dolphins, seals) including those listed as either threatened and/or migratory under the EPBC Act have the potential to occur within the OA. The PBW has foraging habitat BIAs overlapping the OA and the SRW migration BIA also overlaps the OA.

Cetaceans are naturally inquisitive marine mammals that are often attracted to offshore vessels and facilities. The reaction of whales to the approach of a vessel is quite variable. Some species remain motionless when in the vicinity of a vessel, while others are curious and often approach ships that have stopped or are slow moving, although they generally do not approach, and sometimes avoid, faster-moving ships (Richardson, Greene, Malme, & Thomson, 1995).

Although collisions with marine fauna can happen anywhere in Australian waters, the risk of collision is greater in breeding areas and along seasonal migration routes. Collision risk also increases in shallower waters where a vessel has less under-keel clearance, leaving an animal less room to avoid the vessel (AMSA, 2023). Larger vessels with reduced manoeuvrability moving in excess of 10kn may cause fatal or severe injuries to cetaceans, with the most severe injuries caused by vessels travelling faster than 14kn (Laist, Knowlton, Mead, Collet, & Podesta, 2001). Vessels typically used to support these activities do not have the same limitations on manoeuvrability and would not be moving at these speeds when conducting activities inside the OA.

The Australian and New Zealand fur seals are highly agile species that haul themselves onto rocks and oil and gas platform structures. As such, it is likely that they will avoid any collision with moving support vessels.

Vessel strike data from (1997-2015) for marine species in Australian waters was reviewed and identified the following (Peel, Smith, & Childerhouse, 2016):

- off the Victorian coast there are fewer than 10 records of vessel strikes with whales (historic and modern records)
- whales including the humpback whale (*Megaptera novaeangliae*), PBW, Antarctic blue whale (*Balaenoptera musculaus interndedia*), SRW, dwarf minke (*Balaenoptera acutorostrata*), Antarctic minke whale (*Balaenoptera bonaerensis*), fin whale (*Balaenoptera physalus*), Bryde's whale (*Balaenoptera edeni*), pygmy right whale (*Caperea marginata*), sperm whale (*Physeter macroephalus*), pygmy sperm whale (*Kogia breviceps*) and pilot whale species were identified as having interacted with vessels. The humpback whale exhibited the highest incidence of interaction followed by the SRW. A number of these species may be observed in the waters within the vicinity of the OA
- dolphins including the Australian humpback (*Sousa sahulensis*), common bottlenose (*Tursiops truncates* s. str.), Indo-Pacific bottlenose (*Tursiops aduncus*) and Risso's dolphin (*Grampus griseus*) species were also identified as interacting with vessels. The common bottlenose dolphin exhibited the highest incidence of interaction. A number of these species may be observed within the vicinity of the OA
- there were no vessel interaction reports during the period for either the Australian or New Zealand fur seal. There have been incidents of seals being injured by vessel propellers, however all interactions are attributed to be the seal interacting/playing with a vessel, rather than a 'boat strike', with experts indicating the incidence of 'boat strike' for seals is very low.

The duration of fauna exposure to vessel strike is limited to the duration of works under this EP expected to be approximately 300 days. If a fauna strike occurred and resulted in death, it is not expected that it would have a detrimental effect on the overall population. Consequently, the potential consequence from fauna strike is considered to be Consequence Level III as this type of event may result in a localised, short-term impact to species of recognised conservation value but is not expected to affect the population or local ecosystem function.

Due to the restricted area of operation PSZ (500m radius around the MLC) and the slow speed of support vessels when operating in this area, in the unlikely event that contact is made with species, the impact due to vessel strike is expected to be non-life threatening and the likelihood of vessel strike and associated severe injury or death of an individual is considered Likelihood Category E (very highly unlikely) during these activities. While there is the potential for mammals such as dolphins and seals to interact and be playful with slow moving vessels or vessels in DP mode, the likelihood of such interactions causing severe injury or death of an individual is considered Likelihood Category D (very unlikely) during these activities.

7.1.4 Residual risk ranking

Table 7-2 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
III	D	4

7.1.5 Controls

- CM8: Vessel Master

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.1.6 Demonstration of As Low As Reasonably Practicable

Table 7-3 Decision Context and justification

Decision Context B
Offshore petroleum operations are widely undertaken both locally, nationally, and internationally. The risk of cetacean vessel strike is well managed via legislative control measures that are considered industry best practice. These controls are well understood and implemented by the industry. However, these legislative controls do not eliminate the risk of death or injury to seals via interaction with vessels. The consequence of any impact associated with a vessel strike was assessed as Consequence Level III. No objections or concerns were raised by relevant persons with regard to the risk of physical interaction with marine fauna. Esso believes ALARP Decision Context B should apply.

Table 7-4 Good practice controls

Good practice	Adopted	Control	Rationale
Part 8 Division 8.1 of the EPBC Regulations. Australian National Guidelines for Whale and Dolphin Watching 2017 (Commonwealth of Australia, 2017).	✓	**CM8:** Vessel Master	The Vessel Master has responsibility for ensuring the requirements of these Regulations and Guidelines are followed. The Guidelines describe strategies to ensure whales and dolphins are not harmed during offshore interactions with people. The Guidelines were developed jointly by all State and Territory governments through the Natural Resource Management Ministerial Council and, although more relevant for tourism activities, provide a list of requirements that are generally adopted by the oil and gas industry to minimise the risk of cetacean strike occurring. Note: Both the lack of visibility of seals in the water and number of seals in close proximity to oil and gas offshore installations make applicability of these Guidelines to seals impracticable. Furthermore, fauna interaction management actions as described in the Guidelines will not prevent seals approaching/playing with vessels.

Table 7-5 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Grates on vessel thrusters	Grates on vessel tunnel thrusters would prevent entrapment of marine mammals, in particular seals which are known to approach/play with vessels while stationary on DP.	Smaller support vessels (such as those used to deploy ROVs) do not generally have grates on tunnel thrusters, however it is more common for larger platform supply vessels. Adding grates to thrusters significantly impacts efficiency of vessels leading to increased fuel usage and air emissions, particularly for small vessels. Further, grates lead to increased potential for marine growth (which further reduces efficiency of thrusters). Retrofitting of grates to vessels requires dry docking at significant cost.	Not adopted**

** Bow thruster guards are not a mandatory requirement for vessels on this activity. However, where a vessel without thruster guards is planned to be used for the activity and is required to dry dock for IMS inspection or cleaning, the additional fitment of thruster guards shall be considered as part of the docking process. As part of this consideration, a risk assessment will be completed to consider additional hazards that could be introduced to the vessel (including failure of the thruster guard and ingestion into the thruster, or hull damage due to guard failure). With the agreement of the vessel owner and where the assessment shows that there is no additional risk, the opportunity will be taken to install bow thruster guards while the vessel is in dry dock.

7.1.7 Demonstration of acceptability

Table 7-6 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have	✓	Requirements of the EPBC Regulations – Part 8 Division 8.1: Interacting with cetaceans, although more relevant for tourism activities, have been adopted.

Factor	Demonstration criteria	Criteria met	Rationale
	been identified and met.		Vessel disturbance is a recognised threat to the species in the following conservation management plans and advice. The proposed controls are consistent with conservation/management actions in: • CMPBW • *Conservation Advice* for humpback whales (TSSC, 2015) • *National Recovery Plan for the Southern Right Whale (Eubalaena australis)* (DCCEEW, 2024) • *Conservation Advice for sei whales* (TSSC, 2015) • Conservation Advice for fin whales (TSSC, 2015) • *Recovery Plan for Marine Turtles in Australia 2017-2027* (DoEE, 2017) • *Conservation Advice for leatherback turtles* (TSSC, 2008).
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no specific Environmental Standard which addresses interaction with marine fauna, but the controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No concerns have been raised in relation to impacts to marine fauna.

7.2 Physical interaction – Introduction of Invasive Marine Species

7.2.1 Causes of physical interaction with Invasive Marine Species

An IMS is a species occurring, as a result of human activities, beyond its accepted normal distribution and which threatens valued environmental, agricultural or other social resource by the damage it causes (DCCEEW, 2022). Not all non-indigenous marine species introduced into new environments will cause demonstrable effects, some are relatively benign, and few have spread widely beyond ports and harbours.

The following activities have the potential to result in the introduction of IMS in the activity area:

- translocation of foreign species through biofouling of the JUR and support vessel hull and niches (e.g. sea chests, bilges, strainers)
- discharge of ballast water from support vessels containing foreign species.

7.2.2 *Risks of introduction of Invasive Marine Species*

The translocation of IMS through biofouling or ballast water discharge has the potential to result in effects to seabed habitat and marine ecosystems due to:

- change in ecosystem dynamics.

7.2.3 *Risk assessment*

7.2.3.1 Change in ecosystem dynamics.

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. activity 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.

It is estimated that there are more than 250 exotic species in the Australian marine environment and that about one in six introduced marine species become pests (i.e. the effects of the introduced organisms are sufficiently severe) (DCCEEW, 2022).

Over 100 exotic marine species are known to have become established in Victorian marine waters (Hewitt, et al., 2004). Some have become marine pests. The most concerning marine pest species in Victoria (Parks Victoria, 2023) include:

- Northern pacific seastar (*Asterias amurensis*)
- Wakame (Undaria pinnatifida)
- Pacific oyster (*Crassostrea gigas*)
- green shore crab (*Carcinus maenus*)
- European fan worm (*Sabella spallanzanii*)
- New Zealand screw shell (*Maoricolpus roseus*).

These species are largely known to occur in and around port areas. The New Zealand screw shell however is known to have become established in vast beds in Bass Strait and off the coasts of eastern and northern Tasmania, Victoria and NSW (MESA, 2023). Figure 7-1 shows the current known distribution of the New Zealand screw shell.

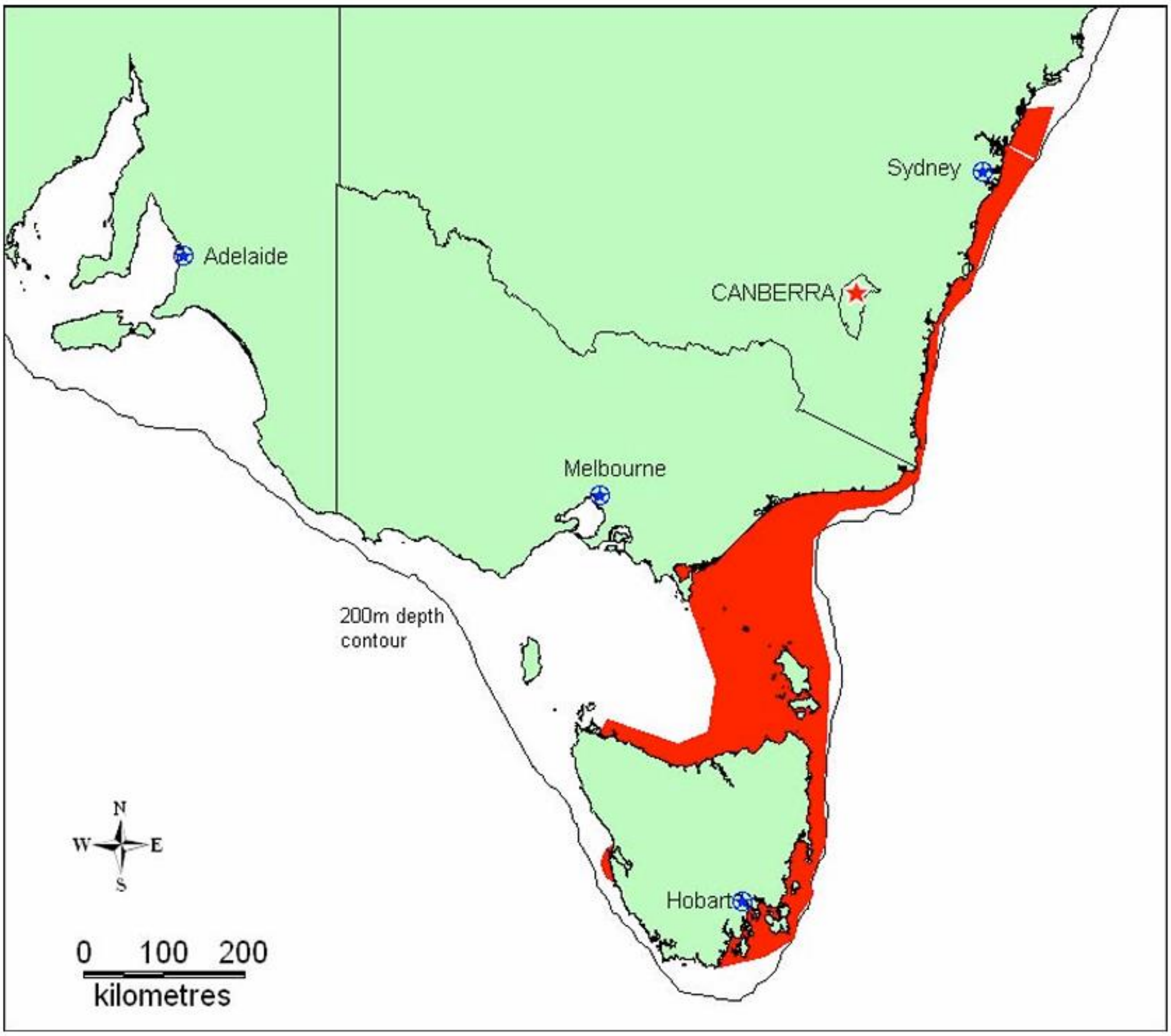

Figure 7-1 Current known distribution of the NZ screw shell (*Maoricolpus roseus*) in Australian waters (CSIRO, 2004)

Marine Management Plans for Victorian Marine National Parks and Marine Sanctuaries (e.g. Beware Reef Marine Sanctuary and Point Hicks Marine National Park) acknowledge that New Zealand screw shell is established in Bass Strait and note the possibility of the occurrence of this species within soft sediment habitats in the parks or sanctuaries (Parks Victoria, 2006). The Ninety Mile Beach Marine National Park Management Plan (Parks Victoria, 2006c) notes that due to the park's inaccessibility and associated difficulty in conducting regular, detailed surveys, incursions of marine pests are unlikely to be detected until they are fully established and beyond potential control.

IMS are likely to have little or no natural competition or predators, thus potentially outcompeting native species for food or space, preying on native species, or changing the nature of the environment.

Marine pest species can also deplete fishing grounds and aquaculture stock, with between 10% and 40% of Australia's fishing industry being potentially vulnerable to marine pest incursion. For example, the introduction of the Northern Pacific seastar (*Asterias amurensis*) in Victorian and Tasmanian waters was linked to a decline in scallop fisheries (Dommisse & Hough, 2004). Similarly, the New Zealand screw shell thought to have been introduced on dry ballast or through the live oyster trade, may threaten other mollusc species, including scallops. The New Zealand screw shell can densely blanket the seafloor with live and dead shells, and faecal pellets and therefore also smother other seafloor species (ABC Science, 2000).

Marine pests can also damage marine and industrial infrastructure, such as encrusting jetties and marinas or blocking industrial water intake pipes. By building up on vessel hulls, they can slow the vessels down and increase fuel consumption.

The benthic habitat within the OAs is characterised by a soft sediment and shell/rubble seabed, infauna communities, and sparse epibiotic communities (typically sponges). The nearest area of higher value or sensitivity, the Ninety Mile Beach Marine National Park on the Victorian coast, is located more than 15kms inshore from the OAs.

Once established, some pests can be difficult to eradicate (Hewitt, et al., 2004) and therefore there is the potential for a long-term or persistent change in habitat structure. 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, Kirkendale, Lambert, & Meyer, 2002).

If an IMS was introduced, and if it did colonise an area, it is expected that any colony would remain fragmented and isolated, and only within the vicinity of the wells (i.e. it would not be able to propagate to nearshore environments, and protected marine areas present in the wider region). Therefore, there is the potential for a localised, but irreversible, impact to habitat resulting in a Consequence Level III.

7.2.3.2 Support vessel operations

Support vessels may pose a risk of introducing IMS through ballast water and hull biofouling. Compliance with regulatory requirements for the management of ballast water and ensuring all vessels are assessed as posing a low biofouling risk through the screening via Esso's IMS Risk Assessment Procedure (AUGO-EV-PCE-014) and in accordance with national guidelines will significantly reduce the likelihood of translocation of an IMS into Bass Strait. Similarly, the risk of secondary translocation through operational movements in Bass Strait is considered in Esso's IMS Risk Assessment Procedure (AUGO-EV-PCE-014) for vessels intended to be used for the activity ensuring that low biofouling risk is posed through vessel movement.

If a new vessel is required to support the Turrum Phase 3 production drilling activities, then all the controls identified for bringing a new vessel into Esso operations will be applied as required, prior to the vessel joining the activities. The controls will be identified based upon whether the vessel is coming in from international or another Australian location.

7.2.3.3 Bringing a jack-up rig to Bass Strait

As the JUR will already be in Bass Strait completing an Esso campaign prior to Turrum Phase 3 production drilling activities for approximately 12 months prior, this risk is not considered credible for Turrum Phase 3 as this risk will have been appropriately managed prior to the Turrum Phase 3 activities.

Turrum Phase 3 production drilling activities will have access to the previous assessments and controls to confirm that there have been no concerns raised in regards to IMS during the previous activities and that the implemented controls have ensured that this risk had been reduced to as low as reasonably possible.

It is considered Very Unlikely (D) that this activity would result in the introduction of an IMS and any subsequent impact to receptor.

7.2.4 Residual risk ranking

Table 7-7 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
III	D	4

7.2.5 Controls

- CM23: Ballast Water Management Plan
- CM24: Ballast Water Management Certificate
- CMP7: Ballast water record system
- CM25: Biosecurity clearance when entering Australian territory
- CM8: Vessel Master

- CM26: Invasive Marine Species Risk Assessment Procedure
- CMP8: Immersible retrievable equipment cleaning
- CMP39: Water jetting activated on spud cans

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.2.6 Demonstration of As Low As Reasonably Practicable

Table 7-8 Decision Context and justification

Decision Context B
The causes resulting in an introduction of IMS from ballast water discharge or biofouling are well understood and well managed by national and international regulations and industry guidance. Esso is experienced in the implementation of industry requirements through their existing ongoing operations. Given the potential for an irreversible (although localised) effect on the benthic habitat, there is the potential for Consequence Level III impacts. No issues, objections or claims were raised by relevant persons with regard to the risk of introduction of IMS. Based on the Consequence Level III rating, Esso believes ALARP Decision Context B should apply.

Table 7-9 Good practice controls

Good practice	Adopted	Control	Rationale
Ballast Water Management (BWM) Convention	✓	**CMP23:** Availability of suitable MODU to drill relief well Water Management plan **CM24:** Ballast Water Management Certificate **CMP7:** Ballast water record system	The BWM Convention requires signatory flag states to ensure that ships flagged by them comply with standards and procedures for the management and control of a ships' ballast water and sediments. The BWM Convention aims to prevent the spread of harmful aquatic organisms from one region to another and halt damage to the marine environment from ballast water discharge, by minimising the uptake and subsequent discharge of sediments and organisms. The BWM Convention requires all vessels designed to carry ballast water to implement a BWM Plan and to carry out BWM procedures in accordance with approved methods. Specifically, these are: • use of a BWM system • ballast water exchange in an acceptable area (at least 12nm from land and in at least 50m water depth) • use of low-risk ballast water • retention of high-risk ballast water on board • discharge to an approved ballast water reception facility. A management certificate is required for all vessels to which the BWM Convention applies, this certificate verifies that the vessel has been surveyed to a standard compliant with the BWM Convention. All vessels that carry ballast water must maintain a ballast water record system.

Good practice	Adopted	Control	Rationale
Maritime arrivals reporting system	✓	**CM25:** Biosecurity clearance when entering Australian territory	The Vessel Master has responsibility for ensuring a pre-arrival report is submitted in Maritime Arrivals Reporting System and clearance to enter Australian territory is obtained from the Department of Agriculture and Water Resources (DAWR). Offshore installations operating outside of Australian territory are not under the jurisdiction of the *Biosecurity Act 2015* (Cth). However, any conveyance (vessel or aircraft) which leaves Australian territory and is not subject to biosecurity control, and which interacts with an installation (or other conveyance) outside of the Australian territory will become an 'exposed conveyance'. A conveyance becomes exposed by being in physical contact with, in close proximity to or being contaminated by the installation or another conveyance. When the exposed conveyance returns to Australian territory, it becomes subject to biosecurity control and it must complete a pre-arrival report and notify if it intends to unload goods, unless exempt under the Biosecurity (Exposed conveyance – exceptions from biosecurity control) Determination 2016.
Australian Ballast Water Management Requirements (DAWR, 2020)	✓	**CM8:** Vessel Master	The Vessel Master has responsibility for ensuring these requirements are followed. The requirements describe the obligations on vessel operators with regards to the management of ballast water and sediments when operating in Australian seas. The acceptable area for a ballast water exchange between an offshore oil and gas installation and an Australian port is in areas that are no closer than 500m from the offshore installation and no closer than 12nm from the nearest land.
National Biofouling Guidelines for the Petroleum Production and Exploration Industry (Department of Agriculture and Water Resources, 2009)	✓	**CM26:** Invasive Marine Species Risk Assessment Procedure	Biofouling risk in accordance with National Biofouling Guidelines (Department of Agriculture and Water Resources, 2009) is assessed and documented through Esso's IMS Risk Assessment Procedure (AUGO-EV-PCE-014). Consistent with the 'best practice' approach set out in the IMO Guidelines for the Management of Ships Biofouling (Department of Agriculture and Water Resources, 2009) the risk assessment considers many parameters of the vessel or JUR including (where relevant): • transport method (dry verses wet haulage) • presence and age of antifouling coating • evidence of in-water inspection by divers or inspection in dry dock and cleaning of hull

Good practice	Adopted	Control	Rationale
			• presence and operation of internal seawater treatment systems if applicable • duration of stay in overseas or interstate coastal waters • location of drilling operations (OA), timings and durations. Where the initial indicative assessment (conducted by an IMS Expert and/or via the online Vessel Check portal (www.vessel-check.com)) results in low risk, the risk assessment is provided to the Principal Officer IMS, Department of Jobs, Precincts and Regions. If the Principal Officer is satisfied that no further action is necessary following this consultation the vessel or JUR is deemed acceptable for use. If the risk assessment result is uncertain or high risk, or further action is recommended by the Principal Officer, an IMS expert is consulted to determine whether additional controls can be implemented to reduce the vessel risk status to low risk. Examples of potential control/mitigation measures to reduce risk that may be proposed are consistent with the National Biofouling Guidelines (Department of Agriculture and Water Resources, 2009) and the IMO Guidelines. The control measures proposed must meet the standard of performance described in IMS Risk Assessment Procedure (AUGO-EV-PCE-014). Following implementation of these mitigation measures, the IMS expert is consulted to reassess the level of risk for the activity and determine whether the level of risk for the activity is low risk and meets the ALARP and Acceptability Criteria (Sections 5.6 and 5.7). If this process still results in an uncertain or higher risk then an alternative vessel or JUR must be sought for the activity.
Removal of sediment from spud cans	✓	**CMP8:** Immersible retrievable equipment cleaning	Management of submersible equipment will be in accordance with the National Biofouling Guidelines for the Petroleum Production and Exploration Industry (Department of Agriculture and Water Resources, 2009).
Removal of sediment from spud cans	✓	**CMP39**: Water jetting activated on spud cans	It is considered best practice to 'clean before you leave' to remove any surface deposits from spud cans which were in contact with the seafloor prior to moving from one site to another.

Table 7-10 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Use of freshwater ballast	By using freshwater ballast, the likelihood of introducing an IMS can be reduced. However, because the likelihood of the consequence is already low (see above), there is limited environmental benefit associated with implementing this measure.	Costs associated with this measure are high, and disproportionate to the benefit.	Not adopted
Inspect and clean all vessels	By dry docking and cleaning all wetted surfaces on all vessels the likelihood of a pest relocation is considerably lowered.	The risk already has a low likelihood so the substantial cost (and time required) to inspect and clean any vessels that are newly coming for Turrum Phase 3 production drilling activities outweighs the environmental benefit.	Not adopted
Dry tow JUR between activity locations	Dry tow would increase the likelihood of dehydration of the IMS on the vector and therefore reduce the risk of survivability and colonisation at the next location.	Dry tow requires a heavy lift vessel (HLV) which is not needed for wet tow. The JUR would need to be welded/secured to the HLV for the tow. The use of a HLV and additional time taken to load, weld/secure, move, remove welds, unload has substantial costs associated with it. This cost far outweighs the environmental benefit.	Not adopted
Use only vessels that are currently operating in Bass Strait to reduce the potential for introduction of IMS	By only using vessels that are currently operating in Bass Strait, the likelihood of introducing an IMS can be reduced. However, because the likelihood of the consequences is already low (see above), there is limited environmental benefit associated with implementing this measure.	Limiting vessel selection to use of those currently operating in Bass Strait could potentially pose a significant risk in terms of time and duration for sourcing a vessel, as well as the ability of those chosen to perform the required tasks. This potential cost (and time required) is grossly disproportionate to the minor environmental gain (of reducing the potential likelihood of IMS introduction) achieved and is not reasonably practicable.	Not adopted

7.2.7 *Demonstration of acceptability*

Table 7-11 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	Although the habitat with the potential to be impacted is characterised by soft sediment communities, because of the potential for irreversible impacts, this aspect is considered as having the potential to (although very unlikely) result in serious or irreversible environmental damage. Therefore, further evaluation against the remaining Principles of ESD is required. There is little uncertainty associated with this aspect as the activities are well understood, the cause pathways are well known, and activities are well regulated and managed. It is not considered that there is significant scientific uncertainty associated with this aspect. Therefore, the precautionary principle has not been applied.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The requirements of the BWM Convention have been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of the BWM Convention in Australia: • Biosecurity Act 2015 (Cth) • Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 (Cth) • Marine Order 98 (Marine pollution – anti-fouling systems) 2013. Australian BWM Requirements (DAWR, 2020) will be adhered to and measures for managing ballast water discharges in this document are incorporated in the controls. Biofouling risk is assessed, and mitigated, in accordance with the *National Biofouling Guidelines for the Petroleum Production and Exploration Industry* (Department of Agriculture and Water Resources, 2009).

Factor	Demonstration criteria	Criteria met	Rationale
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no specific Environmental Standard which addresses interaction with marine fauna, but the controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	• No relevant person concerns have been raised concerning the risk of introduction of IMS.

7.3 Accidental release – Dropped objects

7.3.1 Causes of dropped objects

Dropped objects may be released overboard from the JUR or support vessels, or during ROV operations, due to human error, equipment failure or adverse weather by accidently dropping:

- objects (e.g. small tools (such as spanners) or equipment (such as clamps, scaffold, or any other items not permanently fixed to the JUR or support vessels)
- cargo loads (such as bulk chemical containers or chemical wastes),.

Pre-inspection survey will identify any pipelines in the area and ensure that the JUR can be optimally positioned in regard to any flowlines, umbilicals, hydraulic flying leads/electrical flying leads, jumpers, or export lines within the vicinity of the MLC location. Note that LOC of reservoir fluids due to a dropped object is addressed in Section 7.7.

7.3.1.1 Risks of dropped objects

The accidental release of dropped objects has the potential to result in:

- change in habitat.
- change in water quality.

7.3.2 Risk assessment

7.3.2.1 Change in habitat

In the unlikely event of an accidental dropped object from either the JUR or support vessels, or during ROV operations, effects will be limited to localised physical disturbance to benthic communities arising from equipment sinking to and dragging across the seabed. Any environmental impact caused by damage to small areas of seabed and associated communities would be mitigated by ubiquitous distribution of similar habitat in the region.

Severity of impact to benthic communities is affected by density of biota, sensitivity of biota to disturbance and recovery potential of benthic communities. Physical disturbance to the seabed from a dropped load would be limited to the footprint of the load (estimated at $\leq 10m^2$) and temporary in nature if the item was retrieved and long-term if irretrievable. Both are likely to pose minor environmental risk as the seabed within the OA is largely sandy sediment with benthic assemblages (predominantly polychaetes (worms), crustaceans and molluscs) and not particularly susceptible to physical disturbance.

Wastes such as paint cans containing paint residue, batteries and so forth, would settle on the seafloor if dropped overboard. Over time, this may result in the leaching of chemicals to the seabed resulting in a small area of substrate becoming toxic and unsuitable for colonisation by benthic fauna. Given the low release volumes it is expected that only very small areas of benthic habitat would be affected.

Considering the possible footprint of a dropped object (against the total area of similar habitat within the Bass Strait region) it is highly unlikely that a dropped object would have an effect on any benthic community other than a minor and localised one resulting in a Consequence Level IV.

7.3.2.2 Change in water quality

Impacts from a chemical release during crane transfer of bulk chemical containers – with the maximum volume based upon the loss of an intermediate bulk container typically containing $1m^3$ of chemicals - would be minimal, due to the small potential volumes released, and the fact that spilled chemicals will rapidly evaporate, disperse, and weather. In the open ocean environment, the spilled liquids would be rapidly dispersed and diluted to concentrations at which they are non-toxic resulting in a Consequence Level IV.

The key risk if a cargo load or subsea equipment is dropped during lifting is to the benthic habitat, however, given the controls in place it is considered Likelihood Category D (very unlikely) that such a dropped object would result in the impacts described above.

7.3.3 Residual risk ranking

Table 7-12 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
IV	D	4

7.3.4 Controls

- CMP1: Pre-activity site inspection
- CMP10: Crane handling and transfer procedures
- CMP20: JUR move procedure
- CM18: Preventative Maintenance System
- CM19: Vessel Cargo Securing Manual
- CMP11: JUR Move Guidance Checklist

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.3.5 Demonstration of As Low As Reasonably Practicable

Table 7-13 Decision Context and justification

Decision Context A
The use of cranes and other lifting equipment to handle equipment and materials offshore is well practiced. There is a good understanding of potential dropped object sources, and the control measures required to manage these. Furthermore, the associated safety risks mean that these activities are well managed.

Decision Context A
There is little uncertainty associated with the potential environmental impacts which have been evaluated as Consequence Level IV (the lowest level). No issues, objections or concerns were raised by relevant persons during the consultation process with regard to the risk of dropped objects. Esso believes ALARP Decision Context A should apply.

Table 7-14 Good practice controls

Good practice	Adopted	Control	Rationale
American Petroleum Industry (API) Recommended Practice (RP) 2D	✓	**CMP10:** Crane handling and transfer procedures	The API RP 2D are industry-developed requirements which provide guidance in the development of operating and maintenance procedures for use in the safe operation of cranes on fixed or floating off-shore platforms. The JUR holds Cargo Gear Certificates which certify that the deck cranes and accessory gear are compliant with API RP 2D (refer to *JU-107 Safety Case* (Valaris, 2021)).
Maintenance of lifting gear	✓	**CM18:** Preventative Maintenance System	It is industry good practice that a Preventative Maintenance System (PMS) is in place to ensure that the lifting gear continues to operate at the required standard.
SOLAS Chapter VI Carriage of Cargoes and Chapter VII Carriage of Dangerous Goods (SOLAS, 1974).	✓	**CM19:** Vessel Cargo Securing Manual **CMP11:** JUR Move Guidance Checklist	SOLAS sets minimum safety standards in the construction, equipment, and operation of merchant ships. In accordance with Regulations VI/5 and VII/5 of SOLAS, cargo units and cargo transport units will be loaded, stowed, and secured throughout the voyage in accordance with the approved Cargo Securing Manual (as appropriate to vessel class).

Table 7-15 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

7.3.6 Demonstration of acceptability

Table 7-16 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.

Factor	Demonstration criteria	Criteria met	Rationale
unplanned events			
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The proposed activities outlined in this EP align with the requirements of the OPGGS Act: • Section 280(2) - No interference with the conservation of the resources of the sea and seabed to a greater extent than is necessary for the exercise of the rights conferred by titles granted • Schedule 3 (occupational health and safety) of the OPGGS Act and Safety Regulations – Require the operator of each offshore facility to prepare a Safety Case for submission to NOPSEMA including assessment and controls to manage significant risks associated with dropped objects. Activities at a facility must be conducted in accordance with a Safety Case that has been accepted by NOPSEMA. The requirements of SOLAS Chapters VI and VII, in relation to a Cargo Securing Manual, have also been adopted.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements

Factor	Demonstration criteria	Criteria met	Rationale
			• OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning the risk of dropped objects.

7.4 Accidental release – Waste

7.4.1 Causes of accidental release of waste

The handling and storage of materials and waste on board the JUR and support vessels has the potential for accidental over-boarding of hazardous/non-hazardous materials and waste. Small quantities of hazardous/non-hazardous materials (solids and liquids) will be used, and wastes created, and then handled and stored on board until transferred to port facilities for disposal at licenced onshore facilities. However, accidental releases to sea are a possibility, such as in rough ocean conditions when items may roll off or be blown off the deck.

The JUR uses separate clearly identified cans, drums, boxes, bags, or other containers for short-term (disposable garbage) and trip-long (non-disposable garbage) storage. Short-term storage would be appropriate for holding otherwise disposable garbage while a ship is passing through a restricted discharge area. The JUR has the following procedure in place as outlined in Section 2.3.6.2 of the *JU-107 Safety Case* (Valaris, 2021).

The waste management procedure addressed the following topics:

- compliance requirements
- waste identification and classification
- waste registration and reporting
- waste storage and separation
- signage, labelling and placarding
- waste inspections
- waste handling
- waste transportation
- communication and training.

The following non-hazardous materials and wastes will be disposed of to shore, but have the potential to be accidentally dropped or released overboard:

- paper and cardboard
- wooden pallets
- scrap steel, metal, aluminium, cans
- glass
- plastics.

The following hazardous materials may be used, and waste generated using consumable products and will be disposed to shore, but may be accidentally dropped or released overboard:

- hydrocarbons, hydraulic oils and lubricants
- hydrocarbon-contaminated materials (e.g. oily rags, pipe dope, oil filters)
- batteries, empty paint cans, aerosol cans, fluorescent tubes, printer cartridges
- contaminated personal protective equipment
- acids and solvents (laboratory wastes).

7.4.2 Risk of accidental releases of waste

The potential environmental impacts associated with the accidental release of waste are:

- injury/mortality to fauna
- change in habitat.

7.4.2.1 Injury/mortality to fauna

Discharged overboard, wastes can cause injury or death to marine fauna or seabirds through ingestion or entanglement (e.g. plastics caught around the necks of seals or ingested by seabirds, fish or cetaceans). Several marine mammals (e.g. whales, dolphins, seals), marine reptiles and fish including those listed as either threatened and/or migratory under the EPBC Act have the potential to occur within the OA. The PBW has foraging BIA overlapping the OA and the SRW migration BIA also overlaps the OA. The great white shark breeding and distribution BIAs overlap the OA.

Most records of impacts of plastic debris on wildlife relate to entanglement, rather than ingestion. However, the rate of ingestion of plastic debris by marine wildlife is difficult to assess as not all dead animals are necropsied or ingested plastic debris may not be recorded where it is not considered as the primary cause of death.

The patterns of reports of entanglement in and ingestion of plastic debris by wildlife in Australian waters are likely to be influenced by factors such as the size and distribution of populations, foraging areas, migration patterns, diets, proximity of species to urban centres, changes in fisheries equipment and practices, weather patterns, and ocean currents, as well as the frequency of monitoring and/or observation of wildlife. Species dominating existing entanglement and ingestion records are turtles and humpback whales. Australian pelicans and a number of cormorant species are also frequently reported (Ceccarelli, 2009).

7.4.2.2 Change in habitat

Hazardous wastes released to the sea can cause pollution and contamination, with either direct or indirect effects on marine organisms. For example, chemical residues (depending on the volumes released) can impact on marine life from plankton to pelagic fish communities, causing physiological damage through ingestion or absorption through the skin. Impacts from a minor accidental release would be limited to the immediate area surrounding the release, prior to the dilution of the chemical with the surrounding seawater. In an open ocean environment such as the OA, it is expected that any release would be rapidly diluted and dispersed, and thus temporary and localised.

Solid hazardous wastes, such as paint cans containing paint residue, batteries and so forth, would settle on the seabed if dropped overboard. Over time, this may result in the leaching of hazardous materials to the seabed, which is likely to result in a small area of substrate becoming potentially toxic and unsuitable for colonisation by benthic fauna. The benthic habitats of the area are broadly similar to those elsewhere in the region, so impacts to very localised areas of seabed will not result in the long-term loss of benthic habitat or species diversity or abundance.

Given the restricted exposures and limited quantity of marine pollution expected from this program, it is expected that any impacts from marine pollution are Consequence Level IV resulting from a localised short-term impact to species of recognised conservation value but not affecting local ecosystem functioning.

The likelihood of an accidental release of waste resulting in these impacts is considered to be Likelihood Category D (very unlikely).

7.4.3 Residual risk ranking

Table 7-17 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
IV	D	4

7.4.4 Controls

- CM9: Class certification

- CMP12: Garbage Management Plan

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.4.5 Demonstration of As Low As Reasonably Practicable

Table 7-18 Decision Context and justification

Decision Context A
The risk of accidental release of waste is well regulated via various treaties and legislation, both nationally and internationally, which specify industry best practice control measures. These are well understood and implemented by the industry. There is little uncertainty associated with the potential environmental impacts of this risk and the consequence of any impact was assessed as Consequence Level IV (the lowest level). No objections or claims raised by relevant persons during the consultation for the campaign with regard to risk of accidental release of waste. Esso believes ALARP Decision Context A should apply.

Table 7-19 Good practice controls

Good practice	Adopted	Control	Rationale
MARPOL Annex V Prevention of Pollution from Garbage from Ships.	✓	**CM9:** Class certification	The vast majority of commercial ships are built to and surveyed for compliance with the standards laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the SOLAS, the 1988 Protocol to the International Convention on Load Lines and the MARPOL 73/78. A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO Rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex V Regulations for the Prevention of Pollution by Garbage from Ships specifically requires vessels (as appropriate to class) to have a garbage management plan and garbage record book in place and implemented.

Table 7-20 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

7.4.6 Demonstration of acceptability

Table 7-21 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The proposed activities outlined in this EP align with the requirements of the OPGGS Act: • Section 280(2) – no interference with the conservation of the resources of the sea and seabed to a greater extent than is necessary for the exercise of the rights conferred by titles granted. The requirements of SOLAS Chapters VI and VII, in relation to a Cargo Securing Manual, have also been adopted.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	The controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors
External context	Concerns of relevant persons have been considered/addressed	✓	No relevant person concerns have been raised concerning the accidental release of waste.

Factor	Demonstration criteria	Criteria met	Rationale
	through the consultation process.		

7.5 Accidental release – Loss of containment of hazardous or non-hazardous substances

7.5.1 Causes of loss of containment of hazardous or non-hazardous substances

Hazardous and non-hazardous materials that could be accidentally released to the environment include fuels, hydraulic fluids and well fluids/additives from spills or LOC on the JUR or vessels.

Causes of accidental releases from the JUR, support vessels and ROVs may include:

- failure or mechanical breakdown of equipment that use, store or transfer hazardous or non-hazardous materials
- failure to align valves correctly during transfer to tanks
- overfilling of chemical or well operations fluid tanks on the JUR
- incorrectly operated 'environmentally sensitive' valves
- overfilling of fuel bulk storage tanks on the JUR.

An evaluation of these types of events was completed to determine indicative volumes associated with each type of event.

Both hydraulic line failure and failure or breakdown of equipment onboard were associated with small volume spill events. A ROV underwater hydraulic line failure, for example, is estimated to result in a maximum spill volume of 20L.

Operational fluids such as brines or residual well fluids/muds, inadvertently released from a valve misalignment or unintentionally dumped from the storage tanks would pose the same or lesser risk. Volumes are likely to be less as the tanks are compartmentalised and have redundant alarms systems.

As an example, (AMSA, 2015) suggests the maximum credible spill volume from a refuelling incident with continuous supervision is approximately the transfer rate over 15 minutes. Assuming failure of dry-break couplings and based on the largest typical transfer rate in the order of 250m^3/hour, this equates to an instantaneous spill of approximately 63m^3.

7.5.2 Risks of loss of containment of hazardous or non-hazardous substances

A minor LOC has the potential to result in chronic and acute impacts to marine fauna via:

- change in water quality
- change in habitat.

Given the low toxicity and high biodegradability of ROV hydraulic fluid the accidental release of a small volume is unlikely to adversely affect the receiving environment.

Effects from planned operational discharges and the planned discharge of cement and drilling muds and cuttings are discussed in Sections 6.8 and Section 6.10. In the event of an unplanned LOC little incremental effect is expected on the benthic habitat beyond that predicted for planned discharges. The loss of a small area of habitat, until it can be re-colonised, will not adversely affect the viability of local populations of infauna or epifauna, the ecology of the local area or the biodiversity of the region. The incremental increase in consequence is considered Consequence Level IV considering the footprint as a percentage of the area of the Bass Strait region.

Small open sea hydrocarbon spills result in similar short-term impacts as that of a large hydrocarbon release (Brussaard, et al., 2016). The characteristics of open sea waters is a significant mitigating factor in dispersing small oil spills, such that, no definitive evidence of long-term effects on marine fauna has been identified (Dicks, 1998). The environmental risks associated with a larger loss of diesel fuel from a vessel collision are assessed in Section 7.6.

Considering the small volumes of chemicals or hydrocarbons associated with this type of event together with the control measures in place, the likelihood of a LOC of hazardous substances resulting in the impacts described above is considered Likelihood Category D (very unlikely).

7.5.3 Residual risk ranking

Table 7-22 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
IV	D	4

7.5.4 Controls

- CM14: Procedures for bulk transfer of fluids from support vessels
- CMP13: Design and certification of hoses
- CM18: Preventative Maintenance System
- CM21: Remotely Operated Vehicle (ROV) pre-post dive checks
- CM22: Remotely Operated Vehicle International Marine Contractors Association Audit
- CMP14: Bunding
- CM20: Shipboard Marine Pollution Emergency Plan

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.5.5 Demonstration of As Low As Reasonably Practicable

Table 7-23 Decision Context and justification

Decision Context A
The transfer, storage and handling of fuels and chemicals offshore are commonly practised activities. There is a good understanding of potential spill sources, and the control measures required to manage these. Furthermore, the associated safety risks mean that these activities are well managed. There is little uncertainty associated with the potential environmental impacts which have been evaluated as Consequence Level IV (the lowest level). No issues, objections or claims were raised by relevant persons during the relevant persons consultation process for this campaign with regard to the accident release of hazardous substances. Esso believes ALARP Decision Context A should apply.

Table 7-24 Good practice controls

Good practice	Adopted	Control	Rationale
Job Safety Analysis and Permit to Work	✓	**CM14:** Procedures for bulk transfer of fluids from support vessels	Job Safety Analysis and Permit to Work controls reflect industry good practice adopted to ensure the safety of personnel on board all vessels servicing and supporting offshore facilities, and to reduce the risks associated with such operations.
Design and certification of hoses	✓	**CMP13:** Design and certification of hoses	Hose certification reflects industry good practice adopted to ensure the safety of personnel on board all vessels servicing and supporting offshore facilities, and to reduce the risks associated with such operations.

Good practice	Adopted	Control	Rationale
Maintenance of hoses	✓	**CM18:** Preventative Maintenance System **(PMS)**	It is industry good practice that a PMS is in place to ensure that hoses are inspected and replaced when degraded.
ROV condition check	✓	**CM22:** Remotely Operated Vehicle International Marine Contractors Association Audit **CM21:** Remotely Operated Vehicle (ROV) pre-post dive checks	It is industry practice to obtain an International Marine Contractors Association (IMCA) survey report prior to charter of an ROV to support marine activities. An IMCA audit is a verification tool which states the ROV condition and operational readiness as per IMCA Guidelines.
Containment of oils and chemicals to prevent spills overboard	✓	**CMP14:** Bunding	It is industry good practice that storage of oils and chemicals is adequately contained. Vessel complaint with MARPOL Annex 1, as appropriate to class.
Shipboard Marine Pollution Emergency Plan (SMPEP)	✓	**CM20:** Shipboard Marine Pollution Emergency Plan	The vast majority of commercial ships are built to and surveyed for compliance with the standards (i.e. Rules) laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the SOLAS, the 1988 Protocol to the International Convention on Load Lines and MARPOL. A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO Rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex I Regulations for the Prevention of Pollution by Oil specifically require that a SMPEP (or equivalent, according to class) is in place. MARPOL Annex I Regulations for the Prevention of Pollution by Oil specifically require that a SMPEP (or equivalent, according to class) is in place. To prepare for a spill event, the SMPEP details: • response equipment available to control a spill event • review cycle to ensure that the SMPEP is kept up to date

Good practice	Adopted	Control	Rationale
			• testing requirements, including the frequency and nature of these tests. In the event of a spill, the SMPEP details: • reporting requirements and a list of authorities to be contacted • activities to be undertaken to control the release • procedures for coordinating with local authorities.

Table 7-25 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

7.5.6 Demonstration of acceptability

Table 7-26 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The requirements of MARPOL Annex I have been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of MARPOL in Australia: • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • *Navigation Act 2012* (Cth) – Chapter 4 (Prevention of Pollution) • Marine Order 91 (Marine pollution prevention – oil) 2014.

Factor	Demonstration criteria	Criteria met	Rationale
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist"
	Meets ExxonMobil Environmental Standards.	✓	The controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning the accidental release of hazardous substances.

7.6 Accidental release – Loss of containment of refined oils (collision)

7.6.1 Causes of loss of containment of refined oils

The following activities have the potential to result in a spill of MDO:

- a collision between the support vessel and the JUR or another third-party vessel that results in tank rupture and MDO loss.

Vessel drift or powered grounding is not considered credible given the distance from shore of the OA and the lack of environmental features in the OA.

7.6.2 Spill modelling

7.6.2.1 Modelling methodology

To understand the potential consequences of a MDO spill and the response preparedness required associated with support vessel operations in the Gippsland Basin, Esso commissioned RPS to undertake stochastic and deterministic modelling of potential hydrocarbon loss due to vessel collisions at five locations within the Gippsland Basin (RPS, 2019). These locations were selected to be representative of the potential impacts associated with a MDO spill in the Gippsland Basin. Although the MLC was not one of those locations selected, the modelling at the Kipper subsea facility is considered to provide a close proxy to identify impacts and resource requirements to address a MDO spill at MLC. The modelling input for the Kipper subsea facility location and relevant model inputs and parameters are summarised in Table 7-27.

Table 7-27 Vessel collision MDO spill modelling inputs at Kipper

Parameter	Details			
Number of spill simulations	100			
Period of the year (season)	Annual analysis			
Hydrocarbon type	MDO Group II			
Total spill volume	280m3			
Volume basis	AMSA's guideline for indicative maximum credible spill volumes for other, non-oil tanker, vessel collision (AMSA, 2015) is the volume of the largest fuel tank. The loss of a full tank is most likely an overestimate as hydrostatic pressure would limit the release and pumping of material to another tank could also restrict the amount lost. Based on the type of support vessel that may be used, the largest MDO tank volume of 280m3 has been used to undertake the risk assessment.			
Release location	Kipper subsea facility 38°10' 53" S, 148° 35' 53" E			
Location basis	Close proximity to the MLC (approximately 33km)			
Release duration	6 hours			
Modelled duration	30 days			
MDO characteristics:				
Density	829kg/m3 @ 15°C			
API gravity	37.6			
Dynamic viscosity	4.0cP @ 25°C			
Pour point	-14°C			
Oil property category	Group II (light persistent oil)			
Boiling point	Volatile (<180°C) 6.0%	Semi-volatile (180–265°C) 34.6%	Low volatility (265–380 °C) 54.4%	Residual (>380°C) 5.0%

7.6.2.2 Modelling outputs – weathering and fate

Marine diesel contains 95% of light hydrocarbons (or non-persistent constituents) that are likely to evaporate when available to the atmosphere. The remaining 5% is composed of heavy hydrocarbons (or persistent compounds) that may persist on the sea-surface for extended times.

It is important to note that the viscosity of MDO does not change significantly over time and hence has a strong tendency to physically entrain into the upper water column as oil droplets in the presence of waves, where it is subjected to microbial degradation (decay) but can re-float to the surface if wave energies abate.

Figure 7-2 clearly shows that evaporation is the dominant process contributing to the removal of MDO from the sea surface from the Kipper MDO spill.

For Kipper MDO release there was no shoreline contact predicted, so the deterministic trajectory that had the largest swept area of oil on the sea surface of 10g/m² was considered the worst simulation and selected for weathering and fate analysis. At the conclusion of the simulation period, approximately 89% of the spilled oil was lost to the atmosphere through evaporation, approximately 5% of the MDO was predicted to have decayed, whilst approximately 5% was predicted to remain within the water column.

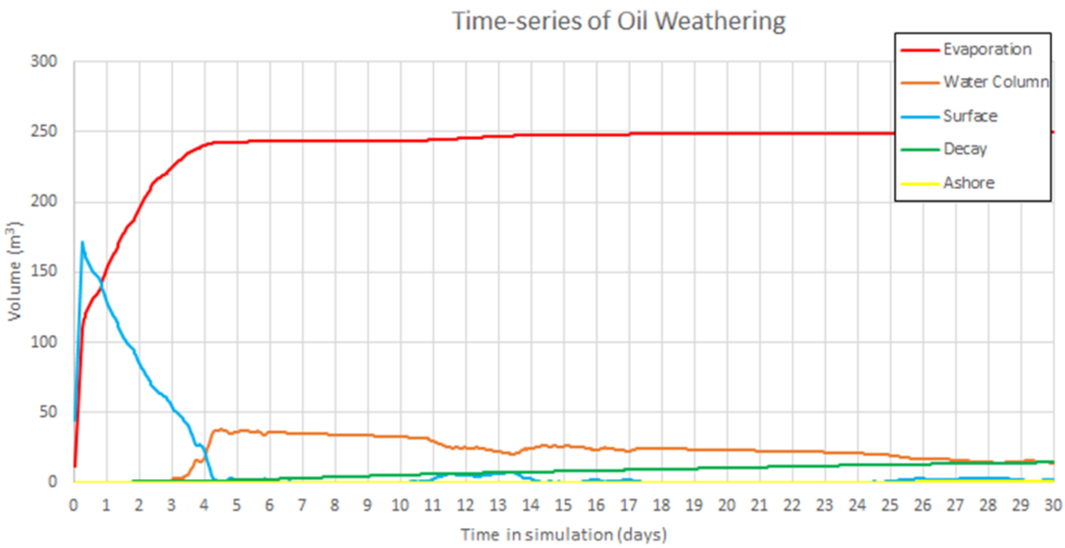

Figure 7-2 Predicted weathering and fates graph as volume for the selected single Kipper MDO spill trajectory

7.6.2.3 Modelling outputs – Stochastic

Oil spill modelling predicts that the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, due toa worst case dischargel. This is known as the EMBA and is used for planning purposes to ensure that all social and environmental sensitivities are acknowledged, described and considered in the development of the EP.

Modelling is also used to inform specific impact assessments by understanding the location and extent of oil at concentrations likely to result in environmental consequences. There is no agreed exposure level below which environmental impacts will not occur so outputs should not be interpreted as a boundary. However, mapping areas that could be moderately impacted by a spill is a useful tool for impact consequence assessment. The environmental sensitivities within this area are described in Table 7-28 for Kipper MDO spill.

Table 7-28 Vessel collision Kipper MDO modelling output summary

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories)
Sea surface exposure	Moderate (10g/m²)	Maximum distance from release site is approximately 17km in an east direction. The zone of moderate exposure overlaps the KEF: Upwelling East of Eden, several petrel and albatross foraging BIAs, foraging and migration whale BIAs (for the PBW and SRW respectively) and the white shark distribution BIA. The spill does not extend into State waters or contact any marine parks at this threshold.
	High (50g/m²)	Maximum distance from release location is approximately 2km in a north-northeast direction.

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories)
		There is a 13% probability that the zone of high exposure will overlap the KEF: Upwelling East of Eden, petrel and albatross foraging BIAs, foraging and migration whale BIAs (for the PBW and SRW respectively) and the white shark distribution BIA.
Shoreline exposure	Moderate ($100g/m^2$)	None predicted.
In-water (dissolved) exposure	Moderate (50ppb instantaneous)	No moderate in-water (dissolved) exposure is predicted.

Other features, outside of the mapped (moderately exposed) area that are within the EMBA are outlined in Table 7-29.

Table 7-29 Kipper vessel collision MDO modelling output of other features outside the mapped area

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories) Kipper (as a representative spill location for the OA)
Surface exposure	Low ($1g/m^2$)	Zone of low exposure extends approximately 160km from release location in a predominately east-northeast direction. Does not extend into State waters or contact any national parks. Due to rapid weathering of MDO sea surface exposure is predicted for only four to five days after release.
Shoreline exposure	Low ($10g/m^2$)	No shoreline contact predicted above low threshold.
In-water (dissolved) exposure	Low (10ppb instantaneous)	Exposure will be confined to the surface 10m of the water column as there was none predicted in the waters below 10m. A narrow zone of water column exposure is predicted to extend approximately 20km from the spill location in northeast and southwest directions. The greatest probability of dissolved hydrocarbon exposure (2%) above the low threshold was predicted to impact several receptors. These included several albatross and petrel foraging BIAs, PBW – foraging BIAs SRW migration BIA and white shark distribution BIA as well as the KEF: Upwelling East of Eden. The water column exposure is not predicted to extend into State waters or contact any national parks.

<table>
<tr><th>Model parameter</th><th>Exposure value</th><th>Stochastic modelling (based on 100 annualised spill trajectories)
Kipper (as a representative spill location for the OA)</th></tr>
<tr><td>In-water (entrained) exposure</td><td>Low (10ppb instantaneous)</td><td>In-water entrained hydrocarbon at the low threshold extends along the southern Australian coast from Marlo, Victoria to Ulladulla, NSW. The probability of contact with the shorelines of various terrestrial National Parks and reserves ranges from approximately 10% at Croajingolong to less than 5% at Cape Conran and Eurobodalla.

Entrained hydrocarbon at the low threshold is predicted to encroach upon Victorian and NSW State waters with likelihoods of 21% and 19% respectively and contact Point Hicks and Cape Howe Marine National Parks, Beware Reef Marine Sanctuary and Batemans Marine Park (NSW).

Entrained hydrocarbon is predicted to encroach upon Tasmanian waters with a likelihood of 4% including the waters surrounding the terrestrial national parks and reserves of the Kent and Hogan Groups.

Other receptors predicted to be contacted by entrained oil at the low threshold:

With probabilities of 20 – 35% are:
• albatross, shearwater and petrel foraging BIAs
• little penguin foraging BIA
• PBW foraging BIAs
• SRW migration BIA
• humpback whale foraging BIA
• spotted bottlenose dolphin breeding BIA
• white shark distribution and foraging BIAs
• grey nurse shark foraging and migration BIAs
• KEF: Upwelling East of Eden.

With probabilities at or <0% are:
• little penguin breeding BIA
• white shark breeding BIA
• KEFs: Big Horseshoe Canyon, canyons on the eastern continental slope, Seamounts south and east of Tasmania and shelf rocky reefs
• East Gippsland, Beagle, Flinders, Freycinet and Jervis AMPs.</td></tr>
</table>

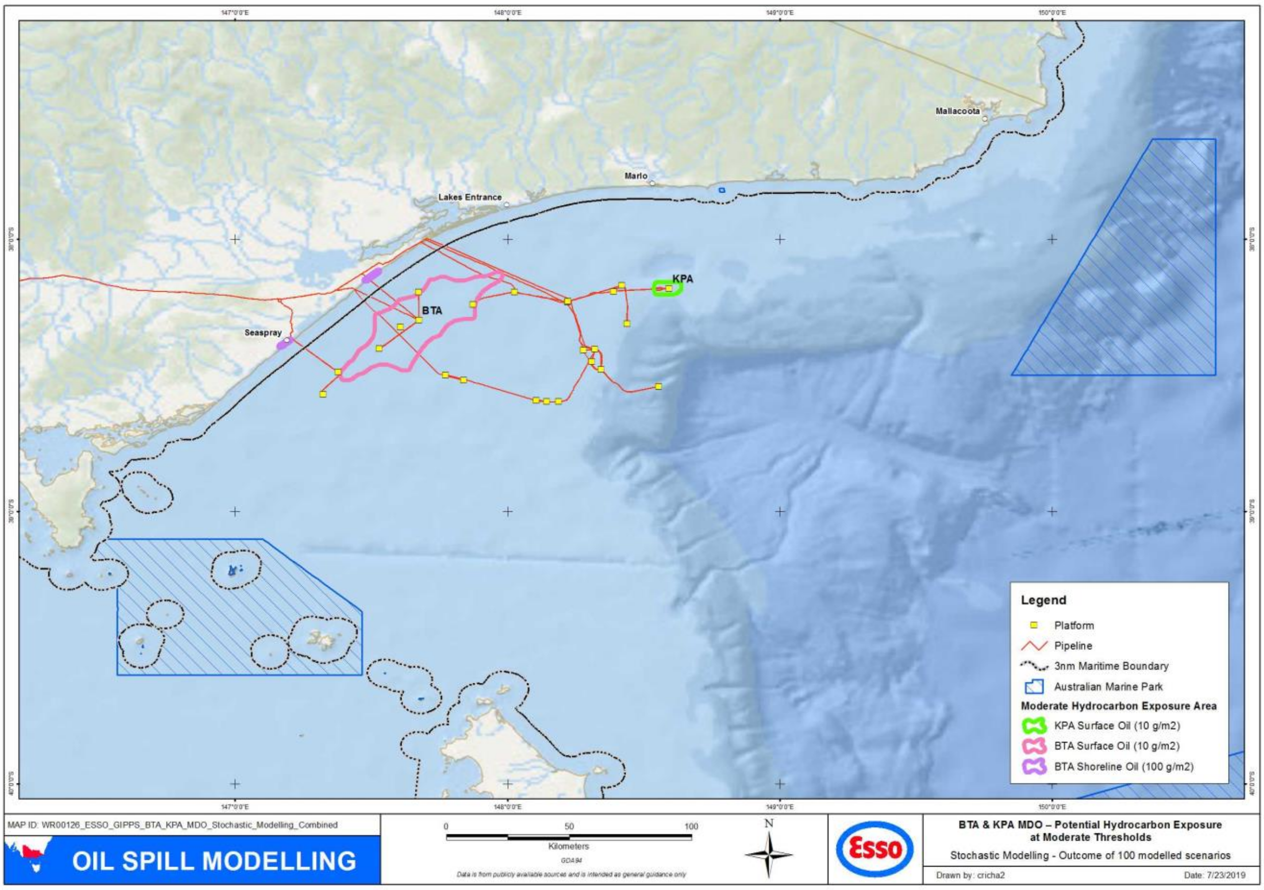

Figure 7-3 Vessel collision MDO spill stochastic modelling output for Kipper (and West Barracouta) release locations. Hydrocarbon exposure at the moderate thresholds (Surface: 10g/m² and Shoreline: 100g/m²))*

**West-Barracouta (BTA) modelling is not relevant to this activity, Kipper scenario is considered representative of Turrum*

7.6.3 Risks of loss of containment of refined oils

An accidental release of MDO has the potential to result in the following impacts:

- injury/mortality to fauna
- change in habitat
- change to the function, interests or activities of other users.

Table 7-30 outlines the impact assessment of the Kipper MDO spill.

Table 7-30 Impact assessment

Receptor	Impact of MDO exposure	Exposure risk assessment
Plankton	Plankton are found in nearshore and open waters beneath the surface in the water column. These organisms migrate vertically through the water column to feed in surface waters at night (NRDA, 2012). As they move close to the sea surface it is possible that they may be exposed to both surface hydrocarbons but to a greater extent, hydrocarbons dissolved or entrained in the water column.	There is no predicted exposure above the moderate in-water (dissolved) threshold. The consequences to plankton are assessed as Consequence Level IV.
Fish	Fish can be exposed to oil through a variety of pathways, including: direct dermal contact (e.g. swimming through oil); ingestion (e.g. directly or via oil-affected prey/foods); and inhalation (e.g. elevated dissolved contaminant concentrations in water passing over the gills). Fish are generally considered vulnerable to oil spills because they inhabit areas coincident with oil exploration and production and those areas that may be subsequently impacted by an oil spill; including coral reefs, seagrasses, nearshore areas, deep offshore areas, pelagic habitats and demersal habitats (Moore & Dwyer, 1974) (Gundlach & Hayes, 1978). Of the potential toxicants, monoaromatic and polycyclic aromatic hydrocarbons (PAH) are generally regarded as the most toxic to fish. <u>Surface oil</u> Since fish and sharks do not generally break the sea surface, the exposure 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., 2004). 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., 2004). Following the Deep Water Horizon (DWH) incident, it was suggested that whale sharks may be vulnerable to oiling of gills if exposed to the oil. The tendency of whale sharks to feed close to surface waters will increase the likelihood of exposure to surface slicks and elevated hydrocarbon concentrations beneath slicks. <u>In-water oil</u>	It has been shown that MDO spills in open water are so rapidly diluted that fish kills are rarely observed (ITOPF, 2011) (NOAA, 2013). The predicted impact from surface oiling on fish is considered to be negligible at a population level. Pelagic free-swimming fish and sharks are unlikely to suffer either acute or chronic effects from oil spill exposure because dissolved/entrained hydrocarbons in the water column are predicted to be below thresholds at which impacts might occur and their mobile, transitory characteristics reduce the risk of prolonged exposure. The consequences to fish are assessed as Consequence Level IV.

Receptor	Impact of MDO exposure	Exposure risk assessment
	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 metabolize toxic hydrocarbons, which reduces the risk of bioaccumulation (NRDA, 2012). 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. Pelagic species are also generally highly mobile and as such are not likely to suffer extended exposure (e.g. >96 hours) at concentrations that would lead to chronic effects due to their patterns of movement. Demersal fish are not expected to be impacted given the presence of in-water hydrocarbons in surface layers only. Fish are most vulnerable to hydrocarbon discharges during their embryonic, larval and juvenile life stages. Oil exposure may result in decreased spawning success and abnormal larval development. 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 areal extent of a spill. As egg/larvae dispersal is widely distributed in the upper layers of the water column it is expected that current induced drift will rapidly replace any oil affected populations.	
Marine reptiles – Turtles	Marine turtles are vulnerable to the effects of oil at all life stages; eggs, hatchlings, juveniles, and adults. Oil exposure affects different turtle life stages in different ways; and each turtle life stage frequents a habitat with varied potential to be impacted during an oil spill. Several aspects of turtle biology and behaviour place them at particular risk, including a lack of avoidance, indiscriminate feeding in convergence zones, and large pre-dive inhalations. Marine turtles can be exposed to oil externally (e.g. swimming through oil slicks) or internally (e.g. swallowing the oil, consuming oil affected prey, or inhaling of volatile oil related compounds). <u>Surface oil</u> 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,	While marine turtles are known to occur in the area potentially exposed to MDO at moderate – high concentrations, they do not reside or aggregate in significant numbers, and there are no recognised BIAs in the region. There are no turtle nesting beaches along the Gippsland coastline, so impacts to turtles from shoreline oiling will not occur. Although the effects of MDO on turtles can be severe, the low density of turtles expected in the region (due to lack

Receptor	Impact of MDO exposure	Exposure risk assessment
	blood, digestive and immune systems, and salt glands. Oil can enter cavities such as the eyes, nostrils, or mouth; and oil covering their bodies may interfere with breathing because they inhale large volumes of air to dive. Experiments on physiological and clinical pathological effects of hydrocarbons on loggerhead turtles (approximately 15 - 18 months old) showed that the turtles' major physiological systems were adversely affected by both chronic and acute exposures (96 hour exposure to a 0.05cm layer of South Louisiana crude oil versus 0.5cm for 48 hours) (Lutcavage, Lutz, Bossart, & Hudson, 1995). Recovery from the sloughing skin and mucosa took up to 21 days, increasing the turtle's susceptibility to infection or other diseases, such as fibro papilloma (Lutcavage, Lutz, Bossart, & Hudson, 1995). 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 DWH incident in the GoM, 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% of the live turtles were later released, suggesting that oiling does not inevitably lead to mortality. <u>Shoreline oil</u> Turtles may experience oiling impacts on nesting beaches and eggs through chemical exposures resulting in decreased survival to hatching and developmental defects in hatchlings. Adult females crossing an oiled beach could cause external oiling of the skin and carapace; nothing that most oil is deposited at the high-tide line, and most turtles nest well above this level. Studies on freshwater snapping turtles showed uptake of PAH from contaminated nest sediments, but no impacts on hatching success or juvenile health following exposure of eggs to dispersed weathered light crude (Rowe, Mitchelmore, & Baker, 2009). However, other studies found evidence that exposure of freshwater turtle embryos to PAH results in deformities (Bell, Spotila, & Congdon, 2006) (Van Meter, Spotila, & Avery, 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 water. Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects including impaired movement and bodily functions (Milton, Lutz, & Shigenaka, 2003). Hatchlings sticky with	of BIA or aggregations) suggests that few, if any, individuals would be affected in the event of a spill. Consequently, the potential impacts to marine reptiles are considered to be Consequence Level IV.

Receptor	Impact of MDO exposure	Exposure risk assessment
	oily residues may also have more difficulty crawling and swimming, rendering them more vulnerable to predation. It should be noted that the threat and relative impacts of an unplanned discharge on some marine reptile species are considered less damaging than other stressors. Report cards produced on protected marine reptiles in Australia generally ranked oil pollution as either not of concern or of less concern depending on the marine region (DSEWPAC, 2012b).	
Birds	Seabirds and shorebirds are sensitive to the impacts of oiling, with their vulnerability arising from the fact that they cross the air – water interface to feed, while their shoreline habitats may also be oiled (Hook, Batley, Holloway, Irving, & Ross, 2016). Species that raft together in large flocks on the sea surface are particularly at risk (ITOPF, 2011). <u>Surface oil</u> Birds foraging at sea have the potential to directly interact with oil on the sea surface some considerable distance from breeding sites in the course of normal foraging activities. Seabird species most at risk include those that readily rest on the sea surface (e.g. shearwaters) and surface plunging species (e.g. terns, boobies). As seabirds are a top order predator, any impact on other marine life (e.g. pelagic fish) may disrupt and limit food supply both for the maintenance of adults and the provisioning of young. For seabirds, direct contact with hydrocarbons can foul feathers, which may subsequently result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impair waterproofing. A bird suffering from cold, exhaustion and a loss of buoyancy may also dehydrate, drown or starve (CoA, 2022). 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, may lead to emaciation (CoA, 2022). The greatest vulnerability in this case occurs when birds are feeding or resting at the sea surface (Peakall, Wells, & Mackay, A hazard assessment of chemically dispersed oil spills and seabirds., 1987). In a review of 45 actual marine 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 (Hook, Batley, Holloway, Irving, & Ross, 2016). The Iron Baron vessel spill (325MT of bunker fuel in	Several threatened, migratory and/or listed marine species may occur in the area exposed to moderate-high surface thresholds. There are foraging BIAs for some species of petrels and albatrosses throughout the EMBA. However, there are no breeding BIAs within this area. Seabirds rafting, resting, diving or feeding at sea have the potential to come into contact with surface oil, ranging from moderate to high exposure. Given the extensive ocean foraging habitat available to species such as albatross and petrel, the small area and temporary nature of MDO on the sea surface makes it unlikely that a spill will limit their ability to forage for unaffected prey. When first released, the MDO has higher toxicity due to the presence of volatile components. Individual birds making contact close to the spill source at the time of the spill may suffer impacts however it is unlikely that a large number of birds will be affected. As such, acute or chronic toxicity impacts (death or long-term poor health) to small numbers of birds are possible, however this is not considered significant at a population level. Consequently, the potential consequence of risks to seabirds and shorebirds from a vessel collision event are

Receptor	Impact of MDO exposure	Exposure risk assessment
	Tasmania in 1995) is estimated to have resulted in the death of up to 20,000 penguins (Hook, Batley, Holloway, Irving, & Ross, 2016). Shoreline oil Shorebirds are likely to be exposed to oil when it directly impacts the intertidal zone and onshore due to their feeding habitats. Foraging shorebirds will be at potential risk of both direct impacts through contamination of individual birds (e.g. fouling of feathers) and indirect impacts (e.g. fouling and/or a reduction in prey items) (Clarke & Herrod, 2016). Birds that are coated in oil can also suffer from damage to external tissues, including skin and eyes, as well as internal tissue irritation in their lungs and stomachs. Breeding birds (both seabirds and shorebirds) may be exposed to oil via direct contact or the contamination of the breeding habitat (e.g. shores of islands) (Clarke & Herrod, 2016). Bird eggs may subsequently 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 21.3mgs/egg. 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. Toxic effects on birds may result where oil is ingested as the bird attempts to preen its feathers, or via consumption of oil-affected prey. Whether this toxicity ultimately results in mortality will depend on the amount consumed and other factors relating to the health and sensitivity of the particular bird species. The threshold thickness of oil that could impart a lethal dose to an individual wildlife species is 10µm (approximately 10g/m^2) (Engelhardt, Petroleum effects on marine mammals, 1983) (Clark, 1984) (Geraci & St. Aubin, 1988) (Jenssen, 1994). A layer 25µm thick would be harmful for most birds that contact the slick (Scholten, et al., 1996).	considered to be Consequence Level III to account for a species of local importance being affected.
Marine mammals - Pinnipeds	Pinnipeds are directly at risk from impacts associated with the exposure to surface, shoreline and in-water hydrocarbons. Sea surface oil Pinnipeds are vulnerable to sea surface exposures in particular given they spend much of their time on or near the surface of the water, as they need to surface every few minutes to	Seals are known to occur within the area exposed to moderate-high surface threshold. However, these areas are not identified as critical habitat and there are no identified BIAs for seals in the region.

Receptor	Impact of MDO exposure	Exposure risk assessment
	breathe, and regularly haul out on to beaches. Pinnipeds are also sensitive as they will stay near established colonies and haul-out areas, meaning they are less likely to practise avoidance behaviours. This is corroborated by (Geraci & St. Aubin, 1988) who suggest seals, sea lions and fur seals have been observed swimming in oil slicks during a number of documented spills. 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 membranes that surround the eyes and line the oral cavity, respiratory surfaces, and anal and urogenital orifices. Seals appear not to be very sensitive to contact with oil, but instead to the toxic impacts from the inhalation of volatile components (Hook, Batley, Holloway, Irving, & Ross, 2016). 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. It is suggested (Kooyman, Gentry, & McAllister, 1976) that in fact, fouling of approximately one-third of the body surface resulted in 50% greater heat loss in fur seals immersed in water at various temperatures. Fur seals are particularly vulnerable due to the likelihood of oil adhering to fur. Heavy oil coating and tar deposits on fur seals may result in reduced swimming ability and lack of mobility out of the water. In-water oil Ingested hydrocarbons can irritate or destroy epithelial cells that line the stomach and intestine, thereby affecting motility, digestion and absorption. However, pinnipeds have been found to have the enzyme systems necessary to convert absorbed hydrocarbons into polar metabolites, which can be excreted in urine (Engelhardt, 1982) (Addison & Brodie, 1984) (Addison, Brodie, Edwards, & Sadler, 1986) . Benzene and naphthalene ingested by seals is quickly absorbed into the blood through the gut, causing acute stress, with damage to the liver considered likely. If ingested in large volumes, hydrocarbons may not be completely metabolized, which may result in death (Volkman, Miller, Revill, & Connell, 1994).	Although the characteristics of MDO reduce the risk of hyperthermia from oiling, other effects of surface and in-water MDO on pinnipeds can be severe. Long term impacts at a population level are considered unlikely however the consequence is assessed as Consequence Level III.

Receptor	Impact of MDO exposure	Exposure risk assessment
	Australian sea lions have naturally poor recovery abilities due to unusual reproductive biology and life history (DSEWPAC, 2013). Due to the extreme philopatry of females and limited dispersal of males between breeding colonies, the removal of only a few individuals annually may increase the likelihood of decline and potentially lead to the extinction of some of the smaller colonies.	
Marine mammals - Cetaceans	Whales and dolphins can be exposed to the chemicals in oil through: • internal exposure by consuming oil or contaminated prey • inhaling volatile oil compounds when surfacing to breathe • external exposure, by swimming in oil and having oil directly on the skin and body • maternal transfer of contaminants to embryos (NRDA, 2012). <u>Surface oil</u> Direct surface oil contact with hydrocarbons is considered to have little deleterious effect on whales, possibly due to the skin's effectiveness as a barrier to toxicity, and effect of oil on cetacean skin is probably minor and temporary (Geraci & St. Aubin, 1988). A 10 - 25µm oil thickness threshold has the potential to impart a lethal dose to the species, however also estimates a probability of 0.1% mortality to cetaceans if they encounter these thresholds based on the proportion of the time spent at surface (French-McCay D. P., 2009). The inhalation of oil droplets, vapours and fumes is a distinct possibility if whales surface in slicks to breathe. Exposure to hydrocarbons in this way could damage mucous membranes, damage airways or even cause death. <u>In-water oil</u> The physical impacts from ingested hydrocarbon with subsequent lethal or sub-lethal impacts are both applicable to entrained oil. However, the susceptibility of cetaceans varies with feeding habits. Baleen whales (such as blue, SRW and humpback) are not particularly susceptible to ingestion of oil in the water column as they feed by skimming the surface. Oil may stick to the baleen while they 'filter feed' near slicks. Toothed whales and dolphins may be susceptible to ingestion of dissolved and entrained oil as they gulp feed at depth. As highly mobile species, in general it is very unlikely that these animals will be constantly exposed to concentrations of hydrocarbons in the water column for continuous durations (for example greater than 96 hours) that would lead to chronic effects. Note also, many	Several threatened, migratory and/or listed cetacean species may traverse through the MDO spill plume. The foraging BIA for the PBW and the migration BIA for the SRW may be exposed to surface concentrations at moderate-high thresholds. Biological effects of physical contact with areas of moderate concentrations of MDO at the sea surface are unlikely to lead to any long-term consequences. In the unlikely event of an MDO spill, the environmental impact would be limited to a relatively short period following the release and would need to coincide with migration to result in exposure of a large number of individuals. The highly mobile nature of cetacean species means that such exposure is not anticipated to result in long term population viability effects and the resultant impact is assessed as Consequence Level III.

Receptor	Impact of MDO exposure	Exposure risk assessment
	marine mammals appear to have the necessary liver enzymes to metabolise hydrocarbons and excrete them as polar derivatives. Evidence suggests that many cetacean species are unlikely to detect and avoid spilled oil (Matkin, Saulitis, Ellis, Olesiuk, & Rice, 2008). There are numerous examples where cetaceans have appeared to incidentally come into contact with oil and/or not demonstrated any obvious avoidance behaviour; e.g. following the Exxon Valdez oil spill, (Matkin, Saulitis, Ellis, Olesiuk, & Rice, 2008) reported killer whales in slicks of oil as early as 24 hours after the spill. Some whales, particularly those with coastal migration and reproduction, display strong site fidelity to specific resting, breeding and feeding habitats, as well as to their migratory paths and this may override any tendency for cetaceans to avoid the noxious presence of hydrocarbons. The SRW exhibits varying degrees of site fidelity, with the majority of females and calves returning to the same birthing location, while some also travel long distances between breeding grounds within a season (DCCEEW, 2024)). If spilled oil reaches these biologically important habitats, the pollution may disrupt natural behaviours, displace animals, reduce foraging or reproductive success rates and increase mortality. If sufficiently high numbers are impacted, the greater population may experience reduced recovery and survival rates.	
Commercial fisheries	Commercial fishing has the potential to be impacted through exclusion zones associated with the spill, the spill response and subsequent reduction in fishing effort. Exclusion zones may impede access to commercial fishing areas, for a short period of time, and nets and lines may become oiled. The impacts to commercial fishing from a public perception perspective, however, may be much more significant and longer term than the spill itself. Fishing areas may be closed for fishing for shorter or longer periods because of the risks of the catch being tainted by oil. Concentrations of petroleum contaminants in fish and crustacean and mollusc tissues could pose a significant potential for adverse human health effects, and until these products from nearshore fisheries have been cleared by the health authorities, they could be restricted for sale and human consumption. Indirectly, the fisheries sector will suffer losses if consumers are either stopped from using or unwilling to buy fish and shellfish from the region affected by the spill.	Several commercial fisheries may operate within the area potentially exposed to an MDO plume and a temporary fisheries closure may be put in place. Oil may foul the hulls of fishing vessels and associated equipment, such as gill nets. A temporary fisheries closure, combined with oil tainting of target species (actual or perceived), may lead to financial losses to fisheries and economic losses for individual licence holders. Due to the rapid weathering of the MDO in the high energy Bass Strait environment, it is unlikely that an exclusion zone would be established, consequently, the potential impacts to commercial fisheries from an MDO

Receptor	Impact of MDO exposure	Exposure risk assessment
	Impacts to fish stocks have the potential for reduction in profits for commercial fisheries, and exclusion zones exclude fishing effort. Detectable tainting of fish flesh was reported after a 24-hour exposure at crude concentrations of 0.1ppm, marine fuel oil concentrations of 0.33ppm and diesel concentrations of 0.25ppm (Davis, Moffat, & Shepherd, 2002). The Montara spill (as the most recent example of a large hydrocarbon spill in Australian waters from 2009) occurred over an area fished by the Northern Demersal Scalefish Managed Fishery (with 11 licences held by seven operators), with goldband snapper *(Pristipomoides typus),* red emperor *(Lutjanus sebae),* saddletail snapper *(Lutjanus malabaricus)* and yellow spotted rockcod *(Epinephelus andersoni)* being the key species fished (PTTEP, 2013). As a precautionary measure, the Western Australia Department of Fisheries advised the commercial fishing fleet to avoid fishing in oil-affected waters. Testing of fish caught in areas of visible oil slick (November 2009) found that there were no detectable petroleum hydrocarbons in fish muscle samples, suggesting fish were safe for human consumption. In the short-term, fish had metabolised petroleum hydrocarbons. Limited ill effects were detected in a small number of individual fish only (PTTEP, 2013). No consistent effects of exposure on fish health could be detected within two weeks following the end of the well release. Follow up sampling in areas affected by the spill during 2010 and 2011 (PTTEP, 2013) found negligible ongoing environmental impacts from the spill. Since testing began in the month after the DWH blowout in the GoM levels of oil contamination residue in seafood consistently tested 100 - 1,000 times lower than safety thresholds established by the USA Food and Drug Administration (FDA), and every sample tested was found to be far below the USA FDA's safety threshold for dispersant compounds (BP, 2015). The USA FDA testing of oysters found oil contamination residues to be 10 - 100 times below safety thresholds (BP, 2015). Sampling data shows that post-spill fish populations in the GoM since 2011 were generally consistent with pre-spill ranges and for many shellfish species, commercial landings in the GoM in 2011 were comparable to pre-spill levels. In 2012, shrimp (prawn) and blue crab landings were within 2.0% of 2007 to 2009 landings. Recreational fishing harvests in 2011, 2012 and 2013 exceeded landings from 2007 to 2009 (BP, 2015).	spill are considered to be Consequence Level III (based on public impact consequence considerations as per the *Risk Matrix Application Guide* (ExxonMobil, 2024).

Receptor	Impact of MDO exposure	Exposure risk assessment
Cultural – Indigenous and historic wrecks	Visible sheen has the potential to reduce the visual amenity of cultural heritage sites such as Indigenous or historic (e.g. shipwreck) protected areas.	Oil sheen is not predicted to encroach upon nearshore waters in the vicinity of the Gunaikurnai Native Title Determination Area or any of the near shore historic shipwrecks. but there may be an impact due to the perception of a polluted environment. However, given the relatively short duration and no predicted exposure the consequence is considered Consequence Level IV (based on public impact consequence considerations as per the *Risk Matrix Application Guide* (ExxonMobil, 2024)).
Recreation and tourism	Refer to sections on fish, and cetaceans above.	Tourism and recreation are also linked to the presence of marine fauna (e.g. whales), particular habitats and locations for swimming or recreational fishing. Short-term impacts to nature-based tourism and other human uses of then impacted may occur because of temporary beach closures due to perceptions of a polluted environment that is not desirable to visit. However, given the relatively short duration, and limited extent of predicted shoreline contact the consequence is considered Consequence Level III based on public impact consequence considerations as per the *Risk Matrix Application Guide* (ExxonMobil, 2024).

7.6.4 Residual risk ranking

Table 7-31 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
III	E	4

7.6.5 Controls

- CM27: Support vessel approach procedure
- CM28: Activity Specific Operating Guidelines/Critical Activity Mode procedures
- CM29: Support vessel dynamic positioning system
- CM36: Pre-start notifications
- CM20: Shipboard Marine Pollution Emergency Plan
- CM12: Oil Pollution Emergency Plan
- CM35: Operational and Scientific Monitoring Plan (OSMP)

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

7.6.6 Demonstration of As Low As Reasonably Practicable

Table 7-32 Decision Context and justification

Decision Context A
Operating vessels close to an offshore facility (platform, JUR) is common practice for activities such as fuel transfer, provision of cargo, and reverse logistical support. These activities are well regulated with associated control measures, well understood, and are implemented across the offshore industry. Although there is the potential for impacts of Consequence Level III from a vessel collision, spill source volumes are limited in size, the environmental impact of MDO is well understood, a credible spill volume has been modelled and a very conservative threshold has been selected to define the EMBA, so there is limited uncertainty associated with this event. No issues, objections or claims were raised by relevant persons during the consultation process with regard to the risk of LOC resulting from a vessel collision. Esso believes ALARP Decision Context A should apply.

Table 7-33 Good practice controls

Good practice	Adopted	Control	Rationale
Support vessel approach protocols.	✓	**CM27:** Support vessel approach procedure	It is standard industry practice for procedures describing support vessel approach protocols to be developed.
Structured operational limits criteria for DP operations.	✓	**CM28:** Activity Specific Operating Guidelines/Critical Activity Mode procedures	The application of ASOG/Critical Activity Mode risk management tools is industry best practice for DP operations. Critical Activity Mode describes how to configure the vessels DP system and ASOG sets out the operational, environmental and equipment performance limits considered necessary for safe DP operations while carrying out a specific activity.
DP Class 2.	✓	**CM29:** Support vessel dynamic	DP Class 2 (redundancy so that no single fault in an active system will cause the system to fail) is the industry standard where loss of position keeping capability may

Good practice	Adopted	Control	Rationale
		positioning system	cause personnel injury, pollution, or damage with large economic consequences.
Pre-start notifications.	✓	**CM36:** Pre-start notifications	Under the *Navigation Act 2012* (Cth), the AHO is responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications including: • Notices to Mariners • AUSCOAST warnings. Details of the PSZ will be published in Notices to Mariners, thus enabling other marine users to plan their activities, and minimising disruption to exclusion zones. Relevant details will be provided to the JRCC to enable AUSCOAST warnings to be disseminated.
SMPEP.	✓	**CM20:** Shipboard Marine Pollution Emergency Plan	The vast majority of commercial ships are built to and surveyed for compliance with the standards (i.e. Rules) laid down by classification societies. The role of vessel classification and classification societies has been recognised by the IMO across many critical areas including the SOLAS, the 1988 Protocol to the International Convention on Load Lines and MARPOL. A vessel built in accordance with the applicable Rules of an IACS member society may be assigned a class designation relevant to the IMO Rules, on satisfactory completion of the relevant classification society surveys. For ships in service, the society carries out routine scheduled surveys to verify that the ship remains in compliance with those Rules. Should any defects that may affect class become apparent, or damages be sustained between the relevant surveys, the owner is required to inform the society concerned without delay. MARPOL Annex I Regulations for the Prevention of Pollution by Oil specifically require that a SMPEP (or equivalent, according to class) is in place. To prepare for a spill event, the SMPEP details: • response equipment available to control a spill event • review cycle to ensure that the SMPEP is kept up to date • testing requirements, including the frequency and nature of these tests. In the event of a spill, the SMPEP details: • reporting requirements and a list of authorities to be contacted • activities to be undertaken to control the release • procedures for coordinating with local authorities.

Good practice	Adopted	Control	Rationale
Oil spill response planning.	✓	**CM12:** Oil Pollution Emergency Plan **(OPEP)**	• Under the Environment Regulations, NOPSEMA require that the petroleum activity have an accepted OPEP in place before commencing the activity. In the event of a vessel collision the OPEP will be implemented.
Oil spill monitoring planning.	✓	**CM35:** Operational and Scientific Monitoring Plan (OSMP)	Esso's OSMP details the arrangements and capability in place for: • operational monitoring of a hydrocarbon spill to inform response activities • scientific monitoring of environmental impacts of the spill and response activities. Operational monitoring will allow adequate information to be provided to aid decision making to ensure response activities are timely, safe, and appropriate. Scientific monitoring will identify if potentially longer-term remediation activities are required.

Table 7-34 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
N/A	N/A	N/A	N/A

7.6.7 Demonstration of acceptability

Table 7-35 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	✓	The risk ranking is Risk Category 4 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	✓	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result in serious or irreversible environmental damage.	✓	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	✓	The proposed activities align with the requirements of the: • *Navigation Act 2012* (Cth) – Chapter 6 (Safety of Navigation) Part 6 deals with

Factor	Demonstration criteria	Criteria met	Rationale
			safe navigation including provisions about reporting of movement of vessels. The requirements of MARPOL Annex I has been adopted. The following legislative and other requirements are considered relevant as they apply to the implementation of MARPOL in Australia: • Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Cth) • *Navigation Act 2012* (Cth) – Chapter 4 (Prevention of Pollution) • Marine Order 91 (Marine pollution prevention – oil) 2014.
Internal context	Consistent with Esso's Environment Policy.	✓	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	✓	There is no standard related to a LOC of MDO but the activities proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	✓	Proposed activities meet • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors • OIMS System 10-2 objectives to document, resource and communicate emergency response plans, and conduct training, exercises and/or drills to determine the adequacy of the plans.
External context	Concerns of relevant persons have been considered/addressed through the consultation process.	✓	No relevant person concerns have been raised concerning the risk of LOC resulting from a vessel collision.

7.7 Accidental release – Loss of containment of reservoir hydrocarbon (loss of well control)

7.7.1 Causes of loss of containment of reservoir hydrocarbons

7.7.1.1 Loss of well control

A LOWC can occur when primary and secondary well control measures fail, which could potentially result in a release of reservoir hydrocarbons into the marine environment, if there is communication from the reservoir section to the wellbore.

This could occur due to issues with the drilling operations when the reservoirs are being accessed or it could also occur if the JUR stability or JUR leg punch through failed whilst the drilling operations were accessing the reservoirs.

7.7.1.2 Damage to subsea infrastructure during JUR move, JUR Stability failure or from dropped objects

During the JUR movement to the required location (which includes the positioning and setting of the legs onto the seafloor) it is possible that the legs may come into contact with existing subsea flowlines or infrastructure.

Leg punch through occurs when a JUR leg (or legs) rapidly penetrates the formation material beneath the spud can and can induce differential loading of legs on the JUR. In the more serious cases when the JUR is unable to balance out this differential leg movement, this event can result in damage to the JUR legs, loss of balance of a rig, and in the worst case the JUR can fall over, potentially harming people, damage to the platform, causing a failure of the drilling equipment and LOWC, and/or an associated LOC of all chemicals on the JUR and other dropped objects. Pre campaign geotechnical assessments confirm the JUR can safely apply loading to its legs to avoid leg punch through. The details of the JUR location and included in the JUR rig move procedure which is approved by both Esso and Valaris personnel.

During the drilling operations it is possible that objects could be dropped and impact the existing Marlin B platform's subsea pipeline and cause a LOC.

The risks associated with dropped objects has been assessed previously, Section 7.3.

Turrum Phase 3 production drilling activities requires the JUR to position itself alongside the Marlin B platform, to enable the JUR to access the existing well area on the platform. To manage the risk during rig mobilisation the JUR will be carefully manoeuvred into position using an approved rig move procedure and under the control of an experienced independent rig mover. The rig move procedure will specify the approach path, the number of vessels that will be involved, communication protocols between the vessel and assets, the Permit to Work arrangements and how the location of the JUR, in relation to the subsea assets, will be confirmed and managed. The rig mover will be responsible for compliance with the rig move procedure and ensuring a suitable weather (wind, current and tide) window is available. Once confirmed on location and in the correct orientation the legs will be jacked down, and the hull lifted out of the water.

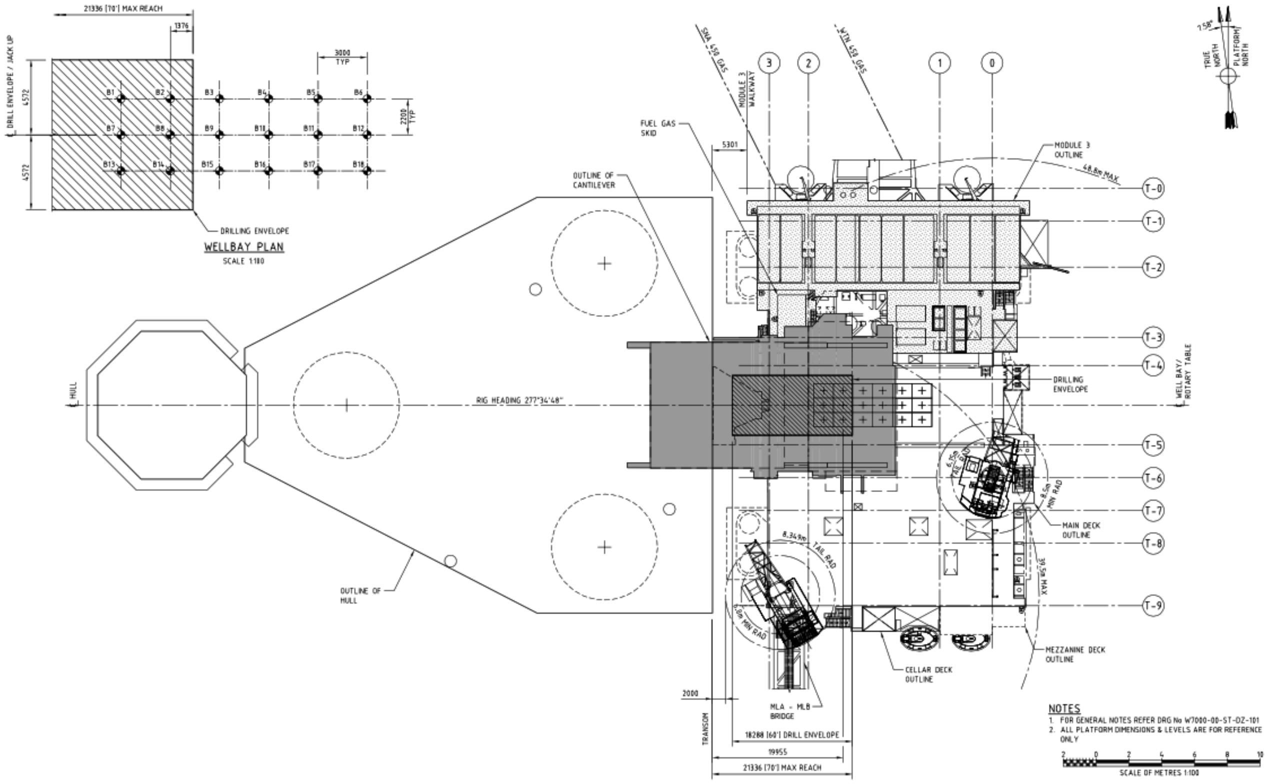

Figure 7-4 JUR position relative to Marlin B platform facilities

Turrum Phase 3 Simultaneous Operations (SIMOPS) plan, including the JUR movements, will be developed with Esso personnel (platform and pipelines representative) and JUR representatives as part of the Turrum Phase 3 drilling and safety case development processes. The SIMOPS plan will formally confirm the controls to be implemented during the JUR activities.

Once the JUR is in position the risk from dropped objects during supply vessel operations was assessed as very low, due to the location of the main rig cranes with respect to the associated Marlin B platform infrastructure. All standard dropped object controls will be in place as required by the JUR and pipeline safety cases, these include use of certified lifting equipment, trained and competent riggers, dog men and crane operators.

7.7.1.3 Spill modelling

To understand the potential consequences of a LOWC and the response preparedness required, Esso commissioned RPS to undertaken stochastic and deterministic oil spill modelling for the Turrum Phase 3 production drilling activities (RPS, 2024).

7.7.1.4 Stochastic modelling

Stochastic modelling is used to determine the total area that may be exposed. By overlaying 100 spill simulations initiated at random different start times into a single map, stochastic modelling shows all the areas that could be affected, not just the area affected by a single spill.

Using the worst-case discharge scenario (WCDS) and the low threshold hydrocarbon exposure levels per Table 3-1, stochastic modelling has been used to define the spill EMBA in Section 3.1 and as described in Appendix A. Stochastic modelling also predicts the extent and the degree of exposure, which enables an assessment of the possible consequence to environmental receptors.

Oil spill modelling is used to determine the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column. This is known as the EMBA and is used for planning purposes to ensure that all social and environmental sensitivities are identified, described, and considered in the development of the EP. The hydrocarbon thresholds, or exposure levels used to define the EMBA are shown in Table 3-1. The values and sensitivities within the EMBA are described in Appendix A.

7.7.1.5 Deterministic modelling

Deterministic modelling for a single worst-case simulation is used to predict the fate and weathering of spilled hydrocarbons. It is also used to inform initial response planning by ensuring sufficient resources are available to mount an effective response and inform decisions relating to protection priorities of potential receptors at risk, noting that in the event of a spill the actual trajectory will depend on the nature of the spill and the environmental conditions at the time. A map of the worst-case deterministic simulation is included in the activity-specific Quick Reference Guide in Appendix JD of the OPEP provided in Attachment 2.

7.7.1.6 Representative crude oil selection

The International Tanker Operators Pollution Federation (ITOPF) newsletter (Anderson, 2001) defines non-persistent oils as those that are generally of a volatile nature and are composed of lighter hydrocarbon fractions, which tend to dissipate rapidly through evaporation. In contrast, persistent oils generally contain a considerable proportion of heavy fractions or high-boiling point material.

It is common practice for the analysis of condensates, including the relevant condensates available at the time of spill modelling for this EP, to analyse the boiling point distribution only for the more volatile fractions, as these are of most commercial interest. Although the residual fraction of these condensates is small, it is important to include the persistent fraction in spill modelling as this fraction is most resistant to weathering and evaporation.

For the discharge scenario a representative blend oil consisting of 28% West Kingfish crude and 72% Kipper condensate, was used for the scenario modelled in this assessment. The selected proxy represents both condensates and is conservative over the range of 'low volatility' and 'residual' ('persistent') hydrocarbons. Table 7-36 contains the relevant details and properties of the proxy blend used in the modelling.

7.7.1.7 Modelling assumptions and discharge scenarios

A range of LOWC scenarios, up to and including the WCDS have been assessed and considered.

A LOWC is a highly unlikely event based upon the frequency assessment in Section 7.7.1.8. When a LOWC occurs, this is more likely to occur during drilling and when the drill stem has penetrated the reservoir. The basis of the WCDS (Table 7-36) assumes the full length of the reservoir has been intersected (i.e. maximum flow), that the BOP has failed (i.e. fully open), and that there is an uncontrolled flow to the surface in an open hole.

There are many other parameters to consider which would reduce the release volume, such as:

- the BOP may close further than modelled, thereby reducing flow rate
- the LOWC event may be brought under control by other means
- the LOWC may occur before the hole has been drilled to its total depth
- the reservoir parameters (porosity, pressure and gas oil ratio) may be less than anticipated
- the LOWC may generate sand and debris from the reservoir that blocks the flow
- the drilling of a relief well may take less than the modelled period.

Table 7-36 LOWC spill modelling inputs

Parameter	Turrum well drilling
Hydrocarbon type	Blend oil consisting of 28% West Kingfish crude and 72% Kipper condensate
Number of spill simulations	100
Period of the year (season)	Annual analysis
Classification	Group I (non persistent oils)
Release type	Surface

Parameter	Turrum well drilling
Release duration	98 days (modelled for 118 days)
Total release volume	1.7MMbbl (approximately 270,300m^2)
Density (kg/m^3)	0.771
API gravity	52.1
Dynamic viscosity (cP@15°C)	1.02
Pour point (°C)	-25.4
Oil property classification	Group I (not persistent oils)
Volume basis	• Open hole blowout while drilling; BOP failure. • Flow to atmosphere at surface through casing, with no restrictions in the wellbore. • Discharge at the BOP level in rig air gap resulting in LOC at sea level.
Release location	Marlin B platform 38°13' 46" S, 148° 13' 16" E
Duration basis	Relief well assumed to be primary response plan (refer to Attachment 2). The response time for a relief well is based on rig mobilisation from Singapore taking 98 days as a conservative case.

7.7.1.7.1 Modelling outputs –Deterministic case - weathering and *FATE*

The oil type used in the modelling is an oil blend consisting of 28% West Kingfish crude and 72% Kipper condensate. The properties of this crude are shown in section 253. These properties classify it as a Group I oil according to the ITOPF classifications (ITOPF, 2020)).

This means they have low viscosity and spread rapidly on the sea surface to form thin sheens. The use of dispersant is not recommended for Group I oils due to its tendency to spread thinly and evaporate quickly.

Figure 7-5 presents the fates and weathering graph for the ‘worst’ single spill trajectory. The shoreline contact of this event is shown in Figure 7-6.

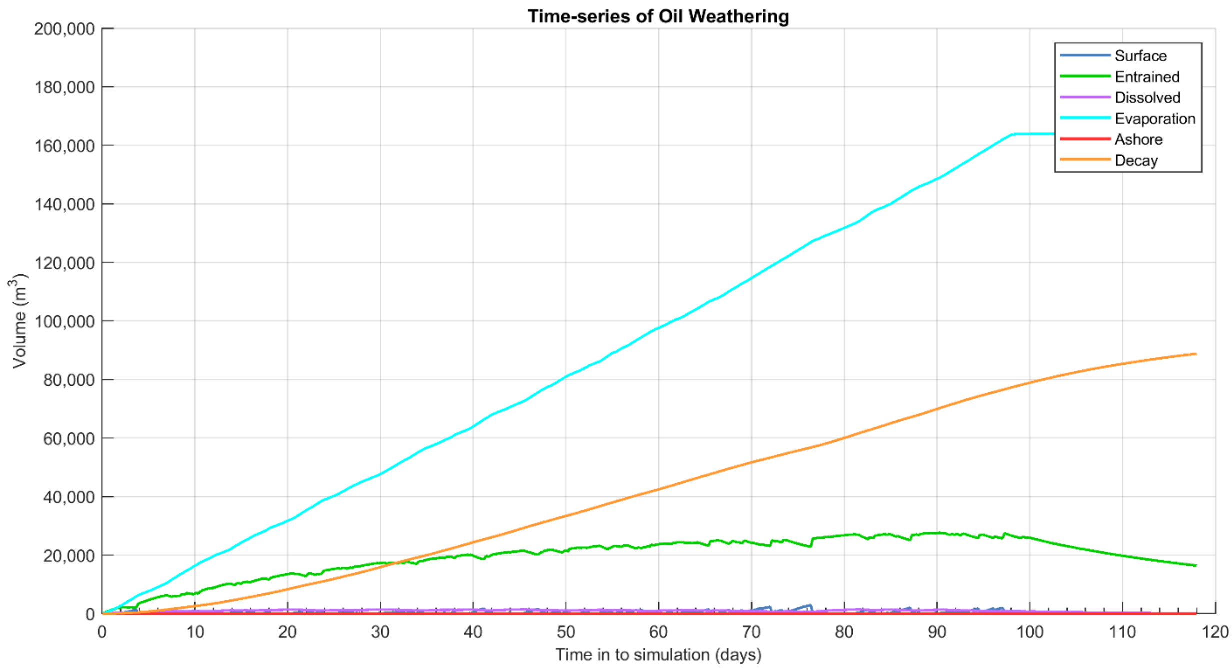

Figure 7-5 Predicted weathering and fates graph for the trajectory with the largest swept area of floating oil above 10gm/m^2

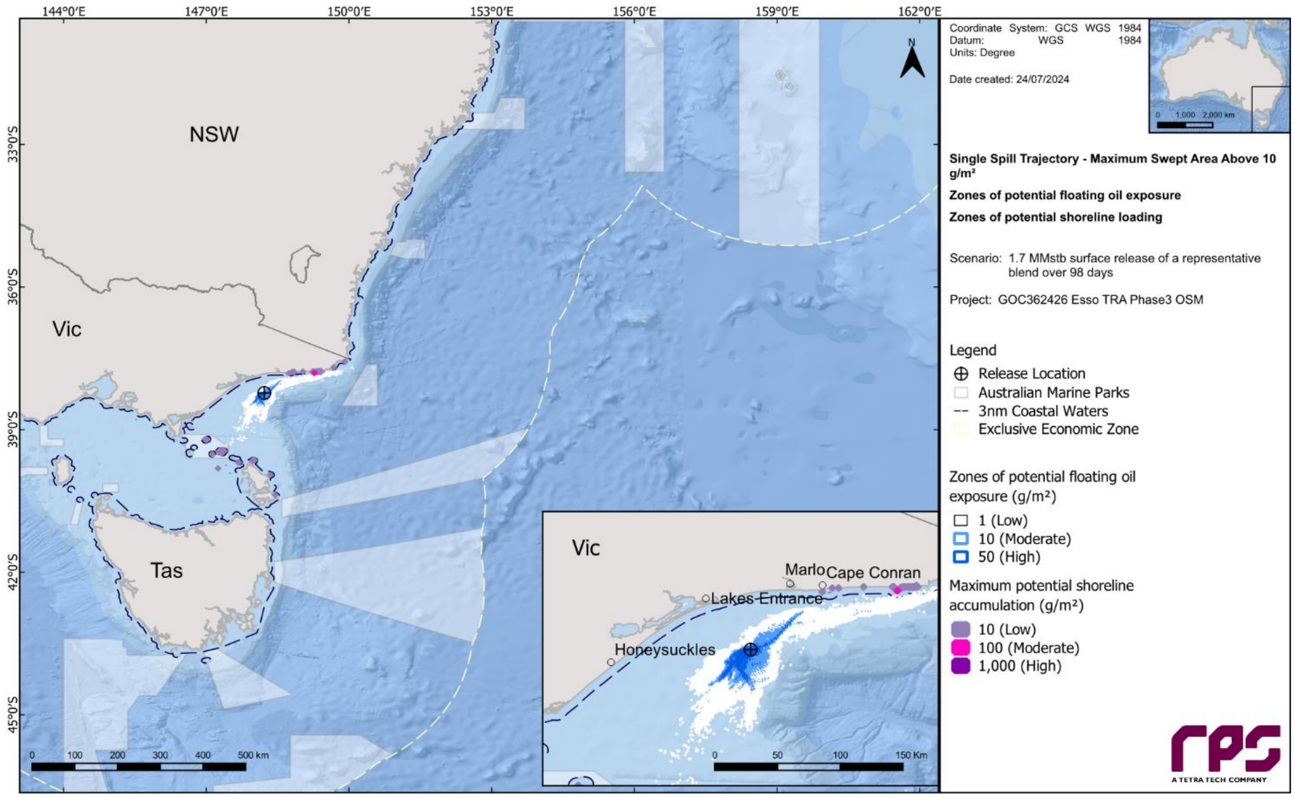

Figure 7-6 Zones of potential floating oil exposure and shoreline accumulation, for the trajectory with the largest swept area of floating oil above 10gm/m^2

7.7.1.7.2 MODELLING OUTPUTS STOCHASTIC

Oil spill modelling predicts that the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, as a result of a worst case spill. This is known as the EMBA and is used for planning purposes to ensure that all social and environmental sensitivities are acknowledged, described and considered in the development of the EP.

Modelling is also used to inform specific impact assessments by understanding the location and extent of oil at concentrations likely to result in environmental consequences. There is no agreed exposure level below which environmental impacts will not occur so outputs should not be interpreted as a boundary. However, mapping areas which could be moderately impacted by a spill is a useful tool for impact or consequence assessment.

The modelling has indicated a number of various impacts associated with the WCDS of the LOWC at the Marlin B platform location. The modelling indicates that there will be surface exposures of hydrocarbons that will impact shorelines in a theortetical WCDS. The maximum extent of surface oil exposure is shown in Figure 7-7, the maximum extent of shoreline exposure is shown in Figure 7-8, the maximum extent of dissolved exposure is shown in Figure 7-9, and the maximum extent of entrained exposure is shown in Figure 7-10. Table 7-37 summarises the receptors within the moderate threshold for surface, shoreline, and in-water (dissolved) exposure. Table 7-38 summarises the receptors within the lowest threshold for surface, shoreline, and in-water (dissolved and entrained) exposure.

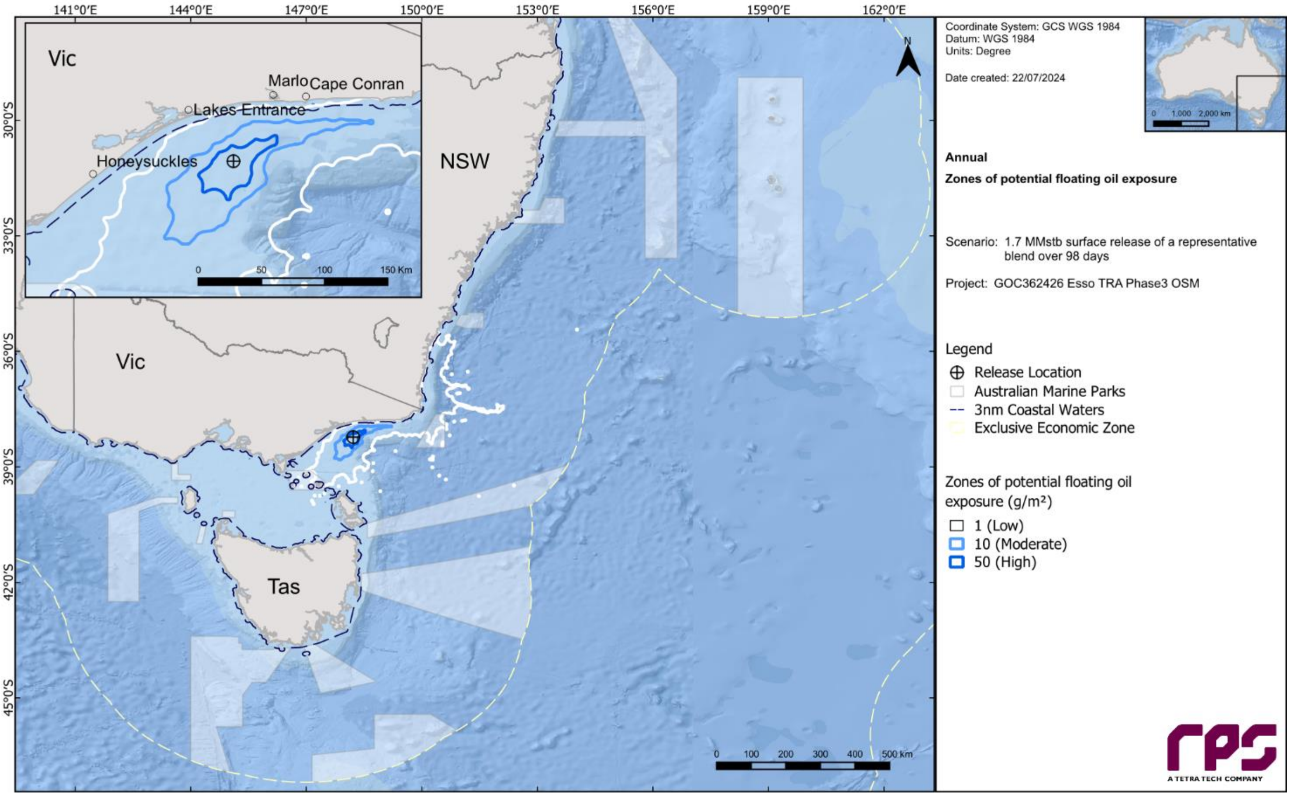

Figure 7-7 Zones of potential floating oil exposure in the event of a 1.7MMbbl surface releases of a representative blend oil over 98 days at Marlin B platform. The results reflect annual conditions.

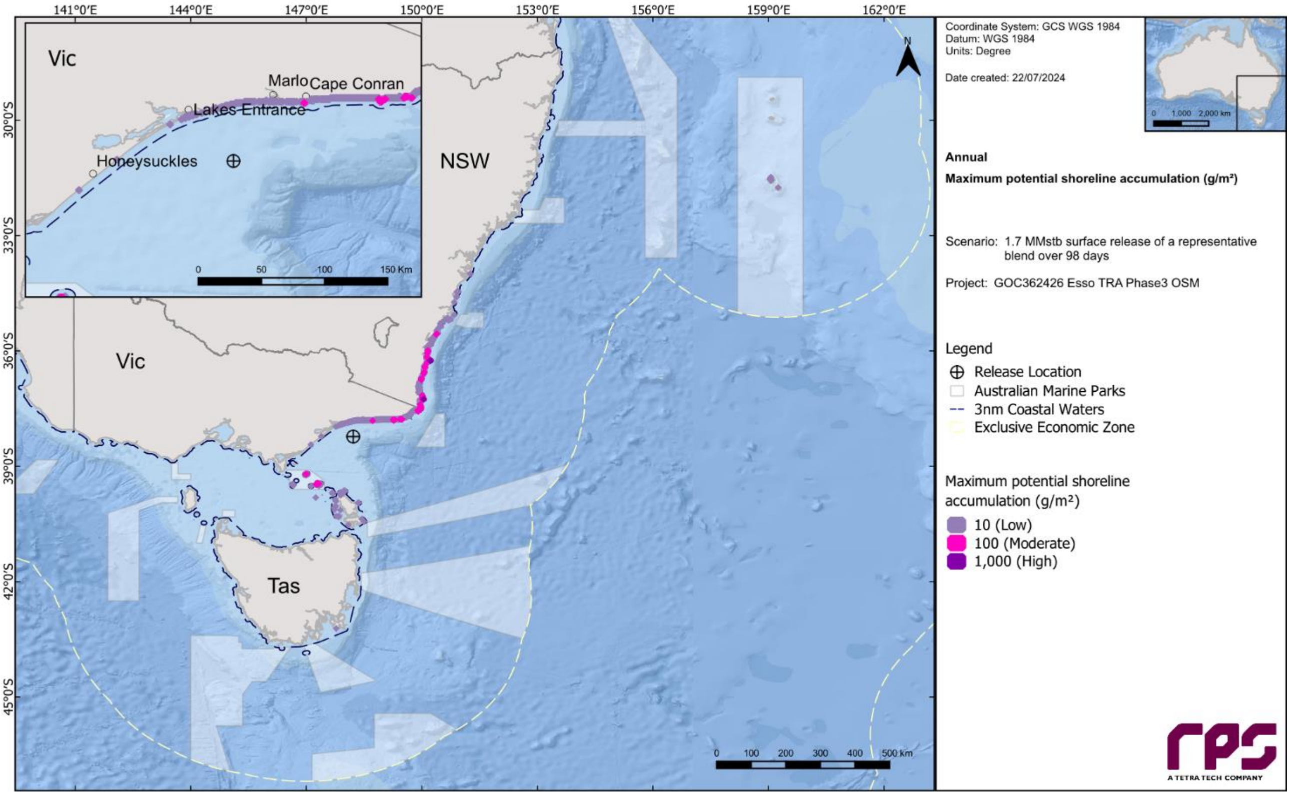

Figure 7-8 Maximum potential shoreline loading in the event of a 1.7MMbbl surface release of a representative blend oil over 98 days at Marlin B platform. The results reflect annual conditions.

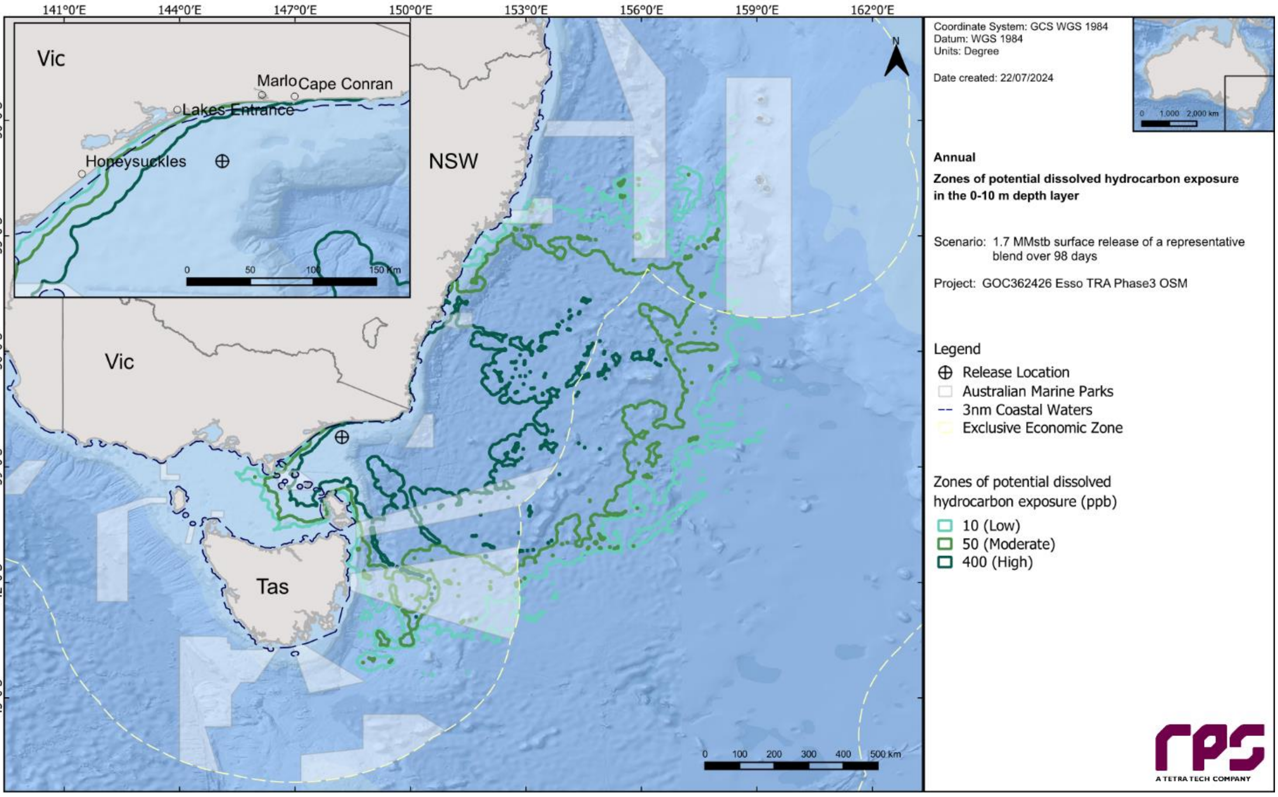

Figure 7-9 Zones of potential dissolved hydrocarbon exposure at 0-10m below the sea in the event of a 1.7MMbbl surface release of a representative blend oil over 98 days at Marlin B platform.

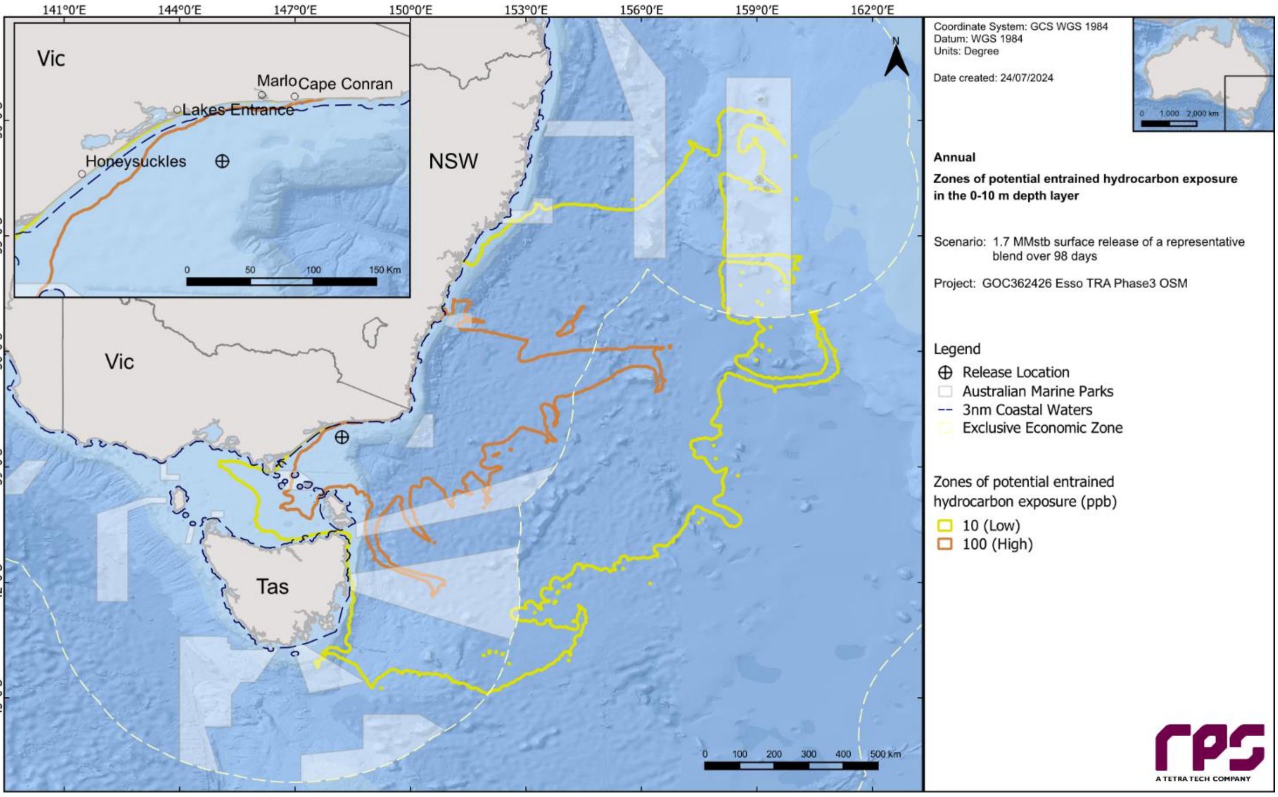

Figure 7-10 Zones of potential entrained hydrocarbon exposure at 0 - 10m below the sea surface in the event of a 1.7MMbbl surface release of a representative blend oil over 98 days at Marlin B platform. The results reflect annual conditions.

Table 7-37 Receptors within the moderate exposure thresholds

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories)
		From Marlin B Location
Surface exposure	Moderate 10g/m^2	Maximum distance from release location was approximately 280km northeast.
Shoreline exposure	Moderate 100g/m^2	Minimum time for shoreline accumulation was approximately 5 days at: • Bega Valley
In-water (dissolved) exposure	Moderate 50ppb instantaneous	In the water column at 0-10m depth there is a 100% probability of contact with dissolved hydrocarbon at the moderate level with the following receptors (see Figure 7-9): • BIAs - antipodean albatross – foraging - black-browed albatross – foraging - Bullers albatross – foraging - Campbell albatross – forging - common diving petrel – foraging - Indian yellow-nosed albatross – foraging - wandering albatross – foraging - wedge-tailed shearwater - short-tailed shearwater - shy albatross – foraging

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories) From Marlin B Location
		- white-faced storm-petrel – foraging - PBW – distribution - PBW – foraging - SRW – known core range - white shark – distribution - white shark – foraging • Interiem Biogeographic Region for Australia (IBRA) - N/A • Integrated Marine and Coastal Regionalisation of Australia (IMCRA) - Twofold Shelf • KEF - Upwelling East of Eden • Marine National Park - Point Hicks • Nearshore waters Local Government Authority - N/A • State waters - Victorian • Nearshore waters sub - Local Government Authority - N/A

Using the lower hydrocarbon exposure criteria the receptors impacted are summarised in Table 7-38.

Table 7-38 Receptors within the lowest exposure thresholds

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories) From Marlin B location
Surface exposure	Low 1g/m^2	Maximum distance from release location was approximately 752km east-northeast.
Shoreline exposure	Low 10g/m^2	Minimum time for visible oil to shore was approximately 4.5 days at: • Point Hicks • Bega Valley • East Gippsland
In-water (dissolved) exposure	Low 10ppb instantaneous	In the water column at 0-10m depth there is a 100% probability of contact with dissolved hydrocarbon at low level with the following receptors (see Figure 7-9): • BIAs - antipodean albatross – foraging - black-browed albatross – foraging - Campbell albatross – forging - common diving petrel – foraging - Indian yellow-nosed albatross – foraging - wandering albatross – foraging - wedge-tailed shearwater - little penguin – foraging - short-tailed shearwater - shy albatross – foraging - white-faced storm-petrel – foraging

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories) From Marlin B location
		- PBW – distribution - PBW – foraging - SRW – known core range - Humpback whale – foraging - white shark – distribution - white shark – foraging - white-faced storm petrel • IBRA - East Gippsland lowlands • IMCRA - Twofold Shelf • KEF - Upwelling East of Eden • Marine National Park - Point Hicks • Nearshore waters Local Government Authority - East Gippsland • State waters - Victorian • Nearshore waters sub - Local Government Authority - Point Hicks
In-water (entrained) exposure	Low 10ppb instantaneous	In the water column at 0 - 10m depth there is a 100% probability of contact with entrained hydrocarbon at low level with the following receptors (see Figure 7-10): • BIAs - Antipodean albatross – foraging - black-browed albatross – foraging - Buller's albatross – foraging - Indian yellow-nosed albatross – foraging - Campbell albatross – foraging - common diving petrel – foraging - shy albatross – foraging - short-tailed shearwater – foraging - wandering albatross – foraging - wedge-tailed shearwater – foraging - white-faced storm petrel – foraging - white shark – distribution - white shark – foraging - Little penguin – foraging - PBW – distribution - PBW – foraging - humpback whale – foraging - SRW – known core range - Indo-pacific/spotted bottlenose dolphin - breeding - SRW • IBRA - East Gippsland lowlands • IMCRA - Twofold Shelf • KEF - Big Horseshoe Canyon

Model parameter	Exposure value	Stochastic modelling (based on 100 annualised spill trajectories)
		From Marlin B location
		- Upwelling East of Eden • Marine National Park - Point Hicks - Cape Howe • Nearshore waters Local Government Authority - East Gippsland • State waters - Victorian - NSW • Nearshore waters sub - Local Government Authority - Cape Howe/Mallacoota - Croajingolong – West - Point Hicks - Sydenham Inlet

7.7.1.8 Risks of loss of containment of reservoir hydrocarbons

A LOC of reservoir hydrocarbons at Marlin B platform due to Turrum Phase 3 production drilling activities has the potential to result in the following impacts:

- injury/injury/mortality to fauna
- change in habitat
- change to the function, interests or activities of other users.

The risks of hydrocarbon exposure to the receptors in the spill EMBA are described in Table 7-40.

The likelihood of LOWC is based on the Norwegian Institute of Technology records as per *Source Control Emergency Response Planning Guide for Subsea Wells* (IOGP, 2019) which presents the frequencies of blowouts and well release incident based on industry data. The likelihood for LOWC has been established based on the following assumptions:

- drilling and well operations are defined as being "of North Sea Standard" ("Operation performed with pressure control equipment (PCE) installed including shear ram and two barrier principle followed") given the relevant Safety Case has been developed based on European standards and references various North Sea standards (e.g. NORSOK for barrier analysis, IOGP for relief well studies, Oil & Gas UK for relief well planning).

The specific controls to prevent LOWC are listed below (see Section 7.7.4), which support the assumptions of the SINTEF data (North Sea Standard).

Based on these assumptions the frequency of blowout is expected to be 2×10^{-4} for an oil well (using the statistics for workover wells, considered to be the most analogous to drilling activities given there are no statistics for drilling related blowouts). This indicates the likelihood of the activity resulting in a LOWC (and the subsequent impacts to receptors) using Esso's methodology is Category D (0.0001 to 0.001) (very unlikely).

7.7.2 Residual Risk Ranking

Table 7-39 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
II	D	3

7.7.3 Risk assessment

The information in Table 7-40 presents the risk assessment for a LOC of hydrocarbons on the receptors in the spill EMBA.

Table 7-40 Risks of surface, shoreline and in-water hydrocarbon exposure to receptors in the WCDS spill EMBA

Receptor	Impact of condensate exposure	Exposure risk assessment
Benthic habitats – Bare substrate, coral, seagrass, macroalgae, subtidal rocky reef	Bare substrate While this receptor represents the 'bare sand' areas offshore, it does provide habitat for benthic invertebrates (both infauna and macroinvertebrates). Unconsolidated mixed and particulate sediments are likely to be dominated by burrowing fauna (e.g. annelid worms, molluscs, echinoderms, crustaceans, cnidarians). Many of the organisms that live in these habitats are habitat modifiers (e.g. through burrows or shell production), stabilising and/or oxygenating the sediments around them, and providing additional ecological niches for colonisation by other fauna – increasing local biodiversity. Surveys undertaken after the Montara blowout found no obvious visual signs of major disturbance at Barracouta and Vulcan shoals (Heyward, Moore, Radford, & Colquhoun, 2010), which occur about 20-30m below the water line in otherwise deep waters (generally >150m water depth). Later sampling indicated the presence of low-level severely degraded oil at some shoals, though in the absence of pre-impact data, this could not be directly linked to the Montara spill. Levels of hydrocarbons in the sediments were, in any case, several orders of magnitude lower than levels at which biological effects become possible (Heyward, et al., 2012) (Gagnon & Rawson, 2011). Studies undertaken since the DWH incident have shown that fewer than 2% of the more than 8000 sediment samples collected exceeded the US Environmental Protection Agency sediment toxicity benchmark for aquatic life, and these were largely limited to the area close to the wellhead (BP, 2015). Acute or chronic exposure through contact and/or digestion can result in toxicological risks to invertebrates. However, the presence of an exoskeleton (e.g. crustaceans) reduces the impact of hydrocarbon	Exposure to in-water hydrocarbons is largely restricted to the surface 30m of the water column and therefore any potential impact to benthic habitats will only occur in shallow nearshore waters. The zone of moderate exposure to dissolved hydrocarbons is predicted to extend into nearshore Victorian waters between Paradise Beach to Mallacoota at the VIC/NSW border. The nearshore waters of NSW from the VIC/NSW border until Shell Harbour are also predicted to be exposed to the zone of moderate exposure to dissolved hydrocarbons see Figure 7-9. The predominant benthic habitat in the Gippsland Basin is bare substrate. However, known areas of seagrass which may be exposed include Lakes Entrance, Lake Tyers, Bemm River Estuary and Tamboon Inlet. There is the potential that exposure could result in sub-lethal impacts, more so than lethal impacts, possibly because much of seagrass biomass is underground in their rhizomes (Zieman, Macko, & Mills, 1984). Seagrass in this region isn't considered a significant food source for marine fauna. Low relief sandstone/limestone rocky reef habitats potentially supporting a diverse range of attached epifauna (such as sponges and ascidians) and associated algae and other fauna are present in the shallower nearshore waters parallel with the Gippsland coast. Suitable hard substrate for macroalgal beds including the threatened 'Giant Kelp' occur in areas such as around Gabo Island and within the Bemm River Estuary. As described opposite, intertidal species are more prone to direct exposure than subtidal beds, however sub-lethal toxicity effects from in-water (dissolved) hydrocarbons may be observed. Corals are not a common habitat type in the Gippsland Basin however solitary soft corals may occur where suitable hard substrate, such as rocky reef or man-made structures, is present. Sub-lethal toxicity effects

Receptor	Impact of condensate exposure	Exposure risk assessment
	absorption through the surface membrane. Invertebrates with no exoskeleton and larval forms may be more prone to impacts. Exposure can induce changes in burrowing depth into the substrate (which can lead to higher predation rates on some species) and can limit the growth, recruitment and reproductive capacity of some marine invertebrates (Fukuyama, Shigenaka, & VanBlaricom, 1988). Deep water benthic invertebrates are usually protected from oiling by the buoyant nature of hydrocarbons, although the depth of oil penetration is dependent on turbulence in the water column. Hydrocarbons can also reach the benthos through the settlement of oiled particles such as faeces, dead plankton or inorganic sand particles (Jewett, Dean, Smith, & Blanchard, 1999). Coral Corals are generally located in shallow and intertidal regions, where there is the potential for exposure to surface and in-water hydrocarbons. Experimental studies and field observations indicate all coral species are sensitive to the effects of oil, although there are considerable differences in the degree of tolerance between species. Differences in sensitivities may be due to the ease with which oil adheres to the coral structures, the degree of mucous production and self-cleaning, or simply different physiological tolerances. Direct contact of coral by hydrocarbons may impair respiration and also photosynthesis by symbiotic zooxanthellae (Van Dam, 2011). Coral gametes or larvae in the surface layer where they are exposed to the slick may also be fouled (Epstein, Bak, & Rinkevich, 2000). Physical oiling of coral tissue can cause a decline in metabolic rate and may cause varying degrees of tissue decomposition and death (Negri & Heyward, 2000). Oil may also cling to certain types of sediment causing oil to sink to the seafloor, covering corals in oiled sediment.	may result from direct contact with in-water hydrocarbons or indirectly through feeding on contaminated prey (plankton). Impact by direct contact of benthic species with hydrocarbon in the deeper areas of the release area is not expected given the surface nature of the spill and the water depths at the spill location. Benthic invertebrate species closer to shore may be affected. Filter-feeding benthic invertebrates such as sponges, bryozoans, abalone and hydroids may be exposed to sub-lethal impacts however population level impacts are considered unlikely. The consequence of a LOWC on benthic habitats is assessed as Consequence Level II.

Receptor	Impact of condensate exposure	Exposure risk assessment
	Where corals come into direct contact with surface exposures (i.e. intertidal/shallow areas), they are more susceptible due to physical presence, than toxicity associated with dissolved oil components within the water column which, in some cases, may be more toxic than the floating surface slicks (Volkman, Miller, Revill, & Connell, 1994). A range of impacts is reported to result from toxicity including partial mortality of colonies, reduced growth rates, bleaching and reduced photosynthesis. Laboratory and field studies have demonstrated that branching corals appear to have a higher susceptibility to hydrocarbon exposure than massive corals or corals with large polyps. Chronic effects of oil exposure have been consistently noted in corals and, ultimately, can kill the entire colony. Chronic impacts include histological, biochemical, behavioural, reproductive and developmental effects. Field studies of chronically polluted areas and manipulative studies in which corals are artificially exposed to oil show that some coral species tolerate oil better than other species (NOAA, Oil Spills in Coral Reefs: Planning & Response Considerations., 2010). Reproductive stages of corals have been found to be more sensitive to oil toxicity. Fertilisation of coral species has been observed to be completely blocked in staghorn coral (*Acropora tenuis*) at heavy fuel oil concentrations of 150ppb (Lane & Harrison, 2002), with significant reductions in fertilisation of sea ginger (*A.millepora*) and *A. valida* at concentrations between 580 and 5800ppb, in addition to developmental abnormalities and reduced survival of coral larvae at similar concentrations. Lower concentrations of less than 100ppb crude oil were observed to inhibit larval metamorphosis in *A. millepora* (Negri & Heyward, 2000). Studies undertaken after the Montara incident included diver surveys to assess the status of Ashmore, Cartier and Seringapatam coral reefs. These found that other than a region-wide coral bleaching event caused by thermal stress (i.e. caused by sea water exceeding 32°C), the condition of the reefs was consistent with previous surveys, suggesting that any effects	

Receptor	Impact of condensate exposure	Exposure risk assessment
	of hydrocarbons reaching these reefs was minor, transitory or sub-lethal and not detectable (Heyward, Moore, Radford, & Colquhoun, 2010). This is despite AMSA observations of surface slicks or sheen nears these shallow reefs during the spill (Heyward, Moore, Radford, & Colquhoun, 2010). Surveys in 2011 indicated that the corals exhibiting bleaching in 2010 had largely survived and recovered (Heyward, et al., 2012), indicating that potential exposure to hydrocarbons while in an already stressed state did not have any impact on the healthy recovery of the coral. In addition, surveys undertaken after the Montara blowout on the plateau areas of Barracouta and Vulcan shoals (Heyward, Moore, Radford, & Colquhoun, 2010), which occur about 20 - 30m below the water line in otherwise deep waters (generally >150m water depth), and contain algae, hard coral and seagrass, found no obvious visual signs of major disturbance. <u>Macroalgae</u> Macroalgae are generally limited to growing on intertidal and subtidal rocky substrata in shallow waters to 10m depth. As such, they may be exposed to subsurface and entrained and dissolved hydrocarbons, however, are susceptible to surface hydrocarbon exposure more so in intertidal habitats as opposed to subtidal habitats. Reported toxic responses to oils have included a variety of physiological changes to enzyme systems, photosynthesis, respiration, and nucleic acid synthesis (Lewis & Pryor, 2013). Despite the well-established pool of literature on macroalgae exposure to petroleum oils, very few investigations have reported effects on species that are common in Australian waters (Lewis & Pryor, 2013). Smothering, fouling and asphyxiation are some of the physical effects that have been documented from oil contamination in marine plants (Blumer, 1971) (Cintron, Lugo, Marinez, Cintron, & Encarnacion, 1981). In macroalgae, oil can act as a physical barrier for the diffusion of CO_2 across cell walls (O'Brien & Dixon, 1976). The effect of hydrocarbons however is largely dependent on the degree of direct exposure and how much of the	

Receptor	Impact of condensate exposure	Exposure risk assessment
	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 (Connell, Miller, & Farrington, 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 oiled kelp beds 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 D. , 2004). Intertidal macroalgal beds are more prone to oil spills than subtidal beds because although the mucous coating prevents oil adherence, oil that is trapped in the upper canopy can increase the persistence of the oil, which impacts upon site-attached species. Additionally, when oil sticks to dry fronds on the shore, they can become overweight and break as a result of wave action (IPIECA, 1995). The toxicity of hydrocarbons to macroalgae varies for the different macroalgal life stages, with water-soluble hydrocarbons more toxic to macroalgae (O'Brien & Dixon, 1976). Toxic effect concentrations for hydrocarbons and algae have varied greatly among species and studies, ranging 2 - 10,000,000ppb (Lewis & Pryor, 2013). The sensitivity of gametes, larva and zygote stages however have all proven more responsive to petroleum oil exposure than adult growth stages (Lewis & Pryor, 2013). Macrophytes, including macroalgae, require light to photosynthesise. So, in addition to the potential impacts from direct smothering or exposure to entrained and dissolved hydrocarbons, the presence of entrained	

Receptor	Impact of condensate exposure	Exposure risk assessment
	hydrocarbon within the water column can affect light qualities and the ability of macrophytes to photosynthesise. Exposure to in-water hydrocarbons poses the greatest threat to sensitive macroalgal assemblages, specifically the Giant Kelp Forests TEC, that grow on rocky reefs from the seafloor ≥8m below sea level. The largest extent of this TEC is in Tasmanian coastal waters. Substrate on which this TEC may occur is also found in Victoria along the west coast of Wilson's Promontory and from Sydenham Inlet to Gabo Island (DSEWPAC, 2012b). Seagrass Seagrasses generally grow in sediments in 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. As such, they may be exposed to both surface and sub-surface hydrocarbons. Submerged vegetation in nearshore areas can be exposed to oil by direct contact (i.e. smothering) and by uptake by rhizomes through contaminated sediments. Exposure also can take place via uptake of hydrocarbons through plant membranes. In addition, seeds may be affected by contact with oil contained within sediments (NRDA, 2012). When seagrass leaves are exposed to petroleum oil, sub-lethal quantities of the soluble fraction can be incorporated into the tissue, causing a reduction in tolerance to other stress factors (Zieman, Macko, & Mills, 1984). The toxic components of petroleum oils are thought to be the PAH, which are lipophilic and therefore able to pass through lipid membranes and tend to accumulate in the thylakoid membranes of chloroplasts (Ren, Huang, McConkey, Dixon, & Greenberg, 1994). As such, the susceptibility of seagrasses to hydrocarbon spills will depend largely on distribution. Deeper communities will be protected from oiling under all but the most extreme weather conditions. Shallow seagrasses are more likely to be affected by dispersed oil droplets or, in the case of emergent seagrasses, direct oiling. Theoretically, intertidal seagrass	

Receptor	Impact of condensate exposure	Exposure risk assessment
	communities would be the most susceptible because the leaves and rhizomes may both be affected. Subtidal rocky reefs Nearshore and offshore subtidal reef habitats are dominated by seaweeds, mobile invertebrates and fish. Potential impacts to sensitive receptors related to these reefs discussed in the appropriate sections. It was observed that the release of large quantities of fuel oil during the grounding of the Iron Baron did not substantially affect populations of subtidal reef associated organisms (Edgar & Barrett, 1995).	
Plankton	Plankton are found in nearshore and open waters beneath the surface in the water column. These organisms migrate vertically through the water column to feed in surface waters at night (NRDA, 2012). As they move close to the sea surface it is possible that they may be exposed to floating hydrocarbons, but plankton also has the potential to be directly affected by in-water hydrocarbons as a result of toxicity effects. Phytoplankton are typically not sensitive to the impacts of oil, though they do accumulate it rapidly (Hook, Batley, Holloway, Irving, & Ross, 2016) due to their small size and high surface area to volume ratio. Oil can affect the rate of photosynthesis and inhibit growth in phytoplankton, depending on the concentration range. For example, photosynthesis is stimulated by low concentrations of oil in the water column (10–30ppb) but becomes progressively inhibited above 50ppb. Conversely, photosynthesis can be stimulated below 100ppb for exposure to weathered oil (González, et al., 2009). In addition, the potential for effects to photosynthesis (i.e. temporary suppression of primary production) from shading caused by continuous surface slicks may have implications for consumers of phytoplankton (Hook, Batley, Holloway, Irving, & Ross, 2016), though a prolonged surface coverage over an extensive area would be required. During the DWH oil spill it was observed that plankton and other surface material were found to be sinking at rates of more than 10 times the normal level. It was hypothesised that the weathered spilled oil catalysed clumping of organic	Plankton are predicted to be exposed to in-water (dissolved) hydrocarbons above the moderate exposure threshold in a narrow zone (up to approximately 150km in width) extending parallel to the Gippsland and southern NSW coastline as well as Kent Group and Hogan Group Islands (Tas) see Figure 7-9. The impact to plankton is predicted to be Level III with potential effects on the food web recognised.

Receptor	Impact of condensate exposure	Exposure risk assessment
	particles (Schrope, 2013). It is currently unclear as to whether this effect was caused by the chemical characteristics of the weathered oil, or a bacterial effect. Zooplankton (microscopic animals such as rotifers, copepods and krill that feed on phytoplankton) are vulnerable to hydrocarbons (Hook, Batley, Holloway, Irving, & Ross, 2016). Water column organisms that come 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, Batley, Holloway, Irving, & Ross, 2016). Plankton are generally abundant in the upper layers of the water column and is the basis of the marine food web, so an oil spill in any one location is unlikely to have long-lasting impacts on plankton populations at a regional level. Reproduction by survivors or dispersion from unaffected areas (via sea surface currents) is likely to rapidly replenish losses (Abbriano, et al., 2011). Plankton have life cycles based on rapid reproduction with levels of high productivity. It is also in the nature of plankton to be dispersive. Oil spill field observations show minimal or transient effects on plankton (Abbriano, et al., 2011). Once background water quality is re-established, plankton takes weeks to months to recover (ITOPF, 2011). Plankton found in open waters of the exposure zone is expected to be widely represented within waters of the wider Bass Strait region and generally across all waters in the southeastern offshore region, which aids in the re-establishment of communities.	
Fish	Fish can be exposed to oil through a variety of pathways, including: direct dermal contact (e.g. swimming through oil); ingestion (e.g. directly or via oil-affected prey/foods); and inhalation (e.g. elevated dissolved contaminant concentrations in water passing over the gills). Fish are generally considered vulnerable to oil spills because they inhabit areas coincident with oil exploration and production and those areas that may be subsequently impacted by an oil spill; including coral reefs, seagrasses, nearshore areas,	The release location is located in open ocean waters and the zone of moderate surface oil are not predicted to extend into shallow nearshore waters. Although pelagic fish species may be exposed to moderate levels of dissolved oil their mobile, transitory characteristics reduce the risk of

Receptor	Impact of condensate exposure	Exposure risk assessment
	deep offshore areas, pelagic habitats and demersal habitats (Moore & Dwyer, 1974) (Gundlach & Hayes, 1978). Of the potential toxicants, monoaromatic and PAH are generally regarded as the most toxic to fish. <u>Surface oil</u> Since fish and sharks do not generally break the sea surface, the exposure 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., 2004). 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., 2004). Following the DWH incident, it was suggested that whale sharks may be vulnerable to oiling of gills if exposed to the oil. The tendency of whale sharks to feed close to surface waters will increase the likelihood of exposure to surface slicks and elevated hydrocarbon concentrations beneath slicks. <u>In-water oil</u> Exposure to hydrocarbons entrained or dissolved in the water column can be toxic to fishes. 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 metabolize toxic hydrocarbons, which reduces the risk of bioaccumulation (NRDA, 2012). Pelagic species are also generally highly mobile and as such are not likely to suffer extended exposure (e.g. >96 hours) at concentrations that would lead to chronic effects due to their patterns of movement. Demersal fish are not expected to be impacted given the presence of in-water hydrocarbons in surface layers only. Fish are most vulnerable to hydrocarbon discharges during their embryonic, larval and juvenile life stages. Oil exposure may result in decreased	prolonged exposure. Large-scale population level effects following a LOWC on fish species, abundances or assemblage composition would be unlikely due to the wide geographical distribution of many fish in Bass Strait and the potential for rapid re-colonisation. Deep water demersal fish are not expected to be impacted given the presence of in-water hydrocarbons in upper layers (0 – 30m) of the water column only. The zone of moderate exposure to dissolved hydrocarbons will contact the white shark foraging and reproduction BIAs and grey nurse shark foraging and migration BIAs. Pelagic species of shark are at greatest risk of being exposed to oil following a LOWC given their wide foraging areas and risks of consuming contaminated prey. White sharks are known to aggregate near Ninety Mile Beach and philopatric characteristics means they may return to the place of birth to breed even if habitats are contaminated. This species is widely distributed and thus unlikely to suffer ecologically important declines in abundance. The consequences to fish and sharks are assessed as Consequence Level II, taking into consideration the potential impacts to threatened species such as the great white shark and grey nurse shark.

Receptor	Impact of condensate exposure	Exposure risk assessment
	spawning success and abnormal larval development. 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 areal extent of the spill. As egg/larvae dispersal is widely distributed in the upper layers of the water column it is expected that current induced drift will rapidly replace any oil affected populations.	
Birds	Seabirds and shorebirds are sensitive to the impacts of oiling, with their vulnerability arising from the fact that they cross the air-water interface to feed, while their shoreline habitats may also be oiled (Hook, Batley, Holloway, Irving, & Ross, 2016). Species that raft together in large flocks on the sea surface are particularly at risk (ITOPF, 2011). <u>Sea surface oil</u> Birds foraging at sea have the potential to directly interact with oil on the sea surface some considerable distance from breeding sites in the course of normal foraging activities. Seabird species most at risk include those that readily rest on the sea surface (e.g. shearwaters) and surface plunging species (e.g. terns, boobies). As seabirds are a top order predator, any impact on other marine life (e.g. pelagic fish) may disrupt and limit food supply both for the maintenance of adults and the provisioning of young. For seabirds, direct contact with hydrocarbons can foul feathers, which may subsequently result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impair waterproofing. A bird suffering from cold, exhaustion and a loss of buoyancy may also dehydrate, drown or starve (CoA, 2022). 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, may lead to emaciation (CoA, 2022). The greatest vulnerability in this case occurs when birds are feeding or resting at the sea surface (Peakall, Wells, & Mackay, 1987). In a review of 45 actual marine spills, there was no	A number of threatened seabird and shorebird species may occur in the area exposed above moderate surface thresholds. There are foraging BIA's for several species of petrels, shearwater and albatross, however, there are no breeding BIAs within this exposed area. Seabirds rafting, resting, diving, or feeding at sea have the potential to come into contact with surface oil, ranging from moderate to high exposure. As such, acute or chronic toxicity impacts (death or long-term poor health) to seabirds are possible. Most species tend to forage on their own, though large feeding flocks will gather at rich or passing food sources. The Gippsland and southern NSW coastlines and neighbouring islands provide feeding and nesting habitats for many coastal and migratory bird species. Accumulation of oil at the moderate threshold may occur on the shoreline of Gabo Island where a little penguin colony and seabird rookery are located. Gabo Island is located within a little penguin foraging BIA. Shorebirds foraging in the intertidal zone, or roosting or nesting on beaches and dunes along the Gippsland and southern NSW coastlines may also be exposed to accumulated oil. Foraging BIAs for several species of shearwater, petrel and albatross overlap with shorelines where oil is predicted to accumulate at moderate thresholds. Because the zone of moderate in-water exposure extends into nearshore waters foraging shorebirds may be indirectly impacted by loss of invertebrate prey.

Receptor	Impact of condensate exposure	Exposure risk assessment
	correlation between the numbers of bird deaths and the volume of the spill (Burger, 1993). Penguins may be especially vulnerable to an oil spill because they do not fly and therefore spend a high proportion of their time in the water when away from resting and breeding locations and readily lose insulation and buoyancy if their feathers are oiled (Hook, Batley, Holloway, Irving, & Ross, 2016). This species also has strong attachment to its natal area (Colombelli-Négrel, 2016) and consequently, birds are likely to retain a strong attachment to a site even if the site and adjacent waters are severely contaminated by oil. The Iron Baron vessel spill (325MT of bunker fuel in Tasmania in 1995) is estimated to have resulted in the death of up to 20,000 penguins (Hook, Batley, Holloway, Irving, & Ross, 2016). Shoreline oil Shorebirds are likely to be exposed to oil when it directly impacts the intertidal zone and onshore due to their feeding habitats. Foraging shorebirds will be at potential risk of both direct impacts through contamination of individual birds (e.g. fouling of feathers) and indirect impacts (e.g. fouling and/or a reduction in prey items) (Clarke & Herrod, 2016). Birds that are coated in oil can also suffer from damage to external tissues, including skin and eyes, as well as internal tissue irritation in their lungs and stomachs. Breeding birds (both seabirds and shorebirds) may be exposed to oil via direct contact or the contamination of the breeding habitat (e.g. shores of islands) (Clarke & Herrod, 2016). Bird eggs may subsequently 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 21.3mg/egg. 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. Toxic effects on birds may result where oil is ingested as the bird attempts to preen its feathers, or via consumption of oil-affected prey. Whether this	The populations of seabird and shorebird species have a wide geographic range, meaning that impacts to individuals or a population at one location will not necessarily extend to populations at other un-impacted locations. Consequently, the potential consequence of risks to seabirds and shorebirds from a LOWC are considered to be Level I taking into consideration the particular vulnerability of the little penguin and shorebirds, such as the hooded plover, which nest along the beaches and dunes of the Gippsland coast.

Receptor	Impact of condensate exposure	Exposure risk assessment
	toxicity ultimately results in mortality will depend on the amount consumed and other factors relating to the health and sensitivity of the particular bird species. The threshold thickness of oil that could impart a lethal dose to an individual wildlife species is 10μm (approximately 10g/m^2) (Engelhardt, Petroleum effects on marine mammals, 1983) (Clark, 1984) (Geraci & St. Aubin, 1988) (Jenssen, 1994). A layer 25μm thick would be harmful for most birds that contact the slick (Scholten, et al., 1996).	
Marine reptiles – Turtles	Marine turtles are vulnerable to the effects of oil at all life stages; eggs, hatchlings, juveniles, and adults. Oil exposure affects different turtle life stages in different ways; and each turtle life stage frequents a habitat with varied potential to be impacted during an oil spill. Several aspects of turtle biology and behaviour place them at particular risk, including a lack of avoidance, indiscriminate feeding in convergence zones, and large pre-dive inhalations. Marine turtles can be exposed to oil externally (e.g. swimming through oil slicks) or internally (e.g. swallowing the oil, consuming oil affected prey, or inhaling of volatile oil related compounds). Surface oil 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. Oil can enter cavities such as the eyes, nostrils, or mouth; and oil covering their bodies may interfere with breathing because they inhale large volumes of air to dive. Experiments on physiological and clinical pathological effects of hydrocarbons on loggerhead turtles (approximately 15 – 18 months old) showed that the turtles' major physiological systems were adversely affected by both chronic and acute exposures (96 hour exposure to a 0.05cm layer of South Louisiana crude oil versus 0.5cm for 48 hours)	While marine turtles, including threatened species, are known to occur in the area potentially exposed to hydrocarbons above surface and in-water (dissolved) moderate exposure thresholds they are not noted to reside or aggregate in significant numbers, and there are no recognized BIAs in the region. There are no turtle nesting beaches along the Gippsland or southern New South Wales coastlines, so impacts to turtles from shoreline oiling will not occur. Although the effects of hydrocarbons on marine reptiles, specifically turtles can be severe, the low density of turtles expected in the region (due to lack of BIA or aggregations) suggests that a LOWC would affect individuals rather than population level. Consequently, the potential impacts to marine reptiles are considered to be Consequence Level II.

Receptor	Impact of condensate exposure	Exposure risk assessment
	(Lutcavage, Lutz, Bossart, & Hudson, 1995). Recovery from the sloughing skin and mucosa took up to 21 days, increasing the turtle's susceptibility to infection or other diseases, such as fibropapilloma (Lutcavage, Lutz, Bossart, & Hudson, 1995). 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 DWH incident in the GoM, 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% of the live turtles were later released, suggesting that oiling does not inevitably lead to mortality. <u>Shoreline oil</u> Turtles may experience oiling impacts on nesting beaches and eggs through chemical exposures resulting in decreased survival to hatching and developmental defects in hatchlings. Adult females crossing an oiled beach could cause external oiling of the skin and carapace; nothing that most oil is deposited at the high-tide line, and most turtles nest well above this level. Studies on freshwater snapping turtles showed uptake of PAH from contaminated nest sediments, but no impacts on hatching success or juvenile health following exposure of eggs to dispersed weathered light crude (Rowe, Mitchelmore, & Baker, 2009). However, other studies found evidence that exposure of freshwater turtle embryos to PAH results in deformities (Bell, Spotila, & Congdon, 2006) (Van Meter, Spotila, & Avery, 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 water (AMSA, 2015). Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects including impaired movement and bodily functions (Milton, Lutz, & Shigenaka, 2003). Hatchlings sticky with	

Receptor	Impact of condensate exposure	Exposure risk assessment
	oily residues may also have more difficulty crawling and swimming, rendering them more vulnerable to predation. It should be noted that the threat and relative impacts of an unplanned discharge on some marine reptile species are considered less damaging than other stressors. Report cards produced on protected marine reptiles in Australia generally ranked oil pollution as either 'not of concern' or 'of less concern' depending on the marine region (DSEWPAC, 2012b).	
Marine mammals-Pinnipeds	Pinnipeds are directly at risk from impacts associated with the exposure to surface, shoreline and in-water hydrocarbons. <u>Sea surface oil</u> Pinnipeds are vulnerable to sea surface exposures in particular given they spend much of their time on or near the surface of the water, as they need to surface every few minutes to breathe, and regularly haul out on to beaches. Pinnipeds are also sensitive as they will stay near established colonies and haul-out areas, meaning they are less likely to practise avoidance behaviours. Seals, sea lions and fur seals have been observed swimming in oil slicks during a number of documented spills (Geraci & St. Aubin, 1988). 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 membranes that surround the eyes and line the oral cavity, respiratory surfaces, and anal and urogenital orifices. Seals appear not to be very sensitive to contact with oil, but instead to the toxic impacts from the inhalation of volatile components (Hook, Batley, Holloway, Irving, & Ross, 2016). 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. It is suggested	Both the New Zealand fur seal (*Arctocephalus forsteri*) and the Australian fur seal are listed marine species with habitat and breeding sites known to occur in areas potentially exposed to surface, in-water above the moderate threshold. These areas are not identified as critical habitat and there are no identified BIAs for fur seals in the region. Both the Australian and New Zealand fur seals are at risk to surface oil while at sea as exposure to surface oil can result in skin and eye irritations and disruptions to thermal regulation, especially if foraging in areas with fresh oil. Fur seals are known to aggregate around offshore oil and gas facilities where, in the event of a release, exposure to fresh oil may occur. Although the characteristics of condensate reduce the risk of hyperthermia from oiling, other effects of surface and in-water hydrocarbons on pinnipeds can be severe. Though, there is no predicted shoreline impacts associated with the Marlin B LOWC, indirect effects of surface oil exposure could be negative behavioural changes associated with the smell of exposure or contamination of prey which could result in mortality of pups. Long term impacts at a population level are considered unlikely. The consequence of a LOWC on pinnipeds is assessed as Consequence Level II.

Receptor	Impact of condensate exposure	Exposure risk assessment
	(Kooyman, Gentry, & McAllister, 1976) that in fact, fouling of approximately one-third of the body surface resulted in 50% greater heat loss in fur seals immersed in water at various temperatures. Fur seals are particularly vulnerable due to the likelihood of oil adhering to fur. Heavy oil coating and tar deposits on fur seals may result in reduced swimming ability and lack of mobility out of the water. In-water oil Ingested hydrocarbons can irritate or destroy epithelial cells that line the stomach and intestine, thereby affecting motility, digestion and absorption. However, pinnipeds have been found to have the enzyme systems necessary to convert absorbed hydrocarbons into polar metabolites, which can be excreted in urine (Engelhardt, 1982) (Addison & Brodie, 1984) (Addison, Brodie, Edwards, & Sadler, 1986). Benzene and naphthalene ingested by seals is quickly absorbed into the blood through the gut, causing acute stress, with damage to the liver considered likely. If ingested in large volumes, hydrocarbons may not be completely metabolized, which may result in death (Volkman, Miller, Revill, & Connell, 1994). Shoreline oil Breeding colonies (used to birth and nurse until pups are weaned) are particularly sensitive to hydrocarbon spills (Higgins & Gass, 1993). Species that rely on fur to regulate their body temperature (such as fur seals) are the most vulnerable to oil as the animals may die from hypothermia or overheating, depending on the season, if the fur becomes matted with oil (ITOPF, 2011). 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. The Long-Term Environmental Impact and Recovery report for the Iron Barren oil spill concluded that "The number of pups born at Tenth Island in 1995 was reduced when compared to previous	

Receptor	Impact of condensate exposure	Exposure risk assessment
	years. There was a strong relationship between the productivity of the seal colonies and the proximity of the islands to the oil spill wherein the islands close to the spill showed reduced pup production and those islands more distant to the oil spill did not" (Tasmanian SMPC, 1999). Pinnipeds are further at risk because they appear to rely on scent to establish a mother-pup bond (Sandegren, 1970) (Fogden, 1971) and consequently oil-coated pups may not be recognizable to their mothers. This is only theorised, with studies and research indicating interaction between mothers and oiled pups were normal (Davis & Anderson, 1976) (Davies, 1949) (Shaughnessy & Chapman, Commensal Cape fur seals in Cape Town docks., 1984). Australian sea lions have naturally poor recovery abilities due to unusual reproductive biology and life history (DSEWPAC, 2013). Due to the extreme philopatry of females and limited dispersal of males between breeding colonies, the removal of only a few individuals annually may increase the likelihood of decline and potentially lead to the extinction of some of the smaller colonies. Note: Australian sea lions are endemic to Australia, found only in South Australia and Western Australia (DSEWPAC, 2013).	
Marine mammals - Cetaceans	Whales and dolphins can be exposed to the chemicals in oil through: • internal exposure by consuming oil or contaminated prey • inhaling volatile oil compounds when surfacing to breathe • external exposure, by swimming in oil and having oil directly on the skin and body • maternal transfer of contaminants to embryos (NRDA, 2012). <u>Surface oil</u> Unlike with pinnipeds oil would not be expected to adhere well to the surface of cetacean skin due to the lack of hairs and the frequent sloughing of skin cells (Engelhardt, 1983) (Helm, et al., 2015). In addition, oil should not readily penetrate cetacean skin due to tight intercellular bridges and thick epidermis (O'Hara & O'Shea, 2001). Nevertheless, cetaceans can be	Several threatened, migratory and/or listed cetacean species may traverse the condensate spill plume. Foraging BIAs for the PBW (see Australian Marine Spatial Information System) and the migration and reproduction BIA for the SRW may be exposed to surface and in-water concentrations above the moderate exposure threshold. It is plausible that individual whales could encounter surface oil above the moderate exposure threshold (or high exposure threshold in the immediate vicinity of the release location), but the release would need to coincide with pod migration or foraging for a greater number of individuals to be present in the plume.

Receptor	Impact of condensate exposure	Exposure risk assessment
	exposed to oil through direct contact with the eyes, mouth (ingestion), and airways (inhalation), potentially leading to inflammation and lung congestion (Geraci & St. Aubin, 1988). Inhalation of toxic compounds associated with fresh oil was of greater concern than absorption through the skin and ingestion (Helm, et al., 2015). The inhalation of oil droplets, vapours and fumes is a distinct possibility if whales or dolphins surface in slicks to breathe. Exposure to hydrocarbons in this way could damage mucous membranes, damage airways or even cause death. Cetaceans may incidentally draw seawater and floating oil, into their lungs by breathing in splashed droplets or liquid that has collected near the blowhole just prior to inhalation. Aspiration of liquid oil can cause physical injuries to the respiratory tract by irritating tissues/membranes and can also lead to absorption of toxicants into the blood, as in inhalation exposure (Takeshita R. , et al., 2017). Exposure to oil concentrations of 10g/m^2 could result in mortality to marine mammals (French-McCay D. , 2016). Evidence suggests that many cetacean species are unlikely to detect and avoid spilled oil (Matkin, Saulitis, Ellis, Olesiuk, & Rice, 2008). There are numerous examples where cetaceans have appeared to incidentally come into contact with oil and/or not demonstrated any obvious avoidance behaviour. Following the Exxon Valdez oil spill, (Matkin, Saulitis, Ellis, Olesiuk, & Rice, 2008) reported killer whales in slicks of oil as early as 24 hours after the spill and evidence (Aichinger Dias, et al., 2017) showed that following the DWH oil spill cetaceans in the GoM came into direct contact with both oil and sheen by swimming through them. Although in the GoM it was observed that cetaceans were able to detect the thick and dark-coloured patches of oil, detection of the lighter substances may have been more difficult. Photographs of dolphins with oil on their bodies showed that oil can adhere to and persist on cetacean skin, and contrary to suggestions from previous studies, direct contact with oil and resultant exposure to toxic compounds is of concern (Aichinger Dias, et al., 2017).	Sightings of blue whales in the Gippsland Basin are reasonably rare (Bannister, Kemper, & Warneke, 1996) and acoustic detecting indicates that the PBW are predominantly located to the east, west and south of the OA. It is difficult to predict with certainty if a spill would lead to levels of mortality or reproductive depression that would manifest in terms of a population-level response. The highly mobile and transitory nature of cetacean species in Bass Strait means that exposure to moderate to high levels of surface oil (in the vicinity of the release location) or moderate levels of in-water hydrocarbon is not anticipated to result in long term population viability effects. Nevertheless, taking into account that the populations of some whale species remain small relative to pre-whaling times and are thought to have a multi-decadal recovery time, mortality of even a small number of adults and or calves as result of oiling could inhibit or limit species recovery, the resultant impact is therefore assessed as Consequence Level II.

Receptor	Impact of condensate exposure	Exposure risk assessment
	In water (dissolved and entrained) oil The physical impacts from ingested hydrocarbon with subsequent lethal or sub-lethal impacts are applicable to both dissolved and entrained oil. However, the susceptibility of cetaceans varies with feeding habits. Baleen whales (such as blue, southern right and humpback) are not particularly susceptible to ingestion of oil in the water column as they feed by skimming the surface. Oil may stick to the baleen whale while they 'filter feed' near slicks. Toothed whales and dolphins may be susceptible to ingestion of dissolved and entrained oil as they gulp feed at depth. As highly mobile species, in general it is very unlikely that these animals will be constantly exposed to concentrations of hydrocarbons in the water column for continuous durations (e.g. >96 hours) that would lead to chronic effects. Note also, many marine mammals appear to have the necessary liver enzymes to metabolise hydrocarbons and excrete them as polar derivatives (Ball & Truskewycz, 2013). Ingestion of oil may however result in acute nausea and vomiting and aspiration of oily vomitus into the lungs. Research conducted in the GoM linked aspiration pneumonia, lung abscesses, and pulmonary infections in dolphins to exposure to DWH oil (Takeshita R. , et al., 2017). Some whales, particularly those with coastal migration and reproduction, display strong site fidelity to specific resting, breeding and feeding habitats, as well as to their migratory paths and this may override any tendency for cetaceans to avoid the presence of hydrocarbons. The SRW exhibits varying degrees of site fidelity, with the majority of females and calves returning to the same birthing location, while some also travel long distances between breeding grounds within a season (DCCEEW, National Recovery Plan of the Southern Right Whale (Eubalaena australis), 2024). If spilled oil reaches these biologically important habitats, the pollution may disrupt natural behaviours, displace animals, reduce foraging or reproductive success rates and increase mortality. It was concluded that the range of adverse health effects and increased mortality/reproductive failure observed in cetacean	

Receptor	Impact of condensate exposure	Exposure risk assessment
	populations throughout the GoM since the DWH oil spill are consistent with the range of exposure scenarios (Takeshita R. , et al., 2017). If sufficiently high numbers of animals are impacted, the greater population may experience reduced recovery and survival rates. The restitution time for cetaceans affected at a population level is assumed to be long term, i.e. 40 years, based on consensus on recovery times for marine mammals following the DWH incident (Bock, et al., 2018).	
Coastal habitats and communities – Sandy shoreline, rocky shoreline, mangroves and saltmarsh	Sandy beaches Sandy beaches provide potential foraging and breeding habitat for numerous bird, marine turtle and pinniped species. These activities primarily occur above the high tide line, with exception of haul outs. Note, most of the oil on a sandy shore will be concentrated at, and below, the high tide mark. Sandy beaches are also inhabited by a diverse assemblage (although not always abundant) of infauna (including nematodes, copepods and polychaetes); and macroinvertebrates (e.g. crustaceans). Given the sand retains oil, such animals may be killed if oil penetrates into the sediments. Long-term depletion of sediment fauna could have an adverse effect on birds or fish that use tidal flats as feeding grounds (IPIECA, 1999). Depth of penetration in sandy sediment is influenced by: • Particle size – Penetration is not generally as great on mud as on coarser sediments. • Oil viscosity – Viscous oils and mousse (water-in-oil emulsion) tend to penetrate less deeply than low-viscosity oils such as light crudes or diesel oil. • Drainage – If sediments are poorly drained (as is often the case with tidal flats remote from creeks or channels), the water content may prevent the oil from penetrating into the sediment. In contrast, oil may reach depths greater than one metre in coarse well-drained sediments.	The coastline that is potentially at risk of shoreline exposure is dominated by wide sandy beaches. With the shortest time to shoreline accumulation at the moderate threshold being approximately 5 days the condensate will have at least partially weathered. The shoreline loadings may result in acute toxicity, and mortality, of invertebrate communities, especially as unweathered condensate will easily penetrate into sandy sediments. However, tidal action is expected to lead to rapid weathering of any hydrocarbons in the intertidal area and the populations of these communities would be likely to rapidly recover. The impact of condensate accumulating on sandy beaches is considered to have a Consequence Level II.

Receptor	Impact of condensate exposure	Exposure risk assessment
	• Animal burrows and root pores – Penetration into fine sediments is increased if there are burrows of animals such as worms, or pores left where plant roots have decayed. A 100g/m^2 threshold (considered a 'stain' or 'film', and equivalent to 0.1mm thickness) is assumed as the lethal threshold for invertebrates on hard substrates and sediments (mud, silt, sand, gravel) in intertidal habitats. A threshold of 100g/m^2 oil thickness would be enough to coat an animal and likely impact its survival and reproductive capacity (French-McCay D. P., 2009). Based on this, areas of heavy oiling would likely result in acute toxicity, and death, of many invertebrate communities, especially where oil penetrates into sediments through animal burrows (IPIECA, 1999). However, these communities would be likely to rapidly recover (recruitment from unaffected individuals and recruitment from nearby areas) as oil is removed from the environment. Following the Sea Empress spill (in west Wales, 1996) many amphipods (sandhoppers), cockles and razor shells were killed. There were mass strandings on many beaches of both intertidal species (such as cockles) and shallow sub-tidal species. Similar mass strandings occurred after the Amoco *Cadiz* spill (in Brittany, France, 1978) (IPIECA, 1999). Following the *Sea Empress* spill, populations of mud snails recovered within a few months but some amphipod populations had not returned to normal after one year. Opportunists such as some species of worm may actually show a dramatic short-term increase following an oil spill (IPIECA, 1999). In March 2014, small volumes of crude oil from an unidentified source (confirmed to not be offshore oil and gas production facilities) washed up along a 7km section of sandy beach on the Victorian Gippsland coast as small (a few millimetres thick) granular balls (Gippsland Times, 2014). No impacts were observed over the course of two months following the incident. As a result of the DWH spill, oil washed up on sandy beaches of the Alabama coastline. The natural movement of sand and water through the beach system continually transformed and re-distributed oil within the beach system, and 18 months after the event, mobile remnant oil remained	

Receptor	Impact of condensate exposure	Exposure risk assessment
	in various states of weathering buried at different depths in the beaches (Hayworth, Clement, & Valentine, 2011). There is also evidence that submerged oil mats exist just offshore of the Alabama beaches (ranging in thickness from a few millimetres to several centimetres), which has resulted in the regular washing up of tar balls onto sandy beaches. These submerged oil mats may serve as long-term sources of remnant oil to the beach ecosystem (Hayworth, Clement, & Valentine, 2011). Long-term changes to the beach ecosystem as a result of stranded oil are unknown. Other results from beach sampling undertaken at Dauphin Island, Alabama, in May (pre-impact) and September 2011 (post-impact) found a large shift in the diversity and abundance of microbial species (e.g. nematodes, annelids, arthropods, polychaetes, protists, fungi, algae and bacteria). Post-spill, sampling indicated that species composition was almost exclusively dominated by a few species of fungi. DNA analyses revealed that the 'before' and 'after' communities at the same sites weren't closely related to each other (Bik, Halanych, Sharma, & Thomas, 2012). Similar studies found that oil deposited on the beaches caused a shift in the community structure toward a hydrocarbonoclastic consortium (petroleum hydrocarbon degrading microorganisms) (Lamendella, et al., 2014). <u>Rocky shorelines</u> Rocky shores encompass a wide variety of habitats. Exposure to the sun and wave energy are key factors in determining the types of plants and animals that inhabit the rocky shores. The persistence of oil is largely governed by the same forces (IOGP, 2016). Rock surfaces exposed to strong wave action are typically dominated by barnacles and limpets that are firmly attached and if oil strands on those surfaces it may result in mortality of the affected animals but is unlikely to persist. Sheltered rocky shores in estuaries or inlets are typically dominated by macroalgae (seaweed) with various invertebrates living on or under the algae. Oil deposited in these habitats may not be washed off so quickly and recovery from impacts may take longer.	

Receptor	Impact of condensate exposure	Exposure risk assessment
	Mangroves and salt marshes Mangroves grow in intertidal mud and sand, with specially adapted aerial roots (pneumatophores) that provide for gas exchange during low tide (DoEE, 2016). The effects of surface hydrocarbons on mangroves include damage by smothering of lenticels (mangrove breathing pores) on pneumatophores or aerial prop roots, or the lower trunk; or by the loss of leaves (defoliation) due to chemical burning. It is also known that mangroves take up hydrocarbons from contact with leaves, roots or sediments, and it is suspected that this uptake causes defoliation through leaf damage and tree death (Wardrop, Butler, & Johnson, 1987). In-water entrained and dissolved hydrocarbons may affect mangrove communities directly through root uptake of toxic contaminants or indirectly due to effects on benthic infauna leading to reduced rates of bioturbation and subsequent oxygen stress on the plants root systems. Observed thresholds for effects are likely to vary depending on the health of the system, the hydrocarbon spilled and the environmental conditions; however, observations (Lin & Mendelssohn, 1996) demonstrated that more than 1kg/m^2 of oil during the growing season would be required to affect salt marsh or mangrove plants significantly. Subtropical and temperate coastal salt marsh (otherwise referred to as coastal salt marsh) is listed as a TEC. This TEC is usually associated with sandy/muddy shores of estuaries and embayments along low wave energy coastlines. The physical environment for the TEC is coastal areas under regular or intermittent tidal influence, with salt marsh being the key vegetation type – that being salt-tolerant grasses, herbs, sedges, rushes and shrubs generally less than 50cm high (DSEWPAC, 2013). Salt marshes occur in sheltered conditions, commonly in the strandline zone, and the vegetation offers a large surface area for oil absorption and trapping. Additionally, many salt marsh grasses, which can be dominant over large areas, have corrugated leaf surfaces which increase their holding capacity.	

Receptor	Impact of condensate exposure	Exposure risk assessment
	Evidence from case histories and experiments shows that the damage resulting from oiling is very variable – as are recovery times. Lighter, more penetrating oils are more likely to cause acute toxic damage than heavy or weathered oils. 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 take place from the underground systems. Good recovery commonly occurs within one to two years. Where thick deposits of viscous oil or mousse accumulate on the marsh surface, vegetation is likely to be killed by smothering and recovery delayed because persistent deposits inhibit recolonization.	
Wetlands	Most wetlands of international importance i.e. Ramsar wetlands have minimal risk of receiving oil following a LOWC because they have no, or very narrow and/or seasonal, connections to the sea. If surface oil was to enter a Ramsar site, the level of effect would be dependent on the type of receptors exposed to oil and the proportion of the site exposed to oil as well as the nature of the oil (fresh versus weathered). Sensitive receptors found in Ramsar sites connected to the sea could include mangroves, salt marshes, fish, shorebirds and seabirds. The consequences of oil exposure to these specific receptors have been described individually in the sections above.	Floating surface oil and in-water (dissolved) hydrocarbons are not predicted to reach any Ramsar site. There is a 21% probability of contact of low in-water(entrained) exposure reaching the Gippsland RAMSAR site and a 45% probability of low in-water (entrained) exposure reaching the Elizabeth and Middleton Reefs Marine National Nature reserve. The consequence is assessed as Consequence Level III.
National parks and reserves	Potential impacts to sensitive receptors related to the shorelines of the terrestrial parks, such as coastal habitats and birds, and the waters of the marine parks, such as benthic habitats, fish, cetaceans and pinnipeds, are discussed in the appropriate sections above. Impacts on tourism and recreation from degraded aesthetic values and water quality or restricted access to the coast and recreational locales within the Parks due to clean up efforts are discussed below.	Modelling indicates that no moderate or high hydrocarbon surface exposure will extend into any State waters or contact any national parks. Low hydrocarbon surface exposure ($1 g/m^2$) is predicted to reach nearshore waters in central Gippsland from Lake Tyers Beach to the Vic/NSW border and along the Southern NSW coast until Bawley Point. Low hydrocarbon surface exposure is also anticipated to reach Cape Howe MNP, Point Hicks MNP, Batemans MP, Jervis Bay MP and Kent Group MP.

Receptor	Impact of condensate exposure	Exposure risk assessment
		Taking into consideration the potential impacts to the receptors within the terrestrial and marine parks and reserves the overall consequence is assessed as Level II.
AMPs	AMPs vary in their conservation objectives and specific values, but all are designed to conserve fauna, habitats and water quality over the long term. AMPs support populations of threatened seabird, marine mammal and fish species. A temporary deterioration of water quality could have negative effects on organisms, such as plankton, seabirds, marine mammals and fisheries resources which in turn affect the values of that park. These impacts are discussed individually within other Sections.	The zone of moderate exposure to in-water dissolved hydrocarbons overlaps the Beagle, Central eastern, East Gippsland, Flineders Freycinet, HunterJervis and Lord Howe AMP's. Taking into consideration the potential impacts to the receptors within the AMPs the overall consequence is assessed as Level III.
KEFs	KEFs are underwater features, and hence are not at direct risk from floating surface oil or shoreline accumulated oil. Deepwater geological features, such as the Big Horseshoe Canyon and canyons on the eastern continental slope will not be impacted directly by oil. However, biological values associated with KEFs such as the Upwelling East of Eden and shelf rocky reefs may be at risk from oil. Potential impacts to sensitive receptors related to the KEF Upwelling East of Eden such as plankton and cetaceans, or to the KEF shelf rocky reefs such as benthic communities and fish, are discussed in the appropriate sections above.	The zones of moderate sea surface and in-water (dissolved) exposure intersect the following KEFs: Upwelling East of Eden, The Big Horseshoe Canyon, Canyons on the eastern continental slope, Seamounts South and East of Tasmania, Shelf rocky reefs, Tasman Front and eddy field and Tasmania seamount chain. All of which are defined as KEFs for the diversity and abundance of benthic species and are located in deep waters at depths hundreds of metres below the surface plume of in-water (dissolved) hydrocarbons. While a spill would not affect the upwelling itself, if the spill occurs at the time of an upwelling event, it may result in krill being exposed to in-water phase hydrocarbons. PBWs feeding at this time may suffer from reduced availability of prey however these impacts are expected to be localised and temporary. The consequence is assessed as Consequence Level III.
Cultural – Indigenous and historic	Visible sheen or oil stranded on the shoreline has the potential to reduce the visual or cultural (including activities such as camping, rituals and ceremonies) amenity of cultural heritage sites such as historic (e.g. shipwreck) or IPAs.	The potential economic impacts to cultural – indigenous and historic locations - from LOWC are considered to result in minor adverse effects with the public impact consequence considered to be Consequence Level III (based on public impact consequence considerations (the scope of the disruption (personal, commerce, transportation or socio-

Receptor	Impact of condensate exposure	Exposure risk assessment
	Impacts from oil exposure are unlikely for submerged shipwrecks.	economic) and the size of the population affected) as per ExxonMobil Risk Matrix Application Guide, 2018). Importantly, there will be no stranded oil on the shorelines which will reduce the amenity of any cultural or indigenous areas.
Commercial fisheries	Commercial fishing has the potential to be impacted through exclusion zones associated with the spill, the spill response and subsequent reduction in fishing effort. Exclusion zones may impede access to commercial fishing areas, for a short period of time, and nets and lines may become oiled. The impacts to commercial fishing from a public perception perspective, however, may be more significant and longer term than the spill itself. Fishing areas may be closed for fishing for shorter or longer periods because of the risks of the catch being tainted by oil. Concentrations of petroleum contaminants in fish and crustacean and mollusc tissues could pose a significant potential for adverse human health effects, and until these products from nearshore fisheries have been cleared by the health authorities, they could be restricted for sale and human consumption. Indirectly, the fisheries sector will suffer losses if consumers are either stopped from using or unwilling to buy fish and shellfish from the region affected by the spill. Impacts to fish stocks have the potential for reduction in profits for commercial fisheries, and exclusion zones exclude fishing effort. Detectable tainting of fish flesh occurs after a 24-hour exposure at crude concentrations of 0.1ppm, marine fuel oil concentrations of 0.33ppm and diesel concentrations of 0.25ppm (Davis, Moffat, & Shepherd, 2002). The Montara spill (as the most recent [2009] example of a large hydrocarbon spill in Australian waters) occurred over an area fished by the Northern Demersal Scalefish Managed Fishery (with 11 licences held by 7 operators), with goldband snapper, red emperor, saddletail snapper and yellow spotted rockcod being the key species fished (PTTEP, 2013). As a precautionary measure, the Western Australia Department of Fisheries advised the commercial fishing fleet to avoid fishing in oil-affected waters.	Several commercial fisheries may operate within the area potentially exposed in the event of a LOWC and a temporary fisheries closure may be put in place. Oil may foul the hulls of fishing vessels and associated equipment, such as gill nets. There are currently no commercially viable scallop beds fished in the area potentially exposed to dissolved hydrocarbons (Patterson, et al., 2021) (Koopman, Knuckey, Harris, & Hudson, 2018). Limited data is publicly available on the location and extent of abalone fishing within Victorian waters however a number of licences are active, and it is known that harvesting occurs off Cape Conran and at Mallacoota (DEDJPR, 2015). Of the State and Commonwealth administered fisheries which overlap the EMBA (see Appendix A), the fisheries most active in the area potentially exposed to hydrocarbons, and therefore potentially most at risk of socioeconomic impact from reduced market confidence, are the SESSF (31 trawl vessels, 19 Danish-seine vessels and 21 scalefish hook vessels active in total) and the Wrasse Fishery (22 licences in total) (Patterson, et al., 2021) (Koopman, Knuckey, Harris, & Hudson, 2018). A temporary fisheries closure and the flow on losses from the lack of income derived from these fisheries based on reduced market confidence and the potential for extended media coverage (potentially greater than 3 months) has the possibility of exceeding medium community disruption (>100 – 1000 people) such as reduced employment (in fisheries service industries and the seafood supply chain). The flow on losses from the lack of income derived from these fisheries are likely to have short-term socio-economic consequences in local communities or the region, such as reduced employment (in

Receptor	Impact of condensate exposure	Exposure risk assessment
	Testing of fish caught in areas of visible oil slick (November 2009) found that there were no detectable petroleum hydrocarbons in fish muscle samples, suggesting fish were safe for human consumption. In the short-term, fish had metabolized petroleum hydrocarbons. Limited ill effects were detected in a small number of individual fish only (PTTEP, 2013). No consistent effects of exposure on fish health could be detected within two weeks following the end of the well release. Follow up sampling in areas affected by the spill during 2010 and 2011 (PTTEP, 2013) found negligible ongoing environmental impacts from the spill. Since testing began in the month after the DWH blowout in the GoM (2010), levels of oil contamination residue in seafood consistently tested 100 to 1,000 times lower than safety thresholds established by the USA FDA, and every sample tested was found to be far below the USA FDA's safety threshold for dispersant compounds (BP, 2015). The USA FDA testing of oysters found oil contamination residues to be 10 to 100 times below safety thresholds (BP, 2015). Sampling data shows that post-spill fish populations in the GoM since 2011 were generally consistent with pre-spill ranges and for many shellfish species, commercial landings in the GoM in 2011 were comparable to pre-spill levels. In 2012, shrimp (prawn) and blue crab landings were within 2.0% of 2007 - 2009 landings. Recreational fishing harvests in 2011, 2012 and 2013 exceeded landings from 2007 - 2009 (BP, 2015).	fisheries service industries, such as tackle and bait supplies, fuel, marine mechanical services, accommodation and so forth). The potential economic impacts to commercial fisheries from LOWC are considered to be Public Impact Consequence Level I based on public impact consequence considerations (media coverage, the scope of the disruption (personal, commerce, transportation or socioeconomic) and the size of the population affected) as per the *Risk Matrix Application Guide* (ExxonMobil, 2024). Refer to Figure 5-1.
Tourism and recreation	Refer also to sections on fish, cetaceans, benthic and coastal habitats and national parks and reserves above.	Tourism and recreation are also linked to the presence of marine fauna (e.g. whales), particular habitats and locations for swimming or recreational fishing. Short to medium-term impacts to nature-based tourism and other human uses of beaches (and nearshore waters) may occur as a result of temporary beach closures including wider impacts due to perceptions of a polluted environment that is not desirable to visit. With respect to human health, post-Macondo oil spill (April 2010) studies in December found of 17,000 water samples, none exceeded US

Receptor	Impact of condensate exposure	Exposure risk assessment
		Environmental Protection Agency benchmarks for protection of human health (OSAT, 2011) and a year later residual oil in nearshore and sandy shoreline areas was highly weathered and concentrations of constituents of concern were below levels of concern for human health (OSAT, 2011). Alaska's tourism economy took approximately two years to recover from the Exxon Valdez (BOEM, 2017). The Eastern Research Group (2014) reported that while the DWH spill had had a significant impact on several areas of tourism in the short term and had wide-ranging impacts across the GoM, the tourism economy has rebounded to pre-spill levels within four years. The extent of potential impacts to tourism and recreation depends on when the spill occurs, and size. Considering the range of activities and locations, and the modelled impacts of the spill, the potential for reduced amenity of areas used by coastal tourists and recreational visitors, temporary health implications and possible closures, the consequence is considered Consequence Level I, based on public impact consequence considerations (media coverage, the scope of the disruption (personal, commerce, transportation or socio-economic) and the size of the population affected) as per the *Risk Matrix Application Guide* (ExxonMobil, 2024). Refer to Figure 5-1.

The likelihood of LOWC has been developed based on SINTEF records (as presented in the IOGP Risk Assessment Data Directory for Blowout Frequencies 2019 (IOGP, 2019) which presents the recommended frequencies of blowouts and well release incident based on industry data. The likelihood for LOWC has been established based on the following assumptions:

- drilling and well operations are defined as being "of North Sea Standard" ("Operation performed with BOP installed including shear ram and two barrier principle followed") given the relevant safety case has been developed based on European standards and references various North Sea standards (e.g. NORSOK for barrier analysis, IOGP for relief well studies, Oil & Gas UK for relief well planning)
- the type of operation is 'Development Drilling, Deep, Normal Wells' given:
  - the drilling being completed is development drilling
  - the drilling is considered 'deep' as activities occurring will be in the reservoir phase of the well
  - the activity is considered 'normal drilling' given the reservoir has normal pore pressure, is not at high temperatures and has minimal H_2S present.

Based on these assumptions the frequency of blowout is expected to be 3.9 x 10^{-5}. This indicates the chances of the activity resulting in a LOWC (and the subsequent impacts to receptors) are <1 × 10^{-4} residual risk ranking.

Table 7-41 Residual risk ranking outcome

Consequence Level	Likelihood Category	Risk Category
II (environmental)/I (public impact)	D	3 (environmental)/2 (public impact)

7.7.4 Controls

- CMP1: Pre-activity site inspection
- CMP20: JUR move procedure
- CM18: Preventative Maintenance System
- CMP19: Pressure Control Equipment testing
- CM32: NOPSEMA Accepted Well Operations Management Plan
- CM34: NOPSEMA accepted Safety Case
- CMP16: Well drilling and completion design
- CMP17: Esso approved procedures
- CMP18: Evaluation of reservoir properties
- CM12: Oil Pollution Emergency Plan
- CM35: Operational and Scientific Monitoring Plan (OSMP)
- CMP22: Source Control Emergency Response Arrangements included in the Australia Wells Tier II/III Emergency Response Plan
- CMP23: Availability of suitable MODU to drill relief well
- CMP24: Availability of resources to meet relief well timeframe commitments
- CM51: Utilisation of idle fishing vessels
- CM52: Communication with fisheries
- CMP34: SIMOPS Procedure

Refer to Appendix H for corresponding descriptions of EPOs and EPSs, and measurement criteria.

A critical part of the response to a LOWC will be to secure a suitable rig capable of drilling a relief well. Depending on the type of MODU and location, the rig may be self-propelled or require tow to the relief well location (towed MODU averages 4kn). The selection of a suitable MODU and support vessels would focus on the units currently operating in Australia under an accepted Safety Case that are suitable to drill the relief well (considering water depth and other well specifications). If required, a vessel Safety Case would be prepared during the time it takes to mobilise the rig to the incident location (approximately 51 days). Table 7-42 lists the breakdown of time required to mobilise a MODU for the purposes of relief well drilling.

Table 7-42 Response time breakdown (wet tow scenario)

Operation	Duration (days)	Cumulative (days)
Notifications; Mobilise specialist personnel; Initiate Source Control Emergency Response Plan (SCERP); Source MODU; Contract; Source anchor handling tow and support	7	7
MODU suspend well, demobilise, transit to tow location	14	21
Tow to incident location (4kn)	30	51
Load materials	2	53
Moor and drill relief well	35	88
Weather allowance	5	93
Kill well	5	98

Table 7-43 outlines that a relief well is assumed to be the primary response option. The response time for the relief well is based upon a rig mobilsation from Singapore and 98 days was chosen as the basis for spill volume calculations assuming a MODU being towed to the LOWC location. This is a conservative estimate as during any initial response to a LOWC event, all possible options regarding reducing response times will be assessed, including potentially using HLVs to reduce transit times (subject to meeting all applicable Australian regulatory and biosecurity requirements).

7.7.5 Demonstration of As Low As Reasonably Practicable

Table 7-43 Decision Context and justification

Decision Context B
The drilling of offshore production wells is a well-established practice and the environmental and public impact risks (Risk Category 3 (medium) and Risk Category 2 (medium) respectively) associated with a LOWC are well understood and effectively managed by existing controls. The environmental and public consequences of a LOWC have been assessed as moderate – high, therefore ALARP Decision Context B has been applied. The utilisation of idle fishing vessels (where practicable and safe to do so) and ensuring ongoing communication with the fishing industry bodies will assist in mitigating socio-economic impacts to commercial fisheries and the seafood supply chain.

Table 7-44 Good practice controls

Good practice	Adopted	Control	Rationale
Well operations planning to prevent LOWC	Yes	**CM32:** NOPSEMA Accepted Well Operations Management Plan	Under Part 5 of the Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 (Cth), NOPSEMA is required to accept a WOMP to enable well activities to be undertaken. The key elements of the WOMP, which function to reduce the likelihood of LOWC include the drilling

Good practice	Adopted	Control	Rationale
			and completion plans design and barriers to be used to prevent a loss of well integrity. Esso's NOPSEMA-accepted WOMP will describe the minimum requirements for barriers during drilling operations.
Implementation of a safety management system that controls risks arising from major incidents and achieves safe operation of the facility	Yes	**CM34:** NOPSEMA accepted Safety Case	Under the Safety Regulations, NOPSEMA requires that the facility (i.e. the JUR) has an accepted Safety Case in place before commencing the activity. The *Valaris 107* has a Safety Case in place (Valaris, 2021). The key elements of the Safety Case that function to reduce the likelihood of LOWC include: • Training (of JUR team) - Section 2.2.4.4 and Attachment A, Section 2.8 • Qualifications (of JUR team) - Section 2.2.4 (competence) • Maintenance (of PCE and JUR equipment) - Section 2.3.19 (maintenance management) • Management of Change – Section 2.3.2 • Selection of Health Safety and Environment (HSE) Critical equipment/systems – Section 3.1.5 • BOP system – Section 3.3.3 • Well Testing – Section 3.8 • Power Generation and Distribution – Section 3.4.1 • Emergency Response – Part 5 • Performance Monitoring – Part 6.
Oil spill response planning	Yes	**CM12:** Oil Pollution Emergency Plan	Under the Environment Regulations, NOPSEMA requires that the petroleum activity has an accepted OPEP in place before commencing the activity. In the event of a LOWC, the OPEP will be implemented.
	Yes	**CMP22:** Source Control Emergency Response Arrangements included in the Australia Wells Tier II/III Emergency Response Plan	Source control tools available include: • subsea first response toolkit • drilling a relief well (if required). Relief well and dynamic kill analysis studies: • dynamic kill analysis to determine kill fluid density, kill flow rate and required volume. The WOMP shall summarise the relief well and dynamic kill analysis studies. Contracts with third-party provider for well construction material, as well as logistics contracts are in place for this campaign.

Good practice	Adopted	Control	Rationale
	Yes	**CMP23:** Availability of suitable MODU to drill relief well	The status and location of suitable rig to drill a relief well are identified 30 days prior Turrum Phase 3 production drilling activities commencing on and subsequently each month throughout Turrum Phase 3 campaign. The monitoring process used to identify availability of suitable rigs and support vessels is done through a system that allows Esso to determine how long the rigs are likely to be available for and therefore provides an advanced outlook of when availability might change. In the unlikely event that there is no suitable rig available to allow a relief well to be drilled in the committed 98-day timeframe, the well will be made safe, and any further activities will be suspended until such time as the activity can comply with this EP or a revised EP has been prepared, submitted and accepted.
Oil spill monitoring planning	Yes	**CM35:** Operational and Scientific Monitoring Plan (OSMP)	Esso's OSMP details the arrangements and capability in place for: • operational monitoring of a hydrocarbon spill to inform response activities • scientific monitoring of environmental impacts of the spill and response activities. Operational monitoring will allow adequate information to be provided to aid decision making to ensure response activities are timely, safe, and appropriate. Scientific monitoring will identify if potential longer-term remediation activities may be required.

Table 7-45 Engineering risk assessment

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Third level of well barriers	Increased level of protection from uncontrolled flow from a well beyond the 'two barriers' requirement.	The two-barrier philosophy is considered industry best practice, specifically designed to reduce the risk to ALARP.	Not adopted
Standby MODU available locally to reduce mobilisation time	Having a MODU on standby may allow the relief well to be drilled 34 days earlier than would otherwise be the case. There is an extremely low	Having a standby MODU would significantly increase the cost of the Turrum Phase 3 production drilling activities, thus potentially jeopardising its viability.	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
	probability of occurrence of a LOWC.	The mobilisation/demobilisation cost of a JUR to drill the relief well is estimated at AUD$22M. The standby costs for a MODU spread for the duration of the Turrum Phase 3 activity are estimated at AUD$2000M. Given the high potential costs to the program, implementing this control measure is considered disproportionate, given that the likelihood of a LOWC is extremely low.	
Relief well materials staged locally	Response time for relief well drilling is dependent on the availability of necessary well construction equipment (i.e. wellhead, casing). There is no meaningful reduction in time for relief well drilling as sufficient materials are available as spares or can be sourced within short timeframes.	Wellhead and casing requirements will be identified during the planning phase concurrently with MODU mobilisation. Any additional equipment would be mobilised from existing ExxonMobil's global inventory.	Not adopted
Prepare detailed relief well plan in advance of campaign	A preliminary plan forms part of the WOMP; further case-by-case details can be developed immediately after the event. Wild Well Control assessed the requirements and parameters for a relief well as a basis for the development of a relief well plan. Sufficient time would be available to prepare a detailed relief well plan when the specific blow-out parameters for a relief well can be determined, immediately following the incident, and while the relief rig is being mobilised.	Detailed relief well plan needs to be developed on a case-by-case basis. Detailed plan can be developed immediately after LOWC scenario is fully understood, and while relief well rig is being mobilised. The benefit from preparing a detailed relief well plan without knowing specifics of the LOWC is negligible.	Not adopted

Additional, alternative, improved controls	Benefit	Cost/feasibility	Adopted
Pre-drill relief well top hole to reduce the relief well drilling time	May reduce response time, possibly by up to approximately 20 days.	Based on the relief well design, the top-hole sections of the relief well would take approximately 20 days to drill. This would result in an additional cost to the well construction program. At a conservative MODU spread-rate of AUD$800K/day, this control measure could result in a cost of AUD$16M. The pre-drilling of a relief well top hole would result in further environmental impacts and risks. Given the high costs to the program, implementing this control measure is considered disproportionate to the level of environmental benefit gained, given that the likelihood of a LOWC is extremely low.	Not adopted
Capping stack system	Not possible as wells are being drilled off the Marlin B platform.	The wells are being drilled from the Marlin B platform with a JUR and the BOP is on the platform. The deployment of a capping stack at a well requires a water depth of greater than 75m. The Marlin B platform is in a water depth of 59m and so a capping stack is technically not feasible. A relief well would be required to kill the well so the primary response strategy will be a relief well.	Not adopted

7.7.6 Demonstration of acceptability

Table 7-46 Demonstration of acceptability test

Factor	Demonstration criteria	Criteria met	Rationale
Risk assessment process for unplanned events	The risk ranking is lower than Risk Category 1.	Yes	The risk ranking is Risk Category 3 (the lowest category) and therefore considered acceptable.
Principles of ESD	No potential to affect biological diversity and ecological integrity.	Yes	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity.
	Activity does not have the potential to result	Yes	The activities were evaluated as having the potential to result in a Consequence Level IV thus are not

Factor	Demonstration criteria	Criteria met	Rationale
	in serious or irreversible environmental damage.		considered as having the potential to result in serious or irreversible environmental damage.
Legislative and other requirements	Legislative and other requirements have been identified and met.	Yes	The proposed activities align with the requirements of the OPGGS Act: • Schedule 3 (occupational health and safety) of the OPGGS Act and Safety Regulations require the operator of each offshore facility to prepare a Safety Case for submission to NOPSEMA. Activities at a facility must be conducted in accordance with a Safety Case that has been accepted by NOPSEMA • Part 5, Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 (Cth) which require NOPSEMA to accept a WOMP to enable well activities to be undertaken.
Internal context	Consistent with Esso's Environment Policy.	Yes	Proposed activities are consistent with Esso's Environment Policy, in particular, to "comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist".
	Meets ExxonMobil Environmental Standards.	Yes	There is no specific Environmental Standard that addresses LOWC but the controls proposed meet the strategic objectives of the Upstream Environmental Standards.
	Meets ExxonMobil OIMS Objectives.	Yes	Proposed activities meet: • OIMS System 6-5 objective to identify and assess environmental aspects; significant aspects are addressed and controlled consistent with policy and regulatory requirements • OIMS System 8-1 objective to clearly define and communicate OI requirements to contractors • OIMS System 10-1 objective to anticipate community concerns and develop response plans, as appropriate • OIMS System 10-2 objectives to document, resource and communicate emergency response plans, and conduct training, exercises and/or drills to determine the adequacy of the plans.
External context	Concerns of relevant persons have been	Yes	No relevant person concerns have been raised concerning the risk of LOC resulting from a LOWC.

Factor	Demonstration criteria	Criteria met	Rationale
	considered/addressed through the consultation process.		

8 Implementation strategy

Regulation 22(1) of the Environment Regulations requires that an implementation strategy must be included in an EP. The implementation strategy must contain a description of the Environmental Management System for the activity (per Regulation 22(2)), including specific measures to be used to ensure that, for the duration of this EP, and until such time as the relevant petroleum titles are surrendered:

- the environmental impacts and risks of the activity continue to be identified and reduced to a level that is ALARP
- control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level
- EPOs and EPSs set out in the EP are being met.

The Environmental Management System for this EP is ExxonMobil's OIMS. Lloyd's Register Quality Assurance Inc. has assessed OIMS and concluded that it is consistent with the intent and meets the requirements of *ISO 14001 Environmental Management Systems*.

8.1 ExxonMobil's framework

As a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, Esso complies with the Exxon Mobil Corporation Standards of Business Conduct, which require the Company to conduct business in a manner that is compatible with the environmental, social and economic needs of the communities in which it operates. These Standards also aim to protect the safety and health of employees, those involved in operations, and members of the public.

In addition to the Standards, Esso manages its operations in accordance with a structured and disciplined risk management framework known as OIMS. This System identifies, evaluates and manages risks across all ExxonMobil exploration, construction and production activities.

8.1.1 Standards of Business Conduct

The Standards of Business Conduct form the framework by which ExxonMobil and its subsidiaries operate around the globe and provide employees with the principles and an understanding of ExxonMobil standards.

The Standards of Business Conduct include the following foundation policies:

- Ethics Policy
- Conflicts of Interest Policy
- Corporate Assets Policy
- Directorships Policy
- Gifts and Entertainment Policy
- Anti-Corruption Policy
- Political Activities Policy
- International Operations Policy
- Antitrust Policy
- Health Policy
- Environment Policy
- Safety Policy
- Product Safety Policy
- Customer Relations and Product Quality Policy
- Alcohol and Drug Use Policy
- Equal Employment Opportunity Policy
- Equal Employment Opportunity Policy (modified for application in the United States)
- Harassment in the Workplace Policy
- Harassment in the Workplace Policy (modified for application in the United States).

The Standards of Business Conduct can be accessed via the following link: https://corporate.exxonmobil.com/-/media/Global/Files/who-we-are/Standards-of-Business-Conduct_apr.pdf

This EP complies with the applicable Standards of Business Conduct, in particular, the Environment Policy which states:

Environment Policy

It is Exxon Mobil Corporation's policy to conduct its business in a manner that is compatible with the balanced environmental and economic needs of the communities in which it operates. The Corporation is committed to continuous efforts to improve environmental performance throughout its operations.

Accordingly, the Corporation's policy is to:

- Comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist
- Encourage concern and respect for the environment, emphasise every employee's responsibility in environmental performance, and foster appropriate operating practices and training
- Work with government and industry groups to foster timely development of effective environmental laws and regulations based on sound science and considering risks, costs, and benefits, including effects on energy and product supply
- Manage its business with the goal of preventing incidents and of controlling emissions and wastes to below harmful levels; design, operate, and maintain facilities to this end
- Respond quickly and effectively to incidents resulting from its operations, in cooperation with industry organisations and authorised government agencies
- Conduct and support research to improve understanding of the impact of its business on the environment, to improve methods of environmental protection, and to enhance its capability to make operations and products compatible with the environment
- Communicate with the public on environmental matters, and share its experience with others to facilitate improvements in industry performance
- Undertake appropriate reviews and evaluations of its operations to measure progress and to foster compliance with this policy.

8.1.2 Operations Integrity Management System

ExxonMobil's OIMS Framework establishes common worldwide expectations to address the risks inherent to the business. ExxonMobil uses OIMS to address all aspects of its business impacting personnel and process safety, security, health and environmental (SSHE) performance. The OIMS Framework includes 11 Elements, as shown in Figure 8-1. Each Element contains overarching Objectives, and a set of Expectations. The Corporate OIMS Framework can be found at: https://corporate.exxonmobil.com/-/media/global/files/risk-management-and-safety/oims-framework-brochure.pdf

The OIMS Framework also includes the characteristics of and processes for implementing OI Management Systems. Application of the OIMS Framework is required across the entire ExxonMobil enterprise, with a specific emphasis on design, construction and operations.

The Upstream has defined 22 Upstream OIMS, as described in Table 8-1. System 1-1 is the driver to ensure effectiveness of all 22 Systems. Each Upstream System includes a description of the System objectives (including associated Corporate OIMS Expectations, where applicable) and scope, with listed processes, procedures, and verification mechanisms that meet those objectives.

The OIMS Management Committee has overall accountability for the implementation, execution, and continuous improvement of OIMS within Esso.

Key responsibilities of the OIMS Management Committee include:

- demonstrate commitment to OIMS through active and visible participation in OIMS implementation, execution and improvement
- ensure that Annual System Reviews are conducted
- review key OI performance indicators that show the status and effectiveness of OIMS implementation and execution

- periodically review OI incidents for learning and continuous improvements to OIMS.

Figure 8-1 OIMS Framework

Table 8-1 Description of Upstream OIMS

Corporate OIMS Element	Upstream OIMS		
	Number	**Title**	**Linked Corporate OIMS Expectations**
1 Leading, Managing and Driving Performance	1-1	Leading, Managing and Driving Performance	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11
	1-2	Partner Management	1.12
2 Identifying, Assessing, Mitigating and Accepting Risk	2-1	Risk Assessment and Management	2.1, 2.2, .2.3, 3.2, 4.2, 6.6
3 Designing, Constructing and Preparing for Start Up	3-1	Project Execution Management	3.1, 3.6
	3-2	Managing Design Practices, Standards, and Deviations	3.3, 3.4, 3.7
	3-3	Quality Assurance	3.5
4 Providing Information Needed for Construction,	4-1	Information Management	4.1

Corporate OIMS Element	Upstream OIMS		
	Number	Title	Linked Corporate OIMS Expectations
Operation and Maintenance			
5 Selecting, Training, Engaging and Enabling People	5-1	Selecting, Training, Engaging and Enabling People	5.1, 5.2, 5.3
	5-2	Occupational Health Management	4.3, 4.4, 4.5*
	5-3	Security Management	*
	5-4	Personnel Safety Management	5.6
6 Operating and Maintaining Assets	6-1	Operating and Maintenance Procedures	5.5. 6.1
	6-2	Facility Integrity Management	6.4, 6.5
	6-3	Well Management	*
	6-4	Work Management	6.2, 6.3
	6-5	Environmental and Regulatory Management	6.7, 4.5
7 Managing Changes	7-1	Managing Changes	7.1
8 Selecting and Engaging with Third-Party Providers	8-1	Selecting and Engaging with Third-Party Providers	8.1, 8.2, 8.3
9 Learning from Operating Experience and Incidents	9-1	Learning from Operating Experience and Incidents	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7
10 Preparing for Emergencies and Managing Potential Risk to the Community	10-1	Community Risk Management	10.2
	10-2	Preparing for Emergencies	10.1
11 Assessing and Driving Effectiveness	11-1	Assessing and Driving Effectiveness	11.1, 11.2

* Upstream OIMS supports multiple Corporate OIMS Expectations.

Esso has determined the following Upstream OIMS Systems are required for the implementation of this EP:

- **OIMS System 1-1:** Management Leadership, Commitment and Accountability
- **OIMS System 2-1:** Risk Assessment and Management
- **OIMS System 4-1:** Information Management
- **OIMS System 4-2:** Compliance with Laws, Regulations and Permits
- **OIMS System 5-1:** Personnel Selection, Training and Competency Verification
- **OIMS System 5-2:** Personnel Training

- **OIMS System 6-2:** Facility Integrity Management
- **OIMS System 6-3:** Well Management
- **OIMS System 6-4:** Work Management
- **OIMS System 6-5:** Environmental Management
- **OIMS System 7-1:** Management of Change
- **OIMS System 8-1:** Third-Party Services
- **OIMS System 9-1:** Incident Management
- **OIMS System 10-1:** Community Awareness and Public Affairs
- **OIMS System 10-2:** Emergency Preparedness and Response

How each of these OIMS Systems are implemented to meet the requirements of this EP is described in the following sections.

8.2 OIMS System 1-1: Management Leadership, Commitment and Accountability

In accordance with OIMS System 1-1, Esso has defined the roles and responsibilities relevant to this EP.

8.2.1 Roles and responsibilities

As required by Environment Regulation 22(3), this Section sets out the roles and responsibilities of personnel in relation to the implementation, management and review of this EP.

An indicative organisational chart is provided in Figure 8-2, while Table 8-2 describes the responsibilities of key personnel involved in the activity.

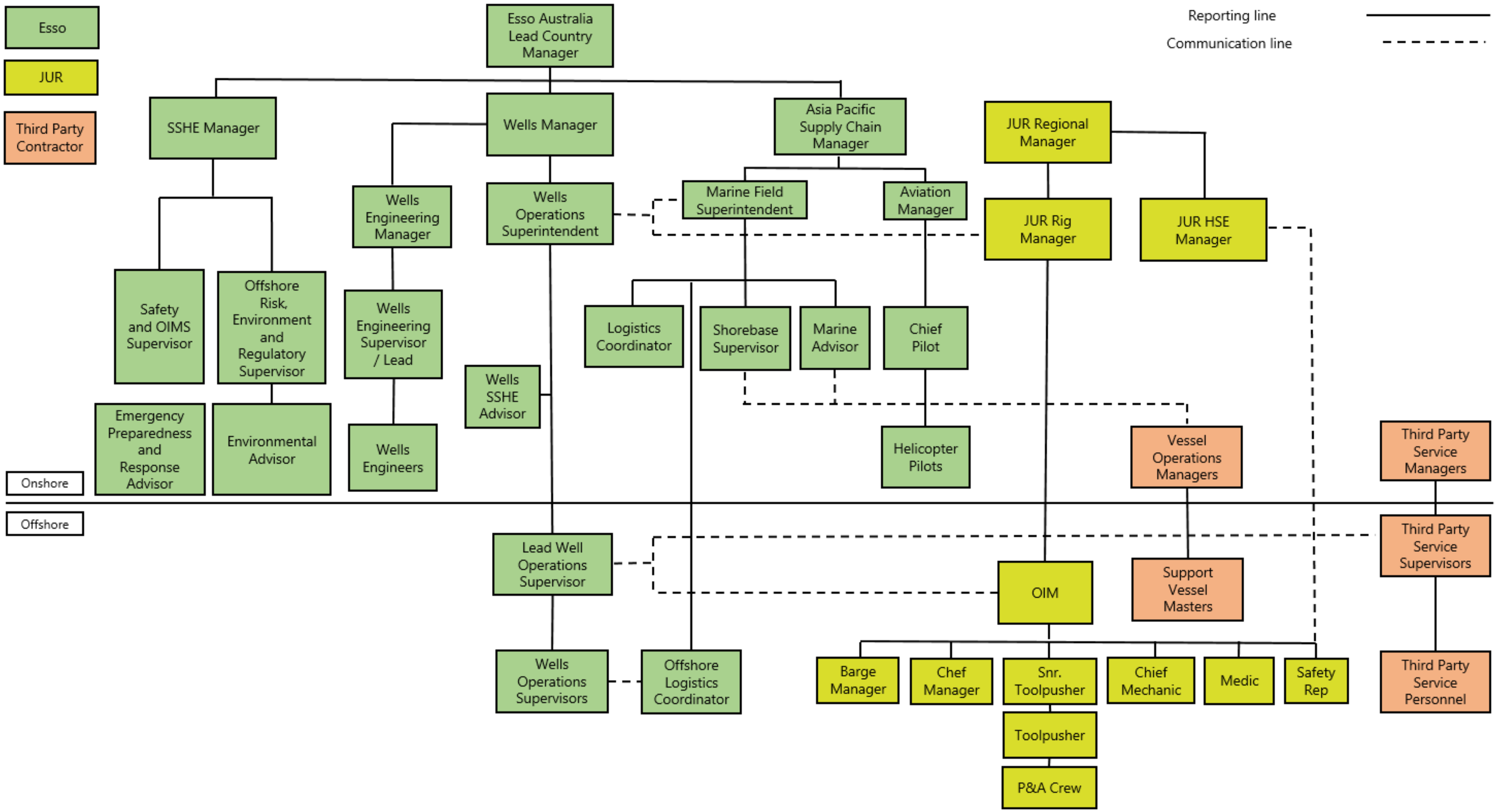

Figure 8-2 Activity-specific organisation chart for this EP

Table 8-2 Activity-specific key roles and responsibilities for this EP

Role	Responsibilities
Wells Operations Superintendent (Esso)	• Reviews and endorses well programs (including level of supervision), as appropriate, in accordance with the established approval authority • Oversees day-to-day operations to ensure compliance with relevant environmental legislative requirements, commitments, conditions and procedures as provided in this EP • Primary contact with JUR management and third-party contract personnel to assure performance is in accordance with contracts. Ensures campaign-related induction is delivered • Ensures procedures are in place and used effectively for the safe and efficient work management during wells operations • Ensures prompt follow-up action is initiated and completed after inspections/audits, incidents, and emergency drills • Member of the Esso Incident Management Team (IMT).
Wells Engineering Manager (Esso)	• Ensures an effective organisational structure is in place, with defined roles and responsibilities to ensure implementation of OIMS for wells operations • Ensures that arrangements are in place to respond to a well control incident • Ensures the engineering team is adequately staffed and receives necessary globval support • Oversees well integrity strategy, technology application, and regulatory document submissions.
Wells Operations Supervisor (Esso)	• Execution of well activities in line with approved procedures in a safe, efficient, reliable, and environmentally sound manner • Monitors wells activities to ensure that the relevant environmental legislative requirements, commitments, conditions and procedures as detailed in this EP are being followed • Maintains clear communication between Esso and JUR personnel • Ensures environmental inspections and/or audits are conducted • Ensures follow up actions identified during environmental inspections/audits, incidents and emergency drills are implemented • Notifies Esso Wells Operations Superintendent of any incidents • Prepares daily operations reports • Ensures only approved chemicals are utilised during well activities. • Maintains records of all operational discharges • Reports to regulatory authorities as appropriate, including the reporting of environmental incidents • Reports reportable incidents to NOPSEMA within 2 hours • Reports recordable incidents to Environmental Advisor (Esso) for monthly reporting to NOPSEMA. Provide input for annual and/or end of activity environmental performance reporting.
Offshore Risk, Environment and Regulatory Supervisor (Esso)	• Ensures all regulatory reporting requirements are met and reports to regulatory authorities as appropriate, including the reporting of environmental incidents • Coordinates EP compliance audits • Maintains communication with government agencies

Role	Responsibilities
Environmental Advisor (Esso)	• Undertakes duties as delegated by Offshore Risk, Environment and Regulatory Supervisor • Interfaces between Esso Wells SSHE Advisor and Rig Safety Advisor • Prepares environmental/regulatory content for inductions and ensures personnel receive the induction and that attendance records are maintained • Completes/coordinates EP compliance audits, as delegated by Offshore Risk, Environment and Regulatory Supervisor • Undertakes incident investigations • Completes monthly incident reporting to NOPSEMA • Completes annual and/or end of activity environmental performance reporting (if delegated by Esso Wells Operations Supervisor).
Helicopter Pilots (Esso)	• Implements cetacean interaction management actions consistent with Part 8 Division 8.1 of the EPBC Regulations.
JUR Rig Manager	• Onshore focal point for well operations. Formal single point-of-contact with Esso and responsible for liaison and contractual compliance • Manages activities associated with the operation of the MODU • Monitors safety performance and maintains adherance to regulations and company / industry standards. • Coordinates and directly supports the OIM during emergencies. • Review and approval of JUR Safety Case Revisions and related safety and well control interface documentation • Management of JUR related change approval. Reviews and approves procurement of equipment brought on board JUR.
JUR Offshore Installation Manager	• Oversees all work activities and work programs ensuring work is undertaken in accordance with procedures, work instructions and in compliance with all legislative requirements and EP commitments • Ensures all offshore personnel understand their obligations with respect to the management of environmental risk • Ensures the MODU training matrix is fully implemented • Ensures rig-entry HSE inductions are conducted • Ensures waste disposal complies with MARPOL requirements • Monitors closeout of non-conformances, corrective actions and audit recommendations • Reports all incidents, near misses and dangerous occurrences to the Wells Operations Supervisor in accordance with the incident reporting system • Manages and coordinates offshore emergency response activities.
Support Vessel Masters (Vessel Contractors)	• Ensures compliance with all applicable navigational safety standards and regulations • Ensures fauna watch • Conducts emergency drills • Supervises vessel crew to ensure they are fit for duty and undertaking work only within their area of qualification and training • Monitors, reports and takes appropriate action to remedy any vessel or equipment defects that may impact on safety and environmental performance of the vesse • Maintains logs of emissions and discharges in accordance with requirements.

Role	Responsibilities
	• Ensures that all crew are appropriately qualified, trained and equipped for their roles on the vessel • Ensures the vessel activities are compliant with requirements of this EP • Reports all incidents and near-misses to the Marine Field Superintendent, Marine Advisor and BBMT Marine Supervisor, recording the details and taking initial actions to render the situation safe. Notification also provided to the JUR Offshore Installation Manager and Wells Operations Supervisor in the event the incident or near-miss occurs inside or near the PSZ.

8.3 OIMS System 2-1: Risk Assessment and Management

Implementation of OIMS System 2-1 is achieved in relation to this EP, through the risk assessment process outlined in Section 5.

8.4 OIMS System 4-1: Information Management

In accordance with OIMS System 4-1, Esso implements processes for the identification of integrity critical documents and drawings, as well as making provisions for these to be accessible, accurate and appropriately safeguarded.

In the context of this System integrity critical information is the general term used to refer to both integrity critical documentation and pertinent records.

Processes are also established to ensure records pertinent to this EP are defined and appropriately maintained.

8.5 OIMS System 4-2: Compliance with Laws, Regulations and Permits

OIMS System 4-2 is used to implement several mechanisms to identify new or amended requirements that may have an impact on this EP, including:

- engagement with government agencies and review of government publications of laws and regulations
- participation in government-sanctioned working committees
- active participation in industry organisations or cooperatives (e.g. AEP)
- active participation in local or international trade organisations
- subscriptions to specialist consultants, commercial publications and government provided subscriptions (e.g. SAI Global, Environment Essentials, COMLAW).

If new, amended or existing requirements are identified, an assessment is undertaken as to their applicability and possible impact on Esso operations and the environment. Environmentally relevant changes could include:

- changes to existing legislation or introduction of new legislation
- changes to the existing environment including (but not limited to) fisheries, tourism and other commercial and recreational uses, and any changes to protective matter requirements
- changes to the requirements of an existing external approval (e.g. changes to conditions of environmental licences)
- new information or changes in information from research, stakeholders, legal and other requirements, and any other sources used to inform the EP
- changes or updates identified from incident investigations, emergency response activities or emergency response exercises.

Changes to legislation are screened by the Environmental Advisor before being forwarded to an appropriate subject matter contact for their determination on applicability. A tracking list of emerging/amending regulations and associated current review status is maintained by Esso.

Relevant changes to protected matter are assessed on a periodic basis by the Environmental Advisor, and incorporated into risk assessments, control measures, EPOs and EPSs and implementation strategy in the EP where required.

Changes identified by the Environmental Advisor are reviewed and assessed in accordance with the process outlined in OIMS System 7-1.

8.6 OIMS System 5-1: Personnel Selection, Training and Competency Verification

In accordance with OIMS System 5-1, Esso has processes in place for the selection of competent personnel and to ensure they are trained in the knowledge and skills necessary to meet the requirements of their specific positions and roles. This aligns with the Environment Regulation 22(4) requirement that the implementation strategy details measures for ensuring that employee and contractors working on, or in connection with, the activity are aware of their responsibilities in relation to the EP, including during emergencies or potential emergencies, and have the appropriate competencies and training.

8.6.1 Personnel selection

8.6.1.1 Esso personnel

Personnel are selected such that they have experience, knowledge, and training necessary to meet the requirements of the specific positions. Selection and placement decisions are made based on individual qualifications, on-the-job experience, specific job requirements, prior work performance, and career development considerations.

The Wells Leadership Team is responsible for selection and placement of personnel into Key Positions.

The placement of personnel is subject to verification of completion of any needed training and/or experience, and demonstration of the required competencies for the performance of the job. The extent of initial, ongoing and refresher training provided is based on established requirements for OI-related training and an individual's competency and/or experience gaps. These training requirements are documented in a training plan. The requirements may be met through training and/or developmental activities (i.e. training assignments).

Learning management systems are used for competency tracking, e-learning, training, scheduling and tracking of re-qualification requirements. Training progress is reviewed periodically by an individual's Supervisor. Any new training requirements are completed per the training plan.

In addition to the process of assuring that a person is competent in the knowledge and skills necessary to perform in a position, an assessment of the individual's performance and behaviours in that position is conducted annually. The performance assessment process includes OI aspects and behaviours such as compliance with OIMS Systems and associated procedures.

8.6.1.1 Contractor and Third party service personnel training and competency

The processes for contractor training and competency are evaluated as part of the contractor selection and management process see section 8.13.1.

8.7 OIMS System 5-2: Personnel Training

In accordance with OIMS System 5-2, Esso has developed training programs, specific to this EP, that are implemented for Esso personnel, contractors and thir parties.

8.7.1 Environmental induction

All personnel, contractor and third parties involved in activities related to this EP undergo environmental awareness training prior to the activities commencing as part of their induction. The environmental awareness component of the induction includes:

- environmental regulatory requirements

- description of the environmental sensitivities and conservation values of the OA and EMBA
- roles and environmental responsibilities of key positions as defined in this EP
- overview of cetacean interaction management actions consistent with Part 8 Division 8.1 of the EPBC Regulations
- overview of waste management requirements
- chemical discharge assessment and approval process requirements
- overview of housekeeping and spill prevention
- procedures for reporting reportable and recordable environmental incidents
- overview of emergency response and spill management procedures.

The Esso Wells Operations Superintendent and Esso Environmental Advisor are responsible for ensuring personnel receive this induction prior to the commencement of activities. All induction attendees will sign an attendance sheet to confirm their participation in, and understanding of, the induction which will be retained by the Esso Environmental Advisor.

JUR and support vessel personnel receive Esso environmental familiarisation. The familiarisation material includes specific EP requirements and definition of an environmental incident.

Drilling specific training and competencies for Esso personnel, contractors and third parties is outlined in the Turrum WOMP.

8.7.2 Oil spill response

In accordance with Environment Regulation 22(14), this implementation strategy describes the processes by which Esso ensures personnel have the appropriate competencies and training to undertake their roles and responsibilities in emergency situations.

8.7.2.1 Training

Appropriate training will be made available to specific personnel required to undertake a role in oil spill response. Personnel with an oil spill response role will undertake incident management training including Incident Command System (ICS) and oil spill response specific training, as defined by their role and in accordance with the roles' training plan. The training program has been designed to meet the PMA08 Chemical, Hydrocarbons and Refining training standard and includes the courses and topics as outlined in Table 8-3.

Table 8-3 Oil spill response training

Training/course	Delivered by	Training description
ICS 100 and 200 training	Various accredited organisations	ICS 100 and 200 training consists of computer-based training which addresses fundamental principles of the ICS including key roles and functions.
ICS 300 training	Various accredited organisations	ICS 300 training is instructor led training that expands upon the information covered in the ICS 200 course.
Australian Marine Oil Spill Centre (AMOSC) Core Group training	AMOSC	Training provided in accordance with the AMOSC Core Group agreement. Personnel also participate in bi-annual training, exercise or response activities in order to maintain their competency.
Oil spill response training program	ExxonMobil University of Spill Management	This course provides the fundamentals of oil spill response and a broad overview of response activities with a focus on the practicality and limits when responding to an oil spill. This course is aimed at personnel who fulfil a role within the Esso IMT. The course combines theory, desktop exercises and field deployment of response equipment. The course is jointly run by ExxonMobil personnel along with specialist contractors and the local oil spill

Training/course	Delivered by	Training description
		response organisation. The course is generally run over four days. The course content covers: • oil spill response concepts • decision processes • corporate policies and preferences • fate, behaviour, tracking and surveillance • response options: mechanical, in-situ burning, dispersants, monitoring and surveillance • response components • practical realities • common misconceptions • hands-on equipment deployment. On completion of the training program, participants are certified in ICS 100-200. ICS 300 certification may also be obtained through where the training provider is accredited to provide this certification.
IMO I – Oil Spill Response Operations	Various accredited organisations	Designed for all personnel who may be called upon to act as an oil spill first responder and to participate in an oil spill clean-up.
IMO II – Oil Spill Response Management (or equivalent)	Various accredited organisations	An alternative to the oil spill response training program delivered by the ExxonMobil University of Spill Management. Training aimed at IMT personnel.
IMO III – Command and Control (or equivalent)	Various accredited organisations	Required for personnel identified to fulfil a Tier 2/3 Incident Commander role.
Aerial surveillance course	AMOSC and Oil Spill Response Limited (OSRL)	The course is typically run over two days and includes theory and practical activities including: • basic hydrocarbon theory and its relevance to aerial surveillance • basic understanding of how to work in an aviation crew environment • how to effectively plan and coordinate an aerial surveillance flight • how to carry out the plotting and recording of oil spill information • how to present oil spill information back through the Esso IMT in a clear and coherent manner.
Emergency Support Group (ESG) training	ExxonMobil (Esso)	The ESG course is used to train ESG members in the ESG process as well as provide an overview of ExxonMobil's emergency response structure. This is an internally run course which combines theory and a number of simulation exercises. The course is typically run over 2.5 days. Course objectives are to:

Training/course	Delivered by	Training description
		• increase awareness of the ExxonMobil emergency response system and the underpinning principles • assist in achieving a consistent approach to the ESG response process across the Corporation • familiarise participants with roles and responsibilities within the ESG and the interface with other responders and stakeholders • provide an opportunity for participants to practice roles • improve ESG leadership and communication skills • build the confidence of participants in responding as a team and individually • enhance ExxonMobil's commitment to a consistent approach to emergency response.
Oil spill response equipment operation training	Esso, supported by AMOSC, Oil Response Company of Australia or another training provider	• Provides familiarisation with oil spill equipment operation, deployment and shoreline clean up techniques through dedicated training sessions and/or through participation in exercises. Selected personnel may also be nominated to attend IMO I – Oil Spill Response Operations.

8.7.2.2 Oil spill response roles

Esso IMT members are selected based on skills and experience. Nominations are reviewed by the OIMS System 10-2 System Owner (to ensure training and competency requirements have been met or appropriate management measures have been put in place) and approved by the asset manager. A road map of Emergency Preparedness and Response required competencies is assigned to the new incumbent. A training plan is put in place and the OIMS System 5-1 mitigation approval process applies.

The selection of the Environmental Unit Lead is based on relevant experience as an Environmental Advisor, with experience and/or training in the implementation of scientific monitoring. Minimum requirements include involvement in drills and spill exercises, management of marine monitoring programs, such as produced formation water monitoring, and monitoring of parameters relating to offshore drilling and operations activities. In addition, the minimum requirement includes a relevant tertiary degree in engineering, environmental science, environmental management or similar.

Esso also allocates members to an ESG, which provide strategic support in the event of an oil spill or other emergency event and contributes personnel to ExxonMobil's Regional Response Team (RRT). The ExxonMobil RRT includes personnel with experience and/or training in oiled wildlife response. These personnel are able to provide above-field support to an oiled wildlife response through development of response plans and coordination of specialist resources.

Selected ExxonMobil personnel have been identified as members of the AMOSC Core Group and may be called upon to respond under the AMOSC Plan and National Plan arrangements.

Esso also have a Source Control Branch (SCB) who specialise in source control in relation to a controlled or uncontrolled well control scenario. Personnel involved in SCB management (i.e. Branch Director/Deputy Branch Director) will have the minimum competencies and training or meet requirements recognition of prior learning and experience.

8.7.2.3 Esso Source Control Branch

In a large-scale emergency response effort, the SCB is responsible for disabling the source of the incident while minimising the impact to People, Environment, Assets and Reputation (PEAR).

In a wells-related Tier II/III incident, the Australian Wells Team will assume responsibility for SCB activities.

The structure of the source control branch can be seen in Figure 8-3. The summary of responsibilities can be seen in Table 8-4.

Source control branch members will be called upon based on the internal notification processes as soon as an offshore emergency has been activated, using the same call out process as the Offshore IMT.

The Australia Wells Tier II/III Emergency Response plan also contains all key information for contacting and mobilising key resource partners such as AMOSC, OSRL, and Wild Well Control based on existing contracts in place.

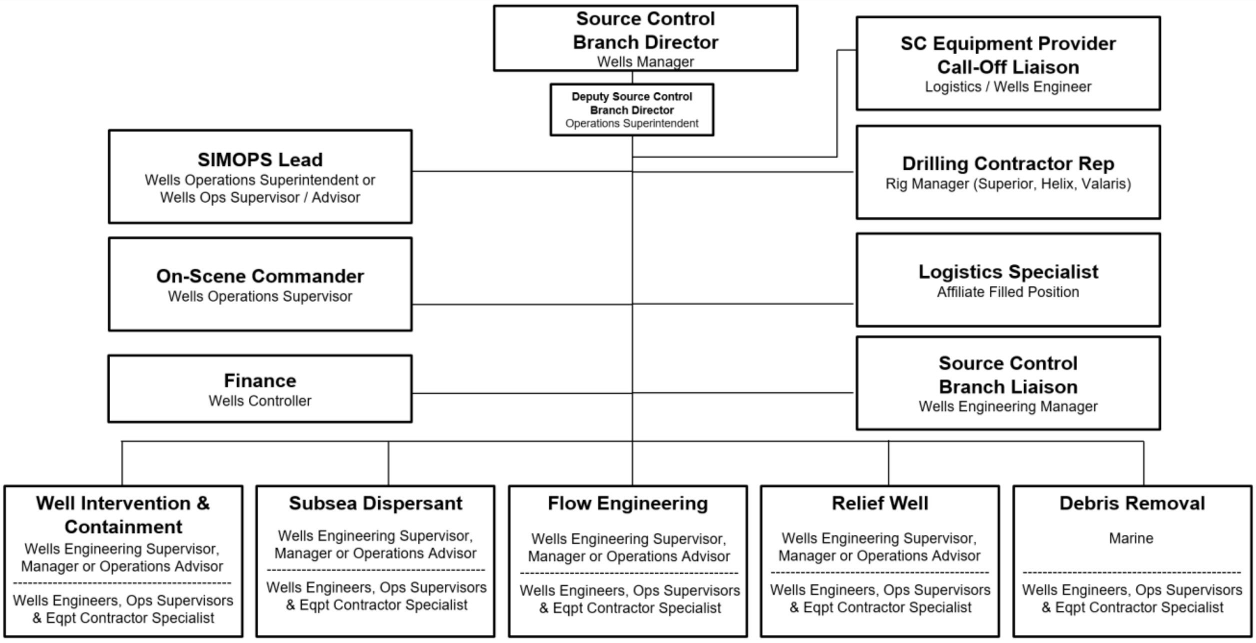

Figure 8-3 Source Control Branch structure

The SCB Director or delegate Deputy Source Control Branch Director is responsible for planning and executing tactics related to source control to achieve the incident objectives set by the Incident Commander. The size of the SCB Support Staff is dictated by the needs of the incident response. Their primary role during the incident is to support the SCB as described in the ExxonMobil Source Control Branch Incident Management Handbook (SCB IMH).

Table 8-4 Summary of responsibilities: Source Control Branch Director/Command staff

Source Control Branch
Source Control Branch Director and Deputy-Director
• Implementation of (operational) tactics based on overall Incident Objectives as established by the Incident/Unified Command • Source Control Exclusion Zone defines overall physical scope of responsibility
Source Control Branch – Command Staff (applicable if Source Control Branch is not co-located with IMT)
• When needed, these individuals serve in their traditional roles, specifically supporting the Source Control Branch; if the IMT and SCB are co-located, the IMT may offer these services • Includes access to the Law Officer, HR Officer, Safety Officer, Liaison Officer, Risk Assessment Lead, Public Information Officer, all of whom should be familiar with Wells/Drilling expectations and services NOTE: Independent of the Response Tier, these specific functions would continue to support Wells organisation by interfacing with ESG and integrating with the IMT

Source Control Branch
Source Control Branch – Planning
• Manages the collection, evaluation, dissemination and use of incident information, and maintaining the status of assigned resources.
Source Control Branch – Logistics
• Provides facilities, services and material in support of the incident.
Source Control Branch – Finance (as applicable)
• Manages all financial, administrative, claims and cost analysis aspects of the incident

Table 8-5 Summary of responsibilities: On-scene Command/Staging Area

On-scene Commander	Staging Area Manager
• Oversees the execution of the tactics dictated by the SCB Director • Maintains the right to stop operations at any time	• Call out vessels/aircraft, materials, etc. based on SCB needs • Ensures all equipment is received, tracked (costs and whereabouts) and demobilised effectively • Reports to the SIMOPS Lead

The Site Survey, Well Intervention and Capping Group are responsible for initial site survey, stewarding intervention through existing BOP (if possible), deployment/installation of a capping stack (if required), well shut-in procedure, and flowback installation/operation. The Well Intervention and Containment Group receives guidance from the Source Control Branch Director and the Well Intervention and Containment Group Supervisor. This team works closely with the Flow Engineering Team to design the shut-in procedure appropriate for the well, as well as any other modelling or engineering analysis required for installation of the capping stack (if required).

For the staffing profile for this Group, see the ExxonMobil SCB IMH.

The Relief Well Group is responsible for planning, procurement and execution of the relief well. Depending on the circumstances of the event, support would be provided by Reservoir and Geoscience. In the event of an incident, the Relief Well Group would be led by the Relief Well Group Supervisor (or delegate).

8.7.2.4 Role-specific competencies and training

Mandatory competencies and training provided to specific personnel required to undertake a role in oil spill response are outlined in Table 8-6.

Table 8-6 Mandatory competencies and training for oil spill response roles

Section	Role	Mandatory competencies and training
Command	Incident Commander	• Incident Management training (PMAOMIR418) • Oil Spill Response training • IMO III – Command and Control training (for Level II/III incidents) • Participate in regular drills and exercises.
	Safety Officer	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control

Section	Role	Mandatory competencies and training
		• Experience in implementing safety management systems • Participate in regular drills and exercises.
	Liaison Officer	• Incident Management training (PMAOMIR320) • Participate in regular drills and exercises.
Planning	Planning Section Chief	• Incident Management training (PMAOMIR320) • Participate in regular drills and exercises • IMO II – Oil Spill Management, or IMO III – Command and Control • Experience in fulfilling Planning Section Chief role • Participate in regular drills and exercises.
	Environment Unit Lead*	• IMO II – Oil Spill Management • Incident Management training (PMAOMIR320) • Familiarity with Bass Strait Operational and Scientific Monitoring Program (AUGO-EV-EPL-001). Known as the Bass Strait OSMP – Refer to Attachment 2 • Participate in regular drills and exercises.
	All other roles	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control • Experience in fulfilling Planning Section role • Participate in regular drills and exercises.
Operations	Operations Section Chief	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control • Experience in fulfilling Operations Section Chief role • Participate in regular drills and exercises.
	Maritime Unit	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control • Experience in marine operations • Participate in regular drills and exercises.
	Aviation Unit	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control, Experience in aviation operations • Participate in regular drills and exercises.
	Aerial Observer	• Aerial surveillance course.
	Source Control Branch Director/Deputy Director (for LOWC incidents)	• ICS 300 • Participate in regular drills and exercises.
	Source Control Branch – Team member	• Participate in regular drills and exercises.

Section	Role	Mandatory competencies and training
Logistics	Logistics Section Chief	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control, or Oil spill response training program (ExxonMobil University of Spill Management) • Experience in fulfilling Logistics Section Chief role • Participate in regular drills and exercises.
	All other roles	• Incident Management training (PMAOMIR320) • IMO II – Oil Spill Management, or IMO III – Command and Control • Experience in logistic operations • Participate in regular drills and exercises.
Finance and Administration	Finance and Administration Section Chief	• ICS 200 • Participate in regular drills and exercises.
	All other roles	• ICS 200 • Participate in regular drills and exercises.
Operations and Maintenance	Selected personnel at Esso's facilities	• Oil spill response equipment operation training • Participate in regular drills and exercises.
RRT	All RRT members and select Esso IMT members	• Oil spill response training program (ExxonMobil University of Spill Management) • RRT training workshop • Role-specific training, as required • Participate in regular drills and exercises.
ESG	All ESG members and select Esso IMT members	• ESG training • Participate in regular drills and exercises.
AMOSC Core Group	All members	• IMO I – Oil Spill Response Operations • AMOSC Core Group training.

* When the Esso IMT is activated, the Environmental Unit Lead becomes responsible for managing implementation of the Bass Strait OSMP Modules, as directed by the Planning Section Chief.

8.8 OIMS System 6-2: Facility Integrity Management

OIMS System 6-2 requires that the OI of all Esso-owned or controlled critical equipment is maintained over the operating life of the equipment, preventing, or mitigating a significant event that could result in significant SSHE consequences. This is achieved through implementation of:

- a systematic, risk-based approach, which is used to identify critical equipment and develop equipment strategies.
- integrity programs, which are developed, approved, and executed at all locations for the OI of critical equipment.
- programmatic condition monitoring, preventive maintenance, inspection, and/or testing of critical equipment, or other measures to minimise the impact of failure.

8.9 OIMS System 6-3: Well Management

In accordance with OIMS System 6-3, Esso has processes in place to document, understand, and effectively execute well work programs. Well integrity activities are in place to effectively address OI for all well types and well status.

8.10 OIMS System 6-4: Work Management

Work activities at Esso-owned, managed, or controlled sites are undertaken in a structured and controlled manner to reduce the risk of incidents, in accordance with OIMS System 6-4. This System provides a structure for managing the risks associated with the work to be performed and confirming that interfaces with the work activities are appropriately considered.

In relation to this EP, work activities are managed through implementation of the following processes:

- work permits are executed to protect personnel, equipment, and the environment from mechanical and operational risks
- controls are in place for the temporary disarming, deactivation, or unavailability of integrity critical equipment
- work interfaces are evaluated, and procedures are in place to manage identified risks, including hand-over and simultaneous operations.

8.11 OIMS System 6-5: Environmental Management

In accordance with Environment Regulation 22(5) the implementation strategy must provide for sufficient arrangements for monitoring, recording, audit, management of non-conformance and review of environmental performance and the implementation strategy to ensure that the EPOs and EPSs in the EP are being met. The majority of these requirements are met through the implementation of OIMS System 6-5, with the exception of recording (see OIMS System 4-1) and management of non-conformance (see OIMS System 9-1).

8.11.1 Environmental management

OIMS System 6-5 specifically addresses corporate requirements for environmental management, including socioeconomic and community health aspects. This includes the fundamental requirement to develop EMPs which identify and assess all environmental aspects, impacts and risks associated with Esso's activities, facilities, and ongoing operations. The EMPs must also describe how the impacts and risks are addressed and controlled. As such, this EP meets the OIMS System 6-5 requirement for an EMP for the activities outlined in this EP.

In addition, OIMS System 6-5 includes processes and procedures for managing environmental impacts, such as the: Environmental Chemical Discharge Assessment Process (AUGO-EV-PCE-013); IMS Risk Assessment Procedure (AUGO-EV-PCE-014); and temporary storage assessment, as discussed in the following sections.

8.11.1.1 Chemical discharge assessment process

Esso assesses all chemicals that are likely to be discharged during the activities described in this EP. The chemical discharge assessment process is triggered by the Management of Change (MOC) process. The introduction of a new chemical to Esso's facilities requires assessment for environmental and safety suitability in accordance with the Workplace Substances Manual (AUGO-PO-WSM-MOHLINK).

Chemicals that have the potential to be discharged into the marine environment must be screened per Esso's Environmental Chemical Discharge Assessment Process (AUGO-EV-PCE-013) to identify if the chemical is considered to be environmentally hazardous in the marine environment. The objective of this process is to promote the selection of chemicals with the lowest possible toxicity for use in operational activities and to reduce the potential environmental impact of a discharge or unplanned release to ALARP and acceptable levels. Esso maintains preference for chemicals with low toxicity that meet the technical needs of the chemical application without compromising the safety of personnel.

The procedure is designed in compliance with international standards that include:

- OCNS

- Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention')
- Centre for Environment, Fisheries and Aquaculture Science (CEFAS).

In the absence of Australian standards regarding the suitability of well operations fluid chemical additives, the OCNS is generally used as a basis for selecting environmentally acceptable chemicals in the Australian offshore petroleum industry. The OCNS manages chemical use and discharge by the UK and Netherlands offshore petroleum industries. The scheme is regulated in the UK by the Department of Energy and Climate Change using scientific and environmental advice from the UK's CEFAS and Marine Scotland.

The OCNS uses the Harmonised Mandatory Control Scheme developed through the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). This ranks chemical products according to Hazard Quotient, calculated using the CHARM model (CHARM Implementation Network, 2017). The CHARM model requires the biodegradation, bioaccumulation and toxicity data of the product to be provided.

Under the OSPAR Convention, organic-based compounds used in production, completion and workovers, drilling and cementing are subject to the CHARM model. The CHARM model calculates the ratio of the 'Predicted Effect Concentration' against the 'No Effect Concentration' expressed as a Hazard Quotient, which is then used to rank the product. The Hazard Quotient is converted to a colour banding to denote its environmental hazard, which is then published on the *Definitive ranked lists of registered products* (OCNS, 2022). Gold has the lowest hazard, followed by silver, white, blue, orange, and purple (having the highest hazard).

Products not amenable to assessment under the CHARM model (i.e., inorganic substances, synthetic based muds, hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS grouping A – E, with 'A' having the greatest potential environmental hazard and 'E' having the least. Products that only contain substances that pose PLONAR to the environment are given the OCNS 'E' grouping. Data used for the assessment includes toxicity, biodegradation and bioaccumulation.

Chemicals that are hazardous to the marine environment are subject to substitution warnings under the Harmonised Mandatory Control Scheme. The UK follows and applies the OSPAR harmonised pre-screening scheme and complies with the recommendation of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), to replace chemical substances identified as candidates for substitution. These substances are flagged with a substitution warning on the product template and CEFAS encourages operators to select products without a substitution warning.

Only chemicals ranked under the OCNS rating system as 'Gold' or 'Silver' (CHARM) and 'E' or 'D' (non-CHARM) with no substitution warning will be approved for discharge without further assessment.

Where no OCNS ranking is available for a chemical but ecotoxicity data is available, an equivalence check can be completed to establish if it would have a substitution warning. The equivalence check will be completed in accordance with the assessment process outlined by CEFAS for the OCNS scheme. A chemical will be considered to be 'equivalent' if it is assessed to ***not*** have a substitution warning according to the criteria defined by OCNS (https://www.cefas.co.uk/cefas-data-hub/offshore-chemical-notification-scheme/substitution-warning/).

If a chemical is not on the OCNS list, has a substitution warning (or equivalent) or has limited ecotoxicity data available, then further assessment is required to determine if the chemical is suitable for discharge to the marine environment. This assessment can include:

- details of the technical requirement for this product and review of any possible alternative chemicals
- assessment of impacts to the receiving environment from discharge in the relevant scenario
- consideration of additional restrictions or controls to the approval e.g. timeframes for use, periodic reassessment
- seeking guidance from toxicity experts
- whole effluent toxicity testing the chemical in the discharge to determine if the environmental impact is beyond the mixing zone; and/or
- completing chemical dispersion modelling in the local environment.

8.11.1.2 Invasive Marine Species risk assessment process

Esso's IMS Risk Assessment Procedure (AUGO-EV-PCE-014) was developed to complement Australian IMS prevention efforts in the context of Esso's operations offshore in Bass Strait. The assessment is undertaken prior to the mobilisation of a vessel (inclusive of MODUs) to an Esso OA (as defined under the EP for the activity). The IMS Risk Assessment Procedure (AUGO-EV-PCE-014) incorporates key considerations from other established risk assessment processes.

8.11.1.3 Temporary storage assessment

Environmental assessment conducted under the MOC process includes assessment against OPGGS Act Section 572. In the event that a change results in out-of-service equipment and/or structures or pieces of equipment being temporarily left on the seabed, an assessment is completed to ensure:

- impacts and risks continue to be reduced to ALARP and acceptable levels
- requirements under OPGGS Act Section 572 continue to be met
- that a plan is in place to safely remove structures or equipment when reasonably practicable.

This assessment must include the following considerations, where applicable:

- management of NORM
- management of any potential leaks/seeps of chemicals and hydrocarbons
- equipment or infrastructure wet stored on the seabed within the PSZ or 200m operational zone around pipelines
- impact to benthic communities through smothering
- integrity status
- the size, configuration, weight, and height above seabed where relevant.

8.11.2 Audit, inspection, and assessments

8.11.2.1 Inspections - Campaign activities

A due-diligence pre-activity inspection of the JUR will be carried out prior to the work commencing to ensure all controls listed in the EP to achieve the EPSs are ready to be implemented prior to the activities commencing and to verify that procedures and equipment for managing routine discharges and emissions are in place (as described in pre-qualification material) to enable compliance with the EP.

A rig inspection checklist will be completed at commencement of the activity and quarterly thereafter by the Esso Wells Operations Supervisor, in conjunction with the Rig Superintendent, and issued to the Esso Environmental Advisor for review.

Throughout the campaign a monthly EP compliance check of EPSs will be conducted and issued to the Esso Environmental Advisor for review and as the basis for the monthly recordable incident report (OIMS System 9-1).

8.11.2.2 Inspections - Vessel activities

In addition to the third-party services OIMS evaluation under System 8-1 a pre-mobilisation inspection is undertaken for all vessels to communicate specific EP requirements and to ensure that procedures and equipment for managing routine discharges and emissions are in place to enable compliance with this EP.

Vessels will conduct their own HSE inspections, which will be provided to Esso for ongoing compliance monitoring. These will be discussed in the quarterly review.

8.11.2.3 Audits - Environment Plan compliance

Esso will undertake an annual compliance audit of the commitments contained in this EP and assess the effectiveness of the implementation strategy. Any non-compliance with this EP will be subject to investigation and follow-up action as detailed in Section 8.14.1.

Any opportunities for improvement or non-compliances noted will be communicated to all relevant personnel at the time of the audit to ensure adequate time to implement corrective actions. The findings and recommendations of inspections and audits will be documented and distributed to relevant personnel for comments, and any actions tracked until closed out.

Results from the environmental inspections and audits will be summarised in the campaign specific EP environmental performance report(s) submitted to NOPSEMA on an annual basis.

8.11.3 Environmental performance review

Environmental performance assurance of the activity will be undertaken in a number of ways. Performance assurance is undertaken to ensure that:

- controls are implemented in accordance with EPSs to achieve the EPOs
- non-compliances and opportunities for improvement are identified
- environmental monitoring and reporting requirements are met.

8.11.3.1 Rig calls

Rig calls are undertaken to keep all personnel involved up to date with the planned activities and allows for input from the management team to assist with work planning.

8.11.3.2 Environmental Matters Discussed in MODU Meetings

Pre-tour meetings are the primary meeting opportunity to discuss any important environmental matters or learnings with the MODU crew. All operational personnel on board the rig are required to attend at least one of these meetings every day (prior to their work shift).

These pre-tour meetings are conducted four times per day, prior to each work shift beginning (typically 05:30, 11:30, 17:30 and 23:30hrs daily).

Environmental matters will be included in these pre-tour meetings as appropriate, including any potential environmental precautions, hazards, incidents or environmental aspects to be prepared for.

Further MODU meeting opportunities to discuss environmental matters will be utilised as appropriate, including:

- Rig arrival briefing
- Weekly safety meeting
- Pre-task safety briefings (toolbox talks)
- Head of department meetings
- Control of work meetings.

8.11.3.3 Completion of activity

The Wells Team conducts regular reviews of key performance indicators such as incident reports (including spills), regulatory compliance and types/volumes of waste disposed.

At the completion of the Turrum Phase 3 production drilling activities, a lessons learned review and assessment will be conducted to determine:

- the effectiveness of control measures
- improvements in procedures or processes for future campaigns.

8.11.4 Monitoring of emissions and discharges

In accordance with Regulation 22(6) the implementation strategy must provide for sufficient monitoring of, and maintain quantitative records of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the EPOs and EPSs in the EP are being met.

For JUR-based activities, the Esso Wells Operations Supervisor is responsible for collecting emissions and discharges data andrecording in Wellview (DDR).

A summary of these results will be reported in the EP environmental performance report submitted to NOPSEMA. Table 8-7 summarises the monitoring requirements for routine operations.

The process for managing environmental monitoring records is addressed through OIMS System 4-1.

Table 8-7 Summary of monitoring of emissions and discharges

Aspect	Monitoring	Frequency	Reporting
Ballast water uptake/discharge	MODU Ballast water maangment(Volume/Location)	Per event	Monitoring of MODU Ballast water compliance reported in end of activity environmental performance report.
Planned cement discharge	Cement volume useage	Per event	End of activity environmental performance report.
Planned operational discharges – surface (i.e. circulation fluids, interface fluids, tank washings, new NaCl brine)	Components of fluids discharged at surface	Per event	End of activity environmental performance report.
	Oil in water content of interface fluids/tank washings	Daily	
Spill to sea	Chemical/oil type Volume	By incident event	Incident report. End of activity environmental performance report.
Release of waste to sea	Waste type	By incident event	Incident report. End of activity environmental performance report.
Dropped object to sea	Object type	By incident event	Incident report. End of activity environmental performance report.
Atmospheric emissions	Fuel consumption Estimated venting	Tallied at end of activity from daily reports	Daily reports.

8.11.5 Reporting

Regulation 51 of the Environment Regulations requires the reporting of environmental performance of this EP.

Regulation 22(7) states that the implementation strategy must:

- state when the titleholder will report to the Regulator in relation to the titleholder's environmental performance for the activity
- provide that the interval between reports will not be more than one year.

In addition to environmental performance reporting, Environment Regulation 54 requires notifying NOPSEMA of the start and end of activity and Regulation 46 requires notifications that all of the obligations under the EP have been completed.

The routine reporting requirements required for this EP are described in Table 8-8.

Table 8-8 Routine EP reporting requirements

Requirement	Timing	Contact
Environmental performance report	Annual	NOPSEMA – submissions@nopsema.gov.au
Submit an end of activity EP environmental performance report to NOPSEMA	The end of activity EP environmental performance report will be submitted to NOPSEMA within three months of the completion of the Turrum Phase 3 production drilling activities.	
Notify NOPSEMA of the commencement date	At least 10 days prior to activity.	
Notify NOPSEMA of the completion date	Within 10 days of activity completion.	
Notification of EP completion	Within 10 days of activity finalisation and obligation completion.	

8.12 OIMS System 7-1: Management of Change

Esso has developed MOC tools and procedures to meet the requirements outlined in OIMS System 7-1. Environmentally relevant changes which could trigger the MOC process include:

- new activities, assets, equipment, processes or procedures proposed to be undertaken or implemented that have the potential to impact on the environment and have not been:
  - assessed for environmental impact previously, in accordance with the relevant standard, or
  - authorised in the existing management plans, procedures, work instructions or maintenance plans.
- proposed changes to activities, assets, equipment (including change of status), processes or procedures that have the potential to impact on the environment or interface with an environmental receptor
- changes to the existing environment including (but not limited to) fisheries, tourism and other commercial and recreational uses, and any changes to protected areas, plans or requirements for protected species
- changes to the requirements of an existing external approval (e.g. changes to conditions of environmental licences)
- new information or changes in information from research, stakeholders, legal and other requirements, and any other sources used to inform the EP
- changes or updates identified from audits, inspections and assessments, incident investigations, emergency response activities or emergency response exercises.

OIMS System 7-1 MOC is a structured process, involving relevant engineers, technicians, operations and maintenance personnel and SSHE specialists to evaluate the potential consequences of the proposed change, and to seek the endorsement of all potentially impacted parties.

The MOC process is implemented electronically and requires a number of assessments which include technical, regulatory, safety and environmental assessments. A mandatory screening checklist is undertaken for all work being assessed under the MOC process to identify the potential for a change to, or increase in, environmental impacts. MOCs which identify potential change to or increase in environmental impacts during screening require completion of an environmental checklist. A mandatory regulatory checklist is also completed to identify if proposed activities will result in a change to the EP. Environmental and regulatory checklists are reviewed and approved by an Environmental and Regulatory Advisor.

The Environmental and Regulatory Advisor reviews the MOC in accordance with Regulation 39 of the Environment Regulations. A revision of the EP will be required under Regulation 39 in the event that a proposed change:

- constitutes a new stage or significant modification, or
- introduces a significant new environmental impact or risk, or
- significantly increases an existing environmental impact or risk.

Minor changes, which do not trigger a resubmission under Regulation 39, may result in administrative updates to this EP which are documented in a change register.

Esso also has a comprehensive process to identify amended and new regulations which is described in OIMS System 4-2.

8.13 OIMS System 8-1: Third-Party Services

OIMS System 8-1 provides a systematic approach for the selection of contractors and subsequent management of interfaces between Esso and contractors to ensure work is performed in a safe, secure, and environmentally sound manner. This System applies to all service contractors (including marine operations, wireline and workover operations, crane services, provision of lifting equipment and aviation services) and suppliers of critical equipment (such as valves, seals, gaskets, lifting equipment and cranes).

8.13.1 Contractor selection and management

Esso's contractor selection and management processes support two different phases of a contract life cycle:

- the first phase includes requisitioning for contractor services, pre-qualifying contractors, selecting the contractor, and conducting pre-mobilisation activities associated with subsequent contractor interface management.
- the second phase occurs during contract work execution and involves ongoing interface management between Esso and the contractor, as well as monitoring and stewardship activities to confirm that the contractor is meeting the OI requirements of the agreement.

The pre-qualification process includes review of recent contractor performance results, reviews of contractor SSHE programs, contractor training and competency and and site visits to the contractor's facilities to validate reported performance results and evaluate a contractor's capability for effective work execution. Esso's SSHE Group participates in the pre-qualification screening and bid evaluation process including contractor site assessments, as required. OIMS System 8-1 specifies that all contractors conducting activities with potential high SSHE impact must submit a SSHE execution plan or a bridging document for the scope of work. High SSHE impacts are activities which, if poorly executed, could cause significant safety or environmental impacts. These may include aviation, construction, well work, subsea activities and vessels.

The contractor's SSHE execution plan is required to address:

- communication of SSHE expectations and requirements to contractor crews and subcontractors
- compliance with relevant regulatory obligations (including EMPs, Safety Cases, relevant laws and regulations)
- contractors training and competencies including third parties
- reporting of leading and lagging indicators
- incident investigation and management processes
- other specific requirements as dictated by the scope of the assignment or local site characteristics.

8.13.2 Jack-up rig Environmental Management System

The JUR that will be used to conduct the activities within this EP is the *Valaris JU-107*, operated by Valaris. JUR operations will be conducted in accordance with the *Valaris 107* operating procedures. These are complemented by the *JU-107 Safety Case* (Valaris, 2021).

The Safety Case outlines:

- management system description
- Valaris business policies
- Valaris master training matrix

- Valaris risk assessment matrix
- facility description
- medical equipment and pharmaceuticals
- safety critical element codes and standards
- risk management
- hazard register
- bow tie diagrams
- summary of operational boundaries matrix
- recommendations register
- emergency response
- performance monitoring.

In addition to these policies and procedures, there will also be operations/location specific working practices which will be incorporated into the operation of the JUR by project specific HSE Management System bridging documents, developed where required.

8.13.3 Contractor performance monitoring

Esso develops performance monitoring plans for third parties prior to a contractor mobilising to a work site location.

The Contract Administrator is engaged in the contract life cycle management and the SSHE Group assists in the assessment and monitoring of contractor performance, as required. Providers of OIMS-critical services such as aviation, vessels, construction and well work are subject to a quarterly performance review and annual performance assessment.

Performance reporting consists of documented reports and verbal communications appropriate to the impacts and risks involved with the services provided. Written reports can include:

- non-conformance reports
- SSHE performance statistics, including environmental incidents
- assessments on the adequacy of actions taken from performance gaps/incidents
- deficiencies with SSHE requirements and recommended corrective actions
- review of contractor SSHE inspections and findings.

Report findings and recommendations are reviewed with contractor management and follow-up actions implemented to address deficiencies.

8.14 OIMS System 9-1: Incident Management

OIMS System 9-1 requires management of SSHE incidents including initial response and notifications, investigation and analysis, documentation, communication of lessons learned, corrective actions management and the analysis of trends. In the context of this System, incidents (including near misses) are related to:

- personnel safety
- process safety
- security
- occupational health
- regulatory compliance
- environmental
- equipment reliability (with SSHE consequences).

OIMS System 9-1 requires that:

- the incident is reported in the IMPACT database
- an investigation occurs, if triggered by an evaluation of actual or potential incident severity, and
- the incident is correctly documented, lessons learned are communicated, and corrective actions are followed up and tracked in the IMPACT database.

Esso utilises the IMPACT incident database as the single, centralised tool for capturing data, tracking, sharing and analysing incidents, assessment findings, lessons learned and follow-up actions.

8.14.1 Management of non-conformance

Investigations into environmental incidents, including EP non-compliances, are conducted in accordance with the Esso incident management system required by OIMS System 9-1.

Notification, reporting and investigation of incidents achieves the following:

- ensures management, regulatory authorities and other appropriate personnel are notified of incidents and near misses on a timely basis
- enables sharing of learnings throughout the organisation to continuously improve SSHE systems
- identifies corrective actions to prevent re-occurrence including (if applicable) actions to re-establish the stated control measures, as outlined in this EP, in order to continue to reduce impacts and risks to ALARP and an acceptable level, and
- enables the analysis and trending of incident data to ensure appropriate focus on emerging issues.

Incidents are managed in accordance with the *Incident Management Guideline* (AUGO-PO-IMG-015) which describes the responsibilities and processes for all stages of incident management. Esso utilises the IMPACT incident database as the single, centralised tool for capturing data: tracking, sharing and analysing incidents, assessment findings, lessons learned and follow-up actions.

All Esso personnel are responsible for notifying their immediate supervisor of incidents, near misses and identified hazards, and for taking appropriate responses as part of their regular duties. Accountability for investigation lies with business line management. The SSHE Group is responsible for maintaining the reporting system, subject matter expert advice and investigation support.

The triggers and expected deliverables for investigations are based on incident severity (actual and potential) and are documented in the Appendix 1 of the Incident Management Guideline, Incident Investigation and Sharing Guideline. The triggers for an investigation into an environmental incident are a significant spill to the environment, community complaint or regulatory reportable incident (see Table 8-9).

Corrective actions that address the root cause(s) of the incident are identified and implemented to prevent the recurrence of similar incidents. Corrective actions can be improvements to facilities, programs, processes or procedures that are identified to reduce the impact or risk and enhance the integrity of operations. Once corrective actions have been identified from incident reports (including audit and inspection reports), the implementation process is managed to completion via IMPACT. This ensures results are achieved and that the improvement is documented and sustained.

8.14.2 Incident notification and reporting

The Environment Regulations define recordable incidents and reportable incidents, and also describe reporting requirements for each type of incident.

The requirements for reporting environmental incidents to external agencies are listed in Table 8-9. These will be reported to the regulator by the Esso Wells Operations Supervisor (or SSHE Group delegate).

Table 8-9 External incident notification and reporting requirements

Requirement	Timing	Contact
Recordable incidents		
Recordable incident, for an activity, means a breach of an EPO or EPS, in the EP that applies to the activity that is not a reportable incident.	As soon as possible but before the 15th day of the following calendar month.	NOPSEMA – submissions@nopsema.gov.au and copy Joint Venture partners: Woodside Energy (Bass Strait) Pty Ltd – bass.strait@woodside.com.au

Requirement	Timing	Contact
As a minimum, the written monthly recordable incident 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 titleholder knows or is able, by reasonable search or enquiry, to find out • any action taken to avoid or mitigate any adverse environmental impacts of the recordable incidents • the action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future. Monthly reports will utilise the *Recordable Environmental Incident Monthly Report* Form (NOPSEMA, 2020). If there are no recordable incidents a 'nil' report will be submitted.		
Reportable incidents		
Reportable incidents are those that have caused, or have the potential to cause, moderate to significant environmental damage. This includes, but is not limited to, those identified through the risk assessment process as having a consequence ranking of I or II, or at a minimum the following incidents: • unplanned release of hydrocarbon liquid or chemicals exceeding 80L into the marine environment caused by, or suspected to have been caused by, petroleum activities • unplanned injury or death of a cetacean or listed threatened/migratory/marine species caused by, or suspected to have been caused by, petroleum activities. The notification must contain: • all material facts and circumstances concerning the reportable incident that the	Verbally as soon as possible but within 2 hours of incident, or, if the reportable incident was not detected by the titleholder at the time of the first occurrence – the time the titleholder becomes aware of the reportable incident, then. Written notification as soon as practicable (copy to National Offshore Petroleum Titles Authority and Department of Jobs, Precincts and Regions (DJPR)). Written report as soon as practicable but within 3 days including specifying if a further written report will be provided (then copy to National Offshore	NOPSEMA – 1300 674 472 DEECA – Earth Resources Regulation Compliance Duty Officer - 0419 597 010 (24-hour) NOPSEMA-Submissions@nopsema.gov.au DTP- marine.pollution@transport.vic.gov.au State Duty Officer: 0409 858 715 NOPTA – reporting@nopta.gov.au

Requirement	Timing	Contact
titleholder knows or is able, by reasonable search or enquiry, to find out • any action taken to avoid or mitigate the adverse environmental impact of the reportable incident • the corrective action that has been taken or is proposed to be taken to stop, control or remedy the reportable incident.	Petroleum Titles Authority and DJPR within 7 days). If formal investigation is triggered, a further written report within 30 days.	Joint Venture partners: Woodside energy (Bass Strait) Pty Ltd – bass.strait@woodside.com
Other reporting requirements		
Mandatory MARPOL report about a pollution incident involving: • a discharge (or probable discharge) of oil or noxious liquid substances in excess of permitted MARPOL discharge levels, quantities or rates, for whatever reason, including those for the purpose of securing the safety of the ship or for saving life at sea • a discharge (or probable discharge) of harmful substances in packaged form, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges. • Report to include: • name of ship/s involved • time, type and location of incident • quantity and type of harmful substance • assistance and salvage measures • any other relevant information.	Vessel Master to notify AMSA verbally without delay. If AMSA asks for a written MARPOL report this must be provided within 24 hours after AMSA asks for the report.	AMSA +61 02 6230 6811 or 1800 641 792 rccaus@amsa.gov.au
Suspected or known IMS introduction	Immediately	Report a pest – https://www.marinepests.gov.au/ DEECA – 136 186 Env Advisor to notify JV partners: Woodside Energy (Bass Strait) Pty Ltd – bass.strait@woodside.com
Oiled wildlife	Immediately	DEECA State Agency Commander – 1300 134 444 (24hrs)

Requirement	Timing	Contact
		Env Advisor to notify JV partners: Woodside Energy (Bass Strait) Pty Ltd – bass.strait@woodside.com
Wildlife emergency	Immediately	DEECA Whale and Dolphin Emergency Hotline – 1300 136 017 Seals, Penguins or Marine Turtles 136 186 (Mon-Fri 8am to 6pm) Marine Response Unit – 1300 245 678 Env Advisor to notify JV partners: Woodside Energy (Bass Strait Pty Ltd – bass.strait@woodside.com
Notification of activities affecting listed species or ecological communities in or on a Commonwealth area (specifically unintentional injury or death of a cetacean or listed threatened/migratory/marine species caused by, or suspected to have been caused by petroleum activity)	Within 7 days	DCCEEW- Environmental Compliance Hotline: 1800 110 395 environment.compliance@dccee w.gov.au Copy to Joint Venture partners: Woodside Energy (Bass Strait Pty Ltd – bass.strait@woodside.com
Cetacean vessel strike	Within 3 days	DCCEEW- Hotline: 1800 920 528 EPBC.Permits@dcceew.gov.au Env Advisor to notify Joint Venture partners: Woodside Energy (Bass Strait Pty Ltd – bass.strait@woodside.com

8.15 OIMS System 10-1: Community Awareness and Public Affairs

In accordance with OIMS System 10-1, Esso has developed a consultation and engagement methodology that enables Esso to:

- ensure every effort is made to identify relevant persons
- undertake a verification process to ensure all representatives of relevant persons are a true representation/advocate of the views of their constituents and can be relied upon to faithfully communicate the results of engagements back to their constituents
- ensure relevant persons, especially those who are directly impacted, are consulted on matters that may affect them
- develop and maintain consistent and constructive relationships with relevant persons with a genuine desire to further understand potential environmental, social, and economic impacts
- pursue engagement with relevant persons using a level of effort commensurate with the nature and scale of the activity

- keep relevant persons informed with respect to their specific interests, functions, or activities
- encourage relevant persons to assess the information provided to them and respond to Esso with any feedback including questions, issues, concerns, suggestions, objections and/or claims
- maintain confidence of relevant persons in Esso and its activities through ongoing open, informative, inclusive and timely communications, wherever possible.

Implementation of the methodology provides a mechanism by which Esso can:

- meet regulatory obligations and aligning to industry best practice consultation and engagement methods
- review and update the consultation methodology to reflect any changes to applicable laws, best practices or standards
- provide meaningful information in a format and language that is readily understandable and tailored to the needs of relevant persons and groups
- provide information within an adequate timeframe to inform decision-making
- ensure consultations are based on open communication that is transparent, collaborative, inclusive and are conducted with integrity to foster respect and trust
- disseminate information in formats, methods and locations that make it easy for relevant persons to access
- respect local traditions and the relevant person's preferred ways of doing things
- establish two-way dialogue that gives all relevant persons the opportunity to exchange views and information, to listen, and to have their feedback heard and addressed
- seek inclusiveness in representation of views, including minority and special interest groups
- develop clear mechanisms for receiving, documenting, and responding to feedback
- incorporate feedback from relevant persons into the program design and providing clear and transparent reporting back to relevant persons in a reasonable timeframe.

Esso recognises First Nations people as the Traditional Custodians of the land and waters in which the Company operates and acknowledges and pays respect to their Elders – past, present, and emerging.

Esso understands that First Nations people see no distinction between the land and the sea, considering it all as a part of their Country.

Esso continues to identify and attempt consultations with environmentally focused non-government organisations (eNGOs) and other environmental protection and advocacy groups.

Esso is committed to undertaking all consultation and engagement activities in accordance with ExxonMobil standards and applicable Australian legislation as outlined in Section 1.3 of this EP.

8.16 OIMS System 10-2: Emergency Preparedness and Response

The process to prepare emergency preparedness and response plans, including procedures to prevent and mitigate potential environmental impacts associated with accidents and emergency situations, is addressed through OIMS System 10-2.

Emergency response planning and preparedness is essential to ensure that, in the event of an incident, all necessary actions are taken for the protection of the public, the environment, Company personnel, assets and reputation.

Responsibilities for the purposes of emergency response are outlined as follows:

- Valaris is the operator of the facility and has legislative responsibilities for all operations on the JUR, including response to emergencies
- Esso's role in dealing with emergencies is to provide the necessary resources to support the operator's emergency response. Esso can provide support locally, regionally, and internationally.

Esso implements incident management based on the ICS. The ICS is a system designed to provide a consistent organisation to respond to emergency situations. Positions within the ICS are fixed and have specific functions, ensuring that all responders know what to do and where they report in the organisation structure. The ICS is based on the US National Incident Management System 2006 ICS Structure, with slight modifications for industry. ICS is the primary emergency response framework for an oil spill response from all offshore activities.

A campaign specific Emergency Response Bridging Plan (ERBP) will be developed to support the existing JUR emergency response documentation. It will describe the location specific arrangements for responding to emergencies including the role of helicopter and vessel support functions, extreme weather evacuation planning, medivac, regulatory liaison and reporting.

The bridging ERP will address local responses for Esso Bass Strait operations including appropriate support linkages to Esso's Australian and corporate-wide emergency preparedness and response network including in-country, regional and global ESGs. The bridging ERP also details how Valaris and Esso will interact in the event of an emergency. A campaign specific Contacts Directory listing all contact numbers will also be developed.

8.16.1 Oil Pollution Emergency Plan

In accordance with Regulation 22(8) and 22(12) of the Environment Regulations, the implementation strategy must include an OPEP and arrangements for testing the response arrangements within this EP.

In all cases Esso, as titleholder under the Environment Regulations, will retain control and responsibility for managing spill response.

Esso has an OPEP (see Attachment 2) in place for all its offshore assets and operations in Bass Strait that outlines how Level 1, 2 and 3 spills will be managed. The Bass Strait OPEP is provided as Attachment 3. In addition, Quick Reference Information specific to the activities of this EP, is included as Appendix D in attachement 2. The Quick Reference Information summarises hydrocarbon properties, worst case deterministic modelling, receptors at risk, relevant shoreline Tactical Response Plans, and recommended spill response strategies.

Level 1 spills are defined in the OPEP as 'Located within a 3nm radius of the spill location'. The operator has the responsibility to respond to emergencies. Therefore, for a Level 1 spill which is contained inside the 500m PSZ the JUR ERP is the primary response plan, and the operator will use its shipboard resources to immediately respond.

As described above, as Esso is the titleholder under the Environment Regulations, it will support the operator with the OPEP and provide additional resourcing as needed. All actions described under Level 1 incidents in the OPEP will still be undertaken by Esso who will work with the operator throughout the response process per the campaign specific bridging ERP. Where the spill extends beyond the 500m PSZ, Esso will continue with the response.

For a Level 2 or 3 spill the Bass Strait OPEP is the primary document and outlines the resources and response strategies to be implemented depending on the size and nature of the spill.

8.16.2 Oil spill response needs and capability.

In order to determine appropriate oil spill response strategies and capabilities, Esso has assessed spill risk, fate and weathering in the process of developing this EP. Deterministic modelling was utilised to identify potentially impacted receptors and anticipated oil loadings. Where modelling indicates surface or shoreline exposure above moderate thresholds, i.e. actionable quantities of oil, an assessment has been carried out to determine resource needs and availability. This information is summarised in Appendix D attachment 2.

MDO is a Group II oil that has a low viscosity and spreads rapidly on the sea surface to form thin sheens. Due to the rapid spread and weathering of MDO in open water environments, on-water containment and recovery may be viable but are unlikely to be effective. The use of chemical dispersants is not recommended practice for MDO. The probability of shoreline contact at the moderate threshold from an MDO spill within the OA is predicted to be 2% (see Section 7.6.2.3).

The Turrum reservoir fluids are Group I and non-persistent oils according to the International Tanker Owners Pollutions Federation classifications. The results for the spill modelling are presented in Section 7.7.1 and predict that the shoreline oiling is likely in the event of a LOWC. Given the properties of the condensate and predicted weathering and fate, based on the Net Environmental Benefit Analysis for the spill, the recommended response strategies will include a combination of spill response techniques that are outlined in the OPEP (Attachment 2).

8.16.3 Testing of oil spill response arrangements

In accordance with Regulation 22(14) of the Environment Regulations and requirements of OIMS System 10-2: Emergency Preparedness and Response, the response arrangements within the Bass Strait OPEP will be tested:

- during the JUR Campaign
- when they are significantly amended

- not later than 12 months after the most recent test
- in accordance with the:
    - schedule outlined in the Bass Strait Environment Plan (AUGO-EV-EMM-002) [Volume 4 Table 9-1]
    - EP-specific schedule outlined in Table 8-10
    - annual Emergency Preparedness and Response Activity Plan.

The annual Emergency Preparedness and Response Activity Plan includes additional detail on the type of test, frequency, duration, and participants and is cross-referenced to preparedness and response performance standards which are to be tested, as detailed in the annual Emergency Preparedness and Response Plan, provided as Attachment 2.

Testing may be externally or internally facilitated. Tests will be documented, assessed against objectives and applicable performance standards and any corrective actions/recommendations arising from the tests will be managed in accordance with the Emergency Preparedness and Response Programs Guide (AUGO-PO-SRT-337). Emergency response training records will be maintained in accordance with OIMS System 10-2.

Where changes are required to the Bass Strait OPEP, resulting from testing/exercise outcomes, altered contractual arrangements, corrective actions, routine information updates (e.g. contact detail change), or other items; the OIMS System 10-2 Administrator is responsible for ensuring changes are assessed against the revision criteria of Regulation 39 of the Environment Regulations and where necessary, this EP and/or the OPEP is submitted to NOPSEMA as a formal revision, in accordance with the MOC process (OIMS System 7-1). For changes which do not trigger a formal revision, internal revisions to the OPEP will also be in accordance with the MOC process with any change justified.

Table 8-10 Testing of oil spill response arrangements

Test	Objective	Parties involved	Scheduled frequency
Relief well	To assess the availability of suitable drill rigs capable of meeting the timelines defined in the Australian Wells Tier II/III ERP which includes source control emergency preparedness (in total well completed in 98 days) for relief well drilling.	Wells Team Third-party service providers Rig operator	Status and location of suitable relief well rigs are confirmed 30 days prior to Turrum Phase 3 production drilling activities commencing when the drilling activity starts and subsequently each month throughout the activity.
Desk top exercise - Source control	To familiarise the Offshore IMT and SCB with their roles and responsibilities detailed in the Bass Strait OPEP and Australian Wells Tier II/III ERP. To validate contact information and resource activation protocols as detailed in the Bass Strait OPEP and Australian Wells Tier II/III ERP to assess the availability of logistical resources to mobilise the following; • the specific aspect of the logistical resources to be assessed will be the availability of suitable construction support vessels. • to notionally test identifying and mobilising a relief rig to drill a relief well as		A minimum of annually.

Test	Objective	Parties involved	Scheduled frequency
	outlined in the Australian Wells Tier II/III ERP		

8.17 OIMS System 11-1: OIMS Assessment

Formal assessment is regularly undertaken on the performance of the OIMS to ensure that the Systems continue to be suitable, effective and are continuously improved. This is undertaken, at a minimum, on an annual basis in accordance with OIMS System 1-1.

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Appendix A: Description of the Environment in the EMBA

10 Contents

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1 Description of the environment

In accordance with Regulation 15(2) of the Environmental Regulations, the EMBA by the activity is described in this Section, together with its values and sensitivities. The definition of the EMBA is within Section 3.1 of this EP. The EMBA is shown in Figure A-1.

The following explanation has been inserted on all the figures displaying the EMBA throughout this Appendix:

"The environment that may be affected (EMBA) illustrated in this map represents the combined modelling results of 100 individual hydrocarbon spill simulations from a loss of well containment (LOWC) of condensate at surface from the Turrum well location. The spill simulates the release of 270,300m^3, over 98 days, using annualised metocean conditions. The spill simulation is subject to different wind and ocean currents at different times of the year. The EMBA is not representative of a single spill; an individual spill would affect a significantly smaller area. The modelled EMBA is based on the lowest reportable hydrocarbon thresholds for floating, shoreline and water column exposure."

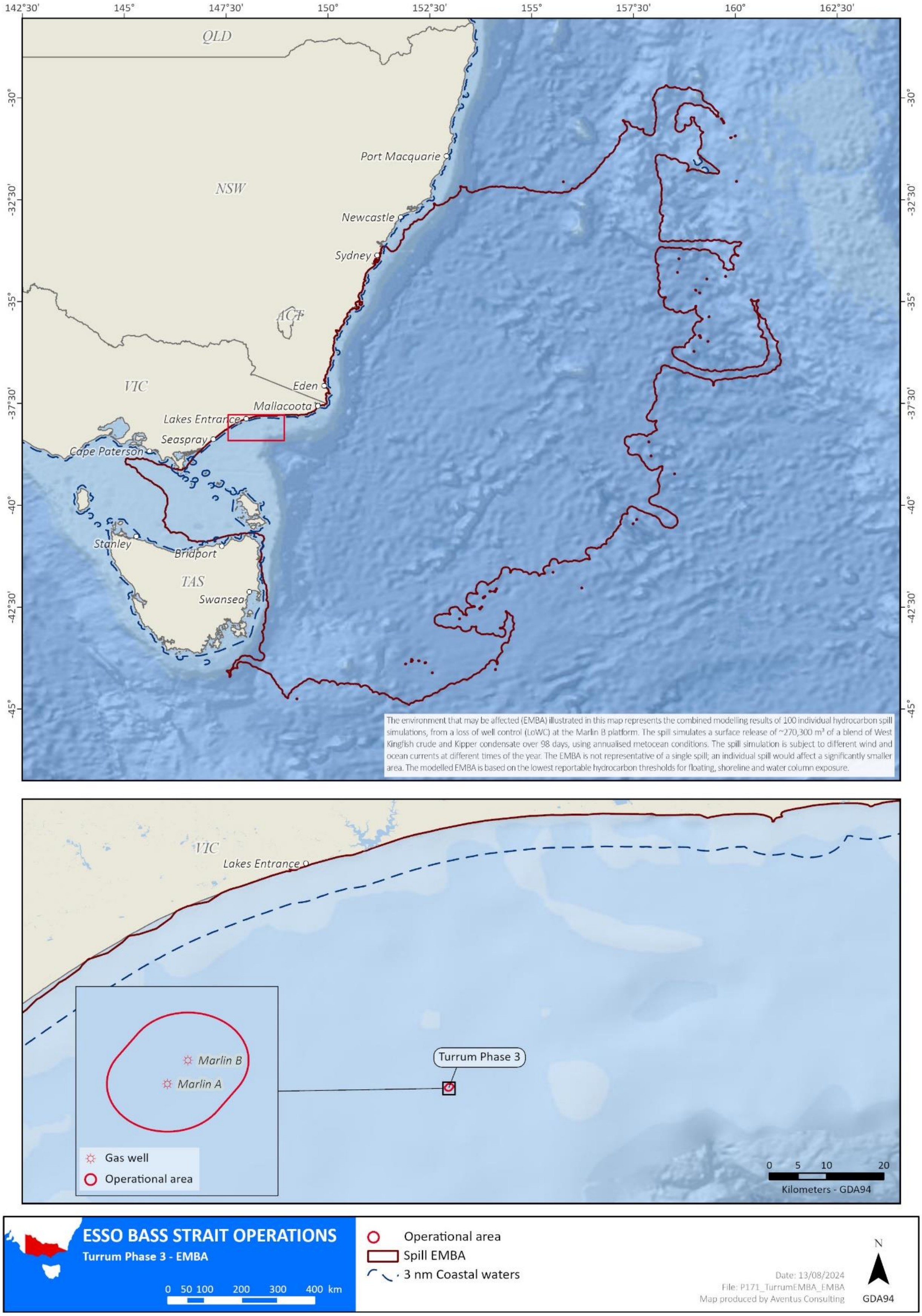

Figure A-1 Jack-up Turrum Phase 3 EMBA

1.1 Conservation values and sensitivities

The conservation values and sensitivities found within EMBA are described within this Section.

1.1.1 World Heritage

World heritage is defined in Table 3-2 of the EP. World heritage sites within the EMBA are described below and shown in Figure A-2. The Sydney Opera house and the Australian Convict Site – Hyde Park Barracks are not described as they are located onshore (i.e. do not have marine features that are present in the EMBA).

1.1.1.1 Lord Howe Island Group

The Lord Howe Island Group is located 700km northeast of Sydney and covers an area of 1,463km^2, the Lord Howe Island Group comprises Lord Howe Island, Admiralty Islands, Mutton Bird Islands, Ball's Pyramid, and associated coral reefs and marine environments. The Lord Howe Island Group was inscribed on the World Heritage List in 1982 (DCCEEW, 2022a).

The justification criteria for its World Heritage listing are its exceptional diversity of spectacular and scenic landscapes within a small area, including sheer mountain slopes, a broad arc of hills enclosing the lagoon and Balls Pyramid rising abruptly from the ocean. It is considered to be an outstanding example of an island system developed from submarine volcanic activity and demonstrates the nearly complete stage in the destruction of a large shield volcano. Having the most southerly coral reef in the world, it demonstrates a rare example of a zone of transition between algal and coral reefs. Many species are at their ecological limits, endemism is high, and unique assemblages of temperate and tropical forms cohabit (DCCEEW, 2022a).

The second criteria for the World Heritage listing is that it is an outstanding example of the development of a characteristic insular biota that has adapted to the island environment through speciation. A significant number of endemic species or subspecies of plants and animals have evolved in a very limited area. The diversity of landscapes and biota and the high number of threatened and endemic species make these islands an outstanding example of independent evolutionary processes (DCCEEW, 2022a). Endemic species occur in the flora and invertebrate fauna; 60% of invertebrate fauna are endemic with discovery of new species still occurring. Of the endemic flora, more is known about the vascular plants of which 113 of the 239 species are endemic. Whilst less is known about the non-vascular plants, they are also thought to be highly diverse and include endemic species (DECCW, 2007). Lord Howe Island Group is within the Lord Howe Marine Park.

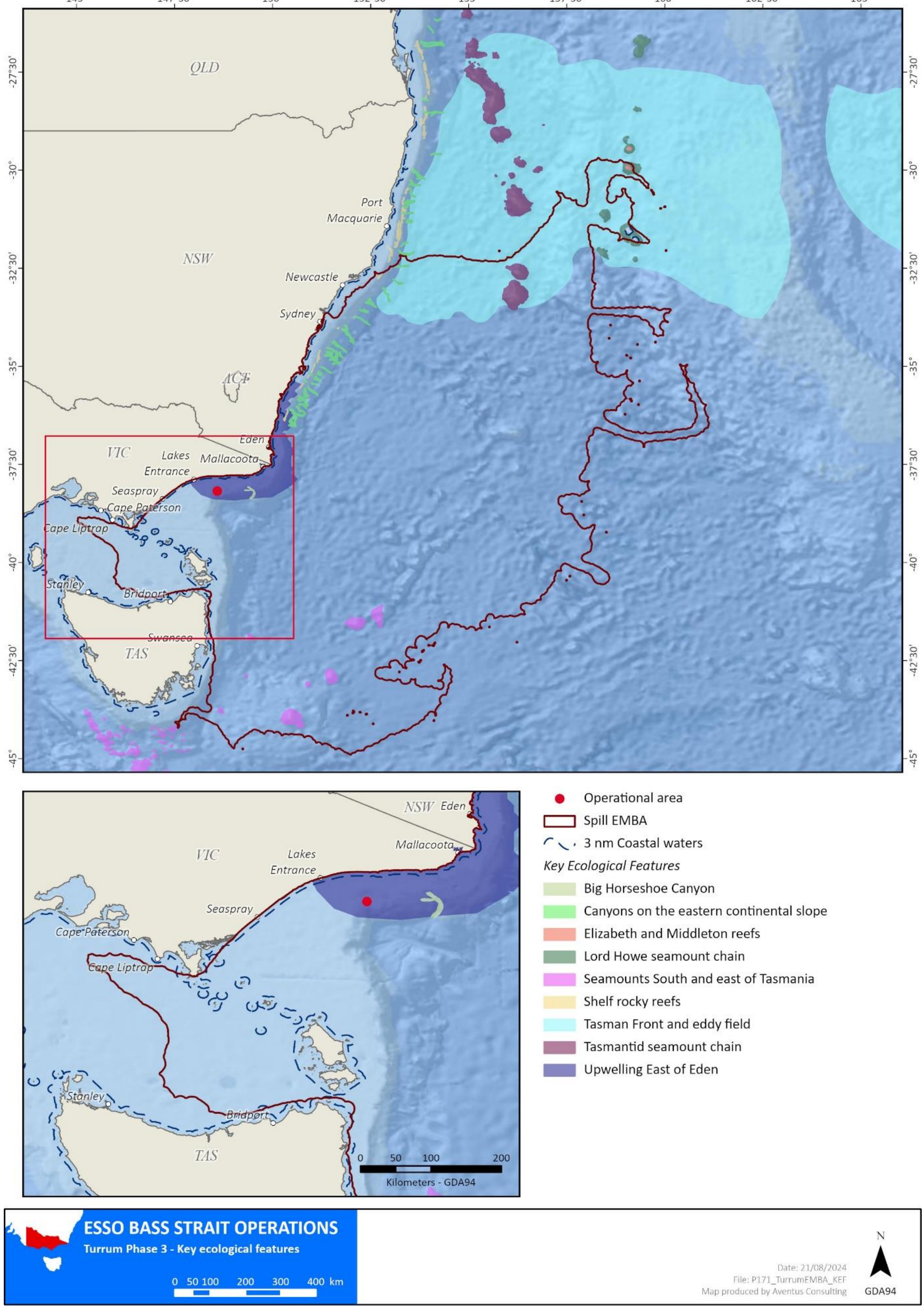

Figure A-2 World Heritage-listed properties within the EMBA

1.1.2 National heritage

National heritage is defined in Table 3-2 of this EP. National heritage sites within the EMBA are described below and shown in Figure A-3. Bondi Surf Pavilion, Centennial Park, First Government House Site, Governors' Domain and Civic Precinct, Hyde Park Barracks, Sydney Harbour Bridge and Sydney Opera House are excluded from this section as the EMBA will only affect marine or coastal areas.

1.1.2.1 Bondi Beach

Bondi Beach was inscribed on the National Heritage List in 2008. Bondi Beach is one of the most famous beaches in the world. Framed within rocky headlands it has come to be seen both nationally and internationally as part of the Australian way of life and leisure. In 1907 the Bondi Surf Bathers' Life Saving Club was formed, which acted as a catalyst for surf lifesaving movement throughout Australia. It also the location of the Bondi Surf Pavilion (DCCEEW, 2023a).

1.1.2.2 Lord Howe Island Group

The Lord Howe Island Group was one of 15 World Heritage places included in the National Heritage List on 21 May 2007, see Section 1.1.1 for the description.

1.1.2.3 Kamay Botany Bay: botanical collection sites

The Kamay Botany Bay: botanical collection sites were added to the National Heritage List in 2017. Botanist Sir Joseph Banks and naturalist Dr Daniel Solander accompanied Captain James Cook on the 1770 voyage to Australia. Upon the first landing, plants collected by Banks and Solander included many iconic Australian plant species, including some that later had important scientific and research value. Banks and Solander collected specimens of at least 132 plant species, including iconic members of the Proteaceae family (Banksia) and Myrtaceae family (Eucalyptus, Melaleuca and Leptospermum) (DCCEEW, 2022b).

The plant collection sites at Kamay Botany Bay, together with the collected plant material, represent the symbolic and actual integration of Australian flora into western science. The place is broadly comprised of three areas: the Kurnell Peninsula and La Perouse Headland which are located within Kamay Botany Bay National Park and the Towra Point Nature Reserve (DCCEEW, 2022b).

1.1.2.4 Kurnell Peninsula Headland

The Kurnell Peninsula Headland was added to the National Heritage List in 2005. The Kurnell Peninsula Headland was the landing site of Captain James Cook which led to the British settlement of the Australian continent. It altered forever the way of life for Indigenous Australians, dramatically expanded the world's scientific understanding of the continent's unique flora and fauna and ultimately led to the creation of a new nation — Australia. The site also represents the first recorded contact between Indigenous people and Britain in eastern Australia representing the birthplace of a nation and the dispossession of Indigenous people (DCCEEW, 2022c).

1.1.2.5 North Head – Sydney

North Head, Sydney was added to the National Heritage List in 2006. North Head is recognised as the entrance to one of the world's most picturesque harbours. The northern seaward entrance to Port Jackson, more commonly known as Sydney Harbour, is important as it played a major role in the cultural and military life of the colony of NSW, following the arrival of the First Fleet in 1788. The 'Heads' have signified arrival and departure at Port Jackson since 1788 and are recognised as important, iconic, national landmarks. In particular, the Manly headland marks the site where ships carrying passengers with infectious diseases were isolated; an important means of defence for an island nation (DCCEEW, 2022d).

1.1.2.6 Royal National Park and Garawarra State Conservation Area

The Royal National Park and Garawarra State Conservation Area was added to the National Heritage List in 2006. Royal National Park was Australia's first national park, and the world's second official national park after Yellowstone National Park in the USA. Located on the southern edge of Sydney, Royal National Park and the adjacent Garawarra State Conservation Area have one of the richest concentrations of plant species in temperate Australia. Royal National Parks is a landscape of sparkling beaches, cliffs, wild heathlands and woodlands. Its rich concentration of more than 1000 plant species supports a wide array of birds, reptiles and butterflies (DCCEEW, 2022e).

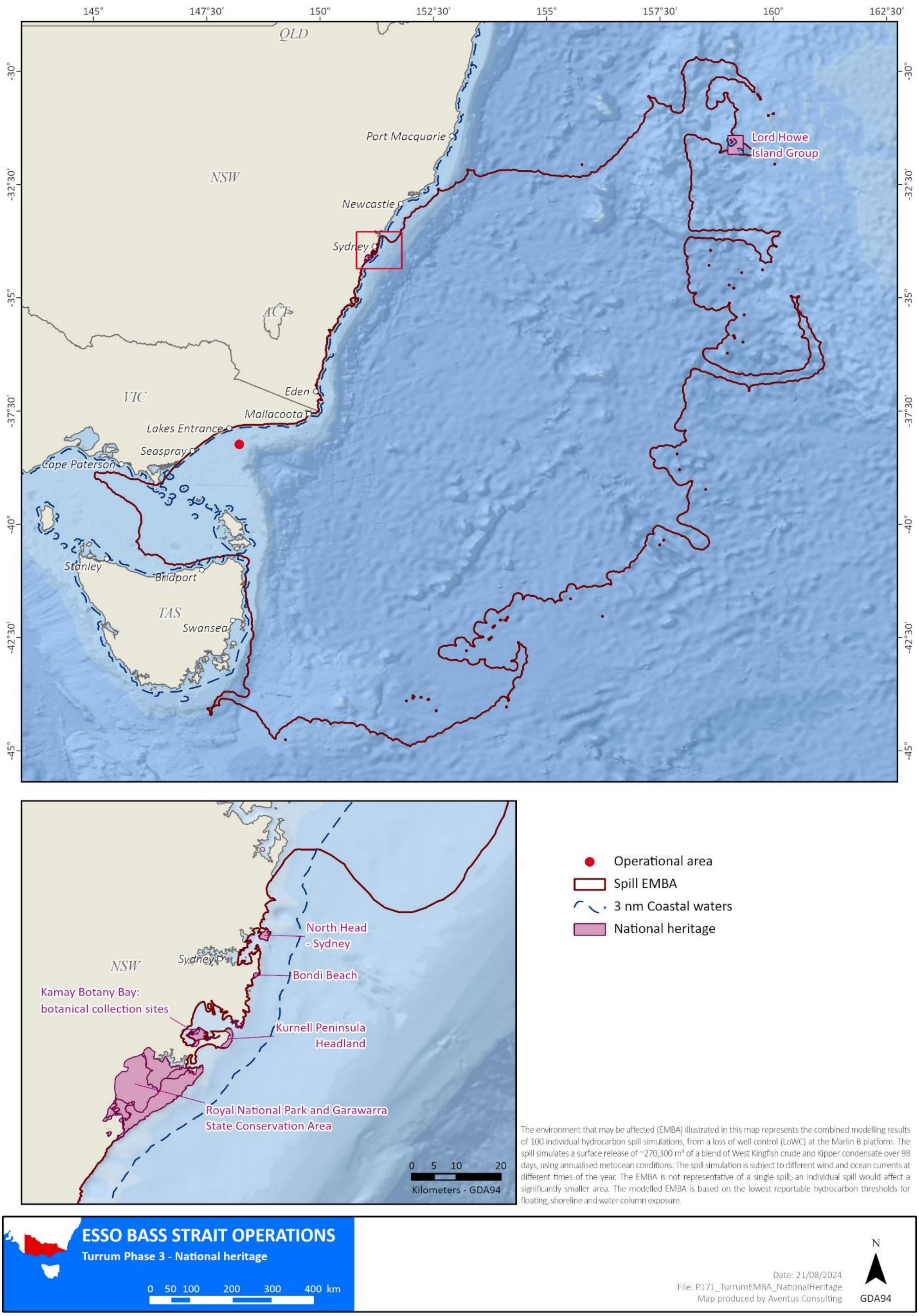

Figure A-3 National Heritage-listed sites within the EMBA

1.1.3 Commonwealth Heritage

Commonwealth heritage is defined in Table 3-2 of this EP. The following Commonwealth Heritage-listed sites are within the EMBA as seen in Appendix D only sites that are marine or coastal in nature are described below:

- Natural heritage:
  - Malabar Headland – located just north of Botany Bay, NSW contains two significant bushland remnants referred to as the coastal section and the western section. Together, these contain what is probably the largest area of essentially unmodified bushland in Sydney's Eastern Suburbs. The bushland is a significant part of one of two semi-natural corridors between Botany Bay and Port Jackson. The two sections support at least seven distinct plant communities. This diversity of habitats is only matched in the eastern suburbs in Botany Bay National Park (DCCEEW, 2023b)
  - Beecroft Peninsula - The Beecroft Peninsula is the best example of a Permian cliffed coast in NSW. It is about 4,040ha located south of the town of Currarong. The area supports a high diversity of vegetation types within a small area including mangroves, saltmarsh, freshwater swamps, heathland, eucalypt forest and subtropical and littoral rainforest. Beecroft Peninsula retains the largest area of heath remaining on the south coast of NSW. This floristically rich vegetation provides important habitat for a variety of bird species, including the vulnerable ground parrot
- Historic heritage:
  - Kirribilli House Garden and Grounds - The Kirribilli House Garden and grounds, developed from the 1850s onwards, are historically significant. The garden and grounds are associated with Australian Prime Ministers since 1957. The grounds are situated on a sloping sandstone ridge on the northern shore of Sydney Harbour. The land drops steeply to the foreshore, through a series of rockbenches and small cliffs.
  - HMAS *Penguin* - The primary group of buildings, mostly erected 1942-45 in the inter-war stripped classical style, display a consistent stylistic theme influenced by nautical features and, united by similar brickwork and green terracotta tiled roofs, are both important visual elements and landmark features in their own right, in a cultural landscape in which trees, gardens and topography contribute to the significance of the cultural landscape.
- Indigenous heritage:
  - Jervis Bay Territory - The Jervis Bay Territory is composed of Bherwerre Peninsula, Bowen Island, and the part of Jervis Bay from Captains Point to Bowen Island. The coast of Bherwerre Peninsula includes high sea cliffs, sea caves, intertidal rock platforms, beaches, and sublittoral rocky reefs. Aboriginal people used Bherwerre long before rising sea levels at the end of the last Ice Age turned this area of land into a peninsula. Evidence from the nearby Burrill Lake demonstrates that Aboriginal occupation extends back at least 20,000 years. The rise of sea levels at the end of the last Ice Age created a diversity of habitats on the Bherwerre Peninsula and the surrounding marine environment. This diversity of habitats and resources attracted Aboriginal people to the area and provided them with sustenance (DCCEEW, 2023d)

1.1.4 Wetlands of International Importance

Wetlands of international importance (Ramsar wetlands) are defined in Table 3-2 of this EP. Ramsar sites within the EMBA are described below and shown in Figure A-4.

1.1.4.1 Gippsland Lakes

The following information was extracted from the Australian Wetlands Database (DCCEEW, 2019a).

The Gippsland Lakes Ramsar site, located in Victoria is a series of large, shallow, coastal lagoons approximately 70km in length and 10km wide, separated from the sea by sand dunes. The surface area of the lakes is approximately 364km^2 and the three main water bodies are Lake Wellington, Lake Victoria, and Lake King.

The site meets five of the nine Ramsar criteria: 1, 2, 4, 6 and 8.

The Gippsland Lakes is a good representation of a natural or near-natural wetland, characteristic of the biogeographical region. It forms one of the largest coastal lagoon systems in the drainage division and contains a distinctive landscape of wetlands and flat coastal plains. The site supports a broad range of wetland types in close proximity to each other, including periodically and permanently inundated palustrine marshes, both shallow and deep lake features, lagoons with narrow inlets, and broad embayment's.

The Ramsar site supports several nationally threatened wetland fauna species at various stages of their life cycle including two nationally threatened frog species (green and golden bell frogs and growling grass frogs), the Australian painted snipe, the Australian grayling as well as three nationally threatened wetland-associated flora species the dwarf kerrawang, swamp everlasting and metallic sun-orchid. The site supports habitat and conditions that are important for critical life cycle stages of a variety of wetland-dependent fauna species.

The permanence of the main lakes and the relatively regular flooding of the adjacent wetlands mean that this wetland is an important drought refuge for many water birds and other aquatic species, including as permanent refuges and breeding sites for two threatened frog species. The Gippsland Lakes have been identified as being of outstanding importance for waterbirds, regularly supporting more than 20,000 waterfowl. Waterbird species which are considered to have met the one per cent population threshold are: red-necked stint, black swan, sharp-tailed sandpiper, chestnut teal, musk duck, fairy tern and little tern.

Gippsland Lakes provides important habitats, feeding areas, dispersal and migratory pathways, and spawning sites for numerous fish species of that are directly and indirectly significant for commercial fisheries. Currently, parts of the Lakes system are heavily used for commercial and recreational fisheries and boating activities, while the immediate hinterland has been developed for agricultural use, and limited residential and tourism purposes.

1.1.4.2 East Coast Cape Barren Islands Lagoons

The following information was extracted from the Australian Wetlands Database (DCCEEW, 2019a).

East Coast Cape Barren Island Lagoons is located on the east coast of Cape Barren Island in Tasmania. The site is significant as it forms a representative sample of coastal lagoons in the Flinders Biogeographic Region and is relatively undisturbed.

The site meets two of the nine Ramsar criteria: 1 and 3.

The Cape Barren Dunes, within the site, are a geoconservation site in Tasmania. Thirsty Lagoon is a hypersaline lagoon and is a Tasmanian estuary of critical conservation significance. Three of the lagoons within the site, Flyover Lagoon 1, Flyover Lagoon 2, and Little Thirsty Lagoon, have been assessed as near pristine wetlands for Tasmania, and are recognised NIWs.

The critical components and processes for the site at the time of listing in 1982 have been determined to be geomorphology, hydrology and vegetation types. While there is some anecdotal evidence that this site is important for shorebirds, there is insufficient data to evaluate whether they are a critical component.

The Ramsar site is an important habitat for a number of plant species and vegetation communities. Thirteen threatened species listed in Tasmania occur on the site, including the furze hakea and horny cone bush. The site represents the only known reserve in Tasmania for the threatened pink bladderwort. The white-bellied sea eagle, and the ruddy turnstone also occur within the site.

This Ramsar site is of cultural importance to the local Indigenous community, who manage the freehold title to part of Cape Barren Island, including the Ramsar site. Access is currently restricted, keeping the site largely undisturbed.

1.1.4.3 Logan Lagoon

The following information was extracted from the Australian Wetlands Database (DCCEEW, 2019a).

The Logan Lagoon Ramsar site is enclosed within the Logan Lagoon Conservation Area located on the southeast corner of Flinders Island, Tasmania. The site is an excellent, regionally representative example of a coastal estuarine wetland system.

The site meets five of the nine Ramsar criteria: 1, 2, 3, 4 and 6.

The Ramsar site contains two sites listed on the Tasmanian Geoconservation Database; Logan Lagoon Holocene Shorelines and Planter Beach Coastal Barrier System. Logan Lagoon, with other lagoons and dunes in the area, represents and outstanding example of the development of Holocene shorelines for the local region. Logan Lagoon is recognised as a wetland in near pristine condition. The Planter Beach Coastal Barrier System, partly within the site, represents and outstanding example of how offshore bars formed with Holocene sea level rise and barrier growth has enclosed the coast, forming large lagoons.

The nationally threatened northern leek orchid and a subspecies of the Common wombat (Bass Strait) also occurs on the site and is restricted to Flinders Island. Logan Lagoon supports species and communities threatened in the Tasmania drainage division, particularly callitris rhomboidea forest and the rayless starwort. The site provides breeding habitat for two beach nesting shorebirds that are threatened, the fairy tern and little tern.

The Ramsar site is an important area for birds migrating between southeastern Australia and Tasmania. Supporting five migratory bird species, the red-necked stint, curlew sandpiper, sharp-tailed sandpiper, common greenshank, and little tern. The site also regularly supports 1% of the global or regional populations of the: hooded plover, fairy tern, musk duck, and chestnut teal.

1.1.4.4 Towra Point Nature Reserve

The following information was extracted from the Australian Wetlands Database (DCCEEW, 2019a).

Towra Point Nature Reserve Ramsar site is located on the southern shore of Botany Bay, NSW, within Towra Point Nature Reserve. Towra Point Nature Reserve is important in providing ecological connectivity for itinerant species and is important for maintaining biodiversity in the greater Sydney region.

The site meets four of the nine Ramsar criteria: 2, 3, 4 and 8.

Towra Point Nature Reserve is a critical roosting and feeding habitat for large numbers of migratory shorebird species and a significant nesting site for the little tern. The mangroves and seagrass provide protection and food for juvenile fish species. Studies have shown that a higher abundance and diversity of fish species are found in areas of mangrove and saltmarsh which are adjacent to seagrass than are found in isolated communities. The release of crab larvae from saltmarsh areas during spring ebb tides provides a reliable source of food for a variety of fish species and a critical link in the estuary's food web.

Threats to the site include its proximity to one of the largest ports in eastern Australia; alterations to the shoreline, hydrology and bathymetry of Botany Bay causing increased wave energy on the southern side of the bay; residential and industrial development within the catchment; invasive species; and the impacts of climate change including sea level rise.

1.1.4.5 Elizabeth and Middleton Reefs Marine National Nature Reserve

The following information was extracted from the Australian Wetlands Database (DCCEEW, 2019a).

Elizabeth and Middleton Reefs are located in the northern Tasman Sea, 150km north of Lord Howe Island. Elizabeth and Middleton Reefs are a pair of isolated oceanic platform reefs separated from one another by 45km of deep oceanic waters and together they represent the southern-most platform reefs in the world. Elizabeth Reef measures 8.2km by 5.5km and Middleton Reef, slightly larger but of a similar shape, at 8.9km x 6.3km

The site meets five of the nine Ramsar criteria: 1, 2, 3, 4 and 8.

Critical Services provided by this site are:

- representative of a unique ecosystem in the bioregion: southern-most open ocean coral reef platform in the world
- supports the green turtle (feeding habitat only, no nesting)
- supports regionally high species diversity: fish; coral communities; molluscs; and sea cucumbers
- supports animal taxa at a vulnerable or critical stage of their lifecycle, particularly the Galapagos Shark (likely nursery ground)
- supports the last known large population of blackrock cod.

Currently, Elizabeth and Middleton Reefs are mainly use for nature conservation and scientific research, with limited recreational diving and fishing also occurring.

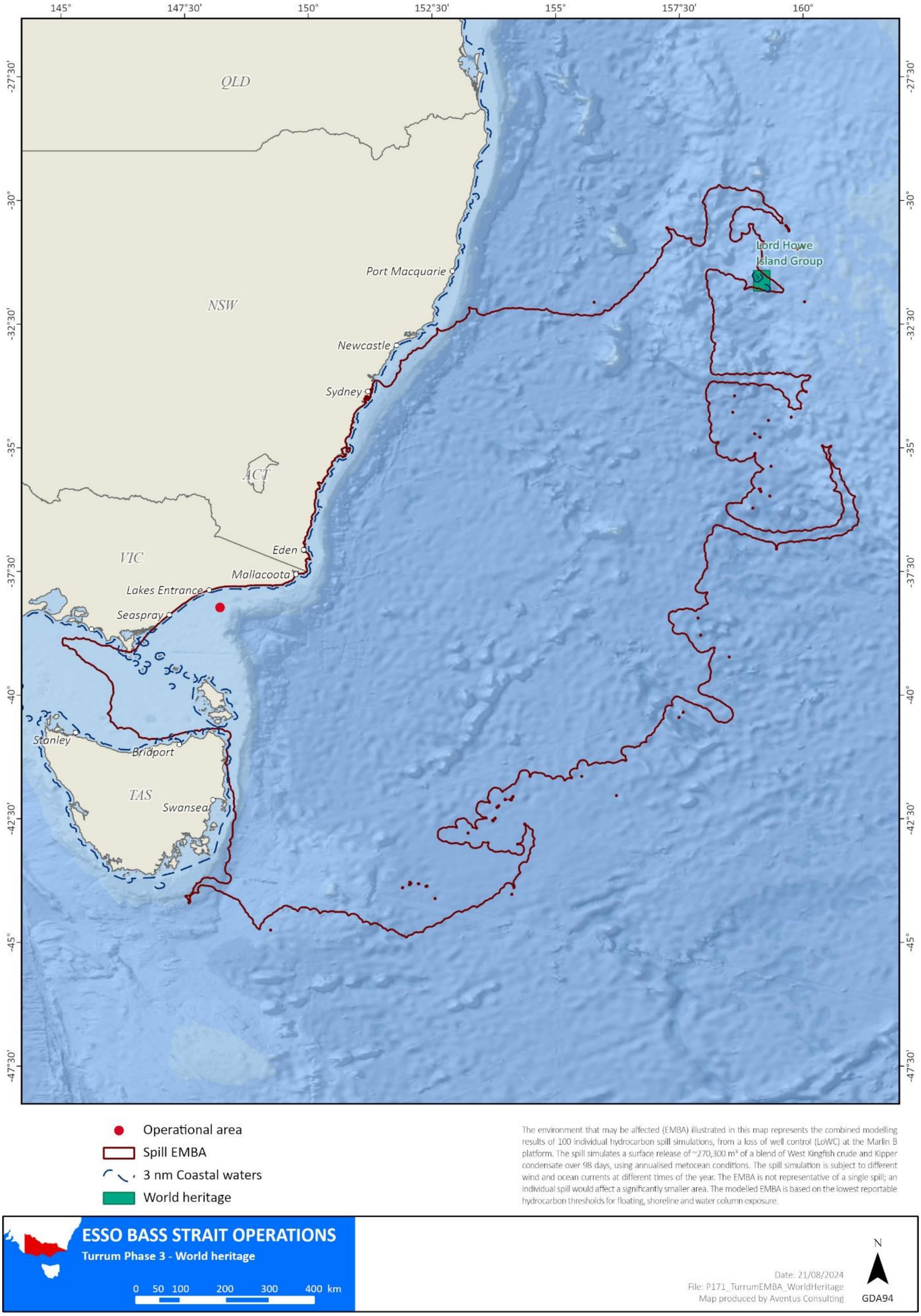

Figure A-4 Ramsar wetlands within the EMBA

1.1.5 Nationally Important Wetlands

NIWs are defined in Table 3-2 of this EP. The following NIWs listed below are intercepted by the EMBA and shown in Figure A-5. Note only NIWs that are marine/coastal in nature are listed below, an extensive list of NIWs detected by the PMST can be seen in Appendix D.

Victoria:

- Benedore River
- Ewing's Marsh (Morass)
- Lake Bunga
- Lake King Wetlands
- Lake Tyers
- Mallacoota Inlet Wetlands
- Shallow Inlet Marine and Coastal Park
- Snowy River
- Sydenham Inlet Wetlands
- Tamboon Inlet Wetlands
- Thurra River

Tasmania:

- Fergusons Lagoon
- Flyover Lagoon 1 (TAS040)
- Flyover Lagoon 2 (TAS041)
- Hogans Lagoon
- Little Thirsty Lagoon
- Logan Lagoon
- Sellars Lagoon
- Stans Lagoon
- Syndicate Lagoon
- Thompsons Lagoon
- Unnamed Wetland (TAS049)
- Unnamed Wetland (TAS050)
- Unnamed Wetland (TAS051)
- Unnamed Wetland (TAS052)

NSW:

- Avoca Lagoon
- Beecroft Peninsula Budgewoi Lake Sand Mass
- Botany Wetlands
- Clyde River Estuary
- Cullendulla Creek and Embayment
- Durras Lake
- Five Islands Nature Reserve
- Jervis Bay Sea Cliffs
- Jervis Bay
- Lake Illawarra
- Merimbula Lake
- Meroo Lake Wetland Complex
- Minnamurra River Estuary
- Moruya River Estuary Saltmarshes
- Nadgee Lake and tributary wetlands
- Nelson Lagoon
- Pambula Estuarine Wetlands
- Port Stephens Estuary

- Shoalhaven/Crookhaven Estuary
- Swan Lagoon
- Tabourie Larke
- Termeil Lake Wetland Complex
- Towra Point Estuarine Wetlands
- Tuross River Estuary
- Twofold Bay
- Wamberal Lagoon
- Wollumboola Lake

Commonwealth Area:

- Elizabeth and Middleton Reefs (EXT003)

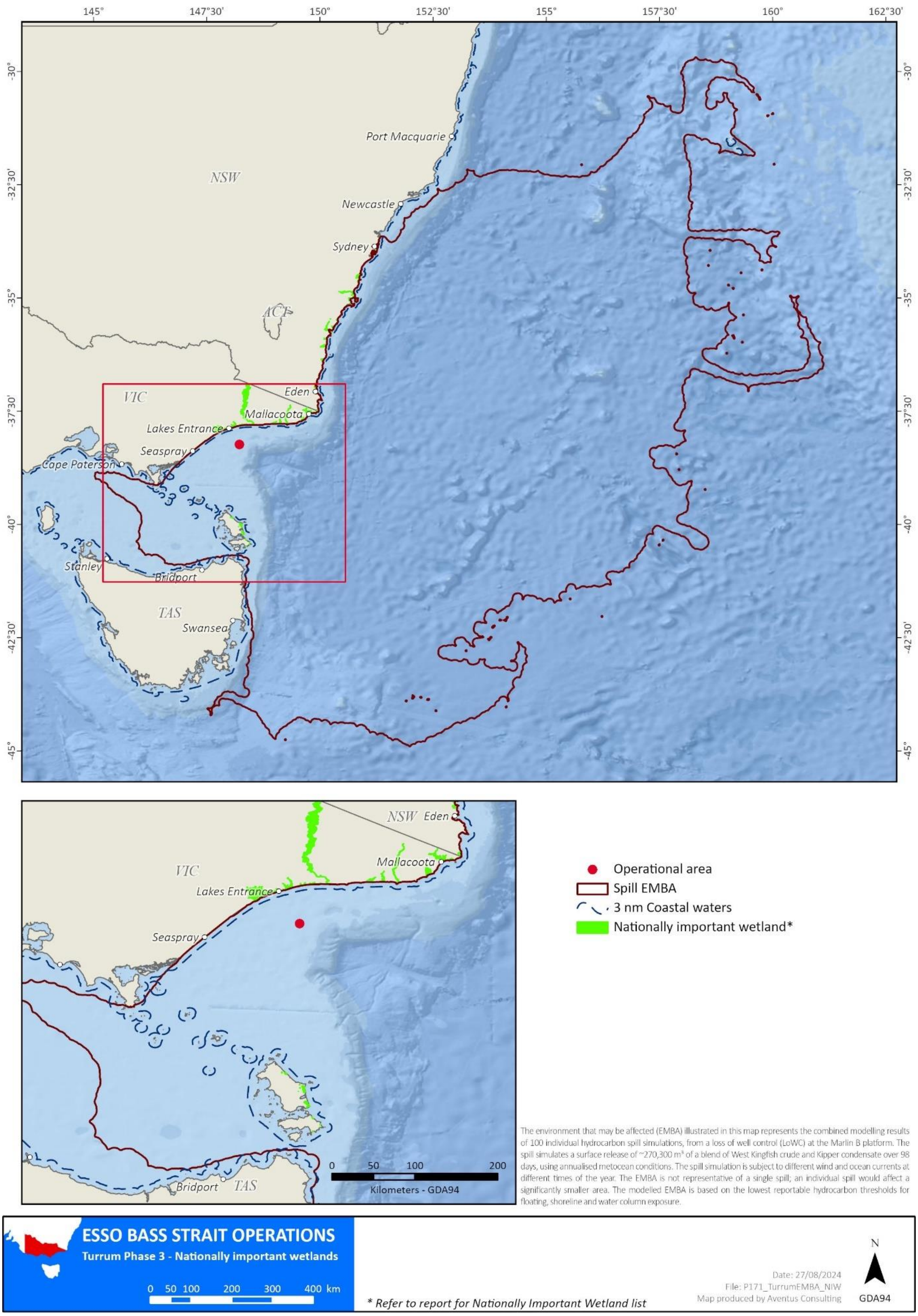

Figure A-5 NIWs within the EMBA

1.1.6 *Threatened Ecological Communities*

TECs are defined in Table 3-2 of the EP. TECs within the EMBA are described below and shown in Figure A-6. Only TECs that are marine/coastal in nature have been described, a full list of TECs detected by the PMST report can be seen in Appendix D.

1.1.6.1 Littoral Rainforest and Coastal Vine Thicket

This TEC is listed as critically endangered under the EPBC Act. This ecological community is a complex of rainforest and coastal vine thickets influenced by its proximity to the sea; and provides habitat for over 70 threatened plants and animals and provides important stepping-stones along the eastern Australian coast for various migratory and marine birds. The community also provides an important buffer to coastal erosion and wind damage (CoA, 2019).

The ecological community occurs as a series of naturally disjunct and localised stands within 2km of the eastern coastline of Australia or adjacent to a large saltwater body, such as an estuary on a range of landforms including dunes and flats, headlands, and sea-cliffs, including offshore islands (CoA, 2019).

This TEC has scattered and fragmented distribution from Princess Charlotte Bay, Queensland to East Gippsland in Victoria, including on estuarine and offshore islands. Sites that occur on the east Gippsland coast (including locations near Lakes Entrance, Marlo and Mallacoota) and communities found along most of the NSW coastline intersect with the EMBA.

1.1.6.2 Subtropical and Temperate Coastal Saltmarsh

This TEC is listed as vulnerable under the EPBC Act. The known distribution of this TEC includes the southern and eastern coasts of Australia where it occurs within a narrow margin in the subtropical and temperate climatic zones; and includes coastal saltmarsh occurring on islands within these climatic zones (DSEWPC, 2013a).

The physical environment for the ecological community is coastal areas under regular or intermittent tidal influence. The community consists mainly of salt-tolerant (halophytes - grasses, herbs, sedges, rushes and shrubs) and non-vascular vegetation including epiphytic algae, diatoms and cyanobacterial. The ecological community is inhabited by a wide range of infaunal and epifaunal invertebrates, and temporary inhabitants such as prawns, fish and birds (and can often constitute important nursery habitat for fish and prawn species). The dominant marine residents are benthic invertebrates, including molluscs and crabs that rely on the sediments, vascular plants, and algae, as providers of food and habitat across the intertidal landscape (DSEWPC, 2013a).

This community occurs sporadically along coastline which intersects with the EMBA.

1.1.6.3 Giant Kelp Marine Forests of Southeast Australia

This TEC is listed as an endangered under the EPBC Act and has progressively diminished, especially on the east coast of Tasmania due to changing oceanographic conditions and corresponding changes in threatening processes caused by climate change (DSEWPC, 2012a). The TEC is found from Eddystone Point in the northeast of Tasmania all along the eastern coastline and around the southern coast as far as Port Davey. The TEC community has also been known to intermittently develop on the northern and western coasts of Tasmania and occur in the coastal waters off Victoria and southeast South Australia where physical conditions and environmental factors are favourable for its growth (DSEWPC, 2012a).

Giant kelp (*macrocystis pyrifera*) plants are the foundation species of this TEC. Giant kelp is a large brown alga that grows on rocky reefs from the seafloor 8m below sea level and deeper. Its fronds grow vertically toward the water surface, in cold temperate waters off southeast Australia. Their presence on a rocky reef adds vertical structure to the marine environment that creates significant habitat for marine fauna (DSEWPC, 2012a). The kelp species itself is not protected; to be considered a giant kelp marine forest, the plants must form a closed or semi-closed canopy at or below the water's surface and grow at depths generally greater than 8m on a rocky substrate. Other components of this TEC include a large range of marine algae, reef associated fish and numerous invertebrates that shelter, feed, and reproduce within giant kelp marine forests (DSEWPC, 2012a).

1.1.6.4 Coastal Swamp Oak Forest of New South Wales and South East Queensland

This TEC is listed as endangered under the EPBC Act and occurs along Southeast Corner bioregions of NSW in coastal catchments, on coastal flats, floodplains, drainage lines, lake margins, wetlands and estuarine fringes where soils are at least occasionally saturated, water-logged or inundated. Coastal Swamp Oak Forest is often found in association with other vegetation types such as coastal saltmarsh and mangroves (DoEE, 2018a).

The vegetation of the Coastal Swamp Oak Forest provides diverse habitat values and is a source of food for a wide range of fauna, particularly the crevices and hollows within older trees. Most fauna species that form a part of the Coastal Swamp Oak Forest also inhabit adjacent wetlands, grasslands, woodlands, and forests. Many fauna species within the ecological community are listed as threatened under State and/or Commonwealth legislation including small mammals, reptiles, invertebrates, amphibians, and birds (DoEE, 2018a).

1.1.6.5 Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community

This TEC is listed as endangered under the EPBC Act and includes an assemblage of native plants, animals and micro-organisms associated with the dynamic salt-wedge estuary systems that occur within the temperate climate, microtidal regime, high wave energy coastline of western and central Victoria. This TEC 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. Some assemblages of biota are dependent on the dynamics of salt-wedge estuaries for their existence, refuge, increased productivity, and reproductive success (DoEE, 2018b).

The TEC currently encompasses 25 estuaries in the region defined by the border between South Australia and Victoria and the most southerly point of Wilsons Promontory (DoEE, 2018b). Salt-wedge estuaries are typically ecosystems of high ecological value which are increasingly under threat. They contribute high levels of productivity to coastal and nearshore marine environments, and provide important refuge, nursery or breeding habitat for a wide range of invertebrates, fish and birds.

1.1.6.6 Coastal swamp sclerophyll forest of New South Wales and South East Queensland

This TEC is listed as endangered under the EPBC Act and includes the plants, animals and other organisms typically associated with forested palustrine wetlands, or swamp forests. This TEC is found in the temperate to subtropical coastal valleys between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of NSW (DAWE, Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland. , 2021). This TEC is resent in in low-lying coastal alluvial areas with minimal relief at elevations below 20m above sea level (ASL) but may occur occasionally up to 220m ASL (DAWE, Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland. , 2021) .

This TEC often has a layered canopy, dominated by melaleucas and/or eucalyptus robusta. This TEC supports a range of aquatic, ground dwelling and aboreal species.

1.1.6.7 Coastal Upland Swamps in the Sydney Basin

This TEC is listed as endangered under the EPBC Act and is endemic to NSW. This TEC is including a range of vegetation and fauna associated with periodically waterlogged soils on the Hawkesbury sandstone plateaux (DoE 2014). This TEC is found in the eastern part of the Sydney Basin, occurring primarily on poorly permeable sandstone plateaux in low relief headwater valleys of streams and on sandstone benches with abundant seepage moisture. Majority of the swamps exist at elevations of 200 - 450m ASL. However, the elevation of some swamps in the region can vary from as low as 20m to around 600m ASL (DoE, 2014a).

The TEC is characterised by highly diverse and variable mosaics of vegetation depending on soil conditions, size of the site, recent rainfall conditions, fire regimes and disturbance history. The swamps also provide habitat for a wide range of fauna permanently or as transients (DoE, 2014a).

1.1.6.8 Posidonia australis seagrass meadows of the Manning Hawkesbury ecoregion

This TEC is listed as endangered under the EPBC Act. This TEC comprises of plants, animals and micro-organisms associated with seagrass meadows dominated by Posidonia australis occurring in the warm temperate Manning Shelf and Hawkesbury Shelf bioregions (NSW) from Wallis Lake to Port Hacking (DoE, 2015a). This TEC mainly occurs within sheltered environments of permanently open estuaries, typically in subtidal waters at depths ranging less than 1 - 10m on sand and silty mud substrate (DoE, 2015a).

The wide strap-like leaves of Posidonia australis provides substrate for a diverse collection of benthic flora. Posidonia australis is believed to provide the greatest habitat structure of any of the seagrass species found in NSW, supporting an abundance of fauna.

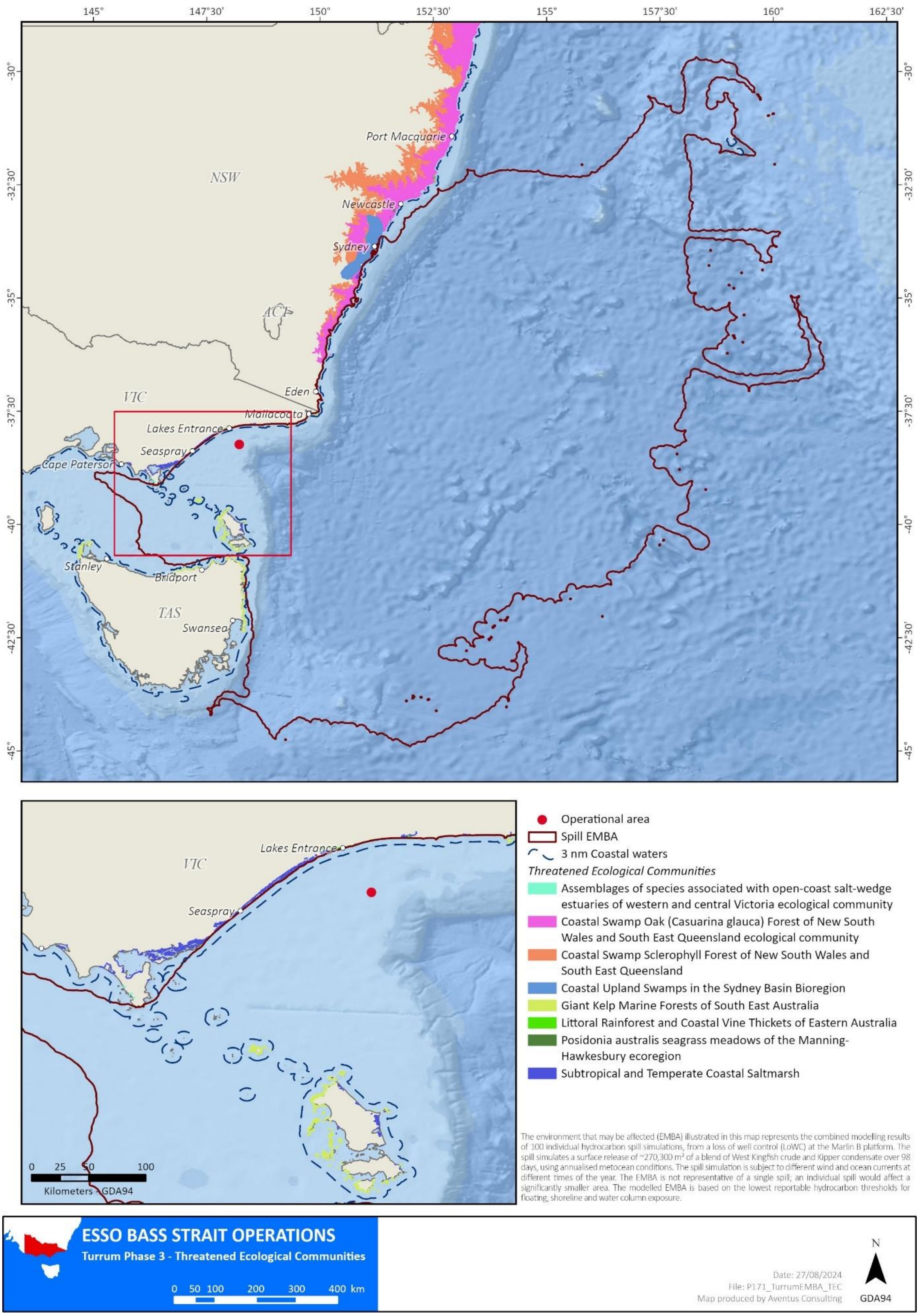

Figure A-6 TECs intersected by the EMBA

1.1.7 Australian Marine Parks

AMPs are defined in Table 3-2 of this EP. AMPs within the EMBA are described below and shown in Figure A-7.

1.1.7.1 East Gippsland Marine Park

The East Gippsland Marine Park is located off the northeast corner of Victoria and is 4,127km^2 the full area of the marine park is designated as a multiple use zone (IUCN VI) (DNP, 2013).

The park contains representative samples of an extensive network of canyons, continental slope, and escarpment at depths from 600m to more than 4,000m. The geomorphic features of this reserve include rocky-substrate habitat, submarine canyons, escarpments and a knoll, which juts out from the base of the continental slope.

The reserve includes both warm and temperate waters, which create habitat for free-floating aquatic plants or microscopic plants (i.e. phytoplankton) communities. Complex seasonality in oceanographic patterns influences the biodiversity and local productivity. The EAC brings subtropical water from the north, and around Cape Howe the current forms large eddies, with a central core of warm water. Around the outside of the eddies, cooler, nutrient-rich waters mix with the warm water creating conditions for highly productive phytoplankton growth, which supports a rich abundance of marine life. During winter, upwellings of cold water may occur and bring nutrient-rich waters to the surface, boosting productivity (DNP, 2013).

Many oceanic seabirds forage in these waters, including albatrosses, petrels and shearwaters.

Major conservation values include:

- examples of ecosystems, habitats and communities associated with the southeast transition and associated with seafloor features of abyssal plain/deep ocean floor, canyon, escarpment, knoll/abyssal hill and slope
- features with high biodiversity and productivity are the Bass Cascade and Upwelling East of Eden
- important foraging area for the wandering, black-browed, Indian yellow-nosed and shy albatrosses; great-winged petrel; wedge-tailed shearwater; and cape petrel
- important migration area for the humpback whale.

1.1.7.2 Beagle Marine Park

The Beagle Marine Park lies entirely within Bass Strait and represents an area of shallow continental shelf ecosystems in depths of about 50 - 70m that extends around southeastern Australia to the east of Tasmania. The seabed that it covers formed a land bridge between Tasmania and Victoria during the last ice age 10,000 years ago. The full area of the marine park (2,928km^2) is designated as a multiple use zone (DNP, 2013).

The Beagle Commonwealth Marine Reserve represents an area of shallow continental shelf ecosystems in depths of about 50 – 70m that extends around southeastern Australia to the east of Tasmania. The seafloor that it covers formed a land bridge between Tasmania and Victoria during the last ice age 10,000 years ago.

Major conservation values include:

- ecosystems, habitats and communities associated with the Southeast Shelf Transition and associated with seafloor features of basin, plateau, shelf, sill
- important migration and resting on migration area for the SRW
- important foraging area for the Australian fur seal, killer whale, great white shark, shy albatross, Australasian gannet, short-tailed shearwaters, pacific gulls, silver gulls, crested tern, common diving petrel, fairy prion, black-faced cormorant and little penguin.

Maritime heritage sites of the wreck of the steamship SS *Cambridge* and the wreck of the ketch *Eliza Davies* are within the park.

1.1.7.3 Flinders Marine Park

The Flinders Marine Park is located east of the northeast tip of Tasmania and Flinders Island and extends over 400km eastward. It covers a depth range from about 40m on the shallow continental shelf to abyssal depths of 3,000m or more near the edge of Australia's exclusive economic zone. The park (27,043km^2) is recognised as both a Marine National Park Zone and Multiple Use Zone.

Key features of this area are the continental shelf, and a long section of steep continental slope, incised by a series of deep submarine canyons. Sea bottom habitats include sheer rocky walls and large rocky outcrops that support a rich diversity of small seabed animals, such as lace corals and sponges. These and the large expanses of sandy and muddy sediments are habitats to a wide variety of fishes and to populations of the giant crab. Areas between 400m and 600m of the continental slope seafloor are habitat for dogfish and gulper sharks, and Harrison's dogfish has been recently recorded in the reserve (DNP, 2013).

Major conservation values include:

- ecosystems habitats and communities associated with the Tasmania Province, the Tasmanian Shelf Province, the Southeast Transition, the Southeast Shelf Transition
- associated with sea-floor features abyssal plain/deep ocean floor, canyon, plateau, seamount/guyot and shelf slope
- features with high biodiversity and productivity are east Tasmania subtropical convergence zone
- the park is an important foraging area for wandering, black-browed, Indian yellow-nosed and shy albatrosses; northern giant petrel, gould's petrel, cape petrel, killer whale, great white shark and Harrison's dogfish
- the park is an important migration area for the humpback whale.

1.1.7.4 Jervis Marine Park

Jervis Marine Park is located about 20km offshore, adjacent to the NSW Jervis Marine Park comprising an area of 2,473km^2 and covering a depth range from 120 - 5,000m approximately. The park has Habitat Protection and Special Purpose (Trawl) zones (DNP, 2018).

Sea floor features represented in the reserve include abyssal-plain/deep ocean floor, canyons, shelf and slope. The reserve includes two KEFs, it is one of three shelf incising canyons occurring within the region (unique seafloor feature with ecological properties of regional significance) and shelf rocky reefs.

Major conservation values are:

- ecosystems habitats and communities associated with the Central Eastern Province and Southeast Shelf Transition
- important foraging area for seabirds, grey nurse sharks and humpback whales
- KEFs; canyons on the eastern continental slope and shelf rocky reefs
- contains one known shipwreck listed under the *Historic Shipwrecks Act 1976* (Cth) - HMAS *Tattoo* (wrecked in 1939).

1.1.7.5 Freycinet Marine Park

The Freycinet Marine Park is located east of Tasmania, offshore from the Freycinet Peninsula. It covers 57,942km^2, with depths from 40 – 3,000m. It has marine national park, recreational use and multiple use zones.The reserve spans the continental shelf and deeper water ecosystems that extend around southeastern Australia to the east of Tasmania. The shelf is adjoined to a large offshore saddle (DNP, 2013).

Major conservation values are:

- ecosystems habitats and communities associated with the Tasmania Province, the Tasmanian Shelf Province, the Southeast Transition
- associated with sea-floor features are abyssal plain/deep ocean floor, canyon, escarpment, knoll/abyssal hill, saddle, seamount/guyot, terrace and shelf
- features with high biodiversity and productivity are east Tasmania subtropical convergence zone
- the park is an important foraging area for wandering, black-browed, and shy albatrosses, cape petrel, fairy prion, sei whales and killer whales
- the park is an important migration and resting during migration area for SRW and migration area for humpback whales.

1.1.7.6 Central Eastern Marine Park

Central Eastern Marine Park begins 30km east of Coffs Harbour. It covers 70,054km^2, with depths from 120 – 6,000m. It has Marine National Park Zone Habitat Protection Zone/Special Purpose Zone (Trawl).

The park is significant because it includes habitats, species and ecological communities associated with the Central Eastern Province, the Central Eastern Shelf Transition and the Tasman Basin Province. It includes three KEFs: canyons on the eastern continental slope; the Tasmantid Seamount Chain; and the Tasman Front and eddy field (both valued for high productivity, aggregations of marine life, biodiversity and endemism) (DNP, 2018).

Major conservation values are:

- ecosystems, habitats, and communities associated with Central Eastern Province, Central Eastern Shelf Transition and Tasman Basin Province
- it is an important area for foraging and breeding of seabirds and migrating humpback whales
- KEFs of the marine park are the Tasmantid Seamount Chain, Canyons on the eastern continental slope and Tasman Font and eddy field
- Sea Country is valued for Indigenous cultural identity
- maritime heritage site for shipwrecks *Amelia* (1816) and *Illagong* (1872)
- social values are tourism, commercial fishing and recreation.

1.1.7.7 Lord Howe Marine Park

The Lord Howe Marine Park is located approximately 550km offshore of NSW, adjacent to the NSW Lord Howe Island Marine Park and World Heritage Area. The park has National Park Zone/Habitat Protection Zone, Habitat Protection Zone (Lord Howe), Recreation Zones/Special Purpose Zone (Trawl).

The waters are a unique mix of warm tropical and cool temperate ocean currents – are home to over 500 fish species, more than 90 coral species and countless other marine species, many only found in the immediate area. A wide range of habitats include a barrier coral reef and lagoon, and fringing reefs dominated either by coral or macroalgal communities (DNP, 2018).

Major conservation values are:

- ecosystems, habitats and communities associated with Lord Howe Province and Tasman Basin Province
- important area for foraging and breeding of seabirds and migrating humpback whales
- KEFs of the marine park are Lord Howe Seamount Chain, Elizabeth and Middleton Reefs and Tasman Font and eddy field
- cultural values are the marine environment around Lord Howe Island valued by the Islanders and Sea Country is valued by the Indigenous people
- national and world heritage listed
- tourism, commercial fishing, recreation, including fishing, and scientific research, are important activities in the marine park.

1.1.7.8 Hunter Marine Park

Encompassing three KEFs, the Hunter Marine Park is located offshore from Port Stephens in NSW and extends out approximately 100km. The marine park (6,257km^2) has Habitat Protection and Special Purpose Zones.

The Hunter Marine Park is significant because it contains habitats, species and ecological communities, representative of the Central Eastern Province and the Central Eastern Shelf Province. It includes three KEFs. The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act (DNP, 2018).

The major conservation values are:

- ecosystems, habitats and communities associated with: Central Eastern Province and Central Eastern Shelf Province
- important area for: foraging seabirds and humpback whales, migrating humpback whales and aggregation of grey nurse sharks
- KEFs of the marine park are canyons on the eastern continental slope, shelf rocky reefs and Tasman Front and eddy field
- the marine park contains one known shipwreck listed under the *Historic Shipwrecks Act 1976* (Cth) - *India* (1884)
- commercial fishing, tourism, and recreation, including fishing, are important activities in the marine park.

These activities contribute to the wellbeing of regional communities and the prosperity of the nation.

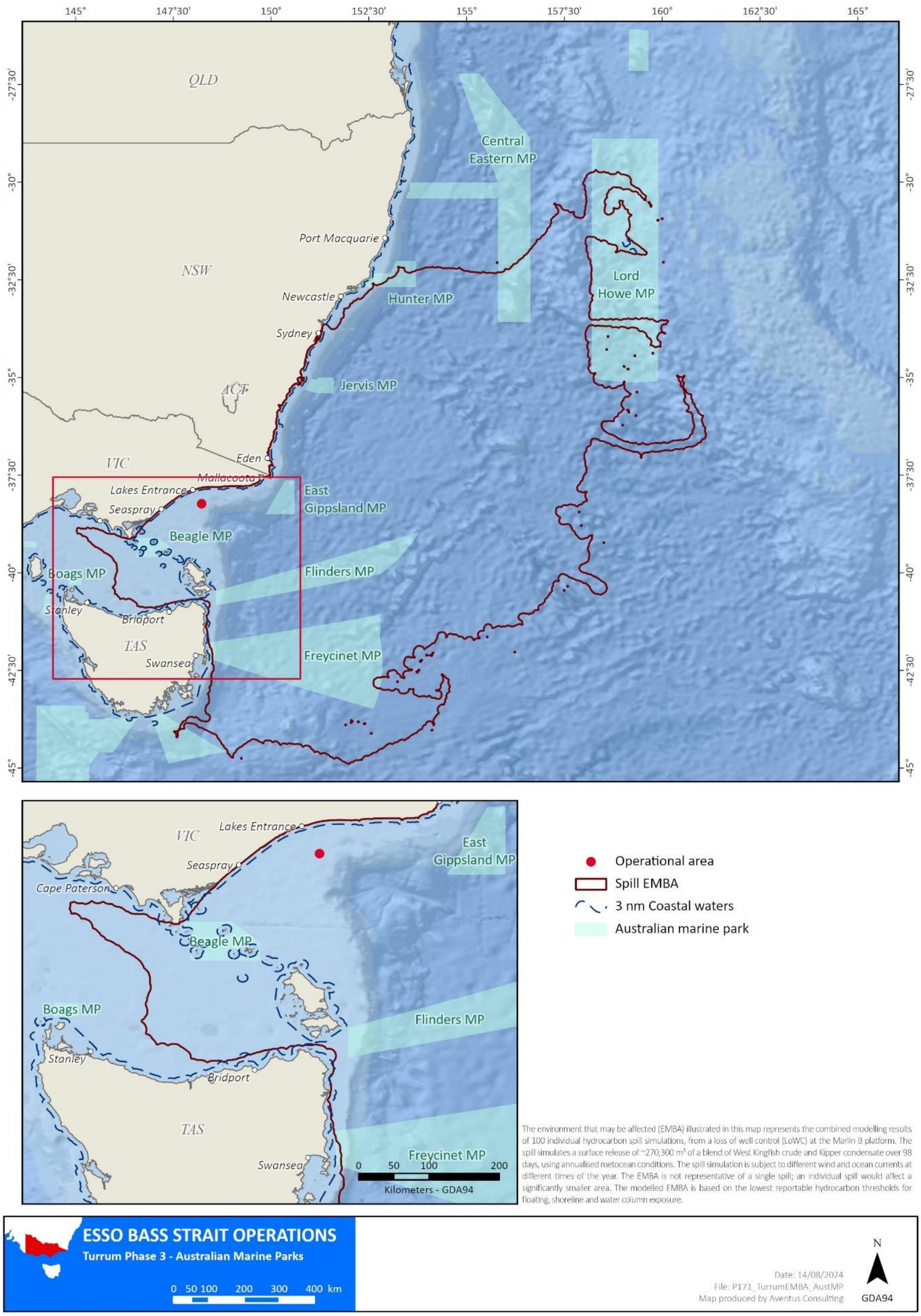

Figure A-7 AMPs intersected by the EMBA

1.1.8 Key Ecological Features

KEFs are defined in Table 3-2 of this EP. KEFs within the EMBA are described below and shown in Figure A-8.

1.1.8.1 Upwelling East of Eden

The Upwelling East of Eden is present along the eastern Victorian and southern NSW coasts and is defined as a KEF as it is an area of high productivity and aggregations of marine life.

Dynamic eddies of the EAC cause episodic productivity events when they interact with the continental shelf and headlands. The episodic mixing and nutrient enrichment events drive phytoplankton blooms, the basis of productive food chains including zooplankton, copepods, krill, and small pelagic fish.

The upwelling supports regionally high primary productivity supports fisheries and biodiversity, including top order predators, marine mammals, and seabirds.

This area is one of two feeding areas for blue whales (*Balaenoptera musculus*) and humpback whales, known to arrive when significant krill aggregations form. The area is also important for seals, other cetaceans, sharks, and seabirds.

1.1.8.2 Big Horseshoe Canyon

Big Horseshoe Canyon is defined as a KEF as it is an area of high productivity and aggregations of marine life. The KEF lies south of the coast of eastern Victoria. This feature is the eastern most arm of the Bass Canyon system (CoA, 2015).

The steep, rocky slopes of the Big Horseshoe Canyon provide hard substrate habitat for attached large epifauna. Sponges and other habitat forming species provide structural refuges for benthic fishes, including the commercially important pink ling.

The Big Horseshoe Canyon is the largest southeastern canyon sampled for benthic biodiversity (Williams A, 2009). It has a total area of 319km^2 in 1,500m depth that supports a rich, abundant, filter-feeding benthic megafauna, including large sponges in dense beds of large individuals at 120m and at 300 – 400m, dense stands of the stalked crinoid (*Metacrinus cyaneus)* in 200 – 300m, and many species of octocoral (especially gold corals) at depths >700m (Kloser RJ, 2001). It is the only known temperate location of the stalked crinoid (*Metacrinus cyaneu)*.

1.1.8.3 Shelf Rocky Reefs (temperate east)

The Shelf Rocky Reefs habitat has been identified as a KEF as it is considered a unique sea-floor feature which is associated with ecological properties of regional significance.

Shelf rocky reefs feature support a range of complex benthic habitats that, in turn, support diverse benthic communities. Along the continental shelf, south of the Great Barrier Reef, benthic communities on rock outcrops and boulder substrates shift from algae-dominated communities to those dominated by attached invertebrates, including dense populations of large sponges, with a mixed assemblage of moss animals and soft corals; this shift generally occurs at a depth of 45m. Below wave-influenced areas, massive and branched growth forms of sponges are more prevalent, and sponge species richness and density generally increases with depth along the NSW coast.

Collectively, these invertebrates create a complex habitat-forming community that supports microorganisms and other invertebrates, such as crustaceans, molluscs, annelids, and echinoderms. These habitats also contribute to increased survival of juvenile fish by providing refuge from predation. Rocky reef habitats on Australia's east coast support a diverse assemblage of demersal fish, which show distinct patterns of association with shelf-reef habitats, e.g. jackass morwong, barracouta, orange-spotted catshark, eastern orange perch, butterfly perch and warehou are species that distinguish rocky reef habitats at depths greater than 45m from those of soft sediments.

1.1.8.4 Canyons on the eastern continental slope

The canyons on the eastern continental slope are defined as a KEF as they are a unique seafloor feature with enhanced ecological functioning and integrity, and biodiversity, which apply to both its benthic and pelagic habitats.

Canyon systems 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.

As such, these features are valued for their enhanced productivity and biological diversity properties. Canyons contribute to habitat diversity by providing a hard surface that offers anchoring points and vertical relief for filter feeder benthic species. Hard substrata support different species assemblages; particularly favouring large filter feeder–dominated benthic species (e.g. attached sponges and crinoids) that thrive in abundance in the enhanced current flow conditions. Large benthic animals such as sponges and feather stars are abundant, with particularly high diversity found in the upper slope regions (150 – 700m). A range of higher trophic level species, including crustaceans, echinoderms, bivalves, cephalopods and fish are then attracted to these regions. Canyons are therefore significant contributors to overall biodiversity, particularly in terms of benthic organisms. Due to isolation, restricted dispersal, and connectivity, it is also expected this diversity encompasses a high degree of endemism, further contributing to the social and biological values of these communities.

The canyons on the eastern continental slope lie off the coast of NSW.

1.1.8.5 Seamounts South and East of Tasmania

The Seamounts south and east of Tasmania are defined as a KEF as they are an area of high productivity and aggregations of marine life.

These seamounts are a chain or cluster of seamounts rising from the abyssal plain, continental rise or plateau situated 200km or more from shore (east of Flinders Island to southeast of southern Tasmania). Seamounts with hard substrate summits and slopes provide attachment points for sessile invertebrates, while the soft sediments can be habitat for species that burrow into the sediments.

These seamounts create localised upwellings of nutrient rich waters from the seafloor. The hard substrate supports sessile invertebrates.

1.1.8.6 Tasmantid Seamount Chain

Just 150 - 600km east of the Australian mainland is a 2,000km long chain of submerged volcanoes which are the Tasmantid Seamount Chain that rise over 4,000m above the seafloor - nearly twice the height of the highest mountain on the mainland.

These undersea mountains, the Tasmantid Seamounts, are extinct volcanoes formed from around 40 to 6 million years ago above a mantle hotspot, similar to the Hawaiian Islands. The seamount chain includes Lord Howe Island and Elizabeth and Middleton Reefs. These isolated, oceanic reefs are thought to support a diverse range of tropical and temperate marine life, including both warm-water and cold-water corals and an abundance of fish species. This diversity is a result of the effect of the EAC on the reefs as it exposes the area to its warm waters, in contrast to the surrounding cooler ocean.

The information on the Tasmantid Seamounts has been based on observations from some seamounts in other locations, however for benthic ecosystems, the data for the Tasmantid seamount chain is poor (CSIRO, 2012). Thus, the seamount chain's conservation values are defined in terms of containing feature scale geomorphic surrogates for biodiversity (basin, plateau, seamount and abyssal plain/deep ocean floor). In general what is known is that Taupo seamount supports a diverse and dense invertebrate megafauna and abundant sharks; a high diversity of demersal fishes is recorded in commercial fishery logbooks and fishery observers; individual seamounts vary greatly in size in shelf and upper/mid slope depths where benthic biodiversity is expected to be greatest (CSIRO, 2012).

1.1.8.7 Tasman Front and eddy field

The Tasman Front and eddy field occurs in the Temperate East Marine Region and is defined as a KEF formed by complex and dynamic oceanographic processes supporting transient patches of enhanced productivity that, in turn, attract aggregations of species across trophic levels, including top predators such as tuna and sharks.

This feature also supports biological connectivity with seamount habitats (Tasmantid Seamount Chain – refer Section 1.1.8.6 above) further offshore. The Tasman Front is formed by a current that moves to the north in winter and to the south in summer. The Front separates the warm, nutrient-poor waters of the Coral Sea from the nutrient-rich waters of the Tasman Sea and its boundary can and associated eddies vary in shape, strength, and location.

In the southern portion of the Temperate East Marine Region, the Tasman Front creates a complex oceanographic environment with vertical mixing causing enhanced productivity. Patches of productivity are important for mid-level consumers including turtles and top fish predators. This is supported by Fisheries oceanography studies that describe a positive relationship between fish catch rates and proximity to frontal features, and a predominance of bigeye tuna and swordfish associated with the Tasman Front (DoEE, 2019a).

1.1.8.8 Lord Howe seamount chain

Lord Howe Seamount Chain is a chain of submerged volcanoes running 1,000km north–south, the seamount chain includes Lord Howe Island and Elizabeth and Middleton Reefs. This seamount chain runs east of the Tasmantid Seamount discussed above (refer Section 1.1.8.6).

These isolated, oceanic reefs support a diverse range of tropical and temperate marine life, including both warm-water and cold-water corals and an abundance of fish species. This diversity is a result of the effect of the EACon the reefs as it exposes the area to its warm waters, in contrast to the surrounding cooler ocean (CoE, 2012).

1.1.8.9 Elizabeth and Middleton Reefs

Elizabeth and Middleton Reefs are a pair of isolated oceanic platform reefs approximately 175km north of Lord Howe Island. The reefs are separated by 45km of deep oceanic waters. These reefs are unique as they represent the southernmost platform reefs on the planet.

The reefs are largely awash with only small sand cays being seen when the tides are right. These reefs are located on the Lord Howe rise a volcanic ridge that extends northwest from New Zealand. Lord Howe island is the only other feature that emerges from this formation. These isolated reefs display a diverse and rich marine fauna and flora (Parks Australia, 2024).

1.1.8.10 The Bass Cascade (along Bass Canyon System)

The Bass Cascade refers to the ‘underwater waterfall’ effect brought about by the northward flow of Bass Strait waters in winter which are more saline and slightly warmer than surrounding Tasman Sea waters. As the water approaches the mainland in the area of the Bass Canyon group it forms an undercurrent that flows down the continental slope. The cascading water has a displacing effect causing nutrient rich waters to rise, which in turn leads to increased primary productivity in those areas. The cascading water also concentrates nutrients, and some fish and whales are known to aggregate along its leading edge. The Bass Cascade occurs during winter months only.

This KEF has not been spatially defined and hence is not shown in Figure A-8 however it is expected to occur within the EMBA.

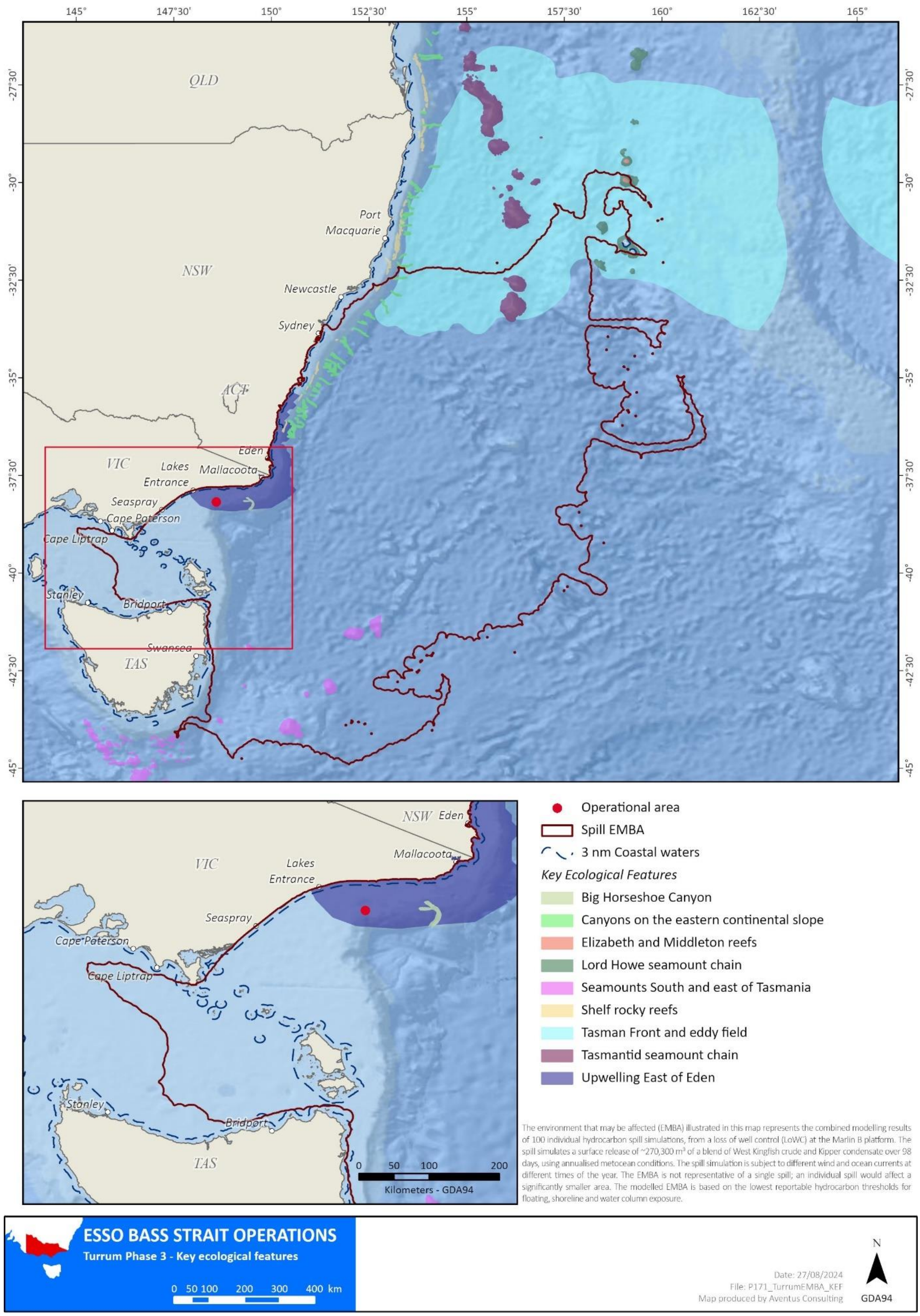

Figure A-8 KEFs intersected by the EMBA

1.1.9 *Other protected areas*

The National Reserve System is Australia's network of protected areas and is made up of Commonwealth, State and Territory reserves, Indigenous lands, and protected areas. National parks and reserves which include marine protected areas and terrestrial protected areas are declared under each individual state's legislation and are managed by state authorities.

This Section only lists the protected areas that are marine and/or coastal in nature that are intersected by the EMBA and that are spatially defined. A detailed list of other protected areas found within the EMBA can be seen in the PMST report (Appendix D). The marine/aquatic and coastal protected areas in relation to each state are mapped in Figure A-9, Figure A-10 and Figure A-11.

1.1.9.1 Marine/aquatic protected areas

Table A-1 lists and describes the marine/aquatic protected areas that are within the EMBA.

Table A-1 Marine/aquatic protected areas that are within the EMBA

Name	Description
Victoria (see Figure A-9)	
Beware Reef Marine Sanctuary	The Beware Reef Marine Sanctuary is a State marine protected area, IUCN Category II, located approximately 5km southeast of Cape Conran, comprising of a granite outcrop covering an area of 220ha and extending for a distance of approximately 500m from the edge of the exposed reef. It rises from a depth of approximately 30m and is exposed at low tide, providing a resting area for Australian fur seals. The reef is covered by outcrops of Bull kelp (*Durvillaea sp.*) and supports a range of marine life, including seahorses and leafy seadragons (ParksVic, Beware Reef Marine Sanctuary., 2017a). Beware Reef is a popular location for recreational divers and the remains of numerous shipwrecks can be encountered in the sanctuary.
Cape Howe Marine National Park	The Cape Howe Marine National Park is situated in the far east of Victoria alongside the border with NSW. The habitats found in the park include kelp forests, granite and sandstone reefs, sandy beaches and soft sediments. The marine life of the area is particularly diverse because species of both warm and cool areas can reside here. Whales pass by Cape Howe on their migration from Antarctica and are sometimes followed by a pod of orcas. Little penguins also forage at the rook on Gabo Island (ParksVic, 2017b).
Churchill Island Marine National Park	Located on the eastern shore of Phillip Island south of Rhyll, covering 670ha, in Western Port, the Churchill Marine National Park contains many varied habitats including mangroves, sheltered intertidal mudflats, seagrass beds, subtidal soft sediments and rocky intertidal shores. The park an important habitat for many bird species and so is included within the Western Port Ramsar site as many migratory waders roost and feed within the park area. The bird species that occur in the park included the bar-tailed godwit sacred ibis, red-necked stint and chestnut teal. The marine seagrass beds are a major food source for black swans as well as being nursery for many commercial fish species, such as yellow-eyed mullet, black bream and King George whiting (Parks Victoria, 2024).

Name	Description
Ninety Mile Beach Marine National Park	Ninety Mile Beach Marine National Park is located 30km south of Sale and adjacent to Gippsland Lakes Coastal Park, the Ninety Mile Beach Marine National Park covers 5km of coastline. The huge subtidal sandy expanses characteristic of the area exhibit particularly high species diversity including tube building worms, small molluscs and many tiny crustaceans. Many pelagic fish species feed on the benthos, and young great white sharks have also been observed feeding in the area (ParksVic, 2017d).
Nooramunga Marine and Coastal Park	Nooramunga Marine and Coastal Park covers an area of 30,170ha in Corner Inlet. The park consists of shallow marine waters, intertidal mudflats and a series of over 40 sand islands. The park, along with the Corner Inlet Marine and Coastal Park to its west, contain the largest stands of white mangrove and saltmarsh areas in Victoria. The saltmarshes are dominated by beaded glasswort (*Sarcocornia quinqueflora*) and shrubby glasswort (*Tecticornia arbuscula*). Seagrass meadows also occur throughout the park. Seaward of the mangroves are extensive areas of intertidal mud and sand flats. An immense range of marine plants and invertebrates can be found here that provide food for the thousands of migratory wading birds that arrive each year from their northern hemisphere breeding grounds. The seagrass meadows provide habitat to over 300 marine invertebrates, including a range of large crabs, seastars, sea snails, iridescent squid and many fish including pipefish, stingarees, flathead, whiting and flounder. Finfish such as snapper, King George whiting, flathead, garfish and salmon are caught by recreational fishers. Thirty-two migratory wader species have been recorded in the park.
Point Hicks Marine National Park	The Point Hicks Marine National Park is located alongside Croajingolong National Park, East Gippsland. Many creatures found here are not found further west because the water is too cold, for example the large black sea urchin. The national park is approximately 4,000ha in area, with fauna including intertidal and shallow subtidal invertebrates, diverse sessile invertebrates living on subtidal reefs, kelps and small algae, and a high diversity of reef fish. In addition to the subtidal reef, the marine environment around Point Hicks includes intertidal rock OAs and offshore sands (ParksVic, 2017e). Point Hicks Marine National Park is also a popular location for recreational divers. Remains of two shipwrecks can be encountered in the national park.
Wilsons Promontory Marine National Park	Wilsons Promontory Marine National Park is Victoria's largest marine protected area at 15,550ha and is located around the southern tip of Wilsons Promontory. There is a diversity of marine life including octopus, sharks and rays. It is a popular location for recreational divers particularly around the sponge gardens. The offshore islands, including Anser Island, support many colonies of fur seals and oceanic birds such as little penguins, fairy prions, silver gulls and pacific gulls (ParksVic, 2017f). Wilsons Promontory National Park is a popular tourist destination due to its coastal scenery and diverse natural environments. Tourist activities include walking, camping, sightseeing, viewing wildlife, fishing, boating, diving, sea kayaking and surfing. The park is important for its range of plants and animals, including many threatened species including the New Holland mouse, ground parrot and white-bellied sea eagle. Coastal features include expansive intertidal mudflats, sandy beaches and sheltered coves interrupted by prominent headlands and granite cliffs in the south, backed by coastal dunes and swamps. The avifauna recorded for Wilsons Promontory includes around half of all Victorian bird species. Significant species of migratory wading birds feed on the tidal mudflats of Corner Inlet within and adjoining the park. The offshore islands have breeding

Name	Description
	and roosting sites for sea birds, including a large number of short-tailed shearwaters (ParksVic, 2017f).
Tasmania (see Figure A-10)	
Arthur Bay Conservation Area	Arthur Bay Conservation Area covers 7.5km^2 and includes the coastline and marine areas south of Blue Rocks and north of Whitemark on the west coast of Flinders Island. There is no management plan in place.
Chappell Islands Nature Reserve	There is a scarceness of information regarding this nature reserve online. However, according to the Tasmania Parks and Wildlife Service listing 2022 the Chappell Islands Nature Reserve is 199ha and is designated IUCN Category IV. There is currently no management plan in place.
Kent Group National Park	The six islands and islets of the Kent Group (Erith, Dover, Deal, North East Isle, South West Isle and Judgement Rocks) comprise Tasmania's northern most national park. Surrounding the largest of the islands, the Kent Group Marine Reserve covers 29,000ha of marine habitat including deep and shallow reefs as well as extensive sponge beds (TPWS, Kent Group Marine Reserve, 2017). The waters around the Kent Group include the southernmost strongholds of several fish species including the violet roughy, mosaic leatherjacket and Wilson's weedfish, and the southern limit of distribution of Maori wrasse, one spot puller and Bank's shovelnose. The marine protected area is made up of a sanctuary zone which is a 'no take' zone, and a habitat protection zone which allows for lower impact fishing (e.g. abalone and rock lobster fishing, hand line fishing). The North East Isle is a 32.62ha unpopulated granite island with a peak elevation of 125m ASL. Recorded breeding seabird and wader species include little penguin, short-tailed shearwater, fairy prior, common diving petrel, pacific gull and sooty oystercatcher (Brothers, 2001).
Marriott Reef Conservation Area	The Marriott Reef Conservation Area covers an area of 0.16km^2 of the marine environment and begins 500m off the west coast of Flinders Island. The area is designated IUCN Category V and there is no management plan in place.
Moriarty Rocks Nature Reserve	Moriarty Rocks Nature Reserve comprises two major rocks and several smaller ones in a reef formation. The more northerly rock is about 1.32ha in area and its southerly neighbour about 1.22ha (DPIPWE, Small Bass Strait Island Reserves Draft Management Plan, 2000). Moriarty Rocks Nature Reserve is the only Australian fur seal (Artocephalus *pusillus*) breeding colony in the Furneaux Group. The two rocks which make up the reserve are constantly wave-washed which accounts for the large variation in the numbers of seal pups counted annually. Over the past 10 years in which the monitoring program has been conducted, there have been fluctuations in seal pup numbers, ranging from 397 to 1,190 (DPIPWE, Small Bass Strait Island Reserves Draft Management Plan, 2000).
Pardoe Northdown	There is a scarceness of information regarding this nature reserve online. However, according to the Tasmania Parks and Wildlife Service listing 2022 the Pardoe North down Conservation area is 277ha and is designated IUCN Category VI. There is currently no management plan in place.

Name	Description
Reef Island Conservation Area	There is a scarceness of information regarding this conservation area online. However, according to the Tasmania Parks and Wildlife Service listing (2022) the Reef Island Conservation Area is 7ha and is designated IUCN Category VI. There is currently no management plan in place.
Unnamed (Badger Corner) Conservation Area	There is a scarceness of information regarding this conservation area online. However, according to the Tasmania Parks and Wildlife Service listing (2022) the Unnamed (Badger Corner) Conservation Area is 0.13ha and is designated IUCN Category IV. There is currently no management plan in place.
NSW (see Figure A-11)	
Batemans Marine Park	The Batemans Marine Park was established in 2006 and covers approximately 85,000ha, extending from the north end of Murramarang Beach near Bawley Point to Wallaga Lake in the south. It includes all of the seabed and waters from the mean high water mark on the coast to 3nm miles offshore. Including all estuaries, creeks, rivers and lakes (except Nargal Lake) to the limit of tidal influence. Scuba diving, snorkelling, beach going, whale, seal and other wildlife watching, fishing, swimming, surfing, and boating are all popular pastimes at this park. The park covers a range of habitats, including continental shelf seafloor along with sponge gardens, beaches, rocky shores, kelp beds, coralline algal banks, rocky reefs, islands, seagrass, mangroves, and estuarine habitats. The Montague Island Nature Reserve, within the marine park, is a breeding and nesting place for over 40,000 sea birds including shearwaters, little penguins, crested terns and silver gulls and is a haul out site for Australian and New Zealand fur seals. Both Montague Island and the Tollgate Islands (also within the park) are aggregation sites for grey nurse sharks (DPI, 2018).
Boat Harbour Aquatic Reserve	Boat Harbour Aquatic Reserve is located on the southern part of the Kurnell Peninsula, incorporating the whole of Merries Reef and extending east to three green 'Water Board' vents at Potter Point. The seaward boundary is 100m from the mean low water mark. It covers an area of approximately 70ha. Boat Harbour is relatively isolated location. The reserve encompasses the whole of Pimweli Rocks and Merries Reef. It contains a sandstone shore and other important marine habitats including boulder and subtidal reefs interspersed with areas of sandy seabed. The rocky shore provides a feeding ground for a number of shorebirds, including threatened species such as sooty oystercatchers and migratory waders (DPI, Boat Harbour Aquatic Reserve, 2023a).
Bronte-Coogee Aquatic Reserve	Bronte-Coogee Aquatic Reserve is located on Sydney's eastern beaches extending from the southern end of Bronte Beach to the rock baths at Coogee Beach and out to 100m offshore. It covers an area of approximately 40ha and includes 4,000m of coastline. Bronte-Coogee Aquatic Reserve is centred on the extensive rocky shores and nearshore reefs of Sydney's eastern suburbs. Two small bays, Gordons Bay and Clovelly Bay, are important features of the reserve. Gordons Bay has a rocky wall drop off which is home to a diversity of marine life. A rocky breakwater exists at the mouth of Clovelly Bay creating very calm conditions. The blue groper (*Achoerodus viridis*) has an iconic status within the eastern suburbs community, and in this reserve recreational divers and snorkelers enjoy swimming with the local groper population. The blue groper has been afforded extra protection through a

Name	Description
	fishing closure in part of the reserve. The reserve is also home to a variety of invertebrate species, including unusual assemblages living under boulders such as chitons, starfish, and flatworms (DPI, 2023b).
Bushrangers Bay Aquatic Reserve	Bushrangers Bay Aquatic Reserve is a small rocky embayment at the eastern end of Bass Point, approximately 4km south of Shellharbour on the NSW South Coast. The reserve covers the entirety of Bushrangers Bay, an area of approximately 4ha. The reserve was declared for its representation of rock platforms, crevices, and rock pools typical of the NSW mid south coast and in recognition of the reserve's unique habitat and role as a nursery area located between temperate and tropical regions. The aquatic reserve's diverse marine life includes common temperate and seasonal tropical fish, many of which are quite abundant in the reserve. Seagrass beds provide habitat for a variety of fish, including halfbanded seaperch (*Hypoplectrodes maccullochi*), southern maori wrasse (*Ophthalmolepis lineolatus*) and senator wrasse (*Pictilabrus laticlavius*). These fish, together with a suite of other species, including red morwong (*Cheilodactylus fuscus*), striped trumpeter (*Latris lineata*), blue groper (Achoerodus viridis), horseshoe and pygmy leatherjackets (*Meuschenia hippocrepis and Brachaluteres jacksonianus*) and herring cale (*Odax cyanomelas*), forage between the seagrass and the variety of other habitats found within the reserve. The aquatic reserve is also the southernmost distribution for several species of tropical fish (DPI, 2023c).
Cabbage Tree Bay Aquatic Reserve	Cabbage Tree Bay Aquatic Reserve is located at Manly. It covers an area of approximately 20ha, including the entire bay, rocky shores, and beaches from the southern end of Manly Beach to the northern end of Shelly Beach Headland. Cabbage Tree Bay Aquatic Reserve includes seven main types of habitats: sandy beaches, rocky shores, rocky reefs, kelp, seagrass beds, sandy seabed and open water. More than 160 species of fish have been recorded in the aquatic reserve. These fish species range from common temperate species through to tropical species that move south on the EAC. Various species use the reserve, including pelagic species that range widely, such as dusky whaler sharks, and sedentary species that would rarely leave the reserve. Iconic species such as blue groper, cuttlefish and wobbegong sharks inhabit the reserve and protected species such as seadragons, elegant wrasse and black rockcod also occur here. The rocky shore has a diversity of habitats and associated marine life, including examples of each of the five types of habitats described for NSW rocky shores (platform, crevice, rock-pool, boulder and cobble habitats). Approximately 50 species of marine invertebrates have been recorded in the aquatic reserve (DPI, 2023d).
Cape Banks Aquatic Reserve	Cape Banks Aquatic Reserve is located on the northern headland of Botany Bay and extends along the whole foreshore from the bridge at Cape Banks to the Endeavour Light at Henry Head and 100m seaward from the mean low water mark. It covers an area of approximately 20ha. The aquatic reserve is surrounded by the Kamay Botany Bay National Park and the NSW Golf Course, which provide a substantial buffer from human influences and ensure the naturalness of the reserve is maintained. A range of rocky intertidal habitats occur at Cape Banks, including platforms, crevices, rock pools, boulders, and cobbles, resulting in a diversity of intertidal marine plant and animal communities (DPI, 2023e).
Jervis Bay Marine Park	Jervis Bay Marine Park on the NSW South Coast covers approximately 215km^2 and spans over 100km of coastline and adjacent oceanic and estuarine waters. It extends from

Name	Description
	Kinghorn Point south to Sussex Inlet. It includes most of the waters of Jervis Bay, with the remainder forming part of the Booderee National Park on Bherwerre Peninsula. It contains the tidal waters of Currambene Creek, Moona Creek, Carama Inlet, Wowly Gully, Callala Creek and Currarong Creek, and the mean high-water mark along the shores. The marine park has six estuaries, excluding Jervis Bay, four small coastal creeks and two larger, wave-dominated estuaries. Four seagrass species are abundant making it an important nursery for fish and providing food and shelter for recreationally and commercially valuable species such as snapper, bream, luderick, whiting and flathead. The rocky shores are important roosting and feeding grounds for shorebirds including the threatened sooty oystercatcher. Shallow and intermediate reefs support a wide range of biodiversity, including habitat for commercially and recreationally valuable fish and for invertebrates such as cuttlefish, crabs, and rock lobsters. The marine park contains important habitat for the endangered grey nurse shark. Protected species known to occur in the park include the eastern blue devilfish, elegant wrasse, black rockcod, some hard and soft corals, sea anemones, zooanthids, and all pipefishes and seahorses. Pied and sooty oystercatchers, hooded plovers and ospreys are among the threatened bird species known to nest, roost and/or feed on the rocky shores. Humpback and SRW are often spotted during migration and are an important tourist attraction. Indigenous people have strong ties to the land with midden sites located in areas around the marine park. Nine shipwrecks have been found in Jervis Bay (DPI, 2023f).
Long Reef Aquatic Reserve	Long Reef Aquatic Reserve is the oldest aquatic reserve in NSW. It was declared in 1980 to conserve the diversity of seashore plants, animals, and habitats. The aquatic reserve is an important place for marine education and research. The aquatic reserve covers an area of approximately 80ha. Its boundaries extend along the shore from Collaroy rock baths south to Long Reef Surf Lifesaving Club and out to 100m offshore. A range of flora and fauna occur within the reserve, including, sea urchins, sea stars, cunjevoi, sea snails, barnacles, anemones, blue-ringed octopus, chitons, shrimps, seagrass, flatworms, octopus, sponges and much more (DPI, 2023g).
Lord Howe Island Marine Park	The Lord Howe Marine Park contains a unique mix of warm tropical and cool temperate ocean currents that are home to over 500 fish species, more than 90 coral species and countless other marine species, many only found in the immediate area. A wide range of habitats include a barrier coral reef and lagoon, and fringing reefs dominated either by coral or macroalgal communities. The marine park shares the same values as described in Section 1.1.1.
Narrabeen Aquatic Reserve	Narrabeen Head Aquatic Reserve on Sydney's northern beaches covers an area of approximately 10ha. It includes the rocky shore between the southern end of Turimetta Beach and the rock baths at Narrabeen Head, and extends 100m offshore. Narrabeen Head Aquatic Reserve was declared primarily to facilitate educational activities on the rocky shore at this site. The rocky shore is broad and flat, and the rock pools, cracks and crevices provide a variety of habitats for algae, invertebrates and small fish. The aquatic reserve is an important area for shorebirds such as the pied cormorant (*Phalacrocorax sulcirostris*), crested tern (*Thalasseus bergii*) sooty oystercatchers (*Haematopus fuliginosus*) (DPI, 2023h).
North Sydney Harbour Aquatic Reserve	North (Sydney) Harbour Aquatic Reserve is located between North Head and Dobroyd Head in the northern part of Sydney Harbour, covering an area of approximately 260ha.

Name	Description
	Historically, the aquatic reserve was the site of some of the first marine specimen collecting conducted in the 1830s by the superintendent of the Quarantine Station. The aquatic reserve includes a variety of habitats, including rocky shores, sandy beaches, nearshore reefs, sandy seabed, and harbour waters up to around 20m deep. Sheltered coves contain seagrass habitats and nearshore reefs support kelp habitats that are used by many species, including seahorses and sea dragons. The rocky reefs and kelp beds are also home to many different invertebrates and fish and the boulder habitats in deeper waters are inhabited by colourful sponges and corals. In summer, tropical fish are a common sight, carried from the Great Barrier Reef along the NSW coast by the (EAC (DPI, 2023i).
Towra Point Aquatic Reserve	Towra Point Aquatic Reserve is the largest NSW aquatic reserve and is located on the southern shore of Botany Bay in Sydney. It stretches from Shell Point on the western side of the Bay to Bonna Point in the east. The aquatic reserve covers an area of approximately 1,400ha and is divided into two zone types, a refuge zone and a sanctuary zone. The aquatic reserve protects one of the largest and most diverse wetland complexes remaining in the Sydney region. It is adjacent to the Towra Point Nature Reserve which is a wetland of international importance and a declared Ramsar site. The aquatic reserve is an important nursery area for fish and invertebrates, provides important habitat for migratory seabirds and is rich in marine biodiversity. The aquatic reserve includes much of the remaining important seagrasses, mangroves, and migratory wading bird habitats in Botany Bay. It represents major nursery habitat supporting commercial and recreational fish stocks in the coastal Sydney region (DPI, 2023k).

1.1.9.2 Coastal protected areas

This Section lists the coastal protected areas that are within the EMBA.

1.1.9.2.1 VICTORIA (SEE FIGURE A-9):

- Anser Island Reference Area
- Bemm, Goolengook, Arte and Errinundra Rivers
- Cape Conran Coastal Park
    - This park extends from Sydenham Inlet in the east to Point Ricardo near Marlo. The park includes ocean beaches and is a popular park for water activities - swimming, diving, boating, fishing and rock pooling. Many birds feed on the nectar rich plants of the heathlands and banksia woodlands including the threatened Ground parrot (*Pezoporus wallicus wallicus*). Lizards and large lace monitors are common around Cape Conran (ParksVic, 2017f).
- Cape Howe Wilderness Zone
- Croajingolong National Park
    - The Croajingolong National Park follows the far-eastern coastline of Victoria for 100km and together with the adjoining Nadgee Nature Reserve in NSW is classified as a UNESCO World Biosphere Reserve. Over 1,000 species of native plants have been recorded in the park including 90 species of orchids. The park also contains areas of cool temperate and warm temperate rainforest, eucalypt forest and coastal heathland. Of the 52 mammal species recorded in the park, arboreal mammals, such as possums, gliders and bats are common. Seals, whales, and dolphins occur in coastal waters adjacent to the park. The islands and ocean beaches attract migratory seabirds and waders, the wetlands are habitat for a diversity of waterfowl and the coastal woodlands are favoured habitat for birds of prey; the Nadgee Lake and tributary wetlands are a recognised NIW. Significant populations of reptiles and amphibians also occur within the park. The park's secluded coastal camping locations make it popular for beach walks, bird watching, boating and fishing (ParksVic, 2017g).

- East Gippsland Coastal streams
- Ewing Morass Natural Features Reserve
- Gippsland Lakes Coastal Park
    - The Gippsland Lakes are a group of large coastal lagoons in eastern Victoria, separated from the sea by sand dunes and fringed on the seaward side by Ninety Mile Beach. The main lakes - Wellington, Victoria and King cover an area of 340km^2 and have a shoreline of 320km. The lakes are fed by a number of river systems. The largest of the rivers are the Latrobe River and the Avon River (flowing into Lake Wellington), and the Mitchell River, Nicholson River and Tambo River (flowing into Lake King). The system is linked to the sea by an artificial entrance near the eastern end, opened in 1889, where the town of Lakes Entrance is now situated (ParksVic, 2017h) (ParksVic, 2017i).
- Jack Smith Lake W.R Natural Features Reserve
- Lake Tyers S.P. State Park
    - Ewing Morass Wildlife Reserve and Lake Tyers State Park are located along Pettmans Beach, approximately 20km east of Lakes Entrance. It is an extensive sandy beach, frequented by campers and fishers. The area is highly significant to Gunaikurnai Traditional Owners due to its Aboriginal cultural heritage (ParksVic, 2023).
- Rame Head Remote and Natural Area
- Sandpatch Wilderness Zone
- Seal Islands W.R. Nature Conservation Reserve
- Southern Wilsons Promontory Remote and Natural Area
- The Lakes National Park
- Wilsons Promontory National Park
- Wilsons Promontory Islands Remote and Natural Area.

1.1.9.2.2 TASMANIA (SEE FIGURE A-10):

- Anderson Islands Conservation Area
- Babel Island Indigenous Protected Area
- Badger Corner Conservation Area
- Badger Island Indigenous Protected Area
- Bass Pyramid Nature Reserve
- Battery Island Conservation Area
- Big Green Island Nature Reserve
- Big Silver Conservation Covenant
- Blyth Point Conservation Area
- Boxen Island Conservation Area
- Briggs Islet Conservation Area
- Brougham Sugarloaf
- Bun Beetons Point Conservation Area
- Cat Island Conservation Area
- Chalky Island Conservation Area
- Cone Islet Conservation Area
- Craggy Island Conservation Area
- Curtis Island Nature Reserve
    - Curtis Island, part of the Curtis Group, is a granite island with an area of 150ha lying in northern Bass Strait between the Furneaux Group and Wilsons Promontory. It is a nature reserve and supports up to 390,000 breeding pairs of short-tailed shearwaters. Other recorded breeding seabird and wader species include little penguin, fairy prion, pacific gull and sooty oystercatcher.Other islands in the Curtis Group are Cone Islet, Sugarloaf Rock and Devils Tower. Devils Tower comprises two small granite islands with a combined area of 4.77ha. It is a nature reserve and recorded breeding seabird species include short-tailed shearwater, fairy prion and common diving-petrel. The island is also used as a regular haul-out site for Australian fur seals (Brothers, 2001).

- Devils Tower Nature Reserve – see description above.
- Doughboy Island Conservation Area
- East Kangaroo Island Nature Reserve
- East Moncoeur Island Conservation Area
    - West Moncoeur Island and East Moncoeur Island are part of Tasmania's Rodondo Group lying in northern Bass Strait south of Wilsons Promontory. The islands are granite islands ringed by steep cliffs. Recorded breeding seabird and wader species include little penguin, short-tailed shearwater, fairy prion, common diving petrel, pacific gull and sooty oystercatcher. Both islands are considered important breeding sites for seabirds (Brothers, 2001). West Moncoeur Island holds an important breeding colony of Australian fur seals and is a nature reserve (DPIPWE, Small Bass Strait Island Reserves Draft Management Plan, 2000).
- Egg Beach Conservation Area
- Emita Nature Recreation Area
- Foochow Conservation Area
- Forsyth Island Conservation Area
- Fotheringate Bay Conservation Area
- Freycinet National Park
- Furneaux Group
    - The Furneaux Group is a group of approximately 100 islands located at the eastern end of Bass Strait, between Victoria and Tasmania (the EMBA intersects with the entirety of the Furneaux Group). The islands contain granite from the Devonian period, as well as unconsolidated limestone and sand from Cenozoic periods and are generally mountainous with rugged coastlines. The islands are home to numerous seabirds including albatross, petrels, cormorants and curlews. It contains the Franklin Sound Islands Important Bird Area and the islands support breeding seabird and wader species such as the little penguin, black cormorants, pacific gull, Caspian terns, sooty oystercatcher and pied oystercatcher. Some of the islands are known to be haul out sites for Australian fur seals. The largest islands in the group are Flinders Island, Cape Barren Island, Clarke Island and Chappell Island. Other islands include: Anderson Island, Babel Island, Badger Island, Bass Pyramid, Battery Island, Billy Goat Reefs, Big Green Island, Boxen Island, Briggs Islet, Cat Island, Chalky Island, Cooties Reef, Doughboy Island, East Kangaroo Island, Fisher Island, Fisher Island Reef, Forsyth Island, Great Dog Island, Inner Sister Island, Outer Sister Island, Isabella Island, Little Anderson Island, Little Chalky Island, Little Dog Island, Little Green Island, Long Island, Low Islets, and another of the same name Low Islets, Middle Pasco Island, Mile Island, Moriarty Rocks, Mount Chappell Island, Neds Reef, Night Island, North Pasco Island, Passage Island (Tasmania), Pelican Island, Prime Seal Island, Puncheon Island, Puncheon Islets, Roydon Island, Rum Island, Samphire Island, Sentinel Island, South Pasco Island, Spences Reefs, Spike Island, Storehouse Island, Swan Island, Tin Kettle Island, Vansittart Island.
- Goose Island Conservation Area
- Great Dog Island Indigenous Protected Area
- Gull Island Conservation Area
- Hogan Group Conservation Area
    - Hogan Island, the largest island in the Hogan Group, is a 232ha granite island located in northern Bass Strait between the Furneaux Group and Wilsons Promontory. Recorded breeding seabird and wader species include little penguin, short-tailed shearwater, pacific gull, silver gull and sooty oystercatcher (Brothers, 2001). Other islets of the Group include: Twin, Long, Round, East, Boundary (or North East) islets, and Seal Rock.
- Holts Point Conservation Area
- Isabella Island Nature Reserve
- Jacksons Cove Conservation Area
- Killiecrankie Nature Recreation Area
- Lackrana Conservation Area
- Lands End Conservation Covenant
- Little Chalky Island Conservation Area

- Little Dog Island Game Reserve
- Little Green Island Conservation Area
- Little Island Conservation Area
- Little Swan Island Nature Reserve
- Logan Lagoon Conservation Area
    - Also a Ramsar site see Section 1.1.4.3 for description.
- Logans Lagoon Conservation Covenant
- Long Island Conservation Area
- Low Islets Nature Reserve
- Low Point Conservation Area
- Lughrata Conservation Covenant
- Lungatalanana Indigenous Protected Area
- Marshall Beach Conservation Area
- Mile Island Conservation Area
- Mount Chappell Island Indigenous Protected Area
- Mount Tanner Nature Recreation Area
- Neds Reef Conservation Area
- Night Island Conservation Area
- North East Islet Nature Reserve
- North East River Game Reserve
- Oyster Rocks Conservation Area
- Palana Beach Nature Recreation Area
- Pasco Group Conservation Area
- Passage Island Conservation Area
- Patriarchs Conservation Area
- Prime Seal Island Conservation Area
- Ram Island Conservation Area
- Reedy Lagoon Private Nature Reserve
- Rodondo Island Nature Reserve
- Roydon Island Conservation Area
- Sellars Lagoon Game Reserve
- Sentinel Island Conservation Area
- Settlement Point Conservation Area
- Sister Islands Conservation Area
- Spike Island Conservation Area
- St Helens Conservation Area
- Storehouse Island Conservation Area
- Strzelecki National Park
    - Strzelecki National Park is located on Mount Strzelecki which is the highest point on Flinders Island. The park has distinctive granite peaks that offer spectacular views, a rich variety of flora and fauna, and beautiful coastal waters, Strzelecki National Park is an ideal spot for walkers, birdwatchers and kayakers. There are well over 100 bird species recorded on the Island, none more prominent than the Cape Barren goose. Many rare or endangered species inhabit the Island, such as the swift parrot, forty-spotted pardalote, grey-tailed tattler and the hooded plover. The park is also home to a large number of endemic species, you can expect to see wombats, Bennetts wallabies, echidnas and pademelons as you explore the park. There are also long-nosed potoroos (TPSW, 2022).
- Sugarloaf Rock Conservation Area
- Sydney Cove Historic Site
- The Dock Conservation Covenant
- Trousers Point Beach Conservation Area
- Vansittart Island Conservation Area
- West Moncoeur Island Nature Reserve

  - West Moncoeur Island and East Moncoeur Island are part of Tasmania's Rodondo Group lying in northern Bass Strait south of Wilsons Promontory. The islands are granite islands ringed by steep cliffs. Recorded breeding seabird and wader species include little penguin, short-tailed shearwater, fairy prion, common diving petrel, pacific gull and sooty oystercatcher. Both islands are considered important breeding sites for seabirds (Brothers, 2001). West Moncoeur Island holds an important breeding colony of Australian fur seals and is a nature reserve (DPIPWE, Small Bass Strait Island Reserves Draft Management Plan, 2000).

- White Beach Conservation Area
- Wingaroo Nature Reserve
- Wright Rock Nature Reserve
- Wybalenna Island Conservation Area.

1.1.9.2.3 NSW (SEE FIGURE A-11):

- Belowla Island Nature Reserve
- Ben Boyd National Park
- Biamanga National Park
- Booderee National Park

  - Booderee National Park stretches across 6,379ha at the southern section of Jervis Bay on the south coast of NSW and includes 875ha of marine environment with values similar to those in Jervis Bay Marine Park. Booderee National Park is owned by the Wreck Bay Aboriginal Community and is jointly managed with Parks Australia. The Yuinpeople have a strong and continuing connection to the Jervis Bay area. The park includes Bowen Island which has a sanctuary zone on the west coast to protect nesting seabirds and their habitat from disturbance. The marine environment has a habitat protection zoning designed to safeguard sensitive, rare and endangered habitats, including littoral areas and seagrass beds (PA, 2019).

- Bournda National Park

  - Bournda has been a special place for the Dhurga and Yuin people for thousands of years and its name means ‘place of tea tree and kangaroos’. The estuarine wetlands provide roosting and feeding areas for a large variety of waders and waterfowl including threatened species such as little tern, hooded plover and pied oystercatcher (NPWS, 2023a).

- Broulee Island Nature Reserve

  - Broulee Island Nature Reserve is located on the south coast of NSW and covers the entire 43ha of Broulee Island to mean high water mark. Broulee Island Nature Reserve contains a vegetation succession from mangroves on the shoreline rock platforms to an open forest dominated by southern mahogany on the plateau. The shoreline and adjacent waters are utilised by a number of seabird species, none of which are known to breed on Broulee Island; these include shearwaters, cormorants, gulls (OEH, Broulee Island Nature Reserve Plan of Management, 2008).

- Brush Island Nature Reserve
- Comerong Island Nature Reserve
- Conjola National Park

  - Located in the mid coast of NSW the Conjola National Park covers 11,060ha including forests, woodlands, rainforest, coastal scrub and wetlands and four endangered ecological communities: Coastal Saltmarsh; Swamp Sclerophyll Forest (important feeding; Swamp Oak Floodplain Forest and Bangalay Sand Forest. 429 plant species are represented, five of which are threatened. Twenty five species of threatened fauna occur in the park. Of these the regent honeyeater (*Xanthomyza phrygia*), swift parrot (*Lathamus discolor*), little tern (*Sterna albifrons*), hooded plover (*Thinornis rubricollis*) and green and golden bell frog (*Litoria aurea*) are endangered. High diversity and occurrence of Aboriginal sites including middens, campsites, rock shelters and grinding grooves. A number of heritage features are located in the park including a burial and monument for the 1870 shipwreck of the *Walter Hood* (NPWS, 2023b).

- Cullendulla Creek Nature Reserve
- Eagles Claw Nature Reserve
- Eurobodalla National Park
    - Eurobodalla National Park contains a range of aquatic environments including lagoons, lakes, estuaries, sheltered and wild beaches that protect a wide variety of plants and animals. The national park provides an important habitat for a wide variety of birds with 131 bird species having been recorded in the park. Estuaries and headlands are important over-wintering areas for migratory birds, including 17 species of waders, and the hooded plover and little tern nest on the sand islands, sand spits and dunes. Water based activities such as boating, fishing and swimming are all popular in the park (NPWS, 2023c).
- Five Islands Nature Reserve
    - Five Islands Nature Reserve includes five small islands clustered off the coast of Port Kembla, immediately south of the city of Wollongong within the Wollongong Local Government Area. The islands are clustered between approximately 0.5km and 3.5km off the coast. The main values of the islands include evidence of geological and geomorphologic processes related to the formation of the Sydney Basin and subsequent landscape evolution, habitat and breeding sites for the sooty oystercatcher (*Haematopus fuliginosus*), breeding sites for the wedge-tailed shearwater (*Puffinus pacificus*), the shorttailed shearwater (*Puffinus tenuirostris*) and habitat for the white-bellied sea-eagle (*Haliaeetus leucogaster*), importance to the Aboriginal community due to continuing cultural associations and past occupation of the area, listed NIW.
- Jervis Bay National Park
- Kamay Botany Bay National Park
    - Located within the Sydney metropolitan area, Kamay Botany Bay National Park (or Botany Bay National Park) covers approximately 456ha of the northern and southern headlands of the entrance to Botany Bay and includes over 13km of coastline. As discussed in the Section on National Heritage (refer to Section 1.1.2.3) the park includes the Kurnell Peninsula and Botany Bay botanical sites, listed National Heritage places. It is also renowned for the place of arrival of the French expedition under the command of Jean-Francois de Galaup, Comte de Laperouse in 1788 before the departure of the first fleet. Laperouse stayed in Botany Bay for six weeks and built a stockade, observatory and a garden for fresh produce on the La Perouse peninsula before leaving and not seen again. The association of the park with the history of the European exploration and the botanical collection of native plants by Banks and Solander are the two most prominent values, however, together with those is the symbolism of the meeting of the Indigenous and European cultures and the historical social issues that have developed from that and the opportunity to further explore current social issues such as reconciliation (NPWS, 2016). The retention of the largest remnants of the original vegetation communities of the Kurnell Peninsula and eastern suburbs and prominent scenic coastal headlands at the entrance to Botany Bay are also defined as core values of the park. The park is also part of a broader network of conservation areas in the region that provide secure protection for native plants and animals, sites of Aboriginal and historic heritage value and recreational opportunities for a growing population. On the southern Headland, the park abuts the Caltex fuel import terminal on the inland side of the park (NPWS, 2018).
- Lord Howe Island Permanent Park Preserve
    - Lord Howe Island Permanent Park Preserve includes a major part of the Lord Howe Island Group but excludes the settlement areas of the island (residential and tourist accommodation and agricultural lands). Whereas a national park does not allow any harvesting, the management of the preserve allows for sustainable harvesting of some natural resources, in this case mainly palm seeds. Lord Howe is listed as World Heritage (refer to Section 1.1.1.1) for its exceptional natural beauty and for a place which has habitats where populations of rare or endangered species of plants and animals still survive. The Lord Howe Island Group forms one of the major seabird breeding sites in the Tasman Sea and is thought to be home to the most diverse and largest number of seabirds in Australia, 34 bird species regularly breed on the island. The summit and slopes of Mt Lidgbird and Mt Gower support almost the entire breeding population of the marine bird, providence petrel (Pterodroma

solandri); the only known breeding locality in Australasia of the grey ternlet (*Procelsterna cerulea*) and vulnerable Kermadec petrel (*Pterodroma neglecta* neglecta); and the southernmost breeding locality in the world for the threatened masked booby (*Sula dactylatra tasmani*), sooty tern (*Sterna fuscata*) and common noddy (*Anous stolidus*) (DECC, 2010a).

- Malabar Headland National Park
  - The Malabar Headland, located in Malabar, 12km south of Sydney, is a 177ha park which has dramatic sandstone cliffs and provides spectacular coastal views. The western and eastern sections of the headland contain rare examples of the once extensive Port Jackson mallee scrub (*Eucalyptus obstans*, formerly *Obtusiflora*). Malabar Headland also contains one of the largest, continuous remnants of the endangered ecological community listed as eastern suburbs banksia scrub. The site is a renowned site for viewing seabirds and marine mammals, in particular the white bellied sea eagle and the humpback whale (NPWS, 2014b). The headland also has Indigenous heritage significance and includes shell middens that can be seen today.
- Meroo National Park
  - Meroo National Park is 3,731ha of coastline, coastal lakes and inland forested areas located 5km south of Ulladulla on the NSW south coast. High conservation values are attributed to the coastal lakes included in the park (Termeil, Tabourie and Wairo Beach Lagoon) and the foreshores and fringing wetlands of the adjoining lakes s (Meroo, Burrill and Willinga Lakes). As per the Narrawallee Creek Nature Reserve it includes endangered ecological communities Swamp Oak Floodplain Forest (*Casuarina glauca – Melaleuca ericifolia*), Coastal Saltmarsh, Littoral Rainforest, Bangalay Sand Forest (*E. botryoides – Banksia serrata*) and Themeda Grassland on Seacliffs and Coastal Headlands. At least 12 threatened fauna species including significant populations of the nationally endangered green and golden bell frog (*Litoria aurea*) have been recorded here. The national park also has Indigenous and recreational values due to mythological sites and a range of bush camping locations (NPWS, 2023d).
- Mimosa Rocks National Park
  - Mimosa Rocks National Park takes its name from the Paddle Steamer Mimosa that wrecked in 1863 after running aground on rocks at the northern end of the park. The rocks of the park have distinctive castle-like features that are the result of geological folds, faults and intrusions. The national park provides important habitat for many migratory birds, including Hooded plovers and Pied oystercatchers that nest along the coastline. The bar tailed godwit rests briefly here in summer months during its migration from Alaska to New Zealand. The national park is popular for fishing, surfing, snorkelling and birdwatching. From May to November, the headlands are excellent whale watching vantage points (NPWS, 2023e).
- Montague Island Nature Reserve
  - The Montague Island Nature Reserve, within the Batemans Marine Park, is a breeding and nesting place for over 40,000 sea birds including shearwaters, little penguins, crested terns and silver gulls and is a haul out site for Australian and New Zealand fur seals. Both Montague Island and the Tollgate Islands (also within the park) are aggregation sites for grey nurse sharks.
- Murramarang National Park
  - Murramurang National Park spans 44km of coastline on the NSW south coast and supports more than 90 species of bird including gannets, shearwaters, white-faced storm petrels, sooty oystercatchers and little penguins. The forest of spotted gums stretches right to the ocean (NPWS, 2023g). The national park includes four offshore Islands and encompasses Brush Island Nature Reserve, Belowla Island Nature Reserve and Tollgate Islands Nature Reserve.
- Nadgee Nature Reserve
- Narrawallee Creek Nature Reserve
  - Narrawallee Creek Nature Reserve is located on the mid south coast of NSW approximately 7km north of Ulladulla and covers an area of 878ha. It includes five endangered ecological communities

being Coastal Saltmarsh, Swamp Sclerophyll Forest (dominated by swamp mahogany, an important food source for several threatened fauna including the yellow-bellied glider and grey-headed flying fox), Swamp Oak Floodplain Forest, Littoral Rainforest and Bangalay Sand Forest). Eleven species of threatened fauna recorded, including breeding sites for the little tern, hooded plover and pied oystercatcher. Both Indigenous and historical values are placed on the reserve (NPWS, 2023h).

- Royal National Park
    - Royal National Park is a 15,068ha park situated on the coast of NSW, adjacent to the southern fringe of metropolitan Sydney and about 30km north of Wollongong. Royal National Park adjoins Heathcote National Park (2,251ha) to the west and Garawarra State Recreation Area (900ha) to the southwest. These adjoining parks do not include coastal areas. The parks are significant for many reasons, and these can be partially attributed to their accessibility to suburban Sydney combined with the parks' diversity of natural and cultural heritage which makes for high public profile and visitation rates for recreation, scientific and educational purposes (NPWS, 2000).
- Seven Mile Beach National Park
- Sydney Harbour National Park
    - Sydney Harbour National Park covers 393ha of headlands, beaches and islands in and around Sydney Harbour. The park includes six headlands including North Head on the northern side and South Head on the south side. The five islands within the park are Shark Island, Clark Island, Fort Denison, Goat Island and Rodd Island, extending well into the harbour past the Sydney Harbour Bridge. All parts of the park are within suburban Sydney city. Its list of values include historic, conservation values for the protection of native flora and fauna, Indigenous heritage, landscape and recreation and tourism (NPWS, 2012).
- Tollgate Islands Nature Reserve
- Towra Point Nature Reserve
    - Located at Kurnell, Botany Bay, in Southern Sydney, Towra Point Nature Reserve is a 603ha reserve. The site is one of the first contacts between European and Aboriginal peoples, Towra Point is a hugely important place for Australia as we know it today. In April 1770, the Cook expedition explored the area and mapped Towra Lagoon as a source of fresh water. Its fresh drinking water and historical richness in seafood provided an abundant source of food to the Indigenous people and the nature reserve is now a dedicated Aboriginal Place. Towra Point Nature reserve forms the largest and most diverse estuarine wetland complex in NSW. Representing around half of the remaining mangrove area near Sydney, and most of the saltmarshes remaining in the region. The abundance of mudflat, fresh water wetlands and sea grass beds, it provides breeding, feeding and roosting sites for many threatened and migratory bird species; Towra Point Estuarine Wetlands are a recognised NIW. Towra Point can only be accessed by boat or kayak (DECC, 2010b).

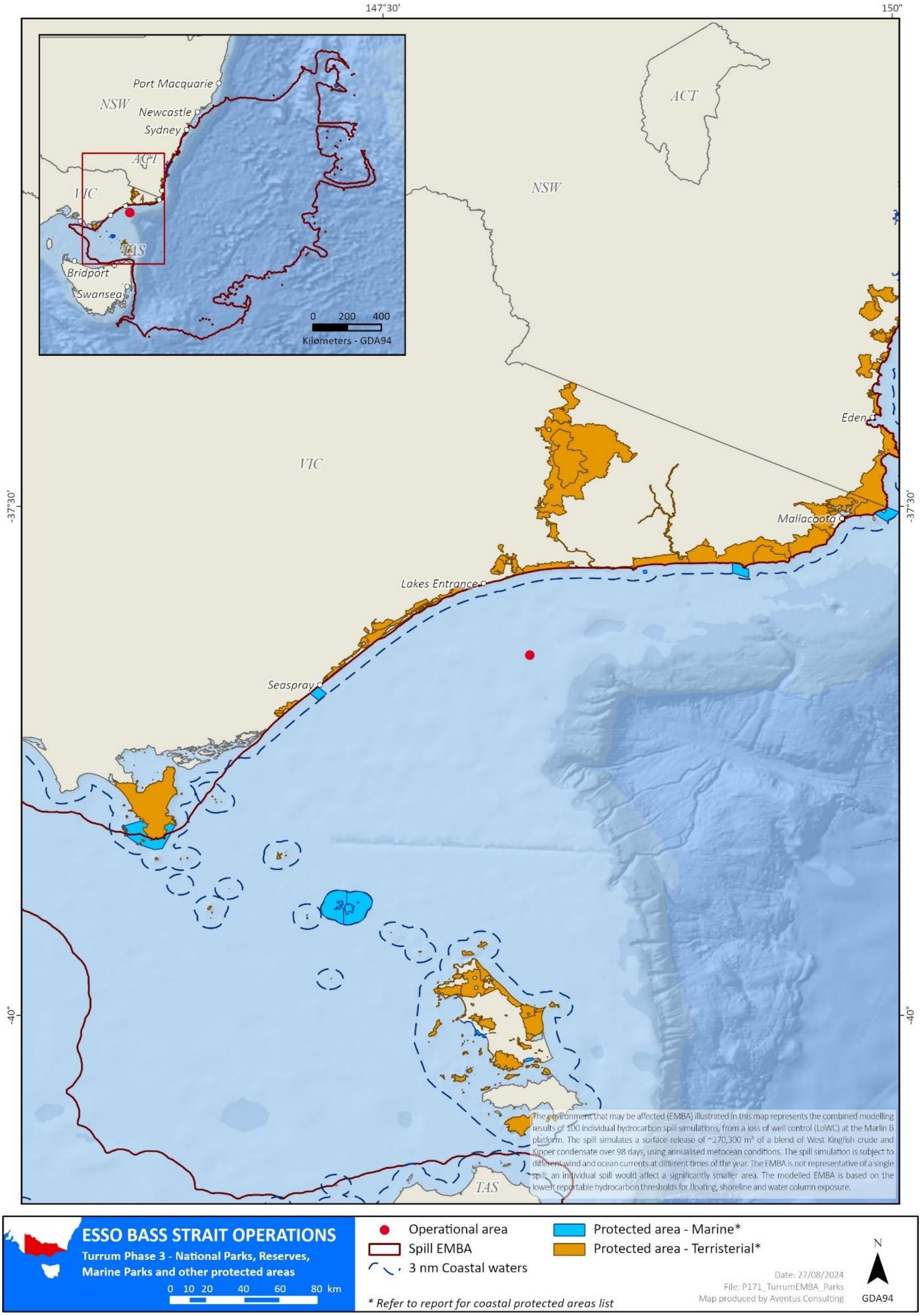

Figure A-9 Victorian protected areas intersected by the EMBA

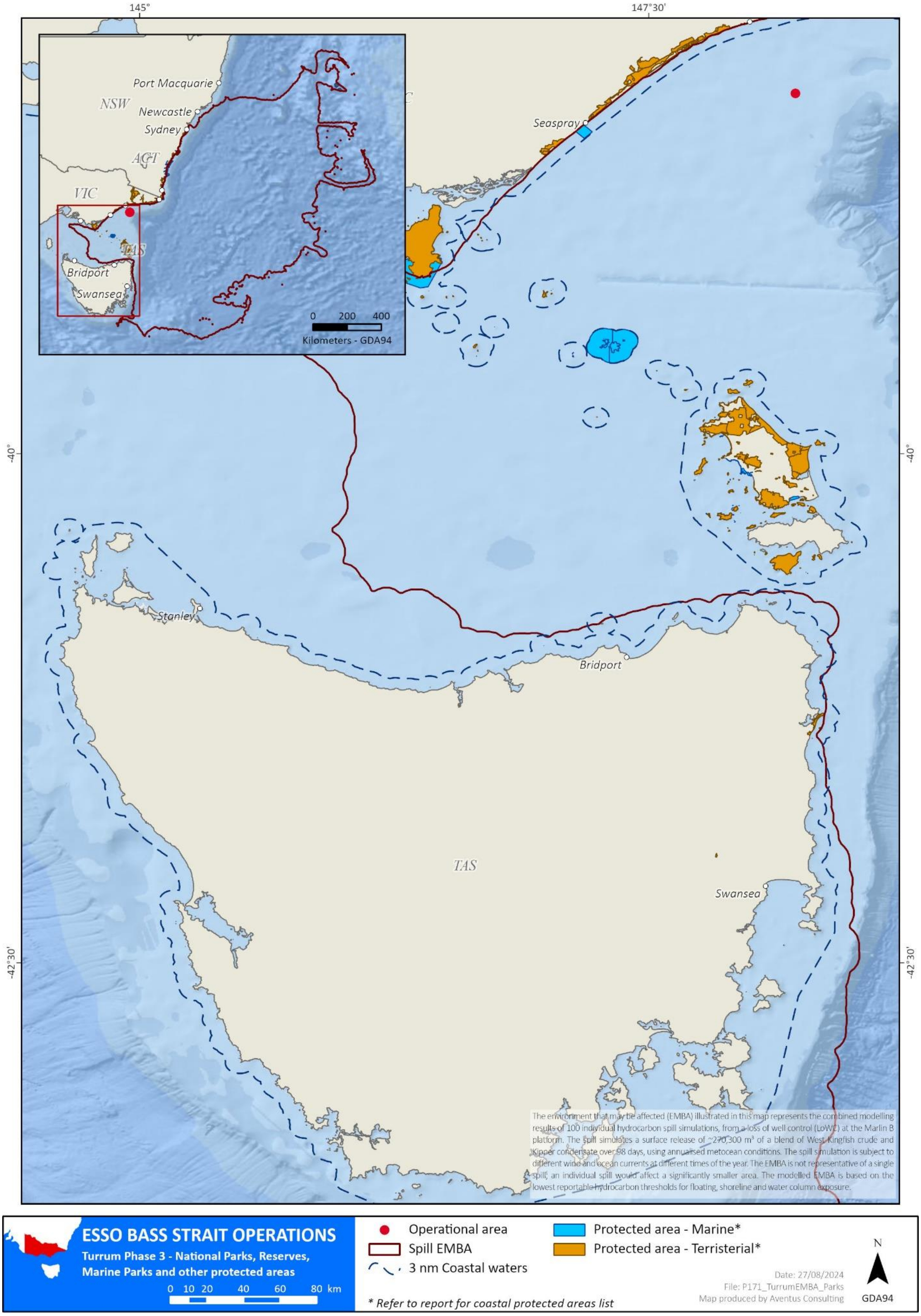

Figure A-10 Tasmanian protected areas intersected by the EMBA

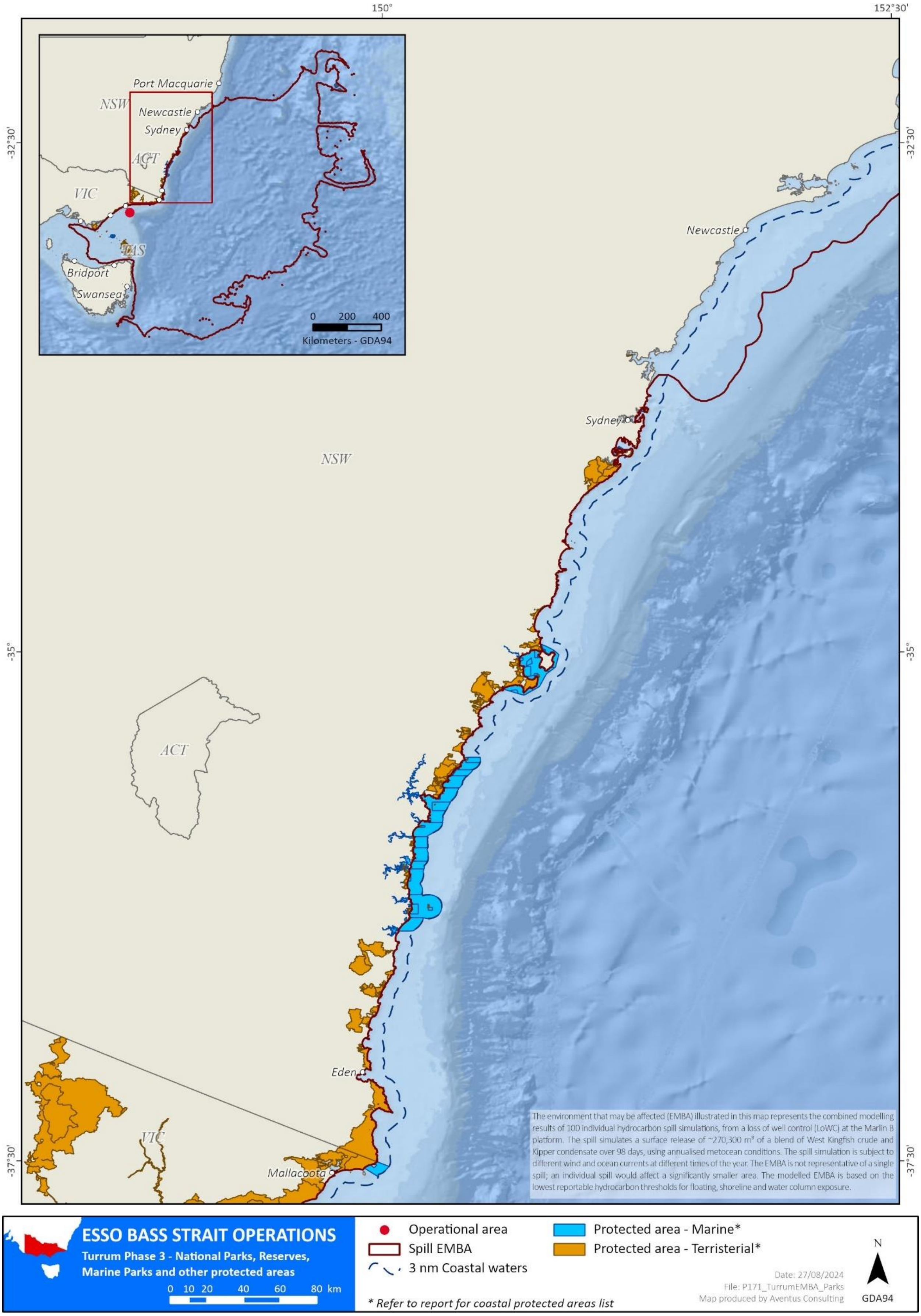

Figure A-11 NSW protected areas intersected by the EMBA

1.2 Regional context

The regional context of the EMBA is described in this Section.

1.2.1 Southeast marine region

Six marine regions have been identified in Commonwealth waters around Australia. Australia has one of the largest marine jurisdictions of any nation in the world. Australian waters cover 14,700,000km^2, including waters around the external territories of Cocos (Keeling), Christmas, Heard and McDonald Islands as well as waters adjacent to Australia's Antarctic Territory.

The EMBA lies within two marine bioregions; the southeast marine region which is described here and the temperate east region which is described in the following section.

The key conservation values of the southeast marine region are (CoA, 2015):

- features with high biodiversity and productivity, such as the east Tasmania subtropical convergence zone, Bass Cascade, Upwelling east of Eden, Seamounts south and east of Tasmania and Bonney coast upwelling
- breeding and resting areas for SRW
- migration areas for blue, fin, sei, SRW and humpback whales
- foraging areas for Australian sea-lion, white shark, Harrison's dogfish, killer and sei whales, Australasian gannet, fairy prion, black-faced cormorant, little penguin, crested tern, and several species of seal, penguin, albatross, petrel, shearwater and gulls
- wrecks of MV *City of Rayville*, SS *Cambridge* and ketch *Eliza Davies*.
- 10 provincial bioregions and 17 seabed types are represented in the network.

1.2.2 Temperate east marine region

The temperate east marine region spans an area of approximately 1,400,000km^2 from the southern boundary of the Great Barrier Reef in Queensland to Bermagui in southern NSW. The key conservation values of the temperate east marine region are (CoA, 2012):

- features with high biodiversity and productivity such as the canyons of the eastern continental slope and shelf rocky reefs
- nesting sites for listed seabirds on islands along the NSW coast, including Montague Island (short-tailed shearwater, sooty shearwater)
- breeding sites for little penguin, shearwater, Wilson's storm petrel, crested tern
- migration areas for humpback whale
- breeding sites for indo-pacific bottlenose dolphin
- foraging sites for several species of petrel, albatross, shearwater
- three provincial bioregions.

1.2.3 Provincial bioregions

Based on the IMCRA Version 4.0 (CoA, 2006), the EMBA is situated within the following provincial bioregions (see Figure A-12):

- Bass Strait Shelf Province
- Central Eastern Province
- Central Eastern Shelf Province
- Lord Howe Province
- Southeast Shelf Transition
- Southeast Transition
- Tasman Basin Province
- Tasmania Province
- Tasmanian Shelf Province
- Western Bass Strait Shelf Transition.

1.2.4 Mesoscale bioregions

Based on the IMCRA Version 4.0 (CoA, 2006), the EMBA is situated within the within the following mesoscale bioregions (Figure A-13):

- Batemans Shelf
- Boags
- Bruny
- Central Bass Strait
- Central Victoria
- Flinders
- Freycinet
- Hawkesbury Shelf
- Manning Shelf
- Otway
- Twofold Shelf.

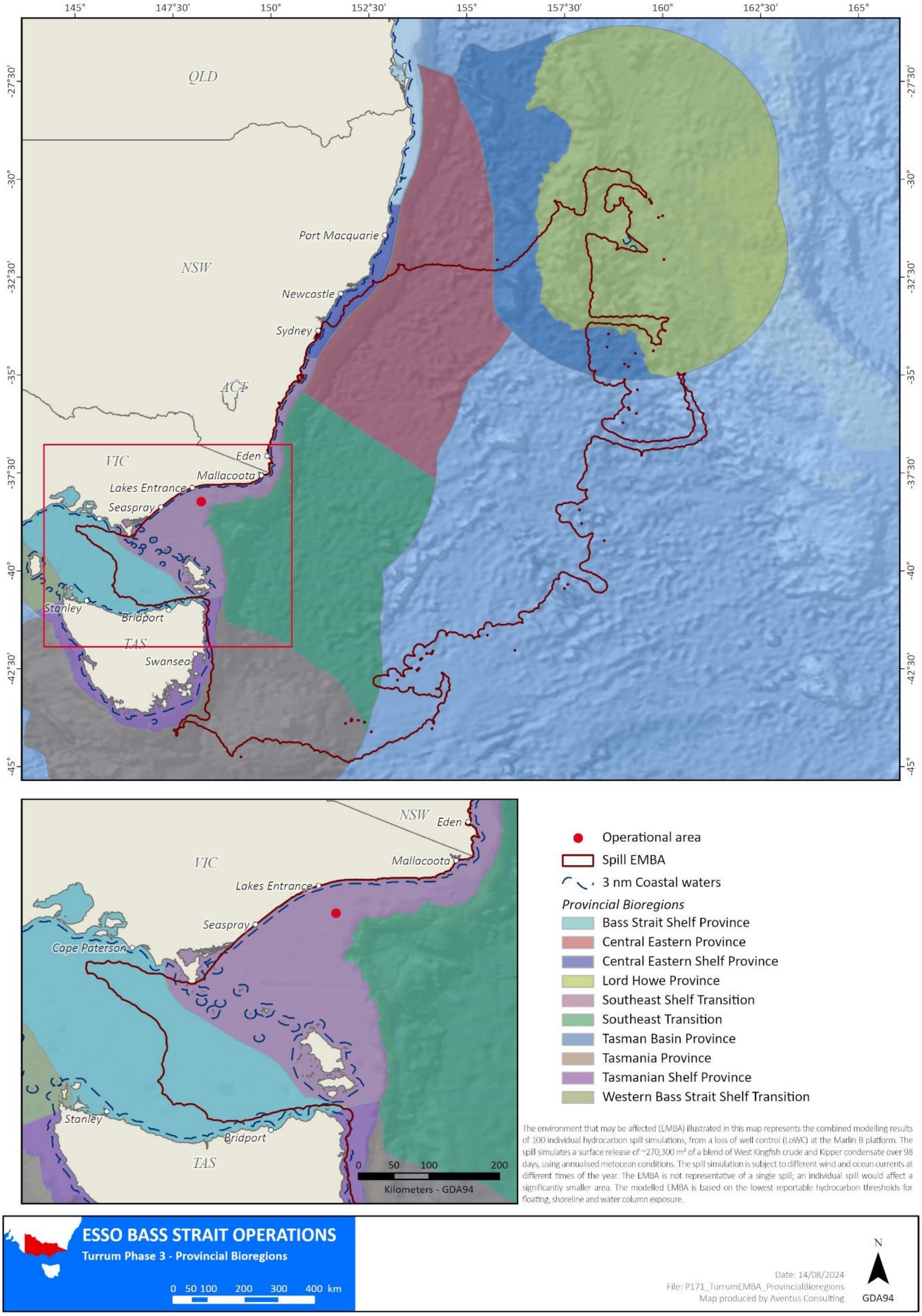

Figure A-12 Provincial bioregions within the EMBA

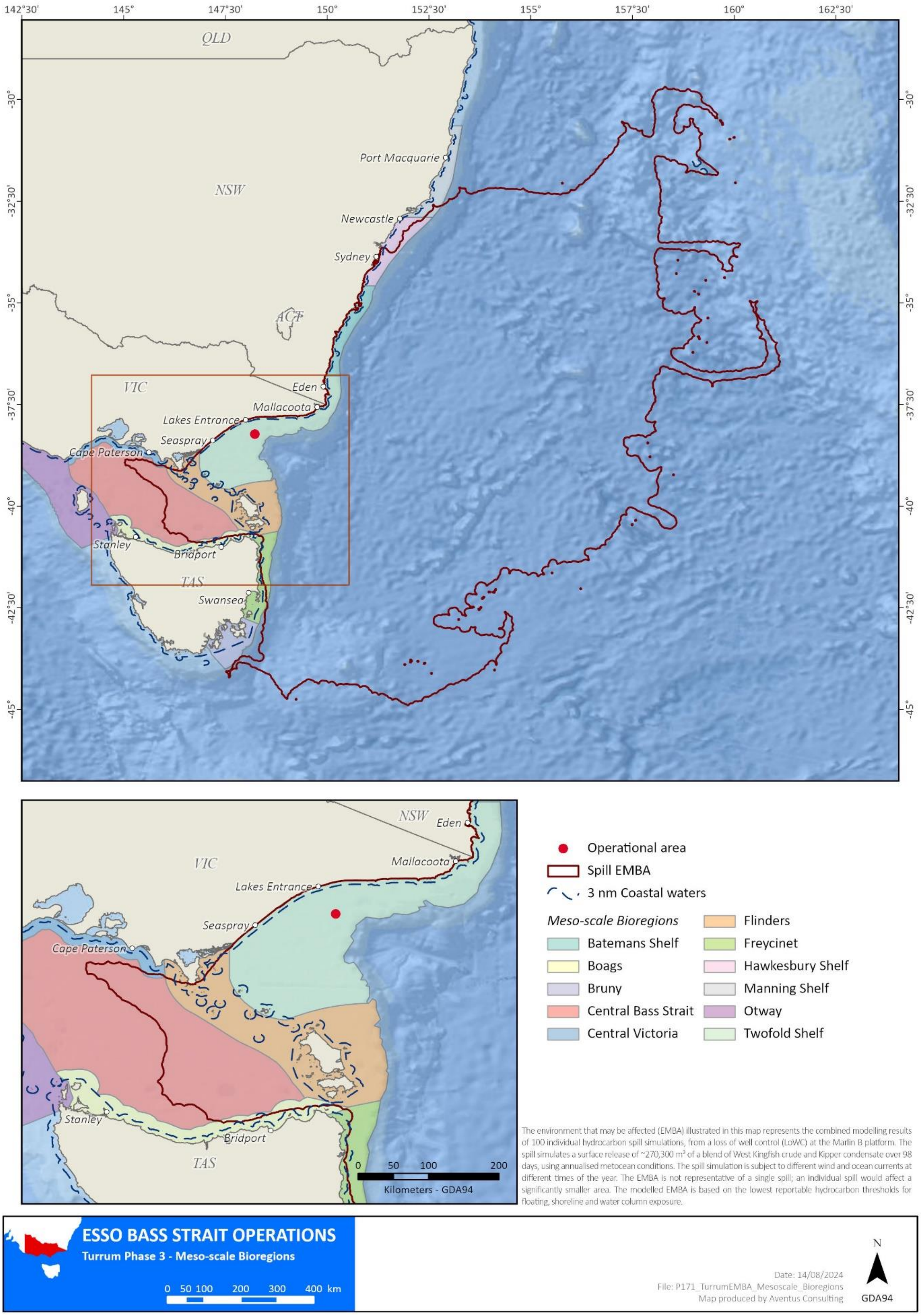

Figure A-13 Mesoscale bioregions within the EMBA

1.3 Physical environment

1.3.1 Climate and meteorology

Average summer air temperatures in coastal Victoria (Yarram Airport) range from early morning lows of 11 - 13°C, to afternoon highs of 23 - 26°C (BOM, 2017). Average winter temperatures range from minimums of 5°C to maximums of 15°C in the afternoons. Offshore (on Deal Island in central Bass Strait), milder conditions occur with an average summer range of 13 - 21°C and an average winter range of 9 - 14°C (BOM, 2017).

Average monthly rainfall along the Gippsland coast (Yarram Airport) ranges from 36mm in January (highest 112mm) to 60mm in June (highest 174mm). Offshore (on Deal Island in central Bass Strait) monthly rainfall ranges from 41mm in January (highest 162mm) to 78mm in June (highest 247mm) and shows a similar pattern to the coastal region (Lakes Entrance) with slightly higher winter rainfall: 38mm in January (highest 90mm) to 101mm in June (highest 298mm) (BOM, 2017).

Wind speeds are in the range of 10 - 30km per hour, with maximum gusts reaching 100km/hour. The wind direction is predominately westerly during winter, westerly and easterly during spring and autumn (when wind speeds are highest) and easterly during summer. Strong southeasterly winds can be generated by low pressure systems known as 'east coast lows. Although these occur relatively infrequently (once or twice per year), the longer fetch of these winds increases their potential for generating extreme wave conditions (BOM, 2017).

There are three main and one minor types of storms which can generate severe wave conditions in the study area of Bass Strait. These are (Esso, Metocean Design Criteria for Bass Strait fixed platforms. Vols. 1 – 4, Esso Australia Ltd. , 1989) and (Cardno, 2017):

- Southeast storms: are generally associated with what has become known as an 'east-coast low'. East-coast lows are generally associated with very strong east to southeast winds (speeds in excess of 80kn have been measured off the NSW coastline) and high rainfall. Southeast storms resulting from east-coast lows occur relatively infrequently (on average 1 to 2 per year), and not all travel far enough south to cause concern in Bass Strait. The waves they generate are however, unrestricted by fetch or water depth. As such they have the greatest potential for generating extreme wave conditions in eastern Bass Strait.
- Southwest storms: occur relatively frequently (typically several severe storms per year). Due to fetch and depth limitation, it is unlikely that extreme design-wave conditions will occur during a southwest storm.
- South storms: are generally associated with low-pressure systems in the western part of the Tasman Sea. During the peak of the storm the Tasman Sea lows generate very strong south southeast through to south southwest winds in Bass Strait. During storm development however, the wind can have a significant southeast or southwest component, depending on the origin of the low. Southerly storms occur at about the same frequency as southeast storms. Southerly storms are considered to have a greater potential than the southwest storms for generating extreme wave conditions.
- Small-scale Bass Strait Lows: can generate southeast, south, or southwest waves, depending on their origin and location. These storms can be quite severe (e.g. the January 1986 storm), but due to fetch limitations are unlikely to be the cause of extreme design-wave conditions.

1.3.2 Oceanography

1.3.2.1 Currents and tides

Currents in the Gippsland Basin are tide and wind driven. Tidal movements predominantly have a northeast–southwest orientation. Tidal flows come from the east and west during a rising (flood) tide, and flow out to the east and west during a falling (ebb) tide. Tidal streams are dominated by the lunar tidal constituent, which has a period of 12.4 hours. The main tidal components vary in phase by about three to four hours from east to west. Most of this phase change occurs between Lakes Entrance and Wilsons Promontory. Timing of the high tide, for example, can vary by up to three hours across this region. Tides in the area from Lakes Entrance to Gabo Island are, however, relatively weak in comparison to other areas of Bass Strait (GEMS, 2005).

Bass Strait is characterised by shallow water and tidal currents. While there is a slow easterly flow of waters in Bass Strait, there is also a large anticlockwise circulation. The shallowness of the water means that these waters more rapidly warm in summer and cool in winter than other waters of the region.

Wind driven currents in Gippsland Basin can be caused by the direct influence of weather systems passing over Bass Strait (wind and pressure driven currents) and the indirect effects of weather systems passing over the GAB (GEMS, 2005).

The eastern parts of the region are strongly influenced by the EAC that flows southward adjacent to the east coast of NSW, Victoria and Tasmania, carrying warm equatorial waters (Refer Figure A-14 and Figure A-15). The EAC is up to 500m deep and 100km wide and is strongest in summer when it can flow at up to 5kn. In winter it flows at 2 – 3kn as the oceanographic and climatic drivers in the Coral Sea diminish. The EAC tends to form ocean eddies that rotate around warm, central cores that can be up to 200km across and may persist for months. Eddies form more frequently off the south coast of NSW than other areas but are also common along the east coast of Tasmania. The eddies can cross the continental shelf, and when mixing with shelf break waters, create upwellings that form isolated areas of enhanced productivity 200 – 300km in diameter. Seasonal and transient upwellings are important ecological features of the Region. The EAC also affects sea surface temperatures on the eastern Tasmanian shelf, which can vary substantially among years depending on the relative influence of subtropical waters.

At the shelf break east of Bass Strait, nutrient-rich waters rise to the surface in winter as part of the processes of the Bass Strait Water Cascade, where the eastward flushing of the shallow waters that are more saline and slightly warmer than surrounding Tasman Sea waters form an undercurrent that cascades down the continental slope. The cascading water has a displacing effect causing nutrient rich waters to rise which in turn leads to increased primary productivity in those areas. The cascading water also concentrates nutrients, and some fish and whales are known to aggregate along its leading edge.

Further offshore, in the southeast, currents are driven by two parameters, the Sub-Antarctic Water movement, coming from the south, and the Bass Strait Water movement from the west (Tomczak, 1985) (Gibbs, 1991). The presence of deepwater currents is documented in the Blackback Oceanographic Study (Lawson and Treloar, 1996), Kingfish B Wave, Current and Wind data (Treloar, 1998) and Metocean Design Criteria for Bass Strait Fixed Platforms (Esso, Metocean Design Criteria for Bass Strait fixed platforms. Vols. 1 – 4, Esso Australia Ltd. , 1989).

Esso undertook a comprehensive current measurement program in the Blackback study area using seven current meters moored 3m above the seabed over a 12 month period (Lawson and Treloar, 1996) to provide an understanding of the regional oceanography of the Bass Strait shelf and continental slope, particularly the relative importance of tidal, wind-driven and density-generated currents and the influence of regional topography on currents in the study area.

Tidal current analysis indicated general seabed current alignment normal to the bathymetry, at speeds of around 0.2 - 0.3m/s. The dominance of the bathymetry was most evident at the current meter sites located within a clearly defined valley.

Analysis of residual, non-tidal current vectors during significant storm periods has confirmed that wind driven currents are the strongest currents in the continental shelf areas but are of progressively lesser significance lower down the continental slope. The study has also provided evidence of flow of water from the continental shelf down the continental slope, conforming to the Bass Strait Cascade, as evidenced by high easterly currents and minimum vertical variation in temperature from the shelf to depths of 500m. Currents during these cascade flows were stronger than background tidal currents and were the strongest currents recorded lower down the continental slope.

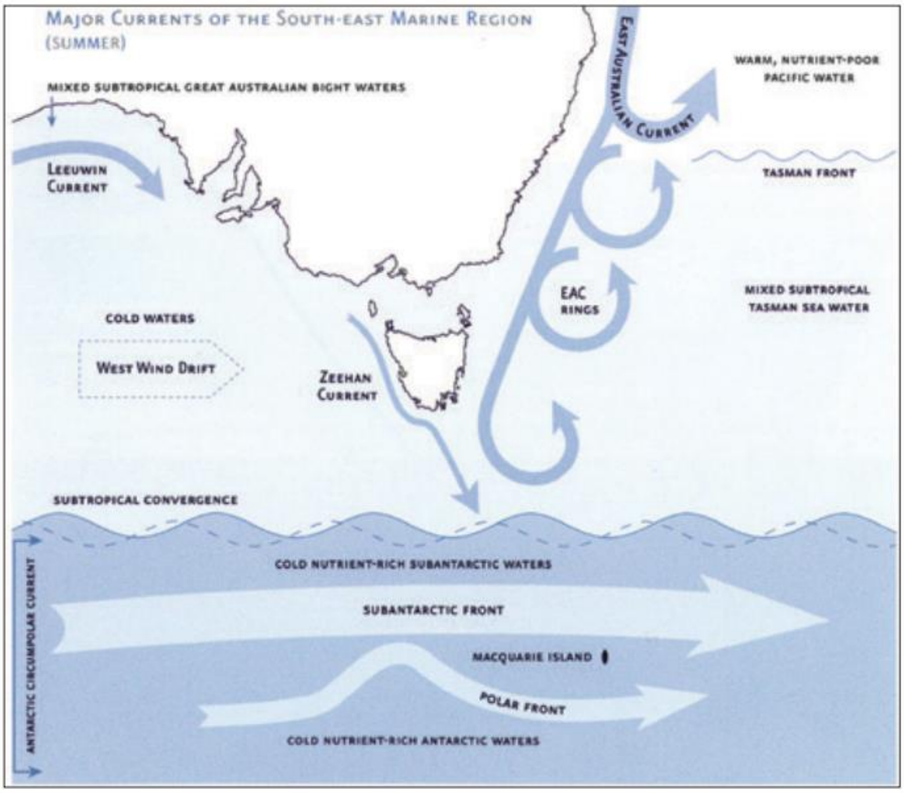

Figure A-14 Major ocean currents in southeastern Australian waters summer

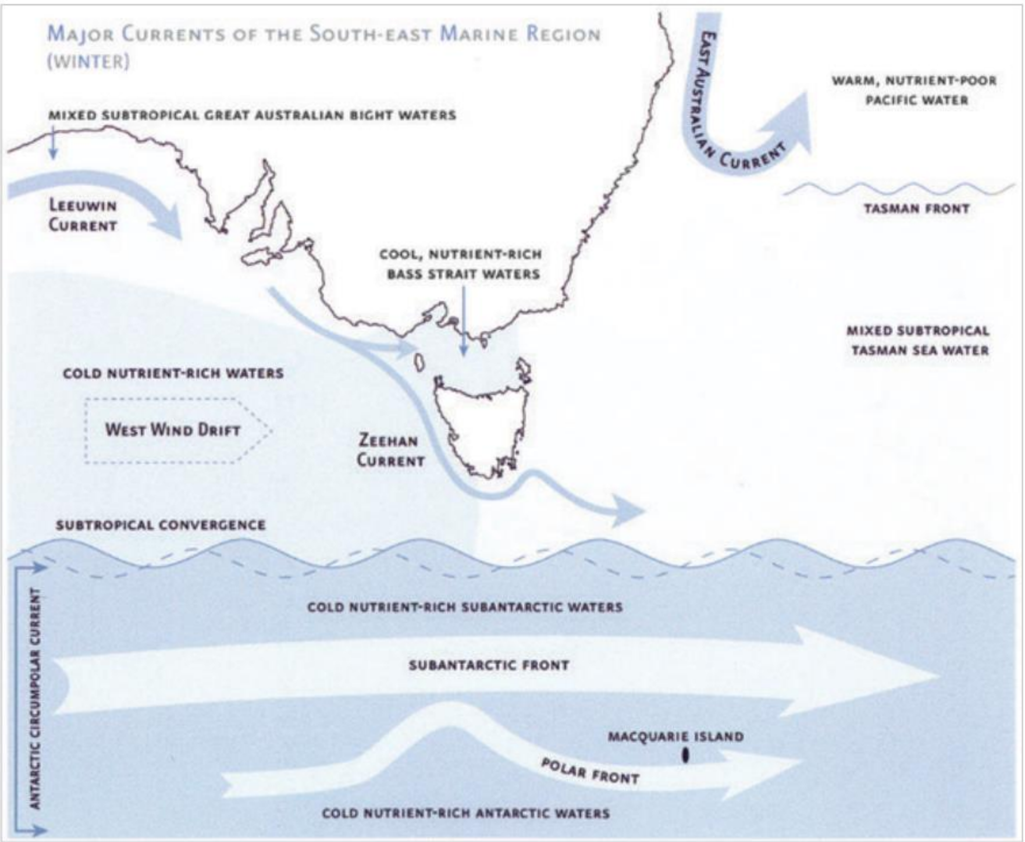

Figure A-15 Major ocean currents in southeastern Australian waters winter

1.3.2.2 Water temperatures and density stratification

Temperatures in the subsurface waters of Bass Strait range from about 13°C in August/September to 16°C in February/March. Surface temperatures can exceed 20°C at times in late summer due to the warmer waters of the EAC entering the strait. Water temperatures within the EMBA are expected to follow this pattern (Jones I. , 1980). Table A-2 shows the monthly average sea surface temperatures and salinity as obtained from the World Ocean Atlas 2013 database which shows the same range of temperatures as those previously recorded. Monthly average sea surface temperatures were shown to range from 14°C (August, September) and 20°C (March). Salinity remained consistent throughout the year ranging from 35 to 36psu (RPS, Blackback Oil Spill Modelling. Prepared for Esso Australia Pty Ltd by. Report No. MAQ0714J, 2018).

Table A-2 Average monthly sea surface temperature and salinity nearby Blackback well location within the 0-5m water depth

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	19	20	20	19	18	16	15	15	14	15	16	18
Salinity (psu)	35	35	36	36	35	36	36	36	35	36	36	36

Waters are generally well mixed, but surface warming sometimes causes weak stratification in calm summer conditions. During these times, mixing and interaction between varying water masses leads to variations in horizontal water temperature and a thermocline (temperature profile) develops. The thermocline acts as a low friction layer separating the wind driven motions of the upper well mixed layer from the bottom well mixed layer. As a result, upwelling of cold water on the northern shores of Bass Strait can occur (Jones I. , 1980).

Information on density and temperature profiles of the deeper area of the Blackback field has been obtained (Lawson and Treloar, 1996). Temperatures measured at the seabed confirmed a decrease in temperature with depth of measurement. The survey also showed a period (July to September) of uniformity of temperature at all measured depths, indicating flow down the continental slope (Bass Strait Cascade). The range of water temperatures observed at the seabed is from a maximum of 17°C at 93m to a minimum of 7°C at 480m. The minimum temperatures at depth were recorded in summer, possibly because of stronger stabilising stratification and absence of the cascade of relatively warmer water during winter.

1.3.2.3 Waves

Bass Strait is a high energy environment exposed to frequent storms and significant wave heights. High wave conditions are generally associated with strong west to southwest winds caused by the eastward passage of low-pressure systems across Bass Strait. Storms may occur several times a month resulting in wave heights of 3 - 4m or more. In severe cases, southwest storms can result in significant wave heights of greater than 6m (Jones 1980).

Wave data have been analysed for the 10-year period from 1977 to 1987 (Lawson, 1987). Wave conditions at Blackback exhibit an increased wave climate, in excess of those experienced at further inshore facilities due to the increased fetch length of waves approaching from the south west. Higher wave conditions are generally associated with strong west to south west winds caused by the eastward passage of low pressure systems across Bass Strait. These may occur several times per month and can result in significant wave heights of 3 - 4m or more. In severe cases, south west storms can result in significant wave heights of up to 6 - 7m.

Extreme design wave conditions are associated with east coast low pressure systems. These can result in very strong east to southeast winds in eastern Bass Strait. The 1989 Metocean Design Criteria Report (Esso, 1989) gives a design significant wave height of 9.0m and a corresponding maximum wave height of 17.5m.

1.3.2.4 Bathymetry

The seabed bathymetry across the region is highly variable. Majority of the EMBA lies within water past the shelf in depths greater than 300m up to 5,000m (see Figure A-16). The bathymetry contours along the coast where the EMBA lies ranges from 10 - 300m deep.

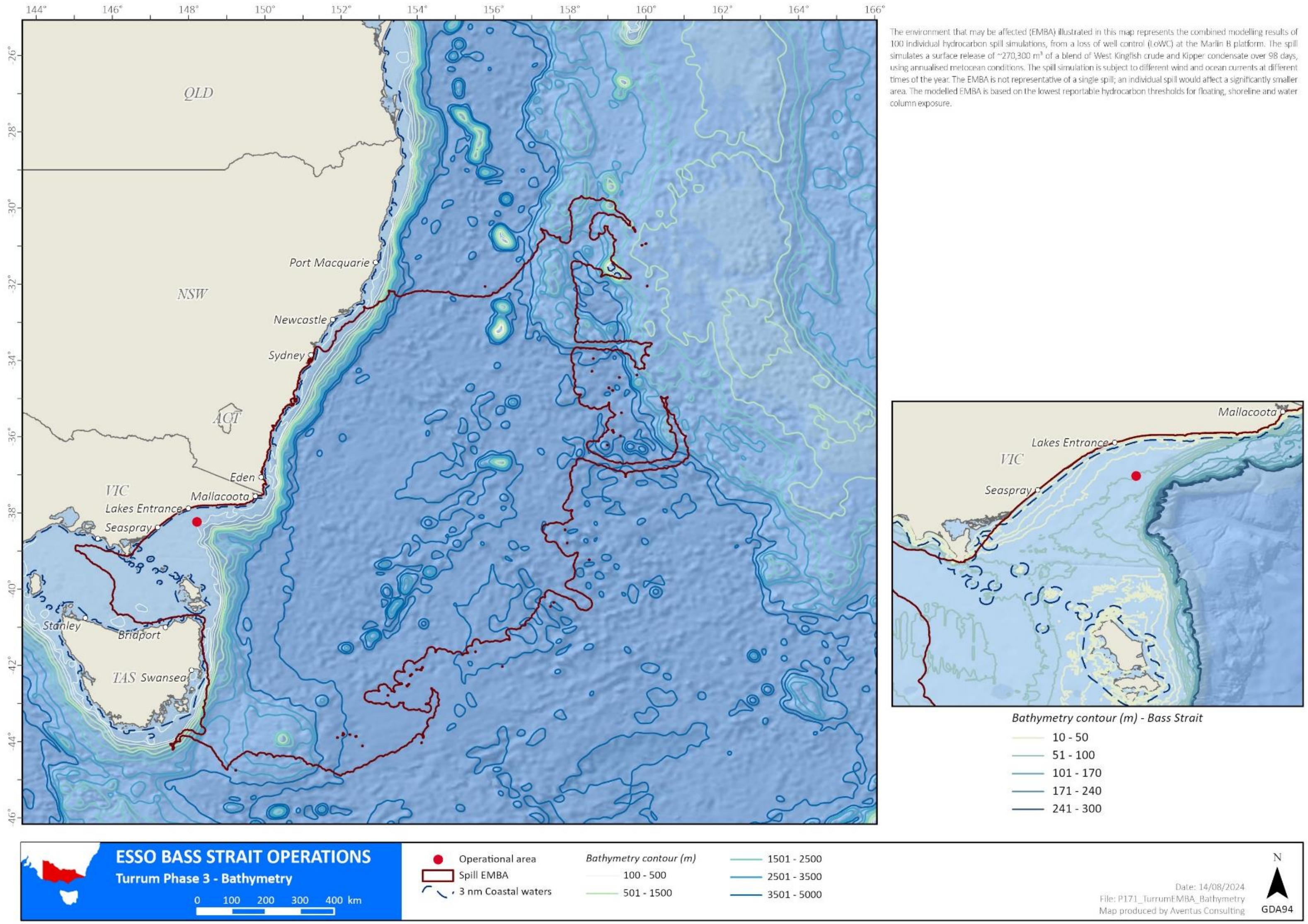

Figure A-16 Bathymetry within the EMBA

1.4 Biological environment

1.4.1 Benthic habitat

1.4.1.1 Bare substrate

Unvegetated bare substrate is a widespread habitat in both intertidal and subtidal areas, particularly in areas beyond the photic zone. The biodiversity and productivity can vary depending upon depth, light, temperature, and the type of sediment present.

In the Gippsland Basin, seabed material is predominantly calcium carbonate comprised of calcarenite marls and marine shales (Esso, 2009). Folk sediment classification of the samples taken at the West Kingfish and Tuna platforms describe the sediments as ranging between slightly muddy, gravelly and muddy, gravelly sand with two locations at Tuna being classed as gravelly sand (Cardno, 2019). Similarly, the West Barracouta geophysical survey classified the seabed as featureless with consistently medium to high variable reflectivity, with backscatter characteristics indicative of fine to coarse calcerous sand with shells (DFWSS, 2018). The 2009 Snapper study found that the seabed surrounding the platform is entirely comprised of soft sediments with no areas of hard substrate of rocky reef (Coffey, 2010). Generalised cross section taken from the Blackback Site survey report and accompanying representative sediment photographs indicate that the seabed sediments at the Blackback region are dense fine to medium grained siliceous carbonate sand (carbonate content approximately 80%) with some silt and shell debris. The samples from the canyon areas had a higher proportion of gravel and shell fragments relative to the slope and ridge samples.

The Gippsland Basin is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment. The sandy plains are only occasionally broken by low ribbons of reef; however, these reefs do not support the large brown seaweeds characteristic of many Victorian reefs, but instead are inhabited by resilient red seaweeds and encrusting animals that can survive the sandy environment (Esso, 2009). A study of the seascape of the southeastern Australian continental shelf conducted in 2001 found that 89% of the seabed was sediment flats/bare substrate with prominent hard grounds making up the remaining 11% of the seabed (Bax, 2001).

The benthic fauna present on the soft sediment can be broadly divided into two groupings:

- the epibenthos which includes sessile species such as sponges and bryozoans, hydroids, ascidians, poriferans and mobile fauna including hermit crabs, sea stars and octopus.
- the infauna which includes a diverse range of species such as amphipods, shrimps, bivalves, tubeworms, small crustaceans, nematodes, nemerteans, seapens, polychaetes and molluscs (Parry G. C., 1990).

Many of these species are burrowing organisms that cause moderate bioturbation (Edgar G. , 2001). Scientific surveys have shown that some shallow Victorian sandy environments have the highest levels of animal diversity in the sea ever recorded (ParksVic, 2016). In the area around the Ninety Mile Beach Gippsland more than 600 different marine animal species, many of them very small, have been found within an area of $10m^2$ (ParksVic, 2016). This high species richness was a major factor in the creation of a marine national park on the Ninety Mile Beach (ParksVic, 2017d). The subtidal sand invertebrate fauna is dominated by small animals, mostly crustaceans, molluscs, echinoderms and polychaetes (A Plummer, 2003) (Williams, 2001).

(Parry G. C., 1990) found high diversity and patchiness of benthos sampled off Lakes Entrance, where a total of 353 species of infauna was recorded. Crustaceans (53%), polychaetes (32%) and molluscs (9%) dominated sample results. A significant site for the listed opistobranch mollusc (seaslug) Platydoris galbana is located off Delray Beach, 2km southwest of Golden Beach on the shoreline (O'Hara, 2000). An ROV seabed survey was conducted following drilling at the Snapper OA in 2009 (Coffey, 2010) and a seabed monitoring program conducted near West Tuna in 1999 (URS, 2000) confirmed that polychaetes and crustaceans were the most abundant infaunal taxa present in the seabed sediments.

These results were further supported by two studies conducted in 2018 for Esso. The first, an in-situ sediment quality and infauna sampling program conducted at West Kingfish and Tuna (including reference locations), confirmed that polychaetes, crustaceans, and molluscs were the most abundant groups of taxa at all the sampled locations. The dominance (in terms of abundance) of taxa varied among zones and reference locations at each platform and between platforms. The benthic infauna assemblages were diverse with a range of taxa having a substantial contribution to the overall assemblage structure. The study investigated the drivers for potential influence on the entire assemblage of benthic infauna and found that it was the proportion of gravel (>2.00mm) particles in the sediment that was the most significant influencing factor. Figure A-17 shows the proportion of the assemblage represented by the Crustacea, Polychaeta, Mollusca, Echinodermata and the Order groups for 'Other Worm Phlya' and 'Other Phyla' for the West Kingfish sampling and Figure A-18 shows the proportion of those assemblages for the sampling conducted at Tuna. The graphs show that the proportions of these assemblages were generally consistent between locations at the West Kingfish platform, however there were significant differences in the benthic infauna assemblages between locations at Tuna platform. Analysis indicated these differences were driven by changes in the physical characteristics of the environment, for example grain size and hydrodynamic differences between locations (Cardno, 2019).

The second 2018 Esso baseline study for the West Barracouta project found similarities in the dominant taxa throughout the survey locations which included annelids (polychaetes), crustaceans (amphipoda, isopoda and decapoda) and molluscs (gastropods and bivalves). This study also found that there was dissimilarity between infauna groups and these were variable throughout the survey area, likely reflecting the heterogeneous nature of the survey area (DVSS, 2018). Figure A-19 shows the taxa classed abundance of infauna at each of the monitoring sites at West Barracouta. The variation in abundance seen between the West Kingfish/Tuna studies and the West Barracouta study is due to the sample sizes taken. West Kingfish/Tuna sample size averaged 2.3L. West Barracouta sample size was 66L (0.66m^2).

The studies suggest there is a consistent variation in the types and abundance of benthic infaunal species forming assemblages across the across Bass Strait. Though the benthic infauna taxa collected during this study are similar to those previously recorded, the contribution of each one to the overall assemblage was different in the majority of cases. The differences in the contribution of individual taxa to the overall assemblage between studies could have resulted from a number of natural factors including habitat heterogeneity (mirco and macro-scale), depth and sediment characteristics (URS, 2000) and temporal differences between sampling periods (Cardno, 2017). This is consistent with the 2004 study of Sediments and Benthic Biota of Bass Strait (GA, 2004), which concluded that it is not possible to classify the biological assemblages into a scheme that can be mapped across Bass Strait. The study emphasized that assemblages could have different distribution patterns to species and that environmental gradients rather than discrete bioregions or habitats better explain the biotic patterns observed in the sea bed of Bass Strait. Analysis of physical variables, derived from data collected on previous surveys by Geoscience Australia and supplemented by more recent data, show that longitude and depth are also important factors in explaining the biological diversity (GA, 2004).

The introduced New Zealand screw shell (*Maoricolpus roseus*) is present in eastern Bass Strait and is known to form extensive and dense beds on the sandy seafloor spreading to the 80m isobath off eastern Victoria and NSW (Patil, 2004). Larger animals found in these soft sediment environments in Victoria have included smooth stingray (*Dasyatis brevicaudata*), pipi (*Plebidonax deltoids*), dumpling squid (*Euprymna tasmanica*), common stargazer (*Kathetostoma leave*) and heart urchin (*Echinocardium cordatum*) (ParksVic, 2016). Soft sediment habitat is the dominant habitat within the EMBA.

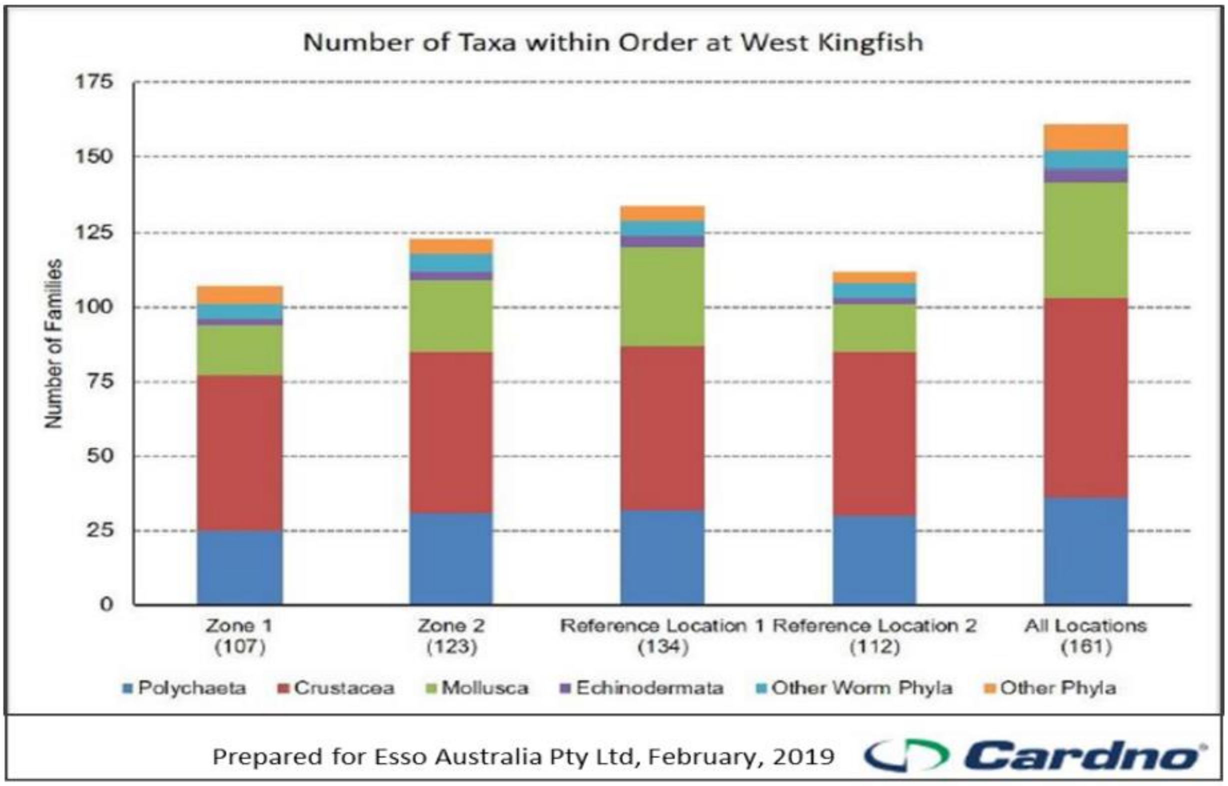

Figure A-17 Number of taxa sampled at West Kingfish platform (Zones 1 and 2) and reference locations (Locations 1 and 2). Values in parentheses indicate the total number of taxa sampled

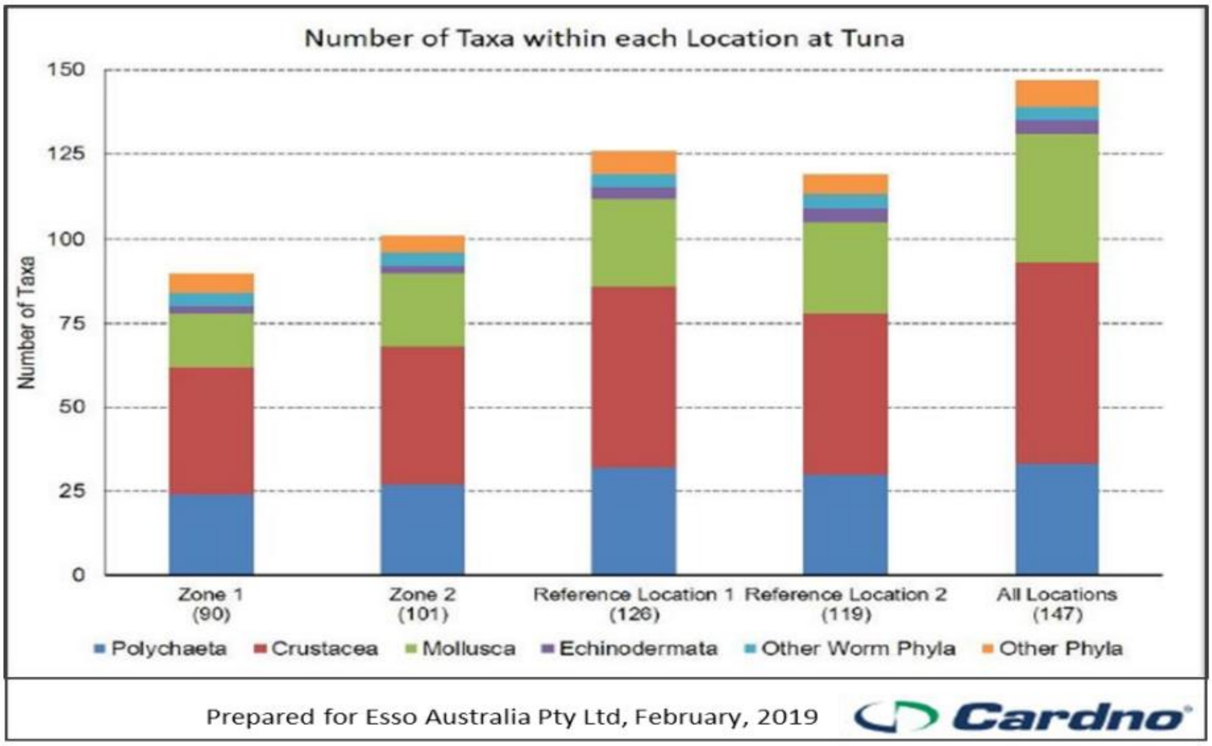

Figure A-18 Number of taxa sampled at Tuna platform (Zones 1 and 2) and reference locations (Locations 1 and 2). Values in parentheses indicate the total number of taxa sampled

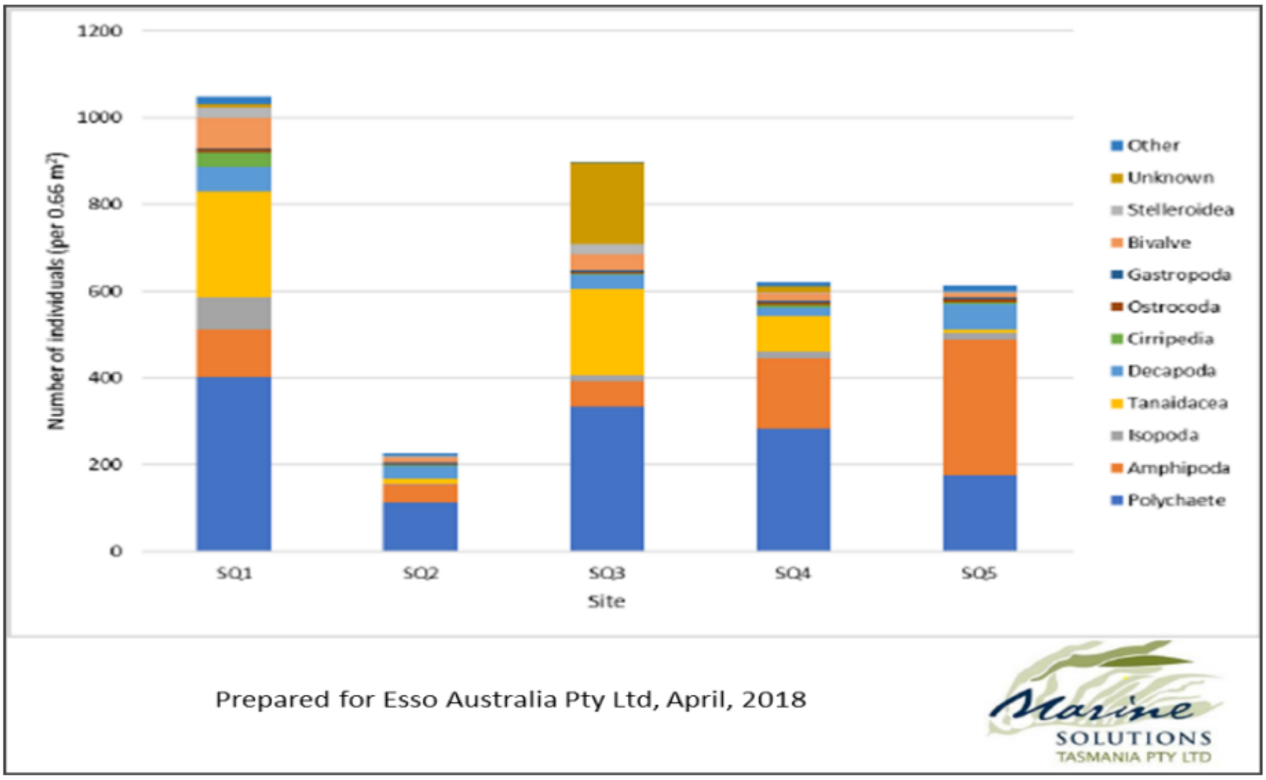

Figure A-19 Taxa classed abundance of infauna at West Barracouta monitoring

1.4.1.2 Seagrass

Seagrasses are marine flowering plants, with about 30 species found in Australian waters (Huisman, 2000). There is a distinction between tropical and temperate seagrasses, and the approximate latitude for the change occurs at Moreton Bay (southern Queensland). The dominant temperate species in the EMBA are *Amphibolis antarctica, Halophila australis, Heterozostera tasmanica*, P*osidonia australis, Posidonia angustifolia and Zostera muelleri* (Kirkham, 1997). Seagrasses generally grow in sediments in intertidal and shallow subtidal waters where there is sufficient light and are common in sheltered coastal areas such as bays, lees of island and fringing coastal reefs (DEWR, 2006) (McLeay, 2003) (Rogers, 2013) (McClatchie, 2006).

Seagrass meadows are important in trapping and stabilising sediments, as seagrass leaves baffle wave action and reduce water movement to the extent that fine suspended particles settle out and are trapped (Edyvane, 1998). Seagrass meadows also provide habitat and nursery grounds for juvenile fish and invertebrates, enhance biodiversity, and promote primary production (Huisman, 2000), (Rogers, 2013), (Kirkham, 1997).

Known areas of seagrass within the EMBA include Corner Inlet and Lakes Entrance in Victoria, and numerous inlets and estuaries along the NSW coast (Lucieer V, 2017). While seagrass meadows are present throughout this region, the proportion of seagrass habitat is not high compared to the rest of Australia, in particular with parts of South Australia and Western Australia (Kirkham, 1997).

Seagrasses are highly productive habitats that occur on intertidal flats and in shallow coastal waters worldwide from arctic to tropical climates. Water temperature, light penetration, sediment type, salinity, and wave or current energy control seagrass distribution. Seagrasses provide breeding and nursery grounds for fish and wildlife. Seagrasses are used by fish and shellfish as nursery areas.

1.4.1.3 Subtidal rocky reefs

This habitat occurs either as extensions of intertidal rocky shores or as isolated offshore reefs and are always submerged. The rocky reefs of southern Australia support a highly endemic marine flora and fauna. Subtidal rocky reefs are scattered along the Gippsland shore and make up approximately 11% of the southeastern Australian shelf (Bax, 2001).

This habitat consists of subtidal substrates composed primarily of limestone reefs and outcrops of sandstone and granite. The composition and characteristics of the substrate varies across the region based on its geologic origin and history. Fossiliferous limestone, as the name suggests, is composed of skeletons of dead animals, such as bivalve and bryozoan clasts. The skeletal elements are cemented together by a fine-grained calcareous matrix formed by a slow rate of sedimentation suggesting that the process is continuing to (slowly) occur on the Gippsland Basin continental shelf (Bax, 2001). Known locations of this type of substrata are Howe Reef, Gabo Reef and Broken Reef.

Limestones usually form in large, tabular slabs of low relief (<2m) as is the case in Broken Reef, however they can also form as low-lying hard grounds that are bored and encrusted by benthic organisms. These are likely to form 'patches' or mosaics of hard substratum that show little (<20cm) or no vertical relief. Based on ROV video surveillance, the presence of South East Reef is not evident when comparing the abundance of biota around the Cobia platform versus other facilities (base on Esso ROV inspection data from 2010, 2013 and 2014). This may be due to the layer of sediment coverage over the hard substrate or the lack of extrusions/elevations.

Another form of the hard substrate is the coarse-grained, quartz rich sandstone. In Gippsland, sandstone, together with fossiliferous sandstone, occurs as elongate, low relief slabs which crop out from soft sediments along the Gippsland coastline. Whilst not confirmed this type of sandstone is also likely to be a common constituent of banks or reefs further offshore.

On the inner shelf of the Gippsland coastline are relatively localized, higher relief (>10m) outcrops formed of distinctive irregular, hexagonally jointed, coarsely crystalline granite, or hard reefs. Point Hicks and New Zealand Star Banks are areas of granite reef. Figure A-20 shows high level substrata distribution in southeast Australia (Bax, 2001).

Rocky reef habitats can support rich, diverse communities of attached epifauna (e.g. stalked chrinoids, sponges, ascidians etc.) and associated algae and other fauna. Structures with a higher relief (reef or bank) several metres high can provide protection and food and attract a diversity of fish and invertebrate species (NOAA, Characteristic Coastal Habitats - Choosing Spill Response Alternatives. , 2010).

The substrata are only one factor which influences the presence of biological communities. The distribution of fish and invertebrate communities is also correlated with latitude, depth, temperature, and hydrology. Areas where the overlap of temperate and subtropical currents coincide will have a different distribution of communities to places like Horseshoe Canyon where upwelling occurs.

Other known areas of subtidal rocky reef include; Bastion Point, Quarry Beach, Little Rame Head, Wingan Point, The Skerries Special Management Area, Petrel Point, Thurra River, Pearl Point, Yeerung River Estuary (Intermittently open), Cape Conran (East Cape, Cowrie Bay, Flat Rocks), Point Ricardo and Ricardo Beach (all of which are within the EMBA).

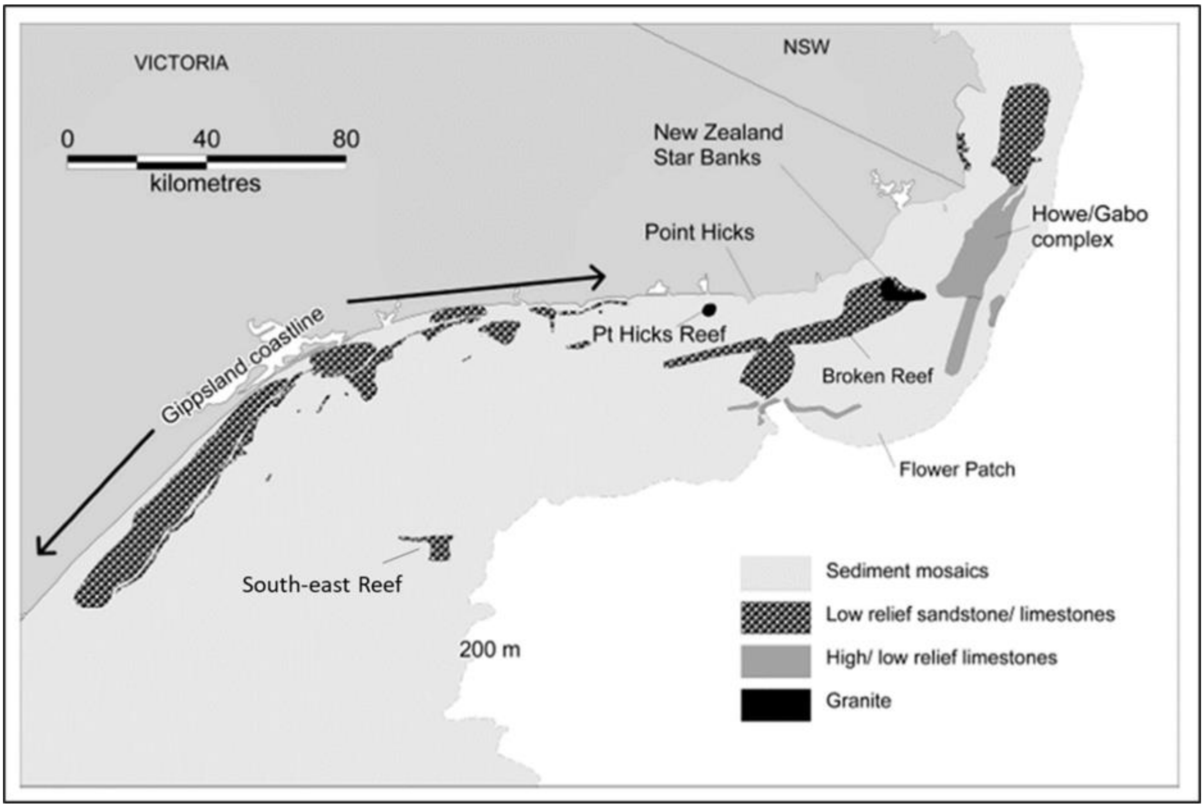

Figure A-20 Substrata on the southeastern Australian continental shelf

1.4.1.4 Macroalgae

Macroalgae are multicellular, marine algae, commonly known as seaweed. Macroalgae communities are generally found on intertidal and shallow subtidal rocky substrates as they require a surface to attach themselves to and can occur throughout Australian nearshore waters. Macroalgae are divided into three groups: brown algae *(Phaeophyceae)*, red algae *(Rhodophyta)*, and green algae *(Chlorophyta)*.

Brown algae are typically the most visually dominant and form canopy layers (McClatchie, 2006). Macroalgae assemblages vary, but *Ecklonia radiata* and *Sargassum sp.* are typically common in deeper areas. The principal physical factors affecting the presence and growth of macroalgae include temperature, nutrients, water motion, light, salinity, substratum, sedimentation and pollution (Sanderson, 1997). Macroalgal systems are an important source of food and shelter for many ocean species; including in their unattached drift or wrack forms (McClatchie, 2006).

Kelps are very large brown algae that grow on hard sub tidal substrates in cold temperate regions. Kelps have a holdfast that attaches to the substrate, a stem-like or trunk-like stipe, and large, flattened, leaf-like blades called fronds. The Giant Kelp Marine Forests are classed as TECs. Refer to Section 1.1.6.3 for information on giant kelp marine forests.

Known areas containing macroalage within the EMBA include around Gabo Island and within the Bemm River estuary (Lucieer V, 2017).

1.4.1.5 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 (Keable, 2007). Hard corals are generally found in shallower (<50m) waters, while soft corals are found at most depths, including in deeper waters throughout the continental shelf, slope and offslope regions, to well below the limit of light penetration.

There are three factors that appear to drive the spawning of warm water corals a gradual rise in sea temperature (this triggers the gametes to mature), the lunar cycle, and the daylight cycle. As such, the timing of coral spawning events varies around Australia. Large spawning events for Great Barrier Reef corals typically occur four to five days after the full moon in October or November (and occasionally into December). Reproduction methods for cold water corals are not as well understood, but it is likely that some are still broadcast spawners (like their tropical counterparts), while others brood and release formed larvae (Roberts, 2009).

While corals may not occur as a dominant habitat type within the Gippsland sector, their presence has been recorded within the region (e.g. Kent Group Marine Reserve, Freycinet Marine Park, and around Wilsons Promontory) (all of which are within the EMBA). Soft corals are typically present in deeper waters throughout the continental shelf, slope and offslope regions, to well below the limit of light penetration.

The cauliflower soft coral (*Dendronephthya australis*) (see Appendix D) is considered an endangered species and may occur within the EMBA. The species is predominantly found in estuarine environments in NSW at depths of 1 - 15m, however, it occasionally occurs offshore to depths of 30m and provides habitat for a variety of fish and invertebrates, including the endangered white seahorse (*Hippocampus whitei*) and juvenile snapper (TSSC, 2020).

1.4.1.6 Submarine canyons

Submarine canyons are abundant features along continental and oceanic island margins that connect continental shelves to deep ocean basins. Because of the physical complexity of canyon habitats, predictions concerning the effects of canyons on diversity are not straightforward since a variety of environmental and physical characteristics interact in canyon habitats. The most important driver affecting biodiversity and biomass/abundance patterns in canyons is organic matter input and is mostly related to coastal detrital inputs or pelagic productivity regimes (De Leo FC, 2010).

Seafloor terrain and substrate heterogeneity account for the second most important driver of benthic biodiversity in submarine canyons. One of these factors, sediment grain size, can be considered as a 'super-parameter' (Etter, 1982) since it directly or indirectly reflects local physical energy and sedimentation patterns. At moderate rates of flow and sediment deposition, suspension and deposit feeding, macrobenthos can be enhanced in abundance and/or diversity in canyons (Vetter, 1998), whereas at high rates of flow and sediment accumulation, canyon fauna can become impoverished, yielding low species richness and high dominance by a few tolerant species (Rowe G. P., 1982) (Gage, 1995) (Vetter, 1998).

While some studies have reported levels of megafaunal biodiversity in canyons rivalling seamounts (Schlacher, 2007), in other cases high disturbance rates (Rowe G. P., 1982) and absence of stable habitat collection led to faunal impoverishment compared to adjacent slope environments (Vetter, 1998).

1.4.2 *Coastal environment*

A range of shoreline types are represented along the coastal areas within the EMBA, including sandy shoreline, rocky shoreline, cliffs, intertidal flats, and saltmarsh (Griffin C, 2012).

The coastline, from Wilson's Promontory in the west to Cape Howe in the east near the NSW border consists mainly of steep sandy beaches and rocky outcrops.

The NSW coast consists primarily rocky outcrops with sections of sandy beaches and rocky cliffs. The offshore islands in Bass Strait are characterised by their steep cliffs and rocky shores. These shoreline types are also dominant along the north and east coast of Tasmania.

1.4.2.1 Sandy shorelines

This shoreline type has been defined as beaches dominated by sand-sized (0.063 - 2mm) particles, and also includes mixed sandy beaches (i.e. sediments may include muds or gravel, but sand is the dominant particle size).

Sandy beaches are dynamic environments, naturally fluctuating in response to external forcing factors (e.g. waves, currents etc.). Sandy beaches can support a variety of infauna and provide nesting and/or foraging habitat to shorebirds and seabirds and pinnipeds. Sand particles vary in size, structure, and mineral content; this in turn affects the shape, colour, and inhabitants, of the beach.

This shoreline type is the most common along the entire Victorian coast, including popular locations such as Ninety Mile Beach (east Gippsland, Victoria) and Squeaky Beach (Wilsons Promontory, Victoria). Bondi Beach is the most notorious sandy beach in Australia.

1.4.2.2 Rocky shorelines

Sheltered rocky shores are characterized by a rocky substrate that can vary widely in permeability. This shoreline type has been defined as hard and soft rocky shores, including bedrock outcrops, platforms, low cliffs (<5m in height), and scarps. Depending on exposure, rocky shores can be host to a diverse range of flora and fauna, including barnacles, mussels, tube building worms, sea squirts (cunjevoi), sea anemones, sponges, sea snails, starfish, and algae. Australian fur seals are also known to use rocky shores for haul-out and/or breeding. Most animals on the intertidal rocky shores are herbivorous molluscs, grazing algae off rock surfaces.

This is a common shoreline type along the southern NSW coast, the islands of Bass Strait, and for smaller areas of Victoria's coast (e.g. Wilsons Promontory). Intertidal rocky shores occur at Bastion Point, Quarry Beach, Shipwreck Creek, Seal Cove, Little Rame Head, Sandpatch Point, Petrel Point, Thurra River, Clinton Rocks, Cloke Rock, Tamboon Inlet and Shelley Beach (all of which are within the EMBA).

1.4.2.3 Sea cliffs

The intertidal zone is steep (>30° slope) and narrow with very little width. Sediment accumulations are uncommon because waves remove debris that has slumped from the eroding cliffs. There is strong vertical zonation of intertidal biological communities. Species density and diversity vary greatly, but barnacles, snails, mussels, polychaetes, and macroalgae can be abundant (NOAA, Characteristic Coastal Habitats - Choosing Spill Response Alternatives. , 2010).

This environment occurs behind Betka Beach and Secret Beach through to Little Rame Head, Sandpatch Point, Wingan Point, The Skerries, Rame Head, Petrel Point, Point Hicks, Clinton Rocks, Tamboon Inlet, Pearl Point, Cape Conran (Needle Rocks, Irvine Rocks, Quincy Rocks Salmon Rocks), and at Ricardo Point (all of which are within the EMBA).This is a common shoreline type for the Furneaux Island Group in Bass Strait (also within the EMBA).

1.4.2.4 Inter-tidal flats

This shoreline type has been defined as areas with predominantly mud-sized (<0.063mm) particles, and also includes mixed sediments (e.g. sands, shell or gravel), where the mud fraction is dominant. These areas are also exposed to high tidal variation, including tidal flats, and are often associated with mangrove or saltmarsh environments.

Sheltered intertidal flats are composed primarily of mud with minor amounts of sand and shell. They are usually present in calm-water habitats, sheltered from major wave activity, and frequently backed by marshes like estuaries or bays. The sediments are very soft and cannot support even light foot traffic in many areas. There can be large concentrations of bivalves, worms, and other invertebrates in the sediments. They are heavily used by birds for feeding (NOAA, Characteristic Coastal Habitats - Choosing Spill Response Alternatives. , 2010).

Sheltered intertidal flats occur at Corner Inlet and Nooramunga Marine and Coastal Parks. Bare sediment occurs at Mallacoota Inlet, Wingan Inlet, Sydenham Inlet - Bemm River and Mud Lake.

1.4.2.5 Mangroves

Along the Gippsland coast, mangroves can be found in Corner Inlet and Nooramunga Marine and Coastal Park and more recently have also been found in Cunningham Arm at Lakes Entrance (Lucieer V, 2017).

The roots and trunks are intertidal, with only the lowest leaves inundated by high tide. The width of the forest can range from one tree to many kilometres. The substrate can be sand, mud, leaf litter, or peat, often as a veneer over bedrock. They are highly productive, serve as nursery habitat, and support a great diversity and abundance of animal and plant species (NOAA, Characteristic Coastal Habitats - Choosing Spill Response Alternatives. , 2010).

1.4.2.6 Saltmarsh

Saltmarshes are terrestrial halophytic (salt-adapted) ecosystems that mostly occur in the upper-intertidal zone and are widespread along the coast of Victoria and NSW. They are typically dominated by dense stands of halophytic plants such as herbs, grasses, and low shrubs. Depending on location and inter-annual variations in rainfall and runoff, associated vegetation may include species tolerant or adapted to salt, brackish, or even tidal freshwater conditions. The diversity of saltmarsh plant species increases with increasing latitude (in contrast to mangroves). 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 (NOAA, Characteristic Coastal Habitats - Choosing Spill Response Alternatives. , 2010).

Saltmarsh is found along the coast throughout the EMBA, although is most extensive behind the sand dunes of Ninety Mile Beach in Gippsland (Boon, 2011).

Salt marshes can be found behind Mallacoota Entrance to Lake Barracouta, Wingan Inlet, inside Cann River Estuary, Tamboon Inlet, Sydenham Inlet (Bemm River Estuary and Mud Lake), Dock Inlet, inside Snowy River Estuary, Lake Tyers Estuary, and inside Lakes Entrance - Gippsland Lakes Ramsar site. In southern NSW between Towradgi Creek about 40km north of the Victorian border there are approximately 12km^2 of saltmarsh spread over 62 estuaries (Daly, 2013). These include the areas of Shoalhaven River, Carama Creek, Clyde River, Tomaga River and Moruya River, Tuross Lake, Wapengo Lake, Bega River, Merimbula Lake and Wonboyn River (Creese R.G, 2009).

1.4.3 Plankton

Plankton species, including both phytoplankton and zooplankton, are key component in oceanic food chains.

Phytoplankton are autotrophic planktonic organisms living within the photic zone that spend either part or all of their lifecycle drifting with the ocean currents. They and are the start of the food chain in the ocean (McClatchie, 2006). Phytoplankton communities are largely comprised of protists, including green algae, diatoms, and dinoflagellates (McClatchie, 2006). There are three size classes of phytoplankton: microplankton (20 - 200µm), nanoplankton (2 - 20µm) and picoplankton (0.2 - 2µm). Diatoms and dinoflagellates are the most abundant of the micro and nanoplankton size classes and are generally responsible for the majority of oceanic primary production (McClatchie, 2006). Phytoplankton are dependent on oceanographic processes (e.g. currents and vertical mixing), that supply nutrients needed for photosynthesis. Thus, phytoplankton biomass is typically variable (spatially and temporally), but greatest in areas of upwelling, or in shallow waters where nutrient levels are high. Seasonal variation in phytoplankton (via chlorophyll-a concentrations) has been demonstrated in Australian waters from the analysis for MODIS-aqua sensor imagery (Figure A-21).

Phytoplankton biomass ranges across Bass Strait (integrated over 0-100m depth), from about 1.6µg/L chlorophyll from shallow to 0.1µg/L in deeper waters (Gibbs, 1991). Phytoplankton biomass rapidly drops off with water depth, to about 0.1µg/L below 100m, due to diminishing light penetration.

Zooplankton is the faunal component of plankton, comprised of small protozoa, crustaceans (such as krill) and the eggs and larvae from larger animals. More than 170 species of zooplankton have been recorded in eastern and central Bass Strait, but it has been found that seven dominant species make up 80% of individuals (Esso, 2009). Zooplankton biomass is higher in shallow waters of Bass Strait (16.1mg/m^3 dry weight off Mallacoota and 15.5mg/m^3 off Seaspray), dropping to between 1.2 - 2.1mg/m^3 further offshore (integrated over the top 50m of the water column), near the deepest regions of the EGBPA (Gibbs, 1991). As with phytoplankton, zooplankton biomass appears to be higher in the shallow waters of the shelf. Copepods dominate the species encountered (Chaloupka, 1982).

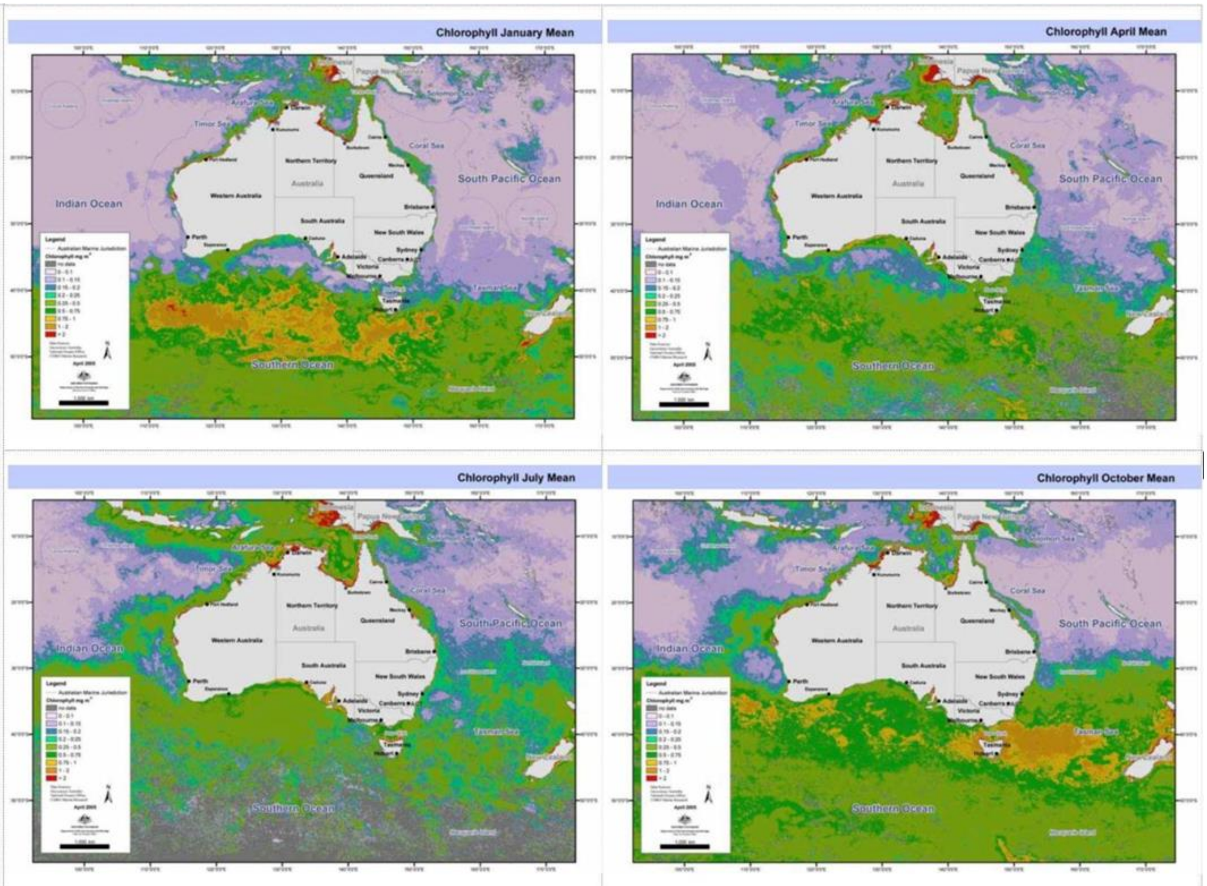

Figure A-21 Seasonal phytoplankton growth from MODIS ocean colour composites (McClatchie, 2006)

1.4.4 Fish, sharks and rays

Fish species detected by the PMST within the EMBA are listed in Table B- 1 and Table B- 2. Only fish, sharks and ray species that are threatened are discussed further within this Section. The full PMST report for the EMBA can be found in Appendix D.

It is estimated that there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries (LCC, 1993). Fish species commercially fished within the EMBA are listed in Sections 1.6.2, 1.6.3, 1.6.4, and 1.6.5.

There are 67 marine fish species listed under the EPBC Act with potential to occur within the EMBA (see Table B-1 and Table B- 2). Forty-three (43) of the 67 fish species identified in the EPBC Act PMST (62%) are Syngnathids, which includes seahorses, seadragon, pipehorse and pipefish. Syngnathidae are mostly benthic on coastal reefs, amongst marine algae, seagrass beds, or on sandy and rubble substrates and in caves and crevices. A few species are found offshore amongst floating *Sargassum* algae (Bray, 2021) they can be found in waters <50m deep and are sometimes recorded in deeper offshore waters. It is likely that Syngnathidae species will occur in coastal reefs, marine algae, seagrass beds, sandy and rubble substrates and caves and crevices sites throughout the EMBA.

1.4.4.1 Handfish

Two species of handfish were detected by the PMST: the red handfsh (*Thymichthys politus*) which is listed a critically endangered under the EPBC Act and the Ziebell's handfish (*Brachiopsilus ziebelli)* which is listed as vulnerable under the EPBC Act. Both species have a known distribution in Tasmania only.

The red handfish is a small, slow moving benthic fish that is known to inhabit a small geographic area in the coastal waters of southeast Tasmania. It appears that the red handfish has undergone a recent marked decline in both distribution and abundance (DSEWPC, 2012a). No specimens were recorded during surveys in 2005 and efforts to locate red handfish at sites where they were previously known in southeast Tasmania to exist are reported to have failed (DSEWPC, 2012a). The most recent sightings of the species were made in Primrose Sands (outside of the EMBA) in 2010 (DSEWPC, 2012a). Given this species habitat and presence, it may occur in the areas where the EMBA interprets the eastern and northern coast of Tasmania.

Ziebell's handfish are only known to occur in eastern and southern Tasmania - in the southern parts of the D'Entrecasteaux Channel, Cox Bight in southwest Tasmania, and the Forestier and Tasman Peninsulas, and off Bicheno, eastern Tasmania (DCCEEW, 2023e). The species inhabits rocky areas and soft bottoms, often near rocky patches with sponge and macroalgal communities. Females lay their egg masses around sponges in depths of about 20m. On hatching, the young settle directly to the bottom near the egg mass (DCCEEW, 2023e).

The main identified threat applies to both species of handfish, being habitat degradation resulting from one or a combination of impacts including introduced species, pollution and siltation, increasing water temperatures and the proliferation of other native species as a result of human activities (DSEWPC, 2012a). Given its known distribution, Ziebell's handfish may be present in the areas where the EMBA interprets the eastern coast of Tasmania.

1.4.4.2 Black rockcod

The black rockcod (*Epinephelus daemelii*) is listed as vulnerable under the EPBC Act. The black rockcod is a large cod species distributed in warm temperate to temperate marine waters of southeastern Australia, from southern Queensland to Mallacoota in Victoria, and rarely south of this point (DSEWPC, 2012b).

The species inhabits caves, gutters, and crevices generally to depths of 50m, with juveniles found inshore. Individuals are highly territorial and have small home ranges (DSEWPC, 2012b). The black rockcod is a protogynous hermaphrodite, meaning it changes sex from female to male during its life cycle. The species has declined in number due to angling and spearfishing (DSEWPC, 2012b). Given their known distribution, the black rockcod may occur in suitable habitat within the EMBA (north of Mallacoota) and are likely to be present within the Elizabeth and Middleton Reefs Marine National Nature Reserve (within the EMBA) which supports an abundant population of black cod (DSEWPC, 2012b).

1.4.4.3 Eastern dwarf galaxias

The eastern dwarf galaxias (*Galaxiella pusilla*) is listed as Vulnerable under the EPBC Act. Habitat suitable to the dwarf galaxias is slow flowing and still, shallow, permanent, and temporary freshwater habitats such as swamps, drains and the backwaters of streams and creeks, often (but not always) containing dense aquatic macrophytes and emergent plants (Saddlier, 2010) (DELWP, Dwarf Galaxias Action Statement., 2015a).

There are 46 rivers and wetlands that are listed in the Dwarf Galaxias Action Statement (DELWP, Dwarf Galaxias Action Statement., 2015a) as being important to the species, the only listed waterway within the EMBA is the Merriman Creek Therefore, the eastern dwarf galaxias may be encountered in the EMBA if the Merriman Creek is open to the ocean at the time of the spill.

1.4.4.4 White's seahorse

The White's seahorse (*Hippocampus whitei*) is listed as endangered under the EPBC Act and is endemic to NSW and Queensland in eastern Australia (TSSC, Conservation Advice Hippocampus whitei White's Seahorse. , 2020). White's seahorse is a small (maximum length approximately 16cm), long snouted seahorse which is highly variable in colour with their colouration known to change depending on the habitat they are found in. The species is known to live in the wild for up to five to six years (TSSC, Conservation Advice Hippocampus whitei White's Seahorse. , 2020).

White's seahorses are known to occur in water depths between 1-15m and are known to occur in estuaries from Saint Georges Basin, NSW (in proximity to the EMBA) to Hervey Bay, Queensland (outside of the EMBA). The White's seahorse is found utilising a wide range of habitat types (both natural and artificial). They prefer more complex habitats, believed to provide better protection and more available food resources (TSSC, Conservation Advice Hippocampus whitei White's Seahorse. , 2020). The species displays strong site fidelity, with tagged males occurring on the same site for up to 56 months and females 49 months, with no seahorse ever recorded moving between sites. Individuals are not known to move far, as the largest distance a tagged animal was found to travel was only 70m (TSSC, Conservation Advice Hippocampus whitei White's Seahorse. , 2020).

The major threat to the White's seahorse is loss habitat across its range followed by cleaning of artificial habitats (protective swimming nets) within the Sydney region (TSSC, Conservation Advice Hippocampus whitei White's

Seahorse. , 2020). Due to the known habitat preferences of the White's seahorse, the species may be encountered by the EMBA within the coastal regions of NSW from Saint Georges Basin to Port Macquarie.

1.4.4.5 Orange roughy

The orange roughy (*hoplostethus atlanticus*) was listed as conservation dependent under the EPBC Act in 2006, within Australian waters with most stocks reported to be well below 20% of estimated pre-fishing equilibrium biomass and closed to targeted fishing (DCCEEW, 2023e).

The orange roughy is a commercially important demersal fish species that is found in ridge and slope waters 180 - 1,800m deep (DCCEEW, 2023e). Orange roughy are very long lived, very slow to mature and have low fertility relative to other bony fishes. Ageing studies show that they do not mature until their mid-20's to mid-30's and may live to 150 years of age.

Although widespread, orange roughy migrate hundreds of kilometres to form spawning aggregations over seamounts between June and August in the southern hemisphere (DCCEEW, 2023e). They are synchronous spawners and form dense spawning and feeding aggregations. Recovery of the species is threatened by commercial trawl fishing. Given its habitat preferences, the orange roughy may occur in deep waters of the EMBA.

1.4.4.6 Australian grayling

The Australian grayling (*Prototroctes maraena*) is listed as Vulnerable under the EPBC Act. The Australian grayling is a dark brown to olive-green fish that is approximately 19cm in length. The species typically inhabits the coastal streams of NSW, Victoria, and Tasmania, migrating between streams and the ocean (Backhouse, 2008). The species spends most of its life in freshwater (DELWP, 2015b), and migrates to lower reaches of rivers to spawn in autumn (Gomon, 2020), though timing is dependent on many variables including latitude and varying temperature regimes (Backhouse, 2008), with increased stream flows also thought to initiate migration (DELWP, 2015b).

Threatening processes to this species include barriers to movement, river regulation, poor water quality, siltation, introduced fish, climate change, diseases, and fishing (Backhouse, 2008). Several rivers intersected by the EMBA (at their mouths, when open) are listed as important locations for the species (DELWP, 2015b). The species may therefore be present in the EMBA in the relatively rare event that creek and river mouths are open, and the species is spawning.

1.4.4.7 Eastern gemfish

The eastern gemfish (*Rexea solandri*) is listed as conservation dependent under the EPBC Act. Gemfish are found throughout southern Australian temperate waters. In Australia, the eastern gemfish are distributed from Cape Moreton, southern Queensland, along the east coast to Bass Strait and the waters off Tasmania.

Eastern gemfish are mesopelagic and inhabit deeper continental shelf habitats and upper slope waters from 100 - 700m (down to 1,254m) but are generally found in waters about 250 - 500m deep. Historical and ongoing commercial fishing is the highest threat to the eastern gemfish. This species is generally caught close to the seabed, but the fish are likely to move into mid-water at times, larvae occur in shallow to very shallow waters. Gemfish are carnivorous and feed close to the ocean floor on other fish, primarily Macrouridae (whiptails). Due to the deep water distribution of this species, it may be present with the eastern sections of the EMBA.

1.4.4.8 Blue warehou

The blue warehou (*Seriolella brama*) is listed as conservation dependent under the EPBC Act. Blue warehou (*seriolella brama*) is a bentho-pelagic species found in southern Australia where it inhabits continental shelf and slope waters. Adults can be found at depths from 50-300m. Blue warehou are schooling fish and usually aggregate close to the seabed and juveniles can sometimes be found schooling close to the surface in estuaries, often in association with jellyfish. This species is commercially important and formally managed under the Blue Warehou Stock Rebuilding Strategy (AFMA, Blue warehou (Seriolella brama) Stock Rebuilding Strategy., 2014). Blue warehou may occur in the EMBA.

1.4.4.9 Southern bluefin tuna

The southern bluefin tuna (*Thunnus maccoyii*) (SBT) is listed as conservation dependent under the EPBC Act. SBT are recorded from every Australian state but absent from the coasts of the Northern Territory and northern Queensland, and very rare in central and western Bass Strait (DCCEEW, 2023e). Elsewhere the species is circum-global in temperate and cold temperate waters of the southern hemisphere. SBT breed between October and

March in an area off Java, Indonesia and migrate down the West Australian coast during their first year (DCCEEW, 2023e). Some fish then head west into the Indian Ocean, while others head eastwards into the GAB. SBT are an extremely valuable and highly prized commercial species, with the Australian SBT industry estimated to be worth more than $100 million annually.

Historically the species was heavily fished, with catches reaching 80,000t per year during the 1960s, but by the 1980s catches had halved, resulting in the implementation of fishing quotas. From September to March, schools of mostly immature fish (aged 2-4 years) are caught in purse seine nets in the GAB (DCCEEW, 2023e) and then slowly towed to Port Lincoln, South Australia where they are transferred to floating sea cages anchored to the seafloor. More than 95% of Australia's SBT catch is caught in this method (DCCEEW, 2023e). Commercial fishing is the major threat to SBT (DCCEEW, 2023e). SBT may be encountered in the EMBA.

1.4.4.10 Grey nurse shark (east coast population)

The grey nurse shark (*Carcharius taurus*) (eastern population) is listed as critically endangered under the EPBC Act due to commercial fishing, spearfishing, and protective beach meshing (TSSC, 2001). The grey nurse shark was historically widespread in sub-tropical and warm temperate seas and previously recorded from all Australian states except Tasmania (TSSC, 2001).

The species currently has a broad inshore distribution throughout sub-tropical to cool temperate waters on the continental shelf, with separate east coast and west coast populations (DoE, 2014b). The east coast population extends from central Queensland to southern NSW, occasionally as far south as the NSW/Victoria border (DoE, 2014b), which coincides with the BIA for their distribution and breeding (October to November) which is intercepted by the EMBA and shown in Figure A-22.

Preferred habitat for grey nurse sharks is inshore rocky reefs or islands, generally aggregating near the seabed in water depths of 10 - 40m in deep sandy or gravel filled gutters, or in rocky caves border (DoE, 2014b). There are no known aggregation sites located off the Victorian coast border (DoE, 2014b) however, the EMBA does intersect with the breeding BIA (October to November) within the coastal waters of Sydney and Newcastle (Figure A-22). Given the current distribution of the grey nurse shark and the known breeding sites, the species may occur within the EMBA.

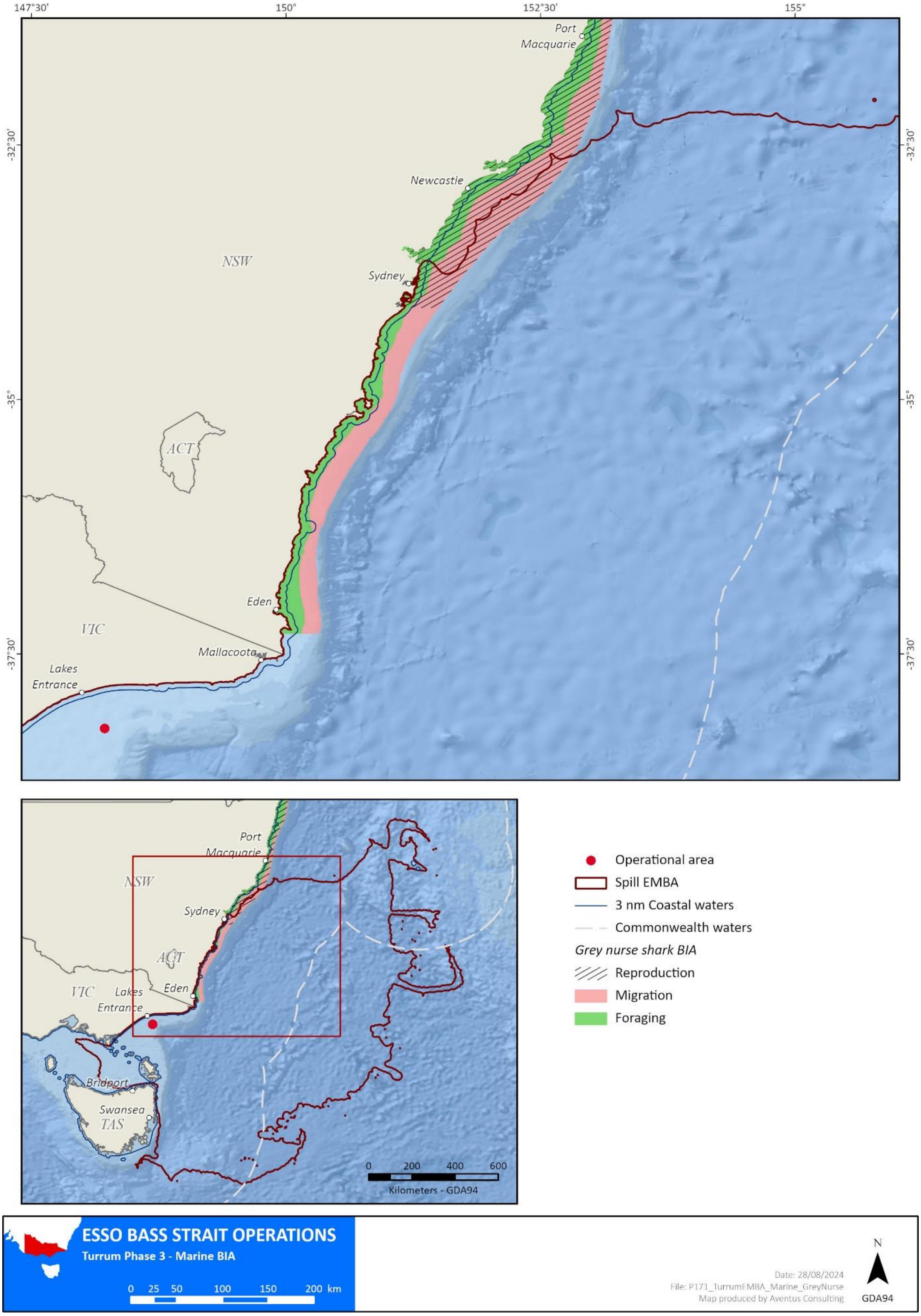

Figure A-22 Grey nurse shark BIAs intersected by the EMBA

1.4.4.11 Great white shark

The great white shark (*Carcharodon carcharias*) is listed as vulnerable under the EPBC Act. The great white shark 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 (DSEWPAC, 2013). Studies of great white sharks indicate that they are usually solitary animals, largely transient and only temporarily resident (e.g. days to weeks) in areas it inhabits (DSE, 2003) (DSEWPAC, 2013). However, individuals are known to return to feeding grounds on a seasonal basis (Klimley, 1996).

The species moves seasonally along the south and east Australian coasts, moving northerly along the coast during autumn and winter and returning to southern Australian waters by early summer. Observations of adult sharks are more frequent around fur seal and sea lion colonies, including Wilsons Promontory and the Skerries (both within the EMBA and is also reflected by the foraging BIA see Figure A-23) (DSE, 2003). Juveniles are known to congregate in certain key areas including the Ninety Mile Beach, Lakes Entrance, Gippsland Lakes and Corner Inlet where a BIA for breeding is overlapped by the EMBA (Figure A-23). Bray (2023) indicates that Corner Inlet may be an important nursery area for the eastern population of great white sharks, mostly from mid-summer through to autumn (DSEWPAC, 2013). A BIA (distribution) for the great white shark covers the entire southeast marine region and the NSW coast which is intercepted by the EMBA (Figure A-23).

Key threats to the species, as listed in the Recovery Plan (DSEWPAC, 2013) and Action Statement (DSE, 2003) are mortality from targeted fishing, accidental fishing bycatch and illegal fishing, and mortality from shark control activities (such as beach meshing and drum lining), none of which will take place during the activity. Similarly, the activity will have no impact on the 10 objectives for protection listed in the plan. Given their transitory nature and the proximity of known congregation areas, great white sharks may occur within the EMBA.

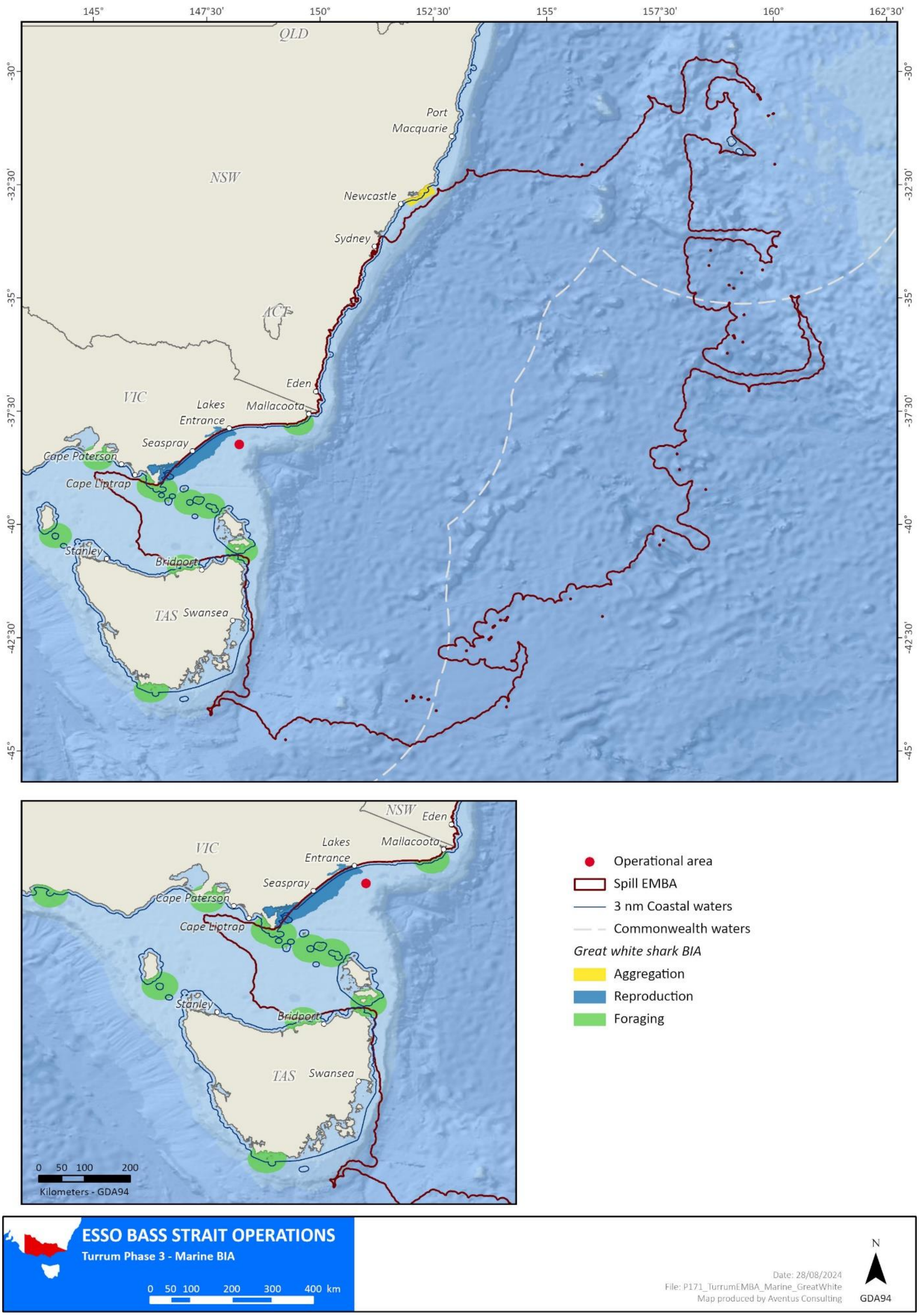

Figure A-23 Great white shark BIAs intersected by the EMBA

1.4.4.12 Harrisson's dogfish

Harrison's dogfish (*Centrophorus harrissoni*) is listed as conservation dependent under the EPBC Act. In Australian waters, Harrisson's dogfish is distributed off the Clarence River, NSW, to off South East Cape, Tasmania, and from Fraser Seamount, Queensland, to Taupo Seamount, NSW (DCCEEW, 2023e). The species prefers water depth ranges from 200 – 1,050m.

The main threat to southern dogfish in Australian waters was population reduction caused by past fishing pressure in both state and Commonwealth-managed commercial fisheries operating on the upper-slope (TSSC, 2013) Harrisson's dogfish populations are estimated to have declined by more than 90% in parts of their range off southern NSW and eastern Victoria. As a result, the species was listed as Conservation Dependent in June 2013. This species habitat preferences indicates that it is likely to occur in the EMBA.

1.4.4.13 Little gulper shark

The little gulper shark (*Centrophorus uyato*) is listed as conservation dependent under the EPBC Act. The little gulper shark is distributed along the continental slope of southern Australia from off Forster (NSW) to Bunbury (West Australia), including Tasmania, in depths of 200 - 700m, but usually in depths below 400m (DCCEEW, 2023e).

Little gulper sharks undertake day-night migrations across their depth range from relatively deep daytime residence depths (1,000m) to shallower night-time feeding depths (to 200m). This species feeds mainly on fish, crustaceans and squid. It migrates up gullies on the continental slope to feed at night on mesopelagic fish that have migrated from deeper waters. The main threat to the little gulper shark in Australian waters is population reduction caused by past fishing pressure in both state and Commonwealth-managed commercial fisheries operating on the upper-slope (TSSC, 2013). Species in genus *Centrophorus* are vulnerable to over-exploitation due to the fact that they are long-lived, late to mature and have small litters (DCCEEW, 2023e). This species habitat preferences indicates that it is likely to occur in the EMBA.

1.4.4.14 Whale shark

The whale shark (*Rhincodon typus*) is listed as vulnerable under the EPBC Act and is the world's largest fish and one of the only three filter feeding shark species (TSSC, 2015a). They have a broad distribution in warm and tropical waters of the world, and in Australia are known only to occur on the west coast of Western Australia, with a feeding aggregation occurring off the Ningaloo Reef between March and July each year (TSSC, 2015a). Isolated records exist of whale sharks off NSW, Victoria and South Australia. Because this species is not known to migrate through Bass Strait, and the lack of known distribution in Victoria, Tasmania, and NSW, it is highly unlikely to occur within the EMBA.

1.4.4.15 Scalloped hammerhead

The scalloped hammerhead (*Sphyrna lewini*) is listed as conservation dependent under the EPBC Act but is currently under a threatened listing assessment which was due 30 April 2022 but has not been updated since. The scalloped hammerhead is a relatively large, fusiform-bodied, moderately slender shark with a circum-global distribution in tropical and sub-tropical waters. This species has a strong genetic population structuring across ocean basins as it rarely ventures into or across deep ocean waters but ranges quite widely over shallow coastal shelf waters (TSSC, 2018).

Within Australian waters the scalloped hammerhead extends from NSW (around Wollongong, where it is less abundant), around the north of the continent and then south into Western Australia. Due to the species distribution, the scalloped hammerhead may be encountered within the area of the EMBA that extends up to Sydney.

1.4.4.16 School shark

The school shark is listed as conservation dependent under the EPBC Act. The species is a widespread mainly coastal and bottom associated shark found in temperate areas over the continental shelf to about 800m on the continental slope (DCCEEW, 2023e). Juveniles are often found in shallow, inshore bays of Victoria and Tasmania. School sharks also occur well offshore in the Tasman Sea. Although usually found near the bottom, the species ranges through the water column even into the pelagic zone (DCCEEW, 2023e).

The species feeds on bony fishes (bottom-dwelling and pelagic species), squid and octopus. Small juveniles feed on crustaceans, polychaete worms, gastropods, and echinoderms. The species was fished throughout its range and heavily exploited due to the excellent quality of its flesh for eating and its oil (DCCEEW, 2023e). In addition, targeted fishing of juveniles and degradation of nearshore nursery sites has been linked to population declines (DCCEEW, 2023e). The species is currently the focus of the School Shark Rebuilding Strategy (AFMA, 2015), which aims to rebuild the species to 40% of its pre-exploitation levels within a biologically relevant timeline, by closing areas to protect pups and breeding age school sharks as well as preventing targeted fishing of the species. School sharks are likely to be present in the EMBA.

1.4.5 Cetaceans

Cetaceans are a widely distributed and diverse group of carnivorous, finned, aquatic marine mammals. They comprise whales, dolphins and porpoises. Cetaceans are generally found in the ocean but can also inhabit river systems.

There are 26 whale, and 16 dolphin species (or species habitat) that may occur within the EMBA see Table B- 4. A list of the conservation advice and/or recovery plans, with relevant key threats and management actions, is shown in Table A-4. Only cetacean species that are threatened and/or are migratory or have known BIAs within the EMBA and are discussed further.

There are several pelagic dolphins that may occur in the EMBA. The population size of these species is not known however none are considered to be rare. No specific conservation or listing advice exists and their distribution has not been specifically defined. All species feed on pelagic fish, squids, octopus, shrimps, and other marine fauna taken at depths exceeding 250m. The extent of occurrence is large in all cases, estimated to be greater than 20,000km^2. All are tropical to subtropical species (occasionally temperate) with distribution varying depending on water temperature and flow of warm currents.

1.4.5.1 Southern right whale

SRWs generally occur along the southern coast of Australia; they migrate annually along the eastern coastline from high latitude feeding grounds to lower latitudes for calving between mid-May and October (DCCEEW, 2023e). Known calving and aggregation grounds in the southeast region are Warrnambool, Port Fairy, Port Campbell and Portland in Victoria, and Encounter Bay, South Australia (DSEWPC, 2012d). Nursery grounds are occupied from May to October, with female-calf pairs generally staying in the area for two to three months (Charlton, 2017). Calving itself usually occurs in very shallow (<10m depth) waters. Other population classes stay in the nursery grounds for shorter and variable periods of time; there is typically a lot of movement along the coast, and thus habitat connectivity is important for this species. The summer offshore distribution and migration routes of SRW largely is unknown but is known to include directly southern and western migration pathways but may include offshore habitat where mating (Mackay, 2015).

In mid-2023, the National Conservation Atlas updated the BIA data for the SRW, which now identifies two BIAs; reproduction (May to September) and migration (April to October), both of which are overlapped by the EMBA (Figure A-39). Reproduction is spatially defined along the entire coast of Victoria including Port Phillip Bay and Western Port Bay and along the entire coastline of Tasmania as well as majority of the NSW coastline up to Burnett Heads in Queensland. Reproduction also occurs in areas along the South Australian and West Australian coast. Migration for the SRW covers all Commonwealth waters in southern Australia from Naturaliste, West Australia to the Victorian/NSW border, including the GAB and all of Bass Strait. Migration also mirrors the reproduction BIA along the coast in NSW and Queensland and exists along the west coast of West Australia. According to the BIA Protocol (DCCEEW, 2023f) category definitions, reproduction BIAs are areas known or likely to be regularly or repeatedly used by individuals or aggregations of a species for reproduction or to provide refuge, or other advantage to young. Migration BIAs are areas known or likely to be regularly or repeatedly used by individuals or aggregations of a species for undertaking seasonal or other temporal movements which contribute to connectivity with other functionally important areas (DCCEEW, 2023f). Both BIAs are within the EMBA (Figure A-24).

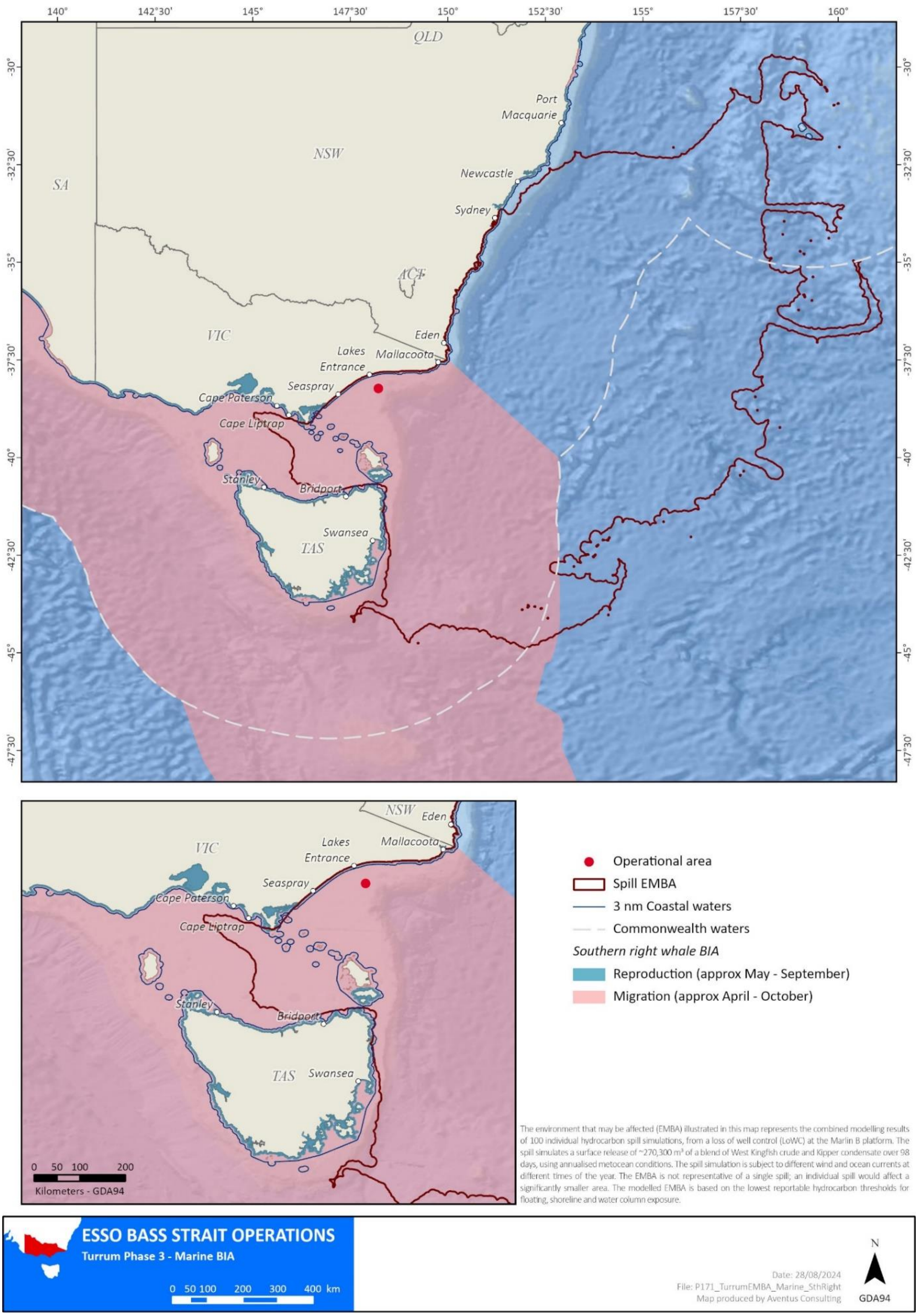

Figure A-24 SRW BIAs intersected by the EMBA

1.4.5.2 Blue whales

The blue whale (*Balaenoptera musculus*) has four subspecies, two of which occur within Australian waters, including the Antarctic blue whale (*B. m. intermedia*) and the PBW (Rice 1998, in (Department of the Environment, 2023).

The PBW has five population groups, two of which are found in the Southern Hemisphere. Figure A-25 summarises the known and predicted ranges of the species and populations around Australia and New Zealand and their likely presence in Esso's areas of operation in eastern Bass Strait.

Distribution

Long term passive acoustic recorders set by McCauley et al. (2018) found Antarctic blue whale calls along the entire southern Australian coast, while calls from the New Zealand PBW population occur predominantly eastward of Bass Strait, and calls from the Indo-Australian PBW population were heard west of Bass Strait. The Indo-Australian PBW population wasn't recorded on the east Australian coast or east of Bass Strait and the New Zealand PBW population was always heard in the Bass Strait recordings, and only ever heard as far west as Portland in Victoria. The Antarctic blue whale was recorded at all sites south of 19°S (McCauley, R.D., Gavrilov, A.N., Jolliffe, C.D., Ward, R. and Gill, P.C., 2018).

Balcazar et al. (2015) suggests that the Australian continent acts as a geographic boundary, separating Indo-Australian and New Zealand PBW acoustic populations at the junction of the Indian and Pacific Ocean basins (Balcazar, et al., 2015). The distribution of PBW in the Australian region is illustrated in Figure A-26. There are few contemporary records of blue whales in the Gippsland region. However, recent scientific literature suggests that PBW populations are capable of travelling great distances far beyond their expected range (Barlow, 2023). This concept that blue whales can extend beyond their current range is corroborated by Branch et al. (2023), who modelled the predicted detection range for the Antarctic blue whale and PBW populations. Findings from Branch et al. (2023) and Barlow et al. (2023) are discussed further within the population sub-headings in this section.

Simplified guide to blue whale presence in Australia

Blue whale
(*Balaenoptera musculus*)

Four sub-species, two of which are found in the southern hemisphere.

Antarctic blue whale
(*B. m. intermedia*)

Calls have been recorded sporadically among most of Australia (excluding NT & QLD).

Occur in Antarctica, including off the Australian Antarctic Territory . Known to migrate through Australian waters and the South Taranaki Bight (NZ).

Predicted to be detected throughout the Southern Hemisphere, with especially high probabilities in winter months and low probabilities in summer.

May occur in area of Esso operations, **likely** to occur within the EMBA.

Pygmy blue whale
(*B. m. brevicauda*)

Five population groups, two of which are found in the southern hemisphere.

Genetically & acoustically different populations

Indo-Australian population

Majority of calls recorded between WA to western Bass Strait, occasional song detections on the east coast of Australia. Vagrant detected in NZ.

Feed in large numbers in Otway Basin between December and June, linked to krill aggregations associated with the Bonney Upwelling.

Migrate from southern Aus through a WA migratory corridor to presumed breeding grounds around Indonesia.

Predicted to be detected further east and south-east of Australia.

May occur in area of Esso operations, **likely** to occur within the EMBA.

Indian Ocean

New Zealand population

Occurs around New Zealand. Calls have also been recorded east of Bass Strait, Tasmania & Tonga.

Bass Canyon could be an important feeding area. Upwelling East of Eden may provide foraging opportunities throughout the year. Lower intensity of upwelling means is it a less important foraging area than the Bonney Upwelling.

Known to occur in South Taranaki Bight (NZ) year-round with a peak aggregation between February-July.

Predicted to be detected northwards and eastwards of Tasmania and around New Zealand.

May occur in area of Esso operations, **likely** to occur within the EMBA.

Pacific Ocean

Boundary between the two populations is the junction of the two oceans

Figure A-25 Simplified guide to blue whale presence in Australia

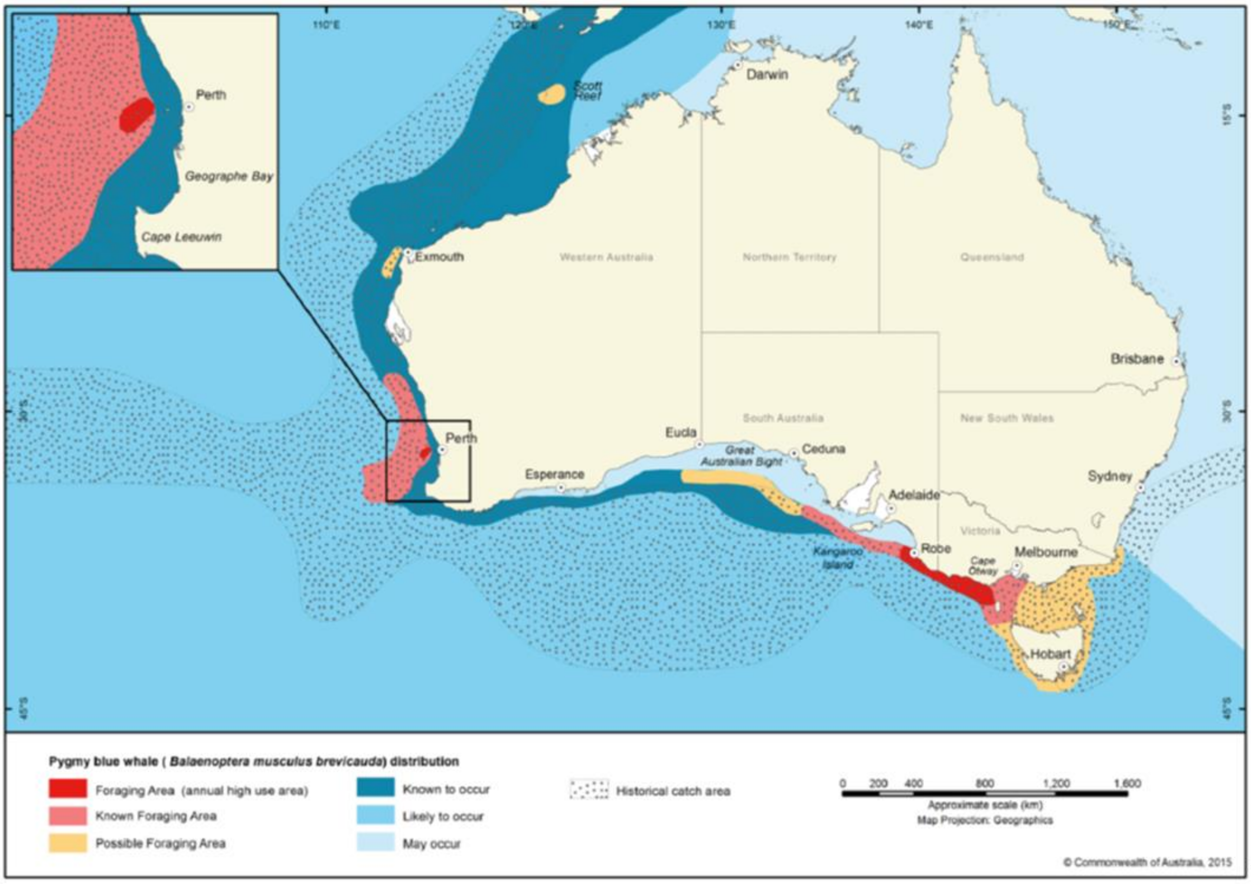

Figure A-26 Distribution and foraging areas for the PBW (DoE, 2015b)

Diet

Blue whales have the highest known prey requirements, consuming up to two tonnes of krill per day (DoE, 2015b). Krill is the key to understanding the ecology and behaviour of blue whales. Krill is sensitive to temperature and migrates vertically and horizontally to maintain optimal positioning with respect to nutrients, often being found along thermal fronts and thermoclines. Krill abundance in a given season may be linked to oceanographic conditions of the previous year. The krill species, *Nyctiphanes australis*, frequently swarm at or near the surface, making it easily available to foraging blue whales. It can also be found at depth, where blue whales must dive to search and consume it. Foraging is energetically expensive for blue whales, which must regularly find sufficient food to balance their enormous energy requirements (Gill., 2020). There are two important seasonal feeding aggregations areas known in Australia where large numbers of PBW have been recorded: the Bonney Coast Upwelling KEF and adjacent waters off South Australia and Victoria (located 230km west of the EMBA); and the Perth Canyon KEF and adjacent waters off Western Australia (located over 2,800km west of the EMBA). Prominent surface upwelling commonly occurs west of Portland where the shelf is narrow (the Bonney Upwelling); whereas on the broader shelf between Portland and King Island, upwelling is usually subsurface, with cooler upwelled water beneath a warmer surface layer (Gill., 2020).

Antarctic blue whale

The Antarctic blue whale subspecies consists of one or more populations that feed off Antarctica during summer, and limited evidence suggests that some proportion migrate to subtropical latitudes of the Pacific and Indian Ocean to breed. They have been acoustically detected off the West and North coasts of Tasmania predominately from May to December. Based on the seasonality of recordings, these areas possibly form part of their migratory route, breeding habitat or a combination of the two (Commonwealth of Australia, 2015).

Results of continuous acoustic recordings that took place from January 2016 to February 2018 in the South Taranaki Bight in New Zealand (Barlow, 2023) noted that the South Taranaki Bight could be a migratory corridor for the Antarctic blue whale. The Antarctic blue whale is predicted to remain consistently within the Southern Hemisphere, with especially high probabilities in winter months (May-August), and low probabilities in summer (December-March) (Branch, 2023).

In light of the findings of Barlow (2023) and Branch (2023), it is likely the Antarctic blue whale will be present within the EMBA.

Indo-Australian pygmy blue whale

The distribution and migration patterns of Indo-Australian PBW are relatively well understood in areas further west of the EMBA. Satellite tagging of Indo-Australian PBW by Double et al. (2014) and Möller, et al. (2020) has revealed that the Indo-Australian population migrates from southern Australian foraging grounds through a Western Australian migratory corridor to (presumed) breeding grounds in waters around Indonesia.

In July 2024, revised BIA spatial data became publicly available via the Australian Marine Spatial Information System website. Based on the revised BIA data, the EMBA overlaps with 58.74% of the foraging BIA for the PBW as seen in Figure A-27.

The time and location of the appearance of Indo-Australian PBW generally coincides with the upwelling of cold water in summer and autumn along the Bonney Upwelling and the associated aggregations of krill that they feed on (Gill, P. and M. Morrice, 2003). The Bonney Upwelling generally starts in the eastern part of the GAB 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 P. M., 2011) (McCauley, R.D., Gavrilov, A.N., Jolliffe, C.D., Ward, R. and Gill, P.C., 2018).

Barlow (2023) detected the Indo-Australian PBW song during a 10-day period in January 2017, implying a rare vagrant occurrence. The modelling predicts that the distribution of the Australian PBW is further westward of WA, further south along the GAB and Indian Ocean, south eastward towards the Bass Strait and Tasmania and even as far as New Zealand (Branch, 2023).

In light of the findings of Barlow (2023) and Branch (2023), it is likely the Indo-Australian PBW will be present within the EMBA.

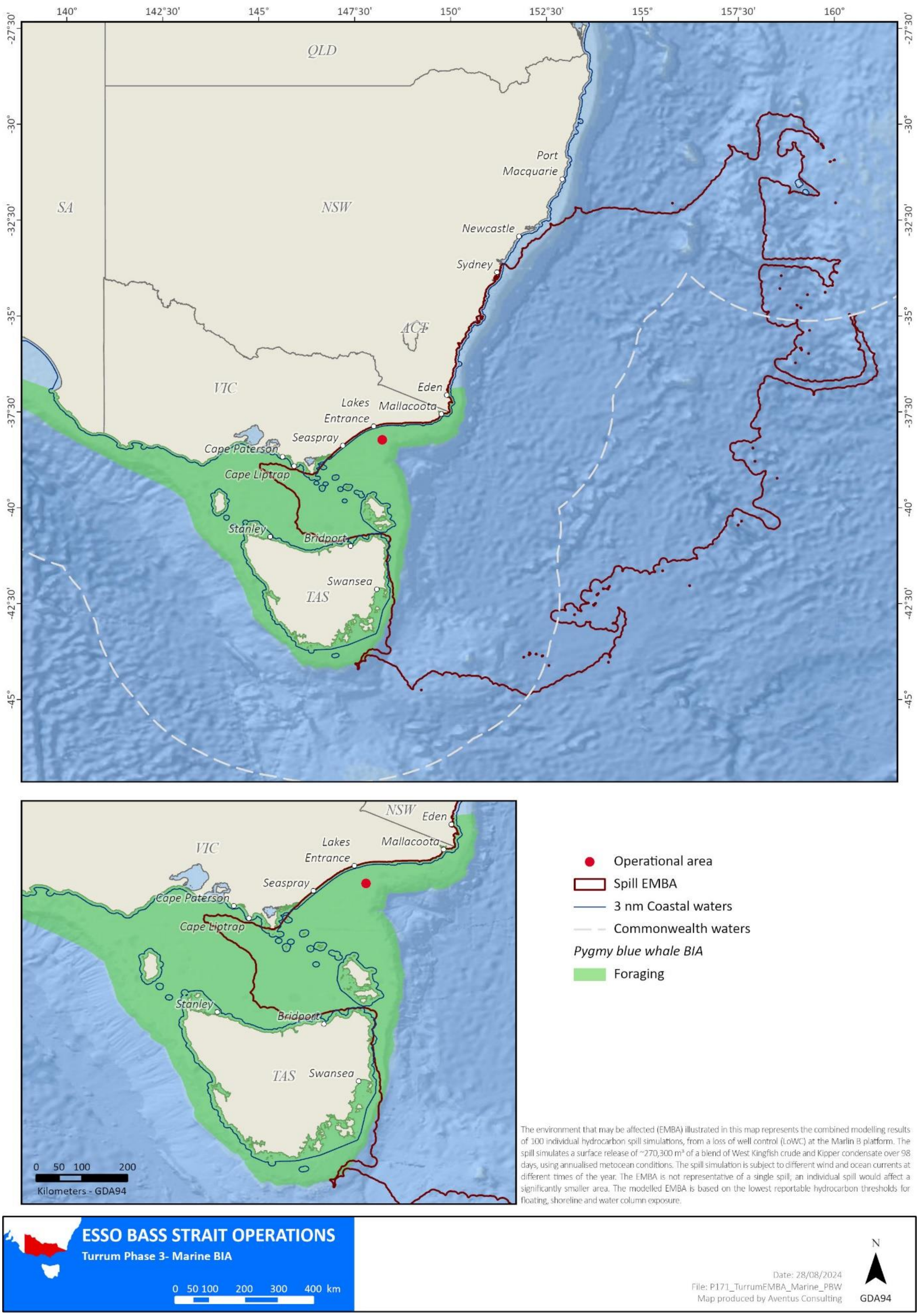

Figure A-27 PBW foraging BIA intersected by the EMBA

1.4.5.3 New Zealand pygmy blue whale

Relatively little is known about New Zealand PBW. Antarctic blue whales are known to co-occur with PBW around New Zealand. Antarctic blue whale detections peaked during austral winter and spring, indicating that New Zealand, and the South Taranaki Bight in particular, is a migratory corridor for them. Some Antarctic blue whale calls were also detected during the breeding season (September and October). PBW calls were highly concentrated in the South Taranaki Bight, particularly between March and May, suggesting that an aggregation may occur here (Warren, V., McPherson, C., Giorli, G., Goetz, K., & Radford, C, 2021).

The Upwelling East of Eden KEF is located within the EMBA and is a recognised upwelling system. Upwelling influence areas were mapped between September and May (austral spring, summer and autumn) each year for a period of 14 years (Sept 2002 to May 2016) along 4,500 km of the south-eastern coast of Australia using monthly MODIS sea surface temperature (SST) data (Huang & Hua Wang, 2019).

The study confirmed that there were three seasonal/semi-seasonal upwelling centres: the Bonney coast upwelling; the Kangaroo Island upwelling; and the Eyre Peninsula upwelling, in the western Victorian and South Australian coastal upwelling system. The NSW coastal upwelling system is a persistent/semi-persistent system occurring continuously from austral spring to autumn, although during mid to late autumn the upwelling may be either lacking or isolated and restricted to the coast. The intensity of the southern NSW/eastern Victorian upwelling system, centred on the Eden upwelling, has a less distinct seasonal pattern (Figure A-28) (Huang & Hua Wang, 2019).

Barlow (2023) states that despite extensive acoustic recordings in eastern Australia, Bass Strait and Tonga, the New Zealand population has rarely been being detected in these locations. The New Zealand PBW is anticipated to be distributed northwards and eastwards of Tasmania (including Bass Strait and the eastern coast of Australia), and around New Zealand (Branch, 2023).

In light of the findings of Barlow (2023) and Branch (2023), it is likely the New Zealand PBW is present within the EMBA.

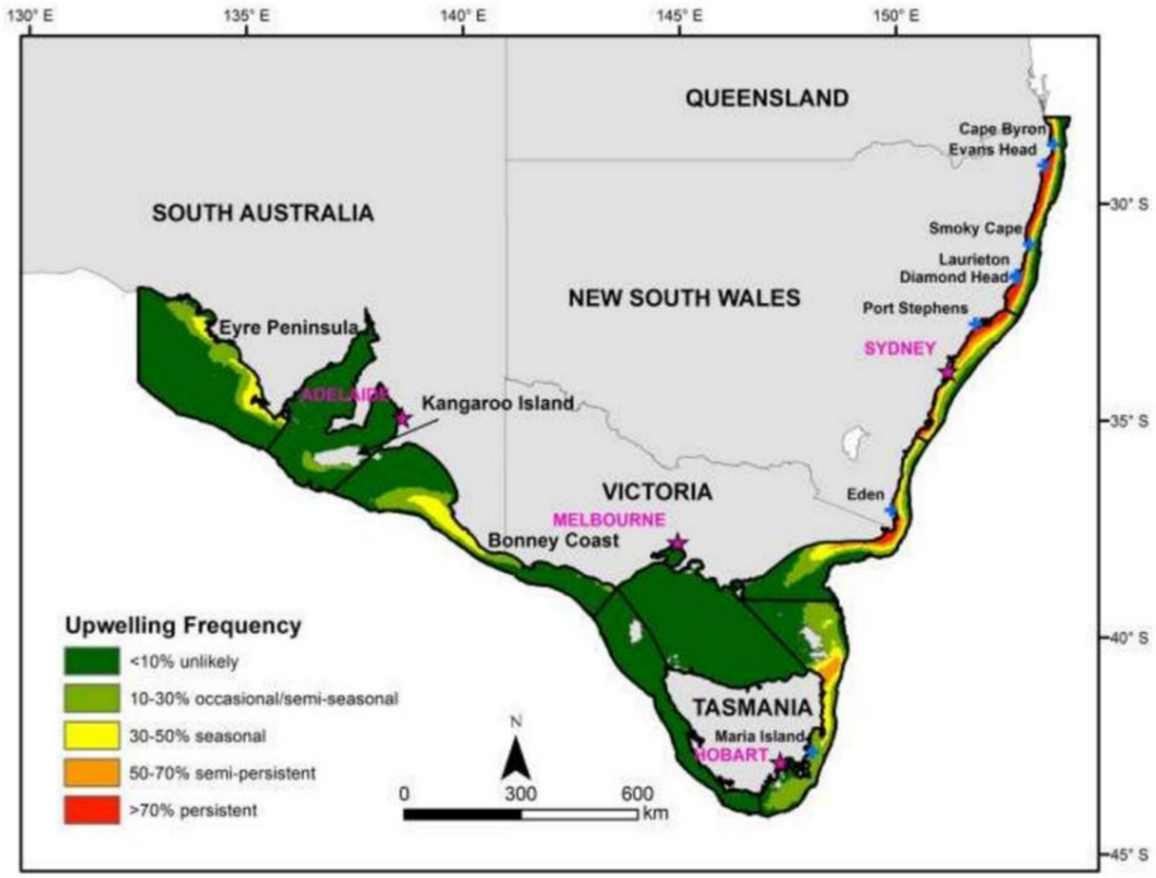

Figure A-28 Upwelling frequency (Huang & Hua Wang, 2019)

1.4.5.4 Humpback whales

Humpback whales migrate annually along the eastern coast of Australia heading north to tropical calving grounds from June to August, and south to Southern Ocean feeding areas from September to November (Figure A-29). While the main migration route of this species is along the east coast of Australia along the continental shelf to the east of Bass Strait, some animals migrate through Bass Strait. Humpback whales do not feed, breed, or rest in Bass Strait and the Victorian coastal waters are not a key location for this whale species (Bannister J. L., 1996).

Most feeding grounds are south of Australian waters (TSSC, 2015b). A BIA for migration has been identified along the east coast of Australia which is overlapped by the EMBA (Figure A-29). Humpback whales in the Southern Hemisphere primarily feed on Antarctic krill (*Euphausia superba*). While most feeding grounds are south of Australian waters, there are some feeding grounds that are regularly used on the southern migration in Australian coastal waters: off the coast of Eden in NSW, and east coast of Tasmania (TSSC, 2015b).

In late February 2022, the humpback whale was removed from the vulnerable category and now holds no threatened status under the EPBC Act. The DAWE listing advice (DAWE, 2022) states that humpback whales have been recovering strongly for the past five decades, since their severe decline due to commercial whaling which ceased in 1963. However, they remain a MNES under the EPBC Act as a listed migratory species, and the species remains listed as a cetacean, where it is an offence to kill, injure, take, trade, keep, move, or interfere with a cetacean (DAWE, 2022).

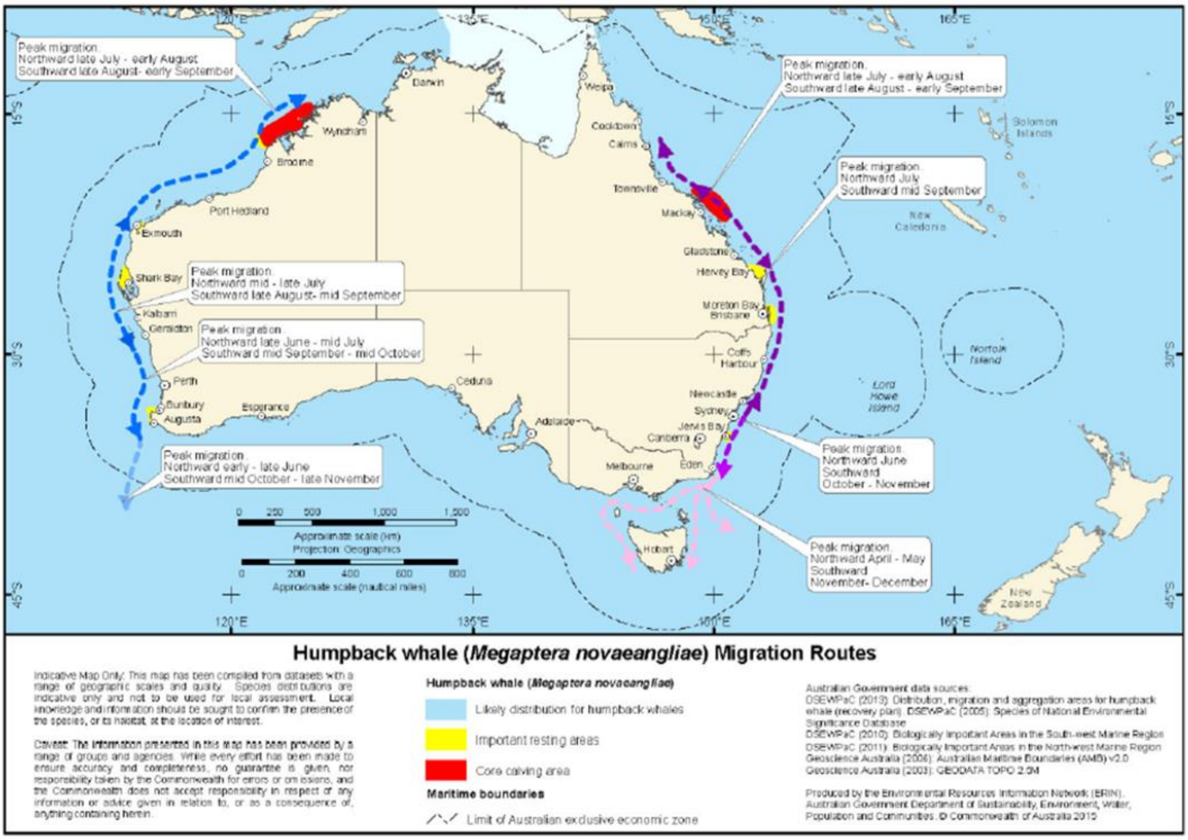

Figure A-29 Migration routes for humpback whales around Australia (TSSC, 2015)

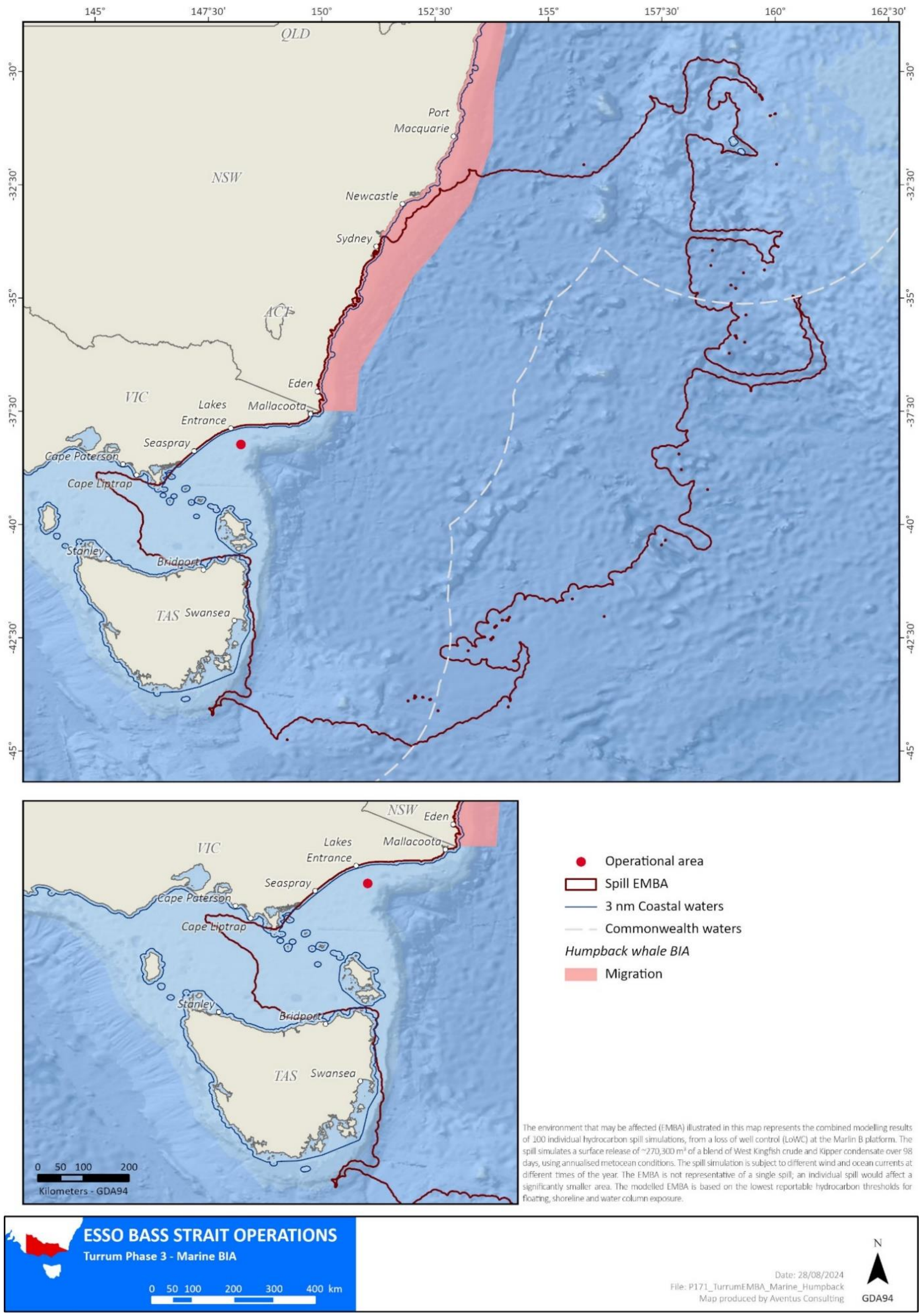

Figure A-30 Humpback whale BIAs intersected by the EMBA

1.4.5.5 Pygmy right whale

Records of pygmy right whales in Australian waters are distributed between 32°S and 47°S but are not uniformly spread around the coast (DCCEEW, 2023e). Areas of coastal upwelling events appear to be an important component regulating pygmy right whale distribution. Pygmy right whales (*Caperea truncates*) have primarily been recorded in areas associated with upwellings and with high zooplankton abundance, which constitute their main prey. There is some evidence to indicate that the area south of 41°S is important for weaned pygmy right whales, possibly because of the higher prey abundance in these waters (DCCEEW, 2023e).

1.4.5.6 Sperm whale

Sperm whales (*Physeter macrocephalus*) are the largest of the toothed whales and are generally found in pods of up to 50 individuals (DCCEEW, 2023e). Sperm whales have a global distribution. They generally inhabit deeper oceanic waters with a water depth of 600m or more and are uncommon in waters less than 300m (DCCEEW, 2023e). The PMST indicates that the species may occur within the EMBA. No BIAs for the species are recorded in the EMBA.

1.4.5.7 Antarctic minke whale

The Antarctic minke whale is more robust than the other large baleen whales. The maximum length of Antarctic minke whales appears to be around 9.8m. Antarctic minke whales are not gregarious and tend to swim alone or in pairs, although large feeding groups of up to 400 individuals may form in the higher latitudes (DCCEEW, 2023e). Minke whales are known to be curious, often approaching boats from a distance.

Antarctic minke whales have been recorded in all Australian states but not in the Northern Territory. The paucity of records obscures the determination of the range of Antarctic minke whales along the Australian coast, although they are known to occur north to 21°S off the east coast. The distribution up the west coast of Australia is currently unknown. The current extent of occurrence for Antarctic minke whales is estimated to be greater than 20,000km^2 (based on the Australian Economic Exclusion Zone) (DCCEEW, 2023e).

1.4.5.8 Bryde's whale

The Bryde's whale is restricted to tropical and temperate waters and has been recorded off all Australian states with exception of the Northern Territory (Bannister J. L., 1996). Bryde's whales can be found in both oceanic (500 to 1,000m isobath) and inshore waters (<200m isobath) (DCCEEW, 2023e). Population estimates are not available for Bryde's whales, globally or in Australia, and no migration patterns have been documented in Australian waters (DCCEEW, 2023e). Bryde's whale is considered to be a fairly opportunistic feeder and it appears that the coastal and offshore forms may be distinguished by their prey preferences, with the smaller coastal form feeding on schooling fishes, such as pilchard, anchovy, sardine, mackerel, herring and others. In contrast, the larger offshore form appears to feed on small crustaceans, such as euphausids, copepods, pelagic red crabs and cephalopods.

1.4.5.9 Sei whale

Sei whales have been infrequently recorded in Australian waters; however occasional sightings have been recorded off Tasmania, NSW, Queensland and within the GAB (DCCEEW, 2023e). Sei whales typically feed between the Antarctic and Subtropical convergences, and their diet is planktonic crustacea, in particular copepods and amphipods. However, they have also been observed feeding on the continental shelf in the Bonney Upwelling region during November and May, suggesting the area may be used for opportunistic feeding (DCCEEW, 2023e).

1.4.5.10 Fin whale

The distribution of fin whales in Australian waters is uncertain, but they have been recorded in Commonwealth waters off most States (the species is rarely found in inshore waters) (DCCEEW, 2023e). Fin whales frequently lunge or skim feed, at or near the surface, feeding on planktonic crustacea, some fish and cephalopods (DCCEEW, 2023e). Fin whales generally feed in high latitudes, however depending upon prey availability and locality, it may also feed in lower latitudes. Fin whales have been observed in waters off the Bonney Upwelling during November and May, suggesting the region may be used for opportunistic feeding (DCCEEW, 2023e). Fin whales have also been detected acoustically south of Portland, Victoria (Erbe C. M., 2016).

Table A-3 lists the relevant threats (as identified by relevant management plans/listing advice/conservation advice) to threatened whale species that may occur within the EMBA.

Table A-3 Key threats to threatened whale species relevant to the activity

Common name	Conservation advice or management plan	Key threats (relevant to the activity)
Sei whale	Approved Conservation Advice for sei whale (*Balaenoptera borealis*) (Department of Agriculture, Water and the Environment, 2015)	• Anthropogenic noise and acoustic disturbance • Habitat degradation including pollution • Pollution (persistent toxic pollutants) • Vessel strike
Blue whale	CMPBW (Department of Climate Change, Energy, the Environment and Water, 2015)	• Noise interference • Habitat modification from marine debris or chemical discharge • Vessel strike
Fin whale	Approved Conservation Advice for fin whale (*Balaenoptera physalus)* (Department of Agriculture, Water and the Environment, 2015)	• Anthropogenic noise and acoustic disturbance • Pollution (persistent toxic pollutants) • Vessel strike
SRW	National Recovery Plan for the Soutern Right Whale (DCCEEW, 2024)	• Entanglement • Vessel strike • Noise Interference • Habitat modification
Humpback whale	Approved Listing Advice for humpback whale (*Megaptera novaeangliae)* (Department of Agricultire, Water and the Environment, 2022)	• Noise interference • Vessel disturbance and strike • Habitat degradation

1.4.5.11 Killer whale

The killer whale (the largest member of the dolphin family) is thought to be the most cosmopolitan of all cetaceans and appear to be more common in cold, deep waters, though they have often been observed along the continental slope and shelf particularly near seal colonies (Bannister J. L., 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 (outside the EMBA) (Bannister J. L., 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 (DCCEEW, 2023e). The breeding season is variable, and the species moves seasonally to areas of food supply (Bannister J. L., 1996) (Morrice, 2004).

1.4.5.12 Dusky dolphin

The dusky dolphin is rare in Australian waters and 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 (Gill P. R., 2000).

Only 13 reports of the dusky dolphin have been made in Australia since 1828 (the very first described specimen of the species by French naturalists was from off the coast of Tasmania in 1826 and key locations are yet to be identified (Bannister J. L., 1996). The dusky dolphin occurs across southern Australia from Western Australia to

Tasmania and there are confirmed sightings near Kangaroo Island, South Australia, and off Tasmania. No key localities or critical habitats in Australian waters have been identified (Bannister J. L., 1996).

1.4.5.13 Indian Ocean bottlenose dolphin

The Indian Ocean bottlenose dolphin is distributed continuously around Australia (DCCEEW, 2023e). The Indian Ocean bottlenose dolphin occurs mainly in riverine and shallow coastal waters (on the shelf or around oceanic islands) (DSEWPC, 2012e). Known populations include Jervis Bay, Twofold Bay, and Phillip Bay (DSEWPC, 2012e)(all of which are within the EMBA). Calving peaks occur in spring and summer or spring and autumn (DCCEEW, 2023e). Gestation lasts approximately 12 months, so peak mating period coincides with peak calving period in each location (DCCEEW, 2023e). A BIA for reproduction for the Indian Ocean bottlenose dolphin has been identified within NSW coastal waters (within the EMBA) A BIA for foragaging also exists within the EMBA around Newcastle (Figure A-31) (DoEE, 2015).

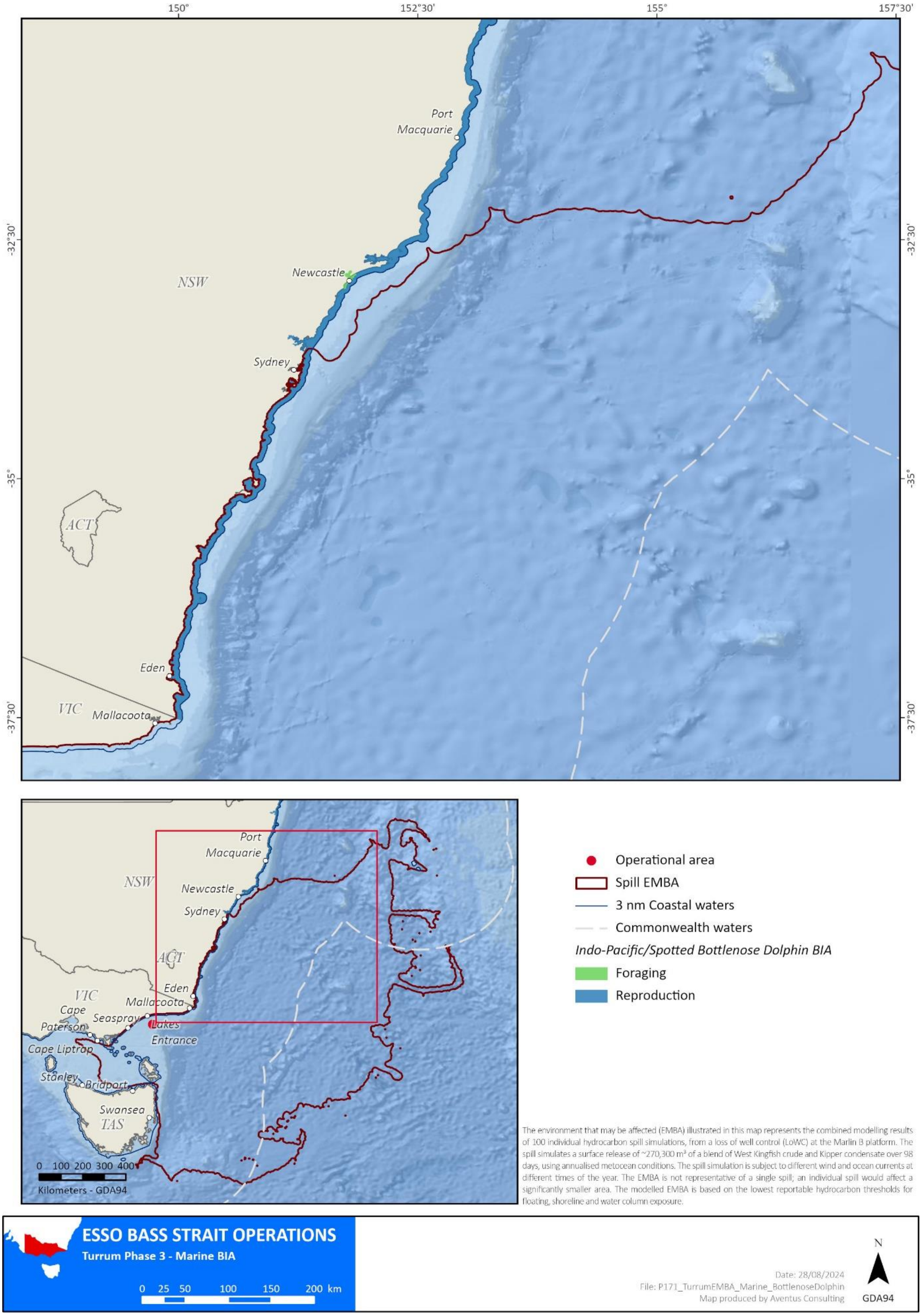

Figure A-31 Indian Ocean bottlenose dolphin BIAs intersected by the EMBA

1.4.6 Sirenia

The dugong is the only species in the Family Dugongidae and one of four species in the Order Sirenia. It is most closely related to Steller's sea cow (*Hydrodamalis gigas*), which is extinct (Marsh H. H., 2002).

The dugong or its habitat may occur along the coast of NSW in the EMBA. BIAs for the dugong are in the northwest of Australia and do not occur in the EMBA.

Dugongs occur in coastal and inland waters from Shark Bay in Western Australia (25°S) across the northern coastline to Moreton Bay in Queensland (27°S) (Marsh H. T., 2011) (Marsh H. H., 2002). The winter range includes about 24,000km of Australia's coast, which represents about 19% of the global extent of occurrence along coastline habitats (Marsh H. T., 2011). Stranded dugongs have been recorded as far south as approximately 36.5°S on the east coast, with occasional sightings south to 32-33.5°S (Newcastle region) in summer. In NSW the dugongs were sighted in coastal and estuarine waters around Wallis Lake, Port Stephens, Lake Macquarie and Brisbane Water in the summer of 2002/2003 (Allen, 2004). These areas are associated with some of the largest seagrass beds in NSW, some of which contain the Halophila seagrass species. The presence of dugongs in these areas at this time coincided with warm water temperatures (>18°C).

1.4.7 Pinnipeds

Two species of pinnipeds were detected by the PMST as potentially occurring in the EMBA. Neither of which are threatened or migratory. Both are described below.

1.4.7.1 Australian fur seal

Australian fur seals are endemic to southeastern Australian waters and have a relatively restricted distribution around the rocky islands of Bass Strait (Figure A-32). It is estimated that there are 60,000 Australian fur-seals in Bass Strait and the waters around Tasmania. The species has been recorded in the waters off South Australia, Victoria, Tasmania, and NSW and are the only species of seal known to breed on Victorian and Tasmanian islands in Bass Strait (Kirkwood R. W., 2009).

There are 10 established breeding colonies of the Australian fur seal that are restricted to islands in the Bass Strait; six occurring off the coast of Victoria and four off the coast of Tasmania (Kirkwood R. W., 2009). The largest of the established colonies occur at Lady Julia Percy Island (26% of the breeding population and 220km west of the EMBA). Not within the EMBA.

Seal Rocks adjacent Phillip Island 25% of the breeding population, in Victoria is within the EMBA.

Other Australian fur seal breeding colonies in Bass Strait and within the EMBA include (Figure A-32):

- Rag Island (1,000 adults and 270 pups in 2007)
- Kanowna Island (15,000 adults and 3,000 pups)
- The Skerries (11,500 adults and 3,000 pups in 2002)
- Judgment Rock in the Kent Island Group (approximately 2,500 pups per year) (Kirkwood R. W., 2009) (Shaughnessy P. , The action plan for Australian seals., 1999) (OSRA, 2015).

(Barton, 2012), (Carlyon, 2011) and (OSRA, 2015) list the haul-out sites known in Bass Strait all of which are within the EMBA (Figure A-32):

- Beware Reef (a haul-out site where the seals are present most of year
- Gabo Island (30-50 individuals)
- The Hogan Island Group (approximately 300 individuals).

Australian fur seals have a relatively restricted distribution around the islands of Bass Strait where it is the most common seal (Kirkwood R. G., 2005). Adult tagged seals have shown travel paths from Flinders Island to King Island presumably passing through central Bass Strait. Their preferred habitat, especially for breeding, is a rocky island with boulder or pebble beaches and gradually sloping rocky ledges.

During the summer months Australian fur seals are observed repeatedly travelling between northern Bass Strait islands and southern Tasmania waters following the Tasmanian east coast. 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.

Australian fur seals forage on benthos at depths of between 60m and 80m (Hume F., 2004.) (Kirkwood A. J., 2007) (Robinson S., 2008) generally within 100km to 200km of the breeding colony for up to five days at a time (Hume F., 2004.). The lactation period lasts for between 10 and 11 months and some females may nurse pups for up to three years (Hindell, 2001).

Male Australian fur seals are bound to colonies during the breeding season from late October to late December. Outside the breeding season they forage up to several hundred kilometres and are away for long periods even up to nine days (Kirkwood R. G., 2005). The sexes generally forage in the same environment (Kirkwood R. G., 2005) this suggests that males target different prey than females as observed in similar New Zealand fur seals where males prey on larger fish and seabird species compared to females. Considering the locations of known breeding and haul-out sites within the EMBA, it is likely the species will be encountered.

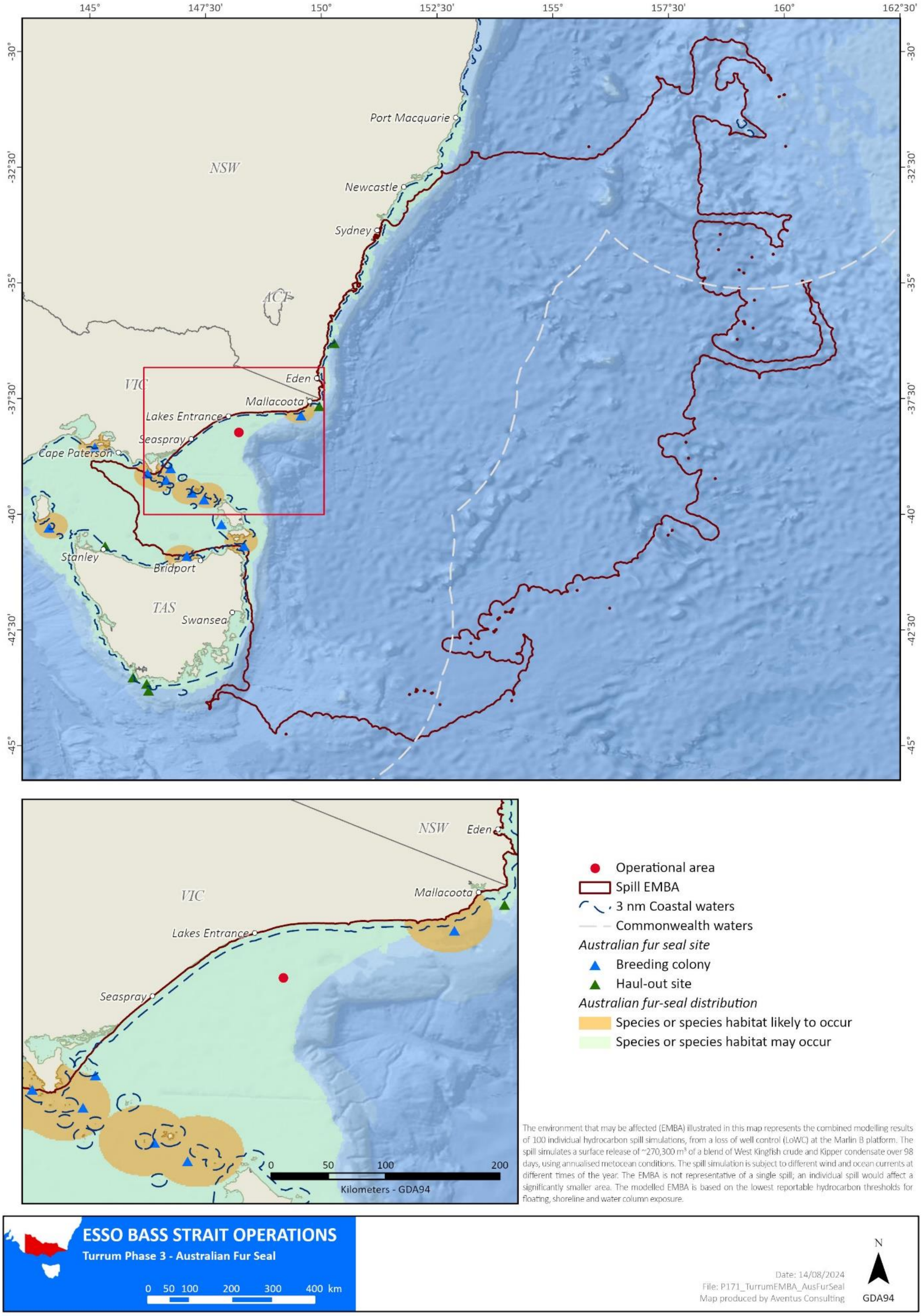

Figure A-32 Australian fur seal distribution, breeding colonies and haul-out sites within the EMBA

1.4.7.2 New Zealand fur seal

New Zealand fur seals (*A. fosteri*, also sometimes referred to as long nosed fur seals) are mostly found in central south Australian waters (Kangaroo Island to South Eyre Peninsula), with 77% of their population found here (outside the EMBA) (Shaughnessy P. , The action plan for Australian seals., 1999).

There are 51 known breeding sites for New Zealand fur seals in Australia, with most of these outside of Victoria (47 in South Australia and Western Australia) (Kirkwood A. J., 2007), with lower density breeding areas occurring in Victoria (Shaughnessy P. , The action plan for Australian seals., 1999). Breeding locations in Victoria occur at Kanowna Island, off Wilson's Promontory and the Skerries (Kirkwood R. W., 2009) both are located within the EMBA. Lady Julia Percy Island is also a known breeding site for the New Zealand fur seal (267km west of the EMBA) (Figure A-33).

During the non-breeding season (November to January) the breeding sites are occupied by pups/young juveniles, whilst adult females alternate between the breeding sites and foraging at sea (Shaughnessy P. , The action plan for Australian seals., 1999).

New Zealand fur seals feed on small pelagic fish, squid, and seabirds, including little penguins (Shaughnessy P. , The action plan for Australian seals., 1999). Juvenile seals feed primarily in oceanic waters beyond the continental shelf, lactating females feed in mid-outer shelf waters (50-100km from the colony) and adult males forage in deeper waters.

In 2005-2006, New Zealand fur seal pup production at the 40 known Australian breeding colonies was estimated at 17,600 pups, equivalent to approximately 35,000 breeding females (Chilvers, 2015). The population has been slow to recover from the previous intense sealing operations from 1798 to 1820, partially as the species are slow reproducers, producing one pup per year when they reach sexual maturity at four years. Up to 15% of pups die before they reach two months of age, primarily because of fishing net and other marine debris entanglements.

Haul-out sites in Bass Strait, as reported by (Barton, 2012) and (OSRA, 2015), all of which are within the EMBA, (Figure A-33) are:

- Beware Reef
- Kanowna Island
- The Hogan Islands Group
- West Moncoeur Island.

The species prefers the rocky parts of islands with jumbled terrain and boulders and prefers smoother igneous rocks to rough limestone. Breeding colonies in Bass Strait recorded by (Shaughnessy P. , The action plan for Australian seals., 1999) and Oil Spill Response Atlas mapping, all of which are within the EMBA, (Figure A-33) are:

- Rag Island (1,000 adults and 235 pups in 2006)
- Kanowna Island (10,700 adults and 2,700 pups)
- The Skerries (300 adults and 78 pups in 2002),
- Judgment Rock in the Kent Island Group (approximately 2,500 pups per year) (Kirkwood R. W., 2009).

There is no BIAs for the New Zealand fur-seal in Bass Strait. Considering the locations of known breeding and haul out sites within the EMBA, it is likely the species will be encountered.

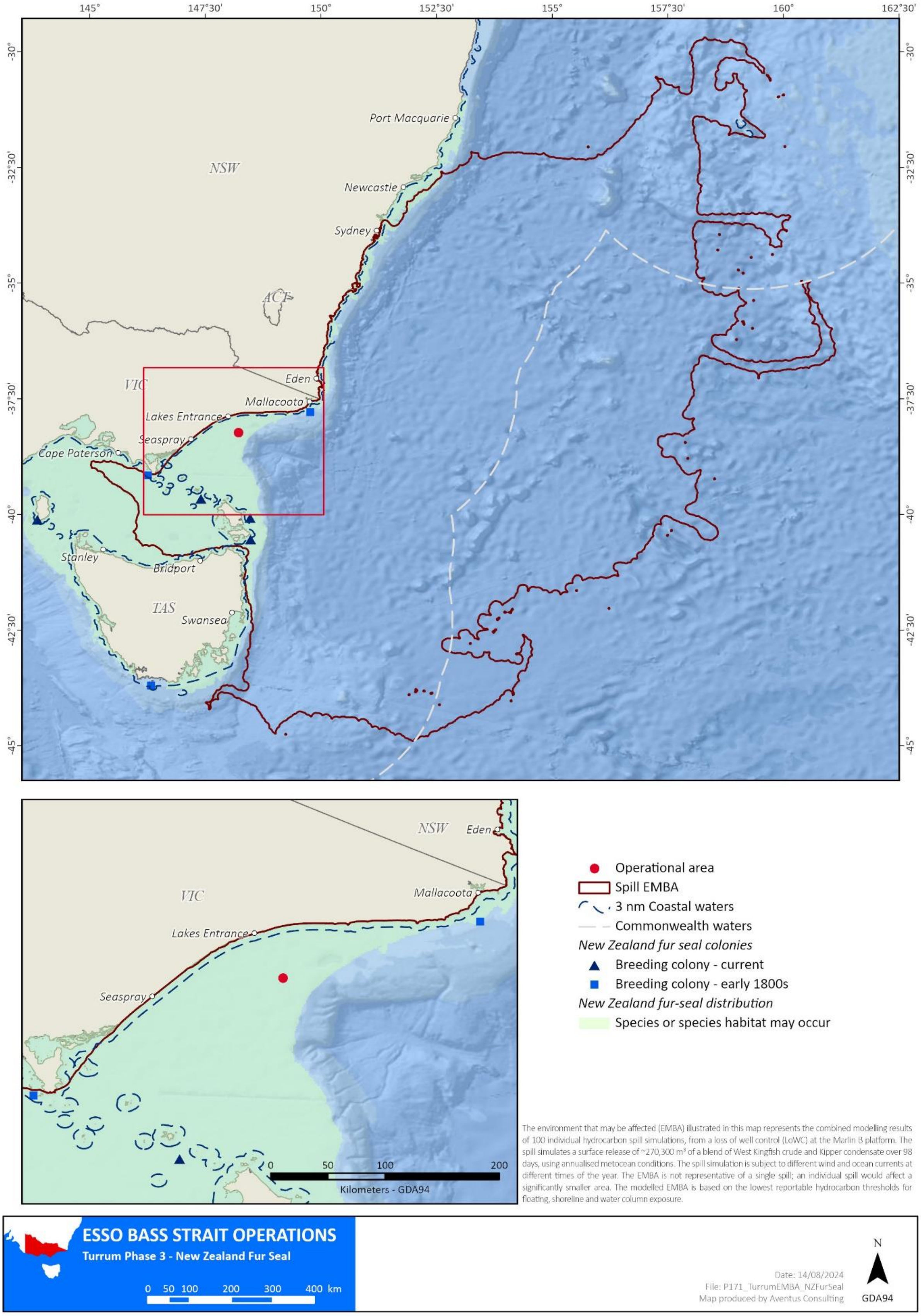

Figure A-33 New Zealand fur seal distribution, breeding colonies and haul-out sites within the EMBA

1.4.8 Turtles

Adult marine turtles spend the majority of their lives in the ocean, typically only coming onshore to nest. Females can lay (on average) between two and six clutches per season: with the period between clutches known as the internesting period. Female turtles typically remain close to the same nesting site during an internesting period. Egg incubation varies between species but is typically two months (DoEE, 2017) . Hatchlings disperse into oceanic currents, and the juveniles will stay in pelagic waters until large enough to settle into coastal feeding habitats. Leatherback turtles are an exception to these general patterns, often exhibiting larger internesting zones, and travelling vast distances to forage rather than settling in a coastal habitat (DoEE, 2017). Flatback turtles also lack an oceanic phase and remain in the surface waters of the continental shelf.

There are five marine turtle species (or species habitat) that may occur within the EMBA. All of which are described below. Table A-4 shows the key threats (as identified in the Recovery Plan for Marine Turtles in Australia, 2017-2027) relevant to the activity for threatened turtles that may occur within the EMBA.

Table A-4 Key threats to threatened turtle species relevant to the activity.

Common name	Recovery plan	Key threats (relevant to the activity)
Loggerhead turtle	*Recovery Plan for Marine Turtles in Australia, 2017-2027* (Department of the Environment and Energy, 2017).	• Marine debris • Chemical discharge • Light pollution • Habitat modification • Vessel disturbance • Noise interference
Green turtle		
Leatherback turtle		
Hawksbill turtle		
Flatback turtle		

1.4.8.1 Loggerhead turtle

The loggerhead turtle has a global distribution throughout tropical, sub-tropical and temperate waters; and in Australia typically occurs in the waters of coral and rocky reefs, seagrass beds, or muddy bays throughout eastern, northern, and western Australia (DCCEEW, 2023e). Loggerhead turtles are carnivorous, feeding primarily on benthic invertebrates. While the species has a broad foraging range throughout Australian waters, nesting is known to occur (from two different genetic stocks) on sandy beaches on the central western and eastern coasts (DCCEEW, 2023e) . The eastern Australian population is smaller than the western Australian population; and has also undergone a decline from approximately 3,500 nesting females in 1977, to approximately 500 nesting females in 2000 (DCCEEW, 2023e). No nesting or internesting, critical habitat, or BIAs, have been identified for the loggerhead turtle within the EMBA.

1.4.8.2 Green turtle

Green turtles are found in tropical and subtropical waters throughout the world; usually occurring within the 20°C isotherms, although individuals can stray into temperate waters (DCCEEW, 2023e). Within Australia, green turtles typically nest, forage and migrate across tropical northern Australia (DCCEEW, 2023e). The total Australian population of green turtles is approximately 70,000 individuals, with approximately 8,000 of these found in the southern Great Barrier Reef area. Adult green turtles consume mainly seagrass and algae, although they will occasionally eat mangroves, fish-egg cases, jellyfish, and sponges; juvenile green turtles are typically more carnivorous and will also consume plankton during their pelagic stage (DCCEEW, 2023e). No nesting or internesting, critical habitat, or BIAs, have been identified for the green turtle within the EMBA.

1.4.8.3 Leatherback turtle

The leatherback turtle has the widest distribution of any marine turtle, occurring in tropical to sub-polar oceans (TSSC, 2008). In Australia, the leatherback turtle has been recorded foraging in all Australian states, but no large nesting populations have been recorded (TSSC, 2008). The leatherback turtle is a highly pelagic species, venturing close to shore mainly during the nesting season (DCCEEW, 2023e). Adults feed mainly on pelagic soft-bodied creatures such as jellyfish, tunicates, salps, squid (DCCEEW, 2023e). No nesting or internesting, critical habitat, or BIAs, have been identified for the leatherback turtle within the EMBA.

1.4.8.4 Hawksbill turtle

The hawksbill turtle is found in tropical, subtropical, and temperate waters all around the world (DCCEEW, 2023e). hawksbill turtles are omnivorous, feeding on sponges, hydroids, cephalopods (octopus and squid), gastropods (marine snails), cnidarians (jellyfish), seagrass and algae (DCCEEW, 2023e). During their pelagic phase (while drifting on ocean currents), young hawksbill turtles will feed on plankton. Hawksbill turtles that forage on the Great Barrier Reef migrate to neighbouring countries including Papua New Guinea, Vanuatu, and the Solomon Islands; it is not known from which stock hawksbill turtles foraging in NSW originate (DCCEEW, 2023e). No nesting or internesting, critical habitat, or BIAs, have been identified for the hawksbill turtle within the EMBA.

1.4.8.5 Flatback turtle

The flatback turtle is found in tropical waters of northern Australia and is one of only two species of sea turtle without a global distribution (DCCEEW, 2023e). All known nesting locations for this species are within Australia (DCCEEW, 2023e). Flatback turtles are primarily carnivorous, feeding on soft-bodied invertebrates; juveniles eat gastropod molluscs, squid, siphonophores. Limited data also indicate that cuttlefish, hydroids, soft corals, crinoids, molluscs and jellyfish may also form part of their diet (DCCEEW, 2023e). No nesting or internesting, critical habitat, or BIAs, have been identified for the flatback turtle within the EMBA.

1.4.9 Birds

Birds in the marine environment can include both seabirds and shorebirds.

Seabirds refers to those species of bird whose regular habitat and food sources are derived from the ocean (both coastal and pelagic); seabirds include such species as pelicans, gannets, cormorants, albatrosses, and petrels. Seabirds spend much of their lives at sea in search of prey only to return for a short time to breed and raise chicks. Most species tend to forage on their own, though large feeding flocks will gather at rich or passing food sources. Squid, fish, and krill are common sources of food.

Shorebirds (sometimes referred to as wading birds) refers to those species of bird commonly found along sandy or rocky shorelines, mudflats, and shallow waters; shorebirds include such species as plovers and sandpipers. Shorebirds spend most of their time (nesting, feeding, and breeding) on the shoreline and don't swim.

There are 109 seabird and shorebird species (or species habitat) that may occur within the EMBA; this includes species classified as threatened and migratory (See Table B- 3 and Appendix D for the full PMST report).

The coast and neighbouring islands within the EMBA provide feeding and nesting habitats for many coastal and migratory bird species.

Many of the birds listed in Table B- 3 are listed in the following international conventions that aim to protect the birds themselves and their habitat:

- Republic of Korea Migratory Birds Agreement 2006
- Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979
- Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment 1974, and
- Convention on Wetlands of International Important especially as Waterfowl Habitat 1971 ('Ramsar Convention').

1.4.9.1 Albatrosses and petrels

The PMST report detected 16 albatross and 16 petrel species (see Table B- 3) that have the potential to occur within the EMBA. BIAs for several albatross and petrel species are shown in Figure A-34, Figure A-35, Figure A-36, Figure A-37 and Figure A-38.

Albatrosses and petrels are mostly surface capturing, pelagic predators that feed on live and dying prey. Their ability to dive varies across species and involves either surface plunge dives or shallow dives to catch prey (generally <15m deep). Both species are wide-ranging, opportunistic predators, individuals will forage singly and will then aggregate in larger numbers where there is a rich food source. They prefer to feed during the day or at night (often by moonlight) (CoA, 2022).

Albatrosses and petrels have a diverse diet, depending on the availability of food, including cephalopods, crustaceans, cyclostomes, fish, and tunicates, although diet is not well known for several species. Both species have a tendency to follow fishing vessels. Competition for fishers discards and baited hooks can be intense with smaller birds subject to secondary attacks by other larger birds (CoA, 2022).

Albatross and petrel species occurring in Australia's jurisdiction predominantly breed on remote, offshore islands in the higher latitudes, apart from the northern royal albatross (detected in the PMST) and westland petrel (not detected in the PMST) that breed on the south island of New Zealand (CoA, 2022).

Albatrosses and petrels are extremely site faithful. The remote offshore islands (Table A-5) should be regarded as habitat that is potentially critical to the survival of albatrosses and petrels in Australia.

Table A-5 Albatross and petrel breeding site locations in Australia's jurisdiction

Site	Species	Distance to the EMBA	Size (ha)
Albatross Island	Shy albatross	Within the EMBA	33
Mewstone	Shy albatross	144km west	13
Pedra Branca	Shy albatross	97km west	2.5
Macquarie Island	Black-browed albatross, grey-headed albatross, grey petrel, light-mantled albatross, wandering albatross, northern giant petrel, southern giant petrel	1,262km southeast	13,000
Bishop and Clerk Islets	Black-browed albatross	1,308km southeast	60
Heard Island	Black-browed albatross, light-mantled albatross, southern giant petrel	5,336km southwest	36,800
McDonald Islands	Black-browed albatross, light-mantled albatross, southern giant petrel	5,336km southwest	360
Giganteus Island	Southern giant petrel	5,396km southwest	16
Hawker Island	Southern giant petrel	4,74km southwest	190
Frazier Islands	Southern giant petrel	3,353km southwest	60

Source: (CoA, 2022)

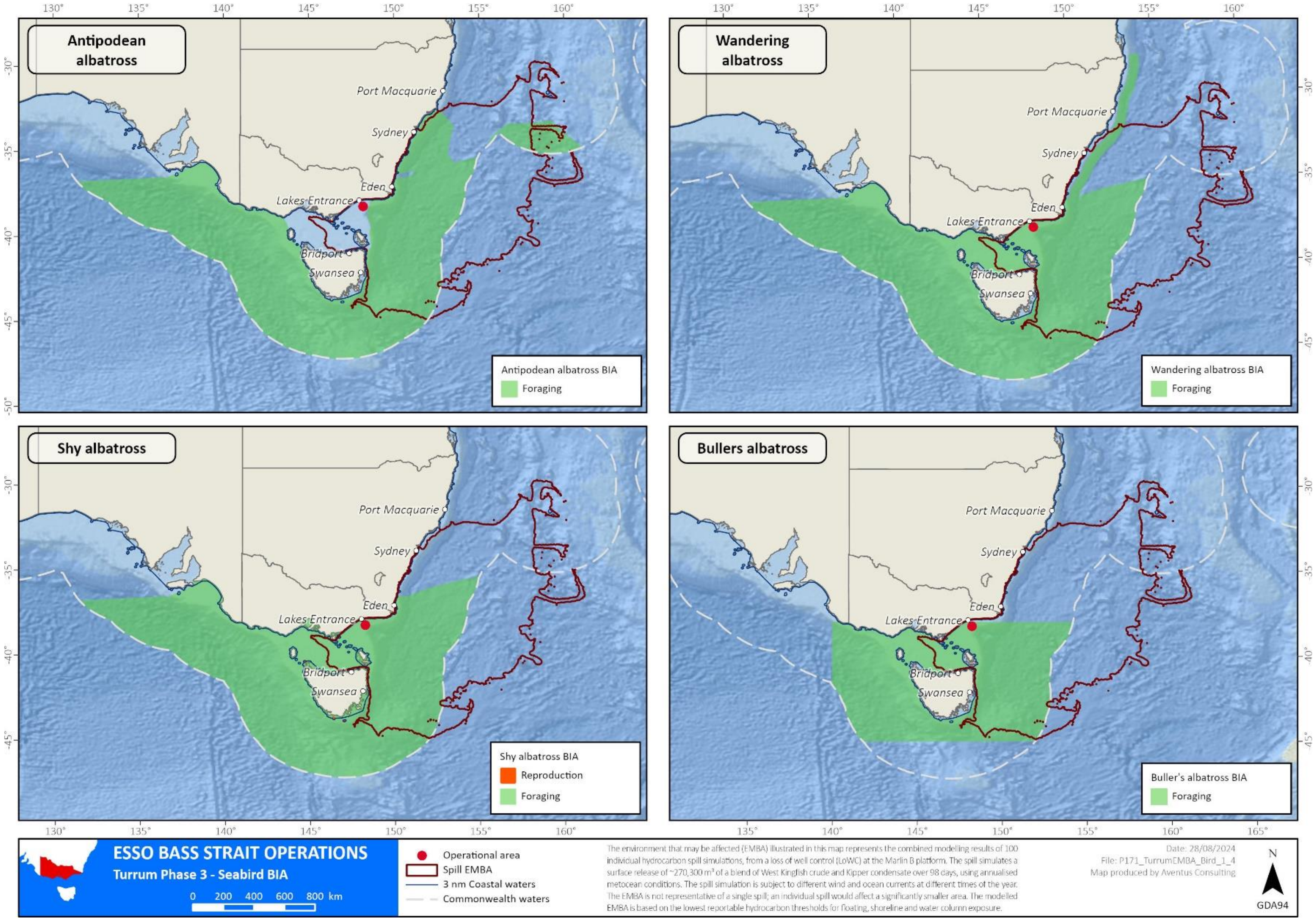

Figure A-34 BIAs for the antipodean, wandering, shy and Bullers albatross intersected by the EMBA

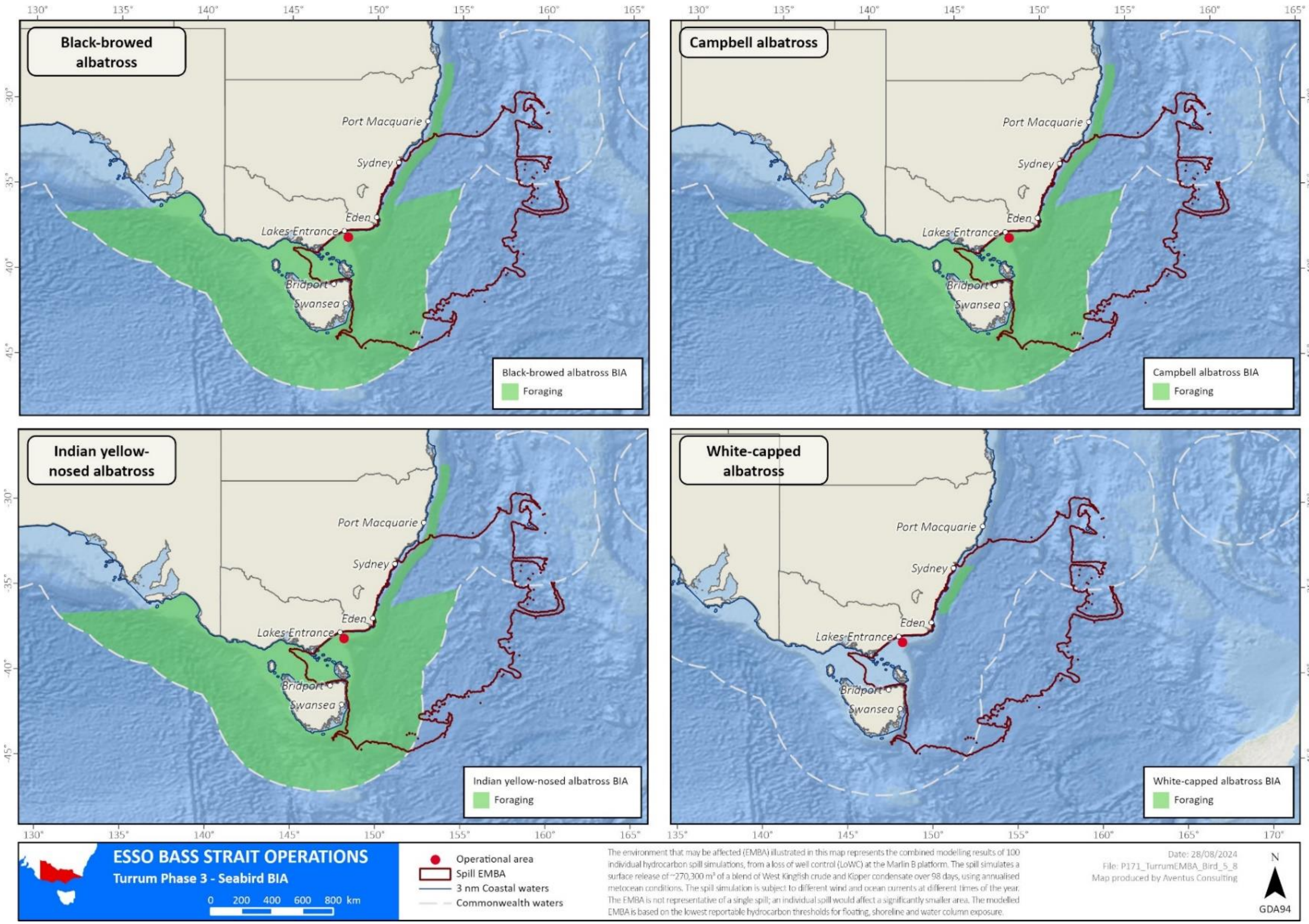

Figure A-35 BIAs for the black-browed, Campbell, Indian yellow-nosed and white-capped albatrosses intersected by the EMBA

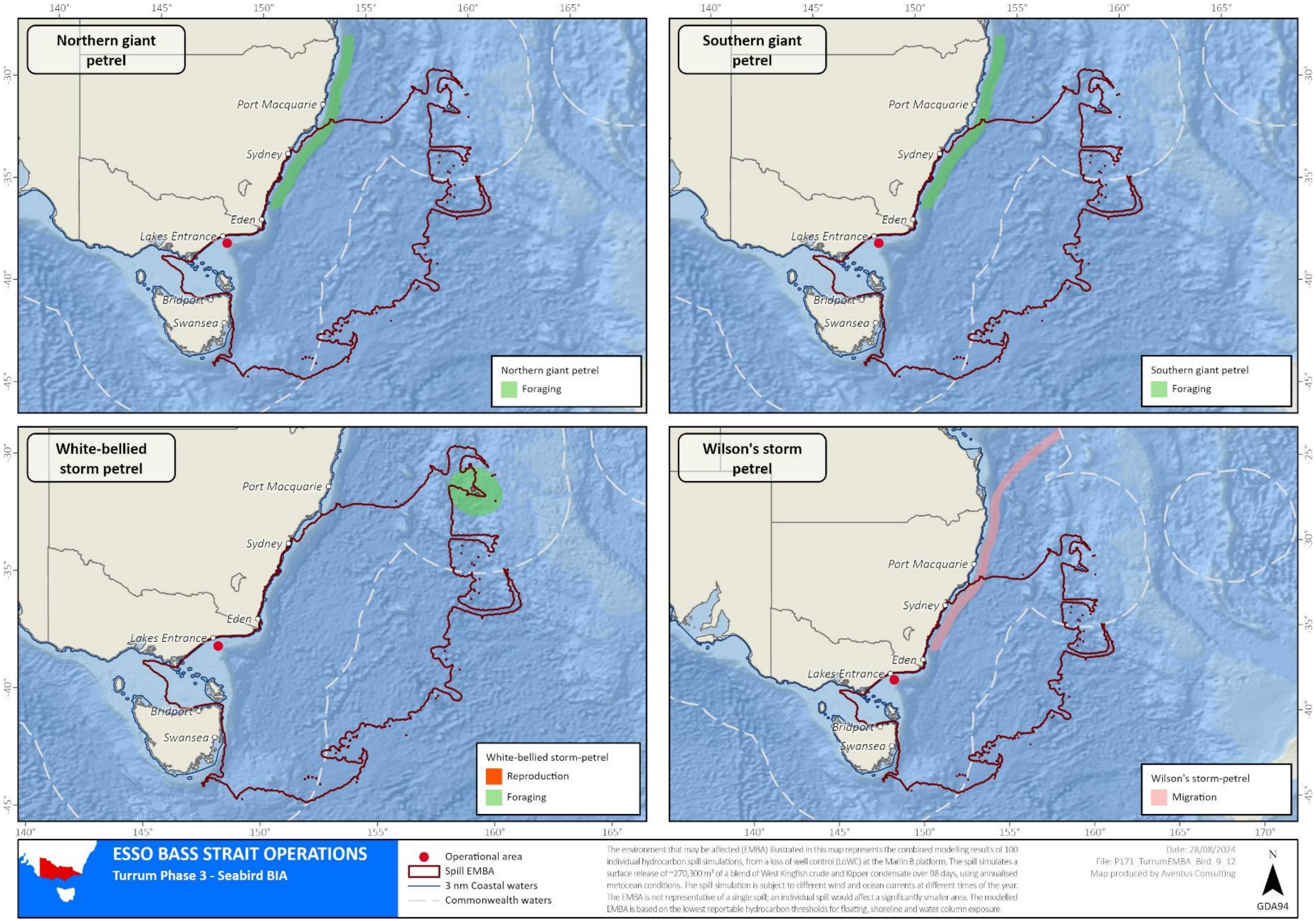

Figure A-36 BIAs for the northern giant, southern giant, white-bellied storm and Wilson's storm petrels intersected by the EMBA

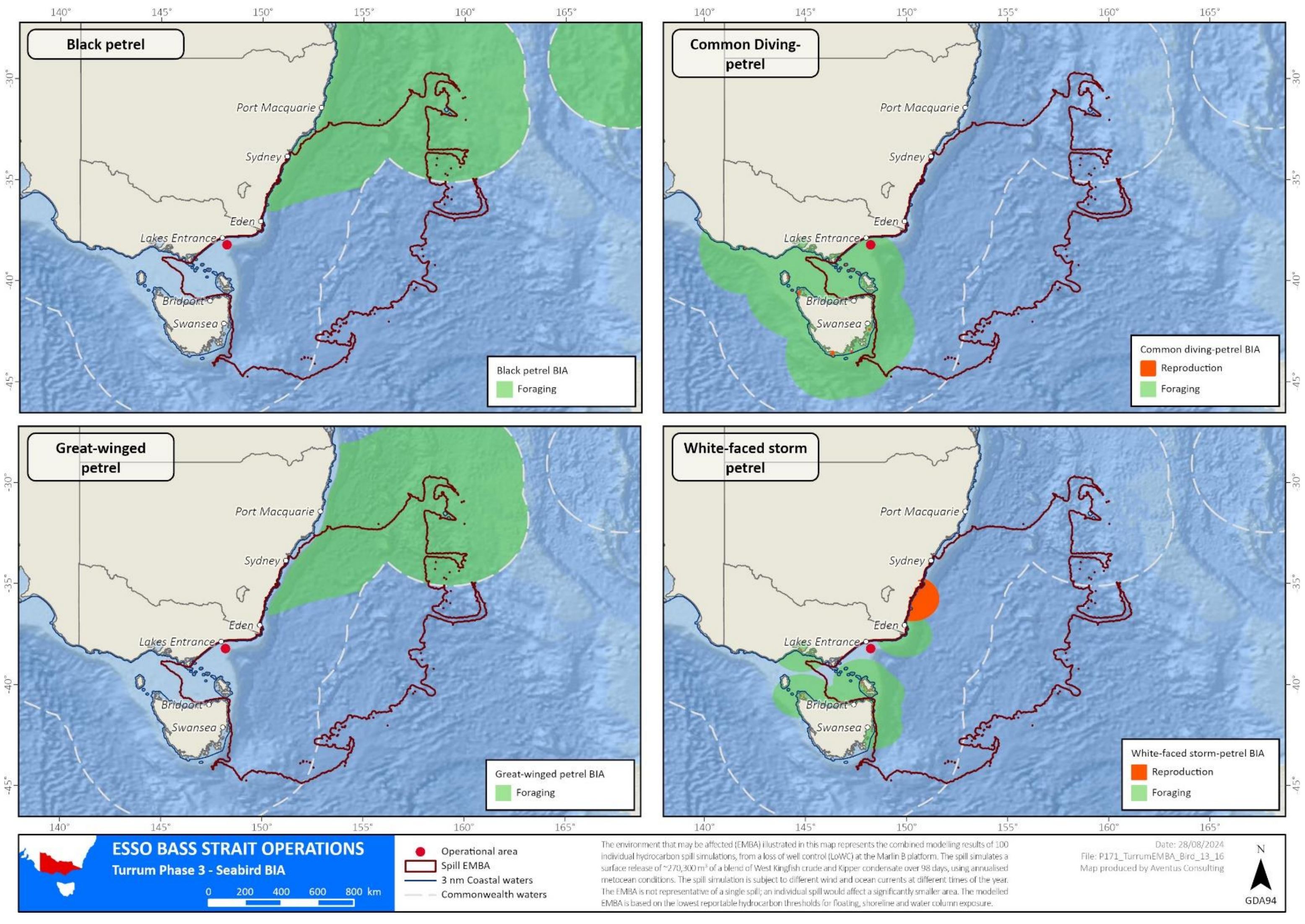

Figure A-37 BIAs for the black, common diving, great-winged and white-faced storm petrels intersected by the EMBA

1.4.9.2 Shearwaters

Six species of shearwaters were detected by the PMST. Shearwaters represent the most abundant seabird in Australia they are typically pelagic, except during breeding seasons where they are found on remote islands or coastal headlands. Shearwaters are medium-size long-winged seabirds that are most common in temperate and cold waters. They spend most of their time foraging in the ocean and return to coastal cliffs and offshore islands only to breed. Shearwaters feed on fish, squid, cephalopod molluscs (squid, cuttlefish, nautilus and argonauts), crustaceans (barnacles and shrimp) and other soft-bodied pelagic prey. Food is usually taken by pursuit-plunging, surface plunging or surface-seizing (DCCEEW, 2023e). Some shearwaters, such as the sooty and flesh-footed, are trans-equatorial migrants and are widely distributed across the Pacific Ocean.

Known breeding locations for the sooty shearwater and wedge-tailed shearwater include oceanic islands in NSW (such as Solitary Island, Cabbage Tree Island, Muttonbird Island, Bird Island) (Bird Island being the only one within the EMBA) (DCCEEW, 2023e). Breeding season in southeastern Australia for shearwaters is typically over summer; late-August/early September to May. Shearwater nests are usually in burrows or rock crevices. Due to their expansive ranges, it is likely that shearwaters may overfly, forage, breed or rest in the EMBA. BIAs for five shearwater species are shown in Figure A-39 and Figure A-40.

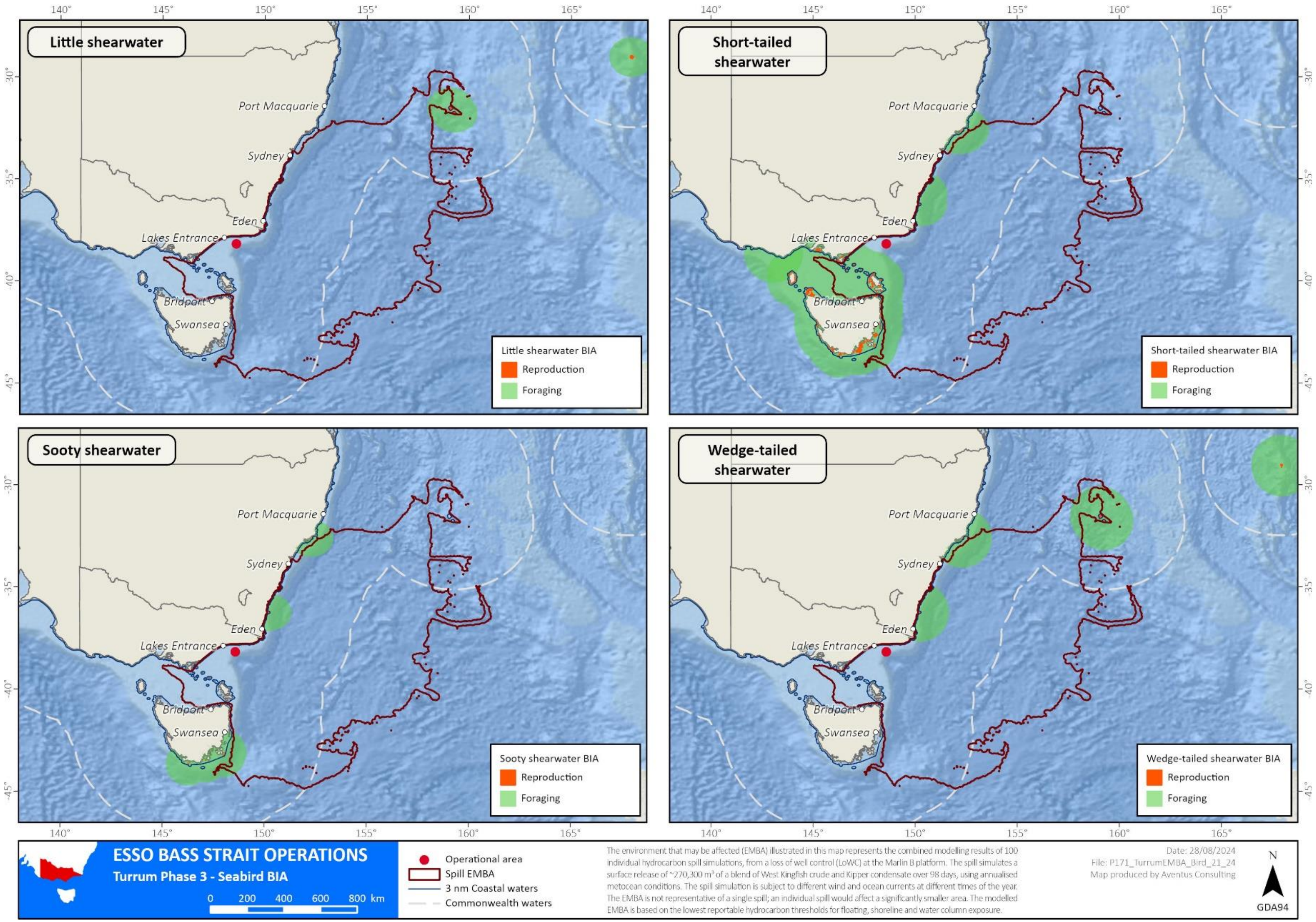

Figure A-38 BIAs for the little, short-tailed, sooty and wdge-tailed shearwater intersected by the EMBA

1.4.9.3 Other seabirds

Other seabirds listed in the PMST that may occur within EMBA are described here:

- the fork-tailed swift (*Apus pacificus*) is a medium-sized bird has a large global distribution and population, occurring throughout much of Australia. In Victoria, it is widespread but sparsely scattered, occurring over cliffs, beaches and sometimes well out to sea (BirdlifeAustralia, 2023). This species is almost exclusively aerial, feeding on insects in flight. As a migratory species, it arrives in Australia from September to October, leaving southern Australia from mid-April (BirdlifeAustralia, 2023). As a common species, the fork-tailed swift may flyover the EMBA from September to April
- the great skua (*Catharacta skua*) is a large migratory seabird distributed throughout all southern Australian waters (though not listed as migratory under the EPBC Act). This species breeds in summer on nested elevated grasslands or sheltered rocky areas on sub-Antarctic islands, with most adult birds leaving their colonies in winter. Great skuas feed on other seabirds, fish, molluscs, and crustaceans, and may be present in EMBA (though scarce) during winter (Flegg, 2002)
- the fairy prion (*Pachyptila tutur*) is the most common prion found in southeast Australia. The species is found mainly offshore but may move inshore during stormy weather. Their diet consists of primarily krill but may include some fish and squid. Surface-seizing and dipping are their primary feeding methods, but they can also surface-plunge and use pattering (BirdlifeInternational, 2023)
- the southern fairy prion (*Pachyptila turtur subantarctica*) is mainly found offshore. The species diet is comprised mostly of crustaceans (especially krill), but occasionally includes some fish and squid. It feeds mainly by surface-seizing and dipping but can also catch prey by surface-plunging or pattering Birdlife (Australia, 2023). In Australia, it is known to breed only on Macquarie Island and on the nearby Bishop and Clerk Islands (BirdlifeAustralia, 2023)
- the white-bellied sea eagle (*Haliaeetus leucogaster*) is distributed along the coastline in coastal lowlands with breeding sites from Queensland to Victoria in coastal habitats and terrestrial wetlands in temperate regions. The breeding season is from June to January with nests built in tall trees, bushes, cliffs, or rock outcrops. Breeding pairs are generally widely dispersed (BirdlifeAustralia, 2023). The species forages over open water (coastal and terrestrial) and feeds on fish, birds, reptiles, mammals, and crustaceans and normally launches into a glide to snatch its prey, usually with one foot, from the ground or water surface. The species is widespread and makes long-distance movements (BirdlifeAustralia, 2023). This species may be present along the adjacent coastline of the EMBA
- the osprey (*Pandion haliaetus*) is a common, medium-sized raptor that is present around the entire Australian coastline, with the breeding range restricted to the north coast of Australia (including many offshore islands) and an isolated breeding population in South Australia (BirdlifeAustralia, 2023). Breeding occurs from April to February. Ospreys occur mostly in coastal areas but occasionally travel inland along waterways, where they feed on fish, molluscs, crustaceans, reptiles, birds, and mammals. They are mostly resident or sedentary around breeding territories, and forage more widely and make intermittent visits to their breeding grounds in the non-breeding season (BirdlifeAustralia, 2023). Due to their broad habitat, osprey may be present in the coastal areas of the EMBA
- terns - several EPBC Act-listed tern species may occur within the EMBA. Terns are slender, lightly built birds with long, forked tails, narrow wings, long bills, and relatively short legs. Many of the tern species present along the southern Australian coastline are widespread and occupy beach, wetland, and grassland habitats. Terns rarely swim; they hunt for prey in flight, dipping to the water surface or plunge-diving for prey (Flegg, 2002) usually within sight of land for fish, squid, jellyfish and sometimes crustaceans. Fairy terns feed by plunge diving on small baitfish in coastal waters, usually close to land (BirdlifeAustralia, 2023). The total number of Australian fairy terns is estimated to be 5,000 mature individuals that utilise offshore, estuarine, lacustrine, wetland, beach, and spit habitats (DSEWPC, 2011). The species nests above the high-water mark in clear view of the water and on sites where the substrate is sandy and the vegetation low and sparse (DSEWPC, 2011). Fairy terns are threatened by predation from introduced mammals, disturbance by humans, dogs, and vehicles (DSEWPC, 2011). BIAs for the crested tern, sooty tern, whit tern and white-fronted tern intercepted by the EMBA can be seen in Figure A-41
- noddies – three EPBC Act-listed noddy species (common, black, and grey) may occur within the EMBA. Noddies are part of the same family as terns. The common noddy is a tropical seabird with a worldwide distribution, occurring around isolated, bare, or vegetated, inshore, or oceanic islands or coral reefs with rocky cliffs or offshore stacks and coral or sand beaches (CoA, 2020). Their diet consists predominantly of

small fish as well as squid, pelagic molluscs, medusae and insects. The black noddy also has a worldwide distribution inhabiting tropical and subtropical island. They feed by hover-dipping and contact-dipping. The grey noddy breeds on Lord Howe (within the EMBA) and Norfolk Islands and on Kermadec Island, New Zealand. The grey noddy eats very small fish (average length 17mm), squid, crustaceans (CoA, 2020). BIAs for the three species of noddy intercepted by the EMBA can be seen in Figure A-40

- the black-faced cormorant is endemic to southern Australia (CoA, 2020); and favours rocky coasts. The species feeds in coastal waters on a variety of fish, typically catching prey by pursuit-diving. There are 40 significant breeding sites (defined as more than 10 breeding pairs) known for the species in southern Australia. Breeding usually occurs on rocky islands, but also on stacks, slopes, and sea cliffs in colonies of up to 2,500 individuals (CoA, 2020). Breeding and foraging BIAs for the black-faced cormorant that intersect with the EMBA can be seen in Figure A-41.
- the masked booby is a large, EPBC Act-listed marine and migratory species that has a breeding population on Lord Howe Island (within the EMBA) (Mutton Bird Point, King Point, Roach Island, South Island, Sugarloaf Island, Mutton Bird Island, Gower Island, Sail Rocks and Ball's Pyramid) that is the most southerly known breeding colony in the world (DCCEEW, 2023e). The masked booby nests in small colonies, laying on sandy beaches and feeds by plunge diving on the ocean (DCCEEW, 2023e). Breeding and foraging BIAs for the masked booby that intersect with the EMBA can be seen in Figure A-43
- the red-tailed tropic bird is a medium sized (45 - 55cm) seabird and is EPBC Act-listed marine and migratory. The species exists in tropical Pacific and Indian oceans (DCCEEW, 2023e). It nests on cliffs by the water's edge, and less so inland on smaller islands and has been identified as a conservation value in the temperate east marine region. The red-tailed tropicbird is mostly a plunge-diver, diving anywhere from an above-water height 6 to 50m to a depth of about 4.5m (AOLA, 2019). No specific conservation plans exist for this species. Breeding and foraging BIAs for the red-tailed tropic bird that intersect with the EMBA can be seen in Figure A-4

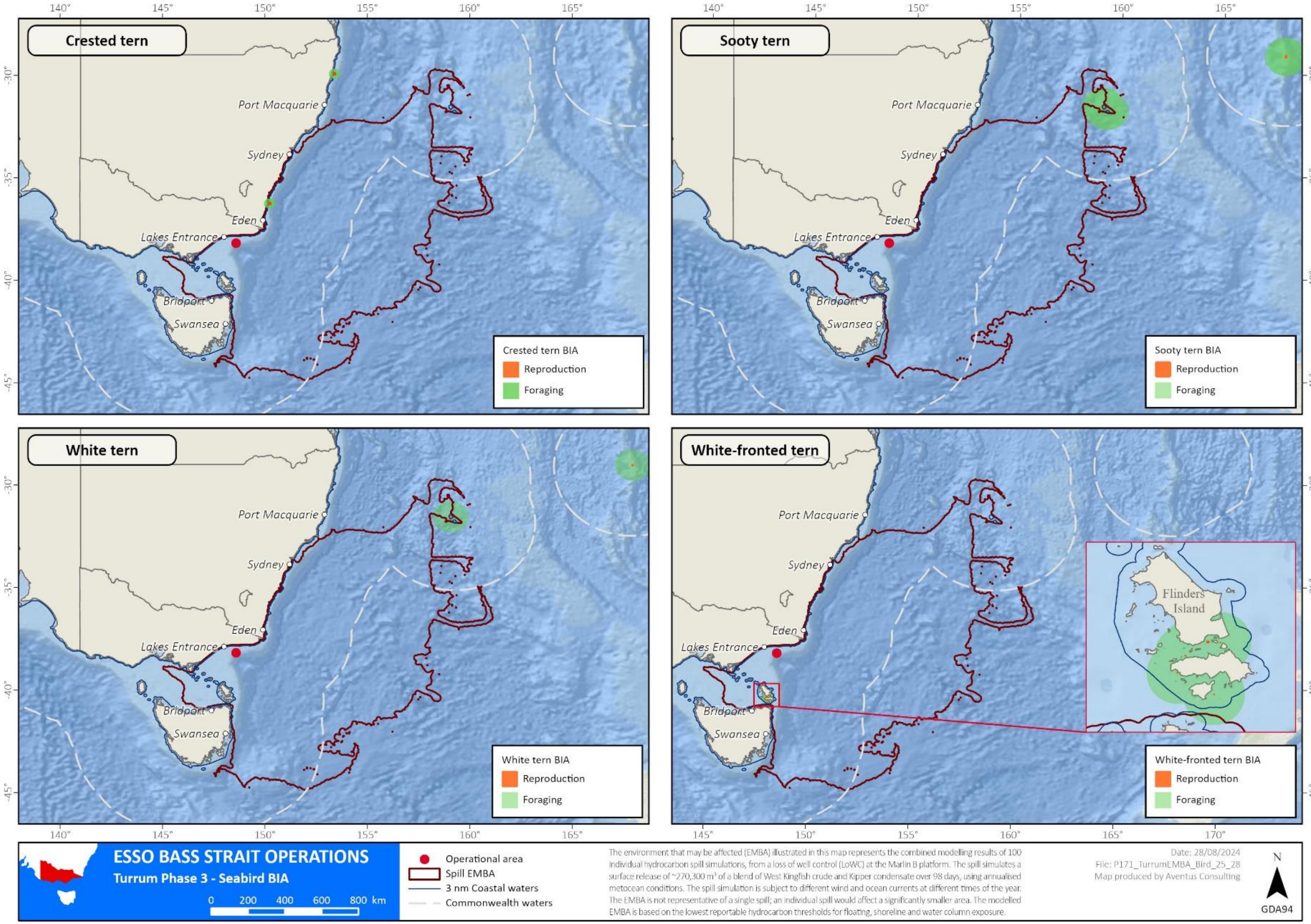

Figure A-39 BIAs for the crested, sooty, white and white-fronted tern intersected by the EMBA

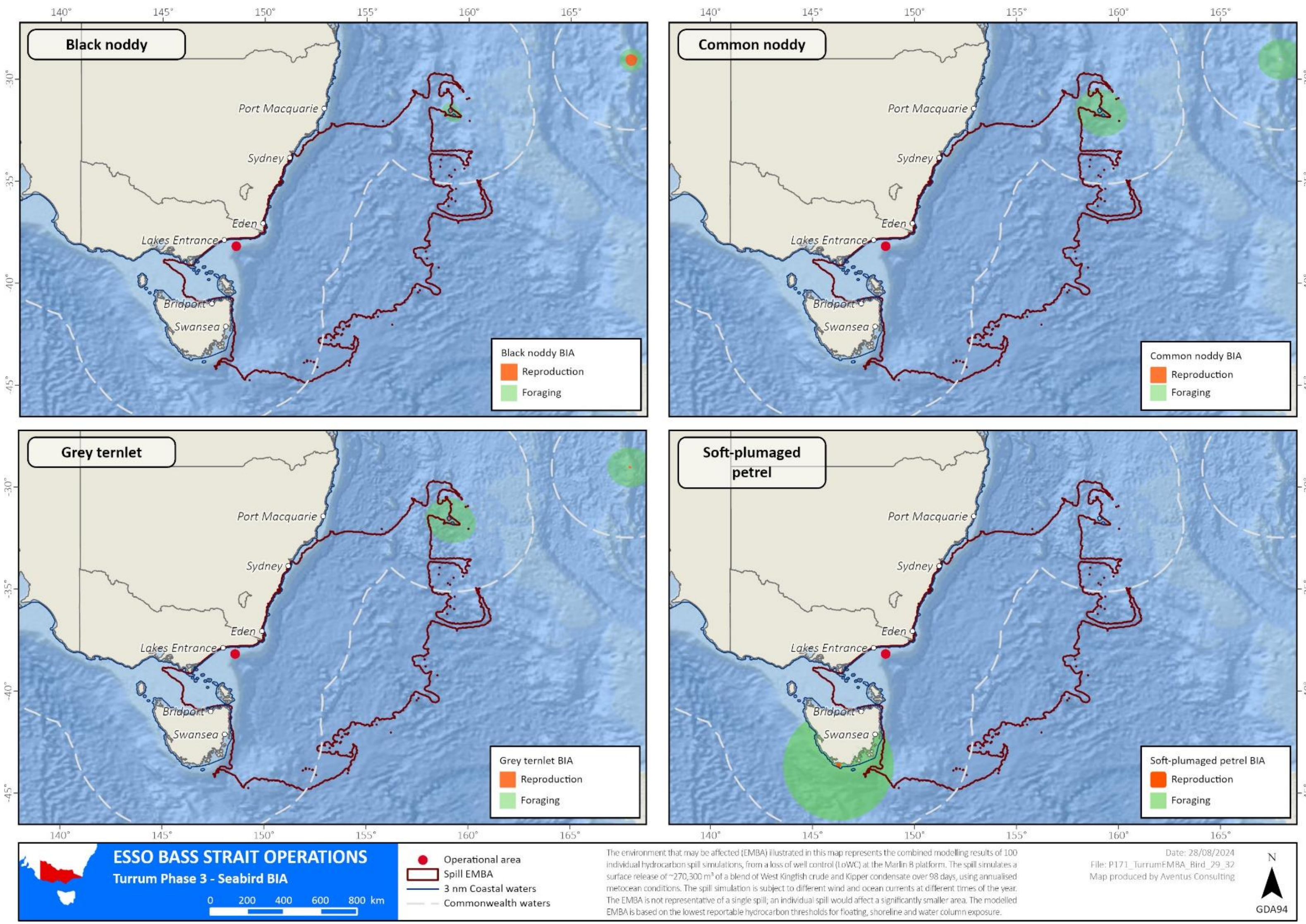

Figure A-40 BIAs for the black and common noddy, grey ternlet and soft-plumaged petrel intersected by the EMBA

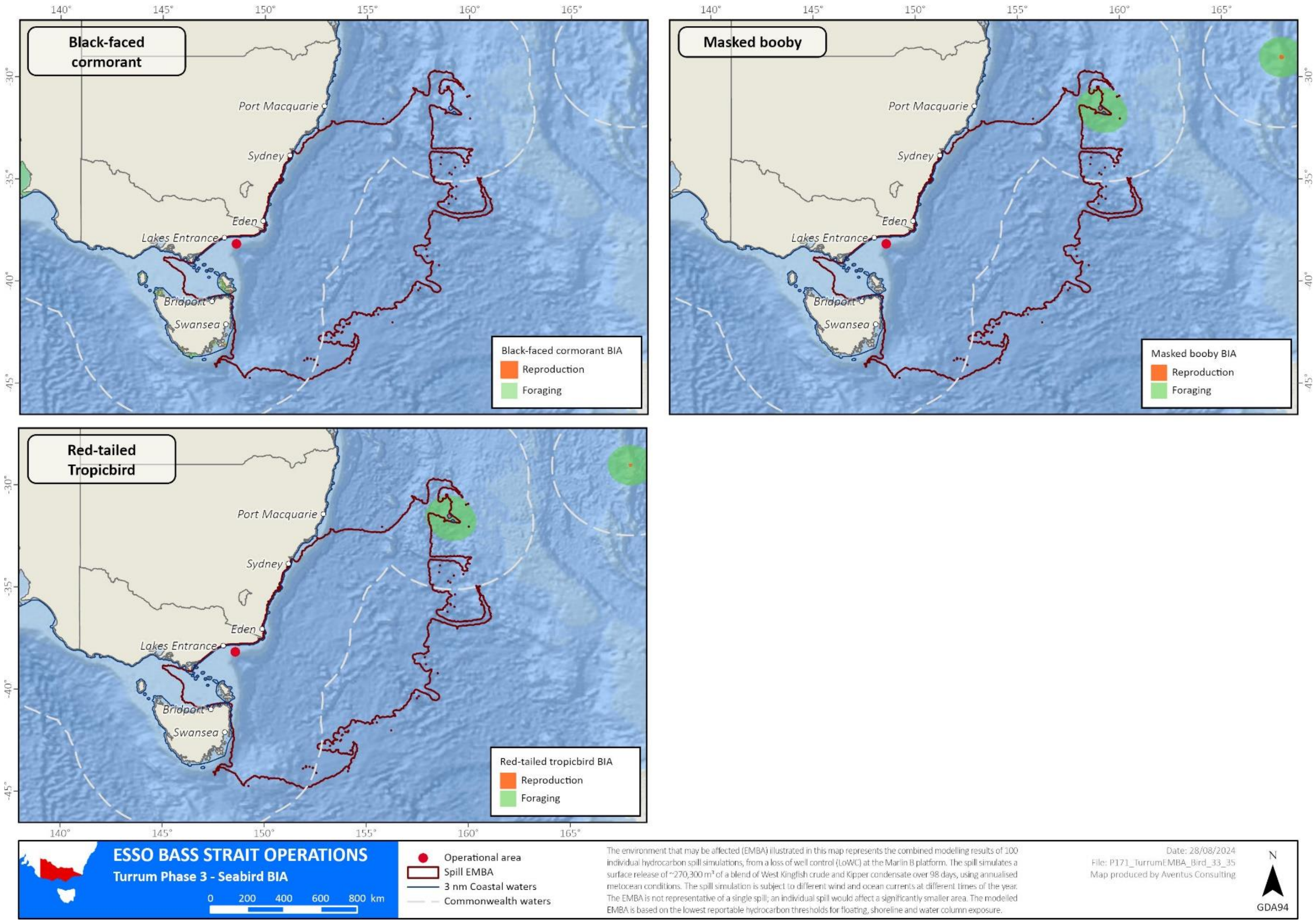

Figure A-41 BIAs for the black-faced cormorant, masked booby and red-tailed tropicbird intersected by the EMBA

1.4.9.4 Little penguin

The little penguin (*Eudyptula minor*) is a seabird that does not fly and is the smallest of the 17 penguin species in the world. Little penguins occur from Western Australia (Carnac Island) to NSW (Broughton Island) and Tasmania. Their distribution is not continuous, with sections of the southern coast of Australia lacking breeding colonies (CoA, 2020). They are permanent residents of the coastal and offshore islands of parts of the Victorian and Tasmanian coast and Bass Strait islands, with the southeast marine region representing about 60% of the species known breeding population (CoA, 2015).

Individuals exhibit strong site fidelity, returning to the same breeding colony each year to breed in the winter and spring months. While on land, penguins remain in burrows to rest, nest, and moult. Nest building (in sand dunes or in rock crevices) occurs from June to December, breeding occurs from August to October, egg laying occurs from August to December, chick raising occurs from August to March and moulting occurs between February and April (during which time they must remain on land).

During winter, little penguins spend most of their time at sea, returning to the burrows to rest and attend to their burrows (DELWP, 2017). Little penguins dive on average between 10 and 30m in depth, with their preferred food sources being young barracouta, anchovies, red cod, warehou, pilchards and, squid (PenguinFoundation, 2022). They forage mostly from dawn to an hour before dusk, returning to their burrows at dusk (BirdlifeAustralia, 2023). During the breeding season, little penguins forage within 5 - 25km of the coast, and at other times, foraging can occur up to 75km from the coast (SARDI, 2011).

Based on Oil Spill Response Atlas mapping, little penguin colonies in the Gippsland region that are within the EMBA are listed below and can be seen in Figure A-42:

- Shellback Island (400 breeding pairs)
- Norman Island (1,000 breeding pairs)
- Glennie Group Islands (3,400 breeding pairs)
- Anser Group of Islands (500 breeding pairs)
- Wattle Island (400 breeding pairs)
- Seal Island (1,000 breeding pairs)
- Notch Island (1,000 breeding pairs)
- Rag Island (400 breeding pairs)
- Rabbit Island (8,000 breeding pairs)
- Rabbit Rock (200 breeding pairs)
- Tullaberga Island (900 breeding pairs)
- Gabo Island (35,000 breeding pairs) (50% of Victorian population).

Other Bass Strait islands with known populations of little penguins within the EMBA are listed below and can be seen in Figure A-42:

- Babel Island (20,000 pairs)
- Curtis Island Group (2,000 individuals)
- Hogan Island Group (10,000 individuals)
- Furneaux Island Group (> 40,000 pairs
- Forsyth, Passage and Gull islands (80,000 pairs)
- Phillip island (32,000 individuals).

Additionally, Betsy Island (Tasmania) has a population of 15,000 pairs, which is outside of the EMBA.

According to the NSW Department of Planning and Environment (DPI, 2019) approximately 25,000 pairs of little penguins nest on islands off the coast of NSW. The largest colonies are on the following islands, all of which are within the EMBA can be seen in Figure A-42.

- Montague Island
- Tollgate Island
- Brush Island.

The only known mainland breeding colony in NSW is in a secluded cove in the Manly area of Sydney Harbour which is also in the EMBA (DPI, 2019).The BIAs for little penguins within the EMBA is presented in Figure A-42.

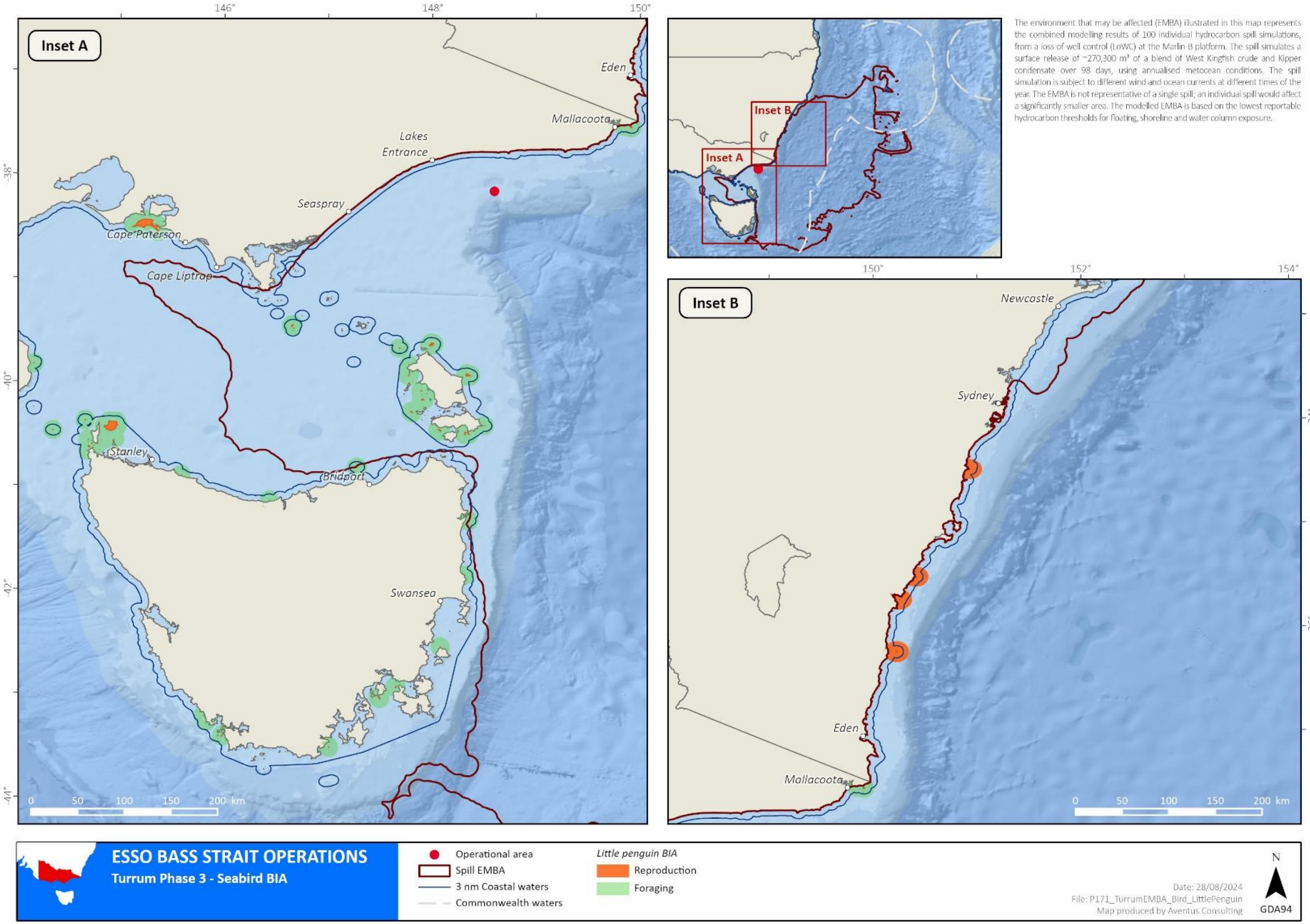

Figure A-42 Little penguin BIAs intersected by the EMBA

1.4.9.5 Orange-bellied parrot

The orange-bellied parrot (*Neophema chrysogaster*) is listed as critically endangered under the EPBC Act.

The species breeds in Tasmania during summer, migrates north across the Bass Strait in autumn and over-winters on the mainland. 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 P. , 1999).

The parrot's breeding habitat is restricted to southwest Tasmania (outside of the EMBA) see Figure A-43, where breeding occurs from November to mid-January mainly within 30km of the coast (Brown, Orange-bellied Parrot Recovery Plan., 1984). The species forage on the ground or in low vegetation (Brown, 1980) (Brown, 1984) (Loyn, 1986). During winter, on mainland Australia, orange-bellied parrots are found mostly within 3km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. 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*) (DELWP, 2016).

The range and migration route of the orange-bellied parrot are shown in Figure A-43

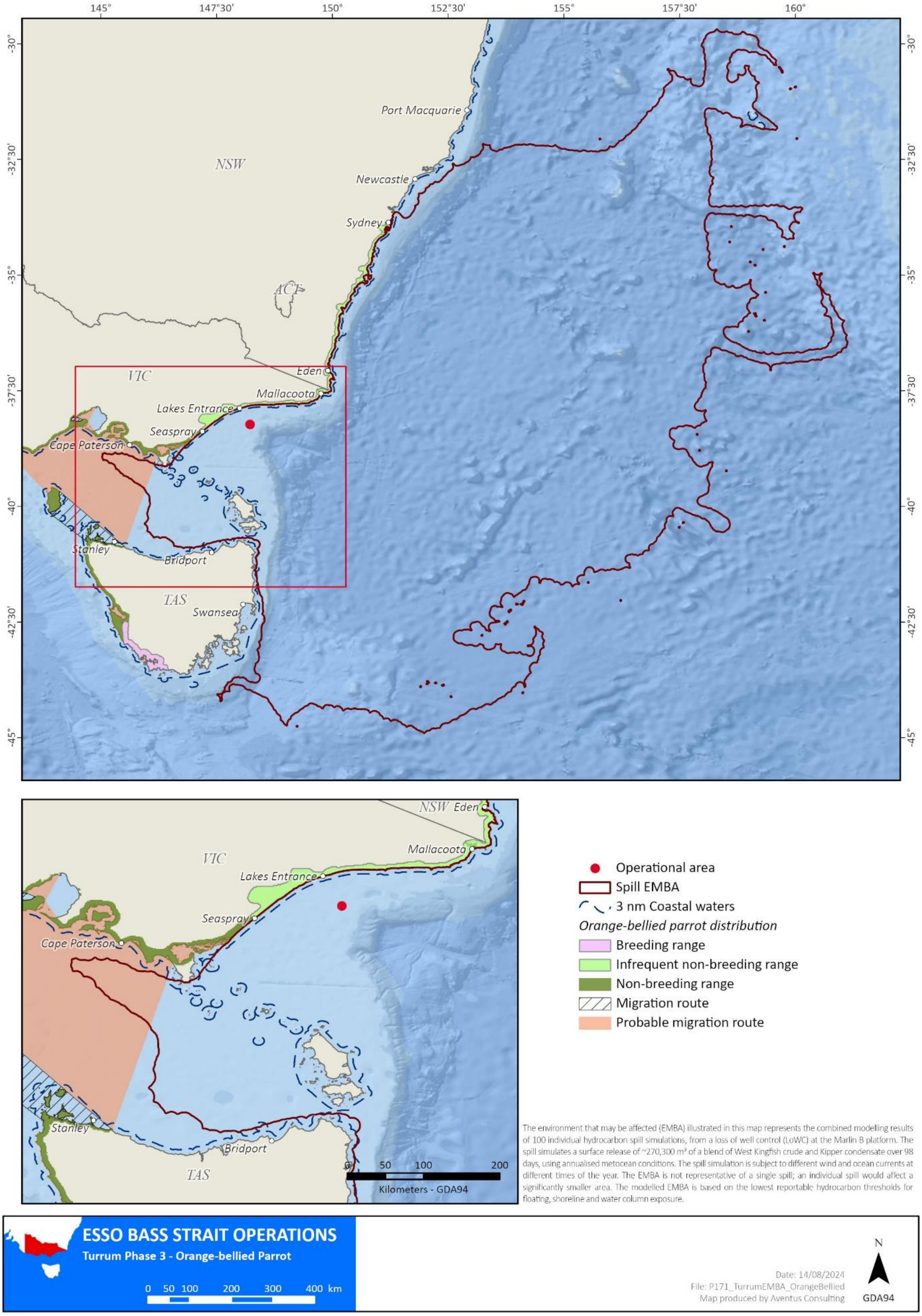

Figure A-43 The range and migration route of the orange-bellied parrot intersected by the EMBA

1.4.9.6 Shorebirds

This Section describes the shorebirds species detected by the PMST, see Table B- 2 for the extensive list:

- Plovers - There are several EPBC Act-listed plovers that may occur within the EMBA. Plovers are medium sized wading birds that have wide-ranging coastal habitats comprising estuaries, bays, mangroves, damp grasslands, sandy beaches, sand dunes, mudflats, and lagoons (Flegg, 2002), with roosting also taking place on sand bars and spits. Plovers feed on a range of molluscs, worms, crustaceans, and insects. Plovers (with the exception of the hooded and red-capped lovers) breed in Asia and the Artic region and are more likely to be present in Australia during summer, depending on the species. The hooded plover breeds in Australia and builds its nests in sandy oceanic beaches. The location of these nests presents the greatest threat to this species' population, as nests, eggs and chicks are vulnerable to predation and trampling (BirdlifeAustralia, 2023)
- Sandpipers - There are several EPBC Act-listed sandpiper species that may occur within the EMBA sandpipers breed in Europe and Asia and migrate to Australia during the southern summer. Sandpipers are small wader species found in coastal and inland wetlands, particularly in muddy estuaries, feeding on small marine invertebrates. Up to 3,000 sharp-tailed sandpiper and up to 1,800 curlew sandpipers are known to congregate to feed at the Gippsland Lakes. Curlew sandpipers breed in Siberia and migrate to Australia, arriving around September each year (DoE, 2015c). The species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects. Curlew sandpipers usually forage in water, near the shore or on bare wet mud at the edge of wetlands. The species is threatened by the sustained loss of intertidal mudflat habitat at key migration staging sites in the Yellow Sea (DoE, 2015c)
- Snipes - There are four EPBC Act-listed snipe species that may occur within the EMBA. These snipe species (other than the Australian painted snipe, which is endemic to Australia) are present during the southern hemisphere summer (breeding in Asia and Russia in the northern hemisphere summer). They are medium-sized waders that roost among dense vegetation around the edge of wetlands during the day and feed at dusk, dawn and during the night on seeds, plants, worms, insects, and molluscs (BirdlifeAustralia, 2023). There are few records of the pin-tailed and Swinhoe's snipe in Victoria, while the Australian painted snipe is known to occur at Mallacoota Inlet (outside of the EMBA). The nest of the Australian painted snipe is usually a scrape in the ground lined with twigs and stalks of grass. The species is threatened by the loss and degradation of wetlands, through drainage and diversion of water for agriculture and reservoirs (BirdlifeAustralia, 2023). Snipes are likely to be present within the EMBA during the summer
- Godwits - There are three EPBC Act-listed godwit species that may occur within the EMBA. Godwits are large waders that are found around all coastal regions of Australia during the southern hemisphere summer (breeding in Europe during the northern hemisphere summer), though the largest numbers remain in northern Australia. Godwits are commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand, or shell-grit where they forage on intertidal mudflats or sandflats, in soft mud or shallow water and occasionally in shallow estuaries (BirdlifeAustralia, 2023). They have been recorded eating annelids, crustaceans, arachnids, fish eggs and spawn and tadpoles of frogs, and occasionally seeds. The Nooramunga Marine and Coastal Park (within the EMBA) has recorded the largest concentrations of bar tailed godwit in southeastern Australia. Godwits are likely to be present within the EMBA during the summer
- Knots - The red and great knots are EPBC Act-listed species that may occur within EMBA. Both the red and great knots have a coastal distribution around the entire Australian coastline when it is present during the southern hemisphere summer (breeding in eastern Siberia in the northern hemisphere summer). The red knot is a medium-sized wader that prefers sandy beach, tidal mudflats and estuary habitats, where they feed on bivalve molluscs, snails, worms and crustaceans (BirdlifeAustralia, 2023). Lake Reeve has supported the largest concentration (5,000) of red knot recorded in Victoria
- Curlews - Two curlews (eastern and little) are listed under the EPBC Act. Curlews are medium-sized migratory birds that breed in the far north of Siberia and winters in Australasia. The eastern curlew is the world's largest shorebird and is widespread in coastal regions in the northeast and south of Australia, including Tasmania. It is commonly found on intertidal mudflats and sandflats where it uses its long beak to pick the surface and probes for crabs. Curlews are also found on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, and lagoons (DoE, 2015d). The status of the eastern curlew was amended from endangered to critically endangered in 2015 because research shows population decline

potentially caused by wetland reclamation in some areas of Asia. In Victoria, the main strongholds are in Corner Inlet (within the EMBA) and Western Port Bay (outside the EMBA), with smaller populations in Port Phillip Bay and scattered elsewhere along the coast. Eastern curlews are found on islands in Bass Strait and along the northwest, northeast, east and southeast coasts of Tasmania. Historically, sightings have been recorded in Bass Strait and depending on the time of year, curlews may be present in the EMBA (DoE, 2015c). The little curlew breeds in Siberia and is seen on passage through Mongolia, China, Japan, Indonesia and New Guinea. In Australia, the little curlew is a bird of coastal and inland plains of the north where it often occurs around wetlands and flooded ground. They often form large flocks, occasionally comprising thousands of birds and sometimes associate with other insectivorous migratory shorebirds.

1.4.10 Marine pests

It is widely recognised that marine pests can become invasive 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, 2007).

In the southeast marine region, 115 IMS have been introduced and 11 have been recognised as pests (NOO, Ecosystems - Nature's Diversity. The South-East Regional Marine Plan Assessment Reports. , 2002a). In NSW waters, six listed marine pest species occur (CoA, 2012). Several introduced species have become pests either by displacing native species, dominating habitats, or causing algal blooms. The following marine pests are found within the waters of the EMBA:

- caulerpa (Caulerpa taxifolia)
- European shore crab (*Carcinus maenas*)
- European fan worm (*Sabella spallanzanii*)
- Japanese goby (Tridentiger trigonocephalus)
- New Zealand screw shell (*Maoricolpus roseus*)
- Pacific oyster (*Crassostrea gigas*)
- Northern Pacific seastar (*Asterias amurensis*)
- dead man's fingers (Codium fragile ssp. fragile)
- cord grass (*Spartina anglica* and Spartina x townsendii sp.).

1.5 Cultural heritage values

Cultural heritage includes both tangible and intangible values, and the definition of cultural heritage has evolved in recent decades as non-tangible cultural heritage continues to develop. Non-tangible cultural heritage includes oral traditions, performing arts, social practices, rituals, festive events, knowledge, and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts (UNESCO, What is Intangible Cultural Heritage?, 2023). Tangible cultural heritage includes artefacts, monuments, a group of buildings and sites and museums that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific, and social significance. Cultural heritage also captures natural heritage such as culturally significant landscapes (UNESCO, 2009).

This Section discusses Indigenous and maritime heritage. World, National and Commonwealth heritage sites relevant to the EMBA can be seen in Sections 1.1.1, 1.1.2 and 1.1.3.

1.5.1 Indigenous

'Gunai/Kurnai' is the name of the Indigenous group who have inhabited the Gippsland region for at least 18,000 years (Ramahyuck, 2023). The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC, 2023) describe their Country as:

"The land, the rivers and the ocean, the people, and the stories, the past and the future. All of it is connected. All of it is important to us. Country heals us and connects us to our ancestors, our culture, and our history".

According to the Gunaikurnai Whole-of-Country Plan (GLaWAC, 2015) the Gunaikurnai people are recognised as Traditional Owners over approximately 1,330,000ha in Gippsland extending from west Gippsland near Warragul, east to the Snowy River, and north to the Great Dividing Range, and including 200m of offshore sea territory. The Gunaikurnai people also have interests and ancestral and historical connections to other places beyond this recognised area. They also describe Sea Country is equally important, with a huge diversity of marine life that supports rich tourism and fishing industries. Sea Country is discussed further in Section 1.5.1.2.

1.5.1.1 Indigenous Protected Areas

IPAs are an essential component of Australia's National Reserve System, which is the network of formally recognised parks, reserves, and protected areas across Australia, designed to protect the nation's biodiversity. IPAs protect cultural heritage into the future, and provide employment, education, and training opportunities for Indigenous people in remote areas. There are five IPAs that occur within the EMBA, on and around Flinders Island to the southwest as seen in Figure A-44. They are all important rookeries for mutton birds and important cultural resources for Tasmanian Aboriginal people.

Figure A-44 IPAs within the EMBA

1.5.1.2 Sea Country

Country is the term often used by Indigenous 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, is of particular importance for this activity, as the EMBA may extend into areas of known Sea Country.

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 & Isherwood, Protecting sea country: Indigenous people and marine protected areas in Australia, 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 & Isherwood, Protecting sea country: Indigenous people and marine protected areas in Australia, 2016). First Nations people see themselves as having responsibilities and rights across the land and sea boundaries that have been put in place over the last 200 years, this includes land that was once inundated by sea, and land that now lies beneath the sea (NOO, 2002b).

In April 2021, the Australian Government committed funding to the Sea Country IPA Program, under which grants will be provided to Indigenous organisations to expand existing IPAs and create new IPAs (DCCEEW, 2023f). The program seeks to increase the area of sea within IPAs in Australia. Ten Sea Country IPA consultation projects were announced in May 2022, including the Nanjit to Mallacoota Sea Country IPA consultation project, which extends from Corner Inlet to the Victoria/NSW border (Figure A-45) which is overlaps with the coastal waters of the EMBA. The GLaWAC has signed an agreement with the Australian Government to start the process of establishing the Sea Country IPA and is currently undertaking engagement with families and clans who may have an interest in participating in the development of the IPA (GLaWAC, 2023). The proposed Sea Country IPA area is illustrated in Figure A-45 and is located in coastal waters along the eastern coast of Victoria from east of Wilsons Promontory to Mallacoota, including the Gippsland Lakes and estuaries around Mallacoota (within the EMBA).

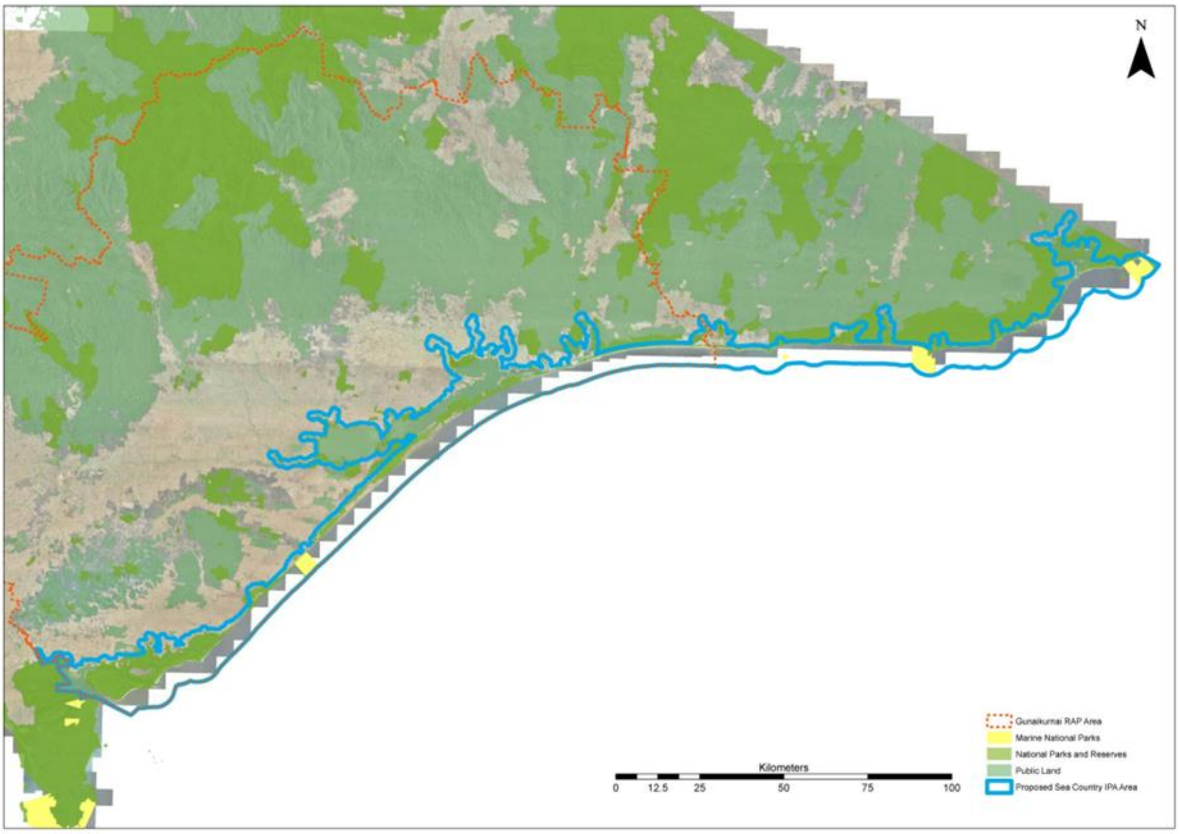

Figure A-45 Proposed Nanjit to Mallacoota Sea Country IPA

1.5.1.3 Native title

Non-exclusive Native Title rights and interests that exist over land and water in the determination area include:

- rights of access
- rights to use and enjoy the land
- rights to take resources from the land for non-commercial purposes
- rights to protect and maintain sites of importance within the determination area, and
- rights to engage in certain activities on the land (including camping, cultural activities, rituals, ceremonies, meetings, gatherings, and teaching about the sites of significance within the determination area).

These rights do not confer exclusive rights of possession, use and enjoyment of the land or waters. Native Title does not exist in minerals, petroleum, or groundwater.

The Gunaikurnai people hold Native Title over much of Gippsland. The Native Title determination area (Tribunal file no. VCD2010/001) covers approximately 45,000ha and extends from west Gippsland near Warragul, east to the Snowy River, and north to the Great Dividing Range, (Figure A-46). It also includes 200m of offshore sea territory between Lakes Entrance and Marlo. The area includes 10 parks and reserves that are jointly managed by the Victorian government and the Gunaikurnai people (NNTT, Native Title Determination Details - VCD2010/001

- Gunai/Kurnai People., 2010). The Gunaikurnai people have occupied, used, and managed the coastal land and sea environment along the coastline adjacent to the EMBA for many thousands of years. These include areas that were dry land before the current sea level stabilised about 5,000 years ago. During the last Ice Age approximately 25,000 years ago, coastlines were on average 125m lower than the present day (Umwelt, 2022). The Gunaikurnai peoples cultural and spiritual connection with these landscapes continues, even where evidence of previous occupation now lies beneath the ocean (GLaWAC, 2015).

In the past, coastal wetlands were highly productive areas for hunter-gatherer people, having a variety of habitats and species, so the majority of archaeological sites in Victoria are found within 1 km of the coast (LCC, 1993). Along the Gippsland coast, stone artefacts that have been found were mostly made from silcrete and quartz from the hinterland. Middens on offshore islands indicate that in the past, Aboriginal people from the area now known as Wilsons Promontory were likely to have visited (Jones R. a., 1979).

The Gunaikurnai people see no distinction between the land and the sea – it is all part of Country (GLaWAC, 2023). Sea Country can include parts of open ocean, beaches, land and freshwater on the coast. It encompasses all living things, beliefs, values, creation spirits and cultural obligations connected to an area (Adelaide, 2023). Water is of particular cultural significance to First Nations people as an integral part of songs, ceremonies, hunting and collecting, and other activities that bind people to their country and each other, including fishing (Smyth L. E., 2018).

Coastal environments are an integrated cultural landscape/seascape that is conceptually very different from the broader Australian view of land and sea. Protecting this cultural heritage is a major concern for First Nation people (NOO, 2002b).

There are no Native Title determinations in NSW within the EMBA, however a Native Title Claimant Application was registered by the South Coast People (NSD1331/2017) for an area covering the NSW south coast from the south of Sydney to Eden, including the coastal waters (NNTT, 2018) (Figure A-46). Indigenous places along the southern NSW coast include Barlings Beach, Ten Pelican Lake BrouBarunguba Aboriginal Place, Mystery Bay Fish Trap, Merriman Island and Bermagui Waterhole (OEH, 2019).

There are no Native Title determinations in Tasmania, although there are areas of Indigenous cultural significance and IPAs including Mt Chappell Island, Badger Island, Babel Island, Great Dog Island in the Ferneaux Group (DPMC, 2019).

Figure A-46 Native Title claims and determinations intersected by the EMBA

1.5.2 Maritime

A search of the National Shipwrecks Database which includes all known shipwrecks in Australian waters, identified hundreds of historic shipwrecks within the EMBA. Shipwrecks over 75 years old are protected within Commonwealth waters under the *Underwater Cultural Heritage Act 2018* (Cth).

In addition to the general protection provided to underwater heritage sites, the *Underwater Cultural Heritage Act 2018* (Cth) also provides that an area containing protected underwater heritage may be declared to be a protected zone. These zones may be established for several reasons including conservation, management or public safety considerations. There are 28 shipwrecks across Australia that have a protection zone in place (Figure A-47). The five protection zones within the EMBA are listed below:

- *Clonmel* (1841) – Victoria
- SS *Glenelg* (1900) – Victoria
- SS *Federal* (1901) – Victoria
- SS-*Alert* (1893) - Victoria
- *M-24* (Japanese Midget Submarine) (1942) – NSW.

Figure A-48 maps the location of known shipwrecks within the EMBA.

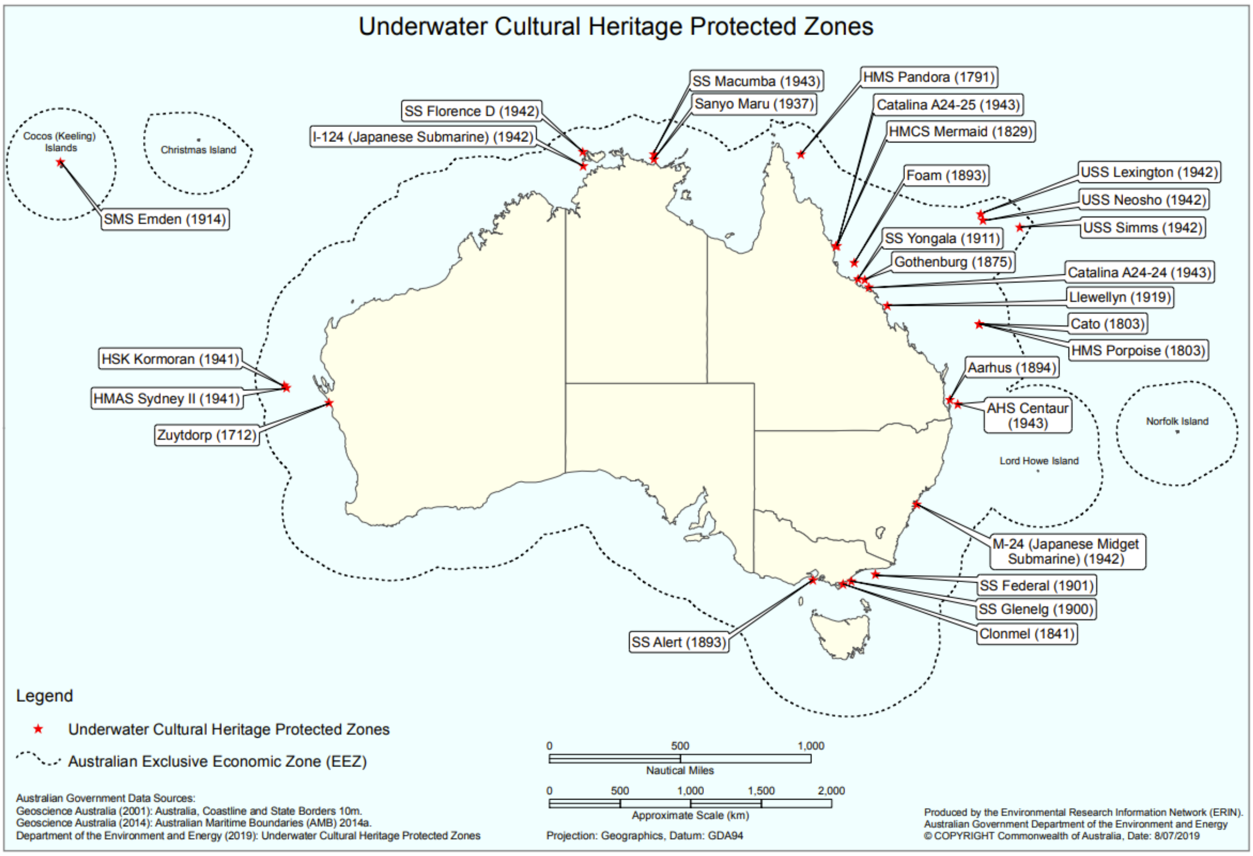

Figure A-47 Shipwreck protection zones within Australia (ERIN, 2019)

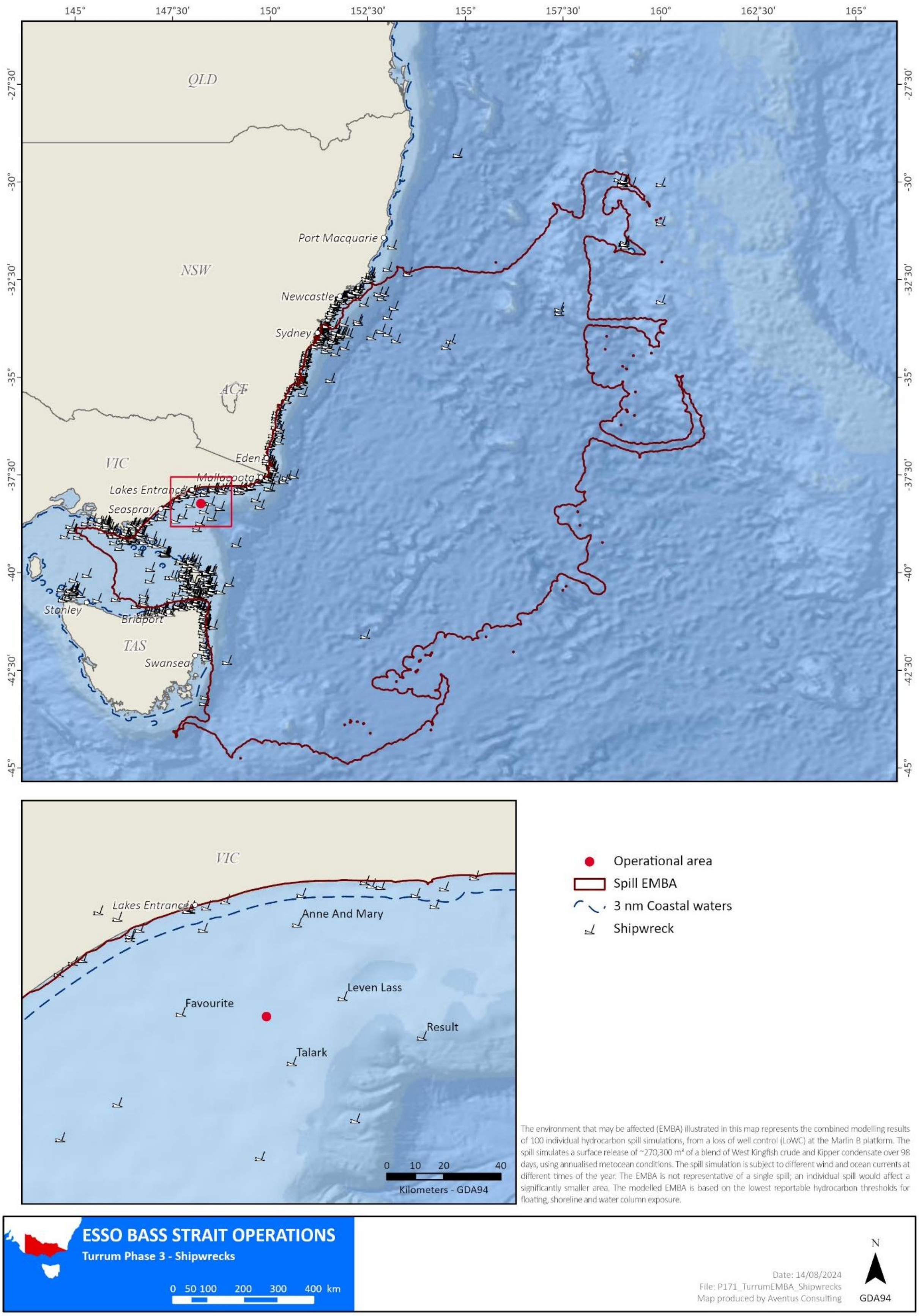

Figure A-48 Shipwrecks within the EMBA

1.6 Socio-economic environment

The social values of the environment can be defined in many ways and the relative importance of the values will vary depending on the perspective and interests of the people, groups or organisations affected (or otherwise). Social values, therefore, can be described in terms of conservation and biodiversity values, economic drivers, or cultural significance. This Section describes the values of the socio-economic and recreational activities in the EMBA.

1.6.1 Commercial fishing

Several Commonwealth, Victorian, Tasmanian and NSW commercial fisheries are licensed to operate in and around the EMBA. These are described in the following sections.

1.6.2 Commonwealth fisheries

There are 22 Commonwealth fisheries that operate within Australian waters. Commonwealth fisheries are managed by the Australian Fisheries Management Authority under the *Fisheries Management Act 1991* (Cth). Their jurisdiction covers the area of ocean from 3nm from the coast out to the 200nm limit (the extent of the Australian Fishing Zone). Table A-6 summarises the Commonwealth fisheries with jurisdiction to fish within the EMBA based on the latest fishery status reports 2023 (Butler I. P., 2023.). However, the maps within this Section contain fishing intensity data for 2020 as this is the latest data available.

Table A-6 Commonwealth fisheries within the EMBA

Commonwealth fishery	Target species	Description	Percentage overlap with the EMBA
BSCZSF	Commercial scallop (*pecten fumatus*)	The BSCZSF operates in the central area of Bass Strait between the Victorian and Tasmanian scallop fisheries (see below sections). In 2022, fishing was permitted throughout the area of the fishery, except in four scallop beds that were closed under the BSCZSF harvest strategy. Fishing intensity in 2022 was concentrated on beds northeast of Flinders Island. This was also reflected in the 2020 fishing intensity (Figure A-49). The 2022 fishing season attained a catch of 495t valued at AUD$1.4M. Thirty-five fishing permits and 10 fishing vessels were in active in 2022 and the primary landing ports were Beauty Point, Devonport, and Stanley (Tas); Apollo Bay, Lakes Entrance, Melbourne, Port Welshpool, Queenscliff, and San Remo (Vic). Scallop dredges are the fishing method used in this fishery.	48.55%
ETBF	Striped marlin (*kajikia audax*), Swordfish (*xiphias gladius*), albacore (*thunnus alalunga*), bigeye tuna (*thunnus obesus*) and yellowfin tuna (*thunnus albacares*)	The ETBF operates in the Exclusive Economic Zone and adjacent high seas, from Cape York Queensland to the Victoria – South Australian border, including waters around Tasmania and the high seas of the Pacific Ocean. Most of the catch in the fishery is taken with pelagic longlines, although a small quantity is taken using minor-line methods. The fishing intensity in 2022 was concentrated around the entire NSW coast and majority of the Queensland coast. Similarly in the 2020 season (Figure A-50). Catch for the 2022 fishing season was 4,032t valued at $34.7M, with 42 active vessels. The primary landing ports are Bermagui, Coffs Harbour and Ulladulla (NSW), Cairns, Mooloolaba and Southport (Queensland).	20.68%
SPF	Blue mackerel (*scomber australasicus*), jack mackerel (*trachurus declivis*), redbait (*emmelichthys nitidus*) and Australian sardine (*sardinops sagax*)	The SPF extends from southern Queensland to southern Western Australia. The fishery includes purse-seine and midwater trawl fishing methods. The maximum area fished for the 2022-23 season was along the far eastern coast of Victoria and some areas along the NSW coast. Similarly, to 2020, however the eastern coast of Tasmania was also fished in 2020 (Figure A-51). Catch for the 2022-2023 fishing season was 21,080t with no value assigned due to confidentiality. 33 fishing permits and six vessels were active in the 2022-23 fishing season, with the primary landing ports being Eden and Ulladulla (NSW).	22.79%

Commonwealth fishery	Target species	Description	Percentage overlap with the EMBA
SESSF	See Commonwealth Trawl Sector (CTS), SHS, SGSHS and East Coast Deepwater Trawl Sector (ECDTS)	The SESSF is a multisector, multi-gear and multispecies fishery, targeting a variety of stocks. The management area covers almost half the area of the Australian Fishing Zone and spans both Commonwealth waters and the waters of several Australian states under Offshore Constitutional Settlement arrangements. The CTS, SHS and the ECDTS all have jurisdiction to fish within the EMBA (see Figure A-52) and are described below.	22.95%
CTS	Blue grenadier (*Macruronus novaezelandiae*), tiger flathead (*Neoplatycephalus richardsoni*), orange roughy, pink ling and eastern school whiting (Based on main species landed in 2022-23 fishing season)	The CTS extends south from Barrenjoey Point in northern NSW to east of Kangaroo Island, South Australia. The CTS and the SHS are major domestic sources of fresh fish for the Sydney and Melbourne markets. The CTS predominantly uses demersal otter trawl (Figure A-53) with fishing intensity being saturated around eastern Victoria for the 2022 - 23 season and Danish-seine fishing methods (Figure A-54) with fishing intensity being saturated around eastern Victoria and eastern Tasmania for both the 2022 - 23 season and 2020 season. Features and statistics for the CTS and the SHS are combined, during the 2022-23 fishing season the sectors attained a total catch of 13,381t, however, at the time of the publication the value of the catch was not available. There were 31 trawl vessels and 18 Danish-seine active vessels during the 2021-22 fishing season. Eden, Sydney and Ulladulla (NSW), Hobart (Tas), Lakes Entrance and Portland (Vic) are the primary landing ports.	47.4%
SHS	Blue grenadier (*Macruronus novaezelandiae*), tiger flathead (*Neoplatycephalus richardsoni*), orange roughy, pink ling and eastern school whiting (Based on main species landed in 2022 - 23 fishing season)	The SHS extends around southeastern Australia to the border between South Australia and Western Australia (Figure A-55). The SHS uses a variety of longline and dropline hook fishing methods, some of which are automated. The maximum area fished in the 2022 - 2023 and 2020 occurred in eastern and western Victoria and along the coast of Tasmania (excluding the northern coast) (Figure A-55). See the CTS for the catch and value information during the 2022 - 23 fishing season. There were 12 scalefish hook active vessels during the 2022 - 23 fishing season. Eden, Sydney and Ulladulla (NSW), Hobart (Tasmania), Lakes Entrance and Portland (Victoria) are the primary landing ports.	25.74%

Commonwealth fishery	Target species	Description	Percentage overlap with the EMBA
SGSHS	Gummy shark (*Mustelus antarcticus*)	Most fishing in the SGSHS using nets occurs in Bass Strait, while most fishing using hooks occurs off South Australia. The SGSHS uses demersal gillnet and demersal longline to target gummy shark (*Mustelus antarcticus*) although, sawsharks (*Pristiophorus cirratus and P. nudipinnis*) and elephantfish (*Callorhinchus milii*) are caught as byproducts. The shark gillnet sector fishing intensity for 2022 - 2023 was saturated in eastern Victoria and North east Tasmania, similarity in 2020, however central bass strait was also fished (Figure A-56). The hook sector maximum area fished in the 2022 - 23 season was in eastern and western Victoria and majority of the Tasmanian coast. However, during the 2020 season fishing intensity was saturated in northeast tasmainaina between the mainland and Flinders Island (Figure A-57). During the 2022 - 23 fishing season the SGSHS attained a total catch of 2,080t, however, at the time of the publication the value of the catch was not available.	24.05%
ECDTS	Alfonsino (*beryx splendens*)	The ECDTS is located beyond the 4,000m isobath of the continental margin off eastern Australia (Figure A-52). The ECDTS began as an exploratory fishery in the early 1990s, primarily taking small quantities of orange roughy (*Hoplostethus atlanticus*) and other deepwater species near Lord Howe Rise. Since 2000, the fishery has targeted mostly alfonsino *(beryx splendens*). There was no effort in the fishery between 2013 – 14 and 2017 –1 8, and 2020 – 2023. The most recent trawl hours were reported in 2018 - 19 (9 hours). The primary landing ports were formerly Sydney and Brisbane.	15.79%
SBTF	SBT	The SBTF spans the Australian Fishing Zone. Young fish (1 – 4 years of age) move from the spawning ground in the northeast Indian Ocean into the Australian Exclusive Economic Zone and southwards along the West Australian coast. Since 1992, most of the Australian catch has been taken by purse seine, targeting juvenile SBT (2 – 4 years of age) in the GAB. This catch is transferred to aquaculture farming operations off the coast of Port Lincoln, South Australia, where the fish are grown to a larger size to achieve higher market prices. The fishing methods used by the SBTF include purse seine, pelagic longline and minor line. The fishing intensity for the SBTF fishery was saturated along the south eastern coast of NSW in the 2021 - 22 season, similarly in the 2020 season (Figure A-58).	9.09%

Commonwealth fishery	Target species	Description	Percentage overlap with the EMBA
		During the 2022 fishing season attained 5,972t of catch valued at $35.45 million and 85 fishing permits were present along with 30 active vessels. The primary landing port is Port Lincoln (South Australia).	
SSJF	Gould's squid (*nototodarus gouldi*)	The SSJF is located off NSW, Victoria, Tasmania and South Australia, and in a small area of oceanic waters off southern Queensland. The fishery typically operates at night in continental-shelf waters between depths of 60m and 120m using a single-method (jigging). The maximum area fished during the 2022 season was in western and eastern Victoria as well as along the north easter and eastern coast of Tasmania. However, in the 2020 fishing season the maximum area fished was situated in western Victoria, central bass straight and majority of the waters off Tasmania (Figure A-59). During the 2022 fishing season the SSJF had six active vessels attaining 394t of catch valued at $1.86 million. The primary landing ports are Triabunna (Tas), Queenscliff, Portland and Apollo Bay (Vic).	28.22%

Source: (Butler I. P., 2023.)

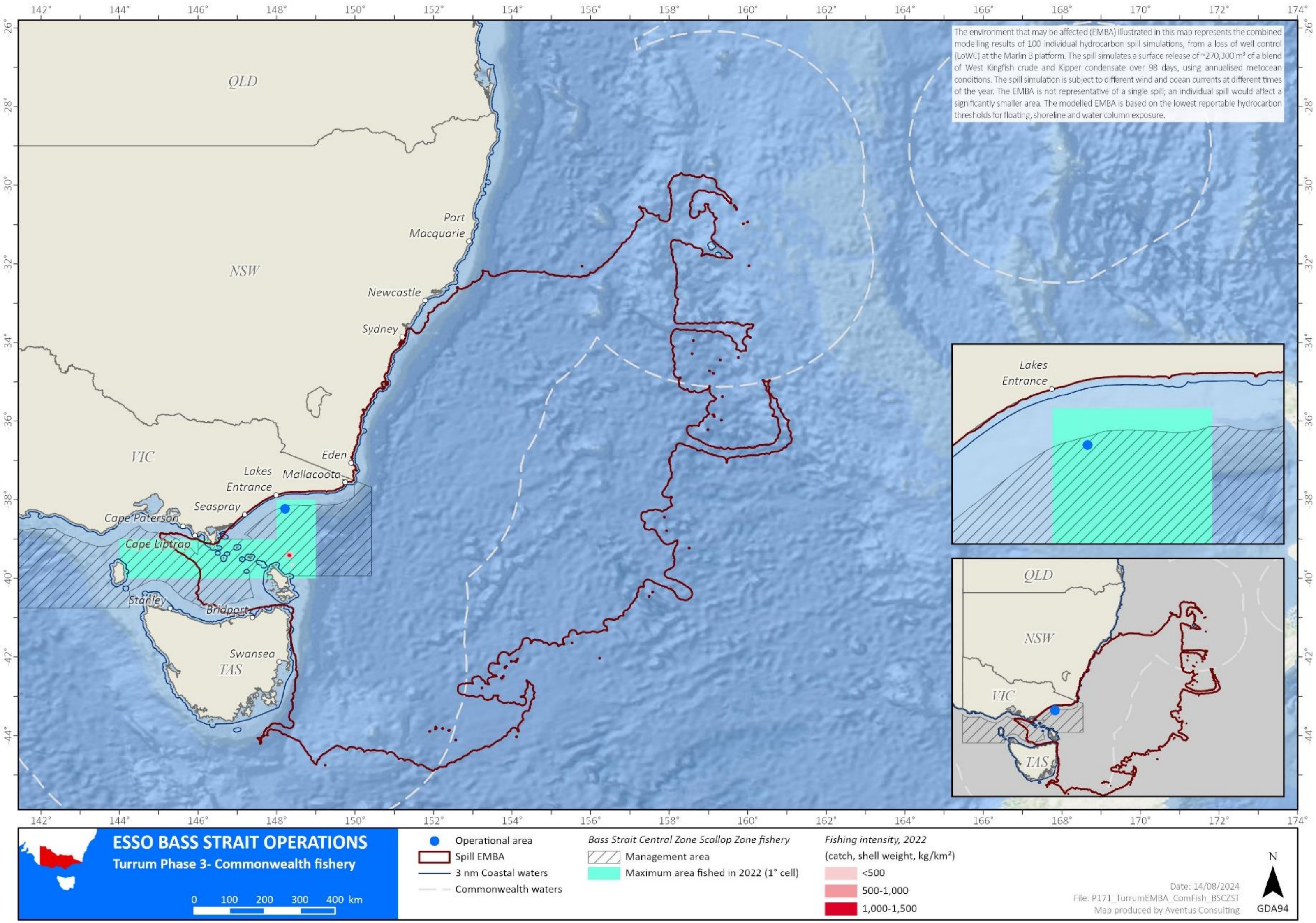

Figure A-49 BSCZSF jurisdiction and fishing intensity (2022 season) intersected by the EMBA

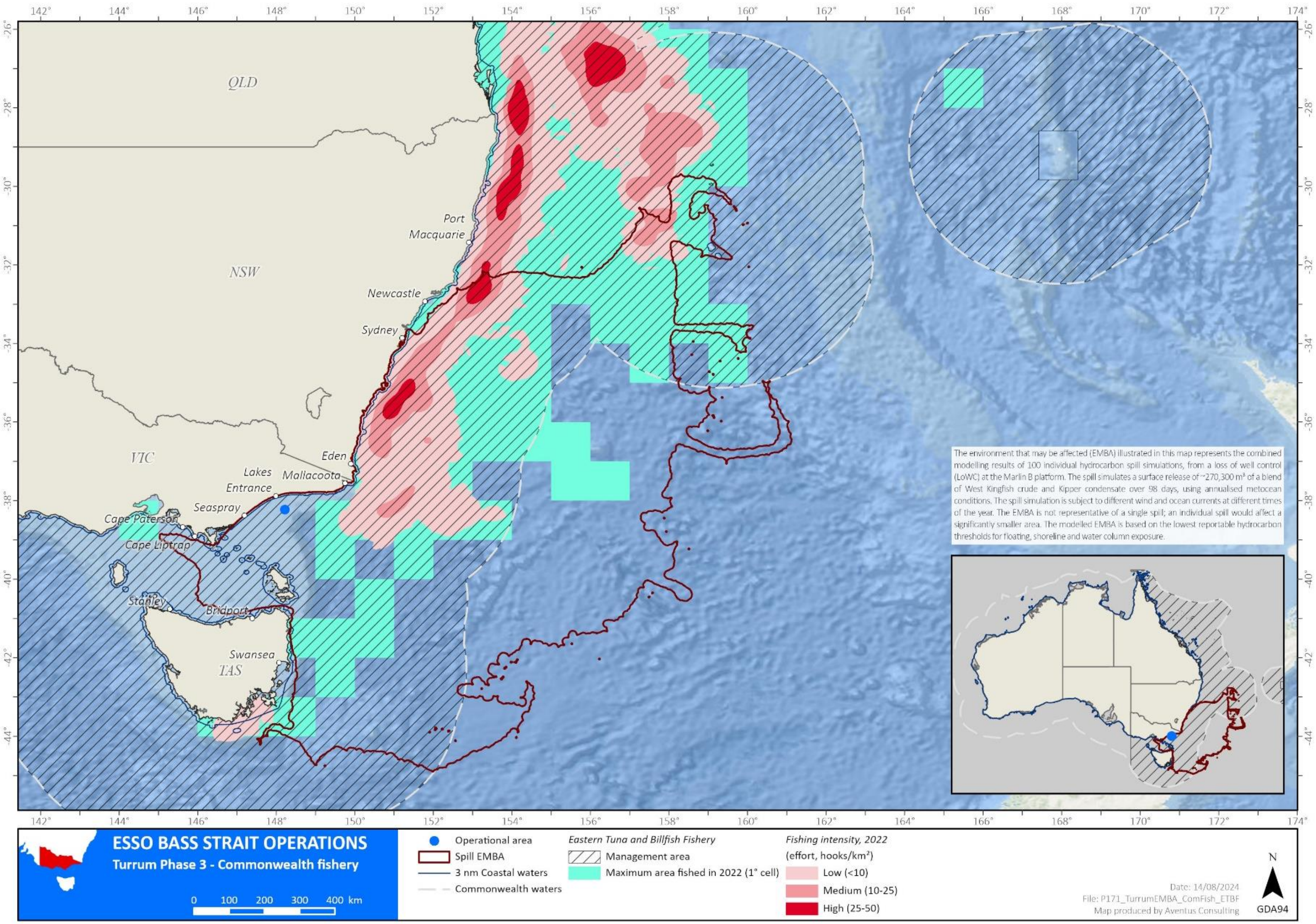

Figure A-50 ETBF jurisdiction and fishing intensity (2022 season) intersected by the EMBA

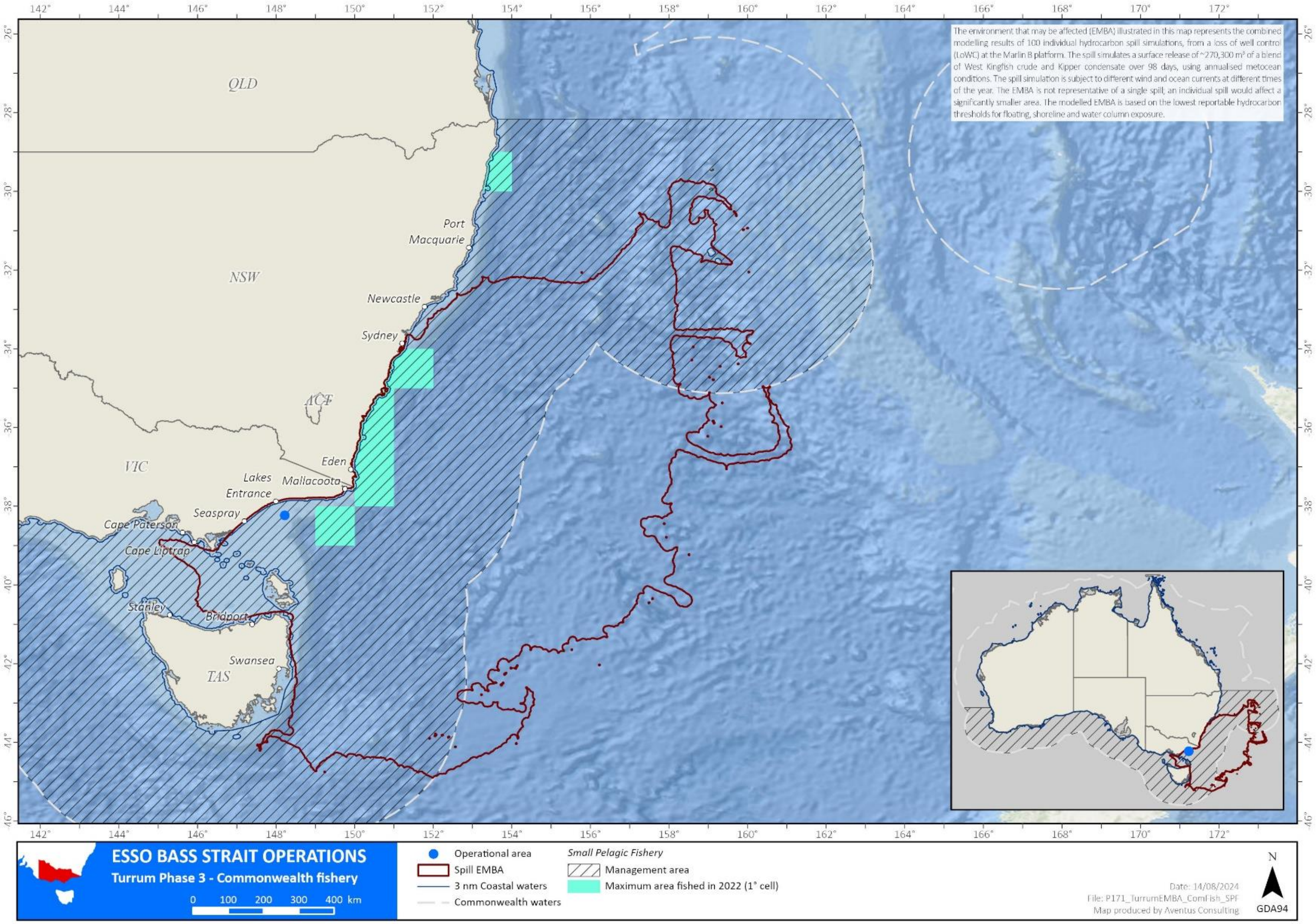

Figure A-51 SPF jurisdiction and fishing intensity (2022 season) intersected by the EMBA

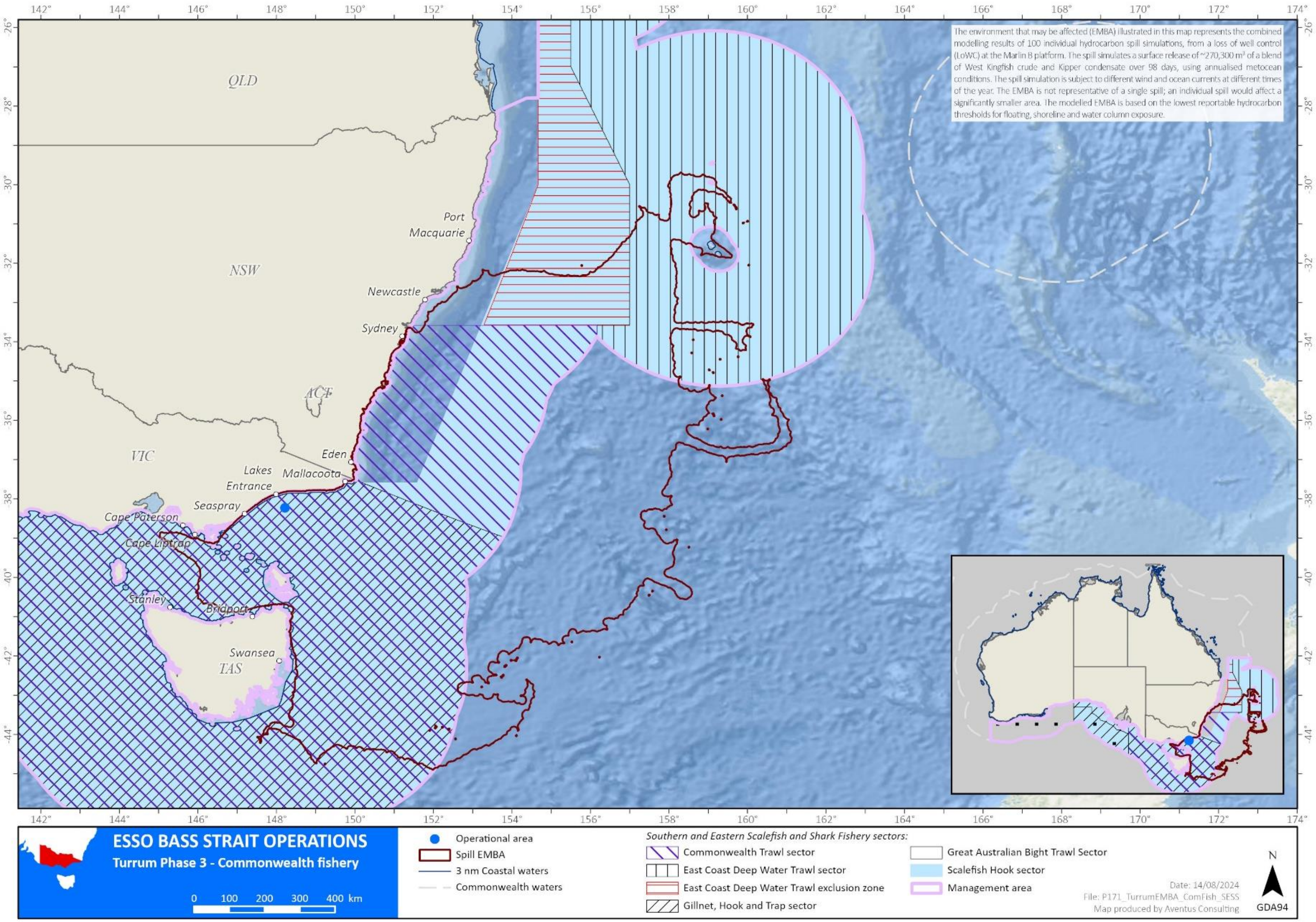

Figure A-52 SESSF fishery sector zones intersected by the EMBA

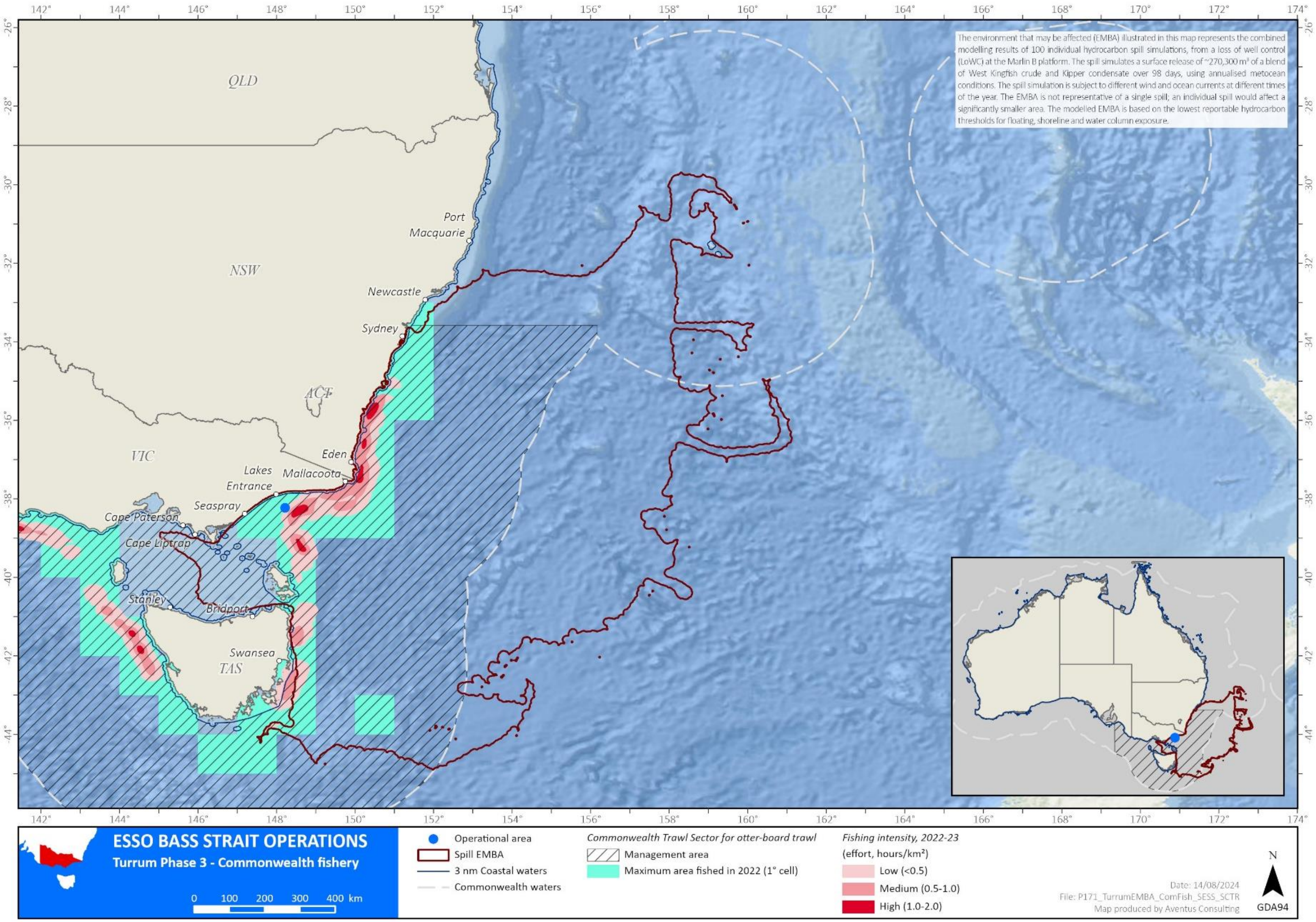

Figure A-53 SESSF CTS otter-board jurisdiction and fishing intensity (2022 - 23 season) intersected by the EMBA

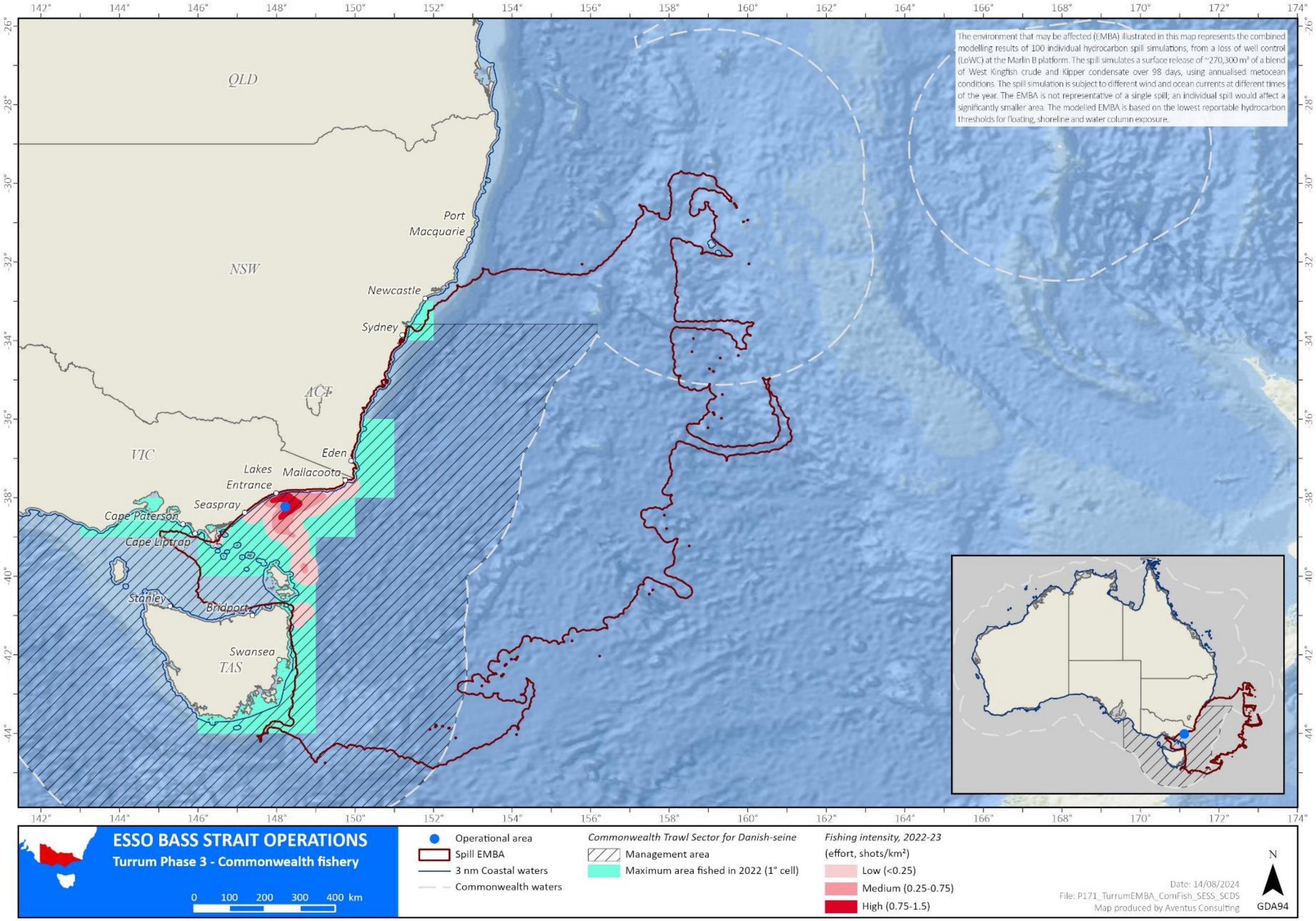

Figure A-54 SESSF CTS Danish-seine jurisdiction and fishing intensity (2022 - 23 season) intersected by the EMBA

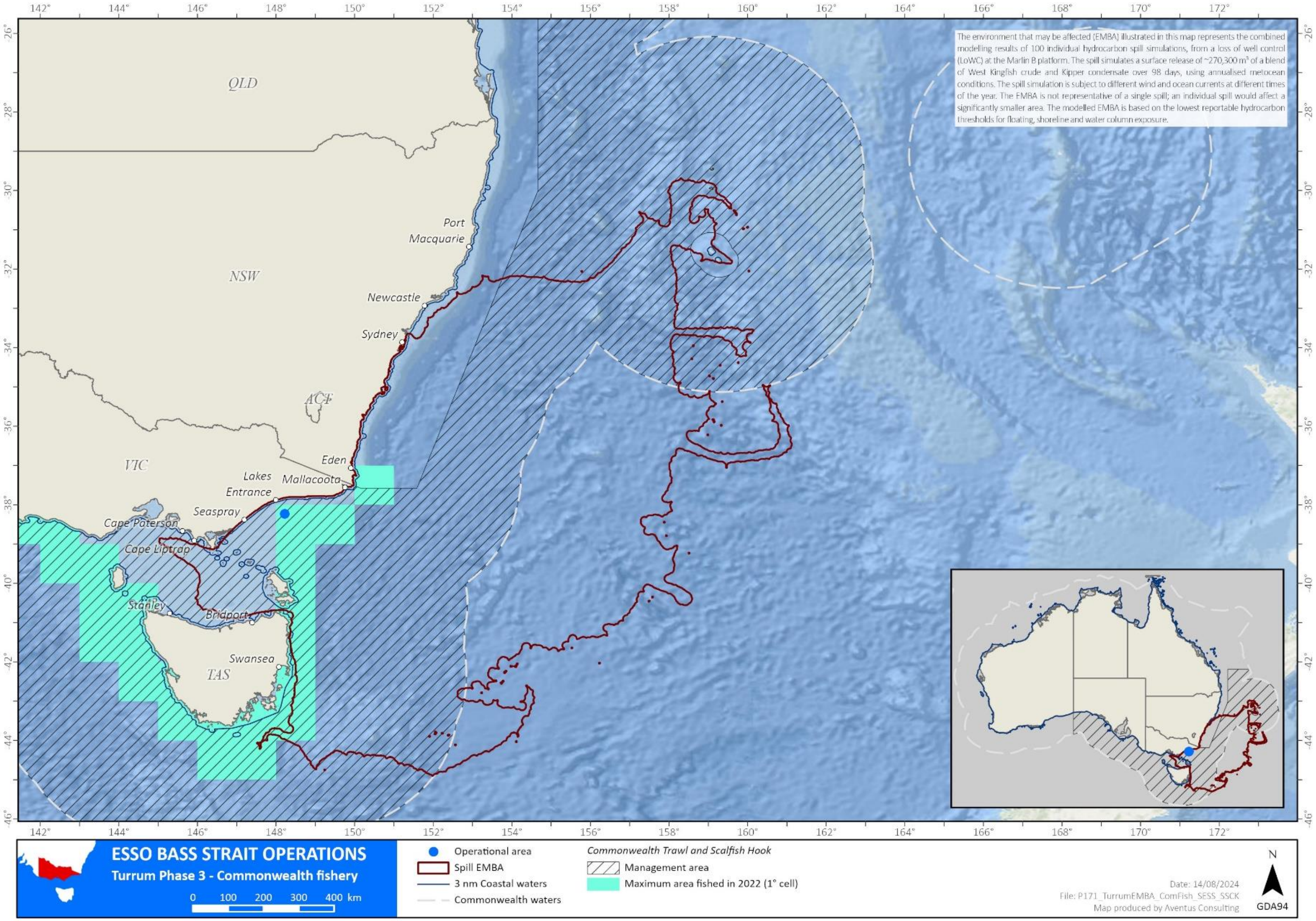

Figure A-55 SHS jurisdiction and fishing intensity (2022 season) intersected by the EMBA

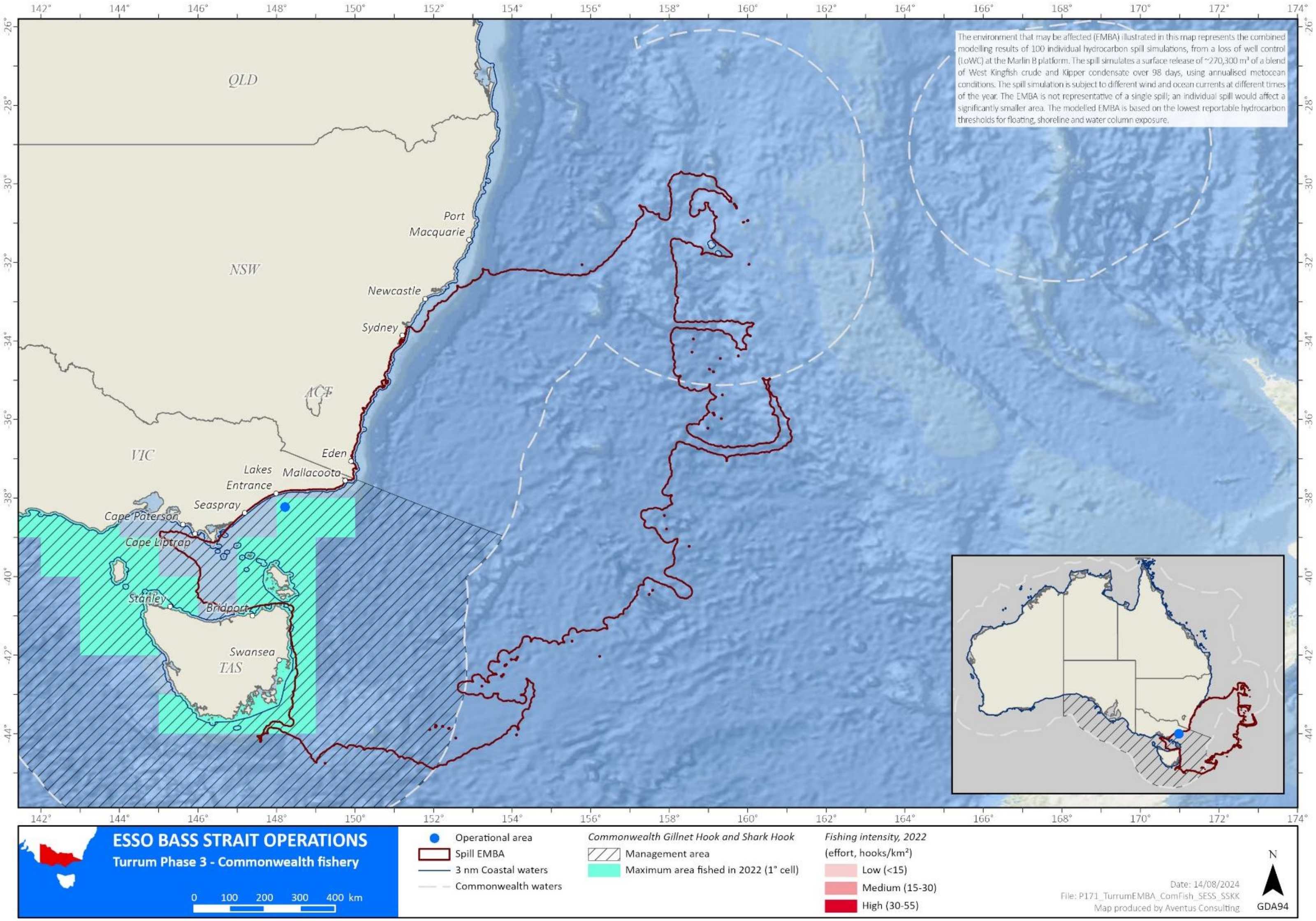

Figure A-56 SESSF SGSHS gillnet jurisdiction and fishing intensity (2022 season) intersected by the EMBA

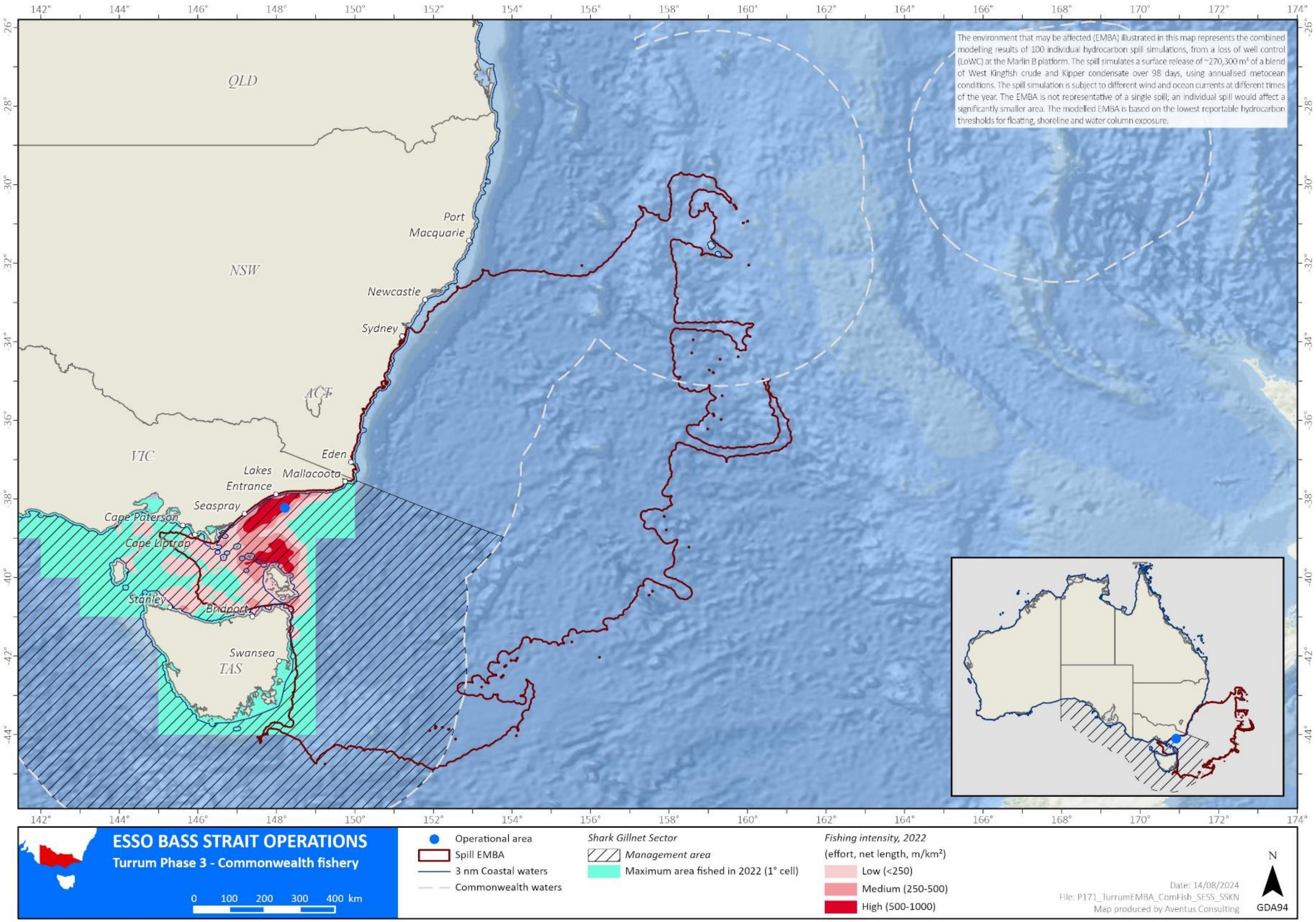

Figure A-57 SESSF SGSHS hook jurisdiction and fishing intensity (2022 season) intersected by the EMBA

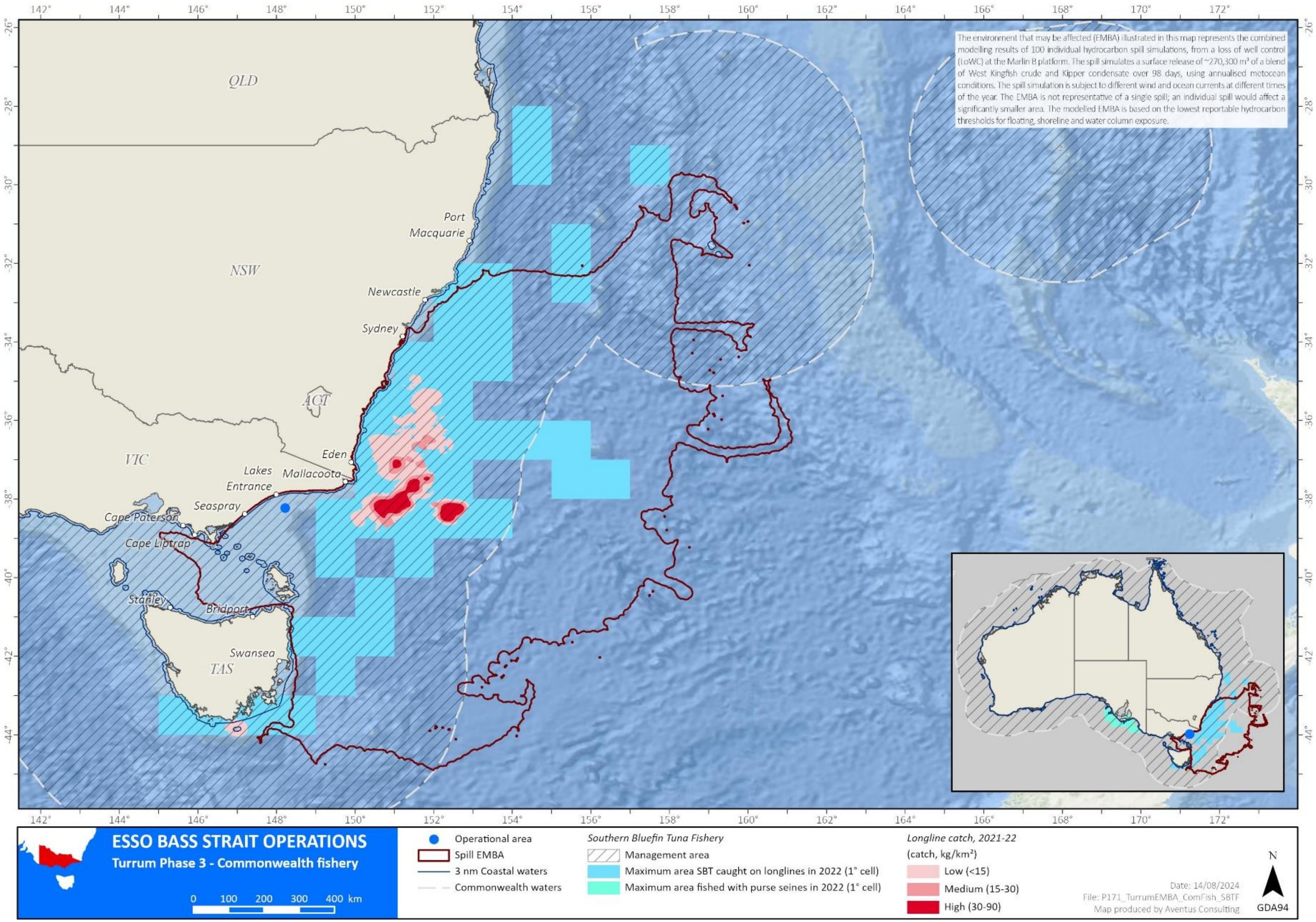

Figure A-58 SBTF jurisdiction and fishing intensity (2021 - 22 season) intersected by the EMBA

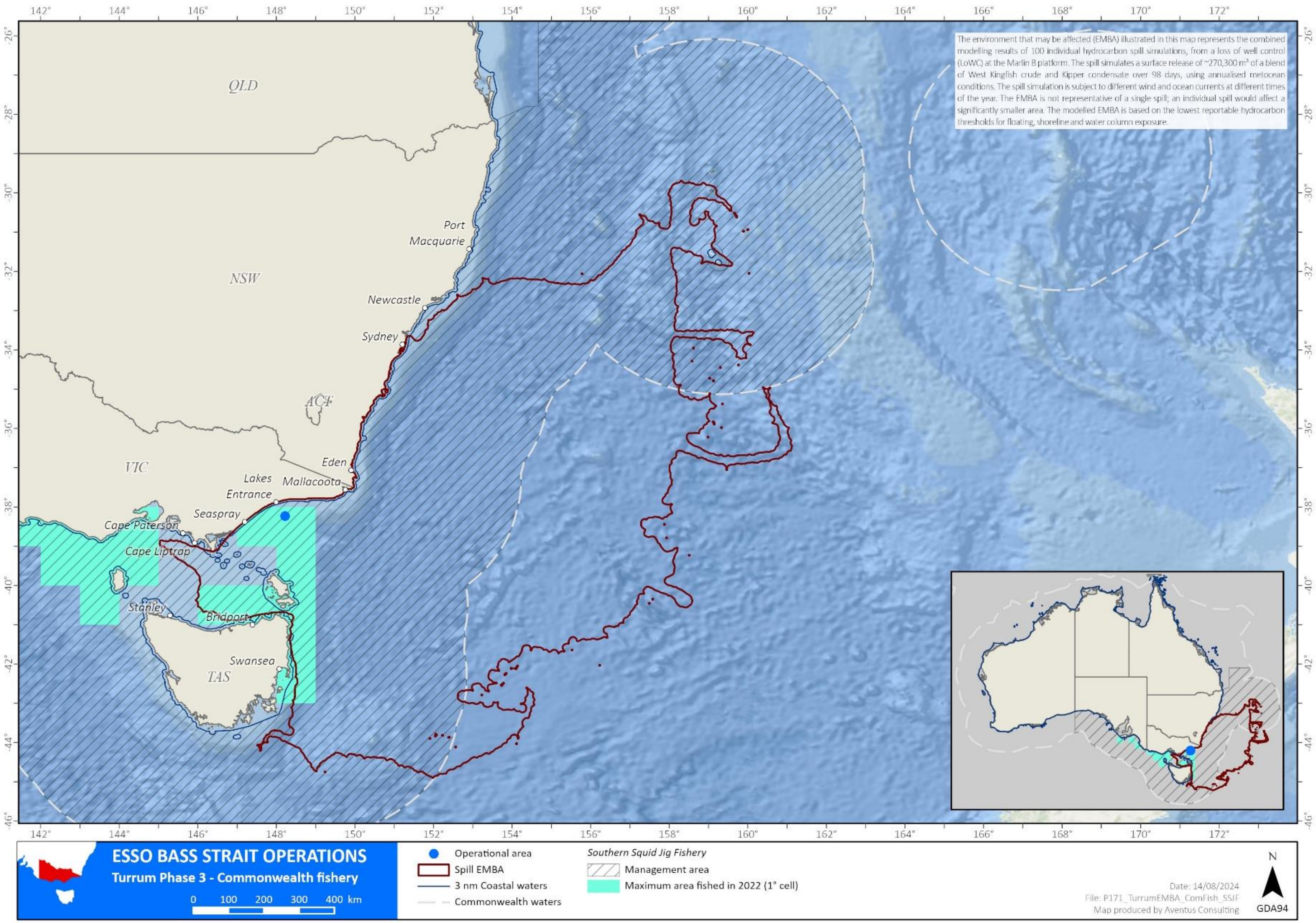

Figure A-59 SSJF jurisdiction and fishing intensity (2022 season) intersected by the EMBA

1.6.3 *Victorian fisheries*

Victorian-managed commercial fisheries with jurisdiction to fish in the waters of the EMBA are described in Table A-7.

Table A-7 Victorian managed fisheries within the EMBA

Victorian fishery	Target species	Description	Percentage overlap with the EMBA
Abalone fishery (Figure A-60)	Blacklip abalone (*Haliotis rubra*) is the primary target, with greenlip abalone (*H. laevigata*) taken as a bycatch.	The abalone fishery is one of Victoria's most valuable commercial fisheries that started in 1962. Almost all catch is exported to international markets, predominately in Asia. Abalone are caught along most of the Victorian coastline. Abalone are collected by divers (generally no greater than 30m deep) who use an iron bar to prise it from the rocks. The divers can stay under water for long periods by using hookah gear.	46.48%
Eel fishery	Short-finned eel (*Anguilla australis*) Long-finned eel (*Anguilla reinhardtii*)	Eel are harvested in Victorian coastal river basins south of the Great Dividing Range. Short-finned eels are found across the State, while long-finned eels are only found in eastern Victoria.	N/A
Giant crab fishery (Figure A-61)	Giant crabs (*pseudocarcinus gigas*)	The giant crab fishery is a small, limited entry fishery affiliated with the rock lobster fishery. Fishers target giant crabs using baited rock lobster pots.	46.12%
Pipi fishery (Figure A-62)	Pipi (*donax deltoides*)	The pipi fishery zone covers the entire victorian coastline, excluding the intertidal zone of Port Phillip Bay, marine national parks, and sanctuaries where shellfish cannot be harvested. Pipi's are found in habitats with high energy surf areas and sandy beaches. The known areas of harvestable quantities of pipi are beaches in Discovery Bay and surrounds in the west, and in Venus Bay and surrounds in the east.	55.69%
Rock lobster fishery (Figure A-63)	Southern rock lobster (*jasus edwardsii*)	The fishery is divided into two separately managed zones: eastern and western. The eastern zone extends west from the NSW border to Apollo Bay; the western zone extends from Apollo Bay west to the border with South Australia. The main ports in the eastern zone are Queenscliff, San Remo and Lakes Entrance.	41.86%

Victorian fishery	Target species	Description	Percentage overlap with the EMBA
		Rock lobster is Victoria's second most profitable fishery after abalone. Southern rock lobsters are found to depths of 150m, with most of the catch coming from inshore waters less than 100m deep.	
Scallop fishery (Figure A-63)	Commercial scallop (*pecten fumatus*)	The Victorian scallop fishery extends 20nm from the high tide water mark of the entire Victorian coastline (excluding bays and inlets where commercial scallop fishing is prohibited). Highest fishing effort is concentrated in the eastern waters of the state, with most vessels launching from Lakes Entrance and Port Welshpool.	45.10%
Octopus fishery (Figure A-64)	Primarily pale octopus (*Octopus pallidus)* however, Maori octopus (*Macroctopus maorum)* and gloomy octopus (*Octopus tetricus*) may also be taken	This fishery is the newest addition to the Victorian fisheries, commencing in 2020. The only area the fishery operates in is the eastern zone extending from Seaspray to the Victorian/NSW border and out to 20nm offshore, except for marine reserves. Octopus fishing in the central and western zones is less established and is being managed by the Victorian Fisheries Association through exploratory, temporary permits.	45.45%
Wrasse fishery (Figure A-65)	Primary: Bluethroat wrasse (*Notolabrus tetricus*) purple wrasse (*N. fucicola*) Other: Rosy wrasse (*Pseudolabrus psittaculus*) senator wrasse (*Pictilabrus laticlavius*) southern Maori wrasse	The commercial fishery extends along the entire length of the Victorian coastline and out to 20nm offshore, except for marine reserves. Most wrasse is harvested by hook and line although commercial rock lobster fishers who also hold a commercial wrasse licence can keep those fish that they catch in their rock lobster pots.	51.44%

Victorian fishery	Target species	Description	Percentage overlap with the EMBA
	(*Ophthalmolepis lineolatus*)		
Sea urchin fishery (Figure A-66)	White sea urchin (*Heliocidaris erythrogramma*) black, long-spined sea urchin (*Centrostephanus rodgersii*)	The sea urchin fishery comprises of four individual management zones. The central zone covers Victorian waters from Hopkins River to Lakes Entrance. The eastern zone extends from Lakes Entrance to the NSW border. The target species are the white sea urchin (*Heliocidaris erythrogramma*) and the black, long-spined sea urchin (*Centrostephanus rodgersii*). The sea urchin is usually collected by hand by divers. Currently, sea urchin will only be harvested in eastern Victoria, primarily out of Mallacoota, and in Port Phillip Bay.	57.52%
Ocean (general) fishery	A range of fish including salmon, snapper, whiting, trevally, mackerel and gummy shark. As well as calamari and rays.	This fishery jurisdiction is the entire Victorian catch and effort cells, excluding bays and inlets. Haul seine gears, multi-filament mesh nets, non-shark monofilament mesh nets, hand lines, hand squid jigs, longlines, drop lines and troll lines are all used.	62%
Trawl (inshore)	A range of fish species including flathead, whiting and mackerel as well as eastern king prawns, eastern school pawns, bug, sand crab and octopus.	This fishery jurisdiction is also the entire Victorian catch and effort grids, excluding bays and inlets. Trawling is the primary fishing method used.	62%

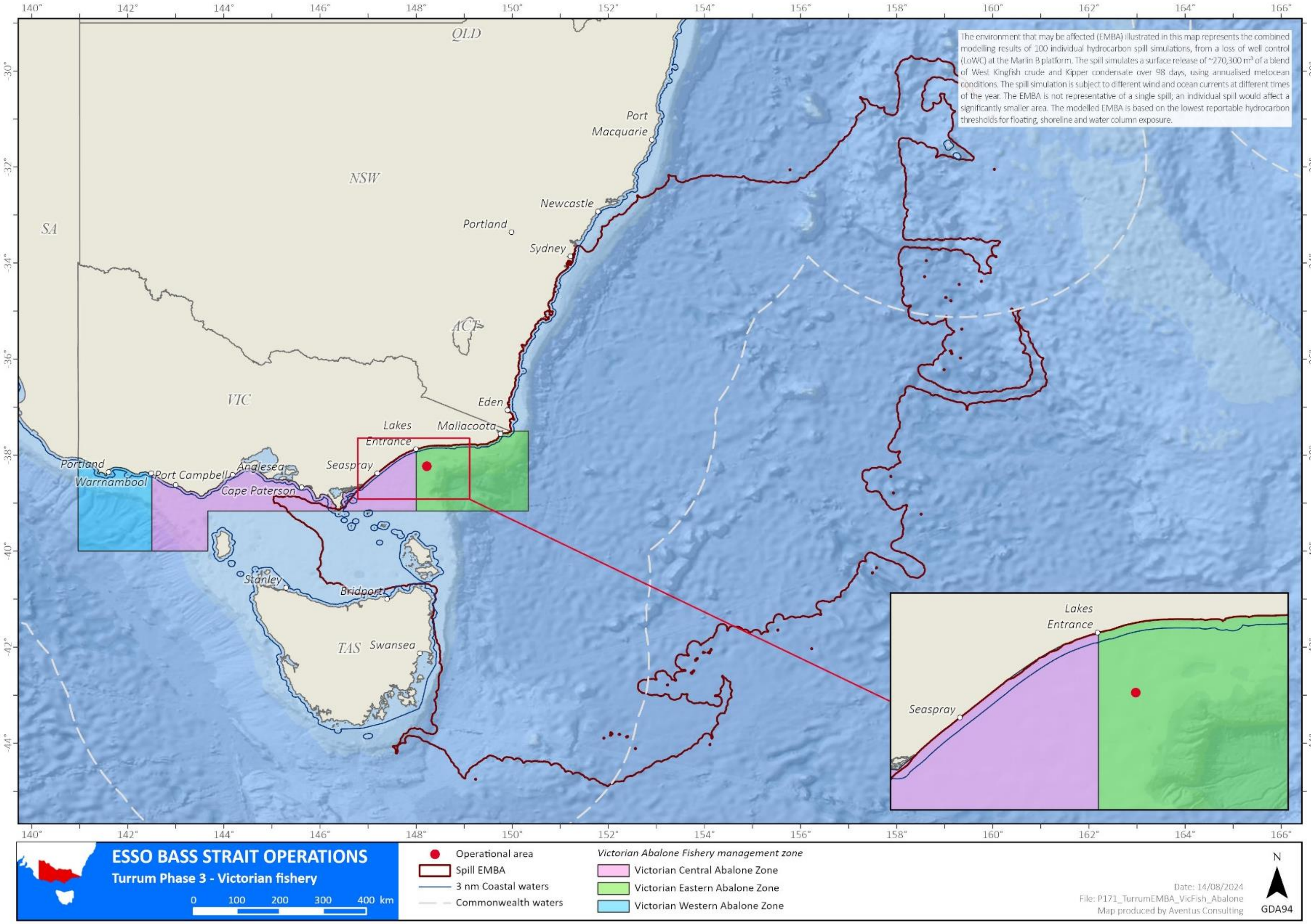

Figure A-60 Victorian abalone fishery jurisdiction intersected by the EMBA

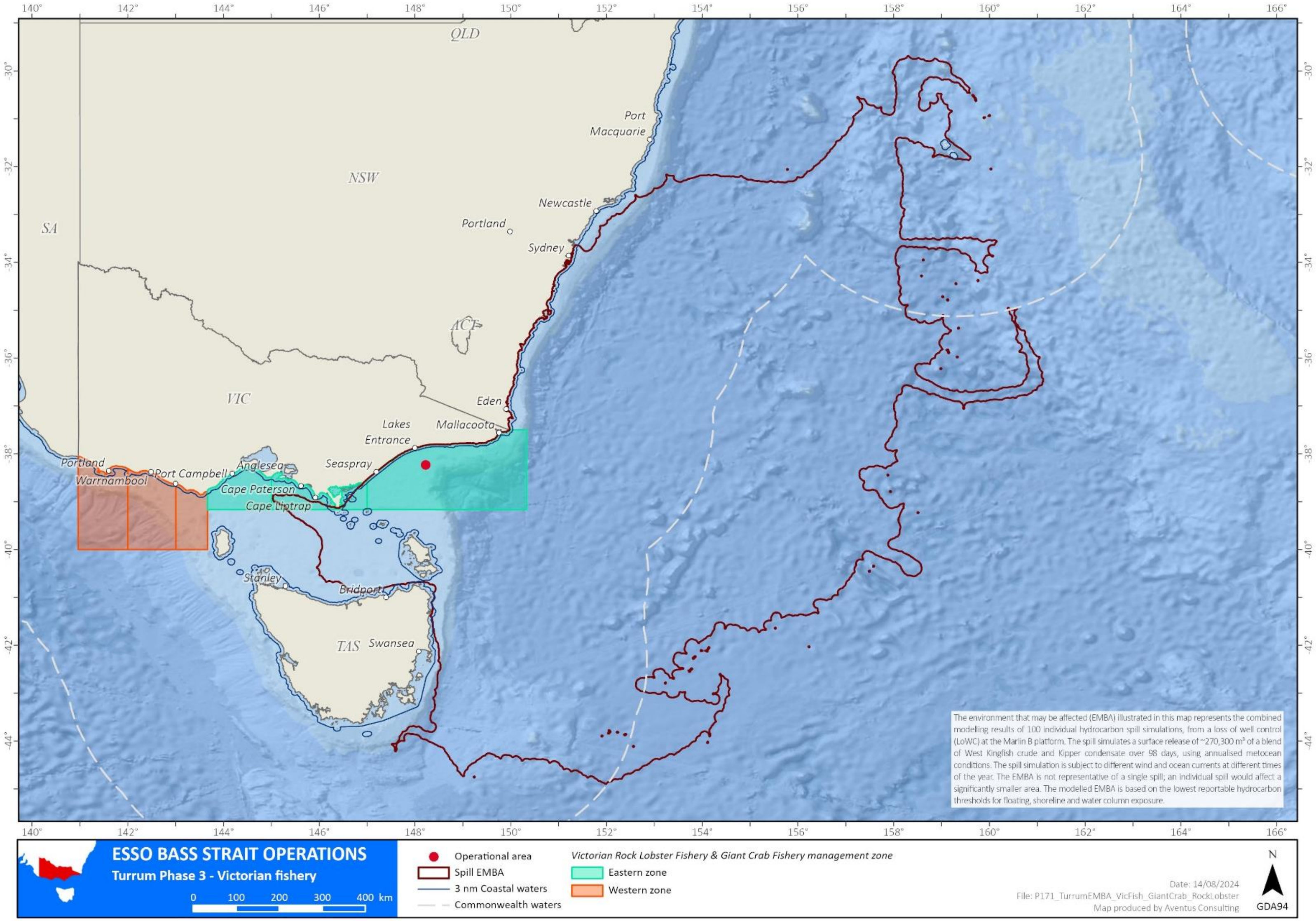

Figure A-61 Victorian rock lobster and giant crab fishery jurisdiction intersected by the EMBA

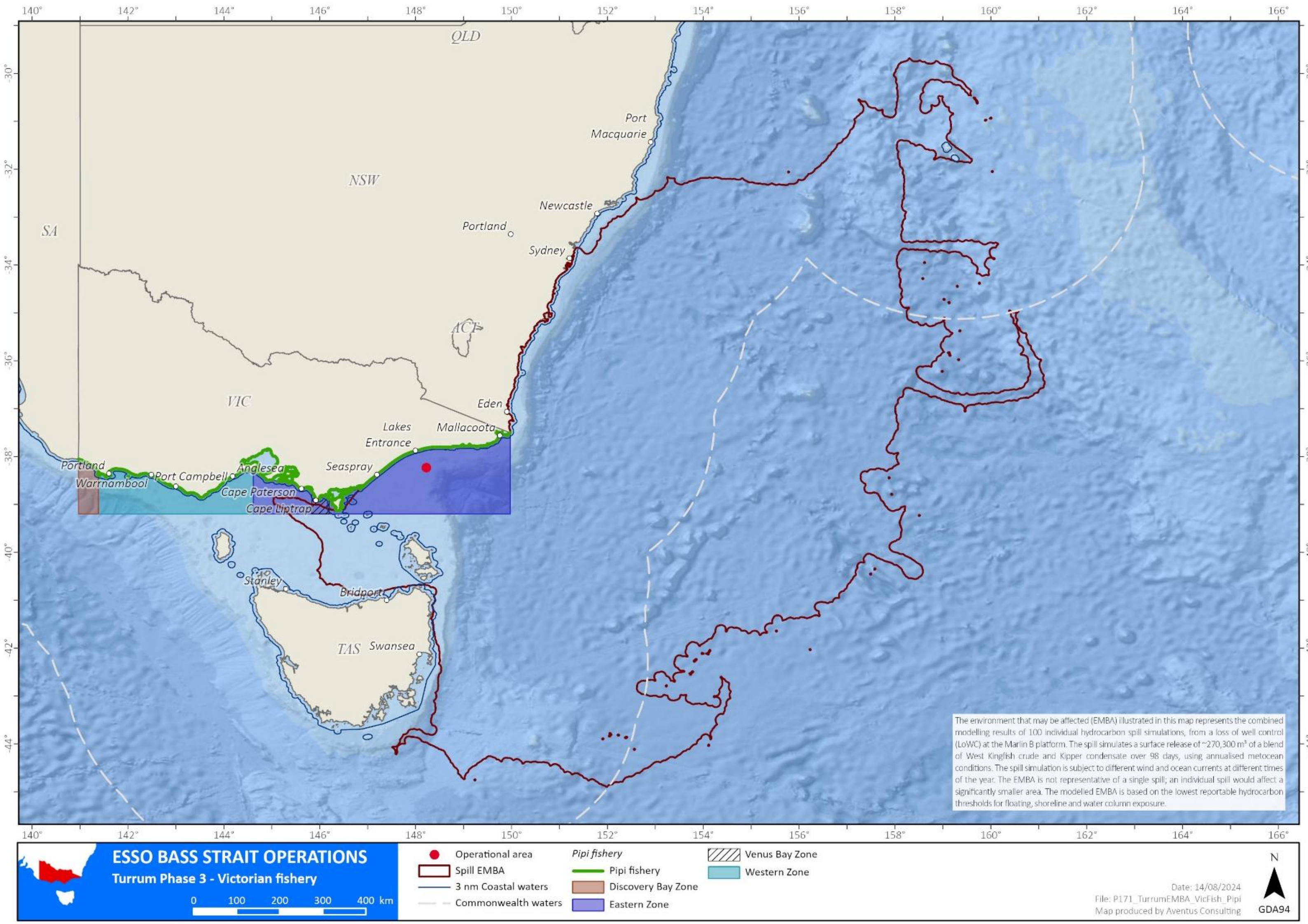

Figure A-62 Victorian pipi fishery jurisdiction intersected by the EMBA

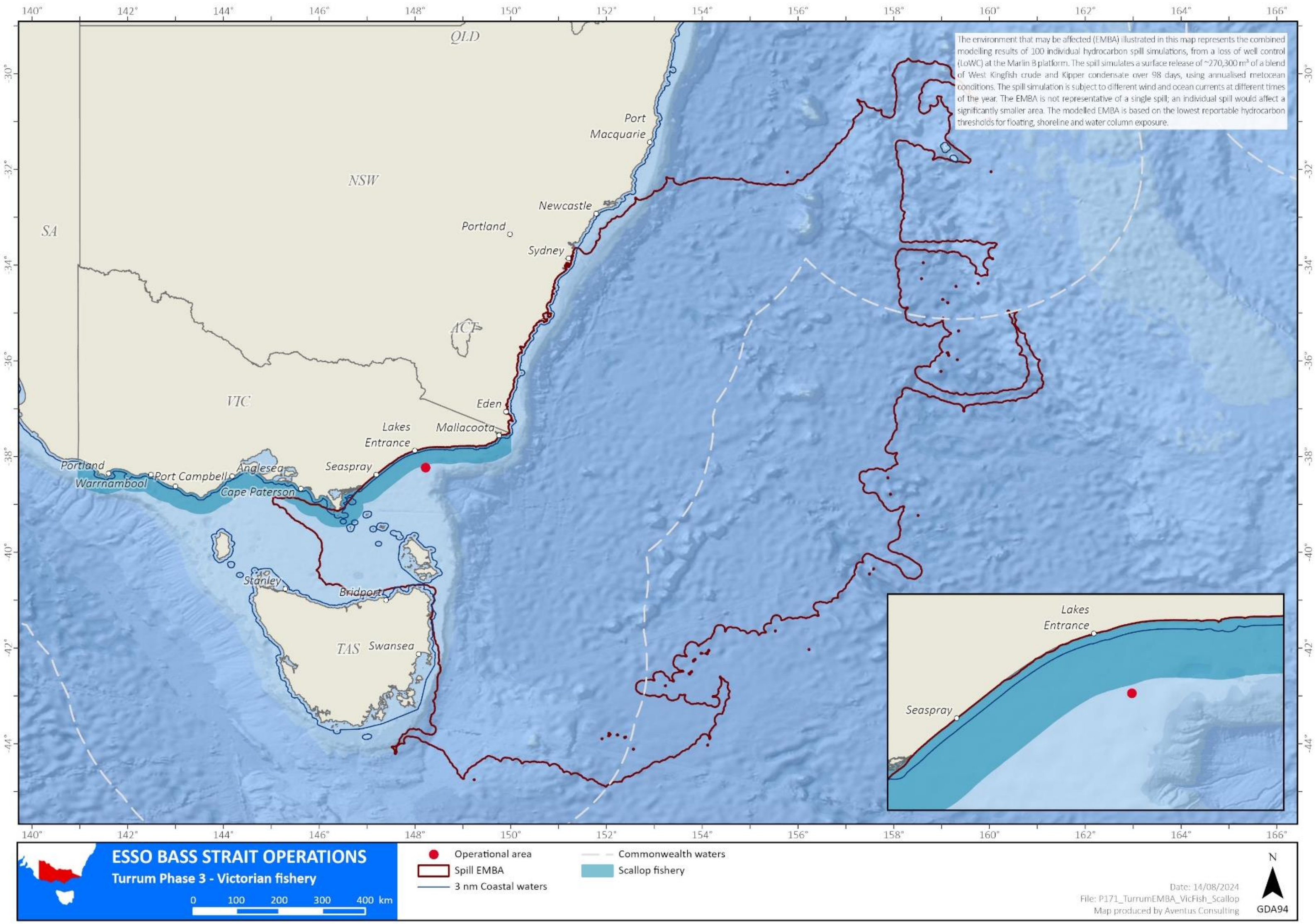

Figure A-63 Victorian scallop fishery jurisdiction intersected by the EMBA

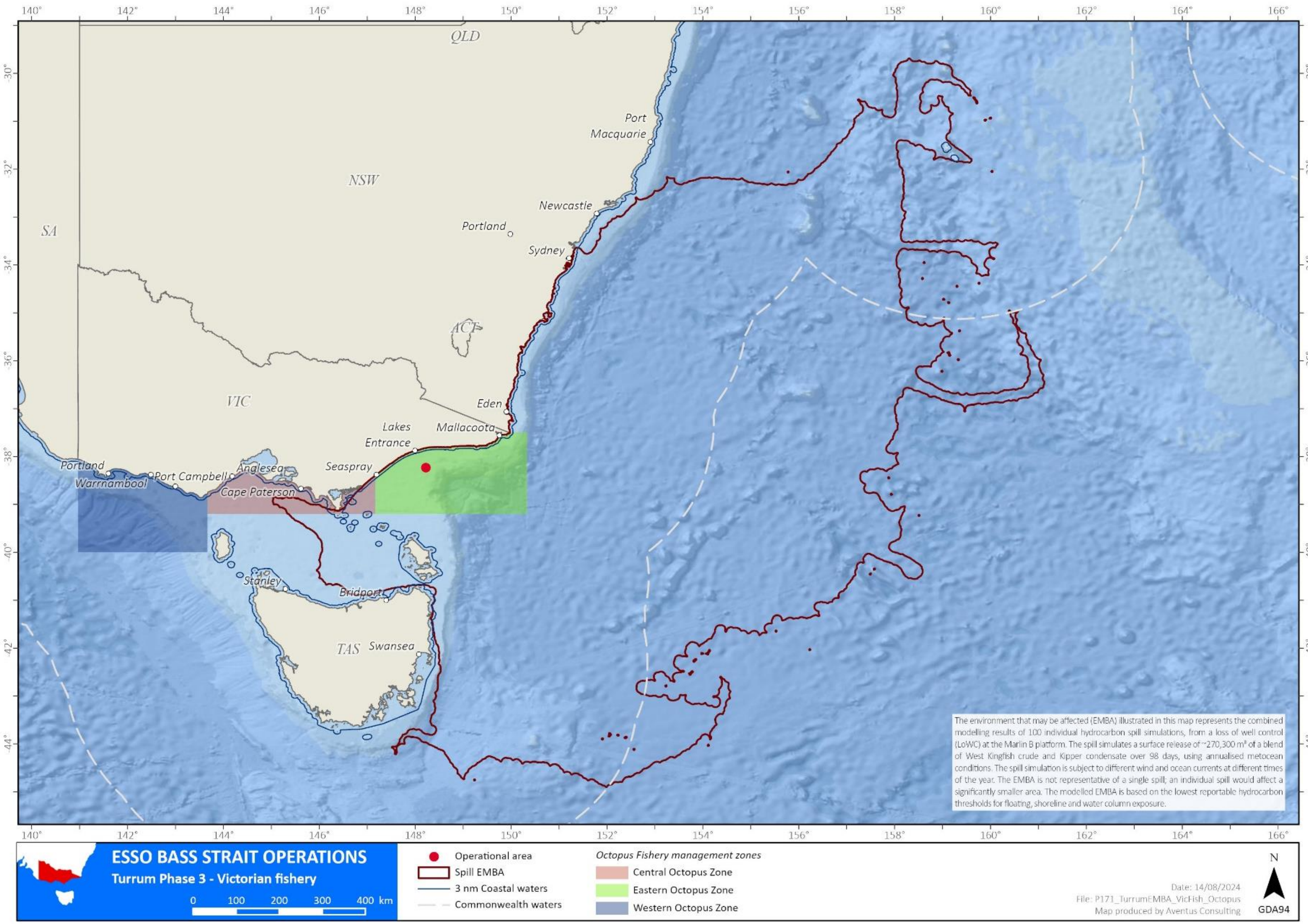

Figure A-64 Victorian octopus fishery jurisdiction intersected by the EMBA

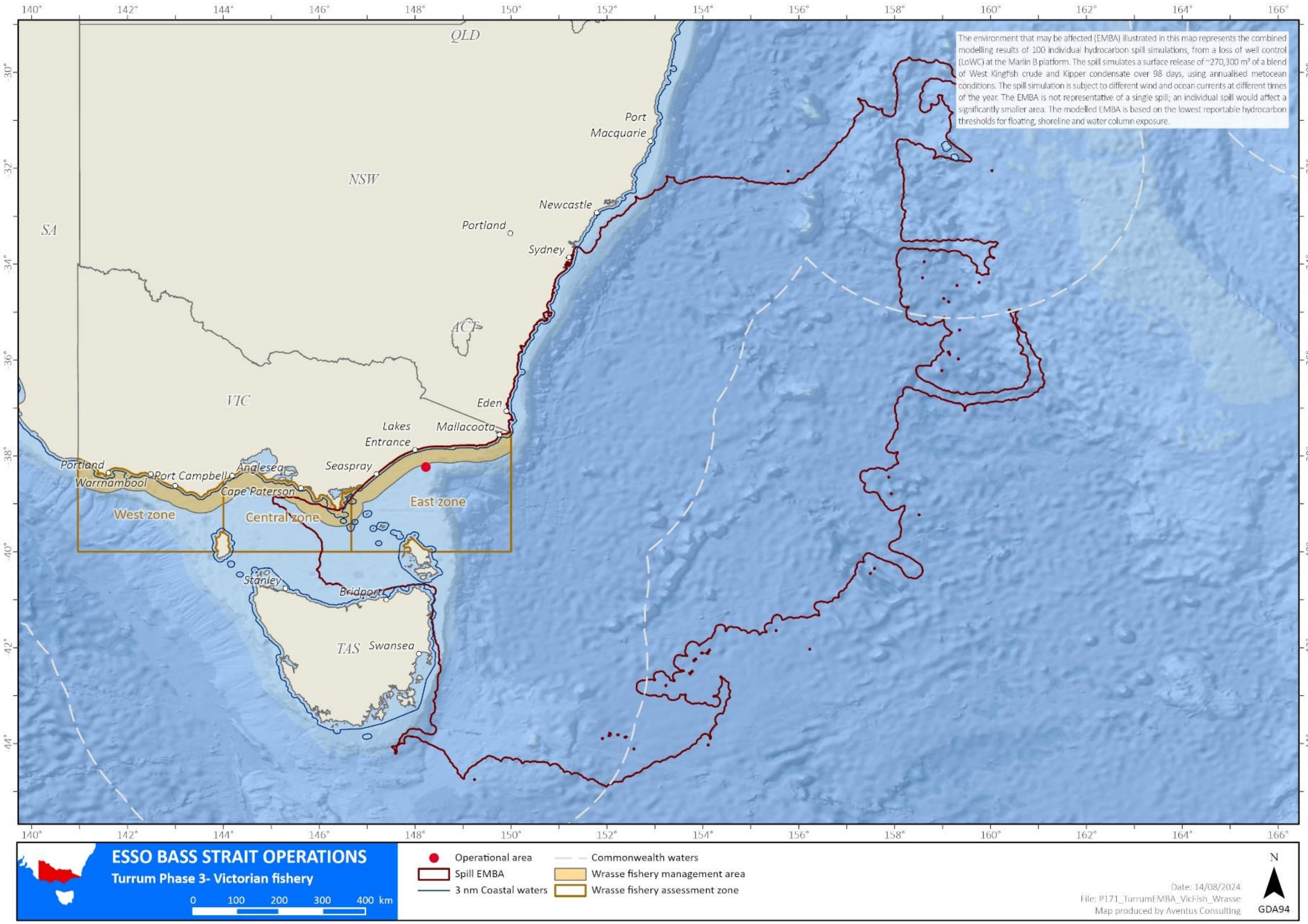

Figure A-65 Victorian wrasse fishery jurisdiction intersected by the EMBA

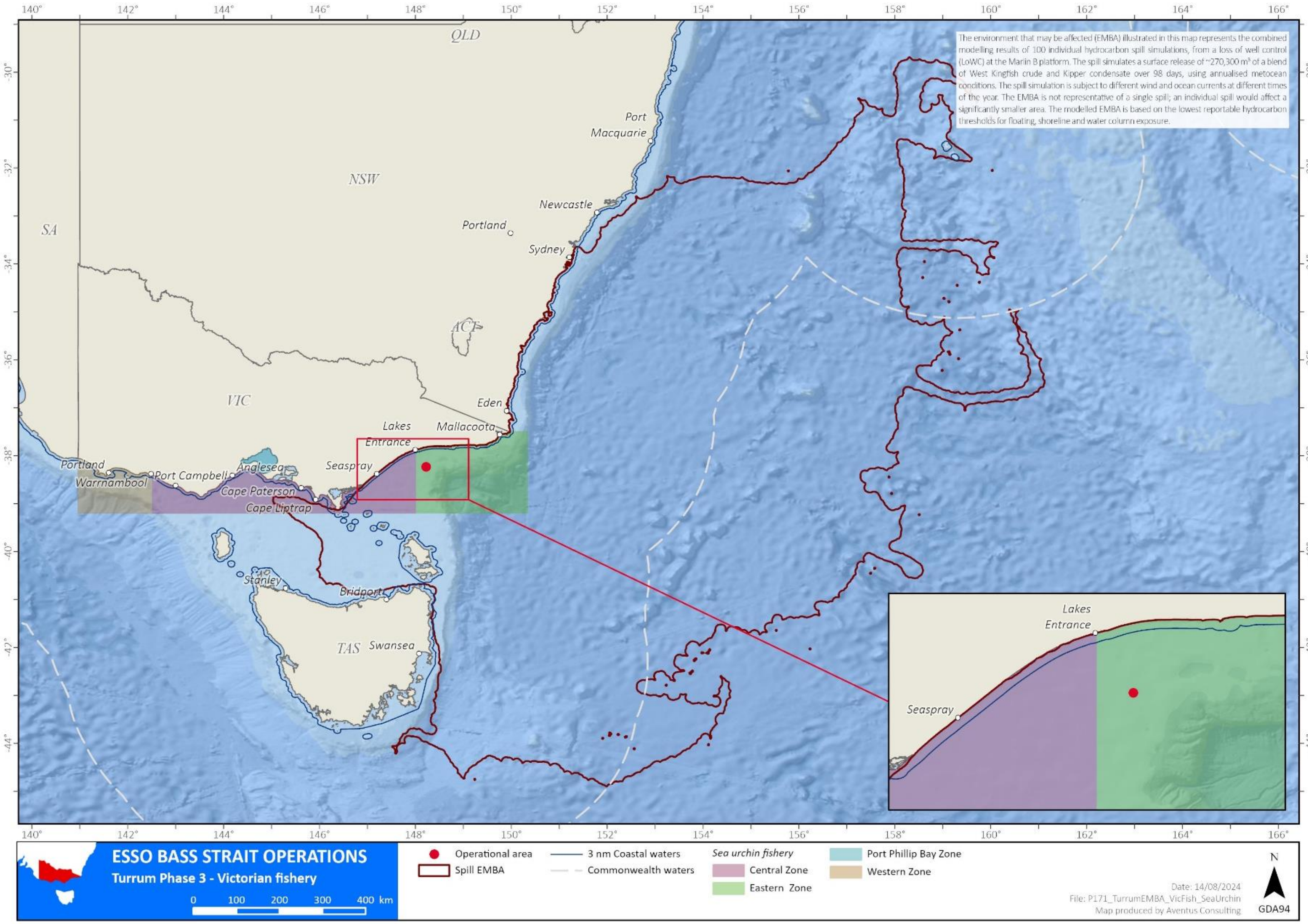

Figure A-66 Victorian sea urchin fishery jurisdiction intersected by the EMBA

1.6.4 *Tasmanian fisheries*

Tasmanian-managed commercial fisheries with jurisdiction to fish in the waters of the EMBA are described in Table A-8.

Table A-8 Tasmanian managed fisheries within the EMBA

Tasmanian fishery	Target species	Description	Percentage overlap with the EMBA
Abalone fishery (Figure A-67)	Blacklip abalone (*Haliotis rubra*), greenlip (*H. laevigata*)	The Tasmanian abalone fishery is the largest wild abalone fishery in the world and the fishery area surrounds the entire island of Tasmania extending northwards into Bass Strait to include Bass Strait islands such as the Furneaux Group. The Tasmanian wild harvest abalone fishery for blacklip (*H. rubra*) and greenlip (*H. laevigata*) produces 25% of the total annual global production of wild caught abalone and is harvested by divers. Annual catch limits are set by the government and the limits are spread across the fishing zones to manage resource sustainability. This system includes closures of some parts of the fishery as published by the Tasmanian regulator Department of Primary Industries, Parks, Water & Environment (DPIPWE, 2019a).	31.03%
Scalefish (Figure A-68)	Wrasse banded morwong (*Cheilodactylus spectabilis*) southern calamari (*Sepioteuthis australis*)	The Tasmanian scalefish fishery is a multi-species and multi-gear fishery that is predominantly made up of small owner operated commercial businesses and a large and diverse recreational fishery. Some of the species commercially targeted include: banded morwong, southern calamari, octopus, tiger flathead, school whiting, southern garfish, wrasse, Gould's squid, bastard trumpeter, blue warehou, silver warehou, flounder, silver trevally and striped trumpeter. The main gear types include gillnet, hooks and seine nets, other fishing gears in use include traps, Danish seine, dip nets and spears. For many commercial operators, scalefish represent an adjunct to other activities, for instance rock lobster fishing (DPIPWE, 2019b).	35.31%
Rock lobster fishery (Figure A-69)	Southern rock lobster (*Jasus edwardsii*)	The rock lobster fishery is a major Tasmanian industry providing significant benefits from exports from the commercial fishery. The southern rock lobster (*Jasus edwardsii*) commonly known as crayfish, lives in a variety of habitats ranging from shallow rocky inshore pools out to the continental shelf. Pots are used as the catch method and over 300 licences issued each year. The fishery is managed by quota management, supplemented by size limits, gear restrictions and seasonal closures (DPIPWE, 2019c).	37.75%

Tasmanian fishery	Target species	Description	Percentage overlap with the EMBA
Giant crab fishery (Figure A-69)	Giant crabs (*pseudocarcinus gigas*)	The giant crab (*Pseudocarcinus gigas*) fishery is a comparatively small fishery with annual harvest set at 46.6t, but is of relatively high value, with the landed valued estimated to be around AUD$2M. The Tasmanian giant crab fishery is managed by limited entry, setting a total annual commercial catch and by an individual transferable quota management system. This regime is supplemented by size limits, gear restrictions and seasonal closures. The permitted gear types are pot (or trap) for the commercial fishery (E Ogier, 2018).	37.75%
Scallop (Figure A-69)	Commercial scallop (*Pecten fumatus*)	This fishery targets commercial scallop (*Pecten fumatus*) using a scallop harvester (dredge). Although commercial fishers can legally take the doughboy scallop and the queen scallop, these species have only minor commercial significance in Tasmania. Pre-season surveys are carried out to determine which areas meet predetermined criteria and can be opened for scallop fishing. The market for commercial harvested scallops is largely domestic. Scallop beds occur on the shelf in water deeper than 20m (E Ogier, 2018).	37.75%
Commercial dive (Figure A-70)	Shortspined sea urchin (*Heliocidaris erythrogramma*) wavy periwinkles (*Lunella undulata*) and longspined sea urchin (*Centrostephanus rodgersii*).	The fishery targets three key species by hand from small vessels. The shortspined sea urchin (*Heliocidaris erythrogramma*) and wavy periwinkles (*Lunella undulata*) and the longspined sea urchin (*Centrostephanus rodgersii*). It operates entirely in State waters in five separate management zones (central eastern, southeastern, northeastern, northern and eastern) (DNRET, Commercial Dive Fishery, 2023a).	31.03%
Shellfish fishery (Figure A-71)	Clams (*Veneruptis largillierti*), native oyster (*Ostrea angasi*), cockles (*Katelysia scalarina*) and wild pacific	The commercial shellfish fishery includes clams (*Veneruptis largillierti*) for which there are three licences restricted to Georges Bay, native oyster (*Ostrea angasi*) for which there are two licences restricted to Georges Bay and wild pacific oyster (*Crassostrea gigas*) (DNRET, 2023b). Temperate climate bivalves generally have two spawning periods within a year following spring and autumnal peaks in phytoplankton production.	36.99%

Tasmanian fishery	Target species	Description	Percentage overlap with the EMBA
	oyster (*Crassostrea gigas*)		
Marine plant fishery	Wakame (Undaria pinnatifida) Bull kelp (*Durvillaea potatorum*)	The only marine plant that can be harvested directly from the water is wakame, a noxious pest species. This fishery is managed under limited introduced marine plant fishing licenses to mitigate the risk of spreading. Other marine plants that have been cast onshore, such as bull kelp, can be collected with a commercial beach-cast harvest license.	N/A

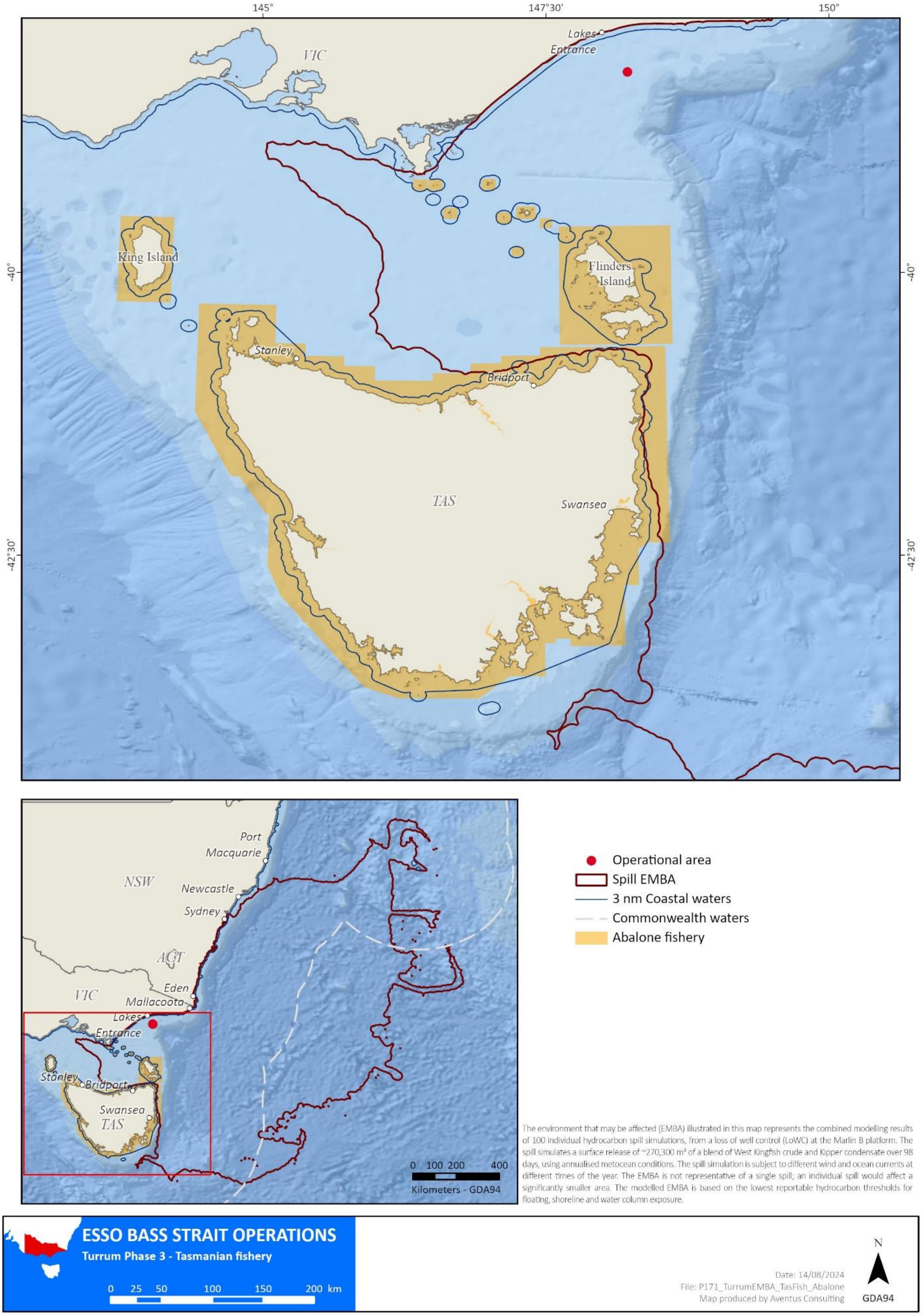

Figure A-67 Tasmanian abalone fishery jurisdiction intersected by the EMBA

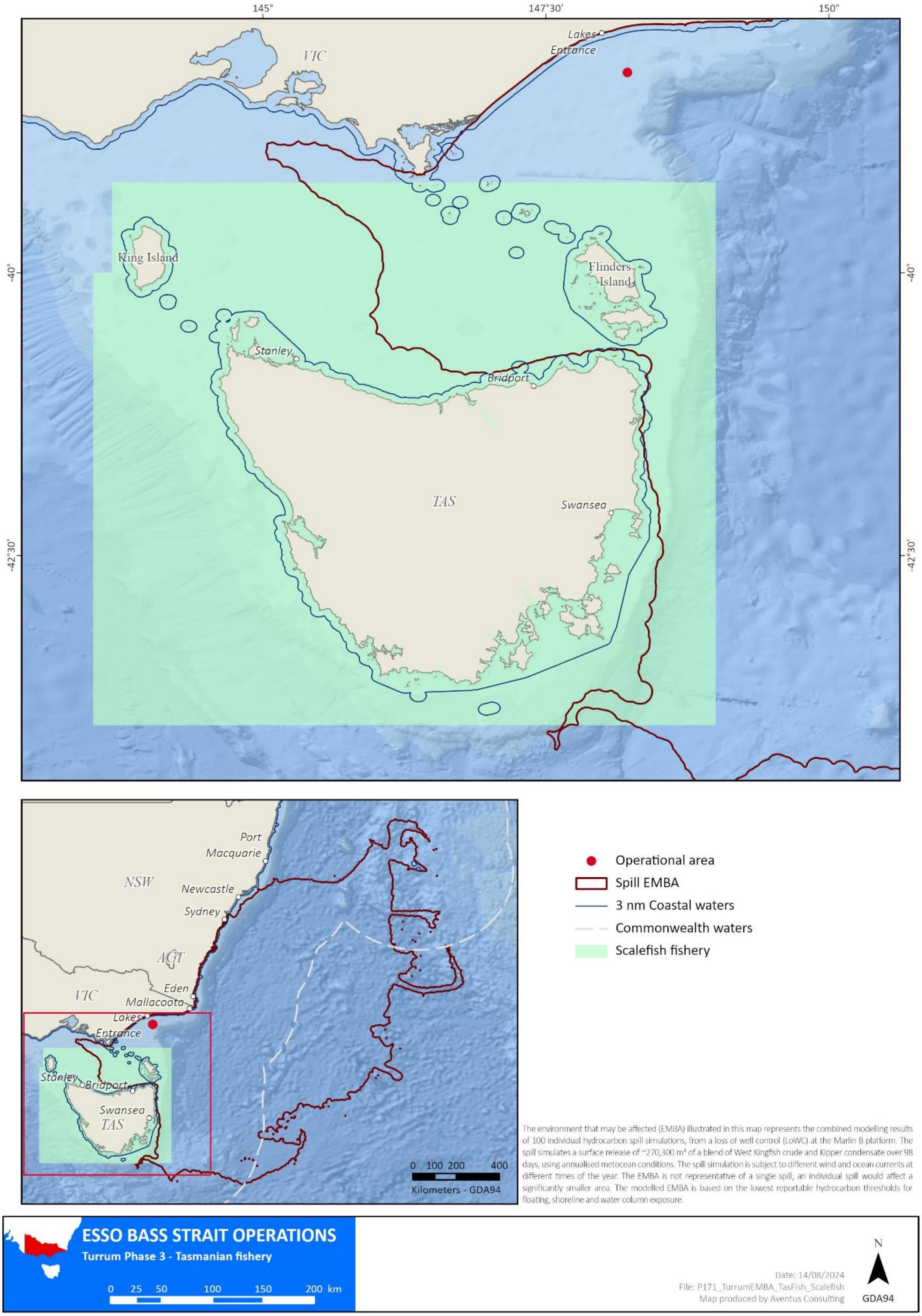

Figure A-68 Tasmanian scalefish fishery jurisdiction intersected by the EMBA

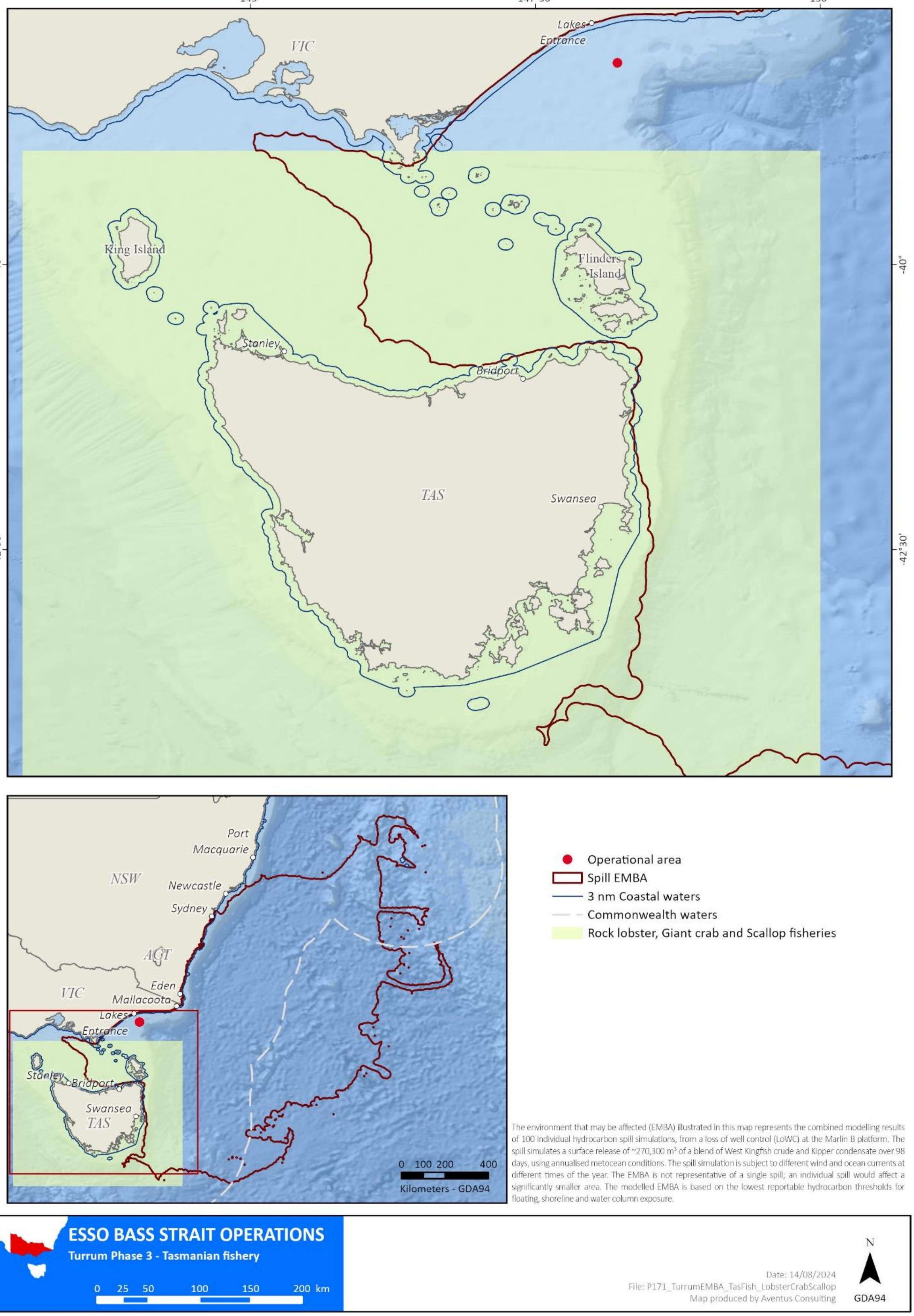

Figure A-69 Rock lobster, giant crab and scallop fishery jurisdiction intersected by the EMBA

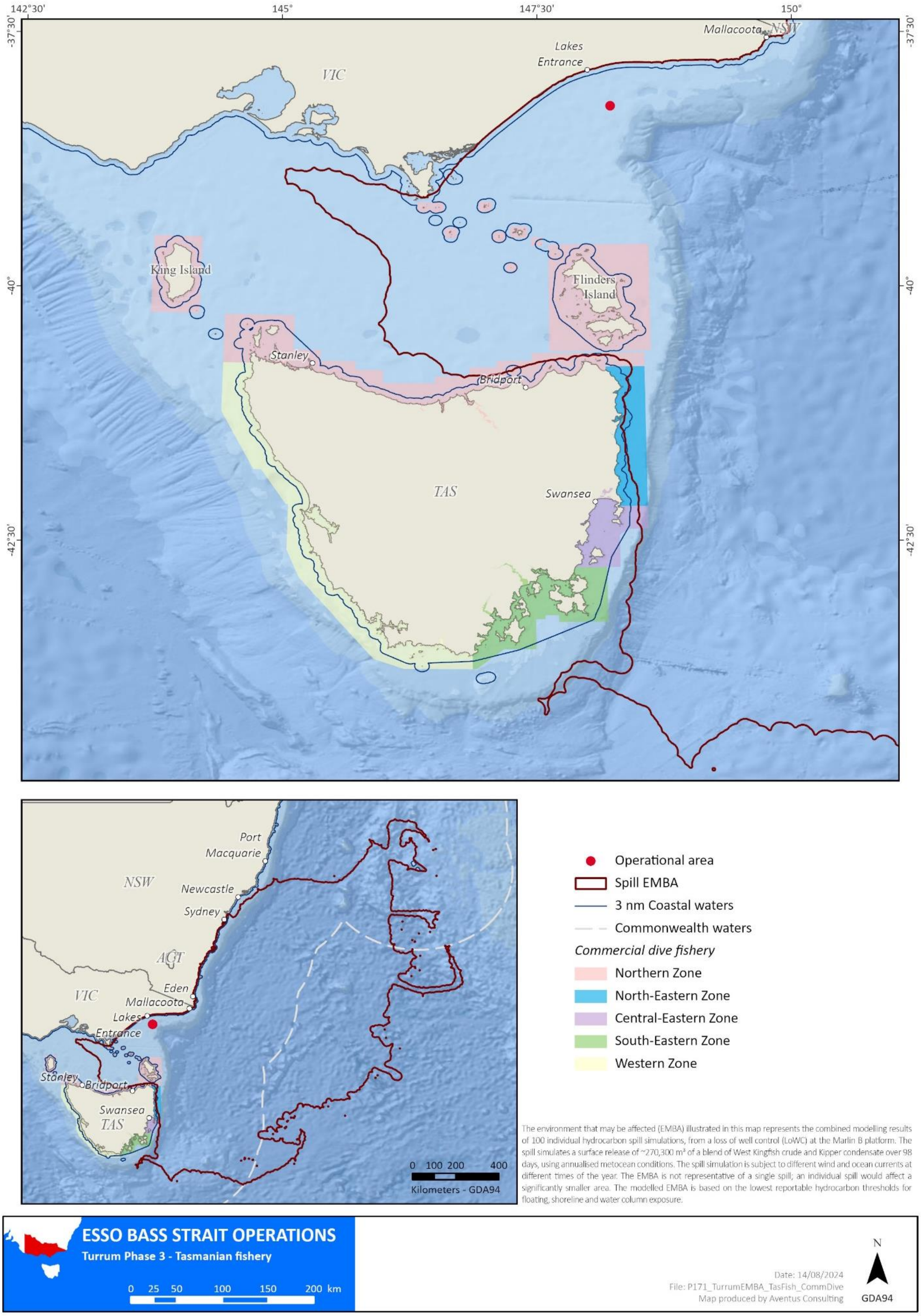

Figure A-70 Tasmanian commercial dive fishery jurisdiction intersected by the EMBA

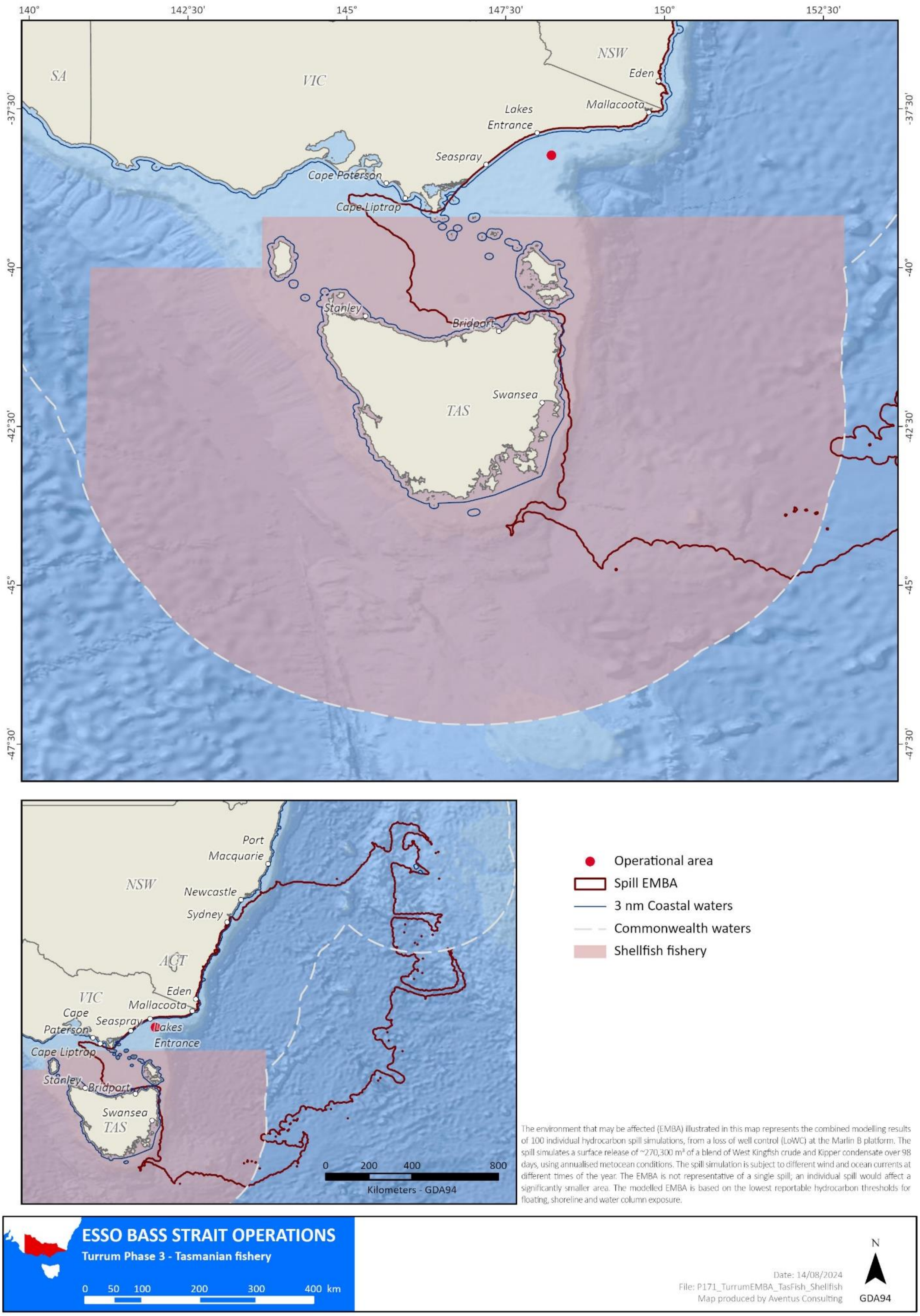

Figure A-71 Tasmanian shellfish fishery jurisdiction intersected by the EMBA

1.6.5 *New South Wales fisheries*

NSW managed commercial fisheries with jurisdiction to fish in the waters of the EMBA are described in Table A-9. Please note that the NSW fisheries does not have data publicly available, therefore mapping and percentage overlaps cannot be attained.

Table A-9 NSW managed fisheries within the EMBA

NSW fishery	Target species	Description	Percentage overlap with the EMBA
Abalone fishery	Blacklip abalone (*Haliotis rubra*)	The blacklip abalone forms the basis of the abalone fishery in NSW. Abalone are commercially harvested from rocky reefs by divers typically using surface-supplied air or scuba. In practice, 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.	N/A – data unavailable.
Estuary general fishery	Sea mullet (*Mugil cephalus*) luderick (*Girella tricuspidata*) yellowfin bream (*Acanthopagrus australis*) school prawn (*Metapenaeus macleayi*) blue swimmer crab (*Portunus pelagicus*) dusky flathead (*Platycephalus fuscus*) sand whiting (*Sillago ciliata*) pipi (*Donax deltoides*) mud crab (*Scylla serrata*) silver biddy (*Gerres subfasciatus*).	The estuary general fishery is a diverse multi-species multi-method fishery that may operate in 76 of the NSW's estuarine systems. This fishery is a significant contributor to regional and state economies providing high quality seafood and bait to the community. The fishery includes all forms of commercial estuarine fishing (other than estuary prawn trawling) in addition to the gathering of pipis and beachworms from ocean beaches. The most frequently used fishing methods are mesh and haul netting. Other methods used include trapping, hand-lining and hand-gathering. Sea mullet, luderick, yellowfin bream, school prawn, blue swimmer crab, dusky flathead, sand whiting, pipi, mud crab and silver biddy make up over 80% of the catch (DPI 2014).	N/A – data unavailable.
Estuary prawn trawl fishery	School prawns (*Metapenaeus macleaya*), eastern king prawns (*Melicertus plebeju*).	The fishery uses otter trawl nets in three estuaries in NSW, (the Clarence, Hawkesbury and Hunter Rivers). With the exception of the Hawkesbury River, the fishery operates for defined seasons (generally October to May) and within each estuary is confined to specific times and areas.	N/A – data unavailable.

NSW fishery	Target species	Description	Percentage overlap with the EMBA
		The majority of prawn catches are landed during the 'dark' of the moon, on either run out or 'slack' tides.	
Lobster fishery	Primary: eastern rock lobster (*Sagmaraisus verreauxi*). Other: southern rock lobster (*Jasus edwardsii*) tropical rock lobster (*Panulirus longipes* and *P. ornatus*).	The lobster fishery extends from the Queensland border to the Victorian border and includes all waters under jurisdiction of NSW to around 128km from the coast. It is characterised by inshore and offshore sectors. Inshore fishers use small beehive or square traps in waters up to 10m in depth, whilst offshore fishers use large rectangular traps.	N/A – data unavailable.
Ocean hauling fishery	Pilchards (*Sardinops sagax*) sea mullet (*Mugil cephalus*) Australian salmon (*Arripis trutta*) blue mackerel (*Scomber australasicus*) yellowtail scad (*Trachurus novaezelandiae*) yellowfin bream (*Acanthopagrus australis*)	The ocean hauling fishery is broken up into seven regions along the NSW coast and targets approximately 20 finfish species using commercial hauling and purse seine nets from sea beaches and in ocean waters within 3nm of the coast.	N/A – data unavailable.
Ocean trap and line fishery	Primary: snapper (*Pagrus auratus*), yellowtail kingfish (*Seriola lalandi*), leatherjackets (*Oligoplites saurus*), bonito (*Gymnosarda unicolor*) silver trevally (*Pseudocaranx georgianus*). Other: 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. The fishery is a share management fishery. This means that commercial fishers must hold sufficient shares to be eligible for an endorsement to operate in the fishery. An endorsement authorises the use of specific gear to take fish for sale from certain waters.	N/A – data unavailable.

NSW fishery	Target species	Description	Percentage overlap with the EMBA
Ocean trawl fishery	Primary: Eastern king prawn (*Melicertus plebejus*), eastern school prawn (*Metapenaeus macleaya*), royal red prawn (*Haliporoides sibogae*), balmain bug (*Ibacus spp*.), octopus spp. Various (*octopodidae*), cuttlefish (*Sepia spp*), southern calamari (*Sepioteuthis australis*), eastern school whiting (*Sillago flindersi*), stout whiting (*Sillago robusta*), tiger flathead (*Platycephalus richardsoni),* bluespotted flathead *(Platycephalus caeruleopunctatus*), silver trevally (*Pseudocaranx georgianus),* eastern shovelnose ray (*Aptychotrema rostrata*). Secondary: Blue swimmer crab (*Portunus armatus*), wquid spp. various (Class: *chephalopoda*) gurnard/latchet (*Pterygotrigla andertoni, Pterygotrigla polyommata, Chelidonichthys kumu*), John dory (*Zeus faber*) angel shark (*Squatina spp*), flounder spp various	There are two sectors to the ocean trawl fishery: the prawn trawl sector and the fish trawl sector. Both sectors use otter trawl nets. The fishery is a share management fishery; meaning commercial fishers must hold sufficient shares to be eligible for an endorsement to operate in the fishery. An endorsement authorises the use of specific gear to take fish for sale from certain waters. Many of the fishers endorsed for fish trawling are also endorsed for prawn trawling.	N/A – data unavailable.

NSW fishery	Target species	Description	Percentage overlap with the EMBA
	(*Pleuronectidae/Bothidae*), red mullet various (*Mullidae*), redfish (*Centroberyx affinis*), leatherjacket spp. various (*Monocanthidae*), ocean perch (*Helicolenus barathri, Helicolenus percoides),* mirror dory (*Zenopsis nebulosus*). Sole spp. various (*Soleidae*), Grey morwong (*Nemadactylus douglasii),* Pink tilefish *(Branchiostegus wardi),* Giant boarfish (*Paristiopterus labiosus*), Shark spp. various		
Sea urchin and turban shell restricted fishery	Sea urchin (*Echinometridae*), turban shell (*Turbinidae*)	The NSW sea urchin and turban shell restricted fishery is relatively small with few divers participating. The main constraint on development is high processing costs and limited domestic markets. Fishing for sea urchins is generally constrained to that part of the year when the roe is well developed. A number of the fishing sub regions have been closed to commercial fishing since 1994.	N/A – data unavailable.

1.6.6 Commercial aquaculture

The Sydney rock oyster (*Saccostrea glomerata*) is the main species grown in NSW. Commercial production in the State occurs in 41 estuaries between Eden in the south to the Tweed River in the north. Wallis Lake and the Hawkesbury River are the main producing areas.

The Sydney rock oyster industry in NSW is largely dependent on natural spawning. The first spawning of a Sydney rock oyster is usually as a male and subsequent spawnings as a female. During spawning, adult females disperse up to 20 million eggs and males hundreds of millions of sperms into the water when the tide and current are optimal for the widest distribution. Fertilisation takes place in the water column and development continues for up to 3 to 4 weeks as the larval stages of the oyster grow, with the 'spat' ultimately being caught on 'sticks'. Oysters are knocked off these sticks at 0.5 to 3 years of age for growing intertidally on trays until maturity in 3 to 4 years. Alternative growing systems such as baskets and tumblers are also being used, and some oysters are grown subtidally on rafts or on floating culture.

No commercial oyster leases exist in Victorian waters, however, a trial to culture Sydney rock oysters in the Gippsland Lakes system has been proposed. Blue mussels are grown in aquaculture fishery reserves in Port Phillip Bay and Western Port. A small number of permits have also been issued to trial native seaweed culture in aquaculture fishery reserves, but commercial licences are not yet available.

The Sydney rock oyster is also farmed south of Hervey Bay in Queensland, with most leases occurring in Moreton Bay. The seasonal occurrence of the disease QX in southeastern Queensland waters restricts the tidal areas where oysters can be viably produced and limits the growing season.

1.6.7 Recreational fishing

Recreational fishing in Australia is a multibillion-dollar industry. Most recreational fishing typically occurs in nearshore coastal waters (shore or inshore vessels), and within bays and estuaries. Offshore fishing (>5km from the coast) only accounts for approximately 4% of recreational fishing activity in Australia; charter fishing vessels are likely to account for the majority of this offshore fishing activity.

The variation in recreational fishing intensity along the coast is illustrated in Figure A-72; there is moderate to high recreational use along most of the Victorian coast in the EMBA. Common recreational fish species include tiger flathead, bream, snapper, Australian salmon, and lobster. Offshore catches can include mackerel, tuna, groper, and shark.

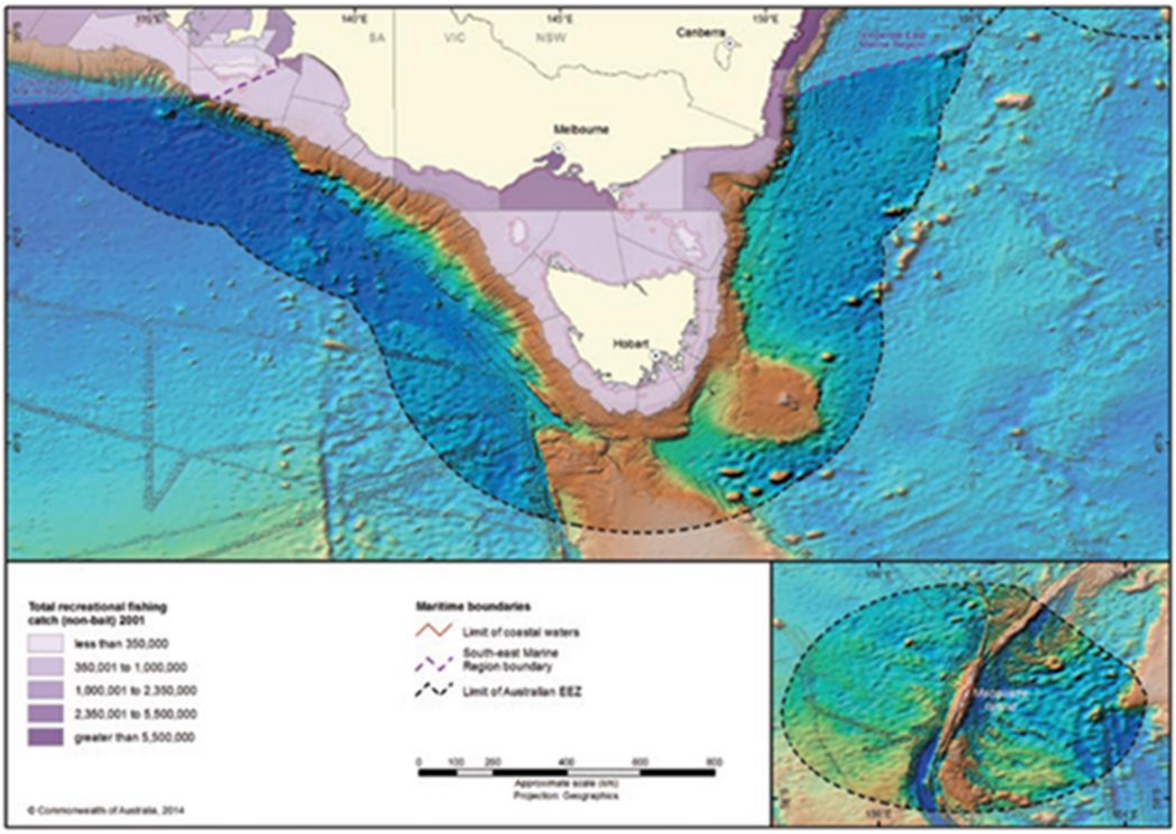

Figure A-72 Recreational fishing catch in temperate east (Commonwealth of Australia, 2015)

1.6.8 Tourism

The Australian coast and marine waters provide a diverse range of recreation and tourism opportunities, including scuba diving, charter boat cruises, cruise shipping, whale and wildlife watching, sailing, snorkelling, surfing, and kayaking.

In 2013-2014 the tourism industry contributed approximately $1.2B to the Gippsland economy; and employed approximately 12,400 (12.2%) (TourismVictoria, Gippsland Market Profile: Year ending December 2014., 2014a) (TourismVictoria, 2014b). Overnight visitors to the Gippsland area were predominantly Australian (86% intrastate, 11% interstate), with low (3%) international visitors (TourismVictoria, 2014a). In East Gippsland, primary tourist locations are the Gippsland Lakes (the largest inland waterway in Australia), Lakes Entrance, Marlo, Cape Conran and Mallacoota. The area is renowned for its nature-based tourism (e.g. Croajingolong National Park), recreational fishing and water sports (lake and beaches) (TravelVictoria, 2017).

NSW has triumphed as Australia's number one destination, with domestic and international visitors delivering almost $42B in expenditure to the State's visitor economy in the year ending December 2022 (DestinationNSW, 2023a) . The South Coast region includes all the towns from Wollongong to the Victorian border. In the year ending in March 2023, the South Coast region had a total of 12.6 million visitors with an expenditure of $4.1B (DestinationNSW, 2023b) .The northern NSW regions, including Coffs harbour, Ballina and North coast. In the year ending in March 2023, the north coast region had a total of 11.8 million visitors with an expenditure of $5.9 billon (DestinationNSW, 2023c)

Tourism in Tasmania directly and indirectly contributes around $2.59B or about 6.7% to Tasmania's Gross Product in 2022 - 2023 (ToursimTasmania, 2023). Tourism directly and in directly supports around 37,300 jobs in Tasmania or about 12.1% of total Tasmanian employment – the highest share in the country. Visitors spent a total of $3.853B on accommodation, attractions, tours, transport and other goods and services during this period (ToursimTasmania, 2023) .

1.6.9 *Oil and gas*

Statistics from 2018 – 2019 showed that oil (nearly 39%) and gas (26%) remained Australia's largest energy sources (APPEA, 2017). The industry recorded a surplus of $27.9B in the trade of oil and gas in 2019 - 20 financial year (APPEA, 2021).

Victoria's petroleum (oil and gas) exploration and production is concentrated in the offshore Commonwealth waters of the Otway and Gippsland Basins; there are a number of current exploration and offshore production permit areas within both basins (Figure A-73). Information on the production licences, exploration permits and retention leases within Gippsland Basin at the time of writing are presented in Table A-10.

The Gippsland Basin in southeastern Australia is located about 200km east of the city of Melbourne, covering about 46,000km^2, of which two thirds are located offshore. The Gippsland Basin is recognised as one of Australia's primary hydrocarbon provinces, having continually produced oil and gas since the late 1960s.

In May 2022, remaining reserves were estimated at 1.64Tcf (1844.5PJ) of natural gas and ethane, and 94MMbbl (552.7PJ) of oil and natural gas liquids (GeoscienceAustralia, 2022). Several petroleum systems operate in the basin, with the largest oil and gas fields hosted by top-Latrobe Group (Eocene) shallow marine barrier sandstones, and additional discoveries made in intra-Latrobe Group (Upper Cretaceous–Paleocene) coastal plain and deltaic channel sandstones. Despite its mature status, parts of the basin remain underexplored and offer a variety of untested resources (GeoscienceAustralia, 2022).

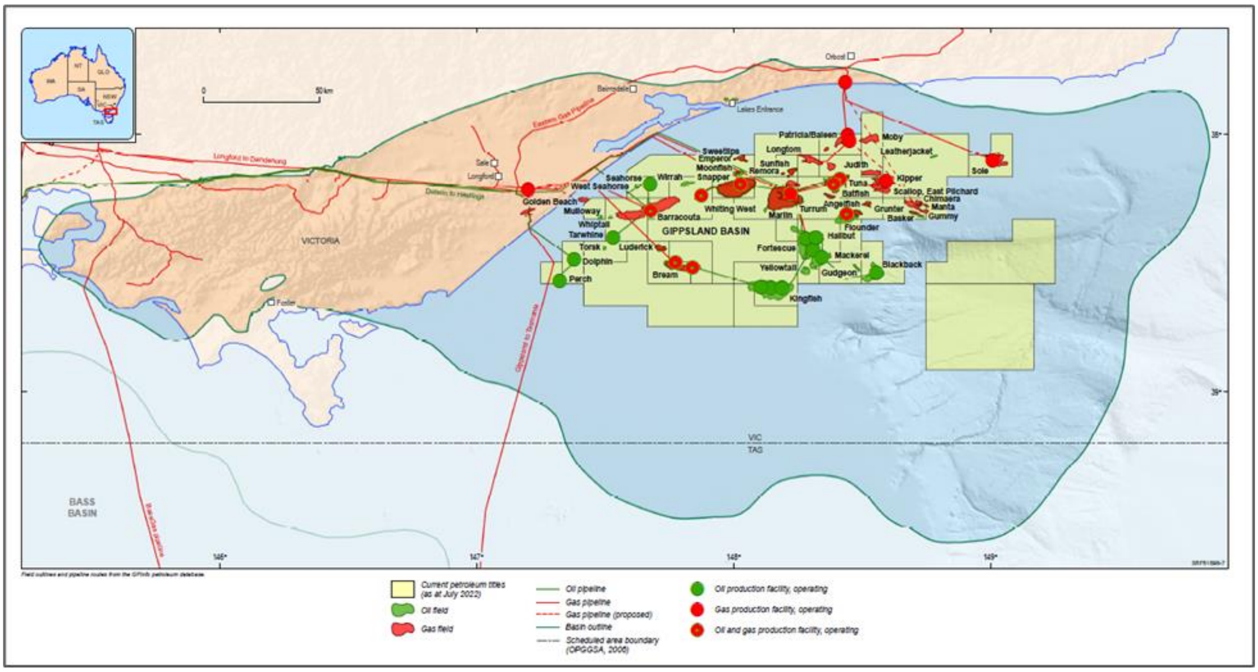

Figure A-73 Petroleum exploration and production permits, oil and gas fields and petroleum production infrastructure in the Gippsland Basin (GeoscienceAustralia, 2022)

Table A-10 Production licenses, exploration permits and retention leases within Gippsland Basin

Title	Title holder/s	Field
Production Licenses, Gippsland Basin		
VIC/L1	EARPL, Woodside Energy	Barracouta/Tarwhine/Whiptail
VIC/L10	EARPL, Woodside Energy	Snapper
VIC/L11	EARPL, Woodside Energy	Flounder

Title	Title holder/s	Field
VIC/L13-14	EARPL, Woodside Energy	Bream
VIC/L15	EARPL, Woodside Energy	Dolphin
VIC/L16	EARPL, Woodside Energy	Torsk
VIC/L17	EARPL, Woodside Energy	Perch
VIC/L18	EARPL, Woodside Energy	Seahorse
VIC/L19	EARPL, Woodside Energy	West Fortescue
VIC/L2	EARPL, Woodside Energy	Barracouta/Whiting/Wirrah
VIC/L20	EARPL, Woodside Energy	Blackback
VIC/L25	EARPL, Woodside Energy, MEPAU	Kipper
VIC/L29	SGH Energy	Longtom
VIC/L3	EARPL, Woodside Energy	Marlin/Turrum/North Turrum
VIC/L32	Cooper Energy	Sole
VIC/L4	EARPL, Woodside Energy	Marlin/Turrum/Tuna/Baldfish/Flounder
VIC/L5	EARPL, Woodside Energy	Halibut/Fortescue/Cobia/Mackerel
VIC/L6	EARPL, Woodside Energy	Mackerel/Flounder
VIC/L7-8	EARPL, Woodside Energy	Kingfish
VIC/L9	EARPL, Woodside Energy	Tuna
Exploration Permits, Gippsland Basin		
VIC/P47	Emperor Energy/Shelf Energy	Judith/Moby
VIC/P57	Carnarvon Hibiscus	West Seahorse/Sea Lion (See VIC/L31)
VIC/P68	Bass Oil	Leatherjacket
VIC/P70	Esso Deepwater	Dory/Baldfish
VIC/P71	Llanberis Energy	-
VIC/P72	Cooper Energy	-
Retention Leases, Gippsland Basin		
VIC/RL1	EARPL, Woodside Energy	Mullloway

Title	Title holder/s	Field
VIC/RL13 VIC/RL14 VIC/RL15	Cooper Energy	Basker, Manta, Gummy Field

1.6.10 Renewable Energy

The EMBA overlaps Australia's first offshore declared areas available for renewable energy projects (Gippsland, Bass Strait, Illawarra and Hunter (Figure A-7475). The EMBA also overlaps with the following projects that have been granted a feasibility license within the declared areas (Figure A-7475):

- FL-001: Blue Mackerel North
- FL-002: High Sea Wind
- FL-003: Gippsland Skies
- FL-004: Gippsland 01
- FL-005: Kut-Wut Brataualung Project
- FL-006: Star of the South
- FL-007: Gippsland Dawn
- FL-008: Kent Offshore Wind Farm
- FL-009: Gippsland 02
- FL-010: Great Eastern Offshore Wind Project
- FL-011: Navigator North
- FL-012: Aurora Green

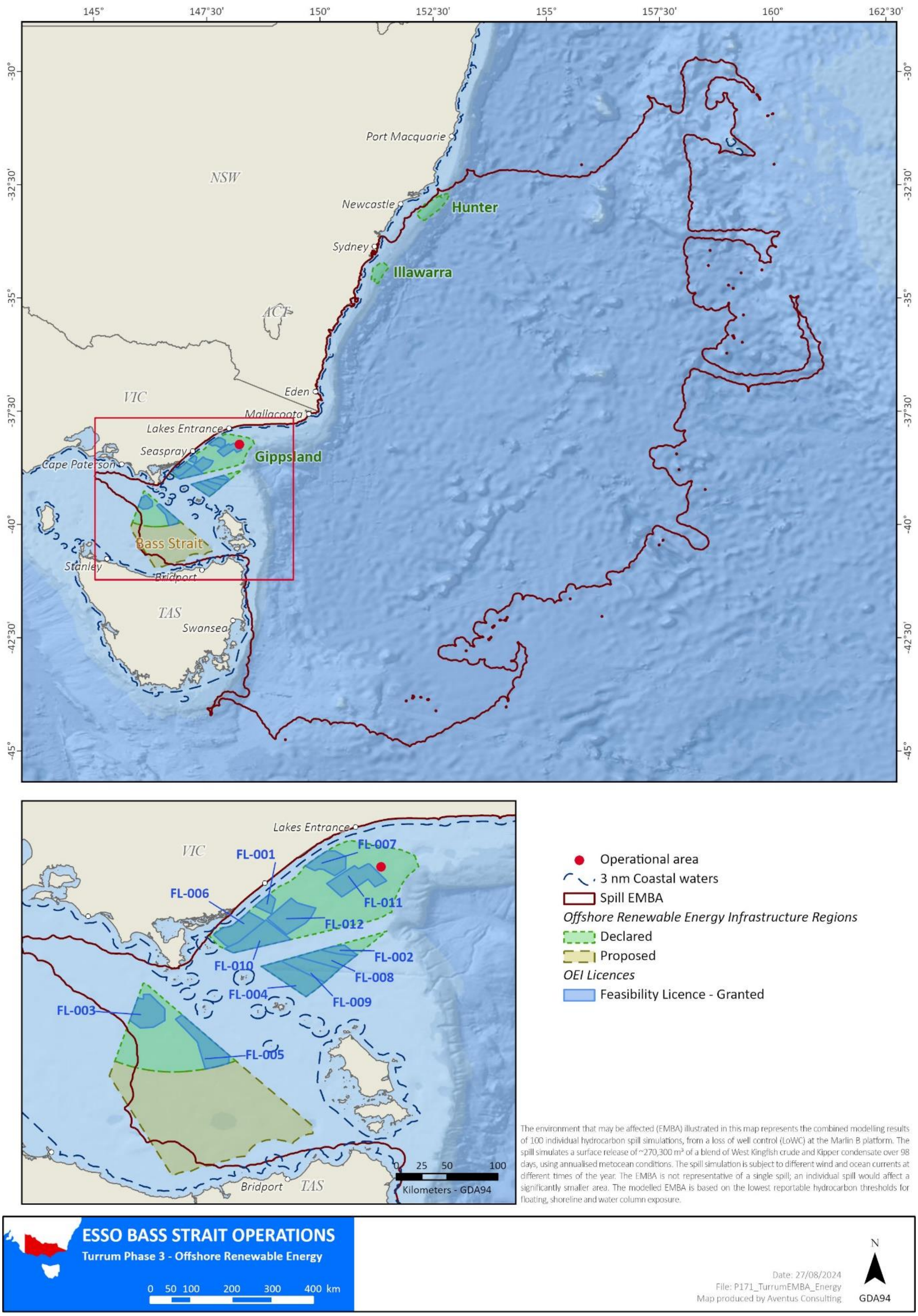

Figure A-7475 Offshore renewable energy infrastructure regions overlapped by the EMBA

1.6.11 *Shipping*

The southeast and eastern coasts are some of Australia's busiest in terms of shipping activity and volumes. This traffic includes international and coastal cargo trade, and passenger and ferry services. Major ports include Melbourne, Geelong, Western Port, Sydney and Brisbane, with other minor ports important to commercial and recreational fishing, yachts and other pleasure craft. Bass Strait is one of Australia's busiest shipping areas, with more than 3,000 vessels passing through Bass Strait each year (NOO, 2002a).

A shipping exclusion zone (or ATBA) exists around the operating oil and gas platforms in the Gippsland Basin, whereby unauthorised vessels larger than 200t (gross tonnage) are excluded from entry (Figure A-76). Two TSSs have been implemented to enhance safety of navigation around the ATBA by separating shipping into one-direction lanes for vessels heading northeast and those heading southwest. One separation area is located south of Wilson's Promontory, and the other south of the Kingfish B platform.

Although the OA for the JUR Turrum Phase 3 production drilling activities is located outside the shipping exclusion zone, the presence of this ATBA along with the existence of the PSZ which are all located outside the TSS routes minimise the potential for interactions with large commercial shipping.

Figure A-77 shows vessel traffic within the EMBA based on August 2023 AMSA data.

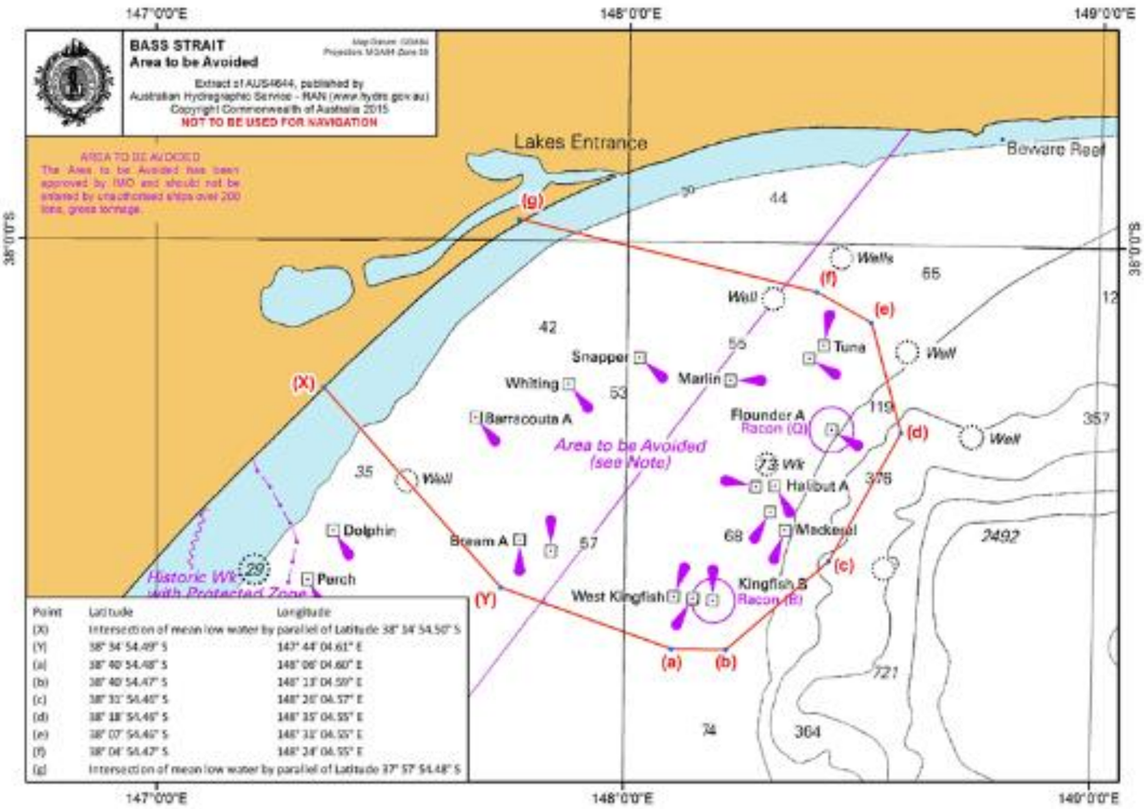

Figure A-76 Bass Strait ATBA (ABF, 2019)

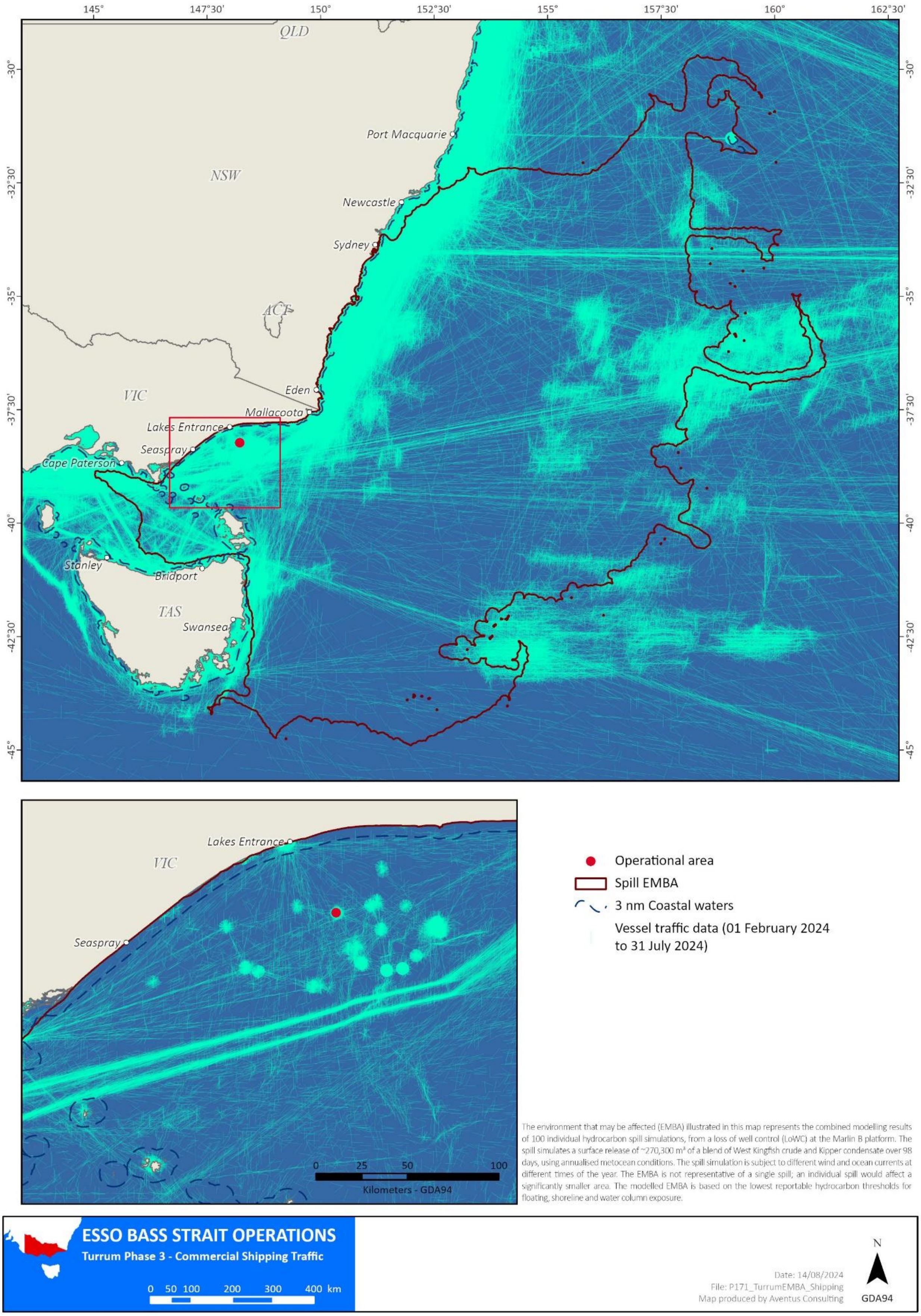

Figure A-77 Vessel traffic within the EMBA based on August 2023 AMSA data

1.6.12 Defence

The Australian Defence Force conducts a range of training, research activities, and preparatory operations in Australian waters (Figure A-78). These activities may include transit of naval vessels, training exercises, shipbuilding and repairs, hydrographic survey, surveillance and enforcement, demolition, use of explosives, use of radar, sonar, sonobuoys, flares, sensors and other equipment, and search and rescue.

Major defence bases within the EMBA include the multi-purpose wharf (naval operations) at Twofold Bay, Eden (NSW).

Primary training locations within the EMBA include the East Australia Exercise Area off the south coast of NSW.

Mine fields were laid in Australian waters during World War II. Post-war minefields were swept to remove mines and to make marine waters safe for maritime activities. There are three areas identified as dangerous due to unexploded ordnances, located south and east of Wilson's Promontory.

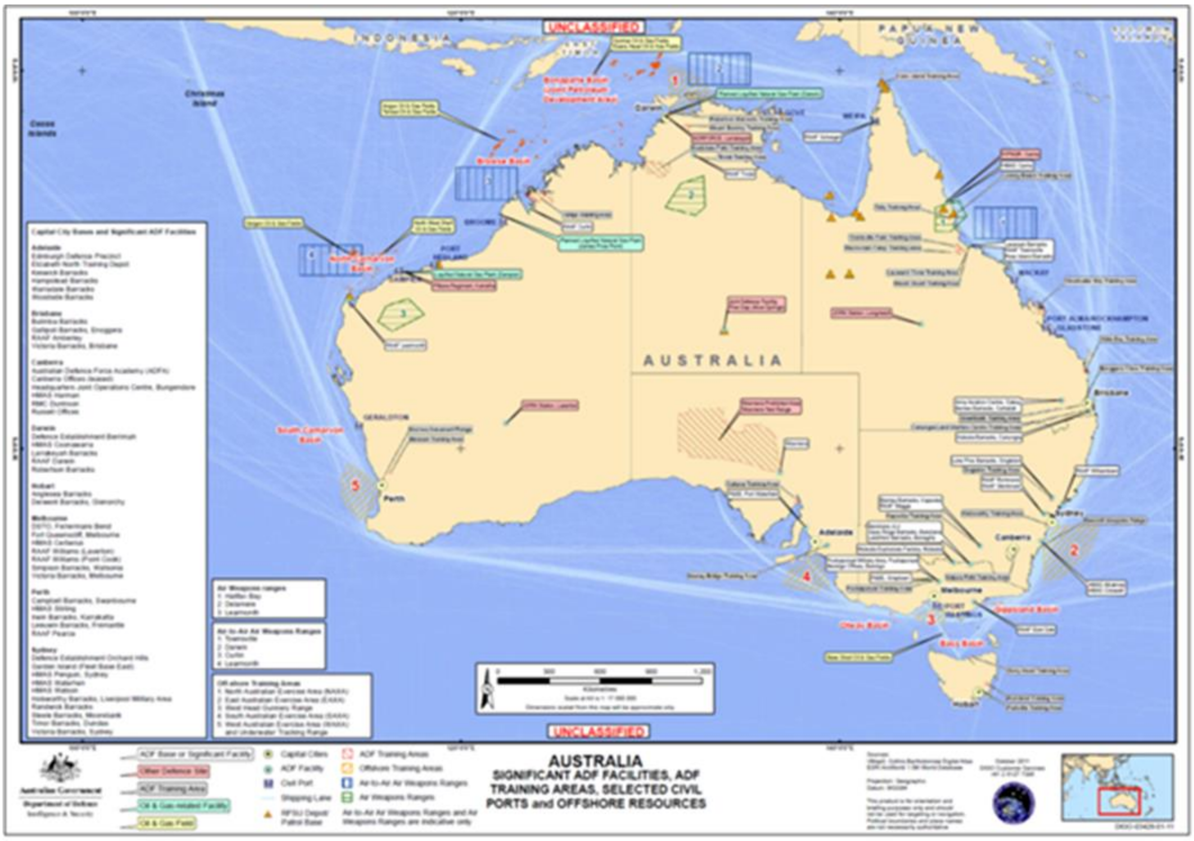

Figure A-78 Significant defence bases and facilities (Department of Defence, 2014)

Appendix B: EPBC Act Listed Species in the OA and EMBA

Table B- 1 EPBC Act listed fish (bony) species or species habitat that may occur within the OA and EMBA.

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Fish							
Acentronura tentaculate	Shortpouch pygmy pipehorse			✓	-	-	MO
Amphiprion mccullochi	Whitesnout anemonefish	CE					KO
Brachiopsilus ziebelli	Ziebell's handfish,	V			-	-	LO
Cosmocampus howensis	Lord Howe pipefish			✓	-	-	MO
Epinephelus daemelii	Black rockcod	V		✓	-	-	LO
Festucalex cinctus	Girdled pipefish			✓	-	-	MO
Filicampus tigris	Tiger pipefish			✓	-	-	MO
Galaxiella pusilla	Eastern dwarf galaxias	E			-	-	KO
Halicampus boothae	Booth's pipefish			✓	-	-	MO
Heraldia nocturna	Upside-down pipefish			✓	-	-	MO
Hippichthys heptagonus	Madura pipefish			✓			MO
Hippichthys penicillus	Beady pipefish			✓	-	-	MO
Hippocampus abdominalis	Big-belly seahorse			✓	-	-	MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Hippocampus breviceps	Short-head seahorse			✓	-	-	MO
Hippocampus minotaur	Bullneck seahorse			✓	-	-	MO
Hippocampus kelloggi	Kellogg Seahorse			✓	-	-	MO
Hippocampus whitei	White's seahorse	E		✓	-	-	KO
Histiogamphelus briggsii	Crested pipefish			✓	-	-	MO
Histiogamphelus cristatus	Rhino pipefish			✓	-	-	MO
Hoplostethus atlanticus	Orange roughy	CD			-	-	LO
Hypselognathus rostratus	Knifesnout pipefish			✓	-	-	MO
Kaupus costatus	Deepbody pipefish			✓	-	-	MO
Kimblaeus bassensis	Trawl pipefish			✓	-	-	MO
Leptoichthys fistularius	Brushtail pipefish			✓	-	-	MO
Lissocampus caudalis	Australian smooth pipefish			✓	-	-	MO
Lissocampus runa	Javelin pipefish			✓	-	-	MO
Maccullochella peelii	Murray cod	V			-	-	TKO
Macquaria australasica	Macquarie perch	E			-	-	TKO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Maroubra perserrata	Sawtooth pipefish			✓	-	-	MO
Mitotichthys mollisoni	Mollison's pipefish			✓	-	-	MO
Mitotichthys semistriatus	Halfbanded pipefish			✓	-	-	MO
Mitotichthys tuckeri	Tucker's pipefish			✓	-	-	MO
Mordacia praecox	Non-parasitic lamprey, precocious lamprey	E		✓	-	-	LO
Notiocampus ruber	Red pipefish			✓	-	-	MO
Phycodurus eques	Leafy seadragon			✓	-	-	MO
Phyllopteryx taeniolatus	Common seadragon			✓	-	-	MO
Prototroctes maraena	Australian grayling	V		✓	-	-	KO
Pugnaso curtirostris	Pugnose pipefish			✓	-	-	MO
Rexea solandri (eastern Australian population)	Eastern gemfish	CD			-	-	LO
Seriolella brama	Blue warehou	CD			-	-	KO
Solegnathus dunckeri	Duncker's pipehorse			✓	-	-	MO
Solegnathus robustus	Robust pipehorse			✓	-	-	MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Solegnathus spinosissimus	Spiny pipe horse			✓	-	-	MO
Solenostomus cyanopterus	Robust ghostpipefish			✓	-	-	MO
Solenostomus paradoxus	Ornate ghostpipefish			✓	-	-	MO
Stigmatopora argus	Spotted pipefish			✓	-	-	MO
Stigmatopora nigra	Widebody pipefish			✓	-	-	MO
Stipecampus cristatus	Ringback pipefish			✓	-	-	MO
Syngnathoides biaculeatus	Double-end pipehorse,			✓	-	-	MO
Thymichthys politus	Red handfish	CE			-	-	MO
Trachyrhamphus bicoarctatus	Bentstick pipefish			✓	-	-	MO
Urocampus carinirostris	Hairy pipefish			✓	-	-	MO
Vanacampus margaritifer	Mother-of-pearl pipefish			✓	-	-	MO
Vanacampus phillipi	Port Phillip pipefish			✓	-	-	MO
Vanacampus poecilolaemus	Long-snout pipefish			✓	-	-	MO
Threatened Species: V Vulnerable E Endangered CD Conservation Dependant	Type of Presence: MO Species or species habitat may occur within the area LO Species or species habitat likely to occur within the area						

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
	KO Species or species habitat known to occur within the area TKO Translocated population known to occur within area						

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Table B- 2 EPBC Act listed fish (cartilaginous) species or species habitat that may occur within the OA and EMBA.

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Sharks and Rays							
Carcharhinus longimanus	Oceanic whitetip shark		✓		-	-	LO
Carcharias Taurus (east coast population)	Grey nurse shark (east coast population)	CE			-	b,f	MO
Carcharodon carcharias	Great white shark	V	✓		M	a,, b, f	MKO
Centrophorus harrissoni	Harrisson's dogfish	CD			-	-	LO
Centrophorus uyato	Little gulper shark	CD			-	-	MO
Galeorhinus galeus	School shark	CD			-	-	LO
Isurus oxyrinchus	Shortfin mako		✓		-	-	LO
Isurus paucus	Longfin mako		✓		-	-	LO
Lamna nasus	Porbeagle		✓		-	-	LO
Mobula alfredi	Reef manta ray		✓		-	-	MO
Mobula birostris	Giant manta ray		✓		-	-	KO
Rhincodon typus	Whale shark	V	✓		-	-	MO
Sphyrna lewini	Scalloped hammerhead	CD			-	-	MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Threatened Species: V Vulnerable CE Critically Endangered CD Conservation Dependant	Type of Presence: MO Species or species habitat may occur within the area LO Species or species habitat likely to occur within the area KO Species or species habitat known to occur within the area MKO Migration route known to occur within area			Biologically Important Areas: b Breeding f Foraging m Migration d Distribution a Aggregation			

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Table B- 3 EPBC Act listed seabird and shorebird species or species habitat that may occur within the OA and EMBA

Note: only seabirds and shorebirds known to occur in marine or coastal environments are listed below. See Appendix C and Appendix D for a full list of birds that were detected by the EPBC Act PMST reports for the OA and EMBA respectively.

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Seabirds							
Albatross							
Diomedea exulans antipodensis	Antipodean albatross	V	✓ (M)	✓	f	f	FLO
Diomedea antipodensis gibsoni	Gibson’s albatross	V	-	✓	-	-	FLO
Diomedea epomophora	Southern royal albatross	V	✓ (M)	✓	-	-	FLO
Diomedea exulans (sensu lato)	Wandering albatross	V	✓ (M)	✓	f	f	FLO
Diomedia sanfordi	Northern royal albatross	E	✓ (M)	✓	-	-	FLO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Phoebetria fusca	Sooty albatross	V	✓ (M)	✓	-	-	MO
Thalassarche bulleri	Buller's albatross	V	-	✓	f	f	MO
Thalassarche bulleri platei	Northern Buller's albatross	V	✓ (M)	✓	-	-	FLO
Thalassarche chlororhynchos bassi (Thalassarche carteri)	Indian yellow-nosed albatross	V	✓ (M)	✓	f	f	LO
Thalassarche cauta cauta	Shy albatross	E	✓ (M)	✓	f	f	FLO
Thalassarche chrysostoma	Grey-headed albatross	E	✓(M)	✓	-	-	MO
Thalassarche eremita	Chatham albatross	E	✓ (M)	✓	-	-	FLO
Thalassarche impavida	Campbell albatross	V	✓ (M)	✓	f	f	FLO
Thalassarche melanophris	Black-browed albatross	V	✓ (M)	✓	f	f	FLO
Thalassarche salvini	Salvin's albatross	V	✓ (M)	✓	-	-	FLO
Thalassarche steadi	White-capped albatross	V	✓(M)	✓	-	f	FKO
Petrels							
Fregetta grallaria grallaria	White-bellied storm-petrel (Tasman Sea)	V	-	-	-	b,f	LO
Halobaena caerulea	Blue petrel	V	-	✓	-	-	MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Macronectes giganteus	Southern giant petrel	E	✓ (M)	✓	-	f	MO
Macronectes halli	Northern giant petrel	V	✓ (M)	✓	-	f	FLO
Oceanites oceanites	Wilson storm petrel	-	✓ (M)	-	-	m	KO
Pelagodroma marina	White-faced storm petrel	-	-	✓	f	b,f	BKO
Pelecanoides urinatrix	Common diving petrel	-	-	✓	f	b,f	BKO
Procellaraia narkinsoni	Black petrel	-	-	-	-	F	LO
Pterodroma cervicalis	White-necked petrel	-	-	✓	-	-	MO
Pterodroma heraldica	Herald petrel	CE	-	✓	-	-	LO
Pterodroma leucoptera leucoptera	Gould's petrel	E	-	-	-	-	BK
Pterodroma macroptera	Great winged petrel	-	-	-	-	f	
Pterodroma mollis	Soft-plumaged petrel	V	-	✓	-	f	MO
Pterodromoa neglecta neglecta	Kermadec petrel (western)	V	-	-	-	b,f	FMO
Pterodroma nigripennis	Black-winged petrel	-	-	✓	-	b,f	BKO
Pterodroma solandri	Providence petrel	-	-	✓	-	b,f	BKO
Shearwaters							

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Ardenna carneipes	Flesh-footed shearwater	-	✓ (M)	✓	f	f	KO
Ardenna grisea	Sooty shearwater	-	✓ (M)	✓	-	b,f	MO
Ardenna pacifica	Wedge-tailed shearwater	-	✓ (M)	-	-	b,f	KO
Ardenna tenuirostris	Short-tailed shearwater	-	✓(M)	✓	f	b,f	BKO
Calonectris leucomelas	Streaked shearwater	-	✓(M)	-	-	-	LO
Puffinus assimilis	Little shearwater	-	-	-	-	b,f	BKO
Shorebirds and other seabirds							
Actitis hypoleucos	Common sandpiper	-	✓ (W)	✓	-	-	MO
Anous albivitta	Grey noddy	-	✓ (M)	-	-	b,f	LO
Anous stolidus	Common noddy	-	✓ (M)	✓	-	b,f	KO
Anthochaera Phrygia	Regent honeyeater	CE	-	-	-	-	KO
Apus pacificus	Fork-tailed swift	-	✓(M)	✓	-	-	LO
Aquila audax fleayi	Tasmanian wedge-tailed eagle	E	-	-	-	-	LO
Arenaria interpres	Ruddy turnstone	V	✓ (W)	✓	-	-	RKO
Botaurus poiciloptilus	Australasian bittern	E	-	-	-	-	KO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Bubulcus ibis	Cattle egret	-	-	✓	-	-	MLO
Calidris acuminata	Sharp-tailed sandpiper	V	✓ (W)	✓	-	-	RKO
Calidris alba	Sanderling	-	✓ (W)	✓	-	-	RKO
Calidris canutus	Red knot	V	✓ (W)	✓	-	-	MO
Calidris ferruginea	Curlew sandpiper	CE	✓ (W)	✓	-	-	MO
Calidris melanotos	Pectoral sandpiper	-	✓ (W)	✓	-	-	MO
Calidris pugnax	Ruff	-	✓ (W)	✓	-	-	RKO
Calidris ruficollis	Red-necked stint	-	✓ (W)	✓	-	-	RKO
Calidris subminuta	Long-toed stint	-	✓ (W)	✓	-	-	RKO
Calidris tenuirostris	Great knot	V	✓ (W)	✓	-	-	RKO
Callocephalon fimbriatum	Gang-gang cockatoo	E	-	-	-	-	KO
Calyptorhynchus lathami lathami	South-eastern glossy black-cockatoo	V	-	-	-	-	KO
Ceyx azureus diemenensis	Tasmanian zzure kingfisher	E	-	-	-	-	KO
Charadrius bicinctus	Double-banded plover	-	✓ (W)	✓	-	-	RKO
Charadrius leschenaultii	Greater sand plover	V	✓ (W)	✓	-	-	KO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Charadrius mongolus	Lesser sand plover	E	✓ (W)	✓	-	-	RKO
Charadrius ruficapillus	Red-capped plover	-	-	✓	-	-	RKO
Charadrius veredus	Oriental plover	-	✓ (W)	✓	-	-	KO
Chroicocephalus novaehollandiae	Silver gull	-	-	✓	-	-	BKO
Climacteris picumnus victoriae	Brown treecreeper	V	-	-	-	-	KO
Dasyomis brachypterus	Eastern bristlebird	E	-	-	-	-	KO
Erythrotriorchis radiatus	Red goshawk	E	-	-	-	-	MO
Eudyptula minor	Little penguin	-	-	✓	-	b,f	BKO
Falco hypoleucos	Grey falcon	V	-	-	-	-	LO
Fregata ariel	Lesser frigatebird	-	✓ (M)	✓	-	-	MO
Fregata minor	Great frigatebird	-	✓ (M)	✓	-	-	MO
Gallinago hardwickii	Latham's snipe	V	✓ (W)	✓	-	-	KO
Gallinago megala	Swinhoe's snipe	-	✓ (W)	✓	-	-	RLO
Gallinago stenura	Pin-tailed snipe	-	✓ (W)	✓	-	-	RLO
Grantiella picta	Painted honeyeater	V	-	-	-	-	KO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Haliaeetus leucogaster	White-bellied sea eagle	-	-	✓	-	-	BKO
Himantopus himantopus	Black-winged stilt	-	-	✓	-	-	RKO
Hirundapus caudacutus	White-throated needletail	V	✓ (T)	✓	-	-	KO
Hydroprogne caspia	Caspian tern	-	✓ (M)	✓	-	-	BKO
Hypotaenidia sylvestris	Lord Howe woodhen	E	-	-	-	b	BLO
Larus dominicanus	Kelp gull	-	-	✓	-	-	BKO
Larus pacificus	Pacific gull	-	-	✓	-	-	BKO
Lathamus discolor	Swift parrot	CE	-	✓	-	-	KO
Limicola falcinellus	Broad-billed sandpiper	-	✓ (W)	✓	-	-	RKO
Limnodromus semipalmatus	Asian dowitcher	V	✓ (W)	✓	-	-	KO
Limosa lapponica	Bar-tailed godwit	-	✓ (W)	✓	-	-	KO
Limosa lapponica baueri	Nunivak bar-tailed godwit	E	-	✓	-	-	KO
Limosa limosa	Black-tailed godwit	E	✓ (W)	✓	-	-	RKO
Merops ornatus	Rainbow bee-eater	-	-	✓	-	-	MO
Melanodryas cucullata cucullata	South-eastern hooded robin	E	-	-	-	-	LO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Monarcha melanopsis	Black-faced monarch	-	✓	✓	-	-	KO
Morus serrator	Australasian gannet	-	-	✓	-	f	BKO
Motacilla flava	Yellow wagtail	-	✓ (T)	✓	-	-	MO
Myiagra cyanoleuca	Satin flycatcher	-	-	✓	-	-	KO
Neophema chrysogaster	Orange-bellied parrot	CE	-	✓	-	-	KO
Neophema chrysostoma	Blue-winged parrot	V	-	✓	-	-	KO
Numenius madagascariensis	Eastern curlew	CE	✓ (W)	✓	-	-	MO
Numenius minutus	Little curlew	-	✓ (W)	✓	-	-	RLO
Numenius phaeopus	Whimbrel	-	✓ (W)	✓	-	-	RKO
Onychoprion fuscatus	Sooty tern	-	-	✓	-	b,f	BKO
Pachyptila turtur	Fairy prion	-	-	✓	-	-	MO
Pachyptila turtur subantarctica	Fairy prion (southern)	V	-	-	-	-	MO
Pandion haliaetus	Osprey	-	✓ (W)	✓	-	-	KO
Pardalotus quadragintus	Forty-spotted pardalote	E	-	-	-	-	KO
Phalacrocorax fuscescens	Black-faced cormorant	-	-	✓	-	b,f	BKO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Phaethon lepturus	White-tailed tropicbird	-	✓ (M)	✓	-	-	KO
Phaethon rubricauda	Red-tailed tropicbird	-	✓ (M)	✓	-	b,f	BKO
Pluvialis fulva	Pacific golden plover	-	✓ (W)	✓	-	-	RKO
Pluvialis squatarola	Grey plover	V	✓ (W)	✓	-	-	RKO
Pycnoptilus floccosus	Pilotbird	V	-	-	-	-	KO
Recurvirostra novaehollandiae	Red-necked avocet	-	-	✓	-	-	RKO
Rhipidura rufifrons	Rufous fantail	-	-	✓	-	-	KO
Rostratula australis	Australian painted snipe	E	-	✓	-	-	KO
Stagonopleura guttata	Diamond firetail	V	-	-	-	-	KO
Stercorarius antarcticus	Brown skua	-	-	✓	-	-	MO
Sterna striata	White-fronted tern	-	-	✓	-	-	MRMO
Sternula albifrons	Little tern	-	✓ (M)	✓	-	-	BKO
Sternula nereis	Fairy tern	-	-	✓	-	-	BKO
Sternula nereis nereis	Australian fairy tern	V	-	✓	-	-	LO
Strepera graculina crissalis	Lord Howe Island currawong	V	-	-	-	-	KO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Sula dactylatra	Masked booby	-	✓ (M)	✓	-	b,f	BKO
Symposiachrus trivirgatus	Spectacled monarch	-	-	✓	-	-	KO
Thalasseus bergii	Greater crested tern	-	✓ (W)	✓	-	b,f	BKO
Thinornis cucullatus	Hooded plover	-	-	✓	-	-	KO
Thinornis cucullatus cucullatus	Eastern hooded plover	V	-	✓	-	-	KO
Tringa brevipes	Grey-tailed tattler	-	✓ (W)	✓	-	-	RKO
Tringa glareola	Wood sandpiper	-	✓ (W)	✓	-	-	RKO
Tringa incana	Wandering tattler	-	✓ (W)	✓	-	-	RKO
Tringa nebularia	Common greenshank	E	✓ (W)	✓	-	-	KO
Tringa stagnatilis	Marsh sandpiper	-	✓ (W)	✓	-	-	RKO
Tyto novaehollandiae castanopus	Masked Owl (Tasmania)	V	-	-	-	-	KO
Xenus cinereus	Terek sandpiper	V	✓ (W)	✓	-	-	KO

Threatened Species:
V Vulnerable
E Endangered
CE Critically Endangered

Biologically Important Areas:
b Breeding
f Foraging Migratory Species:

Type of Presence:
MO Species or species habitat may occur within the area
LO Species or species habitat likely to occur within the area
KO Species or species habitat known to occur within the area
FMO Foraging, feeding or related behaviour may occur within the area
FLO Foraging, feeding or related behaviour likely to occur within the area
FKO Foraging, feeding or related behaviour known to occur within the area
BKO Breeding known to occur within the area

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
M Marine W Wetland T Terrestrial	BLO Breeding likely to occur within the area RMO Roosting may occur within the area RLO Roosting likely to occur within the area RKO Roosting known to occur within the area MLO Migration route likely to occur within the area MRMO Migration route may occue in the area MKO Migration route known to occur within the area						

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Table B- 4 EPBC Act listed cetacean or species habitat that may occur within the OA and EMBA

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Whales							
Balaenoptera bonaerensis	Antartic minke whale	-	ü	-	-	-	LO
Balaenoptera borealis	Sei whale	V	ü	-	-	-	FLO
Balaenoptera edeni	Bryde's whale	-	ü	-	-	-	MO
Balaenoptera musculus	Blue whale	E	ü	-	-	-	LO
Balaenoptera musculus brevicauda	Pygmy blue whale	E	ü	-	f	f	KO
Balaenoptera physalus	Fin whale	V	ü	-	-	-	FLO
Berardius arnuxii	Arnoux's beaked whale	-	--	-	-	-	MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Caperea marginata	Pygmy right whale		ü				FLO
Eubalaena australis	Southern right whale	E	ü		m	m,r**	BKO
Globicephala macrorhynchus	Short-finned Pilot Whale						MO
Globicephala melas	Long-finned Pilot Whale						MO
Hyperoodon planifrons	Southern Bottlenose Whale						MO
Kogia breviceps	Pygmy Sperm Whale						MO
Kogia sima	Dwarf Sperm Whale						MO
Megaptera novaeangliae	Humpback whale		ü			f,m	MO
Mesoplodon bowdoini	Andrew's Beaked Whale						MO
Mesoplodon densirostris	Blainville's Beaked Whale						MO
Mesoplodon ginkgodens	Gingko-toothed beaked whale						MO
Mesoplodon grayi	Gray's beaked whale						MO
Mesoplodon hectori	Hector's beaked whale						MO
Mesoplodon layardii	Strap-toothed Beaked Whale						MO
Mesoplodon mirus	True's Beaked Whale						MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Physeter microcephalus	Sperm whale		ü				MO
Tasmacetus shepherdi	Shepherd's beaked whale						MO
Ziphius cavirostris	Cuvier's beaked whale						MO
Dolphins							
Feresa attenuata	Pygmy Killer Whale						MO
Grampus griseus	Risso's Dolphin						MO
Lagenorhynchus cruciger	Hourglass Dolphin						MO
Lagenodelphis hosei	Fraser's dolphin						MO
Lagenorhynchus obscurus	Dusky dolphin		ü				LO
Lissodelphis peronii	Southern Right Whale Dolphin						MO
Orcinus orca	Killer whale		ü				LO
Peponocephala electra	Melon-headed Whale						MO
Phocoena dioptrica	Spectacled porpoise		ü				MO
Pseudorca crassidens	False Killer Whale						LO
Stenella attenuata	Spotted dolphin						MO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Stenella coeruleoalba	Striped dolphin						MO
Stenella longirostris	Long-snouted spinner dolphin						MO
Steno bredanensis	Rough-toothed dolphin						MO
Tursiops aduncus	Spotted Bottlenose Dolphin					b	LO
Tursiops truncatus s. str.	Bottlenose Dolphin						MO
Threatened Species: V Vulnerable E Endangered Biologically Important Areas: b breeding c calving f foraging m migration d distribution kcr known core range	Type of Presence: MO Species or species habitat may occur within the area LO Species or species habitat likely to occur within the area KO Species or species habitat known to occur within the area FLO Foraging, feeding or related behaviour likely to occur within the area FKO Foraging, feeding or related behaviour known to occur within the area BKO Breeding known to occur within the area						

Note: Shaded species denotes that they occur in both the and the EMBA. ** = the SRW BIA data has undergone revision (mid 2023) and was not detected by the PMST, this information was extracted from the National Conservations Values Atlas (see Section 2.3.1.6 of Appendix A).

Table B- 5 EPBC Act listed pinnipeds or species habitat that may occur within the OA and EMBA

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Arctocephalus forsteri	New Zealand fur seal			✓	-	-	MO
Arctocephalus pusillus	Australian fur seal			✓	-	-	MO
Type of Presence: MO Species or species habitat may occur within the area							

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Table B- 6 EPBC Act listed sirenia or species habitat that may occur within OA and EMBA

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Dugong dugon	Dugong		✓	✓	-	-	MO
Type of Presence: MO Species or species habitat may occur within the area							

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Table B- 7 EPBC Act listed marine reptiles or species habitat that may occur within the OA and EMBA

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Turtles							
Caretta caretta	Loggerhead turtle	E	✓	✓	-	-	FLO

Scientific name	Common name	Threatened species	Migratory species	Listed marine species	BIA		Type of presence
					OA	EMBA	
Chelonia mydas	Green turtle	V	✓	✓	-	-	MO
Dermochelys coriacea	Leatherback turtle	E	✓	✓	-	-	LO
Eretmochelys imbricata	Hawksbill turtle	V	✓	✓	-	-	FKO
Natator depressus	Flatback turtle	V	✓	✓	-	-	KO
Sea snakes							
Pelamis platurus	Yellow-bellied sea snake			✓	-	-	MO
Threatened Species: V Vulnerable E Endangered	Type of Presence: FKO Foraging, feeding or related behaviour known to occur within the area BLO Breeding likely to occur within the area KO Species or species habitat known to occur within the area MO Species or species habitat may occur within the area LO Species or species habitat likely to occur within the area						

Note: Shaded species denotes that they occur in both the OA and the EMBA.

Appendix C: EPBC Act Protected Matters Report – OA

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: 04-Oct-2024

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:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	42
Listed Migratory Species:	43

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:	61
Whales and Other Cetaceans:	27
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
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:	19
Key Ecological Features (Marine):	1
Biologically Important Areas:	8
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)

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
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

Scientific Name	Threatened Category	Presence Text
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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may 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 may occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	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	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may 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 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
FISH		
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
MAMMAL		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely 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

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Migration route 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 may 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

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat 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

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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may 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 may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may 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 eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area

Scientific Name	Threatened Category	Presence Text
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 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	Species or species habitat likely 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

Scientific Name	Threatened Category	Presence Text
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Migration route 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
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 may 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

Scientific Name	Threatened Category	Presence Text
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 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
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
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

Scientific Name	Threatened Category	Presence Text
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat 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
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

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	Species or species habitat may 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 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	Species or species habitat may occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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 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
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

Scientific Name	Threatened Category	Presence Text
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 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

Scientific Name	Threatened Category	Presence Text
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
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		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

Scientific Name	Threatened Category	Presence Text
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 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	Species or species habitat likely 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
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

Current Scientific Name	Status	Type of Presence
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may 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 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

Current Scientific Name	Status	Type of Presence
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

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
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 in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	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
Drilling and side track completion at Baleen gas production well in Production Licence area VIC/L21	2004/1535	Not Controlled Action	Completed
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	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
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Not controlled action (particular manner)			
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
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
Northern Fields 3D Seismic Survey	2001/140	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Longtom 5 Offshore Production Drilling (VIC/L29)	2012/6404	Referral Decision	Completed
Longtom-5 Offshore Production Drilling (Vic/L29)	2012/6413	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
Upwelling East of Eden	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Seabirds		
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
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
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present

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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Appendix D: EPBC Act Protected Matters Report – EMBA

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: 04-Oct-2024

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:	3
National Heritage Places:	15
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	7
Listed Threatened Ecological Communities:	17
Listed Threatened Species:	178
Listed Migratory Species:	92

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:	470
Commonwealth Heritage Places:	69
Listed Marine Species:	135
Whales and Other Cetaceans:	40
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	1
Australian Marine Parks:	12
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:	35
Regional Forest Agreements:	1
Nationally Important Wetlands:	16
EPBC Act Referrals:	158
Key Ecological Features (Marine):	6
Biologically Important Areas:	54
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Legal Status
Australian Convict Sites (Hyde Park Barracks)	NSW	Declared property
Lord Howe Island Group	NSW	Declared property
Sydney Opera House	NSW	Declared property

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Bondi Beach	NSW	Listed place
Bondi Surf Pavilion	NSW	Within listed place
Centennial Park	NSW	Listed place
First Government House Site	NSW	Listed place
Governors' Domain and Civic Precinct	NSW	Listed place
Hyde Park Barracks	NSW	Listed place
Kamay Botany Bay: botanical collection sites	NSW	Listed place
Kurnell Peninsula Headland	NSW	Listed place
North Head - Sydney	NSW	Listed place
Sydney Harbour Bridge	NSW	Listed place
Sydney Opera House	NSW	Listed place
Indigenous		
Cyprus Hellene Club - Australian Hall	NSW	Listed place
Natural		
Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	NSW	Listed place
Lord Howe Island Group	NSW	Listed place
Royal National Park and Garawarra State Conservation Area	NSW	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity

Ramsar Site Name	Proximity
Elizabeth and middleton reefs marine national nature reserve	Within Ramsar site
Towra point nature reserve	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)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
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
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may 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 likely to occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Eastern Suburbs Banksia Scrub of the Sydney Region	Critically Endangered	Community likely to occur within area

Community Name	Threatened Category	Presence Text
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community likely to occur within area
Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion	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
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	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
Robertson Rainforest in the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically 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		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	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]	Vulnerable	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
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 likely 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

Scientific Name	Threatened Category	Presence Text
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	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may 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	Breeding known 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 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

Scientific Name	Threatened Category	Presence Text
Hypotaenidia sylvestris Lord Howe Woodhen [87732]	Endangered	Breeding likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to 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
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may 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 likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
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 may occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma heraldica Herald Petrel [66973]	Critically Endangered	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 neglecta neglecta Kermadec Petrel (western) [64450]	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
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Strepera graculina crissalis Lord Howe Island Currawong, Pied Currawong (Lord Howe Island) [25994]	Vulnerable	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat 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 eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may 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
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
FISH		
Amphiprion mccullochi Whitesnout Anemonefish, McCulloch's Anemonefish [76925]	Critically Endangered	Species or species habitat known to occur within area
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	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
Maccullochella peelii Murray Cod [66633]	Vulnerable	Translocated population known to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Translocated population known 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
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Northern Heath Frog, Littlejohn's Tree Frog [64733]	Endangered	Species or species habitat known to occur within area
Litoria watsoni Southern Heath Frog, Watson's Tree Frog [91509]	Endangered	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
INSECT		
Austrocordulia leonardi Sydney Hawk Dragonfly [84741]	Endangered	Species or species habitat likely to occur within area
Cormodes darwini a beetle [92235]	Critically Endangered	Species or species habitat known to occur within area
Dryococelus australis Lord Howe Island Phasmid, Land Lobster [66752]	Critically Endangered	Species or species habitat known to occur within area
Promethis sterrha a beetle [92260]	Critically Endangered	Species or species habitat known 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	Species or species habitat may 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
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat 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
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
Notamacropus parma		
Parma Wallaby [89289]	Vulnerable	Species or species habitat may 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
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may 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 tridactylus tridactylus		
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Potorous tridactylus trisulcatus		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
OTHER		
Dendronephthya australis		
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat known to occur within area
Pericryptodrilus nanus		
Lord Howe Earthworm [84736]	Critically Endangered	Species or species habitat known to occur within area
PLANT		
Acacia baueri subsp. aspera		
[18662]	Endangered	Species or species habitat known to occur within area
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Acacia terminalis subsp. Eastern Sydney (G.P.Phillips 126) listed as Acacia terminalis subsp. terminalis MS		
Sunshine Wattle (Sydney region) [91564]	Endangered	Species or species habitat known to occur within area
Allocasuarina glareicola		
[21932]	Endangered	Species or species habitat may occur within area
Allocasuarina portuensis		
Nielsen Park She-oak [21937]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Anthosachne kingiana subsp. kingiana Phillip Island Wheat Grass [87946]	Critically Endangered	Species or species habitat known to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat known to occur within area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat known to occur within area
Banksia vincentia [88276]	Critically Endangered	Species or species habitat known to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Calochilus pulchellus Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat known to occur within area
Calystegia affinis [48909]	Critically 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 may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area
Daphnandra johnsonii Illawarra Socketwood [67186]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Darwinia biflora [14619]	Vulnerable	Species or species habitat may occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat known to occur within area
Geniostoma huttonii [56368]	Endangered	Species or species habitat known to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat known to occur within area
Grevillea shiressii [19186]	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
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area
Hibbertia acaulothrix [87409]	Endangered	Species or species habitat may occur within area
Irenepharsus trypherus Delicate Cress, Illawarra Irene [14664]	Endangered	Species or species habitat may occur within area
Kunzea rupestris [8798]	Vulnerable	Species or species habitat may occur within area
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lepidorrhachis mooreana Little Mountain Palm, Moorei Palm [6388]	Critically Endangered	Species or species habitat known to occur within area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat may occur within area
Leucopogon exolasius Woronora Beard-heath [14251]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat known to occur within area
Micromyrtus blakelyi [6870]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia bargoensis Bargo Geebung [56267]	Endangered	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat known to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat known to occur within area
Persoonia oxycoccoides [16114]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Polystichum moorei Rock Shield Fern [40755]	Endangered	Species or species habitat likely to occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum affine Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid [2210]	Endangered	Species or species habitat known to occur within area
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat known to occur within area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat known to occur within area
Prostanthera marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat known to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat known to occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pterostylis sp. Botany Bay (A.Bishop J221/1-13) Botany Bay Bearded Greenhood, Botany Bay Bearded Orchid [64965]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis vernalis Halbury Rustyhood [84711]	Critically Endangered	Species or species habitat may occur within area
Pultenaea aristata [18062]	Vulnerable	Species or species habitat known to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
Xylosma parvifolia [48040]	Endangered	Species or species habitat known to occur within area
Zieria granulata Hill Zieria, Hilly Zieria, Illawarra Zieria [17147]	Endangered	Species or species habitat likely to 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
Christinus guentheri Lord Howe Island Gecko, Lord Howe Island Southern Gecko [59250]	Vulnerable	Species or species habitat 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
Hoplocephalus bungaroides Broad-headed Snake [1182]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Oligosoma lichenigerum Lord Howe Island Skink [91467]	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

Scientific Name	Threatened Category	Presence Text
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 may occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area
SNAIL		
Gudeoconcha sophiae magnifica		
Magnificent Helicarionid Land Snail [82864]	Critically Endangered	Species or species habitat likely to occur within area
Meridolum maryae		
Maroubra Woodland Snail, Maroubra Land Snail [89884]	Endangered	Species or species habitat known to occur within area
Mystivagor mastersi		
Masters' Charopid Land Snail [81247]	Critically Endangered	Species or species habitat known to occur within area
Placostylus bivaricosus		
Lord Howe Flax Snail, Lord Howe Placostylus [66769]	Endangered	Species or species habitat known to occur within area
Pseudocharopa ledgbirdi		
Mount Lidgbird Charopid Land Snail [85279]	Critically Endangered	Species or species habitat likely to occur within area
Pseudocharopa whiteleggei		
Whitelegge's Land Snail [81249]	Critically Endangered	Species or species habitat likely to occur within area

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Breeding known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Breeding known to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	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
Calonectris leucomelas Streaked Shearwater [1077]		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 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	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat 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 eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may 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
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 likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may 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
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area
Carcharias taurus Grey Nurse Shark [64469]		Congregation or aggregation known to 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
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
Dugong dugon Dugong [28]		Species or species habitat may 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
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
Isurus paucus		
Longfin Mako [82947]		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
Mobula alfredi as Manta alfredi		
Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris		
Giant Manta Ray [90034]		Species or species habitat likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour 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

Scientific Name	Threatened Category	Presence Text
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 known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		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]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text
Calidris pugnax as Philomachus pugnax Ruff [91256]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	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]		Roosting known 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
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	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
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	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]		Foraging, feeding or related behaviour known to occur within area
Tringa incana Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	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
Australian Academy of Science	
Commonwealth Land - Australian Academy of Science [12031]	NSW
Australian National University	
Commonwealth Land - Australian National University [13156]	NSW
Commonwealth Bank of Australia	
Commonwealth Land - Commonwealth Bank of Australia [14331]	NSW
Commonwealth Land - Commonwealth Bank of Australia [13158]	NSW
Commonwealth Trading Bank of Australia	
Commonwealth Land - Commonwealth Trading Bank of Australia [12202]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [12203]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [14323]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [14322]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [14325]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [14337]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [12224]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [13209]	NSW
Communications, Information Technology and the Arts - Australian Broadcasting Corporation	

Commonwealth Land Name	State
Commonwealth Land - Australian Broadcasting Corporation [15511]	NSW
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Commission [12205]	NSW
Commonwealth Land - Australian Postal Commission [14391]	NSW
Commonwealth Land - Australian Postal Commission [14329]	NSW
Commonwealth Land - Australian Postal Commission [13290]	NSW
Commonwealth Land - Australian Postal Commission [14324]	NSW
Commonwealth Land - Australian Postal Commission [14326]	NSW
Commonwealth Land - Australian Postal Commission [13195]	NSW
Commonwealth Land - Australian Postal Commission [13224]	NSW
Commonwealth Land - Australian Postal Commission [14338]	NSW
Commonwealth Land - Australian Postal Commission [13291]	NSW
Commonwealth Land - Australian Postal Commission [15538]	NSW
Commonwealth Land - Australian Postal Commission [15537]	NSW
Commonwealth Land - Australian Postal Commission [14350]	NSW
Commonwealth Land - Australian Postal Commission [14355]	NSW
Commonwealth Land - Australian Postal Commission [13137]	NSW
Commonwealth Land - Australian Postal Commission [13228]	NSW
Commonwealth Land - Australian Postal Commission [12078]	NSW
Commonwealth Land - Australian Postal Commission [13153]	NSW
Commonwealth Land - Australian Postal Commission [14284]	NSW
Commonwealth Land - Australian Postal Commission [11893]	NSW
Commonwealth Land - Australian Postal Commission [14280]	NSW
Commonwealth Land - Australian Postal Commission [13215]	NSW
Commonwealth Land - Australian Postal Commission [16431]	NSW
Commonwealth Land - Australian Postal Commission [14366]	NSW
Commonwealth Land - Australian Postal Commission [13239]	NSW

Commonwealth Land Name	State
Commonwealth Land - Australian Postal Commission [13192]	NSW
Commonwealth Land - Australian Postal Commission [13193]	NSW
Commonwealth Land - Australian Postal Commission [12225]	NSW
Commonwealth Land - Australian Postal Corporation [12207]	NSW
Commonwealth Land - Australian Postal Corporation [14343]	NSW
Commonwealth Land - Australian Postal Corporation [14342]	NSW
Commonwealth Land - Australian Postal Corporation [16009]	NSW
Commonwealth Land - Australian Postal Corporation [16525]	NSW
Commonwealth Land - Australian Postal Corporation [16021]	NSW
Commonwealth Land - Australian Postal Corporation [12073]	NSW
Commonwealth Land - Australian Postal Corporation [12227]	NSW
Commonwealth Land - Australian Postal Corporation [13152]	NSW
Commonwealth Land - Australian Postal Corporation [12072]	NSW
Commonwealth Land - Australian Postal Corporation [13214]	NSW
Commonwealth Land - Australian Postal Corporation [12226]	NSW
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian & Overseas Telecommunications Corporation [14359]	NSW
Commonwealth Land - Australian & Overseas Telecommunications Corporation [13155]	NSW
Commonwealth Land - Australian Telecommunications Commission [13240]	NSW
Commonwealth Land - Australian Telecommunications Commission [13241]	NSW
Commonwealth Land - Australian Telecommunications Commission [12010]	NSW
Commonwealth Land - Australian Telecommunications Commission [13225]	NSW
Commonwealth Land - Australian Telecommunications Commission [13194]	NSW
Commonwealth Land - Australian Telecommunications Commission [14379]	NSW

Commonwealth Land Name	State
Commonwealth Land - Australian Telecommunications Commission [13226]	NSW
Commonwealth Land - Australian Telecommunications Commission [13221]	NSW
Commonwealth Land - Australian Telecommunications Commission [13222]	NSW
Commonwealth Land - Australian Telecommunications Commission [12059]	NSW
Commonwealth Land - Australian Telecommunications Commission [14327]	NSW
Commonwealth Land - Australian Telecommunications Commission [11831]	NSW
Commonwealth Land - Australian Telecommunications Commission [12215]	NSW
Commonwealth Land - Australian Telecommunications Commission [13293]	NSW
Commonwealth Land - Australian Telecommunications Commission [13162]	NSW
Commonwealth Land - Australian Telecommunications Commission [11853]	NSW
Commonwealth Land - Australian Telecommunications Commission [14356]	NSW
Commonwealth Land - Australian Telecommunications Commission [14351]	NSW
Commonwealth Land - Australian Telecommunications Commission [13136]	NSW
Commonwealth Land - Australian Telecommunications Commission [13223]	NSW
Commonwealth Land - Australian Telecommunications Commission [11887]	NSW
Commonwealth Land - Australian Telecommunications Commission [13157]	NSW
Commonwealth Land - Australian Telecommunications Commission [13154]	NSW
Commonwealth Land - Australian Telecommunications Commission [11888]	NSW
Commonwealth Land - Australian Telecommunications Commission [11889]	NSW

Commonwealth Land Name	State
Commonwealth Land - Australian Telecommunications Commission [16473]	NSW
Commonwealth Land - Australian Telecommunications Commission [14285]	NSW
Commonwealth Land - Australian Telecommunications Commission [11894]	NSW
Commonwealth Land - Australian Telecommunications Commission [11892]	NSW
Commonwealth Land - Australian Telecommunications Commission [14281]	NSW
Commonwealth Land - Australian Telecommunications Commission [13216]	NSW
Commonwealth Land - Australian Telecommunications Commission [13129]	NSW
Commonwealth Land - Australian Telecommunications Commission [14279]	NSW
Commonwealth Land - Australian Telecommunications Commission [13231]	NSW
Commonwealth Land - Australian Telecommunications Commission [12058]	NSW
Commonwealth Land - Australian Telecommunications Commission [12223]	NSW
Commonwealth Land - Australian Telecommunications Commission [12008]	NSW
Commonwealth Land - Australian Telecommunications Commission [12038]	NSW
Commonwealth Land - Australian Telecommunications Commission [12037]	NSW
Commonwealth Land - Australian Telecommunications Commission [12036]	NSW
Commonwealth Land - Australian Telecommunications Commission [14381]	NSW
Commonwealth Land - Australian Telecommunications Corporation [13292]	NSW
Commonwealth Land - Australian Telecommunications Corporation [14286]	NSW
Commonwealth Land - Telstra Corporation Limited [12204]	NSW
Commonwealth Land - Telstra Corporation Limited [13187]	NSW

Commonwealth Land Name	State
Commonwealth Land - Telstra Corporation Limited [14349]	NSW
Commonwealth Land - Telstra Corporation Limited [12076]	NSW
Commonwealth Land - Telstra Corporation Limited [14332]	NSW
Commonwealth Land - Telstra Corporation Limited [14333]	NSW
Commonwealth Land - Telstra Corporation Limited [12039]	NSW
Commonwealth Land - Telstra Corporation Limited [15407]	NSW
Commonwealth Land - Telstra Corporation Limited [12075]	NSW
Commonwealth Land - Telstra Corporation Limited [14282]	NSW
Commonwealth Land - Telstra Corporation Limited [14283]	NSW
Commonwealth Land - Telstra Corporation Limited [14287]	NSW
Commonwealth Land - Telstra Corporation Limited [14368]	NSW
Commonwealth Land - Telstra Corporation Limited [13213]	NSW
Defence	
Commonwealth Land - Defence Service Homes Corporation [13220]	NSW
Commonwealth Land - Defence Service Homes Corporation [13211]	NSW
Commonwealth Land - Defence Service Homes Corporation [14352]	NSW
Commonwealth Land - Defence Service Homes Corporation [14357]	NSW
Commonwealth Land - Defence Service Homes Corporation [11897]	NSW
Commonwealth Land - Defence Service Homes Corporation [11895]	NSW
Commonwealth Land - Defence Service Homes Corporation [14363]	NSW
Commonwealth Land - Defence Service Homes Corporation [14360]	NSW
Commonwealth Land - Defence Service Homes Corporation [11896]	NSW
Commonwealth Land - Defence Service Homes Corporation [13210]	NSW
Commonwealth Land - Defence Service Homes Corporation & Alice Isabel Patterson [14377]	NSW
Commonwealth Land - Director of Defence Service Homes [13208]	NSW
Defence - BANKSMEADOW DEPOT (Sydney Workshop Company) [11116]	NSW

Commonwealth Land Name	State
Defence - BANKSMEADOW DEPOT (Sydney Workshop Company) [11117]	NSW
Defence - BEECROFT RAPIER RANGE [10051]	NSW
Defence - BEECROFT RAPIER RANGE [10052]	NSW
Defence - BEECROFT RAPIER RANGE [10050]	NSW
Defence - BEECROFT RAPIER RANGE [10048]	NSW
Defence - BEECROFT RAPIER RANGE [10049]	NSW
Defence - DEE WHY DEPOT [11095]	NSW
Defence - DEFENCE PLAZA SYDNEY [11179]	NSW
Defence - DEGAUSSING RANGE [10039]	NSW
Defence - ENDEAVOUR HOUSE - COOGEE [11172]	NSW
Defence - FLEET BASE WHARVES [10024]	NSW
Defence - FLEET BASE WHARVES [10022]	NSW
Defence - FLEET BASE WHARVES [10021]	NSW
Defence - FLEET BASE WHARVES [10023]	NSW
Defence - GARDEN ISLAND [10014]	NSW
Defence - Graovac House [10147]	NSW
Defence - HMAS KUTTABUL (AC 30/5 Lot4 DP218946) [11074]	NSW
Defence - HMAS PENGUIN [11071]	NSW
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10042]	NSW
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10041]	NSW
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL [10040]	NSW
Defence - HMAS WATSON [10029]	NSW
Defence - HYDROGRAPHIC OFFICE [10234]	NSW
Defence - JENNER BUILDING [10034]	NSW
Defence - KENSINGTON DEPOT [11110]	NSW
Defence - KISMET/HMAS KUTTABUL-POTTS PT [11173]	NSW

Commonwealth Land Name	State
Defence - LADY GOWRIE HOUSE [10047]	NSW
Defence - LADY GOWRIE HOUSE [10046]	NSW
Defence - LADY GOWRIE HOUSE [10045]	NSW
Defence - LAKE ILLAWARRA CADET FACILITY [10241]	NSW
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA [10032]	NSW
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA [10033]	NSW
Defence - MARITIME HEADQUARTERS [11178]	NSW
Defence - MILLER'S POINT TRAINING DEPOT [11118]	NSW
Defence - NFI CHOWDER BAY (fuel depot) [10043]	NSW
Defence - NORTH SYDNEY - HYDRO OFFICE [11161]	NSW
Defence - OXFORD ST SYDNEY [11168]	NSW
Defence - OXFORD ST SYDNEY [11164]	NSW
Defence - OXFORD ST SYDNEY [11167]	NSW
Defence - OXFORD ST SYDNEY [11166]	NSW
Defence - OXFORD ST SYDNEY [11169]	NSW
Defence - OXFORD ST SYDNEY [11165]	NSW
Defence - PARKVIEW BUILDING - SYDNEY [11170]	NSW
Defence - PITTWATER DIVING ANNEX (forms part of "RAN Torpedo Range") [10027]	NSW
Defence - PITTWATER DIVING ANNEX (forms part of "RAN Torpedo Range") [10028]	NSW
Defence - PITTWATER DIVING ANNEX (forms part of "RAN Torpedo Range") [10026]	NSW
Defence - RANDWICK (CARRINGTON RD) [11135]	NSW
Defence - RANDWICK (CARRINGTON RD) [11134]	NSW
Defence - RANDWICK (CARRINGTON RD) [11133]	NSW
Defence - RANDWICK (CARRINGTON RD) [11132]	NSW
Defence - RANDWICK BARRACKS [11131]	NSW

Commonwealth Land Name	State
Defence - RANDWICK BARRACKS [11130]	NSW
Defence - RANDWICK BARRACKS [11126]	NSW
Defence - RANDWICK BARRACKS [11125]	NSW
Defence - RANDWICK BARRACKS [11127]	NSW
Defence - RANDWICK BARRACKS [11129]	NSW
Defence - RANDWICK BARRACKS [11128]	NSW
Defence - RANDWICK BARRACKS [11124]	NSW
Defence - RANDWICK FRENCHMANS TRG [11163]	NSW
Defence - RANDWICK FRENCHMANS TRG [11162]	NSW
Defence - ROCKDALE TRAINING DEPOT [11111]	NSW
Defence - THROSBY TRG DEPOT-PORT KEMBLA [10056]	NSW
Defence - TRAINING SHIP CONDAMINE [11072]	NSW
Defence - TRAINING SHIP CONDAMINE [11073]	NSW
Defence - TRESCO [10044]	NSW
Defence - TS ALBATROSS-WOLLONGONG [10148]	NSW
Defence - VAUCLUSE TRAINING DEPOT [11137]	NSW
Defence - VICTORIA BARRACKS - PADDINGTON [11120]	NSW
Defence - VICTORIA BARRACKS - PADDINGTON [11121]	NSW
Defence - VICTORIA BARRACKS - PADDINGTON [11119]	NSW
Defence - WILLOUGHBY TRG DEP [11139]	NSW
Defence - WILLOUGHBY TRG DEP [11138]	NSW
Defence - WILLOUGHBY TRG DEP [11157]	NSW
Defence - WILLOUGHBY TRG DEP [11156]	NSW
Defence - WILLOUGHBY TRG DEP [11154]	NSW
Defence - WILLOUGHBY TRG DEP [11155]	NSW
Defence - WILLOUGHBY TRG DEP [11158]	NSW
Defence - WILLOUGHBY TRG DEP [11159]	NSW

Commonwealth Land Name	State
Defence - WILLOUGHBY TRG DEP [11150]	NSW
Defence - WILLOUGHBY TRG DEP [11151]	NSW
Defence - WILLOUGHBY TRG DEP [11152]	NSW
Defence - WILLOUGHBY TRG DEP [11153]	NSW
Defence - WILLOUGHBY TRG DEP [11149]	NSW
Defence - WILLOUGHBY TRG DEP [11143]	NSW
Defence - WILLOUGHBY TRG DEP [11148]	NSW
Defence - WILLOUGHBY TRG DEP [11145]	NSW
Defence - WILLOUGHBY TRG DEP [11146]	NSW
Defence - WILLOUGHBY TRG DEP [11144]	NSW
Defence - WILLOUGHBY TRG DEP [11141]	NSW
Defence - WILLOUGHBY TRG DEP [11142]	NSW
Defence - WILLOUGHBY TRG DEP [11147]	NSW
Defence - WILLOUGHBY TRG DEP [11140]	NSW
Defence - WOLLONGONG MULTI-USER DEPOT [11209]	NSW
Defence - WOOLLOOMOOLOO CARPARK [11174]	NSW
Defence - WOOLLOOMOOLOO CARPARK [11175]	NSW
Defence - WOOLLOOMOOLOO CARPARK [11176]	NSW
Defence - WOOLLOOMOOLOO CARPARK [11177]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11089]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11088]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11086]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11087]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11082]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11083]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11084]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11085]	NSW

Commonwealth Land Name	State
Defence - ZETLAND NAVY SUPPLY CENTRE [11080]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11081]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11092]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11091]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11090]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11076]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11077]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11075]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11079]	NSW
Defence - ZETLAND NAVY SUPPLY CENTRE [11078]	NSW
Defence - Defence Housing Authority	
Commonwealth Land - Defence Housing Authority [13166]	NSW
Commonwealth Land - Defence Housing Authority [13167]	NSW
Commonwealth Land - Defence Housing Authority [16459]	NSW
Commonwealth Land - Defence Housing Authority [12208]	NSW
Commonwealth Land - Defence Housing Authority [16456]	NSW
Commonwealth Land - Defence Housing Authority [12209]	NSW
Commonwealth Land - Defence Housing Authority [16458]	NSW
Commonwealth Land - Defence Housing Authority [16453]	NSW
Commonwealth Land - Defence Housing Authority [16457]	NSW
Commonwealth Land - Defence Housing Authority [12211]	NSW
Commonwealth Land - Defence Housing Authority [15751]	NSW
Commonwealth Land - Defence Housing Authority [16189]	NSW
Commonwealth Land - Defence Housing Authority [14321]	NSW
Commonwealth Land - Defence Housing Authority [16455]	NSW
Commonwealth Land - Defence Housing Authority [14320]	NSW
Commonwealth Land - Defence Housing Authority [16454]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [15757]	NSW
Commonwealth Land - Defence Housing Authority [15756]	NSW
Commonwealth Land - Defence Housing Authority [15753]	NSW
Commonwealth Land - Defence Housing Authority [15754]	NSW
Commonwealth Land - Defence Housing Authority [15963]	NSW
Commonwealth Land - Defence Housing Authority [15750]	NSW
Commonwealth Land - Defence Housing Authority [13180]	NSW
Commonwealth Land - Defence Housing Authority [13181]	NSW
Commonwealth Land - Defence Housing Authority [13188]	NSW
Commonwealth Land - Defence Housing Authority [13189]	NSW
Commonwealth Land - Defence Housing Authority [14345]	NSW
Commonwealth Land - Defence Housing Authority [15755]	NSW
Commonwealth Land - Defence Housing Authority [14344]	NSW
Commonwealth Land - Defence Housing Authority [14347]	NSW
Commonwealth Land - Defence Housing Authority [14346]	NSW
Commonwealth Land - Defence Housing Authority [13186]	NSW
Commonwealth Land - Defence Housing Authority [13184]	NSW
Commonwealth Land - Defence Housing Authority [13185]	NSW
Commonwealth Land - Defence Housing Authority [13182]	NSW
Commonwealth Land - Defence Housing Authority [13183]	NSW
Commonwealth Land - Defence Housing Authority [13175]	NSW
Commonwealth Land - Defence Housing Authority [14304]	NSW
Commonwealth Land - Defence Housing Authority [13179]	NSW
Commonwealth Land - Defence Housing Authority [15413]	NSW
Commonwealth Land - Defence Housing Authority [13171]	NSW
Commonwealth Land - Defence Housing Authority [16470]	NSW
Commonwealth Land - Defence Housing Authority [13170]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [13178]	NSW
Commonwealth Land - Defence Housing Authority [13172]	NSW
Commonwealth Land - Defence Housing Authority [13177]	NSW
Commonwealth Land - Defence Housing Authority [13176]	NSW
Commonwealth Land - Defence Housing Authority [13196]	NSW
Commonwealth Land - Defence Housing Authority [16028]	NSW
Commonwealth Land - Defence Housing Authority [13174]	NSW
Commonwealth Land - Defence Housing Authority [12077]	NSW
Commonwealth Land - Defence Housing Authority [13212]	NSW
Commonwealth Land - Defence Housing Authority [14539]	NSW
Commonwealth Land - Defence Housing Authority [14330]	NSW
Commonwealth Land - Defence Housing Authority [14294]	NSW
Commonwealth Land - Defence Housing Authority [14299]	NSW
Commonwealth Land - Defence Housing Authority [14298]	NSW
Commonwealth Land - Defence Housing Authority [15414]	NSW
Commonwealth Land - Defence Housing Authority [12067]	NSW
Commonwealth Land - Defence Housing Authority [12061]	NSW
Commonwealth Land - Defence Housing Authority [12213]	NSW
Commonwealth Land - Defence Housing Authority [12210]	NSW
Commonwealth Land - Defence Housing Authority [15749]	NSW
Commonwealth Land - Defence Housing Authority [12212]	NSW
Commonwealth Land - Defence Housing Authority [12216]	NSW
Commonwealth Land - Defence Housing Authority [12214]	NSW
Commonwealth Land - Defence Housing Authority [15959]	NSW
Commonwealth Land - Defence Housing Authority [15752]	NSW
Commonwealth Land - Defence Housing Authority [13168]	NSW
Commonwealth Land - Defence Housing Authority [13169]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [13135]	NSW
Commonwealth Land - Defence Housing Authority [14293]	NSW
Commonwealth Land - Defence Housing Authority [14291]	NSW
Commonwealth Land - Defence Housing Authority [14292]	NSW
Commonwealth Land - Defence Housing Authority [14297]	NSW
Commonwealth Land - Defence Housing Authority [14290]	NSW
Commonwealth Land - Defence Housing Authority [14295]	NSW
Commonwealth Land - Defence Housing Authority [14296]	NSW
Commonwealth Land - Defence Housing Authority [16466]	NSW
Commonwealth Land - Defence Housing Authority [14303]	NSW
Commonwealth Land - Defence Housing Authority [14302]	NSW
Commonwealth Land - Defence Housing Authority [14305]	NSW
Commonwealth Land - Defence Housing Authority [14307]	NSW
Commonwealth Land - Defence Housing Authority [14306]	NSW
Commonwealth Land - Defence Housing Authority [14309]	NSW
Commonwealth Land - Defence Housing Authority [14308]	NSW
Commonwealth Land - Defence Housing Authority [15948]	NSW
Commonwealth Land - Defence Housing Authority [15596]	NSW
Commonwealth Land - Defence Housing Authority [14300]	NSW
Commonwealth Land - Defence Housing Authority [16469]	NSW
Commonwealth Land - Defence Housing Authority [16467]	NSW
Commonwealth Land - Defence Housing Authority [14288]	NSW
Commonwealth Land - Defence Housing Authority [14289]	NSW
Commonwealth Land - Defence Housing Authority [15881]	NSW
Commonwealth Land - Defence Housing Authority [15885]	NSW
Commonwealth Land - Defence Housing Authority [15884]	NSW
Commonwealth Land - Defence Housing Authority [15886]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [15918]	NSW
Commonwealth Land - Defence Housing Authority [15441]	NSW
Commonwealth Land - Defence Housing Authority [14450]	NSW
Commonwealth Land - Defence Housing Authority [16286]	NSW
Commonwealth Land - Defence Housing Authority [14362]	NSW
Commonwealth Land - Defence Housing Authority [16462]	NSW
Commonwealth Land - Defence Housing Authority [16468]	NSW
Commonwealth Land - Defence Housing Authority [16465]	NSW
Commonwealth Land - Defence Housing Authority [16460]	NSW
Commonwealth Land - Defence Housing Authority [16463]	NSW
Commonwealth Land - Defence Housing Authority [16464]	NSW
Commonwealth Land - Defence Housing Authority [16461]	NSW
Commonwealth Land - Defence Housing Authority [14316]	NSW
Commonwealth Land - Defence Housing Authority [14319]	NSW
Commonwealth Land - Defence Housing Authority [14318]	NSW
Commonwealth Land - Defence Housing Authority [14312]	NSW
Commonwealth Land - Defence Housing Authority [14315]	NSW
Commonwealth Land - Defence Housing Authority [14314]	NSW
Commonwealth Land - Defence Housing Authority [14317]	NSW
Commonwealth Land - Defence Housing Authority [14313]	NSW
Commonwealth Land - Defence Housing Authority [14311]	NSW
Commonwealth Land - Defence Housing Authority [13124]	NSW
Commonwealth Land - Defence Housing Authority [13238]	NSW
Commonwealth Land - Defence Housing Authority [13232]	NSW
Commonwealth Land - Defence Housing Authority [15969]	NSW
Commonwealth Land - Defence Housing Authority [12088]	NSW
Commonwealth Land - Defence Housing Authority [12087]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [12086]	NSW
Commonwealth Land - Defence Housing Authority [12085]	NSW
Commonwealth Land - Defence Housing Authority [12084]	NSW
Commonwealth Land - Defence Housing Authority [12062]	NSW
Commonwealth Land - Defence Housing Authority [12060]	NSW
Commonwealth Land - Defence Housing Authority [12063]	NSW
Commonwealth Land - Defence Housing Authority [13289]	NSW
Commonwealth Land - Defence Housing Authority [13288]	NSW
Commonwealth Land - Defence Housing Authority [13190]	NSW
Commonwealth Land - Defence Housing Authority [13286]	NSW
Commonwealth Land - Defence Housing Authority [16062]	NSW
Commonwealth Land - Defence Housing Authority [15608]	NSW
Commonwealth Land - Defence Housing Authority [16122]	NSW
Commonwealth Land - Defence Housing Authority [13191]	NSW
Commonwealth Land - Defence Housing Authority [15718]	NSW
Commonwealth Land - Defence Housing Authority [14380]	NSW
Commonwealth Land - Director of War Service Homes [12206]	NSW
Commonwealth Land - Director of War Service Homes [14358]	NSW
Commonwealth Land - Director of War Service Homes [14361]	NSW
Commonwealth Land - Director of War Service Homes [14367]	NSW
Commonwealth Land - Director of War Service Homes [13230]	NSW
Commonwealth Land - Director of War Service Homes [12068]	NSW
Commonwealth Land - Director of War Service Homes [12032]	NSW
Environment and Heritage	
Commonwealth Land - Booderee National Park [91002]	JBT
Commonwealth Land - Booderee National Park [91001]	JBT
Transport and Regional Services - Airservices Australia	
Commonwealth Land - Airservices Australia [12057]	NSW

Commonwealth Land Name	State
Treasury - Reserve Bank of Australia	
Commonwealth Land - Reserve Bank of Australia [16499]	NSW
Commonwealth Land - Reserve Bank of Australia [13160]	NSW
Commonwealth Land - Reserve Bank of Australia [13138]	NSW
Commonwealth Land - Reserve Bank of Australia [13150]	NSW
Commonwealth Land - Reserve Bank of Australia [13151]	NSW
Commonwealth Land - Reserve Bank of Australia [13159]	NSW
Commonwealth Land - Reserve Bank of Australia [13149]	NSW
Commonwealth Land - Reserve Bank of Australia [13148]	NSW
Unknown	
Commonwealth Land - [13165]	NSW
Commonwealth Land - [13163]	NSW
Commonwealth Land - [16452]	NSW
Commonwealth Land - [14393]	NSW
Commonwealth Land - [14392]	NSW
Commonwealth Land - [14395]	NSW
Commonwealth Land - [14394]	NSW
Commonwealth Land - [14397]	NSW
Commonwealth Land - [14396]	NSW
Commonwealth Land - [14398]	NSW
Commonwealth Land - [14399]	NSW
Commonwealth Land - [12231]	NSW
Commonwealth Land - [12232]	NSW
Commonwealth Land - [15434]	NSW
Commonwealth Land - [15435]	NSW
Commonwealth Land - [15436]	NSW
Commonwealth Land - [15503]	NSW
Commonwealth Land - [11160]	NSW

Commonwealth Land Name	State
Commonwealth Land - [13161]	NSW
Commonwealth Land - [14401]	NSW
Commonwealth Land - [14334]	NSW
Commonwealth Land - [14335]	NSW
Commonwealth Land - [14370]	NSW
Commonwealth Land - [16116]	NSW
Commonwealth Land - [16159]	NSW
Commonwealth Land - [14378]	NSW
Commonwealth Land - [12042]	NSW
Commonwealth Land - [15690]	NSW
Commonwealth Land - [12041]	NSW
Commonwealth Land - [13217]	NSW
Commonwealth Land - [13227]	NSW
Commonwealth Land - [14354]	NSW
Commonwealth Land - [14336]	NSW
Commonwealth Land - [14400]	NSW
Commonwealth Land - [13173]	NSW
Commonwealth Land - [14353]	NSW
Commonwealth Land - [15406]	NSW
Commonwealth Land - [13139]	NSW
Commonwealth Land - [16562]	NSW
Commonwealth Land - [13229]	NSW
Commonwealth Land - [15410]	NSW
Commonwealth Land - [14301]	NSW
Commonwealth Land - [16161]	NSW
Commonwealth Land - [16160]	NSW
Commonwealth Land - [15883]	NSW

Commonwealth Land Name	State
Commonwealth Land - [13145]	NSW
Commonwealth Land - [13147]	NSW
Commonwealth Land - [13144]	NSW
Commonwealth Land - [13142]	NSW
Commonwealth Land - [13146]	NSW
Commonwealth Land - [15882]	NSW
Commonwealth Land - [13218]	NSW
Commonwealth Land - [13219]	NSW
Commonwealth Land - [15689]	NSW
Commonwealth Land - [15688]	NSW
Commonwealth Land - [15729]	NSW
Commonwealth Land - [16283]	NSW
Commonwealth Land - [14365]	NSW
Commonwealth Land - [14369]	NSW
Commonwealth Land - [14364]	NSW
Commonwealth Land - [14374]	NSW
Commonwealth Land - [14375]	NSW
Commonwealth Land - [14376]	NSW
Commonwealth Land - [14371]	NSW
Commonwealth Land - [14372]	NSW
Commonwealth Land - [14373]	NSW
Commonwealth Land - [14310]	NSW
Commonwealth Land - [13285]	NSW
Commonwealth Land - [13287]	NSW
Commonwealth Land - [13143]	NSW
Commonwealth Land - [15459]	NSW
Commonwealth Land - [14382]	NSW

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Admiralty House and Lodge	NSW	Listed place
Admiralty House Garden and Fortifications	NSW	Listed place
Army Cottage with return verandah	NSW	Listed place
Barracks Group HMAS Watson	NSW	Listed place
Batteries A83 and C9A	NSW	Listed place
Battery B42	NSW	Listed place
Battery for Five Guns	NSW	Listed place
Bondi Beach Post Office	NSW	Listed place
Botany Post Office	NSW	Listed place
Buildings 31 and 32	NSW	Listed place
Buildings MQVB16 and VB56	NSW	Listed place
Buildings VB13, 15, 16 & 17	NSW	Listed place
Buildings VB41, 45 & 53	NSW	Listed place
Buildings VB60 and VB62	NSW	Listed place
Buildings VB69, 75 & 76 including Garden	NSW	Listed place
Buildings VB83, 84, 85, 87 & 89	NSW	Listed place
Buildings VB90, 91, 91A & 92	NSW	Listed place
Building VB1 and Parade Ground	NSW	Listed place
Building VB2 Guard House	NSW	Listed place
Cape Baily Lighthouse	NSW	Listed place
Chain and Anchor Store (former)	NSW	Listed place
Chowder Bay Barracks Group	NSW	Listed place
Cliff House	NSW	Listed place
Commonwealth Avenue Defence Housing	NSW	Listed place
Cottage at Macquarie Lighthouse	NSW	Listed place

Name	State	Status
Cronulla Post Office	NSW	Listed place
Customs Marine Centre	NSW	Listed place
Defence site - Georges Heights and Middle Head	NSW	Listed place
Factory	NSW	Listed place
Garden Island Precinct	NSW	Listed place
Gazebo	NSW	Listed place
General Post Office	NSW	Listed place
Golf Clubhouse (former)	NSW	Listed place
Headquarters 8th Brigade Precinct	NSW	Listed place
Headquarters Training Command Precinct	NSW	Listed place
HMAS Penguin	NSW	Listed place
Kiama Post Office	NSW	Listed place
Kirribilli House	NSW	Listed place
Kirribilli House Garden & Grounds	NSW	Listed place
Macquarie Lighthouse	NSW	Listed place
Macquarie Lighthouse Group	NSW	Listed place
Macquarie Lighthouse Surrounding Wall	NSW	Listed place
Marine Biological Station (former)	NSW	Listed place
Military Road Framework - Defence Land	NSW	Listed place
Naval Store	NSW	Listed place
Navy Refuelling Depot and Caretakers House	NSW	Listed place
North Head Artillery Barracks	NSW	Listed place
North Sydney Post Office	NSW	Listed place
Office Building	NSW	Listed place
Officers Mess, HQ Training Command	NSW	Listed place
Paddington Post Office	NSW	Listed place

Name	State	Status
Point Perpendicular Lightstation	NSW	Listed place
Reserve Bank	NSW	Listed place
Residences Group	NSW	Listed place
Rigging Shed and Chapel	NSW	Listed place
School of Musketry and Officers Mess, Randwick Army Barracks	NSW	Listed place
Shark Point Battery	NSW	Listed place
Sydney Airport Air Traffic Control Tower	NSW	Listed place
Sydney Customs House (former)	NSW	Listed place
Ten Terminal Regiment Headquarters and AusAid Training Centre	NSW	Listed place
Thirty Terminal Squadron Precinct	NSW	Listed place
Victoria Barracks Perimeter Wall and Gates	NSW	Listed place
Victoria Barracks Precinct	NSW	Listed place
Victoria Barracks Squash Courts	NSW	Listed place
Indigenous		
Crocodile Head Area	NSW	Within listed place
Currarong Rockshelters Area	NSW	Within listed place
Jervis Bay Territory	ACT	Listed place
Natural		
Beecroft Peninsula	NSW	Listed place
Malabar Headland	NSW	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 albivitta as Procelsterna cerulea Grey Noddy, Grey Ternlet [91286]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Anous stolidus Common Noddy [825]		Breeding 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]		Breeding known to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Breeding known to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		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]	Vulnerable	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]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	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 pugnax as Philomachus pugnax		
Ruff [91256]		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 subminuta		
Long-toed Stint [861]		Roosting known to occur within area overfly marine area
Calidris tenuirostris		
Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat known to occur within 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]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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	Species or species habitat likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat 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

Scientific Name	Threatened Category	Presence Text
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
Larus dominicanus Kelp Gull [809]		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
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat 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]	Endangered	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	Species or species habitat may 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	Species or species habitat may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely 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
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
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma cervicalis White-necked Petrel [59642]		Breeding likely to occur within area
Pterodroma nigripennis Black-winged Petrel [1038]		Breeding known to occur within area
Pterodroma solandri Providence Petrel [1040]		Breeding known to occur within area
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Recurvirostra novaehollandiae		
Red-necked Avocet [871]		Roosting 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]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons		
Little Tern [82849]		Breeding known to occur within area
Sula dactylatra		
Masked Booby [1021]		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	Species or species habitat likely to occur within area
Thalassarche bulleri platei as Thalassarche sp. nov.		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat 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 eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Tringa incana as Heteroscelus incanus Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	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]	Vulnerable	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
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus boothae Booth's Pipefish [66218]		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
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		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 kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		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
Notiocampus ruber Red Pipefish [66265]		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
Solegnathus dunckeri Duncker's Pipehorse [66271]		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
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		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
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		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

Scientific Name	Threatened Category	Presence Text
Vanacampus phillipi Port Phillip Pipefish [66284]		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
Dugong dugon Dugong [28]		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	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
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus Flatback Turtle [59257]	Vulnerable	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
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 likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may 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
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may 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
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		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

Current Scientific Name	Status	Type of Presence
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 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
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may 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

Commonwealth Reserves Terrestrial [Resource Information]

Name	State	Type
Booderee	JBT	National Park (Commonwealth)

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories
Central Eastern	Habitat Protection Zone (IUCN IV)

Park Name	Zone & IUCN Categories
Hunter	Habitat Protection Zone (IUCN IV)
Jervis	Habitat Protection Zone (IUCN IV)
Lord Howe	Habitat Protection Zone (IUCN IV)
Lord Howe	Habitat Protection Zone (Lord Howe) (IUCN IV)
Lord Howe	Multiple Use Zone (IUCN VI)
Lord Howe	National Park Zone (IUCN II)
Lord Howe	National Park Zone (IUCN II)
Lord Howe	National Park Zone (IUCN II)
Lord Howe	Recreational Use Zone (IUCN IV)
Hunter	Special Purpose Zone (Trawl) (IUCN VI)
Jervis	Special Purpose Zone (Trawl) (IUCN VI)

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Barren Grounds	Nature Reserve	NSW
Berkeley	Nature Reserve	NSW
Boat Harbour	Aquatic Reserve	NSW
Bronte-Coogee	Aquatic Reserve	NSW
Bushrangers Bay	Aquatic Reserve	NSW
Cabbage Tree Bay	Aquatic Reserve	NSW
Cape Banks	Aquatic Reserve	NSW
Comerong Island	Nature Reserve	NSW
Dharawal	National Park	NSW
Dharawal	Nature Reserve	NSW

Protected Area Name	Reserve Type	State
Five Islands	Nature Reserve	NSW
Garawarra	State Conservation Area	NSW
Garigal	National Park	NSW
Heathcote	National Park	NSW
Illawarra Escarpment	State Conservation Area	NSW
Jervis Bay	National Park	NSW
Jervis Bay	Marine Park	NSW
Kamay Botany Bay	National Park	NSW
Ku-ring-gai Chase	National Park	NSW
Long Reef	Aquatic Reserve	NSW
Lord Howe Island	Permanent Park Preserve	NSW
Lord Howe Island	Marine Park	NSW
Malabar Headland	National Park	NSW
Nameless Sylvan	Conservation Reserve	NSW
Narrabeen	Aquatic Reserve	NSW
North Head	Private Nature Reserve	NSW
North Sydney Harbour	Aquatic Reserve	NSW
Royal	National Park	NSW
Seven Mile Beach	National Park	NSW
Shiprock	Aquatic Reserve	NSW
Sydney Harbour	National Park	NSW
Towra Point	Nature Reserve	NSW
Towra Point	Aquatic Reserve	NSW
Wolli Creek	Regional Park	NSW
Woollamia	Nature Reserve	NSW

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
Southern RFA	New South Wales

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Beecroft Peninsula	NSW
Botany Wetlands	NSW
Coomaditchy Lagoon	NSW
Coomonderry Swamp	NSW
Eve St. Marsh, Arncliffe	NSW
Five Islands Nature Reserve	NSW
Jervis Bay	NSW
Jervis Bay Sea Cliffs	NSW
Killalea Lagoon	NSW
Lake Illawarra	NSW
Minnamurra River Estuary	NSW
O'Hares Creek Catchment	NSW
Shoalhaven/Crookhaven Estuary	NSW
St Georges Basin	NSW
Towra Point Estuarine Wetlands	NSW
Wollumboola Lake	NSW

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Albion Park Quarry Extraction Area Stage 7 Extension	2020/8871		Post-Approval
Albion Park Rail Bypass, NSW	2017/7909		Post-Approval
Circular Quay Renewal	2023/09727		Assessment

Title of referral	Reference	Referral Outcome	Assessment Status
Development of a Residential Care Facility, Middle Head, NSW	2014/7194		Post-Approval
Dunmore Hard Rock Quarry Modification 13	2022/09319		Assessment
Dunmore Lakes Sand Project Modification 2 Pond 5B extraction	2023/09552		Completed
Eastern Rise Offshore Wind Project	2023/09544		Assessment
Eastern Rise Offshore Wind Project Initial Marine Field Investigations	2023/09555		Completed
Greenway Wall - Macquarie Lightstation Conservation	2023/09650		Completed
Hawaiki Nui Submarine Cable - Marine Route Survey and Cable Installation	2024/09814		Completed
Hunter-Central Coast Offshore Energy Initial Marine Field Investigations	2023/09480		Completed
Hunter Central-Coast Offshore Energy Project	2023/09478		Assessment
Kamay Ferry Wharves Project	2020/8825		Post-Approval
MARA Team Testing - Release 38 - Smoke Test -05 April 2024 - To Be Deleted	2024/09849		Post-Approval
MARA Team Testing - Release 39 - 29 April 2024 - To Be Deleted	2024/09866		Approval
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
PEP11 Site Survey	2009/5093		Completed
Residential development, 11 Jennifer Street, Little Bay, NSW	2018/8170		Completed
South Pacific Offshore Wind Project	2023/09605		Completed
West Culburra Residential Subdivision	2023/09524		Assessment
Action clearly unacceptable			
Lord Howe Island Renewable Energy Project - Stage 2 Wind Turbines	2016/7790	Action Clearly Unacceptable	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Action clearly unacceptable			
Controlled action			
Australian Institute of Police Management Facilities Upgrade	2006/2746	Controlled Action	Post-Approval
Callala Bay Residential Development	2020/8637	Controlled Action	Post-Approval
Construction and operation of the Westconnex New M5, Sydney, NSW	2015/7520	Controlled Action	Post-Approval
Cook Cove Southern Precinct development, Sydney, NSW	2016/7767	Controlled Action	Post-Approval
Cooks Cove Development Project	2006/2685	Controlled Action	Post-Approval
Expansion of Port Botany facilities	2002/543	Controlled Action	Post-Approval
Expansion of the NRE No. 1 Colliery Coal Mine in the Southern Coalfield of NSW	2013/6838	Controlled Action	Completed
Extension of Underground Mining Operations at The Bulli Seam Operations	2010/5350	Controlled Action	Post-Approval
Garden Island Hammerhead Crane Proposed Removal, NSW	2012/6430	Controlled Action	Post-Approval
Kurnell Sand Extraction and Backfilling Proposal	2002/631	Controlled Action	Completed
Lord Howe Island Rodent Eradication Project, NSW	2016/7703	Controlled Action	Post-Approval
Moriah War Memorial College expansion	2002/575	Controlled Action	Post-Approval
Pilot Offshore Artificial Reefs	2008/4176	Controlled Action	Post-Approval
Relocation of Grey-Headed Flying-Fox Colony	2008/4646	Controlled Action	Post-Approval
Residential Subdivision and Town Centre Development, Vincentia	2006/2927	Controlled Action	Post-Approval
Rezoning of land and associated public works to facilitate residential development	2007/3448	Controlled Action	Completed
Russell Vale Colliery Revised Underground Expansion Project	2020/8702	Controlled Action	Post-Approval
Russell Vale Colliery Underground Expansion Project, NSW	2014/7268	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Sand Reclamation to Towra Beach	2003/1085	Controlled Action	Post-Approval
Southern section of the Bonnie Doon Golf Course, Pagewood, NSW	2015/7479	Controlled Action	Completed
Sydney Opera House Building Renewal Program, NSW	2016/7825	Controlled Action	Post-Approval
Sydney Opera House Building Renewal Program - Concert Hall and associated works	2017/7955	Controlled Action	Post-Approval
Upgrade of Floodlighting for Night Sports Training	2009/4798	Controlled Action	Completed
Upgrade of surface facilities at NRE No.1 Colliery	2011/5891	Controlled Action	Post-Approval
Not controlled action			
Admiralty House, Kirribilli, foreshore works, NSW	2014/7357	Not Controlled Action	Completed
Air Traffic Control Infrastructure Facility	2007/3872	Not Controlled Action	Completed
APX-East sub-sea telecommunications & data cable system	2014/7139	Not Controlled Action	Completed
Australia-USA Southern Cross NEXT fibre optic cable installation	2019/8405	Not Controlled Action	Completed
Biggus-1 Exploration Well	2004/1830	Not Controlled Action	Completed
Botany Bay Cable Project	2007/3552	Not Controlled Action	Completed
Botany Rail Duplication	2019/8566	Not Controlled Action	Completed
BP/Mobil Pipeline to Kingsford Smith Airport	2000/104	Not Controlled Action	Completed
Carbon Black Plant Upgrade	2006/2785	Not Controlled Action	Completed
Clearance of native vegetation to create fire breaks	2004/1534	Not Controlled Action	Completed
Conservation and Adaptive Use of Quarantine Station	2002/556	Not Controlled Action	Completed
Construction of a high-capacity fibre optic submarine cable	2006/2914	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Construction of a temporary film set, Malabar Headlands	2007/3939	Not Controlled Action	Completed
Construction Of Two New Fuel Processing Plants On Existing Site	2003/1243	Not Controlled Action	Completed
Continental slope research/mid-NSW/Commonwealth Waters	2006/3026	Not Controlled Action	Completed
Demolition and Removal of Two Naval Cottages	2008/4373	Not Controlled Action	Completed
Demolition of Ablutions Block, Snapper Island, NSW	2018/8303	Not Controlled Action	Completed
Demolition of the existing club house and construction of a new club house	2009/4932	Not Controlled Action	Completed
Dog swimming area	2002/870	Not Controlled Action	Completed
Duke Cogeneration Plant Port Kembla	2001/179	Not Controlled Action	Completed
Environmental Works	2001/396	Not Controlled Action	Completed
Extension of Hale Street to Foreshore Road and Associated Works	2008/4035	Not Controlled Action	Completed
Extension to Lucas Heights production building	2003/1114	Not Controlled Action	Completed
Fitout works, 4th Floor, Sydney Customs House, 31 Alfred Street	2004/1449	Not Controlled Action	Completed
Fuel Reduction Proposal Redfield Road, East Killara	2003/1238	Not Controlled Action	Completed
Garden Island ADI Warehouse	2000/69	Not Controlled Action	Completed
Georges River Program 2	2003/999	Not Controlled Action	Completed
Golf Course Extension	2001/215	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Increase of Road Access to 24 Hours a Day 7 Days a Week	2008/4206	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
Industrial Subdivision	2004/1859	Not Controlled Action	Completed
Industrial Subdivision, 262-276 Captain Cook Drive	2004/1899	Not Controlled Action	Completed
Installation of Sydney-Guam Submarine Cable	2007/3848	Not Controlled Action	Completed
Installation of viewing platform	2005/2138	Not Controlled Action	Completed
Internal Modifications to Reserve Bank of Australia	2008/4431	Not Controlled Action	Completed
Japan-Guam-Australia Sunshine Coast Branch Marine Cable Route Survey (JGA) QLD	2018/8373	Not Controlled Action	Completed
Lake Illawarra entrance works, Stage 2	2004/1696	Not Controlled Action	Completed
Little Bay Residential Subdivision	2002/873	Not Controlled Action	Completed
Lord Howe Island Solar Photovoltaic Project	2015/7544	Not Controlled Action	Completed
Lot 2 Foreshore Drive, in-filling pit, Port Kembla, NSW	2018/8374	Not Controlled Action	Completed
Metropolitan coal project - continutaion, upgrade and extension of underground m	2008/4519	Not Controlled Action	Completed
Noxious weed removal, Anzac Rifle Range	2002/761	Not Controlled Action	Completed
Noxious weed removal and controlled burn	2003/1272	Not Controlled Action	Completed
Noxious Weed Removal at Anzac Rifle Range	2004/1336	Not Controlled Action	Completed
Pilot study - Short term captive holding of 22 LHI Woodhen & 10 LHI Currawong, Lord Howe Island	2013/6847	Not Controlled Action	Completed
Rabbit Control Anzac Rifle Range	2005/1940	Not Controlled Action	Completed
RBA HOWP 65 Martin Place, NSW	2020/8870	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Redevelopment 60 Martin Place, Sydney, NSW	2015/7490	Not Controlled Action	Completed
Redevelopment of the Cronulla Sharks Leagues Club	2011/5889	Not Controlled Action	Completed
Redevelopment of the former Prince Henry Hospital Site	2003/1048	Not Controlled Action	Completed
Rehabilitation works of the Coogee Sewer Diversion Submain - Maxwell Avenue, Mar	2004/1683	Not Controlled Action	Completed
Remediation of contaminated soil around the Macquarie Lighthouse	2004/1836	Not Controlled Action	Completed
Residential subdivision of 62 Hillside Road, Newport, NSW	2017/8044	Not Controlled Action	Completed
Rubbish removal, Anzac Rifle Range	2002/760	Not Controlled Action	Completed
Sale of New South Head Road, Edgecliff	2001/302	Not Controlled Action	Completed
Sandon Point Residential Development	2001/458	Not Controlled Action	Completed
Seismic Station	2007/3301	Not Controlled Action	Completed
sewage treatmemt plant process and reliability renewals project	2005/2186	Not Controlled Action	Completed
Shellcove Boatharbour Marine, Commercial & Residential Development	2007/3935	Not Controlled Action	Completed
Shipment of Spent Nuclear Fuel to USA	2007/3672	Not Controlled Action	Completed
Ship to ship crude oil lightering	2008/4279	Not Controlled Action	Completed
Ship to Ship Crude Oil Lightering	2001/271	Not Controlled Action	Completed
Subdivision and sale of Commonwealth land in Pymble to Ku-ring-gai City Council	2004/1368	Not Controlled Action	Completed
Subdivision of Precincts 3 and 12, St Patricks Estate	2004/1925	Not Controlled Action	Completed
Supply of a gigabit ethernet connection with associated trenching, boring and ha	2007/3637	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Sydney Desalination Plant	2005/2331	Not Controlled Action	Completed
Sydney Metro Network Stage 2	2010/5307	Not Controlled Action	Completed
Sydney Primary Loop Gas Pipeline	2006/2622	Not Controlled Action	Completed
Taleb Property Pty Ltd, Tempe Tyres Warehouse project, Captain Cook Drive, Kurnell	2017/8068	Not Controlled Action	Completed
Tallawarra Lands: Urban Development	2011/6002	Not Controlled Action	Completed
Torpedo Factory Renewal Project	2020/8847	Not Controlled Action	Completed
Undertake a controlled burn of the Eastern Suburbs Banksia Scrub at Byrne Cresce	2004/1728	Not Controlled Action	Completed
Undertaking of fire protection measures for the bushland regeneration of the Ranwick Environmental P	2003/959	Not Controlled Action	Completed
Upgrade of Captain Cook Drive	2012/6286	Not Controlled Action	Completed
Valentine Substation	2005/1961	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D marine seismic survey in PEP-11 permit area, NSW	2002/879	Not Controlled Action (Particular Manner)	Post-Approval
Bushland Path Through Malabar Headland West	2007/3790	Not Controlled Action (Particular Manner)	Post-Approval
Church and School Development	2006/3185	Not Controlled Action (Particular Manner)	Post-Approval
Construction and operation of a subsea telecommunications cable, between Sydney and New Zealand	2015/7480	Not Controlled Action (Particular Manner)	Post-Approval
Construction works on SE corner of the grounds of Admiralty House	2012/6278	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Development of Commercial Shellfish Aquaculture Leases within Jervis Bay	2013/6768	Not Controlled Action (Particular Manner)	Post-Approval
Drilling of one exploration well	2010/5664	Not Controlled Action (Particular Manner)	Post-Approval
Hawaiki Fibre-Optic Submarine Cable installation	2016/7765	Not Controlled Action (Particular Manner)	Post-Approval
Hyde Park Barracks Proposed New Passenger Lift	2017/7933	Not Controlled Action (Particular Manner)	Post-Approval
Illawarra coal seam gas exploration drilling and gas monitoring program	2011/5821	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
International fibre optic submarine cable installation, between Sydney and Honiara, Solomon Islands	2015/7502	Not Controlled Action (Particular Manner)	Post-Approval
Japan-Guam-Australia (JGA) Fibre Optic Cable project	2016/7795	Not Controlled Action (Particular Manner)	Post-Approval
Kiama Post Office alterations	2006/2940	Not Controlled Action (Particular Manner)	Post-Approval
Kingsford Defence Land Subdivision and Redevelopment	2002/852	Not Controlled Action (Particular Manner)	Post-Approval
Lake Illawarra Entrance Works (stage 2)	2005/1997	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Lowering Blinky Beach Sand Dune to Comply with CASA Regulations for Runway 28, Lord Howe Island	2012/6599	Not Controlled Action (Particular Manner)	Post-Approval
Moriah Primary School, Centennial Park, Sydney	2004/1676	Not Controlled Action (Particular Manner)	Post-Approval
NBN Transit Fibre Minnamurra Wetlands Section	2011/5900	Not Controlled Action (Particular Manner)	Post-Approval
Project 2 Witchcliffe - proposed vineyard & dam	2005/2263	Not Controlled Action (Particular Manner)	Post-Approval
Southern Cross Australia-New Zealand-America marine acoustic survey of the seabed	2017/7863	Not Controlled Action (Particular Manner)	Post-Approval
supersonic missile launch facility	2000/120	Not Controlled Action (Particular Manner)	Post-Approval
Survey and Sampling of Lord Howe Island Reef	2008/3986	Not Controlled Action (Particular Manner)	Post-Approval
Tasman Global Access submarine cable marine route survey, Narrabeen, NSW	2015/7442	Not Controlled Action (Particular Manner)	Post-Approval
Transport of intermediate level radioactive waste to Lucas Heights, NSW	2015/7437	Not Controlled Action (Particular Manner)	Post-Approval
Transport of OPAL Spent Fuel to France in 2018 and 2025	2016/7841	Not Controlled Action (Particular Manner)	Post-Approval
Walking Track connecting Middle Head Rd & Balmoral Park	2002/572	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Alterations and Additions	2006/3081	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Beecroft Weapons Range Visitors Centre	2004/1322	Referral Decision	Completed
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed
Demolition and Removal of Five Naval Cottages	2008/4322	Referral Decision	Completed
Demolition of Naval Cottages & Revegetation as Part of SHFT's Headland Park	2005/2128	Referral Decision	Completed
Hybrid Renewable Energy (Solar & Wind Turbine), Lord Howe Island, NSW	2014/7231	Referral Decision	Completed
PEP11 Drilling Program	2009/5094	Referral Decision	Completed
Relocation of Grey-Headed Flying-Fox Colony	2008/4568	Referral Decision	Completed
Renovation and Landscape Rehabilitation of the Championship Course at Royal Sydney Golf Club	2022/9167	Referral Decision	Referral Publication
Stage 2 Masonry Plant, Port Kembla, NSW	2014/7247	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
Canyons on the eastern continental slope	Temperate east
Elizabeth and Middleton reefs	Temperate east
Lord Howe seamount chain	Temperate east
Shelf rocky reefs	Temperate east
Tasman Front and eddy field	Temperate east
Tasmantid seamount chain	Temperate east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Dolphins		

Scientific Name	Behaviour	Presence
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur
Seabirds		
Anous minutus Black Noddy [824]	Breeding	Known to occur
Anous minutus Black Noddy [824]	Foraging	Likely to occur
Anous stolidus Common Noddy [825]	Breeding	Known to occur
Anous stolidus Common Noddy [825]	Foraging	Likely to occur
Ardenna carneipes Flesh-footed Shearwater [82404]	Breeding	Known to occur
Ardenna carneipes Flesh-footed Shearwater [82404]	Foraging	Known to occur
Ardenna grisea Sooty Shearwater [82651]	Foraging	Likely to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely 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

Scientific Name	Behaviour	Presence
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Breeding	Likely to occur
Fregetta grallaria grallaria White-bellied Storm Petrel [64438]	Breeding	Known to occur
Fregetta grallaria grallaria White-bellied Storm Petrel [64438]	Foraging	Likely to occur
Gygis alba White Tern [807]	Breeding	Known to occur
Gygis alba White Tern [807]	Foraging	Likely to occur
Macronectes giganteus Southern Giant Petrel [1060]	Foraging	Known to occur
Macronectes halli Northern Giant Petrel [1061]	Foraging	Known to occur
Oceanites oceanites Wilsons Storm Petrel [1034]	Migration	Known to occur
Onychoprion fuscata Sooty Tern [82847]	Breeding	Known to occur
Onychoprion fuscata Sooty Tern [82847]	Foraging	Likely to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur
Phaethon rubricauda Red-tailed Tropicbird [994]	Breeding	Known to occur
Phaethon rubricauda Red-tailed Tropicbird [994]	Foraging	Likely to occur
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Procelsterna cerulea Grey Ternlet [64378]	Breeding	Known to occur
Procelsterna cerulea Grey Ternlet [64378]	Foraging	Likely to occur
Pterodroma macroptera Great-winged Petrel [1035]	Foraging	Likely to occur
Pterodroma neglecta neglecta Kermadec Petrel [64450]	Breeding	Known to occur
Pterodroma neglecta neglecta Kermadec Petrel [64450]	Foraging	Likely to occur
Pterodroma nigripennis Black-winged Petrel [1038]	Breeding	Known to occur
Pterodroma nigripennis Black-winged Petrel [1038]	Foraging	Likely to occur
Pterodroma solandri Providence Petrel [1040]	Breeding	Known to occur
Pterodroma solandri Providence Petrel [1040]	Foraging	Likely to occur
Puffinus assimilis Little Shearwater [59363]	Breeding	Known to occur
Puffinus assimilis Little Shearwater [59363]	Foraging	Likely to occur
Sula dactylatra Masked Booby [1021]	Breeding	Known to occur
Sula dactylatra Masked Booby [1021]	Foraging	Likely to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche cauta steadi White-capped Albatross [82344]	Foraging	Known to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
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
Sharks		
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur
Carcharias taurus Grey Nurse Shark [64469]	Reproduction	Known to occur
Carcharodon carcharias White Shark [64470]	Aggregation	Known to occur
Whales		
Megaptera novaeangliae Humpback Whale [38]	Migration	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur

Bioregional Assessments [Resource Information]

SubRegion	BioRegion	Website
Sydney	Sydney 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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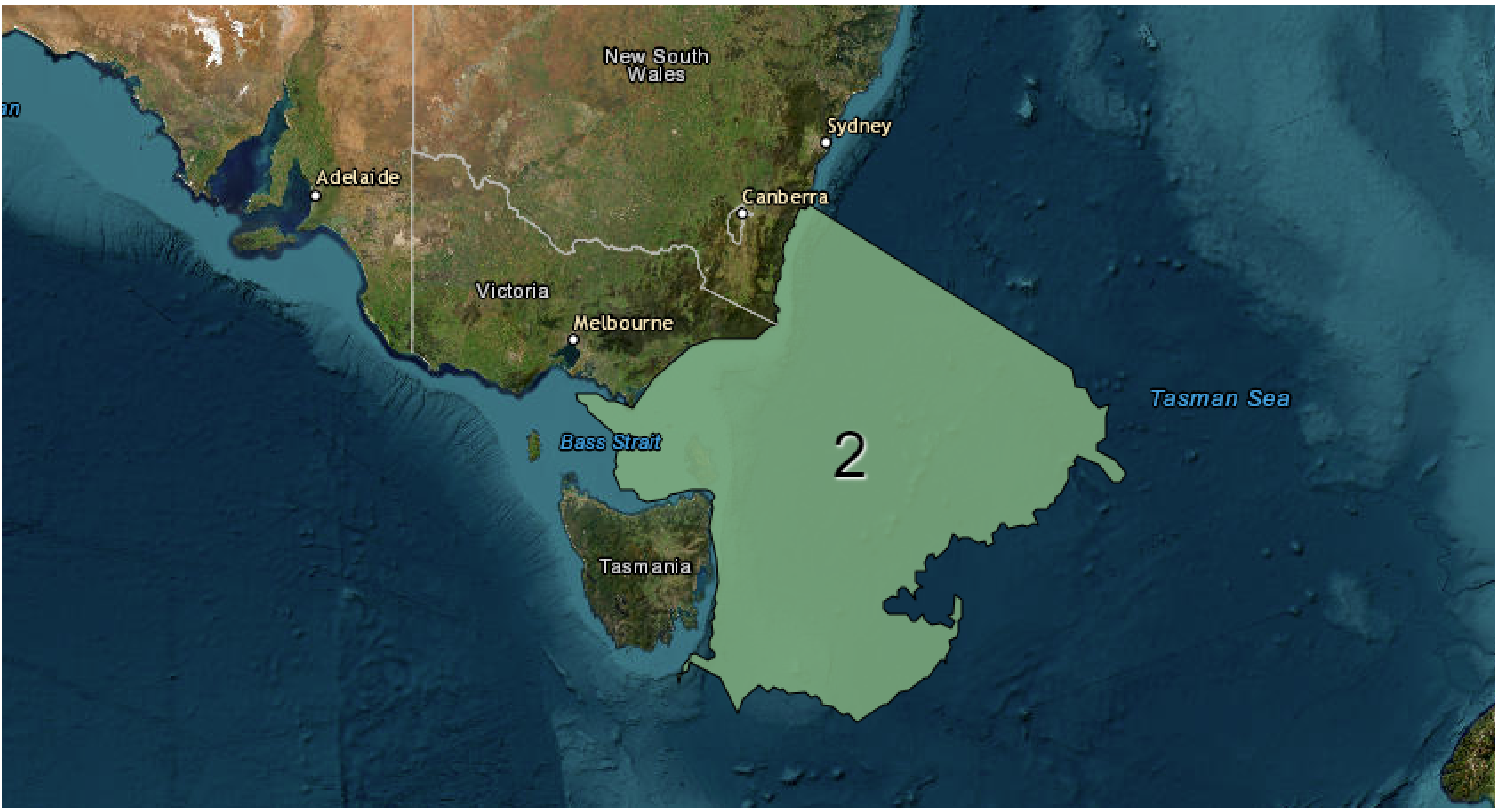
EPBC Act Protected Matters Report

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: 04-Oct-2024



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	6
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	5
Listed Threatened Ecological Communities:	19
Listed Threatened Species:	185
Listed Migratory Species:	87

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:	50
Commonwealth Heritage Places:	13
Listed Marine Species:	137
Whales and Other Cetaceans:	35
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	2
Australian Marine Parks:	10
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:	198
Regional Forest Agreements:	5
Nationally Important Wetlands:	56
EPBC Act Referrals:	139
Key Ecological Features (Marine):	5
Biologically Important Areas:	50
Bioregional Assessments:	2
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Corner inlet	Within Ramsar site
East coast cape barren island lagoons	Within Ramsar site
Gippsland lakes	Within Ramsar site
Jocks lagoon	Within 10km of Ramsar site
Little waterhouse lake	Within 10km of Ramsar site
Logan lagoon	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)
Commonwealth Marine Areas (EPBC Act)
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 may occur within area
Araluen Scarp Grassy Forest	Endangered	Community may occur within area

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
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 likely to occur within area
Giant Kelp Marine Forests of South East Australia	Endangered	Community likely to occur within area
Gippsland Red Gum (Eucalyptus tereticornis subsp. mediana) Grassy Woodland and Associated Native Grassland	Critically Endangered	Community likely to occur within area
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community likely to occur within area
Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion	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
Natural Damp Grassland of the Victorian Coastal Plains	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

Community Name	Threatened Category	Presence Text
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically 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		
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
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to 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	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	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]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
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	Species or species habitat likely 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 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

Scientific Name	Threatened Category	Presence Text
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
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 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]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting 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
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known 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
Pardalotus quadragintus Forty-spotted Pardalote [418]	Endangered	Foraging, feeding or related behaviour known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma heraldica Herald Petrel [66973]	Critically Endangered	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Breeding known 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
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
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat 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 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

Scientific Name	Threatened Category	Presence Text
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
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tyto novaehollandiae castanops (Tasmanian population) Masked Owl (Tasmanian) [67051]	Vulnerable	Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
CRUSTACEAN		

Scientific Name	Threatened Category	Presence Text
Engaeus martigener Furneaux Burrowing Crayfish [67220]	Endangered	Species or species habitat known to occur within area
Euastacus bidawalus Bidhawal Crayfish, Bidawal Crayfish, East Gippsland Spiny Crayfish [83136]	Endangered	Species or species habitat known to occur within area
Euastacus diversus Orbost Spiny Crayfish [66782]	Endangered	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]	Endangered	Species or species habitat known to occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	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
Mordacia praecox Non-parasitic Lamprey, Precocious Lamprey [81530]	Endangered	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

Scientific Name	Threatened Category	Presence Text
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known 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 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
Litoria watsoni Southern Heath Frog, 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 known to occur within area
Uperoleia martini Martin's Toadlet [1873]	Endangered	Species or species habitat known to occur within area
INSECT		
Antipodia chaostola leucophaea Tasmanian Chaostola Skipper, Heath-sand Skipper [77672]	Endangered	Species or species habitat likely to occur within area
MAMMAL		
Antechinus minimus maritimus Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat known 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	Species or species habitat likely 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]	Endangered	Species or species habitat 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
Dasyurus viverrinus		
Eastern Quoll, Luaner [333]	Endangered	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]	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
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 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 likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	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
OTHER		
Dendronephthya australis		
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat known to occur within area
PLANT		
Acacia caerulescens		
Limestone Blue Wattle, Buchan Blue, Buchan Blue Wattle [21883]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Acacia constablei Narrabarba Wattle [10798]	Critically Endangered	Species or species habitat known to occur within area
Acacia georgensis Bega Wattle [9848]	Vulnerable	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 known to occur within area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat may occur within area
Astrotricha sp. Howe Range (D.E.Albrecht 1054) Long-leaf Star-hair [85676]	Critically Endangered	Species or species habitat likely to 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
Banksia vincentia [88276]	Critically 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 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 known to occur within area
Commersonia prostrata		
Dwarf Kerrawang [87152]	Endangered	Species or species habitat known to occur within area
Conospermum hookeri		
Variable Smoke-bush [68161]	Vulnerable	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 rhyolitica listed as Genoplesium rhyoliticum		
Pambula Midge-orchid, Rhyolite Midge Orchid [78697]	Endangered	Species or species habitat likely to occur within area
Corunastylis vernalis listed as Genoplesium vernale		
East Lynne Midge-orchid [78699]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Deyeuxia ramosa		
Climbing Bent-grass [87970]	Critically Endangered	Species or species habitat known to occur within area
Dianella amoena		
Matted Flax-lily [64886]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat known to occur within area
Epacris graniticola Mt Cameron Heath, Granite Heath [82822]	Critically Endangered	Species or species habitat may occur within area
Eucalyptus stenostoma Jillaga Ash [3976]	Endangered	Species or species habitat may occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	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
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area
Leionema ralstonii [64926]	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 likely to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text
Phebalium daviesii Davies' Waxflower, St Helens Waxflower [16959]	Critically Endangered	Species or species habitat may occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	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 affine Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid [2210]	Endangered	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 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 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
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat known to occur within area
Prostanthera galbraithiae Wellington Mintbush [64959]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
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 gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis tenuissima Swamp Greenhood, Dainty Swamp Orchid [13139]	Vulnerable	Species or species habitat known to occur within area
Pterostylis ziegeleri Grassland Greenhood, Cape Portland Greenhood [64971]	Vulnerable	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat known to occur within area
Spyridium cinereum Tiny Spyridium [13564]	Endangered	Species or species habitat known to occur within area
Stenanthemum pimeleoides Spreading Stenanthemum, Propellor Plant [15450]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra jonesii Sky-blue Sun-orchid [76352]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Triplarina nowraensis Nowra Heath-myrtle [64544]	Endangered	Species or species habitat known to occur within area
Westringia davidii [19079]	Vulnerable	Species or species habitat may occur within area
Xanthorrhoea bracteata Shiny Grasstree [7950]	Endangered	Species or species habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known 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	Foraging, feeding or related behaviour 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
Hoplocephalus bungaroides Broad-headed Snake [1182]	Endangered	Species or species habitat likely to occur within area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour 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

Scientific Name	Threatened Category	Presence Text
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
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat may 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
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	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
Calonectris leucomelas Streaked Shearwater [1077]		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

Scientific Name	Threatened Category	Presence Text
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
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may 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
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

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 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 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
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 edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely 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
Carcharias taurus Grey Nurse Shark [64469]		Congregation or aggregation known to 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
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may 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	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]		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	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Phocoena dioptrica Spectacled Porpoise [66728]		Species or species habitat may 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 known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may 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]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
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 pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	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]	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

Scientific Name	Threatened Category	Presence Text
Limosa limosa Black-tailed Godwit [845]	Endangered	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
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	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 nebularia Common Greenshank, Greenshank [832]	Endangered	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]	Vulnerable	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
Australian National University	
Commonwealth Land - Australian National University [15737]	NSW
Commonwealth Land - Australian National University [12021]	NSW
Commonwealth Land - Australian National University [12023]	NSW
Commonwealth Land - Australian National University [12022]	NSW
Commonwealth Land - Australian National University [12024]	NSW
Commonwealth Land - Australian National University [12019]	NSW
Commonwealth Trading Bank of Australia	
Commonwealth Land - Commonwealth Trading Bank of Australia [12017]	NSW
Commonwealth Land - Commonwealth Trading Bank of Australia [12020]	NSW
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Commission [12016]	NSW
Commonwealth Land - Australian Postal Commission [12052]	NSW
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian Telecommunications Commission [12014]	NSW
Commonwealth Land - Australian Telecommunications Commission [12265]	NSW
Commonwealth Land - Australian Telecommunications Commission [16089]	NSW
Commonwealth Land - Australian Telecommunications Commission [15611]	NSW
Commonwealth Land - Australian Telecommunications Commission [15430]	NSW
Commonwealth Land - Australian Telecommunications Commission [12038]	NSW
Commonwealth Land - Australian Telecommunications Commission [12025]	NSW

Commonwealth Land Name	State
Commonwealth Land - Australian Telecommunications Commission [15461]	NSW
Commonwealth Land - Australian Telecommunications Commission [12015]	NSW
Commonwealth Land - Australian Telecommunications Commission [12050]	NSW
Commonwealth Land - Australian Telecommunications Commission [12053]	NSW
Commonwealth Land - Telstra Corporation Limited [15888]	NSW
Commonwealth Land - Telstra Corporation Limited [12051]	NSW
Defence	
Defence - BEECROFT RAPIER RANGE [10050]	NSW
Defence - BEECROFT RAPIER RANGE [10049]	NSW
Defence - BEECROFT RAPIER RANGE [10048]	NSW
Defence - SUSSEX INLET - DEFENCE RESERVE [11233]	NSW
Defence - Royal Australian Navy Central Canteens Board	
Commonwealth Land - Royal Australian Navy Central Canteens Board [12018]	NSW
Environment and Heritage	
Commonwealth Land - Booderee National Park [91005]	JBT
Commonwealth Land - Booderee National Park [91003]	JBT
Commonwealth Land - Booderee National Park [91002]	JBT
Commonwealth Land - Booderee National Park [91004]	JBT
Commonwealth Land - Booderee National Park [91001]	JBT
Unknown	
Commonwealth Land - [60066]	TAS
Commonwealth Land - [60065]	TAS
Commonwealth Land - [21496]	VIC
Commonwealth Land - [21498]	VIC
Commonwealth Land - [12047]	NSW
Commonwealth Land - [12042]	NSW
Commonwealth Land - [12046]	NSW

Commonwealth Land Name	State
Commonwealth Land - [12045]	NSW
Commonwealth Land - [21497]	VIC
Commonwealth Land - [21491]	VIC
Commonwealth Land - [21490]	VIC
Commonwealth Land - [60064]	TAS
Commonwealth Land - [60067]	TAS
Commonwealth Land - [12041]	NSW
Commonwealth Land - [21489]	VIC
Commonwealth Land - [21488]	VIC
Commonwealth Land - [21487]	VIC

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Cape St George Lighthouse Ruins & Curtilage	ACT	Listed place
Christians Minde Settlement	ACT	Listed place
Eddystone Lighthouse	TAS	Listed place
Gabo Island Lighthouse	VIC	Listed place
Goose Island Lighthouse	TAS	Listed place
Jervis Bay Botanic Gardens	ACT	Listed place
Montague Island Lighthouse	NSW	Listed place
Point Perpendicular Lightstation	NSW	Listed place
Royal Australian Naval College	ACT	Listed place
Wilsons Promontory Lighthouse	VIC	Listed place
Indigenous		
Crocodile Head Area	NSW	Within listed place
Jervis Bay Territory	ACT	Listed place
Natural		
Beecroft Peninsula	NSW	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
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	Breeding known to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		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]	Vulnerable	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]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	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 known to occur within area overfly marine area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting 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]	Vulnerable	Roosting known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within 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

Scientific Name	Threatened Category	Presence Text
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
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
Fregata ariel		
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor		
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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]		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	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	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
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 serrator Australasian Gannet [1020]		Breeding known to occur within 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	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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
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
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting 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

Scientific Name	Threatened Category	Presence Text
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
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 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
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
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	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]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text
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
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to 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 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

Scientific Name	Threatened Category	Presence Text
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
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]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Arctocephalus pusillus		
Australian Fur-seal, Australo-African Fur-seal [21]		Breeding known to occur within area
Dugong dugon		
Dugong [28]		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	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	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 likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely 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	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 cruciger Hourglass Dolphin [42]		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

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
Phocoena dioptrica Spectacled Porpoise [66728]		Species or species habitat may 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

Commonwealth Reserves Terrestrial

[Resource Information]

Name	State	Type
Booderee	JBT	National Park (Commonwealth)
Booderee	JBT	Botanic Gardens (Commonwealth)

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Jervis	Habitat Protection Zone (IUCN IV)
Flinders	Marine National Park Zone (IUCN II)
Freycinet	Marine National Park Zone (IUCN II)
Beagle	Multiple Use Zone (IUCN VI)
East Gippsland	Multiple Use Zone (IUCN VI)
Flinders	Multiple Use Zone (IUCN VI)
Freycinet	Multiple Use Zone (IUCN VI)
Huon	Multiple Use Zone (IUCN VI)
Freycinet	Recreational Use Zone (IUCN IV)
Jervis	Special Purpose Zone (Trawl) (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Anderson Islands	Conservation Area	TAS
Anser Island	Reference Area	VIC
Arthur Bay	Conservation Area	TAS
Baawang	Reference Area	VIC
Babel Island	Indigenous Protected Area	TAS
Badger Island	Indigenous Protected Area	TAS
Bancroft Bay - Kalimna G.L.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Bass Pyramid	Nature Reserve	TAS
Batemans	Marine Park	NSW
Battery Island	Conservation Area	TAS
Baxter Island G.L.R.	Natural Features Reserve	VIC
Belowla Island	Nature Reserve	NSW
Bemm, Goolengook, Arte and Errinundra Rivers	Heritage River	VIC
Ben Boyd	National Park	NSW
Benedore River	Reference Area	VIC
Bermaguee	Nature Reserve	NSW
Bermagui	Flora Reserve	NSW
Beware Reef	Marine Sanctuary	VIC
Biamanga	National Park	NSW
Big Green Island	Nature Reserve	TAS
Big Silver	Conservation Covenant	TAS
Blond Bay G.L.R.	Natural Features Reserve	VIC
Blond Bay W.R.	Natural Features Reserve	VIC
Blyth Point	Conservation Area	TAS
Boat Harbour Road Killiecrankie	Conservation Covenant	TAS
Bournda	National Park	NSW
Boxen Island	Conservation Area	TAS
Briggs Islet	Conservation Area	TAS
Brodribb River F.F.R	Nature Conservation Reserve	VIC
Brougham Sugarloaf	Conservation Area	TAS
Broulee Island	Nature Reserve	NSW
Brush Island	Nature Reserve	NSW

Protected Area Name	Reserve Type	State
Bun Beetons Point	Conservation Area	TAS
Cabbage Tree Creek F.R	Nature Conservation Reserve	VIC
Cape Conran Coastal Park	Conservation Park	VIC
Cape Howe	Wilderness Zone	VIC
Cape Howe	Marine National Park	VIC
Cat Island	Conservation Area	TAS
Chalky Island	Conservation Area	TAS
Chappell Islands	Nature Reserve	TAS
Clyde River	National Park	NSW
Cone Islet	Conservation Area	TAS
Conjola	National Park	NSW
Craggy Island	Conservation Area	TAS
Croajingolong	National Park	VIC
Cullendulla Creek	Nature Reserve	NSW
Curtis Island	Nature Reserve	TAS
Darling Range	Conservation Area	TAS
Darriman H29 B.R	Natural Features Reserve	VIC
Devils Tower	Nature Reserve	TAS
Double Creek	Natural Catchment Area	VIC
Doughboy Island	Conservation Area	TAS
Eagles Claw	Nature Reserve	NSW
East Gippsland Coastal streams	Natural Catchment Area	VIC
East Kangaroo Island	Nature Reserve	TAS
East Moncoeur Island	Conservation Area	TAS
Eddystone Point Lighthouse	Historic Site	TAS

Protected Area Name	Reserve Type	State
Egg Beach	Conservation Area	TAS
Emita	Nature Recreation Area	TAS
Eurobodalla	National Park	NSW
Ewing Morass W.R	Natural Features Reserve	VIC
First and Second Islands F.R.	Nature Conservation Reserve	VIC
Flannagan Island G.L.R.	Natural Features Reserve	VIC
Foochow	Conservation Area	TAS
Forsyth Island	Conservation Area	TAS
Fotheringate Bay	Conservation Area	TAS
Fraser Island G.L.R.	Natural Features Reserve	VIC
Fresh-water Swamp, Woodside Beach W.R	Natural Features Reserve	VIC
George Rocks	Nature Reserve	TAS
Giffard H31 B.R	Natural Features Reserve	VIC
Gippsland Lakes Coastal Park	Conservation Park	VIC
Goose Island	Conservation Area	TAS
Great Dog Island	Indigenous Protected Area	TAS
Gulaga	National Park	NSW
Gull Island	Conservation Area	TAS
Hogan Group	Conservation Area	TAS
Holts Point	Conservation Area	TAS
Humbug Point	Nature Recreation Area	TAS
Illawong	Nature Reserve	NSW
Isabella Island	Nature Reserve	TAS
Jack Smith Lake W.R	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Jacksons Cove	Conservation Area	TAS
Jervis Bay	National Park	NSW
Jervis Bay	Marine Park	NSW
Kent Group	National Park	TAS
Killiecrankie	Nature Recreation Area	TAS
Kuhns Rd Memana	Conservation Covenant	TAS
Lackrana	Conservation Area	TAS
Lake Coleman W.R	Natural Features Reserve	VIC
Lake Corringle W.R	Natural Features Reserve	VIC
Lake Curlip W.R.	Natural Features Reserve	VIC
Lake Denison W.R	Natural Features Reserve	VIC
Lake Tyers S.P.	State Park	VIC
Lands End	Conservation Covenant	TAS
Lime Pit Road	Conservation Area	TAS
Little Beach	Conservation Area	TAS
Little Chalky Island	Conservation Area	TAS
Little Dog Island	Game Reserve	TAS
Little Green Island	Conservation Area	TAS
Little Island	Conservation Area	TAS
Little Silver	Conservation Covenant	TAS
Little Swan Island	Nature Reserve	TAS
Logan Lagoon	State Reserve	TAS
Logan Lagoon	Conservation Area	TAS
Logans Lagoon	Conservation Covenant	TAS
Long Island	Conservation Area	TAS

Protected Area Name	Reserve Type	State
Low Islets	Nature Reserve	TAS
Low Point	Conservation Area	TAS
Lughrata	Conservation Covenant	TAS
lungatalanana	Indigenous Protected Area	TAS
Mallacoota B.R.	Natural Features Reserve	VIC
Marriott Reef	Conservation Area	TAS
Marshall Beach	Conservation Area	TAS
Meroo	National Park	NSW
Metung B.R.	Natural Features Reserve	VIC
Mile Island	Conservation Area	TAS
Mimosa Rocks	National Park	NSW
Montague Island	Nature Reserve	NSW
Moriarty Rocks	Nature Reserve	TAS
Morley Swamp G.L.R.	Natural Features Reserve	VIC
Mortimers Paddock B.R.	Natural Features Reserve	VIC
Mount Chappell Island	Indigenous Protected Area	TAS
Mount Tanner	Nature Recreation Area	TAS
Mount William	National Park	TAS
Mulligans Hill	Conservation Covenant	TAS
Mulligans Hill	Conservation Area	TAS
Mumbulla	Flora Reserve	NSW
Murrah	Flora Reserve	NSW
Murramarang	National Park	NSW
Nadgee	Nature Reserve	NSW

Protected Area Name	Reserve Type	State
Narrawallee Creek	Nature Reserve	NSW
Neds Reef	Conservation Area	TAS
Night Island	Conservation Area	TAS
Ninety Mile Beach	Marine National Park	VIC
Ninth Island	Conservation Area	TAS
Nooramunga Marine & Coastal Park	National Parks Act Schedule 4 park or reserve	VIC
North East Islet	Nature Reserve	TAS
North East River	Game Reserve	TAS
Nungurner B.R.	Natural Features Reserve	VIC
Nyerimilang Park G.L.R.	Natural Features Reserve	VIC
Oyster Rocks	Conservation Area	TAS
Palana Beach	Nature Recreation Area	TAS
Pasco Group	Conservation Area	TAS
Passage Island	Conservation Area	TAS
Patriarchs	Private Sanctuary	TAS
Patriarchs	Conservation Area	TAS
Point Hicks	Marine National Park	VIC
Prime Seal Island	Conservation Area	TAS
Rame Head	Remote and Natural Area - Schedule 6, National Parks Act	VIC
Ram Island	Conservation Area	TAS
Raymond Island G.L.R.	Natural Features Reserve	VIC
Reedy Lagoon	Private Nature Reserve	TAS
Reef Island	Conservation Area	TAS
Rigby Island G.L.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Rodondo Island	Nature Reserve	TAS
Roydon Island	Conservation Area	TAS
Salt Lake - Backwater Morass G.L.R.	Natural Features Reserve	VIC
Sandpatch	Wilderness Zone	VIC
Seal Creek	Reference Area	VIC
Seal Islands W.R.	Nature Conservation Reserve	VIC
Sellars Lagoon	Game Reserve	TAS
Sentinel Island	Conservation Area	TAS
Settlement Point	Conservation Area	TAS
Shag Lagoon	Conservation Area	TAS
Sister Islands	Conservation Area	TAS
Snowy River	Heritage River	VIC
Southern Wilsons Promontory	Remote and Natural Area - Schedule 6, National Parks Act	VIC
South Pats River	Conservation Area	TAS
Spike Island	Conservation Area	TAS
Steel Bay - Newland Backwater G.L.R.	Natural Features Reserve	VIC
St Helens	Conservation Area	TAS
Storehouse Island	Conservation Area	TAS
Strzelecki	National Park	TAS
Sugarloaf Rock	Conservation Area	TAS
Summer Camp	Conservation Area	TAS
Sydney Cove	Historic Site	TAS
Tanja	Flora Reserve	NSW
Tenth Island	Nature Reserve	TAS
The Dock	Conservation Covenant	TAS

Protected Area Name	Reserve Type	State
The Dutchman	Conservation Area	TAS
The Lakes	National Park	VIC
Tollgate Islands	Nature Reserve	NSW
Trousers Point Beach	Conservation Area	TAS
Unnamed (Badger Corner)	Conservation Area	TAS
Vansittart Island	Conservation Area	TAS
Waterhouse Island	Conservation Area	TAS
West Moncoeur Island	Nature Reserve	TAS
White Beach	Conservation Area	TAS
William Hunter F.R	Nature Conservation Reserve	VIC
Wilsons Promontory	National Park	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
Wingaroo	Nature Reserve	TAS
Wright Rock	Nature Reserve	TAS
Wybalenna Island	Conservation Area	TAS
Youngs Creek	Conservation Area	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

RFA Name	State
Eden RFA	New South Wales
Gippsland RFA	Victoria
Southern RFA	New South Wales
Tasmania RFA	Tasmania

Nationally Important Wetlands

[Resource Information]

Wetland Name	State
Beecroft Peninsula	NSW
Benedore River	VIC
Bondi Lake	NSW
Clyde River Estuary	NSW
Coila Creek Delta	NSW
Cormorant Beach	NSW
Corner Inlet	VIC
Cullendulla Creek and Embayment	NSW
Durras Lake	NSW
Ewing's Marsh (Morass)	VIC
Fergusons Lagoon	TAS
Flyover Lagoon 1	TAS
Flyover Lagoon 2	TAS
Hogans Lagoon	TAS
Jack Smith Lake State Game Reserve	VIC
Jervis Bay	NSW
Jervis Bay Sea Cliffs	NSW
Lagoon Head	NSW
Lake Bunga	VIC
Lake King Wetlands	VIC
Lake Tyers	VIC

Wetland Name	State
Lake Victoria Wetlands	VIC
Lake Wellington Wetlands	VIC
Little Thirsty Lagoon	TAS
Logan Lagoon	TAS
Lower Snowy River Wetlands System	VIC
Mallacoota Inlet Wetlands	VIC
Merimbula Lake	NSW
Meroo Lake Wetland Complex	NSW
Moruya River Estuary Saltmarshes	NSW
Nadgee Lake and tributary wetlands	NSW
Nargal Lake	NSW
Nelson Lagoon	NSW
Pambula Estuarine Wetlands	NSW
Sellars Lagoon	TAS
Snowy River	VIC
Stans Lagoon	TAS
St Georges Basin	NSW
Swan Lagoon	NSW
Sydenham Inlet Wetlands	VIC
Syndicate Lagoon	TAS
Tabourie Lake	NSW
Tamboon Inlet Wetlands	VIC
Tambo River (Lower Reaches) East Swamps	VIC
Termeil Lake Wetland Complex	NSW
Thompsons Lagoon	TAS
Thurra River	VIC
Tuross River Estuary	NSW

Wetland Name	State
Twofold Bay	NSW
Unnamed Wetland	TAS
Unnamed Wetland	TAS
Unnamed Wetland	TAS
Unnamed Wetland	TAS
Waldrons Swamp	NSW
Wallaga Lake	NSW
Wallagoot Lagoon (Wallagoot Lake)	NSW

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Aurora Green Offshore Wind Farm Preliminary Surveys	2024/09968		Referral Decision
Bermagui Golf Club Proposed Subdivision (Stages 3-8)	2022/09242		Post-Approval
Blue Mackerel North Offshore Wind Farm Marine Surveys	2024/09934		Referral Decision
Blue Marlin Offshore Wind Energy Project	2023/09532		Referral Decision
Broulee Beach Estate residential development subdivision	2023/09551		Completed
Eurobodalla Regional Hospital	2023/09506		Completed
Gippsland Offshore Wind Farm Marine Survey Investigations	2023/09682		Completed
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
Preliminary Site Investigations for Great Eastern Offshore Wind Project	2024/09890		Referral Decision

Title of referral	Reference	Referral Outcome	Assessment Status
Proposed residential subdivision	2023/09632		Completed
Residential Development, Lot 172 DP 755923 and Lot 823 DP 247285, Manyana, NSW	2020/8704		Post-Approval
Seadragon Offshore Wind, Early Marine Surveys	2023/09670		Completed
Seadragon Offshore Wind Farm	2022/9163		Completed
South East Australia Carbon Capture and Storage Project, Commonwealth waters	2023/09732		Referral Decision
South East Australia Carbon Capture and Storage Project, Onshore and State waters	2023/09731		Referral Decision
Controlled action			
Develop an Offshore Tidal Energy Facility	2008/4518	Controlled Action	Completed
Gippsland Lakes Mosquito Control Aerial /Hovercraft Spraying	2001/491	Controlled Action	Completed
Gippsland Regional Port Project	2020/8667	Controlled Action	Assessment Approach
Golden Beach Gas Project	2019/8513	Controlled Action	Post-Approval
North Manyana Subdivision, NSW	2021/8948	Controlled Action	Further Information Request
Residential Subdivision and Town Centre Development, Vincentia	2006/2927	Controlled Action	Post-Approval
Rezoning of land and associated public works to facilitate residential development	2007/3448	Controlled Action	Completed
Star of the South Offshore Wind Farm Project	2020/8650	Controlled Action	Guidelines Issued
Thomson River Mercury Recovery Project	2010/5734	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	2003/1282	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
VIC/RL			
2D seismic Survey in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	Not Controlled Action	Completed
55m lattice tower & infrastructure	2003/1159	Not Controlled Action	Completed
Acquistion of 2D seismic data in State Waters adjacent to Ninety Mile Beach-VIC/P39(V)	2004/1889	Not Controlled Action	Completed
Angas and Galloway Exploration Wells VIC/P39(v)	2005/2330	Not Controlled Action	Completed
Basker-Manta-Gummy Oil Development	2011/6052	Not Controlled Action	Completed
Basker-Manta-Gummy Oil Field Development	2007/3402	Not Controlled Action	Completed
Basker-Manta Oil Field Development	2005/2026	Not Controlled Action	Completed
Bass Basin - Pee Jay-1 - Drilling Program	2007/3908	Not Controlled Action	Completed
Batemans Bay Marina Redevelopment	2008/4265	Not Controlled Action	Completed
Beardie-1 Field wildcat oil well	2001/505	Not Controlled Action	Completed
Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed
Caswell Street - Moruya East	2020/8781	Not Controlled Action	Completed
Clearance of native vegetation to create fire breaks	2004/1534	Not Controlled Action	Completed
Communications tower extension	2003/1099	Not Controlled Action	Completed
Construction of an ocean access boat ramp at Bastion Point	2004/1407	Not Controlled Action	Completed
Cunninghame Arm Redevelopment (Stage 3)	2002/618	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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
DOFA weed eradication program at Goorooyaroo NSW	2003/1270	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
East Pilchard exploration well	2001/137	Not Controlled Action	Completed
Eden Wind Farm	2011/6037	Not Controlled Action	Completed
George Bass Drive Lilli Pilli Road Realignment	2021/8876	Not Controlled Action	Completed
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed
Gippsland Lakes Composting Toilet Program	2000/66	Not Controlled Action	Completed
Golf Course Extension	2001/215	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
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
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Marlin-Snapper Gas Pipeline Project	2006/3197	Not Controlled Action	Completed
Melville 1 Oil Exploration Well	2001/167	Not Controlled Action	Completed
Milton/Ulladulla Sewerage Scheme	2001/251	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
Princes Highway Upgrade, NSW	2013/6968	Not Controlled Action	Completed
Pump station upgrades and rising main construction, Lakes Entrance, Victoria	2016/7646	Not Controlled Action	Completed
Ship to ship crude oil lightering	2008/4279	Not Controlled Action	Completed
Ship to Ship Crude Oil Lightering	2001/271	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
Subdivision for Residential development	2004/1823	Not Controlled Action	Completed
Subdivision of 68 ha into two blocks, construction of access road and house site	2004/1531	Not Controlled Action	Completed
The 3000 Acres, clearing and development of native vegetation	2006/3199	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
wastewater collection systems and pumping stations	2001/511	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Wreck Bay Housing Development	2001/299	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 Seismic Aquisition Survey	2008/4041	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4066	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2008/4131	Not Controlled Action (Particular Manner)	Post-Approval
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 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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Bream 3D seismic survey	2006/2556	Not Controlled Action (Particular Manner)	Post-Approval
Church and School Development	2006/3185	Not Controlled Action (Particular Manner)	Post-Approval
Dalrymple 3D Seismic Survey	2010/5680	Not Controlled Action (Particular Manner)	Post-Approval
Development of Commercial Shellfish Aquaculture Leases within Jervis Bay	2013/6768	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
Golden Beach gas field development	2003/1031	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	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Labatt 3D Seismic Survey T/47P Bass Strait	2007/3759	Not Controlled Action (Particular Manner)	Post-Approval
Lakes Entrance Sand Management Program Trial Dredging	2007/3694	Not Controlled Action (Particular Manner)	Completed
Lakes Entrance Sand Management Program Trial Dredging	2007/3852	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
Maintenance Dredging of Oceanic Sand	2011/5932	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
Pelican 3D Marine Seismic Survey, Gippsland Basin, Vic	2017/8097	Not Controlled Action (Particular Manner)	Post-Approval
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
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
Soil and Organic Recycling Facility	2005/2216	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
supersonic missile launch facility	2000/120	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
Tuskfish 3D Seismic Survey, Bass Strait	2002/864	Not Controlled Action (Particular Manner)	Post-Approval
Waterfront Facility at HMAS Creswell	2002/658	Not Controlled Action (Particular Manner)	Post-Approval
West Seahorse Oil Development Project, Commonwealth waters offshore Victoria	2013/6973	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
All actions taken in response to the current severe bushfires in Victoria.	2009/4787	Referral Decision	Completed
Beardie-1 Field wildcat oil well	2001/469	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Beecroft Weapons Range Visitors Centre	2004/1322	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
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
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed
Upgrade of Corringle Road	2009/4825	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
Canyons on the eastern continental slope	Temperate east
Seamounts South and east of Tasmania	South-east
Shelf rocky reefs	Temperate east
Upwelling East of Eden	South-east

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Dolphins		
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
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	Known to occur
Ardenna grisea Sooty Shearwater [82651]	Foraging	Likely to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely 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

Scientific Name	Behaviour	Presence
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]	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
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
Phalacrocorax fuscescens Black-faced Cormorant [59660]	Foraging	Likely 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]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
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]	Foraging likely	Likely to occur
Thalassarche cauta steadi White-capped Albatross [82344]	Foraging	Known to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging likely	Likely to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Likely 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]	Reproduction	Known to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Known Foraging Area	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur

Bioregional Assessments

[Resource Information]

SubRegion	BioRegion	Website
Sydney	Sydney Basin	BA 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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Appendix E: Consultation report (Summary)

Appendix E-1 Relevant persons consultation levels

Relevant persons consultation levels for Regulation 25(1)(a) relevant persons

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
420	Aboriginal Heritage Tasmania (Part of the Department Premier and Cabinet)	EMBA	Function as a Tasmanian State government agency that aims to protect and promote Tasmania's Aboriginal heritage and facilitate the return of land to Tasmania's Aboriginal people.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is in the EMBA and no impact from planned activity.
4	Australian Fisheries Management Authority	OA	Function as a Commonwealth government agency responsible for management of Commonwealth commercial fisheries from 3-200nm. The OAs overlap with local fisheries.	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as their function is in the OA of the planned activity.
125	Australian Hydrographic Office	OA	Function as a Commonwealth government agency responsible for publication of nautical charts and other information for safety of ships navigating in Australian waters (including Notices to Mariners).	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as they provide Notice to Mariners and therefore have a function in the OA of the planned activity.
2	Australian Maritime Safety Authority	OA	Function as a Commonwealth government statutory authority responsible for maritime safety, protection of the marine environment including marine pollution and maritime aviation search and rescue.	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as their function is in the OA of the planned activity.
407	Bass Coast Shire Council	EMBA	Function as a Victorian local government for Bass Coast Shire. Provides a range of services to community and is interested in maintaining sustainable communities and business.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
100	CarbonNet	ATBA	Function as Victoria government agency to establish a commercial scale Carbon Capture and Storage network in Gippsland, Victoria.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as their function is in the ATBA of the planned activity.
339	Department of Climate Change, Energy, the Environment and Water	OA	Function as a Commonwealth government department whose role is to help Australia respond to climate change, manage water and energy resources, environment, parks and heritage. They have responsibility for considering sea dumping applications.	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as their function is in the OA of the planned activity.
104	Department of Defence	OA	Function as Commonwealth department for national defence. The East Sale Air Base is located in Gippsland and has activities over Bass Strait.	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as their function is in the OA of the planned activity.
44	Department of Jobs Precincts and Regions	ATBA	Function as a Victorian State government department for economic recovery and business and industry engagement.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as their function is in the ATBA of the planned activity.
382	Department of Transport and Planning	EMBA	Function as Victorian State government department with primary responsibility for maritime sourced pollution oil spills in Victorian waters. Function as the oil spill response control agency for Victorian state waters.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
103	Director of National Parks	ATBA	Function as a Commonwealth entity responsible for the management of Commonwealth terrestrial and marine protected areas.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
					as there are no terrestrial or marine protected areas in area of planned activity.
10	East Gippsland Catchment Management Authority	EMBA	Function as a Victoria government statutory authority for the integrated management of land, biodiversity and water resources in the region. The Authority also has responsibility for the planning and delivery of river health works, and several statutory activities.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is in the EMBA and no impact from planned activity.
11	East Gippsland Shire Council	EMBA	Function as Victorian government local council delivering services to community and issuing planning permits for land use and development throughout East Gippsland. Has an interest in maintaining sustainable communities and business.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
392	East Gippsland Water	EMBA	Function as Victorian government statutory corporation responsible for delivery of water supply and wastewater management in East Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
13	Environment Protection Authority Victoria	EMBA	Function as the Victoria's State environmental regulator and performs oil spill response support functions and conducts incident investigations.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

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63	Environmental Protection Agency Tasmania	EMBA	Function as Tasmanian regulator responsible for the environmental protection and management, including ensuring that activities do not cause unacceptable pollution and primary responsibility for wildlife impacted by marine pollution in Tasmanian state waters. Function as the oil spill response control agency for Tasmania state waters.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function may be relevant in the event of an unplanned activity.
536	Fire Rescue Victoria	EMBA	Function as fire and rescue service for the state of Victoria. Responsible for marine response associated with fires, chemical spills on ships and in ports, and other marine related emergencies.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function may be relevant in the event of an unplanned activity.
15	Gippsland Ports	ATBA	Function as Victorian statutory authority responsible for five Gippsland Ports, including Lakes Entrance, Port of Corner Inlet and Port Albert.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their function may occur in the ATBA of the planned activity.
409	Gippsland Water	EMBA	Function as Victorian government statutory corporation to deliver fresh, clean drinking water, and manage and treat wastewater.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
495	Indigenous Land and Sea Corporation	EMBA	Function as a Commonwealth government statutory authority with national responsibilities to assist Aboriginal and Torres Strait Islander people to acquire land and to manage assets to achieve cultural, social, environmental and economic benefits for Indigenous peoples.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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538	Major Road Projects Victoria	N/A	Function as a State government office involved in the coordinated approach to emergency management containing provisions for the mitigation of, response to and recovery from emergencies.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function may be relevant in the event of an unplanned activity.
539	Maritime Border Command	EMBA	Function as a Commonwealth government agency is Australia's principal civil maritime security agency, a de facto coast guard, operating in the maritime domain to ensure compliance with Australia's maritime legislation by foreign and domestic non-state actors.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
85	National Offshore Petroleum Titles Administrator	OA	Function as Commonwealth government agency responsible for the day-to-day administration of petroleum & greenhouse gas titles in Commonwealth waters in Australia.	L1	Esso has applied its methodology and assessed department or agency as a Level 1 consultation as their function is in the OA of the planned activity.
129	Parks Australia (part of DCCEEW)	ATBA	Function as Commonwealth government agency responsible for managing Commonwealth parks, reserves and conservation zones.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as there are no Commonwealth reserves or conservation zones in OA of planned activity.
27	Parks Victoria	EMBA	Function as a Victorian State Government agency that manages coastal marine parks and reserves, and coastal areas. They manage significant stretches of land along the Gippsland coastline and some maritime infrastructure in the Gippsland area (e.g. some piers, jetties, berths and ports including Western Port). Support agency for oil spill response.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is to provide response in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
399	Ports Victoria	EMBA	Function as Victorian State government agency that manages the safe transit of vessels into and out of Victoria's commercial ports. It provides maritime expertise, informing the strategic development and operations within Victoria's commercial ports and waterways.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
42	Safe Transport Victoria - Maritime	ATBA	Function as a Victorian State government department responsible for conducting audits of Victoria's ports and waterways and work with the entities that manage them to ensure they are safe for all waterway users.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as their function is in the ATBA of the planned activity.
38	South Gippsland Shire Council	EMBA	Function as department or agency of Victoria as local council.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
413	Southern Rural Water	N/A	Function as a government-owned statutory corporation, governed by a skills-based Board appointed by the Minister for Water.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
39	State Emergency Service	EMBA	Function as a Commonwealth government agency responsible for flood, storm, tsunami, earthquake and landslide throughout Australia.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is to provide response in the event of an unplanned activity.
64	Tasmania Parks and Wildlife Service	EMBA	Function as Tasmanian State Government agency working to conserve the State's natural and cultural heritage while providing for sustainable use and	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation

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			economic opportunities for the Tasmanian community.		as their activity may occur in the EMBA and no impact from planned activity.
62	Transport for NSW	EMBA	Function as a NSW State government department responsible for NSW's maritime safety and management of transport on coastal waterways primary responsibility for wildlife impacted by marine pollution in NSW state waters. Function as the oil spill response control agency for NSW state waters.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
101	Victorian Fisheries Authority	ATBA	Function as a Victorian State government agency to effectively manage Victoria's fisheries resources. This includes providing support during an emergency that involves cetacean entanglement, strandings and vessel strike; responding to pollution in waterways; respond to marine pest incursions; and preventing noxious aquatic species being brought into Victoria.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as their function is in the ATBA of the planned activity.
403	Victorian Safety Emergency Services Eastern Region	EMBA	Function as a government control agency for flood, storm, tsunami, earthquake and landslide throughout Victoria.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
20	Wellington Shire Council	EMBA	Function as department or agency of Victoria as a local council.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
380	West Gippsland Catchment Management Authority	EMBA	Function as department or agency of Victoria to manage land and water resources in the West Gippsland region.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is in the EMBA and no impact from planned activity.

Relevant persons consultation levels for Regulation 25(1)(b) relevant persons

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
529	Department of Energy, Environment and Climate Action	ATBA	Function as department of the Victorian Government working with industry and the community to develop Victoria's secure and sustainable energy future. Responsible for earth resources exploration, licensing, approval of applications, and enforcement on land and state waters. Responsible for protection of biodiversity and biosecurity on land and in State waters. Has responsibility to approve sea dumping applications in State waters.	L2	Esso has applied its methodology and assessed department or agency as a Level 2 consultation as their function is in the ATBA of the planned activity.

Relevant persons consultation levels for Regulation 25(1)(d) relevant persons

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
122	3D Oil	EMBA	Organisation with activities with oil and gas company with licenses offshore from Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
421	Aboriginal Land Council of Tasmania	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
516	Australian Conservation Foundation	EMBA	Interest as an Australian independent, non-profit organisation, working to conserve threatened wildlife and ecosystems.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
347	Australian Institute of Marine and Power Engineers	EMBA	Function as a union representing the industrial and professional Interest of Marine Engineers in Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
517	Australian Marine Conservation Society	EMBA	Interest as a national charity dedicated solely to protecting our precious ocean wildlife – a community of ocean lovers across the nation working for healthy seas.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
121	Australian Southern Bluefin Tuna Industry Association	EMBA	Organisation representing the Australian Southern Bluefin Tuna Industry working to maintain a high level of quality and training.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
405	Australian Volunteer Coastguard	EMBA	Activities as a volunteer marine search and rescue organisation.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
207	Australian WildCatch Fishing	ATBA	Activities as business operating five fishing vessels in Gippsland and supports a variety of other Vessels, with the design and construction of Fishing Gear, Crew placement, Quota, licence management and associated administration.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
372	Australian Wildlife Conservancy	EMBA	Interest as Australian independent, non-profit organisation, working to conserve threatened wildlife and ecosystems.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
337	Australian Workers Union	EMBA	Activities as negotiating workplace enterprise agreements.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
87	Bass Oil	EMBA	Organisation with activities as oil and gas company with licenses offshore from Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
26	Beach Energy	EMBA	Organisation with activities as oil and gas company with licenses offshore from Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
630	Blue Mackerel North Pty Ltd	EMBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
107	Boating Industry Association of Victoria	EMBA	Activities as a not-for-profit organisation and the peak body representing the recreational and light commercial marine industry.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
209	Bunurong Land Council Aboriginal Corporation	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
424	Cape Barren Island Aboriginal Association Incorporated (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
511	Catches Trust (Chairman)	EMBA	Activities as Chairman of Catchers Trust in NSW, a sounding board for licensed fishermen and a mechanism to distribute profits from Sydney Fish Markets.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
425	Circular Head Aboriginal Corporation (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
218	Committee for Gippsland	EMBA	Interest as independent group established to represent all sectors of business, industry and community views to collaboration on regional priorities to benefit Gippsland communities.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
76	Commonwealth Fisheries Association	ATBA	Organisation contributing to the formulation of effective and responsible fisheries policies.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
335	Community Over Mining	EMBA	Interest as non-government organisation covering many topics in Gippsland and around Australia including pollution to air, land and water.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
496	Construction, Forestry, Maritime, Mining and Energy Union	EMBA	Activities as trade union in building and construction, forestry and furnishing products, maritime and mining and energy production.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
34	Cooper Energy	EMBA	Organisation with activities as oil and gas company with licenses offshore from Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
83	Corner Inlet Fisheries Habitat Association	EMBA	Interest as a person or organisation to facilitate and encourage better habitat protection and stewardship of the local marine resource.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
8	Country Fire Authority (Region 10)	EMBA	Function as a volunteer organisation fire service responsible for fire suppression, rescues, and response to other accidents and hazards across most of the state Victoria, Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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82	East Gippsland Estuarine Fishermens Association	ATBA	Activities as a person or organisation representing the Interest of the Gippsland Lakes Estuarine fishers.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
79	Eastern Victorian Sea Urchin Divers Association	EMBA	Organisation representing Sea Urchin Divers.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
136	Eastern Zone Abalone Industry Association	EMBA	Organisation providing an effective, credible and professional voice for its members.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
426	Elders Council of Tasmania Aboriginal Corporation	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
336	Electrical Trades Union	EMBA	Activities as contractors - services include closure studies and decommissioning, deconstruction and demolition, civil engineering and construction, landscaping and external works, resource recovery and waste management, asbestos removal and disposal, site remediation, rehabilitation and revegetation, and heavy plant rental.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
58	Emperor Energy	EMBA	Organisation with activities as oil and gas company with licenses offshore from Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation

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					as their activity may occur in the EMBA and no impact from planned activity.
518	Environment Victoria	EMBA	Interest as an independent and not-for-profit group campaigning for a safe climate, healthy rivers and sustainable living.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
204	Far Out Charters	EMBA	Organisation operating offshore fishing charters based out of Lakes Entrance.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
427	First Tasmanians Aboriginal Corporation (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
128	Fishing Tribunal	ATBA	Activities as independent group established to consider commercial fishing vessel damage claims resulting from interaction with Esso equipment/facilities.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
428	Flinders Island Aboriginal Association Inc (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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353	Friends of the Earth	EMBA	Interest as eNGO working to protect and/or educate about the natural environment.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
197	Game Fishing Association of Victoria	ATBA	Activities as the governing body for Game Fishing in Victoria.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
393	Gippsland and East Gippsland Aboriginal Cooperative Ltd	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
578	Gippsland Dawn OWP Project Pty Ltd	ATBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA and no impact from planned activity.
208	Gippsland Lakes Fishing Club	ATBA	Activities as a recreational fishing club based in Lakes Entrance.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
408	Gippsland Lakes Yacht Club	EMBA	Organisation sailing club in East Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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651	Gippsland Skies Pty Ltd	EMBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
581	Golden Paradise Beach Ratepayers & Residents Association Inc	EMBA	Interest as a not for profit Volunteer Organisation providing a range of services and advocacy for, and on behalf of, the communities of Golden Beach and Paradise Beach, in Gippsland, Victoria.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
362	GreenPeace	EMBA	Interest as eNGO campaigning for a green and peaceful future.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
429	Gulaga and Biamanga Joint Authority	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
213	Gunaikurnai Land and Waters Aboriginal Corporation	OA	Function, Interest and activities as Registered Aboriginal Party that represents the Gunaikurnai people, the Traditional Owners of our Country, as determined by the Victorian Aboriginal Heritage Council under the Aboriginal Heritage Act 2006.	L1	Esso has applied its methodology and assessed GLaWAC as a Level 1 consultation as there may be connections to sea country within the OA of the planned activity.
190	Hastings Coastal Advisory Group	EMBA	Organisation advising Council in the use or development, planning, management, protecting and enhancing the Shire's coastlines.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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205	Hewardia	ATBA	Activities as Lakes Entrance based commercial fishing boat.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
652	High Sea Wind Pty Ltd	EMBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
631	Iberdrola Australia OW 2 Pty Limited	EMBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
138	Independent chair of Fishing Tribunal	ATBA	Activities as Independent Chair of Esso's Fishing Tribunal.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
430	King Island Shire Council	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
395	Lake Tyers Aboriginal Trust	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

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17	Lakes Entrance Fishermen Limited	ATBA	Activities as Fishing co-operative representing the Interest of Lakes Entrance based commercial fishing vessels. Represents Lakes Entrance commercial fishing by providing a full-service unloading facility to the local fishing fleet. From here, fresh seafood is distributed to local shops.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
410	Lakes Entrance Offshore Charters	EMBA	Organisation as fishing charter operator.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
18	Lakes Entrance Scallop Fishing Industry Association	ATBA	Activities as commercial scallop fishing industry group.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
109	Life Saving Victoria	EMBA	Organisation working with communities, educational institutions, government agencies, businesses and the broader aquatic industry to prevent aquatic related death and injury in all Victorian communities.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
198	Marine and Safety Tasmania	EMBA	Organisation established to ensure the safe operation of vessels, provide and manage marine facilities and manage environmental issues relating to vessels.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
199	Maritime Industry Australia Limited	EMBA	Activities as organisation established to be the voice and advocate of the Australian maritime industry.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

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348	Maritime Union of Australia	EMBA	Activities as union for waterside workers, seafarers, port workers, professional divers, and office workers associated with Australian ports.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
431	Melythina tiakana warrana Aboriginal Corporation (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
137	Member of Fishing Tribunal	ATBA	Activities as Member of Esso's Fishing Tribunal.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
211	Mitchelson Fisheries	ATBA	Activities as commercial fishing company based in Lakes Entrance who represent themselves.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
585	Navigator North Project Pty Ltd	ATBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA and no impact from planned activity.
374	New South Wales Aboriginal Land Council	EMBA	Organisation as NSW State peak representative body in Aboriginal affairs.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

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433	NSW Local Aboriginal Land Council: Awabakal	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
434	NSW Local Aboriginal Land Council: Bahtabah	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
435	NSW Local Aboriginal Land Council: Batemans Bay	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
436	NSW Local Aboriginal Land Council: Bega	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
601	NSW Local Aboriginal Land Council: Birpai	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
437	NSW Local Aboriginal Land Council: Bodalla	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
604	NSW Local Aboriginal Land Council: Bunyah	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
438	NSW Local Aboriginal Land Council: Cobowra	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
439	NSW Local Aboriginal Land Council: Darkinjung	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
440	NSW Local Aboriginal Land Council: Eden	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
441	NSW Local Aboriginal Land Council: Forster	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
442	NSW Local Aboriginal Land Council: Illawarra	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
443	NSW Local Aboriginal Land Council: Jerrinja	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
444	NSW Local Aboriginal Land Council: Karuah	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
602	NSW Local Aboriginal Land Council: Kempsey	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
445	NSW Local Aboriginal Land Council: La Perouse	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
446	NSW Local Aboriginal Land Council: Merrimans	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
447	NSW Local Aboriginal Land Council: Metropolitan	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
448	NSW Local Aboriginal Land Council: Mogo	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
449	NSW Local Aboriginal Land Council: Nowra	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
587	NSW Local Aboriginal Land Council: Purfleet Taree	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
450	NSW Local Aboriginal Land Council: Ulladulla	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
451	NSW Local Aboriginal Land Council: Wagonga	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function may occur in the EMBA and no impact from planned activity.
452	NSW Local Aboriginal Land Council: Worimi	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
453	NSW Local Government Area / Council: Bayside	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
454	NSW Local Government Area / Council: Bega Valley	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
455	NSW Local Government Area / Council: Central Coast	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
456	NSW Local Government Area / Council: Eurobodalla	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
457	NSW Local Government Area / Council: Georges River	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
588	NSW Local Government Area / Council: Kempsey	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
458	NSW Local Government Area / Council: Kiama	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
459	NSW Local Government Area / Council: Lake Macquarie	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
460	NSW Local Government Area / Council: Mid-Coast	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
461	NSW Local Government Area / Council: Mosman	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
462	NSW Local Government Area / Council: Newcastle	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
463	NSW Local Government Area / Council: North Sydney	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
464	NSW Local Government Area / Council: Northern Beaches	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
603	NSW Local Government Area / Council: Port Macquarie - Hastings	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
465	NSW Local Government Area / Council: Port Stephens	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
466	NSW Local Government Area / Council: Randwick	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
467	NSW Local Government Area / Council: Shellharbour	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
468	NSW Local Government Area / Council: Shoalhaven	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
469	NSW Local Government Area / Council: Sutherland Shire	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
470	NSW Local Government Area / Council: Sydney	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
471	NSW Local Government Area / Council: Waverley	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
472	NSW Local Government Area / Council: Wollongong	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
473	NSW Local Government Area / Council: Woollahra	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
474	NTSCORP Limited (NSW)	EMBA	Function as department or agency of NSW local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
25	Oil Spill Response Limited	EMBA	Function as an organisation industry-funded cooperative which exists to respond to oil spills.	L3	Esso has applied its methodology and assessed department or agency as a Level 3 consultation as their function is to provide response in the event of an unplanned activity.
586	Orsted Offshore Australia 1 Pty Ltd	EMBA	Organisation with a feasibility licence for an offshore wind farm project off the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
123	Panama II Octopus fishing vessel	ATBA	Activities as Lakes Entrance based commercial fishing boat.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
475	Parrdarrama Pungenna Aboriginal Corporation (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
398	Peels Cruises	EMBA	Organisation as tour company.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
212	Piscari Industries Pty Ltd	ATBA	Activities as commercial fishing company based in Lakes Entrance.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
30	Port Franklin Fishermans Association	EMBA	Organisation for local fishing association.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
84	Port Phillip Sea Pilots	EMBA	Organisation of marine pilotage for commercial vessels calling to Melbourne, Geelong, Hastings, Corner Inlet, and back-up pilotage to Portland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
515	Qube	EMBA	Organisation with activities as Barry Beach Port Operator.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
507	Relevant Person #507	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
508	Relevant Person #508	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
509	Relevant Person #509	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
541	Relevant Person #541	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
559	Relevant Person #559	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
560	Relevant Person #560	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
561	Relevant Person #561	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
562	Relevant Person #562	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
564	Relevant Person #564	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
565	Relevant Person #565	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
566	Relevant Person #566	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
567	Relevant Person #567	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
568	Relevant Person #568	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
570	Relevant Person #570	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
571	Relevant Person #571	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
572	Relevant Person #572	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
573	Relevant Person #573	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
574	Relevant Person #574	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
575	Relevant Person #575	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
590	Relevant Person #587	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
594	Relevant Person #594	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
595	Relevant Person #595	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
596	Relevant Person #596	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
599	Relevant Person #599	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
600	Relevant Person #600	EMBA	Interest as community member.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
400	Sale Game & Fishing Association	ATBA	Activities as game fishing association.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
214	Save Westernport	EMBA	Interest as community organisation to protect Western Port Bay's wetlands and support sustainable marine and tourism industries.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
196	Scallop Fishermens Association	ATBA	Activities as a collective of the Scallop Fishing Families and associated support work force based in Lakes Entrance.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
519	Scuba Divers Federation of Victoria (SDFV)	EMBA	Activities as supporting and representing recreational scuba diving clubs.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
520	Sea Shepherd Australia	EMBA	Interest as an international, non-profit marine conservation organization that campaigns to defend, conserve and protect the world's ocean.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
33	Seafood Industry Victoria	ATBA	Activities as a not-for-profit, non-government organisation. SIV is the representative peak body for the Victorian seafood industry, from professional fishers through to wholesale, processors and retail.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
402	Seaspray Surf Lifesaving Club	EMBA	Organisation as Surf Lifesaving Club.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
202	SETFIA Chairman	ATBA	Activities as Chairman of Incorporated association representing commercial fishers in Commonwealth South East Trawl Sector; Scalefish Hook Sector; Shark Hook, Shark Gillnet Sectors; small pelagic fishery.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
24	Seven Group Holdings	EMBA	Organisation as shareholder in Beach Energy and has Interest in energy assets in Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
476	Six Rivers Aboriginal Corporation (TAS)	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
37	South East Trawl Fishing Industry Association	ATBA	Activities as incorporated association representing commercial fishers in Commonwealth South East Trawl Sector; Scalefish Hook Sector; Shark Hook, Shark Gillnet Sectors; small pelagic fishery.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
77	Southern Shark Industry Alliance	ATBA	Activities as incorporated association with members from the Southern and Eastern Scalefish Hook Sector; Shark Hook, Shark Gillnet Sectors; small pelagic fishery.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
638	Star of the South Wind Farm Pty Ltd (FL005) and Kut-Wut Brataualung Pty Ltd (FL006)	EMBA	Organisation as commercial venture proposing an offshore wind farm project of the South Coast of Gippsland.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
522	Surfrider Foundation Australia	EMBA	Interest as not for profit sea-roots organisation dedicated to the protection of Australia’s waves and beaches through conservation, activism, research and education.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
40	Sustainable Shark Fishing Association	EMBA	Organisation as representing fishers in the Southern and Eastern Scalefish and Shark Fishery, Gillnet Hook and Trap fisheries.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
477	TAS Local Government Area / Council: Break ODay	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
478	TAS Local Government Area / Council: Burnie	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
479	TAS Local Government Area / Council: Central Coast	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
480	TAS Local Government Area / Council: Circular Head	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
481	TAS Local Government Area / Council: Devonport	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
482	TAS Local Government Area / Council: Dorset	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
483	TAS Local Government Area / Council: Flinders	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
484	TAS Local Government Area / Council: George Town	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
485	TAS Local Government Area / Council: Glamorgan-Spring Bay	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
486	TAS Local Government Area / Council: Latrobe	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
487	TAS Local Government Area / Council: Launceston	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
488	TAS Local Government Area / Council: Waratah-Wynyard	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
489	TAS Local Government Area / Council: West Tamar	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function may occur in the EMBA and no impact from planned activity.
490	Tasman Council	EMBA	Function as department or agency of Tasmania local council.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
421	Tasmanian Aboriginal Centre	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
491	Tasmanian Regional Aboriginal Communities Alliance	EMBA	Organisation representing Traditional Owners.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
41	Tasmanian Seafood Industry Council	EMBA	Organisation representing the Interest of wild capture fishers, marine farmers and seafood processors in Tasmania.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
345	The Wilderness Society	EMBA	Interest as eNGO working to protect, promote and restore wilderness and natural processes across Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
120	Tuna Australia Ltd	EMBA	Activities representing statutory fishing right owners, holders, fish processors and sellers, and associate members of the Eastern and Western tuna and billfish fisheries of Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.
124	Victoria Game Fishing Club	ATBA	Activities as governing body for Game Fishing in Victoria.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
51	Victorian Recreational Fishing	ATBA	Activities as organisation representing Victorian Recreational Fishing in Victoria.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
52	Victorian Scallop Industry Association	ATBA	Activities as commercial scallop fishing representative body.	L2	Esso has applied its methodology and assessed person or organisation as a Level 2 consultation as their activity may occur in the ATBA of the planned activity.
55	Wildlife Victoria	EMBA	Interest as community organisation providing Wildlife Emergency Response.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
370	World Wide Fund for Nature	EMBA	Interest as eNGO that works in the field of wilderness preservation and the reduction of human impact on the environment.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
111	Yachting Victoria	EMBA	Activities as the peak body for sailing and boating in Victoria, representing clubs, and class associations and their members who are involved in competitive sailing and recreational boating.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their activity may occur in the EMBA and no impact from planned activity.

Relevant persons consultation levels for Regulation 25(1)(e) relevant persons

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
1	Australian Marine Oil Spill Centre	EMBA	Function as an organisation set up by the petroleum industry to enable a quick and effective response to oil spills around the Australian coastline. Relevant for OPEP.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their function is to provide response in the event of an unplanned activity.
432	National Native Title Tribunal (NNTT)	EMBA	Function as an independent body established under the Native Title Act 1993 in Australia as a special measure for the advancement and protection of Aboriginal and Torres Strait Islander peoples. It manages applications for and administration of native title in Australia.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.
28	Port of Hastings	EMBA	Function as responsible for managing the operations at the Port of Hastings, including maintaining the associated port infrastructure.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

ID	Person/organisation	Geo. area	Function, interest or activity	Consultation Level	Classification justification
112	Victorian Regional Channels Authority	EMBA	Function as Victorian State government agency/authority managing commercial navigation in the port waters of Geelong and Hastings.	L3	Esso has applied its methodology and assessed person or organisation as a Level 3 consultation as their interest may be relevant in the event of an unplanned activity.

Appendix E-2 Consultation report (Summary)

Reg 25(2) sufficient information:

Unless otherwise noted in the tables below - Esso considers it has discharged its obligations for consultation under Regulation 25(2). Sufficient information has been provided as summarised below: Esso sent a Turrum specific email on 14 May 2024 providing an information bulletin including activity description, location, timing, potential impacts and EMBA map. Email included links to the Esso Consultation Hub on the public website, the Esso Consultation Questionnaire to better understand relevant person consultation wishes and NOPSEMA's "Consultation on offshore petroleum environment plans brochure". Esso held 11 community information sessions between December 2023 and September 2024 in various locations around Gippsland to discuss activity description, location and potential impacts. Additional emails were sent throughout October 2023 and September 2024 with updates on current activities including Turrum - links to proposed activity information available via Consultation hub e.g. Information bulletins and webpages, including EMBA information and consultation submission dates.

Reg 25(3) sufficient time:

Unless otherwise noted in the tables below - Esso considers it has discharged its obligations for consultation under Regulation 25(3). Esso considers that for the nature and scale of the activity as described in this EP, a minimum 30 days would provide a reasonable period for relevant persons to make an informed assessment of the possible consequences of the activity on their functions, interests or activities. Since the start of consultation, as noted in the 'Date' column, which continued until submission of this EP in November 2024 sufficient time has been provided, giving the relevant person the opportunity to provide feedback over a period greater than 30 days.

Consultation report (Summary) for Regulation 25 (1)(a) relevant persons

Aboriginal Heritage Tasmania (Part of the Department Premier and Cabinet) [420]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Fisheries Management Authority [4]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation advised they have no comments on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	19/10/2023	Email	AFMA advised they have no specific comments on the proposals but encourage EAPL to talk directly with commonwealth fishing operators in the area.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Hydrographic Office [125]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of	Reg 34(g) (ii): EP controls

			objection or claim and its response		
Person/Organisation requested to be consulted on this activity. Queries have been answered.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	24/10/2023	Email	Consultation on offshore activities including Turrum EP.
To	25/10/2023	Email	Response to feedback email.
From	25/10/2023	Email	Response to email requesting feedback on current activities.
From	25/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	02/04/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	15/05/2024	Email	Consultation on Turrum Phase 3 Drilling.
From	16/05/2024	Email	The Stakeholder has no concerns and only require further updates once approved.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	17/06/2024	Email	The Stakeholder has no concerns and only require further updates once approved.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Maritime Safety Authority [2]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
From	30/05/2024	Email	AMSA would like to continue to participate in the consultation process for the Turrum Phase 3 drilling activities.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
From	11/06/2024	Email	Automatic response received.		
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
From	23/07/2024	Email	AMSA confirming notification processes.		
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Bass Coast Shire Council [407]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

CarbonNet [100]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Department of Climate Change, Energy, the Environment and Water [339]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Stakeholder requested consultation material to be resent.
From	28/03/2024	Email	Automatic response received.
To	29/03/2024	Email	Information on consultation on offshore activities resent in amended format.

From	29/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	17/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/07/2024	Email	The Stakeholder does not require further notification of progress made in relation to this activity unless details regarding the activity change.
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Department of Defence [104]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Completed Esso Consultation Questionnaire.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
From	03/10/2023	Email	Completed Esso Consultation Questionnaire.

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	22/11/2023	Email	Consultation on offshore activities including Turrum EP.
To	18/01/2024	Email	Consultation on offshore activities including Turrum EP.
To	31/01/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
From	19/08/2024	Email	Automatic response received.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Department of Jobs Precincts and Regions [44]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

Department of Transport and Planning [382]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Response agency provided with Quick Reference Information, OPEP and TRPs.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
From	05/04/2024	Email	DTP Marine Pollution team would like the opportunity to review any OPEP and related documents (i.e. NEBA) that is being prepared for submission to NOPSEMA.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	11/07/2024	Email	Scheduling meeting.		
From	15/07/2024	Email	Scheduling meeting.		
To	16/07/2024	Email	Scheduling meeting.		
From	17/07/2024	Email	Scheduling meeting.		
To	24/07/2024	Email	Invitation to attend a desk top emergency management exercise.		
To	05/08/2024	Email	Esso forwarding invitation to attend a desk top emergency management exercise.		
From	05/08/2024	Email	DTP requesting additional attendee.		
From	09/08/2024	Meeting - In Person	Meeting with DTP.		

From	09/08/2024	Meeting - In Person	Follow up email with meeting notes.
To	09/09/2024	Email	JUR Turrum Phase 3 Drilling Quick Reference Information.
To	09/09/2024	Email	Scheduling meeting.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	24/09/2024	Email	Acknowledgement of registration to community information session.
From	24/09/2024	Media Advertisement	Acknowledgement of registration to community information session.
To	26/09/2024	Email	Thank-you email to stakeholder for attending community information session.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Director of National Parks [103]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
The Stakeholder does not require further notification of progress made in relation to this activity unless details regarding the activity change.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	06/12/2023	Email	The Stakeholder does not require further notification of progress made in relation to this activity unless details regarding the activity change.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

East Gippsland Catchment Management Authority [10]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

East Gippsland Shire Council [11]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	07/12/2023	Email	Request for information on Community Information Sessions.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

East Gippsland Water [392]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Environment Protection Authority Victoria [13]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Request to be consulted on all Esso activities in Gippsland.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	12/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	04/07/2024	Email	Response to query.
From	04/07/2024	Email	Query regarding consultation list.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Environmental Protection Agency Tasmania [63]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Response agency provided with Quick Reference Information, OPEP and TRPs.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	19/06/2024	Email	Review of OPEP.
From	19/06/2024	Email	Review of OPEP.
From	24/06/2024	Email	Review of OPEP and detailed TRPs.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/07/2024	Email	Scheduling meeting.
To	15/07/2024	Email	Scheduling meeting.
From	15/07/2024	Email	Scheduling meeting.
To	09/09/2024	Email	Esso providing Turrum Phase 3 Drilling Quick Reference Information.

Fire Rescue Victoria [536]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland Ports [15]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
From	01/12/2023	Questionnaire	Completed Esso Consultation Questionnaire.		
To	08/12/2023	Email	Acknowledgement of completing questionnaire.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
From	11/06/2024	Email	Stakeholder will pass the email on to GP management.		
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	13/06/2024	Email	Esso thanking the Stakeholder to forwarding to GP management.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Gippsland Water [409]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Indigenous Land and Sea Corporation [495]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		

From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Major Road Projects Victoria [538]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Maritime Border Command [539]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

National Offshore Petroleum Titles Administrator [85]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling email forwarded to NOPSEMA.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Parks Australia (part of DCCEEW) [129]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Parks Victoria [27]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Ports Victoria [399]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Safe Transport Victoria - Maritime [42]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

South Gippsland Shire Council [38]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Attended community information session. No comments on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

From	28/03/2024	Email	Automatic response received.
From	28/03/2024	Email	Automatic response received.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	07/08/2024	Email	Registration to community information session.
To	07/08/2024	Email	Acknowledgement of registration to community information session.
From	28/08/2024	Drop in session – in person	Attended community information session.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	23/09/2024	Email	Invitation to community information sessions.
To	23/09/2024	Email	Invitation to community information sessions.
From	23/09/2024	Email	Automatic response received.
From	23/09/2024	Email	Automatic response received.

To	24/09/2024	Email	Registration to community information session.
From	24/09/2024	Email	Acknowledgement of registration to community information session.
From	25/09/2024	Drop in session – in person	Attended community information session.
To	26/09/2024	Email	Thank-you email to stakeholder for attending community information session.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Southern Rural Water [413]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
From	31/10/2023	Questionnaire	Completed Esso Consultation Questionnaire.		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
From	01/12/2023	Email	Automatic response received.		
To	08/12/2023	Email	Acknowledgement of completing questionnaire.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		

From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

State Emergency Service [39]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Tasmania Parks and Wildlife Service [64]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		

Transport for NSW [62]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		

From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/07/2024	Email	Scheduling meeting.
To	15/07/2024	Email	Scheduling meeting.
To	17/07/2024	Email	Confirming contact details.
To	17/07/2024	Meeting - Online	Meeting and follow up email with meeting notes.
To	17/07/2024	Email	Confirming contact details.
From	17/07/2024	Email	Response to follow up email.
From	17/07/2024	Email	Confirming contact details.
To	05/09/2024	Email	Scheduling meeting.
To	09/09/2024	Email	Esso providing Turrum Phase 3 Drilling Quick Reference Information.
To	11/09/2024	Email	Esso providing copies of the TRPs.
To	11/09/2024	Email	Scheduling meeting.
To	11/09/2024	Email	Scheduling meeting.
From	11/09/2024	Email	Scheduling meeting.
From	11/09/2024	Email	Scheduling meeting.
To	12/09/2024	Meeting - Online	Meeting held with DTP.
From	12/09/2024	Email	Scheduling meeting.
From	12/09/2024	Email	Scheduling meeting.
From	12/09/2024	Email	Scheduling meeting.
To	08/10/2024	Email	EAPL providing requested OPEP information.
To	09/10/2024	Meeting - Online	Meeting and follow up email with meeting notes.

Victorian Fisheries Authority [101]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Consultation regarding commercial fishing licences.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	13/10/2023	Email	Commercial fishing information request
To	13/10/2023	Email	Commercial fishing information request
From	13/10/2023	Email	Response to commercial fishing information request
To	30/10/2023	Email	Commercial fishing information request
From	31/10/2023	Email	Response to commercial fishing information request
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Victorian Safety Emergency Services Eastern Region [403]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Wellington Shire Council [20]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Attended community information session. No comments on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
From	09/08/2023	Questionnaire	Completed Esso Consultation Questionnaire.
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Automatic response received.
From	01/12/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	30/07/2024	Email	Acknowledgement of registration to community information session.
To	29/08/2024	Drop-in Session - In Person	Community presentation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

West Gippsland Catchment Management Authority [380]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Consultation report (Summary) for Regulation 25 (1)(b) relevant persons

Department of Energy, Environment and Climate Action [529]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Consultation report (Summary) for Regulation 25 (1)(d) relevant persons

3D Oil [122]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Aboriginal Land Council of Tasmania [421]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of	Reg 34(g) (ii): EP controls

		objection or claim and its response	
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Australian Conservation Foundation [516]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Institute of Marine and Power Engineers [347]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Marine Conservation Society [517]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
From	12/06/2024	Questionnaire	Completed Esso Consultation Questionnaire.
To	13/06/2024	Email	Acknowledgement of completing questionnaire.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Southern Bluefin Tuna Industry Association [121]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.

To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Volunteer Coastguard [405]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian WildCatch Fishing [207]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Australian Wildlife Conservancy [372]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Bass Oil [87]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Beach Energy [26]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

Blue Mackerel North Pty Ltd [630]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/07/2024	Meeting - Online	Initial introduction meeting between Blue Mackerel North project team - Parkwind and JeraNex and Esso.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
From	16/09/2024	Email	Scheduling meeting.
To	17/09/2024	Email	Scheduling meeting.

From	17/09/2024	Email	Scheduling meeting.
To	19/09/2024	Email	Scheduling meeting.
To	20/09/2024	Email	Scheduling meeting.
From	20/09/2024	Email	Scheduling meeting.
From	20/09/2024	Email	Scheduling meeting – awaiting response.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Boating Industry Association of Victoria [107]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Bunurong Land Council Aboriginal Corporation [209]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Person/Organisation requested to be consulted on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	09/10/2023	Email	Acknowledgement of receipt.		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	12/03/2024	Email	Scheduling meeting.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	08/04/2024	Email	Scheduling meeting.		
From	08/04/2024	Email	Scheduling meeting.		
To	11/04/2024	Email	Scheduling meeting.		
To	12/04/2024	Email	Scheduling meeting.		
From	12/04/2024	Email	Scheduling meeting.		
To	18/04/2024	Email	Scheduling meeting.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	11/06/2024	Email	Automatic response received.		
To	26/06/2024	Meeting – In Person	Meeting held		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	02/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Cape Barren Island Aboriginal Association Incorporated (TAS) [424]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Catches Trust (Chairman) [511]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

Circular Head Aboriginal Corporation (TAS) [425]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Committee for Gippsland [218]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Commonwealth Fisheries Association [76]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Community Over Mining [335]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Construction, Forestry, Maritime, Mining and Energy Union [496]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
No comments on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Scheduling meeting.
To	05/09/2024	Email	Scheduling meeting.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	09/10/2024	Meeting - Online	Meeting with CFMEU.

Cooper Energy [34]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Corner Inlet Fisheries Habitat Association [83]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Country Fire Authority (Region 10) [8]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	21/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

East Gippsland Estuarine Fishermens Association [82]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Eastern Victorian Sea Urchin Divers Association [79]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Eastern Zone Abalone Industry Association [136]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		

To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Elders Council of Tasmania Aboriginal Corporation [426]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Electrical Trades Union [336]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with ETU throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. ETU queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	13/03/2024	Meeting - Online	Meeting with ETU.
To	22/03/2024	Email	Follow up email with meeting notes.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
To	15/04/2024	Email	Follow up email with meeting notes.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	23/05/2024	Questionnaire	Completed Esso Consultation Questionnaire.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	19/06/2024	Email	Acknowledgement of completing questionnaire.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	05/09/2024	Email	Scheduling meeting.
From	06/09/2024	Email	Scheduling meeting.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/09/2024	Meeting - Online	Meeting with ETU.
To	23/10/2024	Email	Follow up email with meeting notes.

Emperor Energy [58]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Environment Victoria [518]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	10/10/2023	Email	Query on proposed offshore activities in Bass Strait.
To	13/10/2023	Email	Response to query on proposed activities.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

From	01/12/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	08/07/2024	Email	Stakeholder nominated to be a relevant person.
To	09/07/2024	Email	Acknowledgement of completing questionnaire.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Far Out Charters [204]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

First Tasmanians Aboriginal Corporation (TAS) [427]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Fishing Tribunal [128]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.

To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Flinders Island Aboriginal Association Inc (TAS) [428]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Friends of the Earth [353]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
From	05/12/2023	Questionnaire	Completed Esso Consultation Questionnaire.
To	08/12/2023	Email	Acknowledgement of completing questionnaire.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Game Fishing Association of Victoria [197]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/08/2023	Email	Scheduling meeting.
To	24/08/2023	Email	Scheduling meeting.
From	25/08/2023	Email	Scheduling meeting.
To	28/08/2023	Email	Scheduling meeting.
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	09/10/2023	Email	Acknowledgement of receipt.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	12/06/2024	Email	Scheduling meeting.
From	15/06/2024	Email	Update on all offshore activities and SPJ decommissioning forum.
From	20/06/2024	Phone call	SPJ decommissioning forum and offshore activities.
From	20/06/2024	Email	Scheduling meeting.
To	21/06/2024	Email	Scheduling meeting.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	02/07/2024	Meeting - In Person	Meeting to discuss all current and proposed offshore activities.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland and East Gippsland Aboriginal Cooperative Ltd [393]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland Dawn OWP Project Pty Ltd [578]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	22/11/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	31/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland Lakes Fishing Club [208]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Provided a presentation on current Esso activities. No queries or comments on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	13/10/2023	Email	Scheduling presentation.
From	13/10/2023	Email	Scheduling presentation.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	20/02/2024	Email	Scheduling presentation.
To	20/02/2024	Email	Scheduling presentation.
From	20/02/2024	Email	Scheduling presentation.
From	20/02/2024	Email	Scheduling presentation.
From	20/02/2024	Email	Scheduling presentation.
To	06/03/2024	Community Group Meeting	Presentation on current Esso activities.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Acknowledgement of receipt.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Acknowledgement of receipt.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland Lakes Yacht Club [408]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gippsland Skies Pty Ltd [651]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Golden Paradise Beach Ratepayers & Residents Association Inc [581]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
From	08/01/2024	Email	Scheduling meeting.		
To	09/01/2024	Email	Scheduling meeting.		
From	09/01/2024	Email	Scheduling meeting.		
To	15/02/2024	Meeting - In Person	Esso provided update on decommissioning and CCS activities and timelines.		
To	15/02/2024	Email	Scheduling meeting.		
From	18/02/2024	Email	Follow up email with meeting notes.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Phone call	Scheduling presentation.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/07/2024	Email	Scheduling presentation.
From	10/07/2024	Email	Scheduling presentation.
To	29/08/2024	Drop-in Session - In Person	Community information session.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Gulaga and Biamanga Joint Authority [429]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Gunaikurnai Land and Waters Aboriginal Corporation [213]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	09/11/2023	Email	Email requesting meeting post the National Sea Country Alliance Summit (NSCAS).
From	09/11/2023	Email	Automatic response received.
To	16/11/2023	Phone call	Scheduling meeting.
To	24/11/2023	Email	Consultation on offshore activities including Turrum EP.
To	21/03/2024	Meeting - Online	Meeting with GLaWAC.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	GLaWAC requesting where to direct email.
To	02/04/2024	Email	Esso response to GLaWAC query on where to direct email.
To	26/04/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	23/05/2024	Meeting - Online	Meeting with GLaWAC.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	13/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	17/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	17/06/2024	Email	Automatic response received.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	02/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	13/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	19/09/2024	Meeting - Online	Meeting with GLaWAC.
To	26/09/2024	Email	Acknowledgement of attendance at community information session.
To	26/09/2024	Email	Providing 2023 Annual Decommissioning Report.
To	26/09/2024	Email	Acknowledgement of registration to community information session.
From	26/09/2024	Email	Acknowledgement of registration to community information session.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	15/10/2024	Email	Providing community information session details.
From	18/10/2024	Email	Acknowledgement of receipt.
To	21/10/2024	Email	Acknowledgement of receipt.

Hastings Coastal Advisory Group [190]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of	Reg 34(g) (ii): EP controls

			objection or claim and its response	
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Hewardia [205]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

High Sea Wind Pty Ltd [652]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

Iberdrola Australia OW 2 Pty Limited [631]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.

From	22/07/2024	Email	Request to be consulted on Turrum activity.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Independent chair of Fishing Tribunal [138]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	24/08/2023	Email	Scheduling meeting. No response received.
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

King Island Shire Council [430]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

Lake Tyers Aboriginal Trust [395]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Lakes Entrance Fishermen Limited [17]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	23/11/2023	Email	Consultation on offshore activities including Turrum EP.
From	05/12/2023	Email	Scheduling a phone call.
To	29/02/2024	Meeting - In Person	Quarterly meeting to discuss current and proposed offshore activities.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	30/05/2024	Meeting - In Person	Quarterly meeting to discuss current and proposed offshore activities.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	22/08/2024	Meeting - In Person	Quarterly meeting to discuss current and proposed offshore activities.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

To	25/09/2024	Meeting - In Person	Quarterly meeting to discuss current and proposed offshore activities.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Lakes Entrance Offshore Charters [410]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Lakes Entrance Scallop Fishing Industry Association [18]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Life Saving Victoria [109]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Marine and Safety Tasmania [198]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

Maritime Industry Australia Limited [199]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Maritime Union of Australia [348]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	06/09/2024	Email	Scheduling meeting.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	23/10/2024	Meeting - Online	Meeting with MUA.

To	23/10/2024	Email	Follow up email with meeting notes.

Melythina tiakana warrana Aboriginal Corporation (TAS) [431]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Member of Fishing Tribunal [137]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	24/08/2023	Email	Scheduling meeting. No response received.
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Mitchelson Fisheries [211]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Navigator North Project Pty Ltd [585]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	12/07/2024	Email	Scheduling meeting.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Scheduling meeting.
To	18/07/2024	Meeting - Online	Meeting with Navigator North.
To	23/07/2024	Email	Acknowledgement of completing questionnaire.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

New South Wales Aboriginal Land Council [374]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Awabakal [433]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Bahtabah [434]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Batemans Bay [435]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Bega [436]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Birpai [601]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Bodalla [437]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Bunyah [604]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Cobowra [438]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Darkinjung [439]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

NSW Local Aboriginal Land Council: Eden [440]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Forster [441]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Illawarra [442]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Jerrinja [443]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Karuah [444]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).

To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Kempsey [602]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: La Perouse [445]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Merrimans [446]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

NSW Local Aboriginal Land Council: Metropolitan [447]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Mogo [448]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Nowra [449]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Purfleet Taree [587]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Ulladulla [450]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Wagonga [451]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Aboriginal Land Council: Worimi [452]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Bayside [453]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Bega Valley [454]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Central Coast [455]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Eurobodalla [456]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

NSW Local Government Area / Council: Georges River [457]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Kempsey [588]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Kiama [458]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Lake Macquarie [459]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Mid-Coast [460]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.

To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Mosman [461]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Newcastle [462]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: North Sydney [463]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Northern Beaches [464]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.

To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	14/02/2024	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Port Macquarie - Hastings [603]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	14/02/2024	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.

From	17/06/2024	Email	Automatic response received.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Port Stephens [465]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Randwick [466]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	14/02/2024	Email	Automatic response received.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Shellharbour [467]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Shoalhaven [468]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.		Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response			
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).			
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).			
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).			
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).			
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).			
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).			

NSW Local Government Area / Council: Sutherland Shire [469]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		

To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Sydney [470]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Waverley [471]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Wollongong [472]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NSW Local Government Area / Council: Woollahra [473]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

NTSCORP Limited (NSW) [474]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Oil Spill Response Limited [25]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Orsted Offshore Australia 1 Pty Ltd [586]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
No queries on this activity.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.		

To	16/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	16/07/2024	Email	Request for information on other activities.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Panama II Octopus fishing vessel [123]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Parrdarrama Pungenna Aboriginal Corporation (TAS) [475]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		

Peels Cruises [398]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Piscari Industries Pty Ltd [212]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Port Franklin Fishermans Association [30]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Port Phillip Sea Pilots [84]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Qube [515]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Relevant Person #507 [507]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #508 [508]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/08/2023	Email	Acknowledgement of completing questionnaire.
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #509 [509]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Relevant Person #541 [541]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #559 [559]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #560 [560]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #561 [561]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	02/09/2024	Email	Consultation on Turrum Phase 3 Drilling.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #562 [562]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Response to update on Esso Australia offshore activities in Bass Strait.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Response to update on Esso Australia offshore activities in Bass Strait.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.

To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #564 [564]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #565 [565]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).

To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #566 [566]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #567 [567]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Relevant Person #568 [568]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #570 [570]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #571 [571]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #572 [572]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #573 [573]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #574 [574]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #575 [575]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.

To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #587 [590]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #594 [594]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Person/Organisation requested to be consulted on this activity. Queries have been answered.		No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**	
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.	
From	28/03/2024	Email	Resent information on consultation on offshore activities in amended format.	
To	29/03/2024	Email	Resent information on consultation on offshore activities in a different format.	
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).	
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.	
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.	
From	05/08/2024	Media Advertisement	Acknowledgement of registration to community information session.	
To	06/08/2024	Email	Responding to enquiry: topics for discussion at community information session include decommissioning, CCS and drilling activities.	

Relevant Person #595 [595]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #596 [596]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #599 [599]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
From	29/02/2024	Drop-in Session	Attended community information session.

		- In Person	
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Relevant Person #600 [600]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Sale Game & Fishing Association [400]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Save Westernport [214]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		

To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Scallop Fishermens Association [196]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Scuba Divers Federation of Victoria (SDFV) [519]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Sea Shepherd Australia [520]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Seafood Industry Victoria [33]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	18/10/2023	Meeting - In Person	SIV quarterly meeting.
To	23/10/2023	Email	Follow up email with meeting notes.
To	23/11/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	02/04/2024	Email	Resent information on consultation on offshore activities in amended format.
From	02/04/2024	Email	Resent information on consultation on offshore activities in amended format.
From	09/04/2024	Email	Agreeing on format for consulting with representatives' members.
To	10/04/2024	Email	Confirmation on consulting with representatives' members.
From	12/04/2024	Email	Confirmation on consulting with representatives' members.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
From	15/05/2024	Email	Consultation on Turrum Phase 3 Drilling.
To	17/05/2024	Email	Consultation on Turrum Phase 3 Drilling.

To	20/05/2024	Email	Consultation on Turrum Phase 3 Drilling.
To	20/05/2024	Email	Scheduling meeting.
From	29/05/2024	Phone call	Meeting with SIV.
To	06/06/2024	Phone call	Meeting with SIV.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	13/06/2024	Meeting - In Person	Meeting with SIV.
To	18/06/2024	Meeting - In Person	Meeting with SIV.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	11/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	16/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	16/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Esso asking the Stakeholder to share the reminder about PSZ's to their members.
From	23/08/2024	Email	Discussing consultation process.
To	26/08/2024	Email	Discussing consultation process.
From	27/08/2024	Email	Discussing consultation process.
From	27/08/2024	Email	Discussing consultation process.
To	28/08/2024	Email	Discussing consultation process.
From	28/08/2024	Email	Discussing consultation process.
From	28/08/2024	Email	Discussing consultation process.
To	29/08/2024	Email	Discussing consultation process.
To	02/10/2024	Meeting - Online	SIV quarterly meeting.

Seaspray Surf Lifesaving Club [402]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

SETFIA Chairman [202]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

Seven Group Holdings [24]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	19/07/2024	Questionnaire	Completed Esso Consultation Questionnaire.
To	23/07/2024	Email	Acknowledgement of completing questionnaire.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Six Rivers Aboriginal Corporation (TAS) [476]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

South East Trawl Fishing Industry Association [37]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Esso held regular meetings with Person/Organisation throughout the consultation period and provided detailed consultation on all offshore activities including this activity including activity description, location, timing and potential impacts and risks. Person/Organisation queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	11/09/2023	Email	Scheduling meeting.
To	14/09/2023	Meeting - In Person	SETFIA Quarterly meeting.
To	08/10/2023	Email	Scheduling meeting.

To	16/11/2023	Email	Scheduling meeting.
To	16/11/2023	Email	Scheduling meeting.
To	16/11/2023	Email	Scheduling meeting.
From	16/11/2023	Email	Scheduling meeting.
From	16/11/2023	Email	Scheduling meeting.
From	16/11/2023	Email	Scheduling meeting.
To	23/11/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/11/2023	Meeting - In Person	SETFIA Quarterly meeting.
To	29/02/2024	Meeting - In Person	SETFIA Quarterly meeting.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	30/05/2024	Meeting - In Person	SETFIA Quarterly meeting.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	16/08/2024	Email	Esso asking the Stakeholder to share the reminder about PSZ's to their members.
To	17/08/2024	SMS	SMS sent to fishing fleet regarding Petroleum Safety Zones.
To	13/09/2024	Meeting - In Person	SETFIA Quarterly meeting.
To	17/09/2024	SMS	SMS sent to Eastern fishing fleet advising of upcoming community sessions.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	23/10/2024	SMS	SMS to advise members of upcoming community information sessions.
To	28/10/2024	Email	Follow up email with meeting notes.

To	28/10/2024	Email	Response to SMS email.
From	28/10/2024	Email	Preparing SMS to fishers advising of upcoming community sessions.

Southern Shark Industry Alliance [77]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Star of the South Wind Farm Pty Ltd (FL005) and Kut-Wut Bratualung Pty Ltd (FL006) [638]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Scheduling meeting.
To	01/07/2024	Email	Scheduling meeting.
To	01/07/2024	Email	Scheduling meeting.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Scheduling meeting.
From	01/07/2024	Email	Scheduling meeting.
From	01/07/2024	Email	Scheduling meeting.
To	03/07/2024	Meeting - In Person	Meeting to discuss all current and proposed offshore activities.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	15/07/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	28/07/2024	Meeting - In Person	Meeting to discuss all current and proposed offshore activities.
To	16/08/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Surfrider Foundation Australia [522]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Sustainable Shark Fishing Association [40]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.

To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

TAS Local Government Area / Council: Break ODay [477]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	14/02/2024	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Burnie [478]

<table>
<tr><th colspan="3">Summary of responses received and Esso's consideration and response</th><th>Summary of objection or claim</th><th>Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response</th><th>Reg 34(g) (ii): EP controls</th></tr>
<tr><td colspan="3">Automatic response received.</td><td>No objection or claims on this activity.</td><td>Not applicable as no objections or claims were made.</td><td>Esso will provide updates of the activity as necessary. No additional measures or controls are required.</td></tr>
<tr><th>To/ from</th><th>Date</th><th>Method</th><th colspan="3">Reg 24(b)(i): Summary of each response</th></tr>
<tr><td>To</td><td>08/10/2023</td><td>Email</td><td colspan="3">Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).</td></tr>
<tr><td>From</td><td>08/10/2023</td><td>Email</td><td colspan="3">Automatic response received.</td></tr>
<tr><td>To</td><td>14/02/2024</td><td>Email</td><td colspan="3">Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).</td></tr>
<tr><td>To</td><td>28/03/2024</td><td>Email</td><td colspan="3">Consultation on offshore activities including Turrum EP (EMBA).</td></tr>
<tr><td>To</td><td>14/05/2024</td><td>Email</td><td colspan="3">Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).</td></tr>
<tr><td>From</td><td>17/06/2024</td><td>Email</td><td colspan="3">Automatic response received.</td></tr>
<tr><td>To</td><td>09/07/2024</td><td>Email</td><td colspan="3">Consultation on offshore activities including Turrum EP (EMBA).</td></tr>
</table>

TAS Local Government Area / Council: Central Coast [479]

<table>
<tr><th colspan="3">Summary of responses received and Esso's consideration and response</th><th>Summary of objection or claim</th><th>Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response</th><th>Reg 34(g) (ii): EP controls</th></tr>
<tr><td colspan="3">Automatic response received.</td><td>No objection or claims on this activity.</td><td>Not applicable as no objections or claims were made.</td><td>Esso will provide updates of the activity as necessary. No additional measures or controls are required.</td></tr>
<tr><th>To/ from</th><th>Date</th><th>Method</th><th colspan="3">Reg 24(b)(i): Summary of each response</th></tr>
<tr><td>To</td><td>08/10/2023</td><td>Email</td><td colspan="3">Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).</td></tr>
<tr><td>From</td><td>08/10/2023</td><td>Email</td><td colspan="3">Automatic response received.</td></tr>
</table>

To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	09/07/2024	Email	Automatic response received.

TAS Local Government Area / Council: Circular Head [480]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Devonport [481]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Automatic response received.		No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	14/02/2024	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	17/06/2024	Email	Automatic response received.
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Dorset [482]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.

To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Flinders [483]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: George Town [484]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Glamorgan-Spring Bay [485]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.

To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Latrobe [486]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: Launceston [487]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		
From	14/02/2024	Email	Automatic response received.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
From	11/06/2024	Email	Automatic response received.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		

TAS Local Government Area / Council: Waratah-Wynyard [488]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	Date	Method	Reg 24(b)(i): Summary of each response		

To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	09/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

TAS Local Government Area / Council: West Tamar [489]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).
From	28/03/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
From	14/05/2024	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
From	11/06/2024	Email	Automatic response received.
From	17/06/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Tasman Council [490]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
From	11/06/2024	Email	Automatic response received.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		

Tasmanian Regional Aboriginal Communities Alliance [491]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	14/02/2024	Email	Consultation on offshore activities including Turrum EP (EMBA). Includes link to Information Bulletin #1 (Appendix F-1).		

To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Tasmanian Seafood Industry Council [41]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

Tuna Australia Ltd [120]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Person/Organisation requested to be consulted on this activity. Queries have been answered.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	09/10/2023	Email	Organisation offering to provide a copy of their Industry position statement and services agreement.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Victoria Game Fishing Club [124]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Victorian Recreational Fishing [51]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
From	01/12/2023	Email	Automatic response received.
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
From	01/07/2024	Email	Automatic response received.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Victorian Scallop Industry Association [52]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response

To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Wildlife Victoria [55]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

World Wide Fund for Nature [370]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
From	08/10/2023	Email	Automatic response received.
From	09/10/2023	Email	Automatic response received.
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
From	28/03/2024	Email	Automatic response received.
From	02/04/2024	Email	Automatic response received.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Yachting Victoria [111]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Consultation report (Summary) for Regulation 25 (1)(e) relevant persons

Australian Marine Oil Spill Centre [1]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

National Native Title Tribunal (NNTT) [432]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Automatic response received.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
From	08/10/2023	Email	Automatic response received.		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	28/03/2024	Email	Automatic response received.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling (EMBA). Includes link to Information Bulletin #3 (Appendix F-3).		
From	14/05/2024	Email	Automatic response received.		
From	14/05/2024	Email	Automatic response received.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).		
From	11/06/2024	Email	Automatic response received.		
From	11/06/2024	Email	Automatic response received.		
To	01/07/2024	Email	Consultation on offshore activities including Turrum EP.		
From	01/07/2024	Email	Automatic response received.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		

To	06/07/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP (EMBA).

Port of Hastings [28]

Summary of responses received and Esso's consideration and response			Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls
Completed consultation questionnaire.			No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.
To/ from	**Date**	**Method**	**Reg 24(b)(i): Summary of each response**		
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).		
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.		
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.		
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).		
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.		
From	02/07/2024	Questionnaire	Completed consultation questionnaire.		
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.		
To	23/07/2024	Email	Acknowledgement of completing questionnaire.		
To	10/09/2024	Email	Consultation on offshore activities including Turrum EP.		
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.		

Victorian Regional Channels Authority [112]

Summary of responses received and Esso's consideration and response	Summary of objection or claim	Reg 24(b)(ii) & (iii): Esso's assessment of merits of objection or claim and its response	Reg 34(g) (ii): EP controls

Not applicable as no responses were received.	No objection or claims on this activity.	Not applicable as no objections or claims were made.	Esso will provide updates of the activity as necessary. No additional measures or controls are required.

To/ from	Date	Method	Reg 24(b)(i): Summary of each response
To	08/10/2023	Email	Consultation on offshore activities including Turrum EP. Includes link to Information Bulletin #1 (Appendix F-1).
To	01/12/2023	Email	Consultation on offshore activities including Turrum EP.
To	28/03/2024	Email	Consultation on offshore activities including Turrum EP.
To	14/05/2024	Email	Consultation on Turrum Phase 3 Drilling. Includes link to Information Bulletin #3 (Appendix F-3).
To	11/06/2024	Email	Consultation on offshore activities including Turrum EP.
To	06/07/2024	Email	Consultation on offshore activities including Turrum EP.
To	30/09/2024	Email	Consultation on offshore activities including Turrum EP.

Appendix F: Sufficient Information materials

Appendix F-1 Information Bulletin #1 (September 2023)

ExxonMobil

CONSULTATION

Bass Strait Operations

Turrum - Phase 3 Drilling

INFORMATION BULLETIN
September 2023

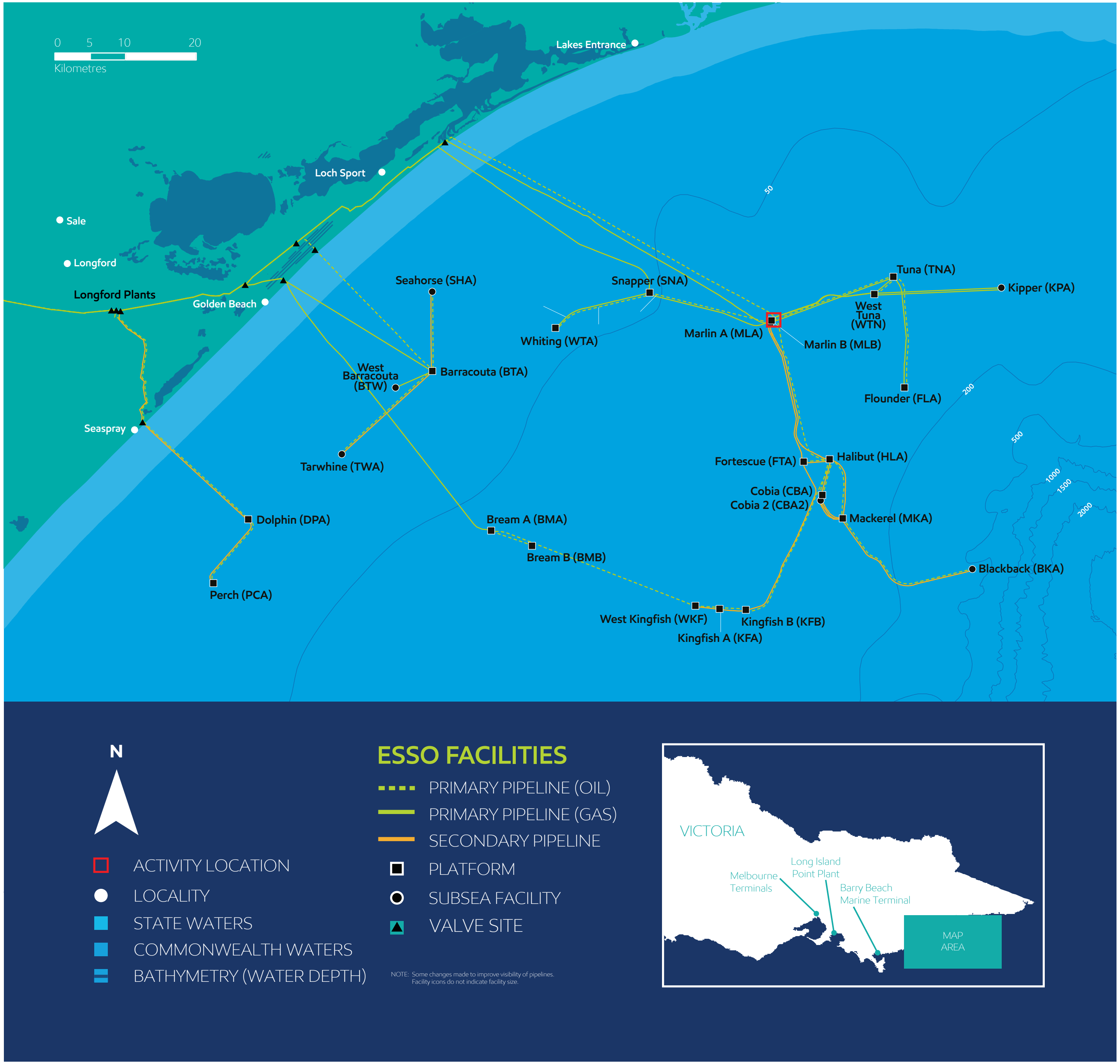
Esso is committed to engaging with the communities where we operate and helping our stakeholders to understand our business. This information bulletin has been developed as part of Esso's commitment to keep relevant persons and other stakeholders informed of planned activities in Bass Strait and to provide them with sufficient information about the nature and scale of the activity, as well as its potential risks and impacts, so that they can make an informed decision as to whether their functions, interests or activities are affected.

Overview

Esso Australia Resources Pty Ltd (Esso) is a wholly owned subsidiary of ExxonMobil Australia Pty Ltd. Esso is the operator of the assets in Bass Strait that are part of the Gippsland Basin Joint Venture between Esso and Woodside Energy (Bass Strait) Pty Ltd (Woodside Energy) and the Kipper Unit Joint Venture (Esso, Woodside Energy, and MEPAU A Pty Ltd). These assets comprise 19 platforms with approximately 400 wells, six subsea facilities and more than 800 kilometres of subsea pipelines.

Esso is planning to undertake a drilling campaign from the Marlin Complex (Marlin A and Marlin B) location in the Gippsland Basin off the Victorian coastline. This campaign will be completed during 2025 along with other jack-up rig activities.

The jack-up rig will operate in accordance with international safety and environmental standards, and will hold a Safety Case accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the Australian regulator.



↑ Cover: Marlin Complex
→ Map of activity location

Activity timing

Earliest date of commencement

June 2025

Field activities estimated to take

~210 days

Activities will be conducted

24/7

The timing and order of activity may vary and is contingent on regulatory approvals, joint venture approvals, weather and rig/vessel schedules. Consultation will be conducted with relevant persons prior to the commencement of drilling activities.

Activity description

Drilling of five wells from Marlin B is planned to take place with the *Valaris 107* jack-up drilling rig. The drilling rig will be supported by up to three support vessels. Jack-up rigs do not have propulsion capability and will be towed into position. The legs will then be lowered onto the seabed and the rig elevated above the sea surface.

Once the jack-up rig is positioned over the proposed well location, the well will be drilled and completed. The drilling process uses a rotating bit attached to the end of a string of drill pipe to bore through the earth to reach the gas reservoirs. As the bit turns, it grinds off small pieces of rock, or drill cuttings, thus deepening the well.

In upper sections seawater-based fluids will be pumped down the drill string to remove the cuttings from the well, cool the drill bit, and maintain pressure control of the well. In lower sections, to assist well stability, low toxicity non-aqueous fluids will be used.

The non-aqueous fluids and cuttings are recirculated to the drilling rig where the fluids will be removed from the cuttings before being reused. Once removed, drill cuttings will be discharged overboard where they will settle on the seabed near the rig.

A blowout preventer will be used to prevent the release of hydrocarbons during drilling of the well.

Once drilling is complete, steel casing will be installed in the wellbore and cemented in place. Production tubing will be installed containing various instruments and valves.

Activity location

The new wells will be drilled from Marlin B, approximately 42 kilometres off the Gippsland coastline, south-east of Lakes Entrance in water depths of approximately 60 metres.

The well will not be located within any established or proposed Commonwealth or State Marine Protected Areas, Critical Habitats or Threatened Ecological Communities.

↗ Construction of the Marlin B platform

→ ENVIRONMENT PLAN

Under the OPGGS Act, before any petroleum-related activities in Commonwealth waters can commence, an Environment Plan (EP) must be accepted by NOPSEMA. A single EP will be developed for drilling of these wells.

The EP is a comprehensive document that describes the existing environment, including relevant persons, and how Esso will undertake the drilling activities to avoid, minimise or manage potential environmental impacts to As Low As Reasonably Practicable (ALARP) and meet regulatory acceptability criteria. Demonstrating ALARP requires a titleholder to implement all available control measures where the cost is not grossly disproportionate to the environmental benefit gained from implementing the control measure.

In the course of preparing an EP, Esso must consult with relevant authorities, persons and organisations whose functions, interests or activities may be affected by the proposed activities (i.e. a relevant person) and provide the opportunity for any feedback.

Petroleum Safety Zones and Notice to Mariners

The new Marlin B wells will be located within the existing 500-metre Petroleum Safety Zone (PSZ) established for the Marlin B platform in accordance with Section 616 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act).

The exact location of the jack-up rig will be communicated to other marine vessels via a Notice to Mariners issued by the Australian Hydrographic Service and AUSCOAST warnings issued by the Australian Maritime Safety Authority.

Interaction with commercial fishing

The activity locations are within existing Commonwealth fisheries that may be used by commercial fishers.

The impacts to commercial fishing should be minimal as fishers are already required to avoid the established PSZ. However, the timing of drilling activities and the support vessel details will be further communicated to the Lakes Entrance Fishermen's Co-op, South East Trawl Fishing Industry Association and Seafood Industry Victoria nearer the campaign.

Potential impacts, consequences and control measures

Esso's aim is to minimise environmental and social impacts associated with the proposed activities. As such, Esso has undertaken an assessment to identify potential impacts and consequences to the environment resulting from the proposed activities, considering timing, duration, location, values and sensitivities.

For each potential impact, Esso has developed the control measures outlined on the following pages to assist relevant persons in making an informed assessment of possible impacts to their functions, interests or activities.

↑ Marlin B platform

→ OIL POLLUTION EMERGENCY PLAN

In accordance with the OPGGS Act, Esso must demonstrate and document oil spill response arrangements. The Oil Pollution Emergency Plan (OPEP) forms part of an EP submission and demonstrates Esso's capability to respond in the unlikely event of an oil spill.

Esso is a member of the Australian Marine Oil Spill Centre, a co-operative national oil spill response organisation, which provides access to additional oil spill response resources if required.

Esso's OPEP interfaces with national, state and industry response plans prepared and implemented by the Australian Government via the Australian Maritime Safety Authority (NatPlan), the Victorian Government (Maritime Emergencies (non-search and rescue) Plan), the Tasmanian Government (TasPlan), the NSW Government (NSW Marine Oil and Chemical Spill Contingency Plan) and the Australian Oil industry's Australian Marine Oil Spill Plan (AMOSPlan) administered by the Australian Marine Oil Spill Centre.

The OPEP defines spill response options which may be applied to a spill event. The selected spill response option(s) would depend upon the size and type of spill; environmental sensitivities within the spill path; prevailing weather conditions; access restrictions and available resources. In all instances, a Net Environmental Benefits Assessment is undertaken, in consultation with relevant government agencies, to determine the most appropriate spill response option.

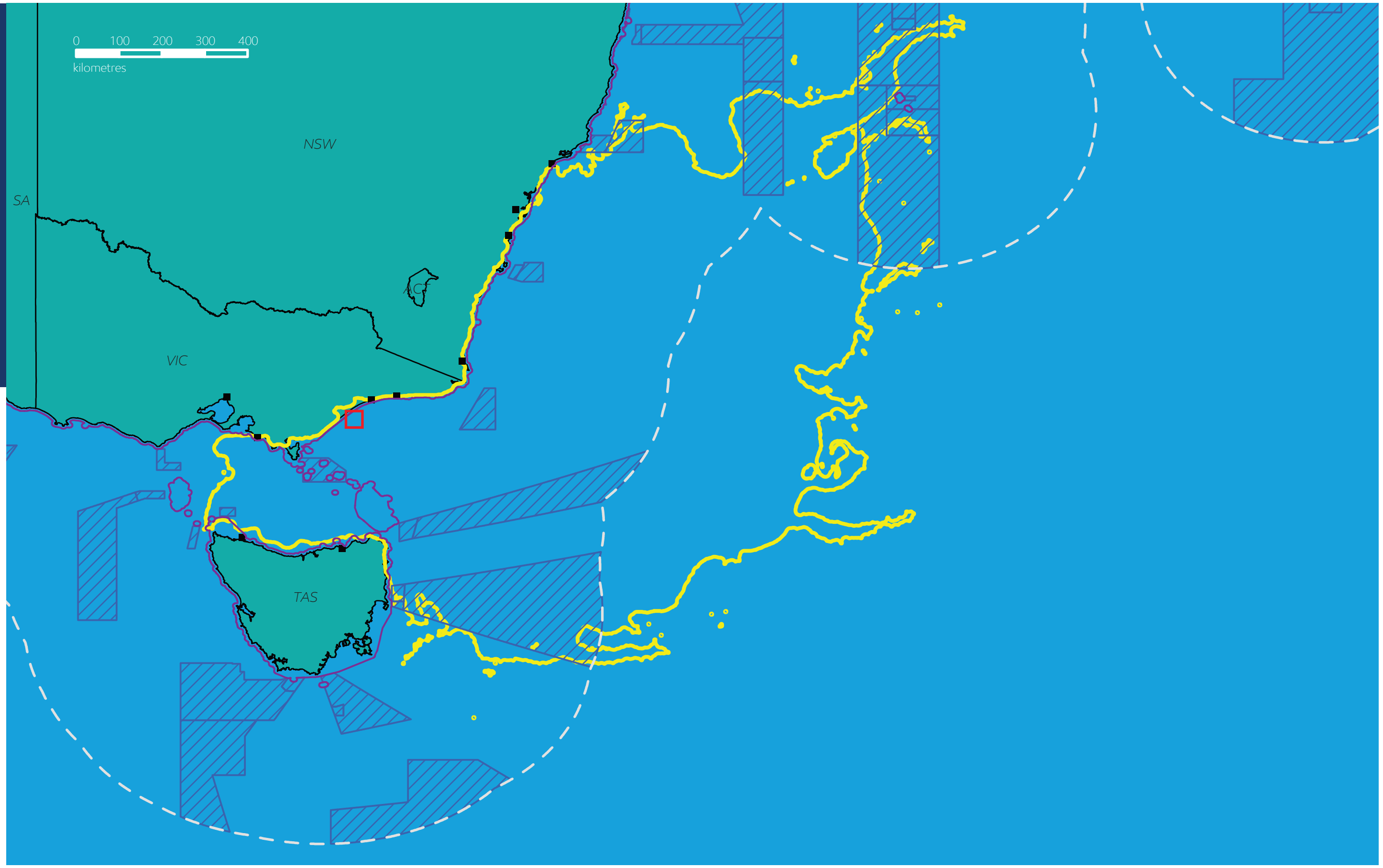
POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
DRILL RIG AND VESSEL-BASED IMPACTS		
Drill rig leg placement	• Temporary and localised seabed disturbance.	• Seabed survey completed to identify obstructions. • Rig move procedures in place. • Small area affected by leg placement, rapidly filled after removal. • Area is sandy bottom with no sensitive seabed features.
Planned discharges to the marine environment: sewage and food waste; treated bilge and deck wash; and cooling water and brine	• Temporary and localised reduction in water quality. • Temporary change to predator/prey dynamics.	• Routine discharges and vessel waste treatment systems will meet International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978, (MARPOL 73/78) requirements. Treatment systems are routinely monitored and regularly maintained. • No discharge of oily water exceeding acceptable limit oil in water content. • Food-scraps macerated prior to discharge. • Planned chemical discharges assessed and approved prior to use.
Sound emissions	• Temporary displacement of sound sensitive fauna around active vessels.	• Compliance with *Environment Protection and Biodiversity Conservation Regulations 2000* Part 8 Division 8.1 interacting with cetaceans.
Light emissions	• Attraction of light sensitive species. • Change in fauna behaviour.	• Lighting will used in accordance with the National Light Pollution Guidelines for Wildlife. • Lighting will be kept to a minimum while still meeting navigational and workplace safety requirements.
Air emissions	• Temporary and localised reduction in air quality.	• Air emissions from marine engines meet MARPOL 73/78 requirements and are routinely maintained. • Use of low sulphur content fuel.
Unplanned interaction with marine fauna (vessel strike)	• Injury or death of marine fauna.	• Support vessels will comply with *Environment Protection and Biodiversity Conservation Regulations 2000* Part 8 Division 8.1 interacting with cetaceans. • Jack-up rig will be stationary during well intervention. Watchkeeping will be maintained during vessel relocations. • Any injury/mortality of *Environment Protection and Biodiversity Conservation Act 1999*-listed fauna will be reported to the Department of Climate Change, Energy, the Environment and Water.
Unplanned introduction of invasive marine species	• Displacement of native species and habitat domination.	• Ballast Water Management Plan and Certificate. • Biofouling Risk Assessment shows low risk of invasive marine species introduction.
Accidental release of materials and waste	• Temporary and localised: - Increase in turbidity - Burial of benthic habitat in immediate seabed area - Potential toxicity impacts	• Waste handling, storage and disposal meets MARPOL 73/78 requirements. • Lifting equipment certified and routinely maintained. • Bulk transfer equipment meets Guidelines for Offshore Marine Operations requirements and routinely maintained. • Recovery of dropped objects where safe and practicable.

POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
Accidental release of fuel (vessel collision)	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton.	• Location within gazetted exclusion zones. • Communicate commencement of activity and exclusion zone to relevant persons via Notice to Mariners and via the Australian Maritime Safety Authority • Vessel crew and navigational equipment will meet legal requirements. • Vessels only travel at slow speeds within PSZ. • Comply with approved Shipboard OPEP, including maintaining spill kits, emergency response procedures and conducting spill response exercises. • Implementation of OPEP.
DRILLING ACTIVITY IMPACTS		
Discharge of cement	• Localised and temporary: - Reduction in water quality. - Smothering of benthic habitat.	• Low toxicity cement additives are selected for use. • Cement hose flushing and slurry releases rapidly diluted and dispersed.
Drilling fluid and cuttings discharges	• Localised and temporary: - Increase in turbidity. - Burial of benthic habitat in immediate seabed area. - Potential toxicity impacts.	• Seawater-based fluids used where practicable. • Use of low toxicity non-aqueous fluids and additives. • Solids control equipment minimises non-aqueous fluids on cuttings prior to cuttings discharge overboard. • Dynamic seabed and marine environment with rapid dispersion of sediments.
Drilling and completion fluid discharges	• Increased salinity. • Potential toxicity effects.	• Low toxicity chemical additives are selected for use in drilling, clean-up and completion fluids. • Planned chemical discharges assessed and approved.
Disconnection/cutting discharges	• Localised and temporary: - Reduction in water quality. - Smothering of benthic habitats.	• Planned chemical discharges assessed and approved.
Loss of well control	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton. • Pollution of shoreline habitats such as sandy beaches and rocky shores.	• NOPSEMA-accepted Well Operation Management Plan will be in place prior to commencement. • NOPSEMA-accepted Safety Case will be in place prior to commencement of activity. • Esso-approved drilling procedures will be in place. • Preventative maintenance systems will be in place. • Well control equipment testing. • Emergency response preparedness including: OPEP; Operational and Scientific Monitoring Plan; Source Control Plan and availability of suitable Mobile Offshore Drilling Unit to drill a relief well.

→ Map of EMBA

ACTIVITY LOCATION
ENVIRONMENT THAT MAY BE AFFECTED
LOCALITY
STATE WATERS BOUNDARY
COMMONWEALTH WATERS
AUSTRALIAN MARINE PARK

N



Environment that may be affected

The environment that may be affected (EMBA) is the largest spatial extent where the activities could potentially have an environmental consequence (direct or indirect impact). For this activity, the broadest extent of the EMBA takes into consideration planned and unplanned activities and is determined by a highly unlikely release of condensate from a low of well control and marine diesel to the environment as a result of a vessel collision.

The EMBA represents the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, as a result of any spill from this activity. This area takes into account the merged area of many possible paths a highly unlikely hydrocarbon release could travel depending on the weather and ocean conditions at the time of the release. This means in the highly unlikely event a hydrocarbon release does occur, the entire EMBA will not be affected and the specific and minimal part of the EMBA that is affected will only be known at the time of the release.

For this activity, Esso has defined the EMBA by combining the potential spatial extent of surface and in-water (dissolved and entrained) hydrocarbons, resulting from a worst-case credible spill from a vessel collision and the accidental release of condensate from a loss of well control.

Consultation

Esso is committed to ongoing engagement with the communities where we operate. Your functions, interests and activities may mean you, your business or your organisation are a relevant person for these activities. Your participation will help Esso to better understand the impacts and risks that may arise from the activities. As such, we're seeking your feedback as we develop the EP. Please note that your feedback and our response will be included in our EP for the proposed activities, which will be submitted to NOPSEMA for acceptance in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*.

Please let us know if your feedback is sensitive and we will make this known to NOPSEMA upon submission of the EP in order for this information to remain confidential to NOPSEMA.

Esso will communicate any material changes to the proposed activity to relevant persons as they arise.

If you would like to comment on the proposed activities outlined in this information bulletin, or would like additional information, please contact us.

How to contact us

For more information, visit our Consultation Hub using the QR Code below, or contact our Consultation team at:

T: +61 3 9261 0000

E: consultation@exxonmobil.com

W: www.exxonmobil.com.au

Scan to access the Consultation Hub and Esso Consultation Questionnaire

Acknowledgement of traditional owners

Esso Australia acknowledges the Traditional Custodians of Country, the Gunaikurnai Peoples, and the land and sea upon which our operations are located.

We recognise the Gunaikurnai Peoples' continuing connection to land, sea, culture and community, and pay our respects to Elders past and present.

Appendix F-2 Information Bulletin #2 (February 2024)

ExxonMobil

CONSULTATION

Bass Strait Operations

Turrum - Phase 3 Drilling

INFORMATION BULLETIN
February 2024

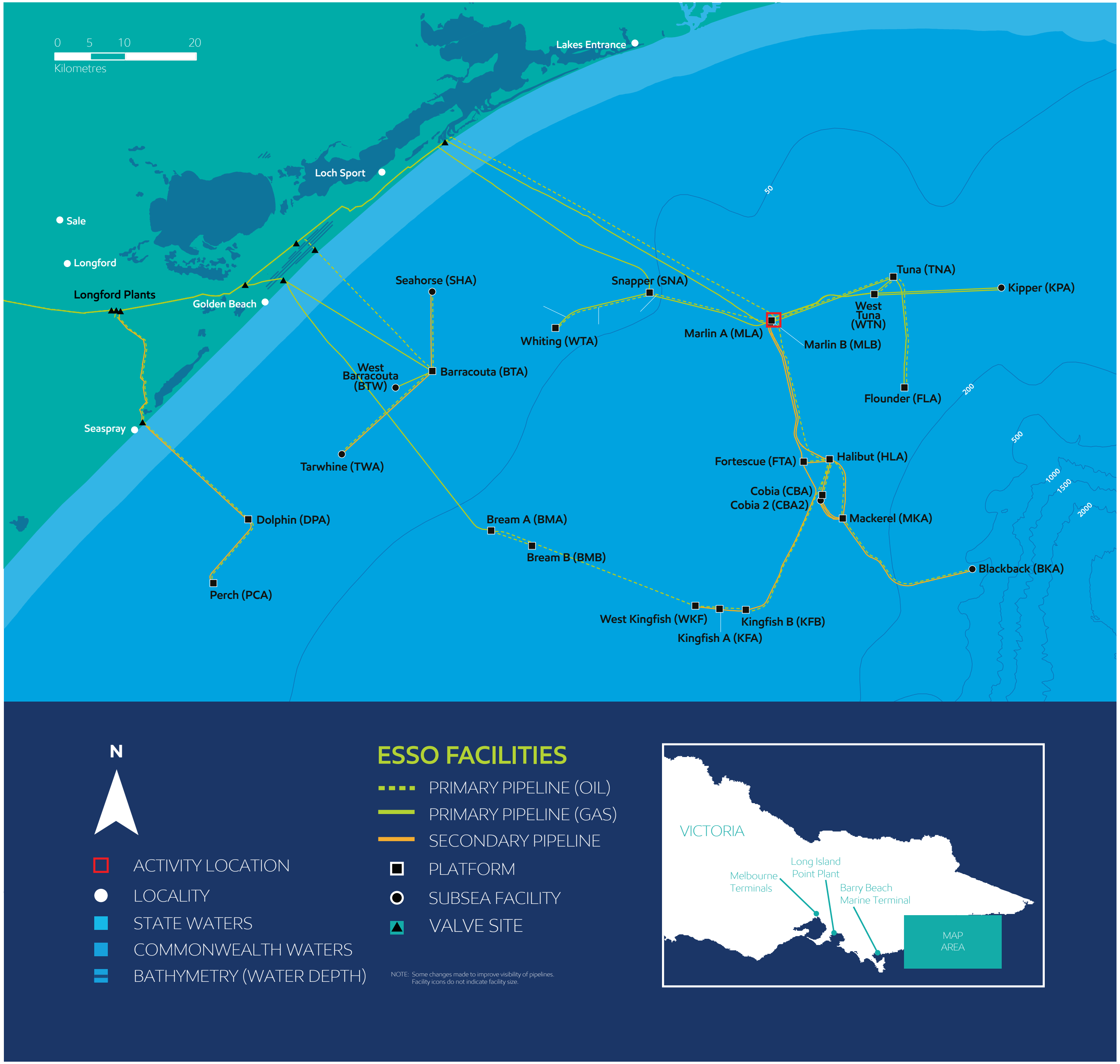
Esso is committed to engaging with the communities where we operate and helping our stakeholders to understand our business. This information bulletin has been developed as part of Esso's commitment to keep relevant persons and other stakeholders informed of planned activities in Bass Strait and to provide them with sufficient information about the nature and scale of the activity, as well as its potential risks and impacts, so that they can make an informed decision as to whether their functions, interests or activities are affected.

Overview

Esso Australia Resources Pty Ltd (Esso) is a wholly owned subsidiary of ExxonMobil Australia Pty Ltd. Esso is the operator of the assets in Bass Strait that are part of the Gippsland Basin Joint Venture between Esso and Woodside Energy (Bass Strait) Pty Ltd (Woodside Energy) and the Kipper Unit Joint Venture (Esso, Woodside Energy, and MEPAU A Pty Ltd). These assets comprise 19 platforms with approximately 400 wells, six subsea facilities and more than 800 kilometres of subsea pipelines.

Esso is planning to undertake a drilling campaign from the Marlin Complex (Marlin A and Marlin B) location in the Gippsland Basin off the Victorian coastline. This campaign will be completed during 2025 along with other jack-up rig activities.

The jack-up rig will operate in accordance with international safety and environmental standards, and will hold a Safety Case accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the Australian regulator.



↑ Cover: Marlin Complex

→ Map of activity location

Activity timing

Earliest date of commencement

June 2025

Field activities estimated to take

~210 days

Activities will be conducted

24/7

The timing and order of activity may vary and is contingent on regulatory approvals, joint venture approvals, weather and rig/vessel schedules. Consultation will be conducted with relevant persons prior to the commencement of drilling activities.

Activity description

Drilling of five wells from Marlin B is planned to take place with the *Valaris 107* jack-up drilling rig. The drilling rig will be supported by up to three support vessels. Jack-up rigs do not have propulsion capability and will be towed into position. The legs will then be lowered onto the seabed and the rig elevated above the sea surface.

Once the jack-up rig is positioned over the proposed well location, the well will be drilled and completed. The drilling process uses a rotating bit attached to the end of a string of drill pipe to bore through the earth to reach the gas reservoirs. As the bit turns, it grinds off small pieces of rock, or drill cuttings, thus deepening the well.

In upper sections seawater-based fluids will be pumped down the drill string to remove the cuttings from the well, cool the drill bit, and maintain pressure control of the well. In lower sections, to assist well stability, low toxicity non-aqueous fluids will be used.

The non-aqueous fluids and cuttings are recirculated to the drilling rig where the fluids will be removed from the cuttings before being reused. Once removed, drill cuttings will be discharged overboard where they will settle on the seabed near the rig.

A blowout preventer will be used to prevent the release of hydrocarbons during drilling of the well.

Once drilling is complete, steel casing will be installed in the wellbore and cemented in place. Production tubing will be installed containing various instruments and valves.

Activity location

The new wells will be drilled from Marlin B, approximately 42 kilometres off the Gippsland coastline, south-east of Lakes Entrance in water depths of approximately 60 metres.

The well will not be located within any established or proposed Commonwealth or State Marine Protected Areas, Critical Habitats or Threatened Ecological Communities.

↗ Construction of the Marlin B platform

→ ENVIRONMENT PLAN

Under the OPGGS Act, before any petroleum-related activities in Commonwealth waters can commence, an Environment Plan (EP) must be accepted by NOPSEMA. A single EP will be developed for drilling of these wells.

The EP is a comprehensive document that describes the existing environment, including relevant persons, and how Esso will undertake the drilling activities to avoid, minimise or manage potential environmental impacts to As Low As Reasonably Practicable (ALARP) and meet regulatory acceptability criteria. Demonstrating ALARP requires a titleholder to implement all available control measures where the cost is not grossly disproportionate to the environmental benefit gained from implementing the control measure.

In the course of preparing an EP, Esso must consult with relevant authorities, persons and organisations whose functions, interests or activities may be affected by the proposed activities (i.e. a relevant person) and provide the opportunity for any feedback.

Petroleum Safety Zones and Notice to Mariners

The new Marlin B wells will be located within the existing 500-metre Petroleum Safety Zone (PSZ) established for the Marlin B platform in accordance with Section 616 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act).

The exact location of the jack-up rig will be communicated to other marine vessels via a Notice to Mariners issued by the Australian Hydrographic Service and AUSCOAST warnings issued by the Australian Maritime Safety Authority.

Interaction with commercial fishing

The activity locations are within existing Commonwealth fisheries that may be used by commercial fishers.

The impacts to commercial fishing should be minimal as fishers are already required to avoid the established PSZ. However, the timing of drilling activities and the support vessel details will be further communicated to the Lakes Entrance Fishermen's Co-op, South East Trawl Fishing Industry Association and Seafood Industry Victoria nearer the campaign.

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Esso's aim is to minimise environmental and social impacts associated with the proposed activities. As such, Esso has undertaken an assessment to identify potential impacts and consequences to the environment resulting from the proposed activities, considering timing, duration, location, values and sensitivities.

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↑ Marlin B platform

→ OIL POLLUTION EMERGENCY PLAN

In accordance with the OPGGS Act, Esso must demonstrate and document oil spill response arrangements. The Oil Pollution Emergency Plan (OPEP) forms part of an EP submission and demonstrates Esso's capability to respond in the unlikely event of an oil spill.

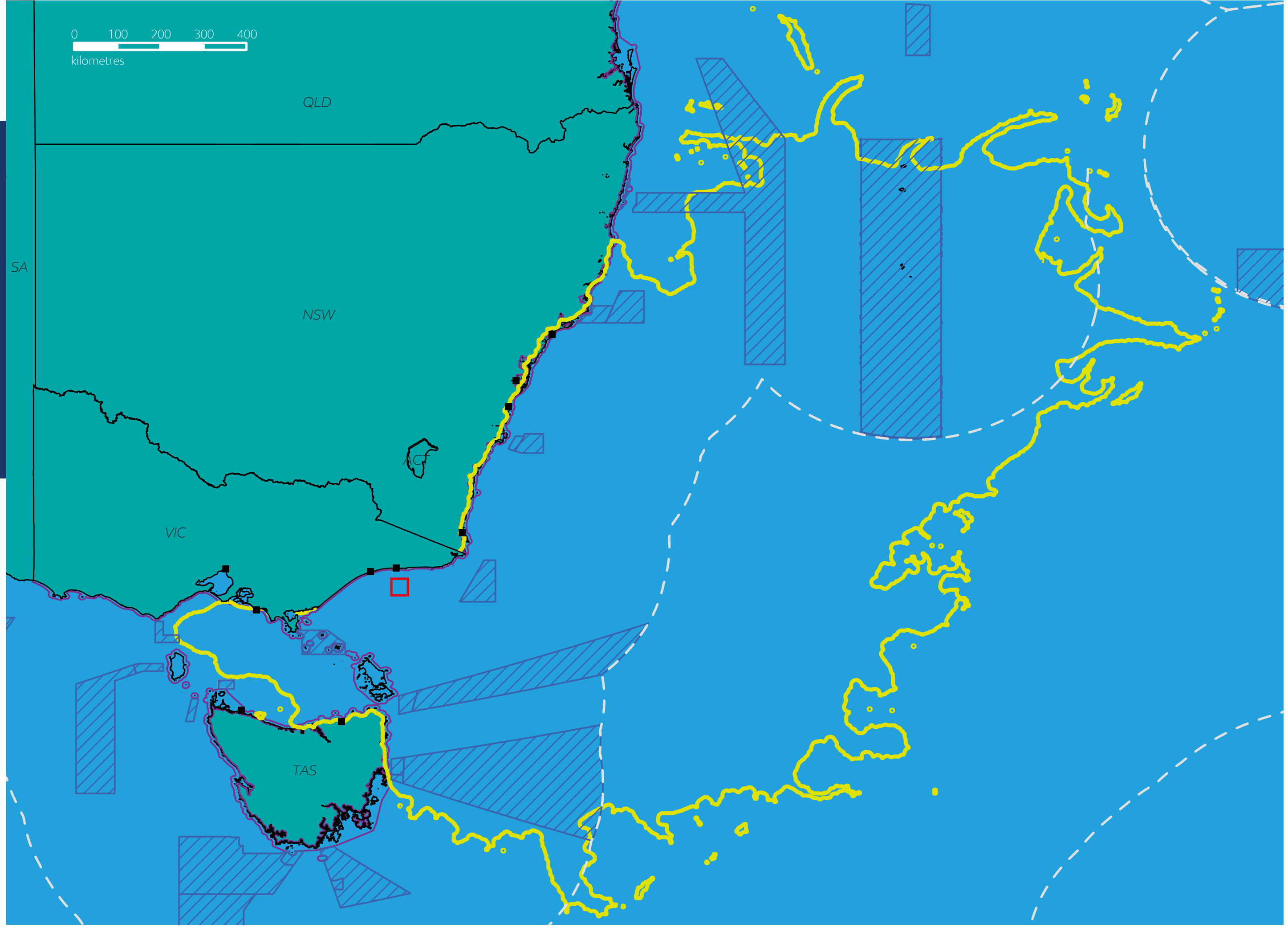
Esso is a member of the Australian Marine Oil Spill Centre, a co-operative national oil spill response organisation, which provides access to additional oil spill response resources if required.

Esso's OPEP interfaces with national, state and industry response plans prepared and implemented by the Australian Government via the Australian Maritime Safety Authority (NatPlan), the Victorian Government (Maritime Emergencies (non-search and rescue) Plan), the Tasmanian Government (TasPlan), the NSW Government (NSW Marine Oil and Chemical Spill Contingency Plan) and the Australian Oil industry's Australian Marine Oil Spill Plan (AMOSPlan) administered by the Australian Marine Oil Spill Centre.

The OPEP defines spill response options which may be applied to a spill event. The selected spill response option(s) would depend upon the size and type of spill; environmental sensitivities within the spill path; prevailing weather conditions; access restrictions and available resources. In all instances, a Net Environmental Benefits Assessment is undertaken, in consultation with relevant government agencies, to determine the most appropriate spill response option.

POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
DRILL RIG AND VESSEL-BASED IMPACTS		
Drill rig leg placement	• Temporary and localised seabed disturbance.	• Seabed survey completed to identify obstructions. • Rig move procedures in place. • Small area affected by leg placement, rapidly filled after removal. • Area is sandy bottom with no sensitive seabed features.
Planned discharges to the marine environment: sewage and food waste; treated bilge and deck wash; and cooling water and brine	• Temporary and localised reduction in water quality. • Temporary change to predator/prey dynamics.	• Routine discharges and vessel waste treatment systems will meet International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978, (MARPOL 73/78) requirements. Treatment systems are routinely monitored and regularly maintained. • No discharge of oily water exceeding acceptable limit oil in water content. • Food-scraps macerated prior to discharge. • Planned chemical discharges assessed and approved prior to use.
Sound emissions	• Temporary displacement of sound sensitive fauna around active vessels.	• Compliance with *Environment Protection and Biodiversity Conservation Regulations 2000* Part 8 Division 8.1 interacting with cetaceans.
Light emissions	• Attraction of light sensitive species. • Change in fauna behaviour.	• Lighting will used in accordance with the National Light Pollution Guidelines for Wildlife. • Lighting will be kept to a minimum while still meeting navigational and workplace safety requirements.
Air emissions	• Temporary and localised reduction in air quality.	• Air emissions from marine engines meet MARPOL 73/78 requirements and are routinely maintained. • Use of low sulphur content fuel.
Unplanned interaction with marine fauna (vessel strike)	• Injury or death of marine fauna.	• Support vessels will comply with *Environment Protection and Biodiversity Conservation Regulations 2000* Part 8 Division 8.1 interacting with cetaceans. • Jack-up rig will be stationary during well intervention. Watchkeeping will be maintained during vessel relocations. • Any injury/mortality of *Environment Protection and Biodiversity Conservation Act 1999*-listed fauna will be reported to the Department of Climate Change, Energy, the Environment and Water.
Unplanned introduction of invasive marine species	• Displacement of native species and habitat domination.	• Ballast Water Management Plan and Certificate. • Biofouling Risk Assessment shows low risk of invasive marine species introduction.
Accidental release of materials and waste	• Temporary and localised: - Increase in turbidity - Burial of benthic habitat in immediate seabed area - Potential toxicity impacts	• Waste handling, storage and disposal meets MARPOL 73/78 requirements. • Lifting equipment certified and routinely maintained. • Bulk transfer equipment meets Guidelines for Offshore Marine Operations requirements and routinely maintained. • Recovery of dropped objects where safe and practicable.

POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
Accidental release of fuel (vessel collision)	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton.	• Location within gazetted exclusion zones. • Communicate commencement of activity and exclusion zone to relevant persons via Notice to Mariners and via the Australian Maritime Safety Authority • Vessel crew and navigational equipment will meet legal requirements. • Vessels only travel at slow speeds within PSZ. • Comply with approved Shipboard OPEP, including maintaining spill kits, emergency response procedures and conducting spill response exercises. • Implementation of OPEP.
DRILLING ACTIVITY IMPACTS		
Discharge of cement	• Localised and temporary: - Reduction in water quality. - Smothering of benthic habitat.	• Low toxicity cement additives are selected for use. • Cement hose flushing and slurry releases rapidly diluted and dispersed.
Drilling fluid and cuttings discharges	• Localised and temporary: - Increase in turbidity. - Burial of benthic habitat in immediate seabed area. - Potential toxicity impacts.	• Seawater-based fluids used where practicable. • Use of low toxicity non-aqueous fluids and additives. • Solids control equipment minimises non-aqueous fluids on cuttings prior to cuttings discharge overboard. • Dynamic seabed and marine environment with rapid dispersion of sediments.
Drilling and completion fluid discharges	• Increased salinity. • Potential toxicity effects.	• Low toxicity chemical additives are selected for use in drilling, clean-up and completion fluids. • Planned chemical discharges assessed and approved.
Disconnection/cutting discharges	• Localised and temporary: - Reduction in water quality. - Smothering of benthic habitats.	• Planned chemical discharges assessed and approved.
Loss of well control	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton. • Pollution of shoreline habitats such as sandy beaches and rocky shores.	• NOPSEMA-accepted Well Operation Management Plan will be in place prior to commencement. • NOPSEMA-accepted Safety Case will be in place prior to commencement of activity. • Esso-approved drilling procedures will be in place. • Preventative maintenance systems will be in place. • Well control equipment testing. • Emergency response preparedness including: OPEP; Operational and Scientific Monitoring Plan; Source Control Plan and availability of suitable Mobile Offshore Drilling Unit to drill a relief well.



Environment that may be affected

The environment that may be affected (EMBA) is the largest spatial extent where the activities could potentially have an environmental consequence (direct or indirect impact). For this activity, the broadest extent of the EMBA takes into consideration planned and unplanned activities and is determined by a highly unlikely release of condensate from a low of well control and marine diesel to the environment as a result of a vessel collision.

The EMBA represents the total area that could be exposed to hydrocarbon, including trace concentrations of oil in the water column, as a result of any spill from this activity. This area takes into account the merged area of many possible paths a highly unlikely hydrocarbon release could travel depending on the weather and ocean conditions at the time of the release. This means in the highly unlikely event a hydrocarbon release does occur, the entire EMBA will not be affected and the specific and minimal part of the EMBA that is affected will only be known at the time of the release.

For this activity, Esso has defined the EMBA by combining the potential spatial extent of surface and in-water (dissolved and entrained) hydrocarbons, resulting from a worst-case credible spill from a vessel collision and the accidental release of condensate from a loss of well control.

Consultation

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Please let us know if your feedback is sensitive and we will make this known to NOPSEMA upon submission of the EP in order for this information to remain confidential to NOPSEMA.

Esso will communicate any material changes to the proposed activity to relevant persons as they arise.

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Appendix F-3 Information Bulletin #3 (May 2024)

ExxonMobil

CONSULTATION

Bass Strait Operations

Turrum - Phase 3 Drilling

INFORMATION BULLETIN
May 2024

Esso Australia Resources Pty Ltd (Esso) is committed to engaging with the communities where we operate and helping our stakeholders to understand our business. This information bulletin has been developed as part of Esso's commitment to keep relevant persons and other stakeholders informed of planned activities in Bass Strait and to provide them with sufficient information about the nature and scale of the activity, as well as its potential risks and impacts, so that they can make an informed decision as to whether their functions, interests or activities are affected.

Overview

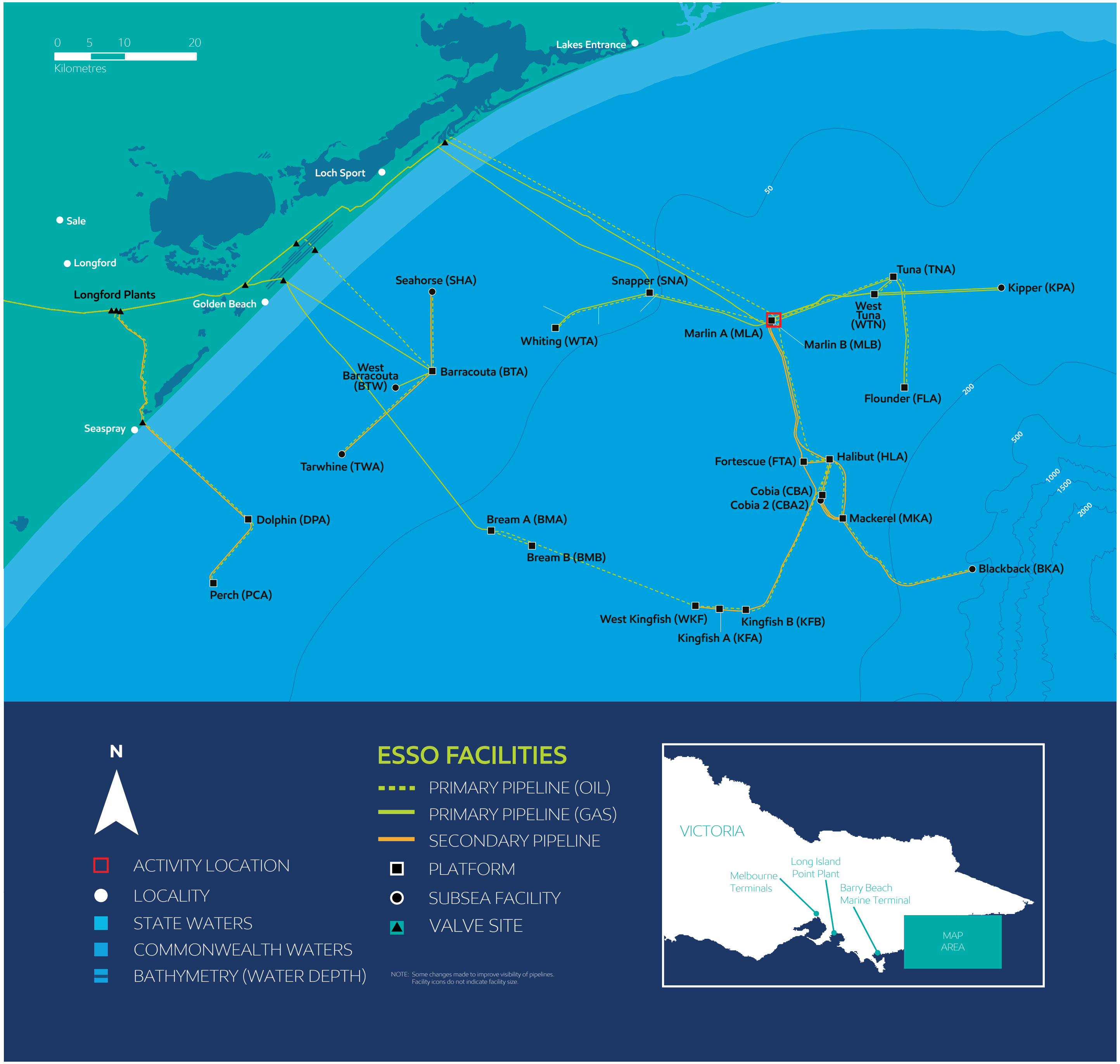
Esso is a wholly owned subsidiary of ExxonMobil Australia Pty Ltd. Esso is the operator of the assets in Bass Strait that are part of the Gippsland Basin Joint Venture between Esso and Woodside Energy (Bass Strait) Pty Ltd (Woodside Energy) and the Kipper Unit Joint Venture (Esso, Woodside Energy and MEPAU Pty Ltd). These assets comprise 19 platforms with approximately 400 wells, six subsea facilities and more than 800 kilometres of subsea pipelines.

Esso is planning to undertake a drilling campaign from the Marlin Complex (Marlin A and Marlin B) location in the Gippsland Basin off the Victorian coastline. This campaign will be completed during 2025/2026 along with other jack-up rig (JUR) activities.

The JUR will operate in accordance with international safety and environmental standards, will hold a Safety Case and operate under an Environment Plan (EP) and a Well Operations Management Plan (WOMP), after all have been accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

Activity location

The new wells will be located at the existing Marlin B platform, approximately 42 kilometres off the Gippsland coastline, south-east of Lakes Entrance in water depths of approximately 60 metres.



↑ Cover: Marlin Complex
→ Map of activity location

The wells will not be located within any established or proposed Commonwealth or State Marine Protected Areas, Critical Habitats or Threatened Ecological Communities.

Activity timing

Earliest date of commencement:

2H 2025

Field activities estimated to take:

~1 year

Activities will be conducted:

24/7

The timing and order of activity may vary and is contingent on regulatory approvals, joint venture approvals, weather and JUR/vessel schedules. Consultation will be conducted with relevant persons prior to the commencement of drilling activities.

Activity description

Drilling of five wells from Marlin B is planned to take place with the *Valaris 107* JUR. As the JUR does not have propulsion capability, it will be supported by up to three support vessels which will tow it into position alongside the Marlin B platform. The legs will then be lowered onto the seabed and the JUR elevated above the sea surface.

Gravel bed installation alongside the Marlin B platform may be required on the seafloor to ensure stability of the JUR. If necessary, a specialised vessel will be utilised to install the gravel bed. This may require several transits to the location from shore. If a gravel bed is required, it will become part of the infrastructure associated with the Marlin B platform and will be located within the existing 500m Petroleum Safety Zone (PSZ).

Any potential impacts and risks from the gravel bed will be managed to ensure impacts and risks are As Low As Reasonably Practicable (ALARP) and of an acceptable level.

The JUR will position over each proposed well location and the well will be drilled and completed. The conductors for the five wells are planned to be installed prior to JUR arrival using a hydraulic hammer on the existing Marlin B platform, in existing conductor slots. The drilling process uses a rotating bit attached to the end of a string of drill pipe to bore through the earth to reach the gas reservoirs. As the bit turns, it grinds off small pieces of rock, or drill cuttings, thus deepening the well.

In upper sections water-based fluids will be pumped down the drill string to remove cuttings from the well, cool the drill bit, and maintain pressure control of the well. In lower sections, to assist well stability, low toxicity non-aqueous fluids will be used.

The drilling fluids and cuttings are recirculated to the JUR where the fluids will be removed from the cuttings before being reused. Once fluids have been removed, drill cuttings will be discharged overboard where they will settle on the seabed near the JUR.

A blowout preventer will be used to prevent the release of hydrocarbons during drilling of the wells.

Once drilling is complete, steel casing will be installed in the wellbore and cemented in place. The well will be perforated to establish communication with the gas reservoir and production tubing will be installed containing various instruments and valves to produce the well.

↗ Construction of the Marlin B platform

→ ENVIRONMENT PLAN

Under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGS Act), before any petroleum-related activities in Commonwealth waters can commence, an EP must be accepted by NOPSEMA. A single EP is being developed for drilling of these five wells.

The EP is a comprehensive document that describes the existing environment, including relevant persons, and how Esso will undertake the drilling activities to avoid, minimise or manage potential environmental impacts to ALARP and meet regulatory acceptability criteria. Demonstrating ALARP requires a titleholder to implement all available control measures where the cost is not grossly disproportionate to the environmental benefit gained from implementing the control measure.

In the course of preparing an EP, Esso must consult with relevant authorities, persons and organisations whose functions, interests or activities may be affected by the proposed activities (i.e. a relevant person) and provide the opportunity for any feedback.

Petroleum Safety Zones and Notice to Mariners

The new Marlin B wells will be located on the existing Marlin B platform within the existing 500m PSZ established for the facility in accordance with Section 616 of the OPGGS Act.

The location and timing of the campaign will be communicated to other marine vessels via a Notice to Mariners issued by the Australian Hydrographic Office and AUSCOAST warnings issued by the Australian Maritime Safety Authority.

Interaction with commercial fishing

The activity locations are within existing Commonwealth fisheries that may be used by commercial fishers.

The impacts to commercial fishing should be minimal as fishers are already required to avoid the established PSZ. However, the timing of drilling activities and the support vessel details will be further communicated to the Lakes Entrance Fishermen's Co-op, South East Trawl Fishing Industry Association and Seafood Industry Victoria nearer the campaign.

Potential impacts, consequences and control measures

Esso's aim is to minimise environmental and social impacts associated with the proposed activities. As such, Esso has undertaken an assessment to identify potential impacts and consequences to the environment resulting from the proposed activities, considering timing, duration, location, values and sensitivities.

For each potential impact, Esso has developed the control measures outlined on the following pages to assist relevant persons in making an informed assessment of potential impacts to their functions, interests or activities.

↑ Marlin B platform

OIL POLLUTION EMERGENCY PLAN

In accordance with the OPGGS Act, Esso must demonstrate and document oil spill response arrangements. The Oil Pollution Emergency Plan (OPEP) forms part of an EP submission and demonstrates Esso's capability to respond in the unlikely event of an oil spill.

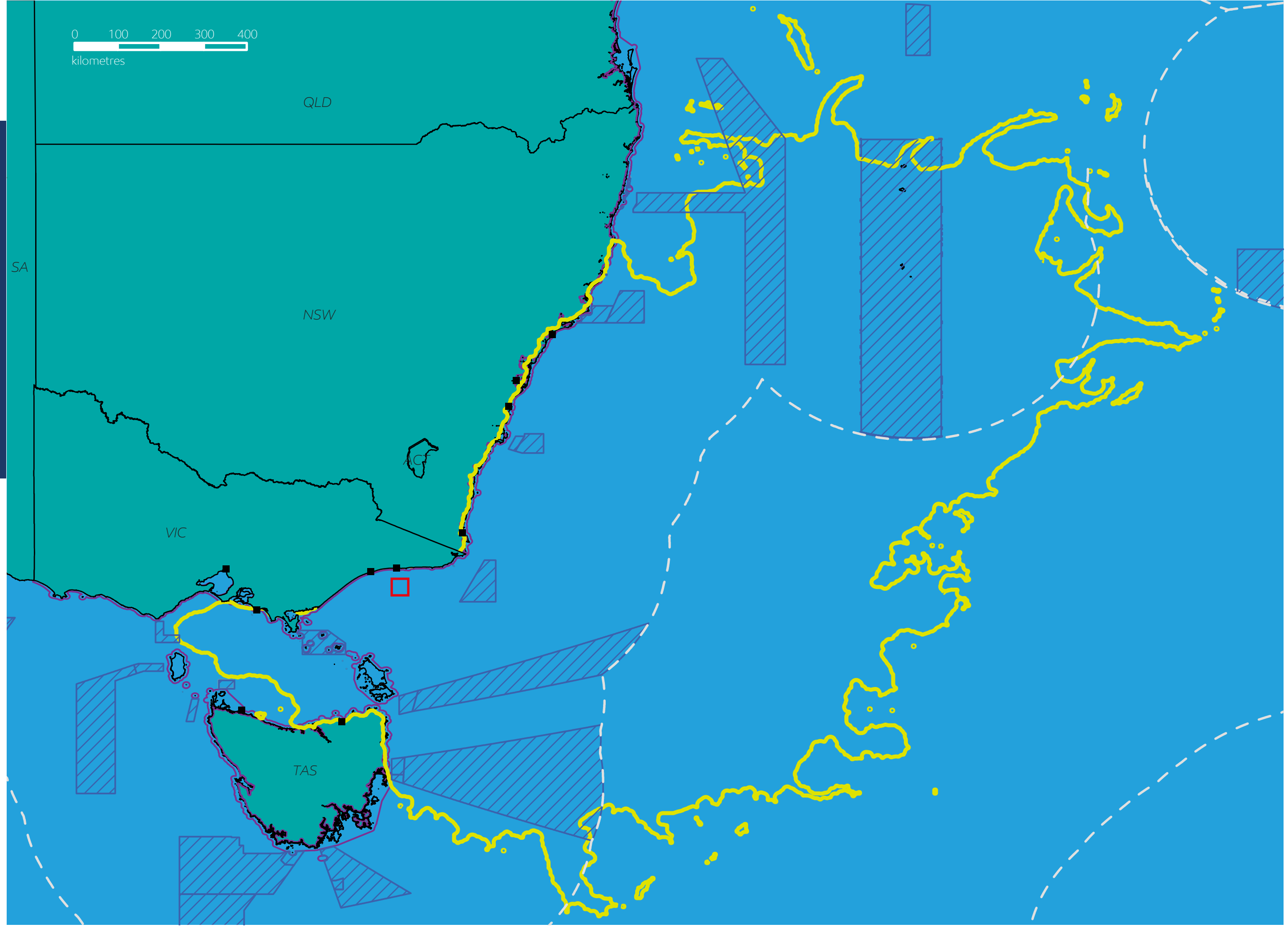
Esso is a member of the Australian Marine Oil Spill Centre, a co-operative national oil spill response organisation, which provides access to additional oil spill response resources if required.

Esso's OPEP interfaces with national, state and industry response plans prepared and implemented by the Australian Government via the Australian Maritime Safety Authority (NatPlan), the Victorian Government (Maritime Emergencies (non-search and rescue) Plan), the Tasmanian Government (TasPlan), the NSW Government (NSW Marine Oil and Chemical Spill Contingency Plan) and the Australian Oil industry's Australian Marine Oil Spill Plan (AMOSPlan) administered by the Australian Marine Oil Spill Centre.

The OPEP defines spill response options which may be applied to a spill event. The selected spill response option(s) would depend upon the size and type of spill; environmental sensitivities within the spill path; prevailing weather conditions; access restrictions and available resources. In all instances, a Net Environmental Benefits Assessment is undertaken, in consultation with relevant government agencies, to determine the most appropriate spill response option.

POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
JUR AND VESSEL-BASED IMPACTS		
JUR leg placement causes seabed disturbance	• Localised seabed disturbance/turbidity. • Temporary and localised reduction in water quality.	• Seabed survey completed to identify obstructions. • JUR move procedures in place. • Small area affected by leg placement, rapidly filled by natural current movements after removal. • Area is sandy bottom with no sensitive seabed features.
Gravel bed alongside Marlin B platform (if required)	• Localised seabed disturbance/turbidity. • Temporary and localised reduction in water quality.	• Clean gravel will be sourced from Australia and will be free of invasisve marine species. • The specialised vessel uses a discharge pipe extended to the seafloor , for accurate placement to minimise water column and seafloor disturbance.
Planned discharges to the marine environment: sewage and food waste; treated bilge and deck wash; and cooling water and brine	• Temporary and localised reduction in water quality. • Temporary change to predator/prey dynamics.	• Routine discharges and vessel waste treatment systems will meet International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978, (MARPOL 73/78) requirements. Treatment systems are routinely monitored and regularly maintained. • No discharge of oily water exceeding acceptable limit for oil in water content. • Food-scraps macerated prior to discharge. • Planned chemical discharges assessed and confirmed consistent with the Esso chemical assessment procedure prior to use.
Sound emissions	• Temporary displacement of sound sensitive fauna around active vessels.	• Compliance with Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) Part 8 Division 8.1 interacting with cetaceans. • Sound modelling has been undertaken for conductor installation activity, indicating extremely localised distances to effect for mammals and fish.
Light emissions	• Attraction of light sensitive species. • Change in fauna behaviour.	• Lighting will used in accordance with the National Light Pollution Guidelines for Wildlife. • Lighting will be kept to a minimum while still meeting navigational and workplace safety requirements.
Air emissions	• Temporary and localised reduction in air quality.	• Air emissions from marine engines meet MARPOL 73/78 requirements and are routinely maintained. • Use of low sulphur content fuel.
Unplanned interaction with marine fauna (vessel strike)	• Injury or death of marine fauna.	• Support vessels will comply with Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) Part 8 Division 8.1 interacting with cetaceans. • JUR will be stationary during drilling activities.. • Any injury/mortality of Environment Protection and Biodiversity Conservation Act 1999 (Cth)-listed fauna will be reported to the Department of Climate Change, Energy, the Environment and Water.
Unplanned introduction of invasive marine species	• Displacement of native species and habitat domination.	• Ballast Water Management Plan and Certificate. • Biofouling Risk Assessment shows low risk of invasive marine species introduction.

POTENTIAL IMPACTS	POTENTIAL CONSEQUENCES	CONTROL MEASURES
Unplanned Wastes and Materials discharge (accidental loss)	• Temporary and localised: - increase in turbidity - burial of benthic habitat in immediate seabed area - potential toxicity impacts.	• Waste handling, storage and disposal meets MARPOL 73/78 requirements. • Lifting equipment certified and routinely maintained. • Bulk transfer equipment meets Guidelines for Offshore Marine Operations requirements and is routinely maintained. • Recovery of dropped objects where safe and practicable.
Accidental release of fuel (vessel collision)	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton.	• Location within gazetted exclusion zones. • Communicate commencement of activity and exclusion zone to relevant persons via Notice to Mariners and via the Australian Maritime Safety Authority • Vessel crew and navigational equipment will meet vessel class requirements. • Vessels travel at reduced speeds within PSZ. • Comply with approved Shipboard OPEP, including maintaining spill kits, emergency response procedures and conducting spill response exercises. • Implementation of OPEP.
DRILLING ACTIVITY IMPACTS		
Discharge of cement	• Localised and temporary: - reduction in water quality - smothering of benthic habitat.	• Low toxicity cement additives are selected for use. • Cement hose flushing and slurry releases rapidly diluted and dispersed.
Drilling fluid and cuttings discharges	• Localised and temporary: - increase in turbidity - burial of benthic habitat in immediate seabed area - potential toxicity impacts.	• Seawater-based fluids used where practicable. • Use of low toxicity non-aqueous fluids and additives. • Solids control equipment minimises non-aqueous fluids on cuttings prior to cuttings discharge overboard (i.e. fluids are returned for reuse). • Dynamic seabed and marine environment with rapid dispersion of sediments.
Drilling and completion fluid discharges	• Increased salinity. • Potential toxicity effects.	• Low toxicity chemical additives are selected for use in drilling, clean-up and completion fluids. • Planned chemical discharges assessed and confirmed consistent with the Esso chemical assessment procedure prior to use.
Loss of well control	• Tainting of commercial fisheries species (e.g. shellfish). • Injury and death of species such as fish, marine reptiles, seabirds, cetaceans. • Pathological effects on fish larvae and plankton. • Pollution of shoreline habitats such as sandy beaches and rocky shores.	• Turrum wells are predominantly gas with some associated condensate, therefore large oil spills are unlikely. • NOPSEMA-accepted WOMP will be in place prior to commencement. • NOPSEMA-accepted Safety Case will be in place prior to commencement of activity. • Esso-approved drilling and completions procedures will be in place. • Preventative maintenance systems will be in place. • Well control equipment testing. • Emergency response preparedness including: OPEP; Operational and Scientific Monitoring Plan; Source Control Plan and relief well planning.



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Consultation

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Appendix F-4 Glawac Key Messages and other information

ExxonMobil

21 March 2024

GLaWAC Consultation Pack

Energy lives here™

GLaWAC Representatives: [redacted]

Esso Representatives: [redacted]

Location: Teams Meeting

To be discussed

- Re-cap on previous discussion
- Previous Actions
- Q&A
- Further discussion

Previous discussion - Key points

1. General discussion about Esso's current and planned activities in Bass Strait.
2. Esso has conducted several offshore studies and public forums to collate a list of Risks and Impacts for decommissioning activities. We also utilize several other consultation methods to share information and gather feedback from a variety of stakeholders.
3. Esso would like to build a stronger partnership to understand more about cultural heritage and sea country.
4. Esso is seeking Gunaikurnai feedback on risks and impacts, including to cultural heritage and sea country.
5. Esso is seeking regular consultation on planned activities, as well as opportunities to partner, with the Gunaikurnai.

Previous discussion - Actions

1. Esso – Develop Esso key messages material for GLaWAC to refer to consultation with Gunaikurnai People - *complete*

2. Esso – Provide an update re potential environmental & GIS information that could be provided to GLaWAC – *in progress*

3. Esso / GLaWAC – Schedule initial follow-up meeting ~ March 2024 for further consultation (meeting scheduled for 21st March 2024) - *complete*

4. Esso / GLaWAC – [post March meeting] Confirm frequency of regular catchups with Esso and preferred format for consultation - *pending*

5. GLaWAC – Provide information re current Cultural Heritage survey program, and potential options for Esso support - *pending*

Q&A

1. Waste Water Treatment (GLaWAC)

a) Who is responsible for monitoring the out fall once it is treated?

Gippsland Water

b) Does it cease being ESSO's responsibility once it enters the treatment plant at Dutson Downs?

- Treatment responsibility transfers to Gippsland Water.
- There are specifications on what components / concentrations Esso are allowed to send to Dutson Downs in water for treatment to ensure it remains within the treating capacity that Gippsland Water has available.
- Waste water from the Esso facilities has been treated this way for 20+ years. And the volumes of waste water will decrease with the cease of oil production later this year.

a) Does it just become responsibility of Gippsland Water and what is the EPA's role?

Yes. Gippsland Water has to meet all regulatory requirements including with the EPA

Q&A

2. Barry's Beach Terminal [GLaWAC]

a) What is the footprint of the upgrade?

Qube are operators of the Barry Beach Marine Terminal on behalf of Esso. The upgrade is wholly within the existing site boundaries and occupies around half of the existing site.

b) Is it within the existing area or are ESSO seeking approval to extend beyond this area?

The upgrade is wholly within the existing site boundaries.

Q&A

3. Pipeline Flushing and Capping of Wells [GLaWAC]

a) We would like to understand this process better so if we can have it explained further that would be excellent. Are the pipes flushed from the platform and then disconnected?

- Pipelines are cleaned and flushed by pumping water from offshore to onshore (Longford) with cleaning pigs.
- Once cleanliness is confirmed, the pipelines are cut at the sea floor at the base of the platform to allow removal of the platform topsides and upper sections of the platform jackets pending decisions on final end states of the pipelines.

b) What is the monitoring process going to be after the well capping and who is responsible for this?

- Wells are plugged and abandoned to prevent pressure or fluid communication between distinct subsurface zones and prevent surface or sea bed releases.
- Our plug and abandonments are approved by the regulator NOPSEMA; for this reason there is no on-going monitoring of the wells required after plug and abandonment.
- For the offshore platforms environmental monitoring after the removal of the upper sections will occur for approximately 12 months after the removal, and another survey approximately 5 years later to assess how the environment has responded

Further discussion

1. Are there any other indigenous groups that Esso should be engaging with?

2. Is Esso better off leaving decommissioned infrastructure alone, or accepting a disturbance to remove it?

3. Do you have any questions on anything you've heard from other sources recently about Esso's activities?

4. Consultation alignment – does this format work for GLaWAC? Any changes?

5. Catch-up frequency?

Locations of Esso's Bass Strait facilities

Thank you

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CONSULTATION

Gippsland Basin Activities

February 2024

Key Messages

Esso wishes to build relationships with stakeholders based on open, accurate and transparent consultation, where information can be shared with each other about our interests and activities. By working together, we will better understand each other's needs and how opportunities for community can be supported.

Esso's assets in the Bass Strait consist of 421 wells, 19 platforms, six subsea facilities and more than 800 kilometres of subsea pipeline. After delivering energy for more than 50 years to Australia, some of the facilities, consisting of 10 platforms, four of the subsea facilities, associated pipelines and approximately half of all wells, no longer produce oil and gas. An additional three platforms and associated pipelines are anticipated to stop supporting oil and gas production by 2025.

Esso will continue to produce gas in Bass Strait into the next decade. However, oil will no longer be produced in Bass Strait after 2024. All wells will be plugged and abandoned by installing cement plugs and all pipelines will be flushed and cleaned to remove remaining oil. Esso's oil producing platforms will be decommissioned starting no later than 30th September 2027, followed by pipelines and other subsea infrastructure.

Climate change is one of the major problems facing the world today. To help reduce our carbon dioxide (CO_2) from Bass Strait operations, Esso is seeking to develop the South East Australia Carbon Capture and Storage (SEA CCS) Project, which could start capturing and permanently storing CO_2 as early as 2026. We are also exploring opportunities to offer this service to businesses interested in accessing the SEA CCS facilities to reduce emissions from their operations.

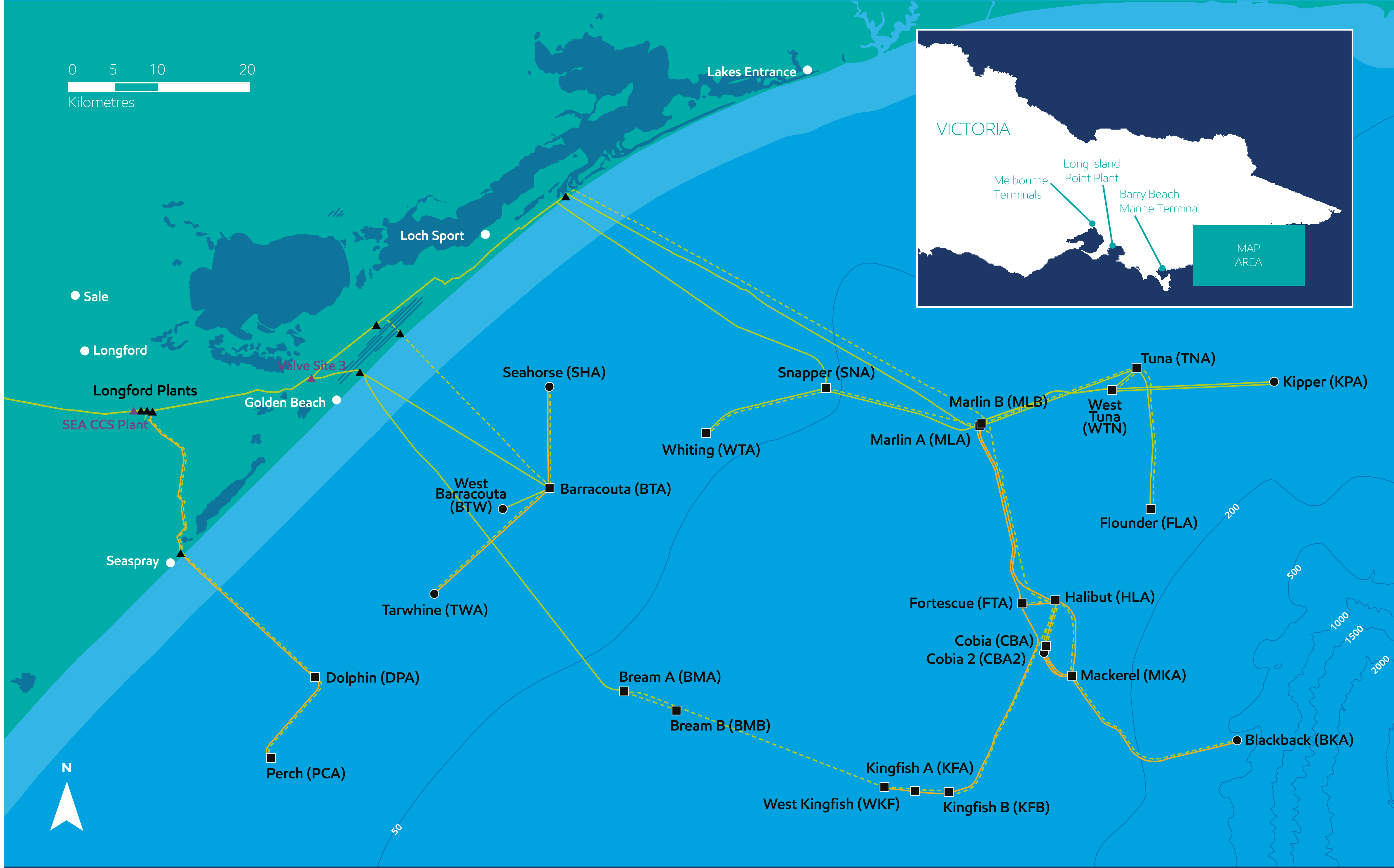
Esso's activities may affect the environment and other values, including sea country and cultural heritage. As well as inviting community to join in our regular consultation activities, Esso would also like to welcome indigenous feedback about areas that may be sensitive to Esso's activities and how cultural values and heritage are considered in Esso's activity plans.

Consultation

Esso is committed to ongoing engagement with the communities where we operate. Your functions, interests and activities may mean you, your business or your organisation are a relevant person for these activities.

Your participation will help Esso to better understand the impacts and risks that may arise from proposed activities.

As information bulletins are made available we would very much appreciate your feedback on the proposed activity outlined in each bulletin.



- LOCALITY
- PLATFORM
- PRIMARY PIPELINE (OIL)
- PRIMARY PIPELINE (GAS)
- SECONDARY PIPELINE
- SUBSEA FACILITY
- VALVE SITE
- STATE WATERS
- COMMONWEALTH WATERS
- BATHYMETRY (WATER DEPTH)
- SEA CCS FACILITY

PROPOSED ACTIVITY	CONSULTATION STATUS
Kipper - Subsea Drilling	Closes April 2024
Turrum Phase 3 Drilling (From Marlin B)	Closes April 2024
Geotechnical and Geophysical (5 yearly revision)	Closes April 2024
Decommissioning Steel Piled Jackets - Execution	Closes Fourth Quarter 2024
Decommissioning Pipelines	Closes Fourth Quarter 2025
South East Australia Carbon Capture and Storage Project	Ongoing
Decommissioning Steel Piled Jackets – End State	Closed (Environment Plan submitted March 2024)
Jack-Up Rig Well Plug and Abandonment	Closed (Environment Plan under assessment)
Bass Strait State Waters Environment Plan	Closed (Environment Plan under assessment)
Gudgeon-1 and Terakihi-1: Exploration Well Plug & Abandonment	Closed (Environment Plan has been accepted)

NOTE: Some changes made to improve visibility of pipelines. Facility icons do not indicate facility size.

All dates current at time of publishing.

Appendix G: Advertisement materials

ExxonMobil

Esso's oil and gas facilities in Bass Strait

Esso

An ExxonMobil Brand

Esso Australia Pty Ltd (Esso), a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is committed to operating and decommissioning its' Bass Strait offshore facilities safely and effectively.

Community Drop-in

If you'd like to know more about current operations, decommissioning, South-East Australian Carbon Capture and Storage, and proposed Kipper and Turrum drilling activities, the Esso Consultation Team will be hosting a community drop in at Lakes Entrance:

When: Thursday 7 December 2023

Where: The Bellevue Hotel, Lakes Entrance

Time: Any time between 5.00 pm - 6.30 pm

There will be maps of the facilities and infrastructure, brochures about the projects, and friendly staff available to answer your questions.

No booking is required.

Contact us by email or phone

If this time doesn't work for you, please feel free to contact us to ask a question, raise a concern or register your interest to be involved by emailing us at consultation@exxonmobil.com
or by phone: 03 9261 0244

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more information

For more information about Esso's Decommissioning activities and other projects, please go to the Esso Consultation Hub at:

https://www.exxonmobil.com.au/community-engagement/local-outreach/consultation-hub

Like to be consulted about these activities?

Please fill in the Esso Consultation Questionnaire in the Esso Consultation Hub to let us know if you'd like to be consulted and any questions or feedback you may have.

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Esso's oil and gas facilities in Bass Strait

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Community Drop-in

If you'd like to know more about the following:

- Pipeline Decommissioning
- Steel Pile Jacket Decommissioning
- Kipper Drilling
- Turrum Drilling
- Geophysical and Geotechnical Environment Plans,

the Esso Consultation Team will be hosting a community drop in at Lakes Entrance:

When: Thursday 29 February 2024

Where: The Bellevue Hotel, Lakes Entrance

Time: Between 5.00 pm - 6.30 pm

There will be maps of the facilities and infrastructure, brochures about the activities, and a friendly consultation team available to answer your questions.

Please email us at consultation@exxonmobil.com to register your attendance.

Contact us by email or phone

If this time doesn't work for you, please feel free to contact us to ask a question, raise a concern or register your interest to be involved by emailing us at consultation@exxonmobil.com
or by phone: 03 9261 0244

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more information

For more information about Esso's activities and projects, please go to the Esso Consultation Hub at:

https://www.exxonmobil.com.au/community-engagement/local-outreach/consultation-hub

Like to be consulted about these activities?

Please fill in the Esso Consultation Questionnaire in the Esso Consultation Hub to let us know if you'd like to be consulted and any questions or feedback you may have.

ExxonMobil

Esso's oil and gas facilities in Bass Strait

Esso

An ExxonMobil Brand

Esso Australia Pty Ltd (Esso), a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is committed to operating and decommissioning its' Bass Strait offshore facilities safely and effectively.

In planning for these activities, Esso is required under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* to prepare an Environment Plan about the risks and impacts these activities may have on the environment.

Additionally, Esso is required to identify and consult with relevant persons whose functions, interests, or activities may be affected by one or more of Esso's proposed offshore activities.

Community Drop-in

If you'd like to know more about Environment Plans for the following:

- Pipeline Network Decommissioning
- Steel Pile Jacket Decommissioning
- Jack Up Rig Plug and Abandonment
- Kipper Sub-Sea Drilling
- Turrum Drilling
- Gippsland Basin Geophysical and Geotechnical Investigations
- South East Australia Carbon Capture & Storage Project

The Esso Consultation Team will be hosting a community drop in between 5.00 pm and 6.00 pm on:

- **Wednesday, 29 May 2024** at The Criterion Hotel, Sale, and
- **Thursday, 30 May 2024** at Bellevue on the Lakes, Lakes Entrance

Please email us at consultation@exxonmobil.com to register your attendance.

Contact us by email or phone

If these dates and times don't suit, please feel free to contact us via email at consultation@exxonmobil.com to ask a question, raise a concern or register your interest to be consulted, or by phone on 03 9261 0000.

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more

For more information about Esso's activities and projects, please go to the Esso Consultation Hub at https://www.exxonmobil.com.au/community-engagement/local-outreach/consultation-hub or hover and click over the QR Code below to take you to the link:

Like to be consulted about these activities?

Please fill in the Esso Consultation Questionnaire (sli.do) in the Esso Consultation Hub to let us know if you'd like to be consulted or have any questions or feedback.

Your feedback and our response will be included in the relevant Environment Plan and submitted to the regulator, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), for acceptance.

ExxonMobil

Esso's oil and gas facilities in Bass Strait

An ExxonMobil Brand

Esso Australia Pty Ltd (Esso), a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is committed to operating and decommissioning its' Gippsland and Bass Strait facilities safely and effectively.

In planning for these activities and in accordance with the regulations, Esso will prepare application documentation e.g. Environment Plans about the risks and impacts these activities may have.

Community Drop-in

If you'd like to know more about activity plans for the following:

- Steel Pile Jacket Decommissioning
- Jack-Up-Rig Well Plug and Abandonment
- Kipper - Sub-Sea Drilling
- Turrum Phase 3 Drilling
- Gippsland Basin Geophysical and Geotechnical Investigations
- South East Australia Carbon Capture & Storage (SEA CCS) Project
- Bream Greenhouse Gas Appraisal Environment Plan (SEA CCS)
- Pipeline Network Decommissioning

The Esso Consultation Team will be hosting community drop-ins between 5:00pm and 6:00pm on:

Wednesday, 21 August 2024 at The Criterion Hotel, Sale, 90 MacAlister Street

Thursday, 22 August 2024 at Off The Wharf café, Bullock Island, Lakes Entrance

Tuesday, 27 August 2024 at the Welshpool Memorial Hall, 49 Main Street, Welshpool

Wednesday, 28 August 2024 at Manna Gum Community House, 33 Station Street, Foster

To register your attendance, please email us at: consultation@exxonmobil.com

If these dates and times don't suit, please contact us at consultation@exxonmobil.com or by phone on 03 9261 0000.

Like to be consulted about these activities?

Esso is working to identify and consult with relevant persons [stakeholders] whose functions, interests, or activities may be affected by one or more of Esso's proposed activities.

Please fill in the Esso Consultation Questionnaire (Slido) in the Esso Consultation Hub to let us know if you'd like to be consulted or have any questions or feedback.

Please refer to the NOPSEMA brochure *Consultation on offshore petroleum environment plans* (link) to understand more about consultation on offshore petroleum environment plans assessed under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023*.

Your feedback and our response will be included in the relevant regulatory application documentation and submitted to the regulator.

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more information

For more information about Esso's Decommissioning activities and other projects, please go to the Esso Consultation Hub at:

https://www.exxonmobil.com.au/community-engagement/local-outreach/consultation-hub

ExxonMobil

Esso's decommissioning of platforms in Bass Strait

Esso

An ExxonMobil Brand

Esso Australia Pty Ltd (Esso), a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is committed to operating and decommissioning its' Gippsland and Bass Strait facilities safely and effectively.

After delivering energy to Australia for over 50 years, many of the Bass Strait oil fields are now reaching the end of their productive life. As planning for decommissioning progresses, Esso is focused on safely shutting-down non-producing facilities and ensuring they stay safe throughout the entire decommissioning process.

Community Information Session and Drop-in

If you'd like to know more about activity plans for **Decommissioning of platforms and pipelines in Bass Strait,** the Esso Consultation Team will be hosting a community information session and drop-in at the following locations:

Wednesday 25 September 2024 - Welshpool
Welshpool Memorial Hall
49 Main Street, Welshpool
10.00 am – 1.00 pm

Wednesday, 25 September 2024 - Leongatha
South Gippsland Trade Skills Alliance (SGBLLEN)
71 Ogilvy St., Leongatha
3.00 pm – 7.00 pm

Thursday, 26 September 2024 - Foster
Manna Gum Community House
33 Station Street, Foster
3.00 pm – 7.00 pm

A presentation about decommissioning activities will be provided at 11.00 am for the AM sessions and 3.30 pm and 5.30 pm for the PM sessions. We encourage you to come along and ask questions or to raise any concerns you may have.

To register your attendance, please email us at: consultation@exxonmobil.com

If these dates and times don't suit, please contact us at consultation@exxonmobil.com or by phone on 03 9261 0000.

The Esso Consultation Team will also be available to discuss all current activities, including:

- Bass Strait Decommissioning
- Jack-Up-Rig Well Plug and Abandonment
- Gippsland Basin Geophysical and Geotechnical Investigations
- Kipper - Sub-Sea Drilling
- Turrum Phase 3 Drilling
- South East Australia Carbon Capture & Storage (SEA CCS) Project
  Bream Greenhouse Gas Appraisal Environment Plan (SEA CCS)

Like to be consulted about these activities?

Esso is working to identify and consult with relevant persons [stakeholders] whose functions, interests, or activities may be affected by one or more of Esso's proposed activities.
Please fill in the Esso Consultation Questionnaire (sli.do) in the Esso Consultation Hub to let us know if you'd like to be consulted or have any questions or feedback.

Please refer to the NOPSEMA brochure Consultation on offshore petroleum environment plans brochure.pdf (nopsema.gov.au) to understand more about consultation on offshore petroleum environment plans assessed under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023*

Your feedback and our response will be included in the relevant regulatory application documentation and submitted to the regulator.

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more information

For more information about Esso's activities and other projects, please go to the Esso Consultation Hub at:

https://corporate.exxonmobil.com/locations/australia/our-approach

ExxonMobil

Community Consultation - decommissioning of oil & gas infrastructure in Bass Strait

Esso

An ExxonMobil Brand

Esso Australia Pty Ltd (Esso), a wholly owned subsidiary of ExxonMobil Australia Pty Ltd, is committed to operating and decommissioning its Gippsland and Bass Strait facilities safely and effectively.

After delivering energy to Australia for over 50 years, many of the Bass Strait oil and gas fields are now reaching the end of their productive life. As planning for decommissioning progresses, Esso is focused on safely shutting-down non-producing facilities and ensuring they stay safe throughout the entire decommissioning process.

Community Information Sessions

If you'd like to know more about plans for **Decommissioning of platforms and pipelines in Bass Strait,** the Esso Consultation Team will be hosting a community information and drop-in session at the following locations:

Tuesday 22 October 2024 - Yarram

Yarram Hub
156 Grant Street, Yarram

Wednesday, 23 October 2024 - Foster

Manna Gum Community House
33 Station Street, Foster

Thursday, 24 October 2024 - Leongatha

South Gippsland Trade Skills Alliance (SGBLLEN)
71 Ogilvy Street, Leongatha

All of the above sessions will run from **5.00 - 7.00pm** with a **presentation** about decommissioning activities provided at **5.30pm**.

We encourage you to come along and ask questions or to raise any concerns you may have. Please **register your attendance** by emailing: consultation@exxonmobil.com

If these dates and times don't suit, please contact us at consultation@exxonmobil.com or by phone on 03 9261 0000.

The Esso Consultation Team will also be available to discuss all current activities, including:

- Jack-Up-Rig Well Plug and Abandonment
- Gippsland Basin Geophysical and Geotechnical Investigations
- Kipper - Sub-Sea Drilling
- Turrum Phase 3 Drilling
- South East Australia Carbon Capture & Storage (SEA CCS) Project.

Like to be consulted about these activities?

Esso is working to identify and consult with relevant persons [stakeholders] whose functions, interests, or activities may be affected by one or more of Esso's proposed activities.

Please fill in the Esso Consultation Questionnaire (sli.do) in the Esso Consultation Hub to let us know if you'd like to be consulted or have any questions or feedback.

Please refer to the NOPSEMA brochure Consultation on offshore petroleum environment plans brochure.pdf (nopsema.gov.au) to understand more about consultation on offshore petroleum environment plans assessed under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023.

Your feedback and our response will be included in the relevant regulatory application documentation and submitted to the regulator.

Please connect us with other interested people

If there is anyone you know who may be interested in our activities, we encourage you to share this information with them.

To find out more information

For more information about Esso's activities and other projects, please go to the Esso Consultation Hub at: https://corporate.exxonmobil.com/locations/australia/our-approach

Appendix H: EPOs, EPSs, controls and measurement criteria

Table H-1 Environmental performance – Activities

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
Physical presence – Seabed disturbance	Change in habitat, smothering and change in water quality.	1.	Avoid physical damage to sensitive habitats (i.e. benthic features such as reefs).	**CMP1:** Pre-activity site inspection	1	ROV seabed survey(including potential Anchor Pre-lay and post lay if required) confirms the proposed location is free from seabed obstacles, including benthic features, identify any pipelines in the area, and ensure that the JUR can be positioned away from any flowlines, umbilicals, hydraulic flying leads/electrical flying leads, jumpers or pipelines.	JUR arrival ROV clearance report notes the absence of seabed obstacles.
				CMP20: JUR move procedure	2	The approved JUR move procedure details how the JUR will be moved onto and moved off location. It includes approach path, communication protocols, Permit to Work arrangements, survey criteria, subsea impact prevention and JUR elevation/stability processes.	Approved procedure is available on site and utilised. Daily reports confirm that the procedure is followed.
Physical interaction – Other marine users	Change to the function, interests or activities of other users.	2	Marine users are informed prior to commencement of the drilling activities such that they can plan their activities and avoid unexpected interference.	**CMP2:** Petroleum Safety Zone	3	PSZs established in accordance with OPGGS Act.	PSZs are gazetted and published on the NOPSEMA website.
					4	Presence of navigation aids and communication systems on JUR. Collaboration with AHO in providing adequate warnings and Notices to Mariners.	Records confirm that navigation aids are in place and notifications are made prior to field activities.
				CM36: Pre-start notifications	5	AMSA JRCC notified before operations commence to enable AMSA to distribute an AUSCOAST warning.	Records confirm that information to distribute an AUSCOAST warning was provided to the JRCC before operations commenced. Issued AUSCOAST warning dated prior to, or on the date operations commenced.
					6	AHO notified before operations commence to allow generation of navigation warnings (including Notice to Mariners).	Issued Notice to Mariners dated prior to, or on the date operations commenced.
					7	Commercial fisheries are notified of activities via the ongoing quarterly engagement forum.	Minutes of engagement forums confirm upcoming activities discussed.
Planned discharge – Sewage and food waste	Change in water quality and fauna behaviour.	3.	Sewage discharges comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex IV requirements.	**CM9:** Class certification	8	JUR and vessels are compliant with MARPOL Annex IV as appropriate to vessel class.	Vessels have class certification verified and issued by International IACS member.
		4	Food waste discharges comply with MARPOL Annex V requirements.	**CM9:** Class certification	9	JUR and vessels are compliant with MARPOL Annex V as appropriate to vessel class.	Vessels have class certification verified and issued by IACS member.
Sound emissions	Injury to fauna and change in fauna behaviour.	5.	There is no injury (TTS and PTS) or displacement from foraging, aggregation, calving/breeding or	**CMP4:** Helicopter Pilot	10	Interaction between helicopters and cetaceans within the OAs will be consistent with Part 8 Division 8.1 of the EPBC Regulations. Helicopters will not fly lower than 1650ft (503m) when within 500m horizontal distance of a cetacean except when	Annual refresher memo demonstrates that pilots are aware of flight requirements when in the vicinity of a cetacean.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
			migrating grounds in cetacean BIAs from sound emissions. No injury, harm or interference to cetaceans from sound emissions during support vessel operations or from conductor driving activities.			landing or taking off and will not approach a cetacean from head on.	
				CM8: Vessel Master	11	Vessel masters will implement cetacean interaction management actions consistent with the *Australian National Guidelines for Whale and Dolphin Watching 2017* (Commonwealth of Australia, 2017) (which enact) Part 8 Division 8.1 of the EPBC Regulations, including: • Caution zones - vessels will not knowingly travel faster than 6kn within 300m of an adult whale or 150m of an adult dolphin • vessels will not knowingly get closer than 100m of a whale or 50m of a dolphin. If a cetacean approaches the vessel within the above zones, the vessel will avoid rapid changes in engine speed or direction.	Daily operations reports note when cetaceans were sighted in the caution zone and interaction management actions implemented.
				CMP26: Fauna observations	12	Bridge crew are trained and competent in whales observation and species identification as part of their normal requirements and ability to comply with Part 8 Division 8.1 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (EPBC Regulations), which is implemented via the Australian National Guidelines for Whale and Dolphin Watching 2017 (Commonwealth of Australia, 2017). • Trained Bridge crew undertake continuous observations • Vessels are required to have two Watchkeepers on the bridge at all times when operating near the facility. • One Watchkeeper is focused on the operational task at hand, the other is responsible for maintaining the safe navigation of the vessel including keeping compliance with COLREGs Rule 5 which requires that the vessel at all times maintains a proper look-out by sight, hearing and all available means appropriate to the prevailing circumstances and conditions, including marine fauna observations. • All Watchkeepers hold Certificates of Competency recognized by the vessel Flag State which can only be obtained by completing years of sea service, including understudy time on watch on the bridge. • All vessel operators are required to maintain compliance with the EPBC Act and other relevant conservation management plans. As such, vessel crews complete MFO training to ensure that obligations with respect to marine mammals are observed while they are in charge of the vessel. • Esso verifies the crew MFO training as part of pre-hire and routine EP compliance inspections.	Watchkeeper certificates of competency Vessel Crew MFO training records Esso Pre-hire assessment records Esso Vessel Inspection records

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
						• The vessels have multiple pairs of binoculars available to Watchkeepers. • Marine megafauna identification charts are posted onboard.	
					13	Vessel Masters, the JUR OIM and all crew undertake an awareness induction for managing sound impact megafauna this includes awareness in: • Whale observation, species identification and distance measurement and reporting. • Providing photos/pictures of the different megafauna expected in the area at the time of the geophysical activity, including the location of the mammal identification chats on board on display on the vessel. • Instructions on the pre-start, requirements (as listed in CMP33). • Instructions on distance estimation, including the specification that marine binoculars with reticles are used. • Instructions on how to detect marine megafauna based on observations on the water surface and surrounds. • Instructions on data to be recorded for marine megafauna sightings, including time of observation, type and number of species observed and estimated location coordinated. • Location of binoculars available to Watchkeepers. Note if there is any uncertainty or species type the precautionary principle applies and all adaptive management measure will be applied, see CMP33	Induction records.
					14	• Crew members on active duty will report observations of megafauna to bridge watch officers or OIM as soon as it is safe to do so.	Daily reports confirm recordings of cetacean sightings.
					15	Whilst undertaking conductor drive activities during off peak whale season (November to March) at Marlin B, several crew trained in visual observation on the platform will commence visual observations of the extended 3km observation zone for 30 minutes prior to undertaking conductor drive activities • If a whale is observed in the observation zone conductor piling will not commence until the whale has left the observation zone and has not been observed for more than 30 minutes. • Observations will continue during the activity and if at any time a whale is observed in the observation zone the conductor driving activity will cease until the whale has left the observation zone and not been observed for more than 30 minutes.	Daily reports confirm recordings of cetacean sightings.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
					16	Whilst undertaking conductor drive activities during peak whale season (April to October) at Marlin B, several crew trained in visual observation as well as a dedicated and trained MFO will be on the platform will commence visual observations of the extended 3 km observation zone for 30 minutes prior to undertaking conductor drive activities • If a whale is observed in the observation zone conductor piling will not commence until the whale has left the observation zone and has not been observed for more than 30 minutes. • Observations will continue during the activity and if at any time a whale is observed in the observation zone the conductor driving activity will cease until the whale has left the observation zone and not been observed for more than 30 minutes.	MFO Daily reports confirm recordings of cetacean sightings.
				CMP33: Adaptive management	17	Vessel based observations within the behavioural zone around the vessels will be undertaken while on route to the OA at the start of the activity, prior to and during rig moves. If a PBW or SRW is observed (or if there is any uncertainty in species identification) the following action will be undertaken: • Delay rig moves until whale has been confirmed outside of the behavioural zone or no new sightings for 30 minutes • Delay support vessel operations or moves and delay beginning unloading/loading activities until whale has been confirmed outside of the behavioural zone or no new sightings for 30 minutes • If already in transit, vessels will reduce speed, adjust heading if safe to do so and apply the caution zone requirements of CM8 • During unloading/loading operations whilst a support vessel is alongside the JUR, the support vessel will either stop operations if safe to do so and move away from the behavioural zone, or if not safe to stop operations, reduce thrusters to as low as possible and adjust heading.	Daily reports confirm recordings of cetacean sightings and all actions undertaken.
Light emissions	Change in fauna behaviour.	6.	Lighting will be limited to that required for safe navigation and work requirements.	**CMP30:** Lighting will be limited	18	Lighting will be limited to that required for safe navigation and work requirements, with unnecessary lighting minimised.	Inspection confirms light spill to sea is minimised, except where required for safe work/navigation.
Planned discharge – Treated bilge	Change in water quality.	7	Deck drainage discharges comply with MARPOL Annex V requirements.	**CM9:** Class certification	19	JUR and vessels are compliant with MARPOL Annex V as appropriate to vessel class.	Vessels have class certification verified and issued by IACS member.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
water and deck drainage		8	Bilge discharges from vessels comply with MARPOL Annex I requirements.	**CM9:** Class certification	20	JUR and vessels are compliant with MARPOL Annex I as appropriate to vessel class.	Vessels have class certification verified and issued by IACS member.
Emissions to air	Change in air quality. Contribution to GHG effect.	9	Fuel combustion equipment complies with the requirements of MARPOL Annex VI.	**CM9:** Class certification	21	JUR and vessels are compliant with MARPOL Annex VI as appropriate to vessel class.	Vessels have class certification verified and issued by IACS member.
Planned discharge – Cement	Change in water quality.	10	All cements and additives approved according to chemical discharge assessment process.	**CM3:** Chemical discharge assessment process	22	All cement and additives planned for discharge are evaluated as acceptable in accordance with the chemical discharge assessment process.	Chemical assessment records confirm evaluation of each component making up cement as acceptable prior to use/discharge and appropriate approvals documented. Environmental performance fluid tracking shows cement and additives used.
		11	No discharge of unmixed cement/ no discharge of dry bulk powders.	**CMP5:** Cementing procedures	23	Cementing procedures developed and implemented including no surface or seabed discharge of any dry unmixed cement. Cementing procedure outline the volume of cement to be used and inventory of cement kept on board the JUR is kept to the minimum required for safe execution of the activities. Stock management is undertaken to limit the volume of excess unused cement at the end of the driilling activities in the following order of preference: • effort made to minimise inventory of cement on board • all cement used in the drilling activities with no discharge required • effort to use remaining cement in another Esso operation, if not possible then; • effort made to transfer any remaining cement on board to the next operator and if not possible then; • effort to dispose of remaining cement in last operation, if not possible then; • effort to transfer cement onshore for disposal – subject to feasibility analysis, if not possible then; • minimal volume of cement is mixed into a slurry (<100m^3) and discharged overboard at the end of campaign (wet cement). Discharge to the marine environment will only occur when there are no other safe or technically feasible options.	Cementing procedures developed and implemented. Environmental performance fluid tracking verifies no discharge of unmixed cement. Cement report verifies stock management process and lists volume of any discharge of cement slurry Feasibility analysis completed 6 months prior to end of campaign.
Planned operational discharge – Surface	Change in water quality. Change in habitat.	12	All operational discharges approved according to chemical discharge assessment process.	**CM3:** Chemical discharge assessment process	24	All planned chemical discharges are evaluated as acceptable in accordance with the chemical discharge assessment process.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. Environmental performance fluid tracking shows components of all planned operational discharges.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
		13	Barite to comply with mercury and cadmium specifications		25	When selecting barite, Esso will ensure that the contaminant limit concentrations are at or below the following: • Hg – 1mg/kg (1ppm) dry weight in stock barite. • Cd – 3mg/kg (3ppm) dry weight in stock barite.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. This includes consideration of concentration levels where applicable.
		14	Circulated fluids/tank washings/NaCl brine fluids measured for accepted maximum oil content before discharge.	**CMP6:** Worksite Operations Safety Plan	26	Test result for circulated fluids/tank washings/NaCl brine fluids must be below 1% oil in water by volume to be acceptable for discharge	Test reports document circulated fluids/tank washings/NaCl brine fluids oil in water content measured. Oil in water content of circulated fluids/tank washings/NaCl brine fluids is recorded in environmental performance fluid tracking when discharge occurs.
					27	The rig circulation and solids handling equipment (i.e. Shakers) will be used to maintain the mud system and minimise the required volume used in operations.	Daily mud reports record all volumes of water-based muds used.
					28	Overboard drains from mud tanks classified as "critical valves" i.e. locked and tagged. A Permit to Work will be required to unlock the valves.	Permit to work
Planned operational discharge – Drilling fluid and cuttings	Change in water quality.	15	All operational discharges approved according to chemical discharge assessment process.	**CM3:** Chemical discharge assessment process	29	All planned chemical discharges are evaluated as acceptable in accordance with the chemical discharge assessment process.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. Environmental performance fluid tracking shows components of all planned operational discharges.
		16	Barite to comply with mercury and cadmium specifications		30	When selecting barite, Esso will ensure that the contaminant limit concentrations are at or below the following: • Hg – 1mg/kg (1ppm) dry weight in stock barite. Cd – 3mg/kg (3ppm) dry weight in stock barite.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. This includes consideration of concentration levels where applicable.
		17	Circulated fluids/tank washings/NaCL brine fluids measured for accepted maximum oil content before discharge.	**CMP6:** Worksite Operations Safety Plan	31	Test result for circulated fluids/tank washings/NaCl brine fluids must be below 1% oil in water by volume to be acceptable for discharge	Test reports document circulated fluids/tank washings/NaCl brine fluids oil in water content measured. Oil in water content of circulated fluids/tank washings/NaCl brine fluids is recorded in environmental performance fluid tracking when discharge occurs.
		18	No bulk discharge of NAF		32	To ensure there is no bulk discharge of NAF the folllwing options will be considered, in order of preference • If this well is not the last well in the Esso JUR campaign it will be feasible to keep remaining stock and either store on shore and use in upcoming drilling operations or retain on the JUR while the JUR is under contract. • If Esso does not require the stock for future operations it may be possible to sell the unmixed	Permit to work records Daily reports

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
						stock to the next operator. This will depend on demand and commercial agreements. • Stock on board will be managed to ensure that only the minimum amount required to undertake the successful operation is maintained • Overboard drains from mud tanks classified as "critical valves" i.e. locked and tagged. A Permit to Work (PTW) will be required to unlock the valves.	
		19	No discharge of dry bulk powders (Barite/Bentonite or any other dry powders)		33	• It will be feasible to keep remaining stock and either store on shore and use in upcoming drilling operations or retain on the JUR while the JUR is under contract. • If Esso does not require the stock for future operations it may be possible to sell the unmixed stock to the next operator. This will depend on demand and commercial agreements. Stock on board will be managed to ensure that only the minimum amount required to undertake the successful operation is maintained	Daily reports confirm volume and location of dry bulk stock.
		20	Drilling hole sizes minimised to reduce cuttings to as low as practicable		34	Cuttings will be discharged just below the sea surface resulting in dispersion of the cuttings and residual muds over a larger area as they sink to the seabed.	Daily report confirms cutting discharges
		21	All discharges of cuttings from NAF drilled sections must be below 6.9% residual oil on cuttings dry weight prior to discharge.	**CMP27:** Solids Controls Procedure	35	Solids controls (shakers and/or dryers) to treat cuttings to level below 6.9% residual oil on cuttings dry weight basis averaged over each well section where NAF is used. Frequency of ROC testing will be once every 12 hours.	Retort test reports document ROC measured. Daily drilling well view report shows progressive average ROC for the section being drilled. Actual average ROC per section shows required standard achieved. ROC retort test reports confirm frequency of measurements.
Planned Discharge – Cooling water and reverses osmosis	Change in water quality.	22	Sewage discharges comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex IV requirements.	**CM9:** Class certification	36	JUR and vessels are compliant with MARPOL Annex IV as appropriate to vessel class.	Vessels have class certification verified and issued by International Association of Classification Societies (IACS) member.
		23	All operational discharges approved according to chemical discharge assessment process.	**CM3:** Chemical discharge assessment process	37	All planned chemical discharges are evaluated as acceptable in accordance with the chemical discharge assessment process.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. Environmental performance fluid tracking shows components of all planned operational discharges.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
			Barite to comply with mercury and cadmium specifications		38	When selecting barite, Esso will ensure that the contaminant limit concentrations are at or below the following: • Hg – 1mg/kg (1ppm) dry weight in stock barite. • Cd – 3mg/kg (3ppm) dry weight in stock barite.	Chemical assessment records confirm evaluation of chemical discharges as acceptable prior to use/discharge and appropriate approvals documented. This includes consideration of concentration levels where applicable.
Aspects of unplanned events							
Physical interaction – Marine fauna	Injury/mortality to fauna.	24	No injury or death of megafauna resulting from vessel strike.	**CM8:** Vessel Master	39	Vessel Master is aware of and implements interaction management actions consistent with Part 8 Division 8.1 of the EPBC Regulations, including: • vessels will not knowingly travel faster than 6kn within 300m of a whale or 150m of a dolphin. • vessels will not knowingly get closer than 100m of a whale or 50m of a dolphin. if a cetacean approaches the vessel within the above zones, the vessel will avoid rapid changes in engine speed or direction.	Daily operations reports note when cetaceans were sighted in the caution zone and interaction management actions implemented.
Physical presence - Introduction of IMS	Change in ecosystem dynamics.	25	No introduction, establishment, or translocation of IMS.	**CM23:** Ballast Water Management Plan	40	BWM Plan approved in accordance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention) and guidance (Resolution MEPC.127(53), 2005) (Resolution MEPC.306(73), 2018).	Records show an approved BWM Plan which complies with the BWM Convention requirements, including implementation of D-2 standard, in accordance with the agreed timeline per the Class or flag state of the respective vessel.
				CM24: Ballast Water Management Certificate	41	BWM Certificate approved in accordance with the BWM Convention, including implementation of D-2 standard, as per the agreed timeline.	Records show an approved BWM Certificate which complies with the BWM Convention requirements, including implementation of D-2 standard, in accordance with the agreed timeline per the Class or flag state of the respective vessel.
				CMP7: Ballast water record system	42	BWM record system is maintained in accordance with Regulation B-2 of the Annex to the BWM Convention including: • start and finish coordinates. • actual pumping times • residual volume remaining in the tank at the end of the empty cycle prior to refill (empty refill method only).	Ballast water records.
				CM25: Biosecurity clearance when entering Australian territory	43	Vessel Master to obtain biosecurity clearance to enter Australian Territory through pre-arrival information reported through the Maritime Arrivals Reporting System.	Records confirm biosecurity status.
				CM8: Vessel Master	44	Vessel Master to adhere to Australian BWM requirements (DAWR, 2020) and BWM Convention.	Ballast water records show location of ballast water uptake and discharge.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
				CM26: Invasive Marine Species Risk Assessment Procedure	45	Biofouling risk assessment conducted in accordance with Esso's IMS Risk Assessment Procedure (AUGO-EV-PCE-014) shows low risk.	Biofouling risk assessment record confirms vessel poses low risk of introducing IMS.
				CMP8: Immersible retrievable equipment cleaning	46	All immersible retrievable equipment has been cleaned and/or inspected in accordance with *National Biofouling Guidelines for the Petroleum Production and Exploration Industry* (Department of Agriculture and Water Resources, 2009) prior to commencement of activities at each location.	Records document cleaning and/or inspection of immersible retrievable equipment.
				CMP39: Water jetting activated on spud cans	47	Removal of sediment from spud cans prior to departure from location by using water jets - JUR specific operational procedures in compliance with requirements of with *National Biofouling Guidelines for the Petroleum Production and Exploration Industry* (Department of Agriculture and Water Resources, 2009).	Daily operations reports include records of water jetting spud cans during JUR departure.
Accidental release – Dropped objects	Change in habitat. Change in water quality.	26	No dropped objects which result in disturbance of benthic habitat.	**CMP1:** Pre-activity site inspection	48	Pre arrival geotechnical and geophysical reports are established and confirm the suitability and stability of the ground conditions. ROV seabed survey confirms the proposed location is free from seabed obstacles, including benthic features, identify any pipelines in the area, and ensure that the JUR can be positioned away from any flowlines, umbilicals, hydraulic flying leads/electrical flying leads, jumpers or export lines.	Rig arrival ROV clearance report notes the absence of seabed obstacles.
				CMP10: Crane handling and transfer procedures	49	The crane handling and transfer procedure is in place and implemented by crane operators (and others, such as dogmen).	Completed handling and transfer procedure checklist, Permit to Work and/or risk assessments verify that the procedure is implemented prior to each transfer.
				CMP20: JUR move procedure	50	The approved JUR move procedure details how the rig will be moved onto and moved off location. It includes approach path, communication protocols, Permit to Work arrangements and survey criteria to prevent an impact with subsea assets.	Approved procedure is available on site and utilised. Daily reports confirm that the procedure is followed.
				CM18: Preventative Maintenance System	51	Visual inspection of lifting gear is undertaken every quarter by a qualified competent person (e.g. maritime officer) and lifting gear is tested regularly in line with the PMS.	Inspection of PMS records and lifting register verifies that inspections and testing have been conducted to schedule.
				CM19: Vessel Cargo Securing Manual	52	All support vessel cargo securely fastened or stored during transport in accordance with approved Cargo Securing Manual to prevent loss to sea during support vessel operations.	A completed pre-departure inspection checklist verifies that cargo is securely sea-fastened.
				CMP11: JUR Move Guidance Checklist	53	All JUR cargo securely fastened to or stored during transport in accordance with JUR rig move checklist to prevent loss to sea.	JUR Pre -Move Checklist verifies that cargo is securely sea-fastened.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
Accidental release –Waste	Injury/mortality to fauna and change in habitat.	27	No unplanned overboard release of waste.	**CM9:** Class certification	54	JUR and vessels are compliant with MARPOL Annex V as appropriate to vessel class which includes measures to prevent loss of waste to the ocean such as: • prohibition of discharge of garbage to the sea (other than as permitted for bilge, sewage and food waste) • separation of garbage by recommended types • any receptacles on deck areas, or areas exposed to the weather should be secured on the ship and have lids that are tight and securely fixedall garbage receptacles should be secured to prevent loss, spillage.	Vessels have class certification verified and issued by IACS member.
				CMP12: Garbage Management Plan	55	JUR and vessels have a Garbage Management Plan which identifies the procedures for collecting, storing and disposing of garbage.	Inspection verifies that waste is segregated, stored and handled in accordance with the Garbage Management Plan.
Accidental Release –LOC: Hazardous or non-hazardous substances	Change in water quality.	28	No unplanned release of hazardous or non-hazardous substances to the marine environment.	**CM14:** Procedures for bulk transfer of fluids from support vessels	56	Bulk transfer of fluids from support vessels undertaken in accordance with relevant procedures.	Permit to Work records for liquid bulk transfers.
				CMP13: Design and certification of hoses	57	Transfer hoses shall comprise sufficient floating devices and self-sealing weak-link couplings in the mid-section of the hose string, where required, and suitable pressure rating.	Hose certificate confirms suitable fittings and rating.
				CM18: Preventative Maintenance System	58	The rig transfer hoses are inspected and replaced in accordance with the PMS or when they are visibly degraded.	The rig hose register, and PMS indicate regular inspection and replacement of fuel/chemical/mud hoses.
				CM21: Remotely Operated Vehicle (ROV) pre-post dive checks	59	A ROV pre- and post-dive inspection visually check for leaks.	Records of ROV pre- and post-dive inspection checklist.
				CM22: Remotely Operated Vehicle International Marine Contractors Association Audit	60	ROV installation inspected against IMCA guidelines.	Audit report developed and corrective action(s) managed in accordance with IMCA category rating
				CMP14: Bunding	61	Bulk liquid transfer points and equipment located on deck utilising hydraulic fluids will have primary bunding or sheathing.	Inspection records demonstrate that bulk transfer points and equipment located on deck utilising hydraulic fluids have primary bunding or sheathing.
					62	Chemicals and oils stored on deck are stored within bunded areas.	Inspection records demonstrate that chemicals and oils stored on deck are stored within bunded areas.
				CM20: Shipboard Marine Pollution Emergency Plan	63	MARPOL Annex I specifically require that a SMPEP (or equivalent, according to class) is in place.	Vessel have SMPEP in place.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
Accidental release – LOC: Refined oils (collision)	Injury/mortality to fauna. Change in habitat. Change to the function, interests or activities of other users.	29	No unplanned release of MDO to the marine environment from support vessel collision.	**CM27:** Support vessel approach procedure	64	JUR to coordinate with support vessels to avoid a collision (Refer to Valaris Support Vessel approach procedure) (Valaris, 2021).	Radio operations communications log verifies coordination with approaching vessels have been issued when necessary.
				CM28: Activity Specific Operating Guidelines/Critical Activity Mode procedures	65	ASOG (or Well Specific Operations Criteria)/Critical Activity Mode procedures developed to IMCA standards.	Implementation procedures signed by Vessel Master and available.
				CM29: Support vessel dynamic positioning system	66	All support vessels engaged in DP operations have Class-recognised DP2 or DP3 systems.	Records of IACS member DP Notation, Failure Mode and Effects Analysis, proving trials and Annual Trials.
					67	Watchkeepers in charge of watch hold DP certification.	Watchkeepers' DP certificates available.
				CM36: Pre-start notifications	68	AMSA JRCC notified before operations commence to enable AMSA to distribute an AUSCOAST warning.	Records confirm that information to distribute an AUSCOAST warning was provided to the JRCC before operations commenced. Issued AUSCOAST warning dated prior to, or on the date operations commenced.
					69	AHO notified before operations commence to allow generation of navigation warnings (including Notice to Mariners).	Issued Notice to Mariners dated prior to, or on the date operations commenced.
					70	Commercial fisheries are notified of activities via the ongoing quarterly engagement forum.	Minutes of engagement forums confirm upcoming activities discussed.
				CM20: Shipboard Marine Pollution Emergency Plan	71	Relevant persons are notified of activities approximately four weeks and again one week prior to commencement.	Relevant persons consultation records confirm that information was distributed to relevant persons in the required timeframes.
					72	MARPOL Annex I specifically require that a SMPEP (or equivalent, according to class) is in place.	Vessels have class certification verified and issued by IACS member.
			Minimise the impact on the environment of an MDO spill.	**CM12:** Oil Pollution Emergency Plan	73	Capability is maintained to ensure OPEP can be implemented in response to an incident, as expected. Emergency response activities will be implemented in accordance with the OPEP.	Test records confirm that emergency response capability has been maintained in accordance with that described in Attachment 2 ERP and the OPEP. Records confirm that emergency response activities have been implemented in accordance with the OPEP.
				CM35: Operational and Scientific Monitoring Plan (OSMP)	74	Capability is maintained to ensure the OSMP can be implemented in response to an incident, as expected. Operational and scientific monitoring will be implemented in accordance with the OSMP.	Test records confirm that emergency response capability has been maintained in accordance with that described in the OSMP. Records confirm that emergency response activities have been implemented in accordance with the OSMP.
Accidental release – Reservoir hydrocarbons (LOWC)	Injury/mortality to fauna. Change in habitat.	30	Maintain well control such that reservoir hydrocarbons are not released to the marine environment.	**CMP1:** Pre-activity site inspection	75	Pre arrival Geotechnical and Geophysical reports are established and confirm the suitability and stability of the ground conditions. • ROV seabed survey confirms the proposed location is free from seabed obstacles, including benthic	Rig arrival ROV clearance report notes the absence of seabed obstacles.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
	Change to the function, interests or activities of other users.					features, identify any pipelines in the area, and ensure that the JUR can be positioned away from any flowlines, umbilicals, hydraulic flying leads/electrical flying leads, jumpers or export lines.	
				CMP20: JUR move procedure	76	• The approved JUR move procedure details how the rig will be moved onto and moved off location. It includes approach path, communication protocols, Permit to Work arrangements and survey criteria to prevent an impact with subsea assets.	Approved procedure is available on site and utilised. Daily reports confirm that the procedure is followed.
				CM18: Preventative Maintenance System (PMS)	77	PMS ensures that Pressure Control Equipment (PCE) and control systems are maintained, to enable reliable performance.	Records show routine completion of maintenance in accordance with PMS.
				CMP19: Pressure Control Equipment testing (PCE)	78	PCE is tested before deployment on each well.	Records show that PCE has successfully passed PCE test prior to deployment of the PCE and subsequent tests as per WOMP.
				CM32: NOPSEMA Accepted Well Operations Management Plan	79	The NOPSEMA accepted WOMP describes how the risks to the integrity of the wells will be reduced to ALARP. This includes: • that two barriers have been maintained • that barrier integrity is tested and verified. That the wells are left in a safe state prior to JUR departure.	Records confirm a NOPSEMA-accepted WOMP was in place before operations commence. Records demonstrate that the drilling and completion has been completed in accordance with the WOMP.
				CM34: NOPSEMA accepted Safety Case	80	The NOPSEMA accepted JUR Safety Case demonstrates how the risks to the integrity of the wells will be reduced to ALARP, including: • planned maintenance of pressure well control equipment • testing of well control equipmentvalidation of activity specific safety critical equipment.	Records confirm a NOPSEMA-accepted JUR Safety Case was in place before operations commenced. Records demonstrate that operations have taken place in accordance with processes described in the Safety Case.
				CMP16: Well drilling and completion design	81	Drilling and completion procedures consider well and completion design, fluid selection and formation pressures to ensure that there are two barriers in the well at any time. Procedures signed off at appropriate level of management.	Well-specific drilling and completion procedures have been signed off by the Wells Engineering Supervisor and Wells Operations Superintendent. Changes to the approved procedures are managed by MOC.
				CMP17: Esso approved procedures	82	Procedures consider well and completion design, fluid selection and formation pressures to ensure that there are two barriers maintained at any time.	Approved procedures are available onsite and distributed to Esso and JUR leadership. Daily reports confirm that these procedures are followed.
				CMP18: Evaluation of reservoir properties	83	Risk profiling, well and completion design are peer reviewed and approved by appropriate levels of management. Each well is subject to this process and considers reservoir properties for placement of barriers.	Well program is reviewed and approved by Wells Engineering Supervisor and Wells Operations Superintendent.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
				CM12: OPEP	84	Capability is maintained to ensure OPEP can be implemented in response to an incident, as expected. Emergency response activities will be implemented in accordance with the OPEP.	Test records confirm that emergency response capability has been maintained in accordance with that described in Attachment 2 and the OPEP. Records confirm that emergency response activities have been implemented in accordance with the OPEP.
			Minimise the impact on the environment from a LOWC.	**CM35:** OSMP	85	Capability is maintained to ensure OSMP can be implemented in response to an incident, as expected. Operational and scientific monitoring will be implemented in accordance with the OSMP.	Test records confirm that emergency response capability has been maintained in accordance with that described in the OSMP. Records confirm that emergency response activities have been implemented in accordance with the OPEP.
				CMP22: Source Control Emergency Response Arrangements included in the Australia Wells Tier II/III Emergency Response Plan	86	Source control emergency response arrangements consistent with IOGP Report 594 (IOGP, 2019) will be in place prior to commencement of drilling Activities. Source control emergency response arrangements includes: • Subsea First Response Toolkit • requirements for (including logistics plan)drilling a relief well (if required).	Check/gap analysis against the requirements of IOGP Report 594 (IOGP, 2019). Contracts with third-party provider for well construction material, as well as logistics contracts are in place for this campaign.
				CMP23: Availability of suitable MODU to drill relief well	87	• Availability of MODU to meet minimum requirements/ specifications for the MODU (to drill relief well).	Status and location of suitable MODU to drill relief well identified 30 days prior to drilling activity commencing on first well and on a monthly basis throughout the campaign.
				CMP24: Availability of resources to meet relief well timeframe commitments	88	In the unlikely event that there is no suitable MODU available, or information becomes available to Esso or its JUR contractor to indicate that resources may be required beyond those identified in the Australia Wells Tier II/III ERP to allow a relief well to be drilled in the committed 98-day timeframe, the well activities will be made safe and any further activities will be suspended until such time as the activity can comply with this EP or the EP is resubmitted and accepted.	Records of tracking process indicate that a suitable MODU were available/identified throughout the activity.
				CM51: Utilisation of idle fishing vessels	89	Opportunities to utilise idle fishing vessels for oil spill response and monitoring activities will be taken where there is agreement of the vessel owner and where a risk assessment shows that there are no additional risks to vessels and crew.	Esso IMT records reflect communications with fishing industry looking for opportunities to utilise idle fishing vessels.
			Minimise the impact on commercial fisheries from a LOWC.	**CM52:** Communication with fisheries	90	Should a spill occur, then updates on oil spill response and monitoring will be provided to fishery representative bodies (through SETFIA) to enable accurate information on spill status, impacts and effects on seafood safety to be provided to fishing industry members and the public. Daily updates provided in the first week until the modelling is completed and then as needed, until relief well completed (and beyond if there is ongoing concern).	Relevant persons consultation records show communication with SETFIA per the performance standard.

Aspect	Impact	EPO Number	EPO	Control	EPS Number	EPS	Measurement criteria
			Minimise impact on platform activities and prevent LOWC	**CMP34:** SIMOPS Procedure	91	SIMOPS procedure will be in place to ensure ongoing communication and arrangements are known and understood between the Marlin platform operations and the JUR activities.	SIMOPS Procedure

Table H-2 Environmental performance – Emergency response capability

EPO	Control	#	EPS	Measurement criteria
Esso IMT is available to respond as required to coordinate spill response operations in a timely manner to minimise impact to the environment.	Esso IMT.	92	Trained personnel are available to fulfil Incident Commander, Operations Section Chief, Planning Section Chief, Logistics Section Chief, Safety Officer and Environmental Unit Lead roles with 1 hour of Esso IMT activation.	Capability is demonstrated during test/drill and is documented in test/drill report. Training records.
		93	ExxonMobil's Regional Response Team (RRT) support is available for a Tier III response in: • <12 hours from notification for remote support • <72 hours for in country support.	Capability is demonstrated during test/drill and is documented in test/drill report.
		94	A minimum of four Esso Australia personnel will be provided initial IMT oil spill training, in the Incident Command function, using the IMO3 training course.	Offshore IMT staffing list is maintained (ERM V0). Records of training
		95	A minimum of 10 Esso Australia personnel will be provided initial IMT oil spill training to fulfill Section Chief roles, using the IMO2 training course.	Offshore IMT staffing list is maintained (ERM V0). Records of training
		96	A minimum of 12 Esso Australia personnel will be provided IMT training to fulfill supporting IMT roles, using the PMAOMIR322 course.	Offshore IMT staffing list is maintained (ERM V0). Records of training
	Agreement in place with AMOSC, OSRL and OSMP service provider to facilitate access to trained personnel.	97	Esso will have required contracts, agreements, and memberships with AMOSC in place to support incident management.	Agreement with AMOSC Agreement with OSRL Agreement with OSMP service provider
	ExxonMobil maintains agreement with The Response Group and Ambipar Response	98	ExxonMobil maintains agreement with The Response Group and Ambipar Response to provide global incident response capability.	Agreement with The Response Group Agreement with Ambipar Response
	Members of the Offshore IMT participate IMT drills or exercises to maintain competency.	99	Offshore IMT members participate in scheduled drills and exercises.	Exercise records
Source control equipment is available when required to prevent further uncontrolled release of hydrocarbons into the marine environment.	Agreements in place with ROV specialist.	100	Current global agreements state that a ROV appropriate to the task will be available. Estimated 5 days from call out request to arrive in Victoria.	Current global agreement document.
	Support vessel identification process.	101	Suitable support vessels and their location during the activity will be identified prior to rig activities.	Completed register in the Tier II/III ERP.
	Agreements with the AMOSC for Subsea First Response Toolkit.	102	Agreements with AMOSC for Subsea First Response Toolkit.	Annual review of agreement document.

EPO	Control	#	EPS	Measurement criteria
	Memorandum of Understanding with AEP.	103	Current AEP Memorandum of Understanding states that signatories will make best endeavours to make drilling units available for transfer between operators when requested for emergency response.	Memorandum of Understanding document.
Equipment and third-party services are available to complete oil spill surveillance and monitoring when required to gather information on the extent, severity and persistence of the oil and potential sensitivities at risk.	Helicopter fleet.	104	A helicopter is available to complete surveillance and monitoring in <4 hours of request, subject to safe flying conditions. (Note: Assumes good visibility, daylight hours and suitable flying conditions).	Capability is demonstrated during test/drill and is documented in test/drill report.
	Arrangements with third-party for provision of fixed wing aircraft.	105	Third-party fixed wing aircraft will be available <24 hours from request of service.	Capability is demonstrated during test/drill and is documented in test/drill report.
	Support vessel.	106	Support vessel is available to complete surveillance and monitoring in <24 hours from request of service.	Capability is demonstrated during test/drill and is documented in test/drill report.
	Agreement with third-party suppliers for provision of additional vessels.	107	Current agreement states additional vessels will be available when requested.	Agreement document.
	Agreement with AMOSC for trajectory modelling.	108	Trajectory modelling is through AMOSC within <4 hours of service request.	Agreement document.
	Tracking buoys.	109	Tracking buoy is available to complete surveillance and monitoring within 12 hours of spill occurring subject to safe conditions.	Functionality is demonstrated during test/drill and is documented in test/drill report.
	Contract with satellite imagery provider.	110	Current agreement with satellite imagery provides 24/7 emergency response support.	Agreement document.
	Esso initial response sampling kits.	111	Esso initial response sampling kit with required equipment is available when required. Samples obtained <24 hours of spill occurring subject to safe conditions.	Functionality is demonstrated during test/drill and is documented in test/drill report.
	Agreement with service provider for monitoring and sampling.	112	Monitoring and sampling service provider has capability to implement the Bass Strait OSMP.	Annual capability review.
Equipment and personnel available to support shoreline protection and clean-up when requested to reduce oil impact on shoreline environmental sensitivities.	Agreement with third-party Bass Strait OSMP-implementation consultant.	113	Esso will have required contract in place to enable access to personnel and resources required for implementation of the Bass Strait OSMP in the timeframe described in Attachment 2 (Table 7-10).	Current agreement in place for Bass Strait OSMP-implementation consultant. Capability testing conducted and recorded.
	Annual review of agreement with third-party suppliers for provision of vessels.	114	Esso will have required contracts in place to enable access to vessels needed for shoreline protection in the timeframe described in Attachment 2 (Table 7-10).	Current agreement in place for vessels which meets standard. Capability testing conducted and recorded.
	Esso/AMOSC response equipment.	115	Equipment is maintained in accordance with maintenance strategy. Equipment is available for deployment within 24 hours.	Monthly exception reports show any overdue maintenance, inspection, and/or testing tasks with actions signed-off by the appropriate level of operations management. Capability is demonstrated during test/drill and is documented in test/drill report.
	Agreement in place with AMOSC.	116	Esso will have required contracts, agreements and memberships with AMOSC in place to provide oil spill response equipment and personnel in timeframe described in Attachment 2 (Table 7-10).	Contracts, agreements or memberships that demonstrate access to spill response equipment and personnel.
	Annual assurance assessment of AMOSC capabilities.	117	Response capabilities maintained per AMOSC Service Level Statement.	Annual assurance assessment report.

EPO	Control	#	EPS	Measurement criteria
	Personnel hiring agreements.	118	Current agreements in place with labour hiring companies.	Agreement documents.
	Agreement with waste management contractor.	119	Current contract in place for onshore waste management in timeframe described in Attachment 2 (Table 9-6).	Agreement contract. Capability is demonstrated during test/drill and is documented in test/drill report.
	Agreement with contractor for heavy plant equipment.	120	Current agreement in place with contractor for heavy plant equipment. Equipment is available for deployment within 48 hours.	Agreement documents. Capability is demonstrated during test/drill and is documented in test/drill report.
Equipment and personnel to support oiled wildlife response are available when requested to monitor, evaluate and reduce environmental impact on fauna.	Agreement in place with AMOSC.	121	Esso will have required contracts, agreements and memberships with AMOSC in place to provide oiled wildlife response equipment and personnel per Attachment 2 (Table 8-6) for deployment within 24 hours.	Contracts, agreements or memberships that demonstrate access to oiled wildlife response equipment and personnel.
	Annual assurance assessment of AMOSC capabilities.	122	Response capabilities maintained per AMOSC Service Level Statement.	Annual assurance assessment report.
	Agreement in place with OSRL.	123	Esso will have required contracts, agreements and memberships with OSRL in place to provide oiled wildlife response equipment per Attachment 2 (Table 8-6) for mobilisation to Melbourne within 72 hours.	Contracts, agreements or memberships that demonstrate access to oiled wildlife response equipment and personnel.
	ExxonMobil's RRT.	124	ExxonMobil RRT Oiled Wildlife Response Core team personnel are available for remote support within 12 hours and in country support within 72 hours.	Capability is demonstrated during test/drill and is documented in test/drill report.
	Agreement with waste management contractor.	125	Current contract in place for onshore waste management. Equipment is available for deployment within 48 hours.	Contract agreement. Capability is demonstrated during test/drill and is documented in test/drill report.
Equipment and personnel to manage waste are available when requested to reduce secondary contamination impacts on shoreline environmental sensitivities.	Annual review of agreement with third-party suppliers for provision of vessels.	126	Esso will have required contracts in place to enable access to vessels needed for waste management in the timeframe described in Attachment 2 (Table 7-10).	Current agreement in place for vessels which meets standard. Capability testing conducted and recorded.
	Agreement in place with AMOSC.	127	Esso will have required contracts, agreements and memberships with AMOSC in place to provide oil spill response equipment and personnel, and waste management resources in timeframe described in Attachment 2 (Table 9-8).	Contracts, agreements or memberships that demonstrate access to spill response equipment and personnel.
	Annual assurance assessment of AMOSC capabilities.	128	Response capabilities maintained per AMOSC Service Level Statement.	Annual assurance assessment report.
	Agreement with waste management contractor.	129	Current contract in place for onshore waste management in timeframe described in Attachment 2 (Section 9.3.1).	Agreement contract. Capability is demonstrated during test/drill and is documented in test/drill report.
	Personnel hiring agreements.	130	Current agreements in place with labour hiring companies.	Agreement documents.
	Agreement with contractor for heavy plant equipment.	131	Current agreement in place with contractor for heavy plant equipment. Equipment is available for deployment within 48 hours.	Agreement documents.

Appendix I: JASCO Sound modelling Report

Esso Bass Strait Operations Modelling

Assessing Marine Fauna Sound Exposures

JASCO Applied Sciences (Australia) Pty Ltd

28 March 2023

Submitted to:

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Executive Summary

JASCO Applied Sciences (Australia) performed a modelling study of underwater acoustic noise levels related to Esso's base business operations and future decommissioning operations in Bass Strait. This study considers the operation of Esso's Barracouta (BTA) and Kingfish B (KFB) production platforms, the operation of a generic production platform, and the operations associated with a future drilling campaign involving a generic jack-up rig. These operations were modelled with three similar classes of vessels: an offshore supply vessel (OSV), a multi-purpose supply vessel (MPSV), and an attendant vessel (representing a non-specific offshore vessel attending a platform or drill rig). The OSV and MPSV were modelled while alongside the production platforms, using dynamic positioning (DP) system to keep station. The OSV was also modelled alone, using DP while away from the platforms. The attendant support vessel was modelled supporting the jack-up drilling rig, and was considered in standby near the rig, transiting through a defined standby box near the jack-up rig; in total 17 scenarios were modelled.

The results are presented as distances from the platform, vessel or drill rig at which underwater sound levels reached thresholds associated with potential injury and behavioural response in marine mammals. The primary species of interest are pygmy blue, southern right and humpback whales, common and bottlenose dolphins, and Australian fur seals, therefore the functional hearing groups considered were for low- and high-frequency cetaceans and other carnivores (including otariids) in water.

Further to the Noise Monitoring Study conducted in March-April 2021 (McPherson et al. 2022), distances to the pertinent sound level thresholds were modelled for the BTA and KFB platforms on their own, with one attendant vessel (the *Skandi Feistein*) and with two attendant vessels (the *Skandi Feistein* and the *MMA Leeuwin*, Scenarios 1–6). The results show that noise levels from production platforms in isolation do not produce noise levels high enough for potential injury, and the distances to the behavioural response threshold are relatively small (30 m at BTA; 55 m at KFB). The presence of attendant vessels under DP (*Skandi Feistein* and *MMA Leeuwin*) close to the platforms, however, results in TTS exceedance up to 290 m from the platform, with PTS not predicted. The distances to potential behavioural response increase significantly with the presence of attendant vessels: up to 2.16 km at the KFB platform with two attendant vessels.

Results at the BTA platform were compared to results from the modelling study for the Esso Seahorse/Tarwhine Plug and Abandonment (P and A) Campaign (McPherson and Koessler 2020). In general, the distances to the effect thresholds were greater in the prior study than at the BTA platform. This can be attributed to two main factors: the difference in the jack-up rig versus production platform MSL spectra, and the difference in the attendant vessel spectra.

The second set of scenarios (Scenarios 7 to 12) assesses distances associated with an offshore supply vessel (OSV) alone under DP, the platforms with a Multi-Purpose Supply Vessel (MPSV) under DP permanently alongside, and the platforms with an MPSV plus an OSV both under DP alongside for periods of 1 and 2 h. The results show that the distance to potential TTS to marine mammals around the OSV is similar to the length of the vessel when that vessel is stationary for 24 h; the distance to behavioural response is on the order of 555 m. The presence of the MPSV at the platform results in short distances to potential PTS (up to 60 m) and TTS (up to 380 m) only on the side of the platform the vessel is on; distances are shorter or nil in the other directions. The presence of the OSV for periods of 1 to 2 h does not significantly change the distances to potential PTS and TTS, and increases the distance for behavioural response by up to 300 m (from 2.4 to 2.7 km at the KFB platform).

Results from this second set of scenarios show longer distances to injury and behavioural response thresholds than the first set of scenarios because the monopole sound level (MSL) spectra used to represent the vessels was derived from monitoring of the vessel under DP in isolation to the platforms. This is contrast to using the combined measurements of vessels and platforms together (the vessel

being at the platform). This because the applied power, or the maximum continuous rating (MCR) level used by the vessels operating close a platform was likely lower than while operating at DP, away from any platform. Results for Scenarios 7 to 12 are therefore considered realistically conservative.

The third set of scenarios (Scenarios 13 to 15) considers a generic production platform in isolation, with an MPSV permanently alongside under DP, and with an MPSV permanently alongside plus an OSV alongside for periods of 1 and 2 h under DP. Results show no potential for marine mammal PTS or TTS, and potential behavioural response up to 30 m from the platform in isolation. The presence of the MPSV and the OSV resulted in distances to low-frequency cetacean TTS and marine mammal behavioural thresholds that are similar, but slightly longer than those estimated for the KFB platform in the second set of scenarios. This increase in distances is partly due to the difference in water depth between the two locations.

The last set of scenarios in this study (Scenarios 16 and 17) relates to a future drilling campaign; they represent drilling operations at the jack-up rig, with an attendant vessel (an offshore support vessel similar to the *Skandi Feistein*) standing by in a nominal 2 km × 4 km box under slow transit, 500 m from the rig. The last scenario adds an OSV under DP (again similar to the *Skandi Feistein*) performing resupply alongside the rig for periods of 2 and 8 h. The results show distances to potential TTS of up to 190 m around the rig for low-frequency cetaceans. This distance is only slightly influenced by the presence of an OSV and does not change with the location of the attendant support vessel. The distance to behavioural response threshold, however, is largely influenced by the location of the vessel in relation to the jack-up rig; it varied between 2.95 and 3.70 km when the support vessel was at its closest and farthest location from the rig.

1. Introduction

JASCO Applied Sciences (Australia) performed a modelling study of underwater acoustic noise levels related to Esso's base business operations and future decommissioning operations in Bass Strait. The modelling study considered the operation of Esso's Barracouta (BTA) and Kingfish B (KFB) production platforms, the operation of a generic production platform, and the drilling operation of a generic jack-up rig. These operations were modelled with three similar classes of vessels: an offshore supply vessel (OSV), a multi-purpose supply vessel (MPSV), and an attendant vessel (representing a non-specific offshore vessel attending a platform or drill rig). The OSV and MPSV were modelled while alongside the production platforms, using dynamic positioning (DP) system to keep station. The OSV was also modelled alone, using DP while away from the platforms. The attendant support vessel was modelled supporting the jack-up drilling rig, and was considered in standby near the rig, transiting through a defined standby box near the jack-up rig. For these operations, the noise levels at the source were based on measurements obtained during a Noise Monitoring Study conducted in March-April 2021 (McPherson et al. 2022). The likely impact of simultaneous underwater cutting activities on the modelled results is also discussed; this type of activity was not measured during the Noise Monitoring Study. The modelled scenarios are detailed in Section 1.1.

The modelling study predicted the distances from the platform or rig at which underwater sound levels reached thresholds associated with potential injury and behavioural response in marine mammals. The primary species of interest are pygmy blue, southern right and humpback whales, common and bottlenose dolphins and Australian fur seals, therefore the functional hearing groups considered were for low- and high-frequency cetaceans and otariids. The marine mammal noise effect criteria used in this study are discussed in Section 2.

In this report, Section 3 summarises the methods and parameters used to model the sound fields. Section 4 presents the results as tables of distances to sound level thresholds associated with the possibility of permanent threshold shift (PTS), temporary threshold shift (TTS) and behavioural response. Maps are also used to show the noise footprints associated with the modelled activities. Section 5 discusses the results; a comparison between the presented results and previous modelling estimates is included. More details about the terminology used in this report can be found in the Glossary or in Appendix A; more details about the methodology used is provided in Appendix B.

1.1. Modelling Scenarios

Bass Strait is located off the Gippsland coast, south-eastern Australia; Figure 1 shows an overview of the study area. The BTA platform lies 26 km off the coast in 46 m water depth, and the KFB platform is located approximately 78 km offshore in 76 m water depth.

Further to the Noise Monitoring Study conducted in March-April 2021 (McPherson et al. 2022), distances to the pertinent sound level thresholds (listed in Section 2) were modelled for the BTA and KFB platforms on their own (Scenarios 1 and 4), with one attendant vessel (*Skandi Feistein*) under DP (Scenarios 2 and 5), and with two attendant vessels (*Skandi Feistein* and *MMA Leeuwin*) under transit (Scenarios 3 and 6). For these first six scenarios, listed in Table 1, the acoustic source was modelled at the centre of the platform. The source levels were derived during the Noise Monitoring Study (McPherson et al. 2022). These levels represent the sound emitted from all sources in each scenario (i.e., the platform and one or two attendant vessels in proximity to the platform in Scenarios 2, 3, 5 and 6). In Section 5.1.1, the results from these scenarios are compared to those from JASCO's modelling study for the SHA/TWA P&A campaign (McPherson and Koessler 2020).

The second set of scenarios (Scenarios 7 to 12; Table 1) are used to assess distances associated with a solo Offshore Supply Vessel (OSV) under DP (the *Skandi Feistein*), the platforms with a Multi-Purpose Supply Vessel (MPSV) under DP permanently alongside, and the platforms with an MPSV plus an OSV alongside. The layout used for modelling the platform with one or two vessels alongside is presented in Figure 2. While the MPSV (vessel 1 in Figure 2) is assumed alongside for at least 24 h, the OSV is assumed stationary under DP (away from the platform) for periods of 2 h and 24 h (Scenarios 7 and 10), and alongside the platform (vessel 2 in Figure 2) for periods of 1 h and 2 h (Scenarios 9 and 12).

A generic production platform is considered in the third set of scenarios (Scenarios 13 to 15; Table 1). The acoustic source levels for this platform were derived from the analysis of the spectra for the BTA and KFB platforms, and it was located between the BTA and BTA and KFB platforms, in 60 m of water. Here again, the platform was modelled alone (Scenario 13), with one OSV under DP permanently alongside (Scenario 14) and with two OSVs under DP alongside, the second being there for a duration of 1 and 2 h. The same sound source layout as for Scenarios 7 to 12 was used (see Figure 2).

The last set of scenarios (Scenarios 16 and 17) are related to a future drilling campaign and considers the drilling operations of a jack-up rig, an attendant support vessel and a supply vessel. Here, the attendant support vessel is assumed to be keeping station within a nominal 2 km × 4 km box, just outside the 500 m zone around the jack-up rig, whilst the OSV under DP is assumed alongside the rig (vessel 1 in Figure 2) for periods of 2 h and 8 h.

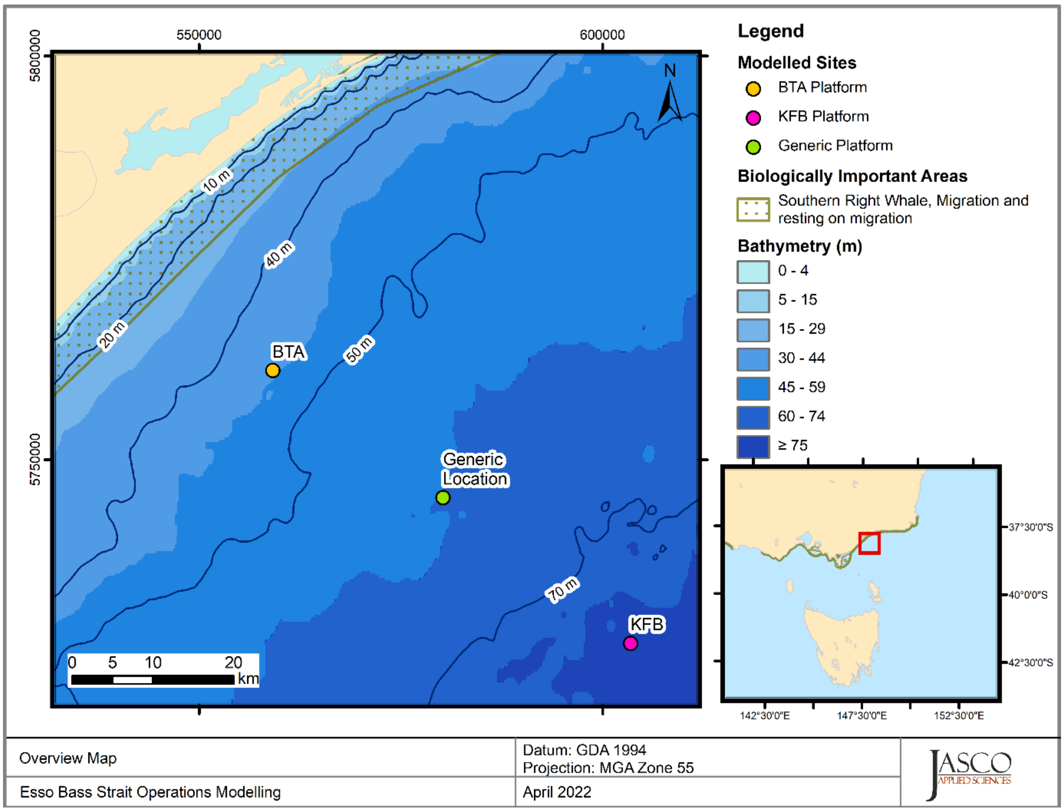


Figure 1. Overview of the Esso Bass Strait Operations modelling study area.

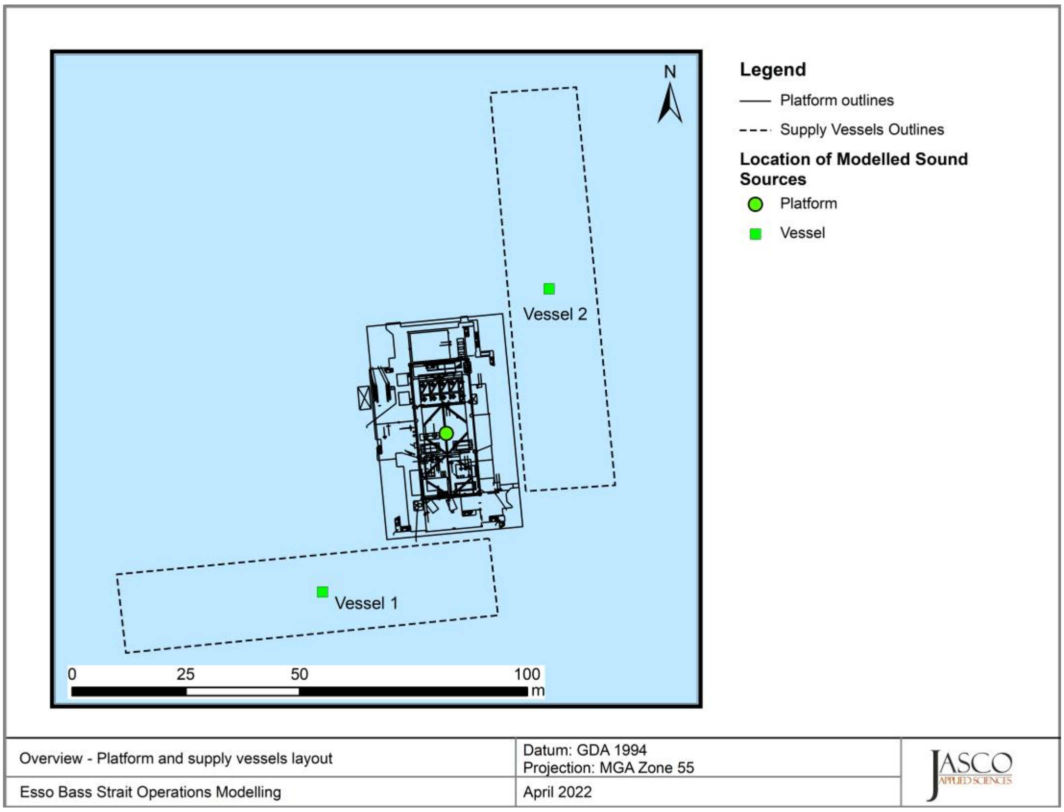


Figure 2. Layout used in modelling a platform with one and two vessels alongside. Vessel 1 is the MPSV and Vessel 2 is the OSV, both vessels are under DP.

Table 1. List of modelled scenarios. BTA: Barracouta platform; KFB: Kingfish B platform; OSV: offshore supply vessel; MPSV: multi-purpose supply vessel.

Scenario			Main sound source location			
Group	#	Description	Name	Latitude, Longitude	Easting, Northing UTM Zone 55S	Water depth (m)
Platforms with/without one or two attendant vessels	1	BTA platform	BTA	38° 17' 47.796" S, 147° 40' 33.708" E	559114, 5761059	44
	2	BTA platform with one attendant vessel				
	3	BTA platform with two attendant vessels				
	4	KFB platform	KFB	38° 35' 49.524" S, 148° 11' 17.124" E	603462, 5727264	75
	5	KFB platform with one attendant vessel				
	6	KFB platform with two attendant vessels				
Supply vessel alone, platforms with one and two vessels	7	OSV stationary for 2 and 24 h periods, no platform included	BTA area	38° 19' 34.586" S, 147° 42' 39.964" E	562156, 5757744	49
	8	BTA platform with MPSV permanently alongside	BTA	38° 17' 47.796" S, 147° 40' 33.708" E	559114, 5761059	44
	9	BTA platform with an MPSV permanently alongside and an OSV alongside for 1 and 2 h periods				
	10	OSV stationary for 2 and 24 h periods, no platform included	KFB area	38° 33' 32.332" S, 148° 10' 13.724" E	601982, 5731513	76
	11	KFB platform with MPSV permanently on location	KFB	38° 35' 49.524" S, 148° 11' 17.124" E	603462, 5727264	75
	12	KFB platform with an MPSV permanently on location and an OSV on station for 1 and 2 h periods				
Generic platform with/without supply vessels	13	Generic platform	Generic location between BTA and KFB	38° 26' 12.581" S, 147° 55' 08.855" E	580217, 5745316	60
	14	Generic platform and MPSV vessel permanently alongside				
	15	Generic platform with an MPSV permanently on location and an OSV on station for 1 and 2 h periods				
Jack-up rig and attendant vessel with/without supply vessel	16	Jack-up rig drilling and an attendant support vessel permanently on location	Generic location between BTA and KFB	38° 26' 12.581" S, 147° 55' 08.855" E	580217, 5745316	60
	17	Jack-up rig drilling with an attendant support vessel permanently on location and a supply vessel alongside for 2 and 8 h periods				

2. Marine Mammal Noise Effect Criteria

To assess the potential effects of a sound-producing activity, it is necessary to first 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 period. Appropriate subscripts indicate any frequency weighting applied (see Appendix A.4). The acoustic metrics in this report reflect the ANSI and ISO standards for acoustic terminology, ANSI S1.1 (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 sound sources.
2. Marine mammal behavioural threshold based on the current interim US 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.

Section 2.1 and Appendix A.3 expand on the thresholds for marine mammals.

2.1. Marine Mammals

The criteria applied in this study to assess possible effects of non-impulsive on marine mammals are summarised in Table 2. Cetaceans were identified as the hearing group requiring assessment. Details on thresholds related to auditory threshold shifts or hearing loss and behavioural response are provided in Appendix A.3, with frequency weighting explained in detail in Appendix A.4. Of particular note, whilst the newly published 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 2. Criteria for effects of non-impulsive noise exposure, including vessel noise, for marine mammals: Unweighted SPL and SEL_{24h} thresholds.

Hearing group	NOAA (2019)	Southall et al. (2019)	
	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 µPa²·s)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)
Low-frequency (LF) cetaceans	120	199	179
High-frequency (HF) cetaceans		198	178
Other carnivores (including otariids) in water		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 µPa²·s.

2.1.1. Behavioural Response

The NMFS non-pulsed noise criterion was selected for this assessment because it represents the most commonly applied behavioural response criterion by regulators. The distances at which behavioural responses could occur were therefore determined to occur in areas ensonified above an unweighted SPL of 120 dB re 1 µPa (NMFS 2014, NOAA 2019). Appendix A.3 provides more information about the development of these criteria.

2.1.2. Injury and Hearing Sensitivity Changes

There are two categories of auditory threshold shifts or hearing loss: permanent threshold shift (PTS), a physical injury to an animal's hearing organs; and temporary threshold shift (TTS), a temporary reduction in an animal's hearing sensitivity as the result of receptor hair cells in the cochlea becoming fatigued.

To assist in assessing the potential for effect on marine mammals, this report applies the criteria recommended by Southall et al. (2019), considering both PTS and TTS (see Table 2). Appendix A.3 provides more information about the Southall et al. (2019) criteria.

3. Methods and Parameters

JASCO's Marine Operations Noise Model (MONM-BELLHOP), in combination with the various operations' source level spectra, was used to predict the site-specific underwater acoustic sound fields. This section provides a high-level description of the model inputs. It is divided into subsections detailing the sound sources considered, the applied modelling technique and the project-specific configuration. The terminology used is defined in the Glossary and in Appendix A. More details about the methods and the input parameters can be found in Appendix B.

3.1. Sound Sources

In this study, operational underwater sound is produced by production platforms, vessels, and a jack-up drill rig. The various monopole source level (MSL) spectra used to model the 17 scenarios and their provenance are described in Sections 3.1.1 to 3.1.3.

3.1.1. Production Platforms

The equipment operating onboard any platform can contribute to underwater sound; it is expected that the dominant pathway for sound generation is structure-borne (i.e., vibration from machinery passing through the legs or hull) as opposed to air-born (Spence et al. 2007). Fixed platforms and jack-up rigs have lower radiated sound levels than floating platforms (Spence et al. 2007). The equipment on floating platforms can be located below the water line, while the machinery on elevated platforms is located above the waterline. Underwater noise produced from platforms standing on metal jack-up legs is also lower given the small surface areas available for sound transmission compared to that of the hull of a floating platform.

3.1.1.1. BTA and KFB Platforms

The BTA platform is a fixed installation consisting of an eight-legged steel piled jacket with 10 conductor slots; the Kingfish B platform is a fixed installation consisting of an eight-legged steel piled jacket with 21 conductor slots. During the monitoring program (McPherson et al. 2022), the BTA and KFB platforms operated normally. The monopole source level spectra for the platforms in isolation were derived during the monitoring project; these spectra (see Figure 3) were used in scenarios 1 (BTA) and 4 (KFB), as well as Scenarios 7 to 9 (BTA) and 10 to 12 (KFB).

The spectral levels for the BTA platform (broadband MSL of 150.1 dB re 1 μPa; 20 Hz to 63 kHz) present higher levels at for higher frequencies (≥ 10 kHz) which is likely due to the sound of snapping shrimps. On the other hand, the KFB platform (broadband MSL of 153.2 dB re 1 μPa; 20 Hz to 63 kHz) presents higher levels at low frequencies (< 80 Hz), likely due to mooring flow noise.

As for the back propagation of the received levels in the monitoring project, the monopole sound sources representing the platforms in this study were placed in the middle of the water column, that is, at 22 m for the BTA platform and 38 m for the KFB platform.

Distances to PTS, TTS, and behavioural thresholds were also calculated for the platforms in operation with one and two attendant vessels in the vicinity of the platforms (Scenarios 2, 3, 5 and 6). For these scenarios, the source level spectrum for the platform in isolation (used for Scenarios 1 and 4) was replaced by the MSL spectrum representing all sound sources, i.e., the platform plus one or two attendant vessels, which were also derived during the monitoring project (McPherson et al. 2022). The first attendant vessel was the *Skandi Feistein* and the second was the *MMA Leeuwin* (extended details are provided in Section 3.1.2). In these scenarios, since the vessels are the main sources of sound, the modelled monopole source was located at 3.6 m, the mean depth at which cavitation would occur for recorded vessels. Figure 3 compares these spectra to the spectrum for the BTA (left) and KFB (right) platforms in isolation.

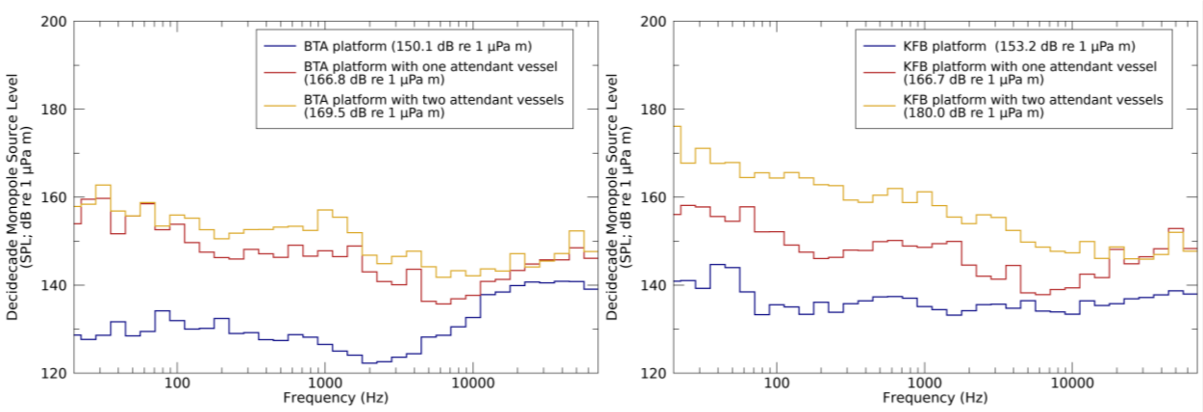
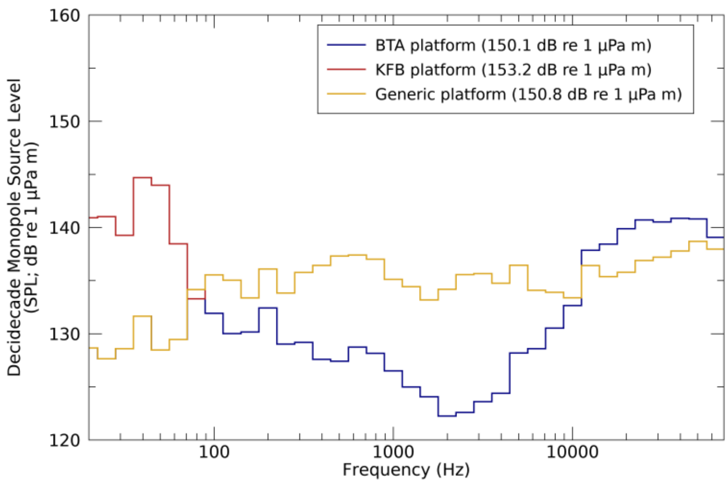


Figure 3. Monopole Source Level (MSL) spectra representing (left) the BTA and (right) the KFB platforms in isolation (blue), with one (red) and with two (yellow) attendant vessels (the *Skandi Feistein* and the *MMA Leeuwin*).

3.1.1.2. Generic Platform

The monitoring program recommended the creation of a composite platform MSL spectrum to better represent a generic platform. To create a conservative, but generic spectra, the BTA platform spectral levels were used at frequency ≤ 80 Hz and the level for the KFB platform were used at all higher frequencies. This eliminates the possible flow noise at low frequencies, and the noise from snapping shrimps at high frequencies, as mentioned above (Section 3.1.1.1). The monopole source representing the generic platform was also modelled in the middle of the water column, i.e., at a depth of 30 m. Figure 4 compares the spectra for the BTA, KFB and generic platforms.



3.1.

Figure 4. Monopole Source Level (MSL) spectra representing the BTA (blue) and the KFB platforms (red) and the generic platform (yellow).

Vessels

Underwater sound that radiates from vessels is produced mainly by propeller and thruster cavitation, with a smaller fraction of noise produced by sound transmitted through the hull, such as by engines, gearing, and other mechanical systems. In general, a vessel produces broadband acoustic energy with most of the energy emitted below a few kilohertz. Sound levels tend to be the highest when thrusters are used to position the vessel and when the vessel is transiting at high speeds. Sound from onboard machinery, particularly sound below 200 Hz, dominates the sound spectrum before cavitation begins (Spence et al. 2007). A vessel's sound signature depends on the vessel's size, power output, propulsion system (e.g., conventional propellers vs. Voith Schneider propulsion), and the design characteristics of the given system (e.g., blade shape and size).

Three similar classes of vessels were modelled in this study: an offshore supply vessel (OSV), a multi-purpose supply vessel (MPSV), and an attendant support vessel. The OSV and MPSV were modelled while alongside the production platforms, using dynamic positioning (DP) system to keep station (Scenarios 8 to 17). The OSV was also modelled alone, using DP while away from the platforms (Scenarios 7 and 10). The attendant support vessel was modelled while on standby, transiting through a defined standby box near the jack-up rig (Scenarios 16 and 17 only).

During the monitoring program, measurements from two vessels were analysed (McPherson et al. 2022), and the derived decidecade MSL spectra were used in this study. The OSV and the attendant support vessel spectra were derived from measurements of the *Skandi Feistein* (Figure 5; left), a DP Class 2 vessel operated by the DOF Group (DOF Group 2022). Measurements of the *Skandi Feistein* while using DP were used derived the average decidecade MSL of the OSV. Measurements for the same vessel transiting at 11.6 and 10.9 knots were averaged and scaled for a speed of 4 knots using the recommended speed scaling factor for tugs (the most similar vessel category to the *Skandi Feistein*) by MacGillivray and Li (2018).

The MPSV spectra were derived from measurements of the *MMS Leeuwin*, a DP Class 2 vessel operated by *MMA* Offshore Limited (MMA Offshore Limited 2022). Figure 6 compared the MSL spectra of the vessels used in this study. Note that the OSV modelled at the KFB platform is defined by more conservative MSL then at the BTA platform. Therefore, it was also used with the generic platform (Scenario 15) and the jack-up rig (Scenario 17).

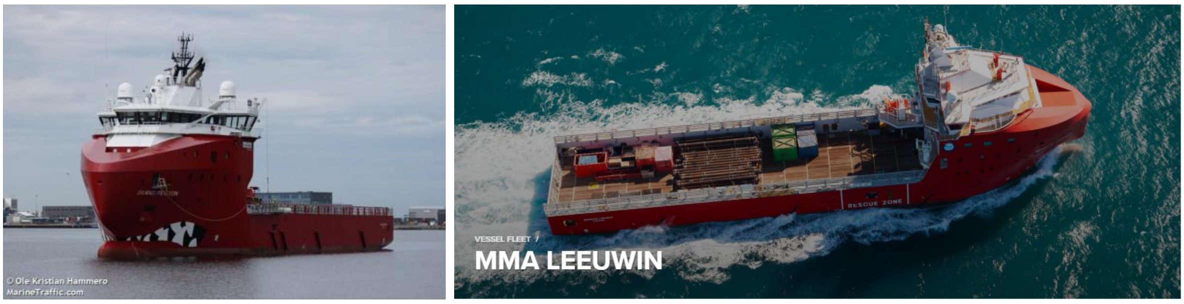


Figure 5. Photographs of the *Skandi Feistein* (left; photo credit Marine Traffic) and the MMA Leeuwin (right; photo credit MMA Offshore Limited).

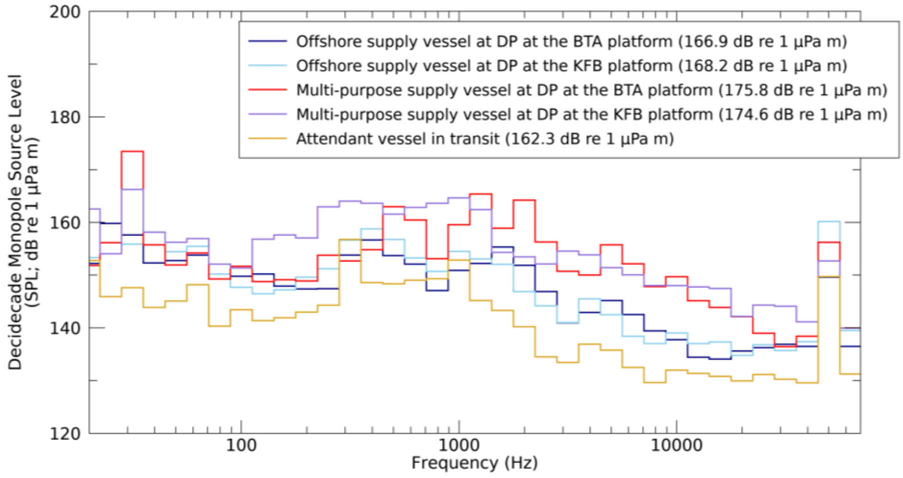


Figure 6. Monopole Source Level (MSL) spectra representing the vessels used in multiple scenarios.

3.1.3. Jack-Up Drill Rig

Jack-up rigs are a type of mobile offshore drilling unit; they are not fixed, like the BTA and KFB platforms, and are usually less self-sufficient than fixed platforms. Therefore, they usually require an attendant vessel standing-by within a certain distance from the rig.

Todd et al. (2020) reported on the near-field recordings of underwater noise from the sides of a jack-up rig during drilling operations in the North Sea (water depth of 40 m). Measurements were made of the *Noble Kolskaya*, a three-legged cantilever type jack-up rig, 69 m long and 80 m wide (Todd et al. 2020, Wikipedia 2022). The reported decidecade received levels for drilling operations (25 Hz to 12.5 kHz) were back propagated assuming spherical spreading over a distance of 60 m, to provide conservative estimates of the MSL. The spectrum was extrapolated by continuing the attenuation of the last decidecade, that is assuming a 10 dB per decade at frequencies below 25 Hz, and 25 dB per decade at frequencies above 12.5 kHz. Figure 7 compares the spectrum for the jack-up drilling rig to the spectra for the OVS and the attendant support vessel modelled in operation with the rig (Scenarios 16 and 17).

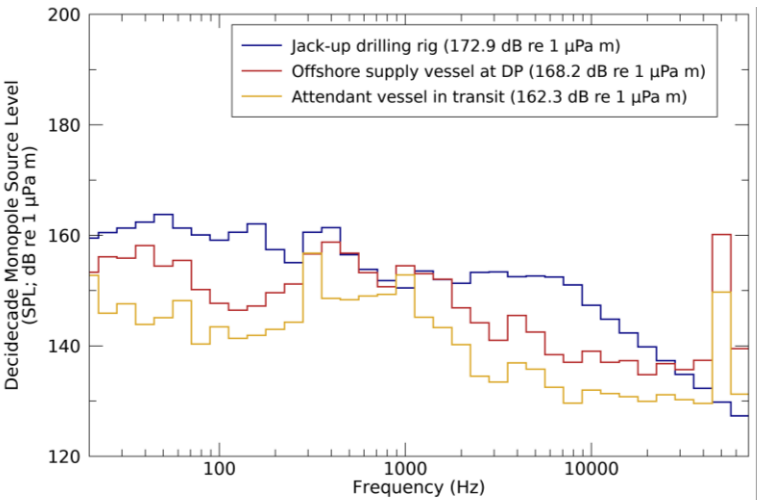


Figure 7. Monopole Source Level (MSL) spectra representing the jack-up rig during drilling operations (blue), with the offshore supply vessels (red) and the attendant support vessel transiting within the standby box (yellow).

3.2. Sound Propagation Model and Configuration

JASCO's Marine Operations Noise Model (MONM-BELLHOP; see Appendix B.2.2) was used to predict the underwater acoustic propagation loss at the modelled sites at frequencies of 20 Hz to 63 kHz. This model considers the environmental variations along the propagation path (see Appendix B.1). The final acoustic fields combine the acoustic source levels (see Section 3.1) with the site-specific propagation loss fields.

To assess sound levels with MONM-BELLHOP, the sound field modelling calculated propagation losses up to distances of 100 km from the source in each cardinal direction, with a horizontal separation of 20 m between receiver points along the modelled radials. The sound fields were modelled with a horizontal angular resolution of $\Delta\theta = 2.5°$ for a total of N = 144 radial planes. Receiver depths were chosen to span the entire water column over the modelled areas, from 1 m to a maximum of 2700 m, with step sizes that increased with depth. To supplement the MONM results, high-frequency results for propagation loss were modelled using BELLHOP (Porter and Liu 1994) for frequencies from 1.25 to 63 kHz. The MONM and BELLHOP results were combined to produce results for the full-frequency range of interest.

To produce the maps of the sound footprint, received level isopleths, and to calculate distances to specified sound level thresholds, the sound field on radial planes are resampled (by linear triangulation) to produce a regular Cartesian grid (with a cell size of 20 m) and the maximum-over-depth level is calculated at each grid point within the modelled region. The sound field grids from all sources are then summed (see Equation A-3) to produce the cumulative sound field grid. The contours and threshold ranges are calculated from these flat Cartesian projections of the modelled acoustic fields.

3.3. Accumulated SEL

While the criterion for potential behavioural responses is based on SPL, the criteria for potential PTS and TTS are based on dose-type measurements, i.e., the SEL accumulated over a 24 h period. Platforms, drill rigs and vessels continuously produce sound while in operation. The reported source levels are usually in terms of sound pressure levels (SPL), representing the average acoustic level of each source that could be recorded at any time during specific operations. It is equivalent to the SEL accumulated over 1 s (more details are provided in Appendix A.1). The evaluation of the cumulative sound field (e.g., in terms of 24 h SEL) depends on the number of seconds of operation during the accumulation period (e.g., 24 h), as well as the sound source location.

For sound sources that are stationary (i.e., the platforms, the jack-up rig and the vessels while at DP), the 1-s sound field is simply accumulated over the duration of the operation within the prescribed accumulative period of 24 h. For vessels in transit (i.e., the attendant support vessel in Scenarios 16 and 17), it would be computationally prohibitive to perform sound propagation modelling for every vessel position with an interval of 1 s over a period of 24 h. In the present case, the vessel speed (2 m/s or 4 knots) and, therefore, the distance between consecutive vessel positions, is small enough that the environmental parameters that influence sound propagation are virtually the same for many positions. Consequently, the acoustic fields can be modelled for a subset of vessel positions over the 24 h period. After sound fields from representative vessel locations are calculated, they are adjusted to account for the nearby positions. For Scenarios 16 and 17, 18 positions of the attendant support vessel (i.e., one position every 8 minutes) were selected using the random walk method to simulate the vessel keeping station within a 2 km × 4 km box.

Although estimating the cumulative sound field with the described approach is not as precise as modelling sound propagation at every vessel position, small-scale, site-specific sound propagation features tend to blur and become less relevant when sound fields from adjacent positions are summed. Larger scale sound propagation features, primarily dependent on water depth, dominate the cumulative sound field. The accuracy of the present method acceptably reflects those large-scale features, thus providing a meaningful estimate of a wide area SEL field in a computationally feasible framework.

4. Results

The maximum-over-depth sound fields for the 17 modelled scenarios (described in Section 1.1) are presented below in two formats: as tables of distances to sound levels thresholds and, where the distances are long enough, as contour maps showing the directivity and extent of the various sound level isopleths. The tabulated distances were calculated from the centre of the platform or rig. When vessels are alongside, this distance is maximal in the direction of the vessel and may not be as long in the opposite direction.

Section 4.1 presents the results for Scenarios 1 to 6: the operation of the BTA and KFB production platforms in isolation, with one attendant vessel, and with two attendant vessels (the *Skandi Feistein* and the *MMA Leeuwin*). These results are later compared with modelling results conducted before the monitoring program (see Section 5.1.1).

Section 4.2 presents the results for Scenarios 7 to 12: a stationary OSV in isolation, the BTA and KFB platforms with an MPSV permanently alongside, and the platforms with an MPSV plus an OSV alongside for 1 h or 2 h. Unlike for Scenarios 1 to 6, the sound sources for the platforms and vessels were modelled separately and the individual fields were summed to create the composite sound fields. This method allows the specific positioning of the vessels alongside the platform (10 m separation was assumed between the edge of the platform and the vessel) and for limiting the duration of the supply operations to less than 24 h.

Section 4.3 presents the results for Scenarios 13 to 15: a generic production platform in isolation, with an MPSV permanently alongside, and with an MPSV plus an OSV alongside for 1 h or 2 h. The same modelling method as for Scenarios 7 to 12 was used here. The generic platform was positioned in 60 m of water, between the BTA and the KFB platforms, and representative of the Esso Bass Strait platforms and assets in general.

Finally, Section 4.4 presents the results for Scenarios 16 and 17: a jack-up rig during drilling operation with an attendant support vessel on standby, and with an OSV alongside the jack-up rig for 2 h and 8 h. The attendant support vessel is assumed to be transiting at a speed of 4 knots within a 2 km x 4 km box, with one of its boundaries 500 m from the jack-up rig. Here, distances to behavioural response thresholds are given for two limiting cases: when the attendant support vessel is closest and farthest from the rig.

4.1. BTA and KFB Platforms with/without One or Two Vessels

Table 3. *Scenarios 1 to 6:* Distances (m) to permanent threshold shift (PTS), temporary threshold shift (TTS), and behavioural response of low-frequency cetaceans (LFC), high-frequency cetaceans (HFC), and other carnivores in water (OCW). Scenarios detailed in Table 1.

Effect thresholds			Scenario											
			BTA platform						KFB platform					
			1 (Platform)		2 (with one vessel)		3 (with two vessels)		4 (Platform)		5 (with one vessel)		6 (with two vessels)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	–	–	–	–	–	–	–	–	–	–	–	–
		TTS	–	–	30	30	90	100	–	–	45	45	285	290
	HFC	PTS	–	–	–	–	–	–	–	–	–	–	–	–
		TTS	–	–	–	–	20	20	-	-	20	20	30	30
	OCW	PTS	–	–	–	–	–	–	–	–	–	–	–	–
		TTS	–	–	–	–	–	–	–	–	–	–	–	–
Behavioural response			30	30	360	395	710	745	55	55	280	290	2095	2160

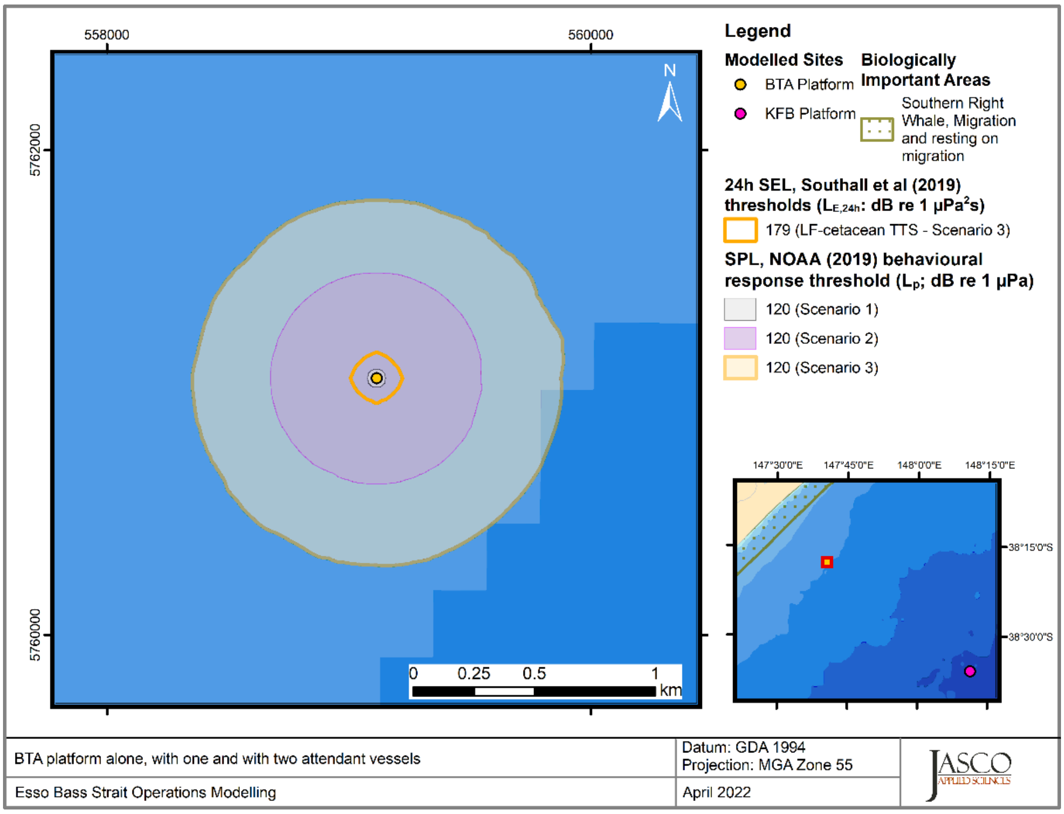


Figure 8. *Scenarios 1 to 3, BTA alone, with the Skandi Feistein, and also with the MMA Leeuwin*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

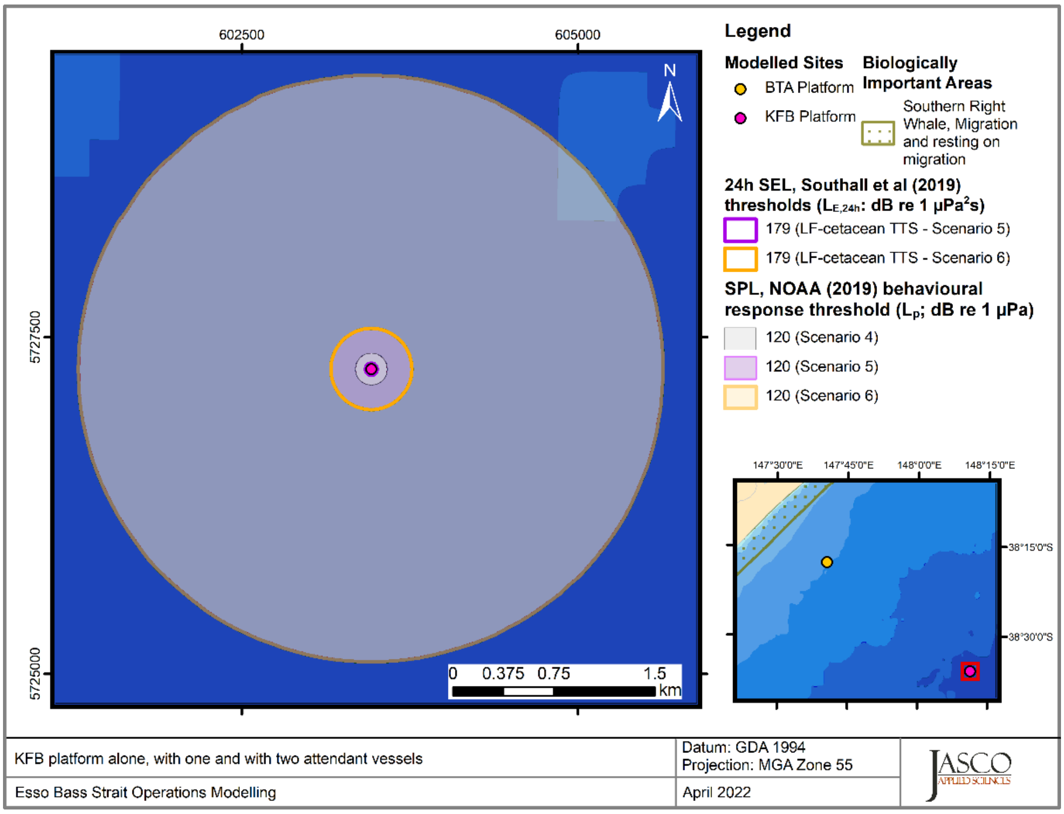


Figure 9. *Scenarios 4 to 6, KFB, Skandi Feistein, and MMA Leeuwin*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

4.2. Offshore Supply Vessel, Platforms with One or Two Vessels

Table 4. *Scenarios 7 to 9 (near BTA):* Distances (m) to permanent threshold shift (PTS), temporary threshold shift (TTS), and behavioural response of low-frequency cetaceans (LFC), high-frequency cetaceans (HFC), and other carnivores in water (OCW). Scenarios detailed in Table 1.

Effect thresholds			Scenario									
			7 (2 h)* (OSV)		7 (24 h)* (OSV)		8 (Platform and MPSV)		9 (1 h)* (Platform, MPSV and OSV)		9 (2 h)* (Platform, MPSV and OSV)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	–	–	–	–	60†	60†	60†	60†	60†	60†
		TTS	–	–	70	70	300	330	300	330	300	330
	HFC	PTS	–	–	–	–	60†	60†	60†	60†	60†	60†
		TTS	–	–	–	–	75†	75†	75†	75†	75†	75†
	OCW	PTS	–	–	–	–	–	–	–	–	–	–
		TTS	–	–	–	–	60†	60†	60†	60†	60†	60†
Behavioural response			490	515	490	515	1460	1640	1670	1800	1670	1800

* During the accumulation period of 24 h, the OSV is operating for 1 or 2 h, the other sources are operating continuously.
† Distance from the centre of the platform, toward the MPSV vessel permanently alongside, n/a in the other directions.

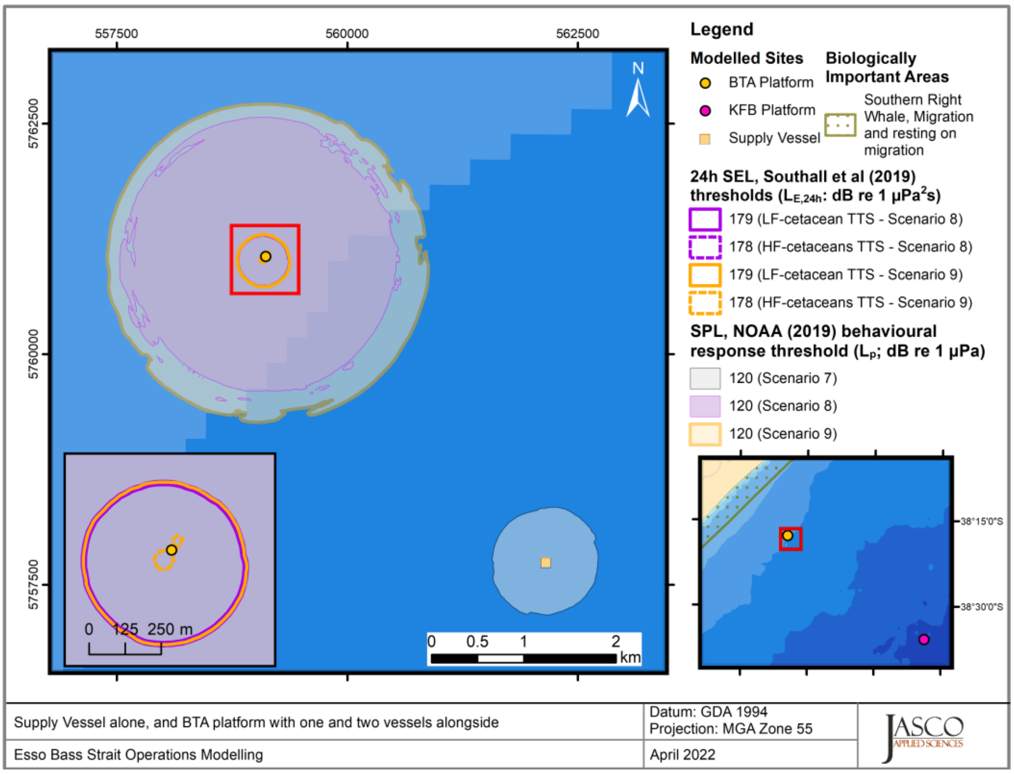


Figure 10. *Scenarios 7 to 9, BTA, with MPSV, and also with OSV*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

Table 5. *Scenarios 10 to 12 (near KFB):* Distances (m) to permanent threshold shift (PTS), temporary threshold shift (TTS), and behavioural response of low-frequency cetaceans (LFC), high-frequency cetaceans (HFC), and other carnivores in water (OCW). Scenarios detailed in Table 1.

Effect thresholds			Scenario									
			10 (2 h)* (OSV)		10 (24 h) (OSV)		11 (Platform and MPSV)		12 (1 h)* (Platform, MPSV and OSV)		12 (2 h)* (Platform, MPSV and OSV)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	–	–	–	–	60[†]	60[†]	60[†]	60[†]	60[†]	60[†]
		TTS	20	20	85	85	350	375	350	380	350	380
	HFC	PTS	–	–	–	–	60[†]	60[†]	60[†]	60[†]	60[†]	60[†]
		TTS	–	–	30	30	75[†]	75[†]	75[†]	75[†]	75[†]	75[†]
	OCW	PTS	–	–	–	–	–	–	–	–	–	–
		TTS	–	–	–	–	60[†]	60[†]	–	–	–	–
Behavioural response			500	555	500	555	2420	2765	2725	2820	2725	2820

* During the accumulation period of 24 h, the OSV is operating for 1 or 2 h, the other sources are operating continuously.
† Distance from the centre of the platform, toward the MPSV permanently alongside, n/a in the other directions.

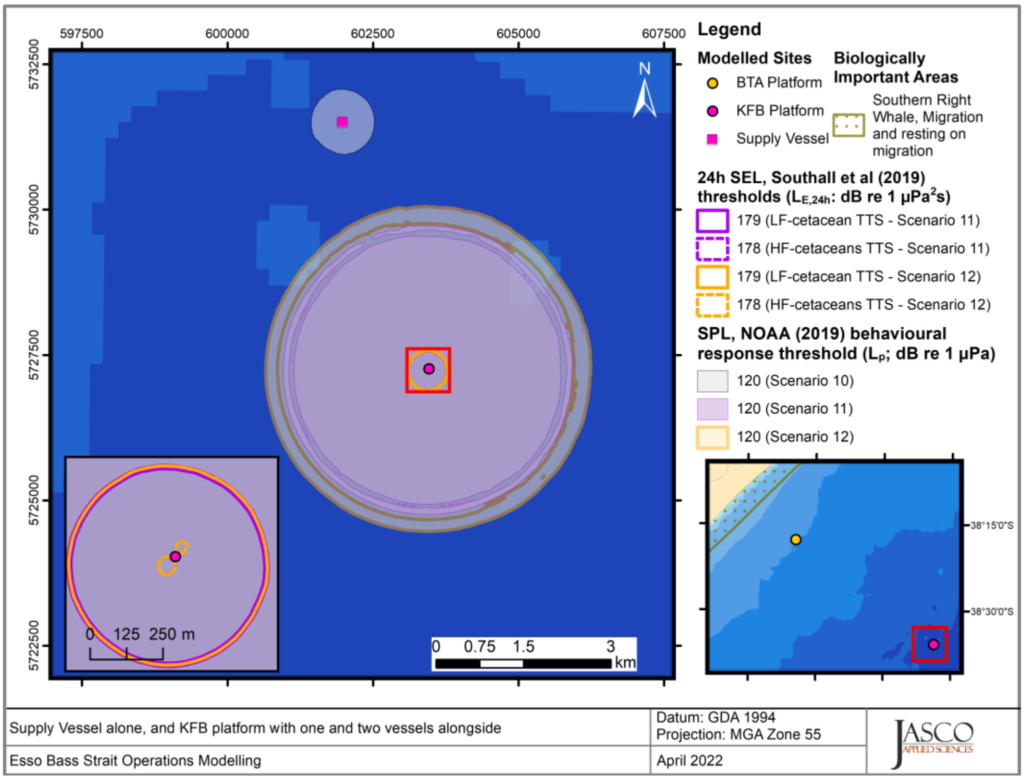


Figure 11. *Scenarios 10 to 12, KFB, with MPSV, and also with OSV*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

4.3. Generic Platform with/without One or Two Vessels

Table 6. *Scenarios 13 to 15, Generic Platform:* Distances (m) to permanent threshold shift (PTS), temporary threshold shift (TTS), and behavioural response of low-frequency cetaceans (LFC), high-frequency cetaceans (HFC), and other carnivores in water (OCW). Scenarios detailed in Table 1.

Effect thresholds			Scenario							
			13 (Platform)		14 (Platform and MPSV)		15 (1 h)* (Platform, MPSV and OSV)		15 (2 h)* (Platform, MPSV and OSV)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	–	–	60†	60†	60†	60†	60†	60†
		TTS	–	–	400	435	400	435	400	435
	HFC	PTS	–	–	60†	60†	60†	60†	60†	60†
		TTS	–	–	75†	75†	75†	75†	75†	75†
	OCW	PTS	–	–	–	–	–	–	–	–
		TTS	–	–	60†	60†	60†	60†	60†	60†
Behavioural response			30	30	2485	2715	2720	3090	2720	3090

* During the accumulation period of 24 h, the supply vessel is operating for 1 or 2 h, the other sources are operating continuously.

† Distance from the centre of the platform, toward the MPSV permanently alongside, n/a in the other directions.

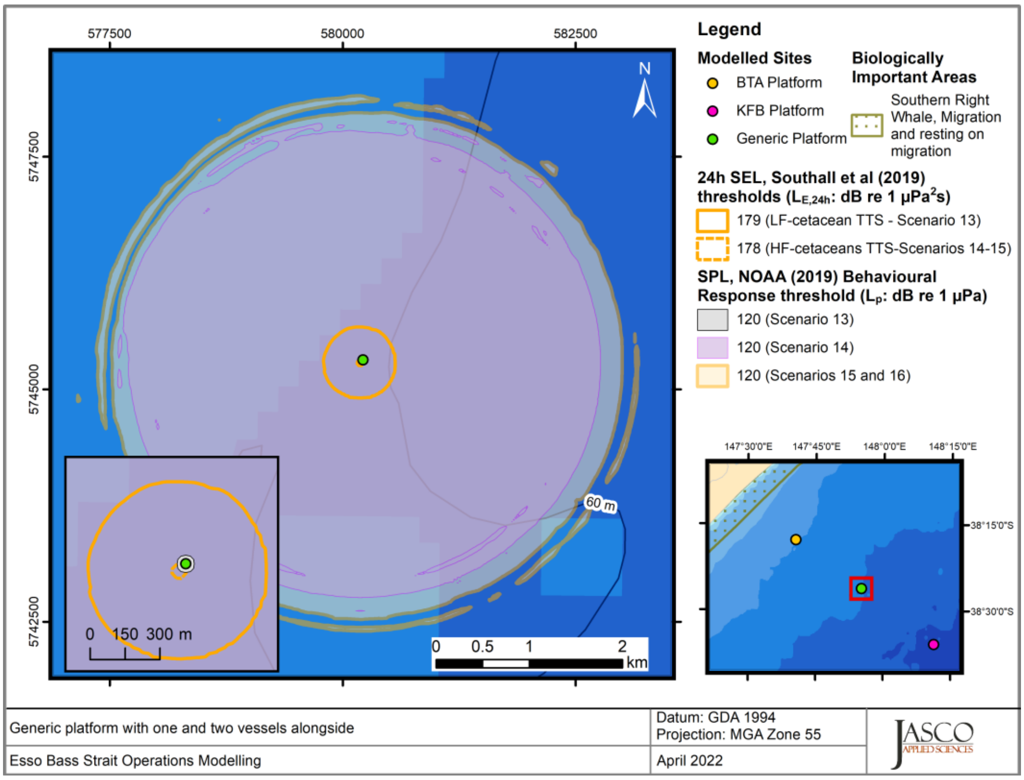


Figure 12. *Scenarios 13 to 15, Generic Platform, with MPSV, and also with OSV*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

4.4. Jack-Up Drilling Rig and an Attendant Support Vessel, with/without an OSV

Table 7. *Scenarios 16 and 17, BTA:* Distances (m) to permanent threshold shift (PTS), temporary threshold shift (TTS), and behavioural response of low-frequency cetaceans (LFC), high-frequency cetaceans (HFC), and other carnivores in water (OCW). All distances are calculated from the centre of the platform. Scenarios detailed in Table 1.

Effect thresholds			Scenario					
			16 (Jack-up with support vessel)		17 (2 h)* (Jack-up, support vessel and OSV)		17 (8 h)* (Jack-up, support vessel and OSV)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	–	–	–	–	–	–
		TTS	160	170	165	170	185	190
	HFC	PTS	–	–	–	–	–	–
		TTS	–	–	–	–	30	30
	OCW	PTS	–	–	–	–	–	–
		TTS	–	–	–	–	–	–
Behavioural response	Attendant vessel closest to the jack-up rig		2570	2755	2800	2945	2800	2945
	Attendant vessel farthest from the jack-up rig		2840	3670	2950	3700	2950	3700

* During the accumulation period of 24 h, the OSV is operating for 2 or 8 h, the other sources are operating continuously.

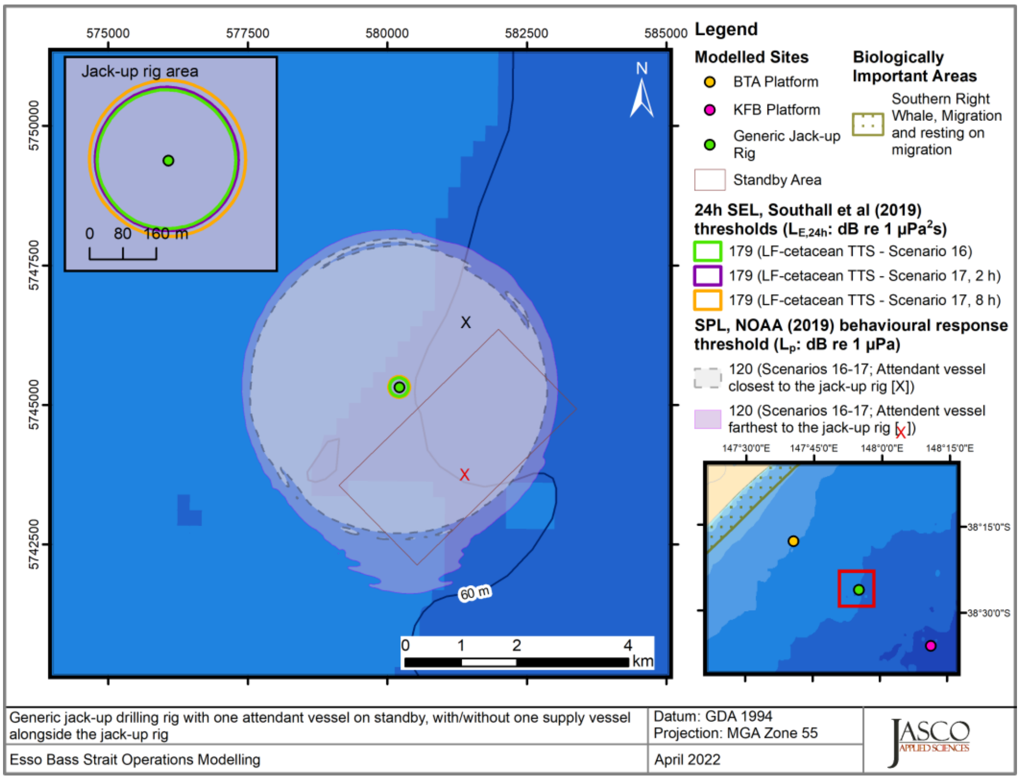


Figure 13. *Scenarios 16 to 17, BTA, OSV under DP, and support vessel under transit in standby box*: Sound level contour map showing isopleths to injury (frequency-weighted maximum-over-depth SEL 24 h) and behavioural response (unweighted maximum-over-depth SPL) thresholds. Scenarios detailed in Table 1.

5. Discussion and Conclusion

This modelling study predicted underwater sound levels associated with production platforms, a jack-up drilling rig and the associated attendant vessels. Maximum and 95th percentile distances (R_{max} and $R_{95\%}$) were computed to marine mammal PTS, TTS, and behavioural response thresholds. This section discusses the modelled results and the possible effects of simultaneous cutting operations.

For the purpose of discussing the possible effects of simultaneous cutting operations, the spectrum derived by McPherson and Koessler (2020) for a diamond wire saw operated via a remotely operated vehicle (ROV) is considered. This spectrum peaks at 10 kHz, with a broadband MSL of 161.4 dB re 1 µPa m.

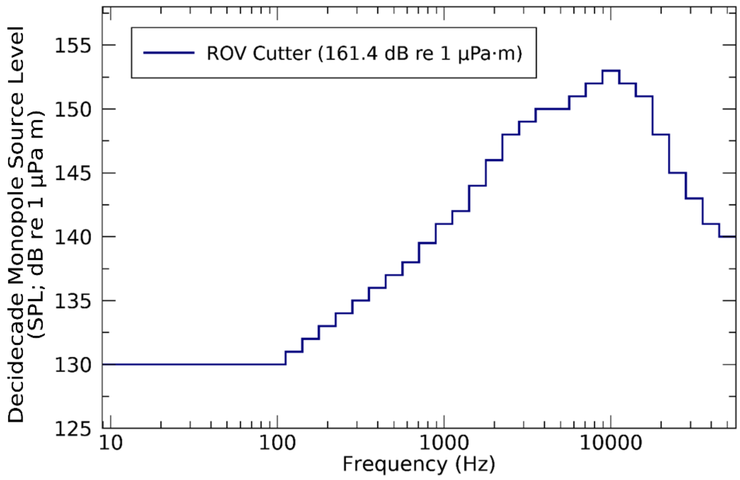


Figure 14. Monopole Source Level (MSL) spectra representing a diamond wire saw operated via a remotely operated vehicle (ROV cutter; McPherson and Koessler 2020).

5.1. BTA and KFB Platforms with One or Two Vessels

Further to the Noise Monitoring Study conducted in March-April 2021 (McPherson et al. 2022), distances to the pertinent sound level thresholds (listed in Section 2) were modelled for the BTA and KFB platforms on their own (Scenarios 1 and 4), with one attendant vessel under DP (*Skandi Feistein*) (Scenarios 2 and 5) and with two attendant vessels under DP (*Skandi Feistein* and *MMA Leeuwin*) (Scenarios 3 and 6). For these first six scenarios, listed in Table 1, the acoustic source levels were derived during the Noise Monitoring Study (McPherson et al. 2022).

Distances to marine mammal effect thresholds were modelled to further the Noise Monitoring Study conducted in March-April 2021 (McPherson et al. 2022). The results show that noise levels from production platforms in isolation do not results in levels high enough for potential injury, and the distances to behavioural response are relatively small (30 m at BTA; 55 m at KFB).

The presence of attendant vessels at the platforms, however, results in TTS exceedance close to the platform, with PTS not predicted. The distances to TTS thresholds are shorter at BTA (30 to 100 m for low-frequency cetaceans and ≤ 20 m for high-frequency cetaceans) than at KFB (45 to 290 m for low-frequency cetaceans and 20 to 30 m for high-frequency cetaceans). The distances to potential behavioural response increase significantly with the presence of vessels, with distances of up to 2.16 km at the KFB platform with two vessels present.

If cutting operations were to happen at the BTA or KFB platforms, at least one vessel (operating the ROV) would be present near the platform. Based on the ROV cutter spectrum (Figure 14) and the spectra for the platforms with one and two vessels (Figure 3; red and yellow lines), sound levels may increase at frequencies between approximately 3 and 20 kHz. Since MSL at low frequencies (below a few 100 Hz) remain the dominant frequencies, distances to effect thresholds for low-frequency cetaceans are not expected to increase in a meaningful way. Distances to injury thresholds for high-frequency cetaceans, however, may increase slightly (likely by less than 100 m). Distances to behavioural response are not expected to increase significantly, with changes likely to be in the tens of metres.

5.1.1. Comparison with Modelling Results for the Seahorse/Tarwhine Plug and Abandonment Campaign

In September 2020, JASCO presented a modelling study of underwater sound levels associated with the Esso Seahorse/Tarwhine Plug and Abandonment (P and A) Campaign. In this study, the jack-up rig *Tom Prosser* was modelled under normal drilling operations (McPherson and Koessler 2020):

- Scenario 1: jack-up rig in isolation,
- Scenario 2: with an attendant vessel 1 km from the platform under DP (25% MCR),
- Scenario 3: with an attendant vessel 1 km from the platform under DP (25% MCR), a ROV vessel next to the platform (25% MCR), and ROV cutting tools under the platform
- Scenario 4: with an OSV under DP next to the platform (45% MCR).

At the jack-up rig, the water depth was 41 m, similar to that at the BTA platform (44 m). Scenario 1 for the Seahorse/Tarwhine P and A Campaign is therefore comparable to Scenario 1 for the current study. Scenarios 2 and 3 for the Seahorse/Tarwhine P and A Campaign are not comparable to the scenarios in the current study since the attendant vessel for the jack-up rig was assumed stationary at 1 km from the rig, whilst more operationally relevant mobile slow transit representations are now used. The attendant vessel near the BTA platform was recorded when it was conducting resupply operations at the platform, therefore Scenario 4 for the Seahorse/Tarwhine P and A Campaign modelling can be compared to current Scenario 2 (BTA platform with one vessel). Table 8 compared the distances to marine mammal effect thresholds modelled in the current study and for the Seahorse/Tarwhine P and A Campaign.

Table 8. Distances (m) to permanent threshold shift (PTS) and temporary threshold shift (TTS) of low-frequency cetaceans (LFC), and marine mammal behavioural response for the current study (BTA platform) and the Seahorse/Tarwhine P and A Campaign (Jack-up rig Tom Prosser; McPherson and Koessler 2020).

Effect thresholds			Scenario							
			BTA platform				Jack-up rig *Tom Prosser*			
			1 (Platform)		2 (Platform and one vessel)		1 (Jack-up rig)		4 (Platform and one vessel)	
			$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}
Injury	LFC	PTS	-	-	-	-	n/a	-	n/a	30
		TTS	-	-	30	30	n/a	30	n/a	550
Behavioural response			30	30	360	395	210	220	4510	3870

In general, the distance to the effect thresholds is greater for the jack-up rig than the BTA platform. This can be attributed to two main factors: the difference in the rig vs. platform MSL spectra, and the difference in the attendant vessel spectra.

The MSL spectrum derived from measurement for the BTA platform is different from the spectrum used in modelling the jack-up rig. The broadband MSL for the BTA platform was measured to be 150.1 dB re 1 µPa m, approximately 10 dB lower than for the jack-up rig *Tom Prosser* (160.4 dB re 1 μPa m), which was based on measurements of the jack-up rig *Endeavour* operating in Cook Inlet, Alaska (Illingworth and Rodkin Inc. 2014). The jack-up rig spectrum also presents peaks in the MSL around 63 and 300 Hz, and between 3 and 7 kHz. The MSL spectrum for the BTA platform is relatively flat below 10 kHz, with maximum levels above 20 kHz. Since frequencies in different regimes (e.g., low- vs. high-frequency regimes) propagate differently (Jensen et al. 1994), these two spectra (compared in Figure 15) are expected to lead to different distances to the assessed marine mammal noise effect thresholds.

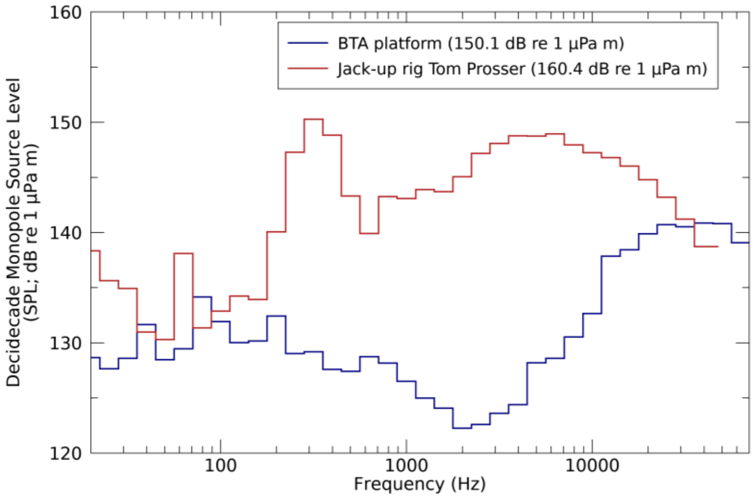


Figure 15. Monopole Source Level (MSL) spectra representing the BTA production platform in isolation (blue) and the jack-up rig *Tom Prosser* (red) modelled under normal drilling operations (McPherson and Koessler 2020).

In the Seahorse/Tarwhine P and A Campaign, because of the absence of vessel-specific operational data, the supply vessel was modelled using the specification of the *Skandi Feistein* at a conservative 45% maximum continuous rating (MCR) (defined by Esso), to adjust measurements of the dive support vessel *DSV Fu Lai* (MacGillivray 2006). This method leads to a broadband MSL of 177.6 dB re 1 μPa m. However, recordings of the *Skandi Feistein* at DP when stationary in isolation resulted in a broadband MSL of 166.9 dB re 1 μPa m (McPherson et al. 2022) and the recordings of the same vessel operation close (< 150 m) to the BTA platform (in combination with the platform) resulted in a broadband MSL of 166.8 dB re 1 μPa m. (The MCR level used by the *Skandi Feistein* operation close to the BTA platform was likely lower than while operating at DP away from the platform; the exact MCR is however unknown due to the record keeping intervals.) Although the difference in broadband MSL is approximately 9 dB, the MSL spectrum of the supply vessel (based on the *DSV Fu Lai*) presents much lower levels (by more than 10 dB) at frequencies below 100 Hz, and much higher levels (up to 15 dB) at frequencies above 100 Hz. Figure 16 presents the MSL spectrum for the BTA platform with one attendant vessel under DP (the *Skandi Feistein*) derived from the Monitoring Study and used in Scenario 2 of the current modelling study; it is compared to the spectrum for the OSV under DP used in Scenario 4 for the Seahorse/Tarwhine P and A Campaign.

The significant difference in decidecade MSL leads to much shorter distances to PTS, TTS, and behavioural response thresholds at the BTA platform than modelled in Scenario 4 for the Seahorse/Tarwhine P and A Campaign (compare Scenarios 2 and 4 in Table 8). This spectral difference is likely due to the supply vessel spectrum being based on that of the *DSV Fu Lai* (MacGillivray 2006), an older vessel than the *Skandi Feistein*, with not only bow and stern thrusters but also a pair of variable pitch propellers. Although the two vessels are similar in length, draft, and power used at DP, the measurement campaign has demonstrated that they have a different signature. The MCR statistics for the *Skandi Feistein* used during the monitoring study during resupply was not calculated, however the data shown in Figure 83 of McPherson et al. (2022) for radiated noise level

(RNL) vs. engine power for *Skandi Feistein* at BTA indicates that none of the three motors driving the propellors used more than 120 kW of power each, and often less, therefore the total percentage of MCR used was significantly less than the 45% considered for the Seahorse/Tarwhine P and A Campaign assessment.

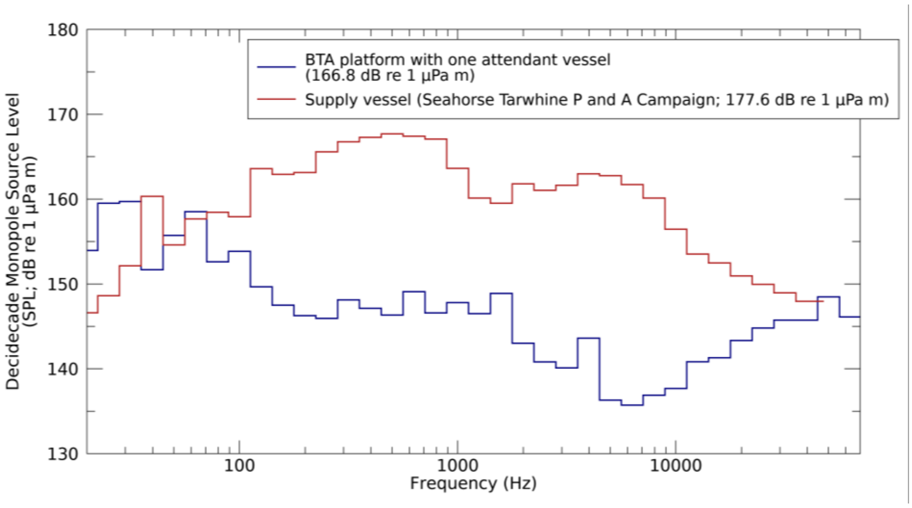


Figure 16. Monopole Source Level (MSL) spectra representing the BTA production platform with one attendant vessel (blue) and the supply vessel (red) modelled for the Seahorse/Tarwhine P and A Campaign (McPherson and Koessler 2020).

5.2. Supply Vessel alone and Platforms with One or Two Vessels

In Scenarios 7 and 10, the OSV, based on the measurements of the *Skandi Feistein*, was modelled stationary under DP for 2 and 24 h. The results show that the potential for TTS to marine mammals is relatively low since the longest distance (85 m for TTS to low-frequency cetaceans near KFB) is similar to the length of the recorded vessel (87.9 m). The distance to behavioural response is more significant: on the order to 515 to 555 m, depending on the vessel's location (BTA or KFB respectively).

Scenarios 8, 9, 11 and 12, representing the platforms with an MPSV under DP permanently alongside, with and without an OSV present, result in the similar distances to potential TTS. This similarity shows that the presence of an OSV for a short period (up to 2 h) does not change significantly that sound field already produced by the BTA or KFB platforms with an MPSV permanently alongside. The presence of the OSV, however, increases the $R_{95\%}$ distances to the threshold for marine mammal behavioural response by up to 300 m (see Tables 4 and 5); this distance does not depend on the operational period.

Scenarios 8, 9, 11 and 12 results in longer distances to injury and behavioural response thresholds than Scenarios 2, 3, 5 and 6 (BTA and KFB platform measured with one or two attendant vessels under DP). This difference is caused by the vessels in Scenarios 8–12 being modelled alongside the platforms with MSL spectra derived from monitoring while at DP, in isolation to the platforms. As mentioned in Section 5.1.1, the MCR level used by the vessel operating close to the BTA platform was likely lower than while operating at DP, away from the platform. Results for Scenarios 8, 9, 11 and 12 are therefore considered realistically conservative.

If cutting operations were occurring simultaneously, it is unlikely that the modelled distances to effect threshold would increase since the MPSV spectral levels (Figure 6) are far higher than that of the ROV cutter (Figure 14).

5.3. Generic Platform with/without and one or Two Vessels

Scenarios 13 to 15 represent the operation of a generic production platform within the Esso Bass Strait field. Here, environmental parameters similar to those at the KFB platform were used, but the water was shallower (60 m, as opposed to 75 m at the KFB platform).

The distances estimated for the generic platform in isolation are similar to those of the BTA platform in isolation: no potential for marine mammal PTS or TTS, and potential behavioural response up to 30 m from the platform. This similarity is due to reduction in MSL at low frequencies (< 80 Hz) compared to the KFB platform; these high MSL at KFB are likely due to tidally induced mooring flow noise (see Sections 3.1.1.1 and 3.1.1.2).

For Scenarios 14 and 15, the estimated distances to low-frequency cetacean TTS and marine mammal behavioural thresholds are similar, but slightly longer than those estimated for Scenarios 11 and 12, at the KFB station. This is caused by the combination of various sound propagation effects and to difference in water depth. Here again, the addition of an OSV for up to 2 h does not increase distances to PTS or TTS thresholds and increases the distance to the behavioural response threshold by about 14% (300 m).

If cutting operations were occurring simultaneously, it is unlikely that the modelled distances to effect threshold would increase since the MPSV spectral levels (Figure 6) are far higher than that of the ROV cutter (Figure 14).

5.4. Jack-up Drilling Rig and an Attendant Vessel, with/without an OSV

The last two scenarios in this study are related to a future drilling campaign and represent the drilling operations at the jack-up rig, including the presence of a attendant vessel standing by between 0.5-3.5 km from the rig; the last scenario adds a supply vessel under DP alongside the rig for periods of 2 and 8 h.

The results show that distances to TTS are slightly larger around the rig when the OSV is present for longer periods (see Figure 13). This distance does not change based on the location of the attendant vessel, and only slightly increases with the presence of the supply vessel (by up to 12% or 20 m).

The distance to behavioural response threshold increases slightly (by up to 7% or 190 m) with the presence of the OSV. The location of the attendant support vessel increases this distance: by up to 26%, or 755 m (see Figure 13 and Table 7).

In comparison with the generic production platform, the jack-up rig's broadband MSL is significantly higher (22 dB) than that of the platform. Therefore, the distances to potential injury thresholds are longer for the jack-up rig (Scenario 16) than for the generic production platform (Scenario 13). The presence of the supply vessel has little influence on the distances at the jack-up rig because its MSL is comparable to that of the jack-up rig, and it is present for less than half the accumulation period. At the production platform, however, the MPSV, present in Scenarios 14 and 15, has higher MSL than the platform and it is present for the entire accumulation period (24 h). Its presence has therefore a significant influence on the distances to TTS.

Glossary

Unless otherwise stated in an entry, these definitions are consistent with ISO 80000-3 (2017).

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).

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 sound pressure level calculated over the 90 %-energy time window of a pulse.

A-weighting

Frequency-selective weighting for human hearing in air that is derived from the inverse of the idealized 40-phon equal loudness hearing function across frequencies.

absorption

The reduction of acoustic pressure amplitude due to acoustic 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.

ambient sound

Sound that would be present in the absence of a specified activity, 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.

auditory frequency weighting

The process of applying an auditory frequency weighting function. In human audiometry, C-weighting is the most commonly used 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. Example hearing groups are low-, mid-, and high-frequency cetaceans, phocid and otariid pinnipeds.

azimuth

A horizontal angle relative to a reference direction, which is often magnetic north or the direction of travel. In navigation it is also called bearing.

background noise

Combination of ambient sound, acoustic self-noise*,* and sonar reverberation*.* Ambient sound 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 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.

broadband level

The total level measured over a specified 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 species 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 primary wave or P-wave.

conductivity-temperature-depth (CTD)

Measurement data of the ocean's conductivity, temperature, and depth; used to compute sound speed and salinity.

continuous sound

A sound whose sound pressure level remains above ambient sound during the observation period . 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 80000-3:2006).

decidecade

One tenth of a decade. *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)

Unit of level used to express the ratio of one value of a power quantity to another on a logarithmic scale. Unit: dB.

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.

Fourier transform (or Fourier synthesis)

A mathematical technique which, although it has varied applications, is referenced in the context of this report as a method used in the process of deriving a spectrum estimate from time-series data (or the reverse process, termed the inverse Fourier transform). A computationally efficient numerical algorithm for computing the Fourier transform is known as fast Fourier transform (FFT).

flat weighting

Term indicating that no frequency weighting function is applied. Synonymous with unweighted.

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. 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 acquisition system, typically consisting of a hydrophone, one or more amplifiers, and an analogue to digital converter.

geoacoustic

Relating to the acoustic properties of the seabed.

hearing group

Category of animal species when classified according to their hearing sensitivity and to the susceptibility to sound. Examples for marine mammals include very low-frequency (VLF) cetaceans, low-frequency (LF) cetaceans, mid-frequency (MF) cetaceans, high-frequency (HF) cetaceans, very high-frequency (VHF) cetaceans, otariid pinnipeds in water (OPW), phocid pinnipeds in water (PPW), sirenians (SI), other marine carnivores in air (OCA), and other marine carnivores in water (OCW) (NMFS 2018, Southall et al. 2019). See **auditory frequency weighting functions**, which are often applied to these groups. Examples 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).

hearing threshold

The sound pressure level for any frequency of the hearing group that is barely audible for a given individual for specified 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

See **hearing group**.

intermittent sound

A sound whose level abruptly drops below the background noise level several times during an observation period.

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. Examples of impulsive sound sources include explosives, seismic airguns, and impact pile drivers.

isopleth

A line drawn on a map through all points having the same value of some quantity.

knot

One nautical mile per hour. Symbol: kn.

level

A measure of a quantity expressed as the logarithm of the ratio of the quantity to a specified reference value of that quantity. Examples include sound pressure level, sound exposure level, and peak sound pressure level. For example, a value of sound exposure level with reference to 1 μPa^2 s can be written in the form *x* dB re 1 μPa^2 s.

low-frequency (LF) cetacean

See **hearing group**.

masking

Obscuring of sounds of interest by sounds at similar frequencies.

median

The 50th percentile of a statistical distribution.

mid-frequency (MF) cetacean

See **hearing group**.

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-like (monopole) sound source. Also see **radiated noise level**.

M-weighting

See **auditory frequency weighting function** (as proposed by Southall et al. 2007).

mysticete

A suborder of cetaceans that use baleen plates to filter food from water. Members of this group include rorquals (Balaenopteridae), right whales (Balaenidae), and grey whales (*Eschrichtius robustus*).

non-impulsive sound

Sound that is not an impulsive sound. A non-impulsive sound is 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

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, beluga whales, narwhals, dolphins, and porpoises.

otariid

A common term used to describe members of the Otariidae, eared seals, commonly called sea lions and fur seals. Otariids are adapted to a semi-aquatic life; they use their large fore flippers for propulsion. Their ears distinguish them from phocids. Otariids are one of the three main groups in the superfamily Pinnipedia; the other two groups are phocids and walrus.

other marine carnivores in air (OCA)

See **hearing group**.

other marine carnivores in water (OCW)

See **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 back-scattered sound, simplifying the computation of propagation loss. The effect of back-scattered sound is negligible for most ocean-acoustic propagation problems.

peak sound pressure level (zero-to-peak sound pressure level)

The level ($L_{p,pk}$ or L_{pk}) of the squared maximum magnitude of the sound pressure (p^2_{pk}). Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 µPa².

$$L_{p,\mathrm{pk}} := 10 \log_{10}\left(p^2_{\mathrm{pk}}/p_0^2\right) \mathrm{dB} \ = 20 \log_{10}\left(p_{\mathrm{pk}}/p_0\right) \mathrm{dB}$$

The frequency band and time window should be specified. Abbreviation: PK or Lpk.

peak-to-peak sound pressure

The difference between the maximum and minimum sound pressure over a specified frequency band and time window. Unit: pascal (Pa).

permanent threshold shift (PTS)

An irreversible loss of hearing sensitivity caused by excessive noise exposure. PTS is considered auditory injury.

phocid

A common term used to describe all members of the family Phocidae. 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. Phocids are one of the three main groups in the superfamily Pinnipedia; the other two groups are otariids and walrus.

point source

A source that radiates sound as if from a single point.

pressure, acoustic

The deviation from the ambient pressure caused by a sound wave. Also called sound pressure. Unit: pascal (Pa).

pressure, hydrostatic

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).

propagation loss (PL)

Difference between a source level (SL) and the level at a specified location, PL(x) = SL − L(x). Also see **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 and seabed. Also see **monopole source level**.

received level

The level measured (or that would be measured) at a defined location. The type of level should be specified.

reference values

standard underwater references values used for calculating sound **levels**, e.g., the reference value for expressing sound pressure level in decibels is 1 µPa.

Quantity	Reference value
Sound pressure	1 µPa
Sound exposure	1 µPa^2 s
Sound particle displacement	1 pm
Sound particle velocity	1 nm/s
Sound particle acceleration	1 µm/s^2

rms

abbreviation for root-mean-square.

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.

sensation level

Difference between the sound pressure level and hearing threshold at a specified frequency.
Unit: decibel (dB).

sound

A time-varying disturbance in the pressure, stress, or material displacement of a medium propagated by local compression and expansion of the medium.

sound exposure

Time integral of squared sound pressure over a stated time interval. 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: Pa^2 s.

sound exposure level

The level (L_E) of the sound exposure (E). Unit: decibel (dB). Reference value (E_0) for sound in water: 1 µPa^2 s.

$$L_E := 10\log_{10}(E/E_0)\,\mathrm{dB} \;= 20\log_{10}\left(E^{1/2}/E_0^{1/2}\right)\,\mathrm{dB}$$

The frequency band and integration time should be specified. Abbreviation: 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. Unit: Pa^2 s/Hz.

sound field

Region containing sound waves.

sound intensity

Product of the sound pressure and the sound particle velocity. The magnitude of the sound intensity is the sound energy flowing through a unit area perpendicular to the direction of propagation per unit time.

sound pressure

The contribution to total pressure caused by the action of sound.

sound pressure level (rms sound pressure level)

The level ($L_{p,\mathrm{rms}}$) of the time-mean-square sound pressure (p^2_{rms}). Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 µPa^2.

$$L_{p,\mathrm{rms}} := 10\log_{10}(p^2_{\mathrm{rms}}/p_0^2)\ \mathrm{dB}\ = 20\log_{10}(p_{\mathrm{rms}}/p_0)\ \mathrm{dB}$$

The frequency band and averaging time should be specified. Abbreviation: SPL or Lrms.

sound speed profile

The speed of sound in the water column as a function of depth below the water surface.

soundscape

The characterization of the ambient sound in terms of its spatial, temporal, and frequency attributes, and the types of sources contributing to the sound field.

source level (SL)

A property of a sound source obtained by adding to the sound pressure level measured in the far field the propagation loss from the acoustic centre of the source to the receiver position. Unit: decibel (dB). Reference value: 1 µPa^{2}m^2.

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.

surface duct

The upper portion of a water column within which the sound speed profile gradient causes sound to refract upward and therefore reflect off the surface resulting in relatively long-range sound propagation with little loss.

temporary threshold shift (TTS)

Reversible loss of hearing sensitivity. TTS can be caused by noise exposure.

thermocline

The depth interval near the ocean surface that experiences temperature gradients due to warming or cooling by heat conduction from the atmosphere and by warming from solar heating.

transmission loss (TL)

The difference between a specified level at one location and that at a different location, TL(x1,x2) = L(x1) − L(x2). Also see **propagation loss**.

unweighted

Term indicating that no frequency weighting function is applied. Synonymous with flat weighting.

very high-frequency (VHF) cetacean

See **hearing group**.

very low-frequency (VLF) cetacean

See **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

This section describes in detail the acoustic metrics, impact criteria, and frequency weighting relevant to the modelling study.

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 pulsed sound 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 sound and its effects on marine life. Here we provide specific definitions of relevant metrics used in the accompanying report. Where possible, we follow International Organization for Standardization definitions and symbols for sound metrics (e.g., ISO 2017, ANSI S1.1-2013).

The sound pressure level (SPL or L_p; dB re 1 μPa) is the root-mean-square (rms) pressure level in a stated frequency band over a specified time window (T; s). It is important to note that SPL always refers to an rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T g(t)\,p^2(t)\,dt \Big/ p_0^2\right)\ \mathrm{dB} \tag{A-1}$$

where $g(t)$ is an optional time weighting function. In many cases, the start time of the integration is marched forward in small time steps to produce a time-varying SPL function.

The sound exposure level (SEL or LE; dB re 1 μPa^2·s) is the time-integral of the squared acoustic pressure over a duration (T):

$$L_E = 10\log_{10}\left(\int_T p^2(t)\,dt \Big/ T_0 p_0^2\right)\ \mathrm{dB} \tag{A-2}$$

where T_0 is a reference time interval of 1 s. SEL continues to increase with time when non-zero pressure signals are present. It is a dose-type measurement, so the integration time applied must be carefully considered for its relevance to impact to the exposed recipients.

SEL can be calculated over a fixed duration, such as the time of a single event or a period with multiple acoustic events. When applied to pulsed sounds, SEL can be calculated by summing the SEL of the N individual pulses. 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:

$$L_{E,N} = 10\log_{10}\left(\sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}}\right)\ \mathrm{dB}\,. \tag{A-3}$$

If applied, the frequency weighting of an acoustic event should be specified, as in the case of weighted SEL (e.g., $L_{E,LFC,24h}$; Appendix A.4). The use of fast, slow, or impulse exponential-time-averaging or other time-related characteristics should also be specified.

A.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. 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, $f_c(i)$, is defined as:

$$f_c(i) = 10^{\frac{i}{10}} \text{ kHz} \qquad \text{(A-4)}$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the ith decade band are defined as:

$$f_{lo,i} = 10^{\frac{-1}{20}} f_c(i) \quad \text{and} \quad f_{hi,i} = 10^{\frac{1}{20}} f_c(i) \qquad \text{(A-5)}$$

The decidecade bands become wider with increasing frequency, and on a logarithmic scale the bands appear equally spaced (Figure A-1). The acoustic modelling spans from band 10 (f_c (13) = 20 Hz) to band 48 ($f_c(48)$ = 63 kHz).

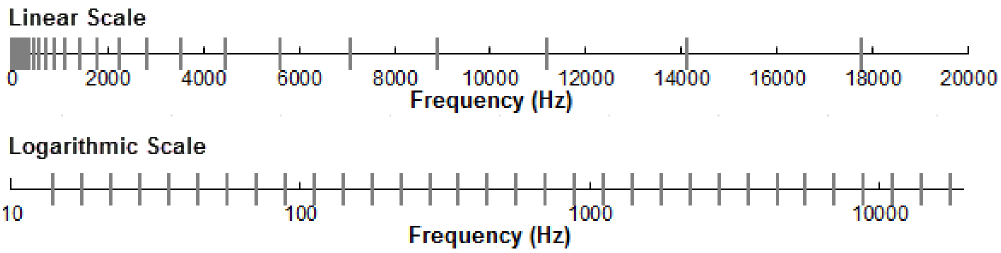


Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the ith band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{lo,i}$ and $f_{hi,i}$:

$$L_{p,i} = 10\, log_{10} \int_{f_{lo,i}}^{f_{hi,i}} S(f)\, df \;\; \text{dB} \qquad \text{(A-6)}$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_i 10^{\frac{L_{p,i}}{10}} \text{ dB} \qquad \text{(A-7)}$$

Figure A-2 shows an example of how the decidecade band sound pressure levels compare to the sound pressure spectral density levels of an ambient sound signal. Because the decidecade bands are wider than 1 Hz, the decidecade band SPL is higher than the spectral levels at higher frequencies. Acoustic modelling of decidecade bands requires less computation time than 1 Hz bands and still resolves the frequency-dependence of the sound source and the propagation environment.

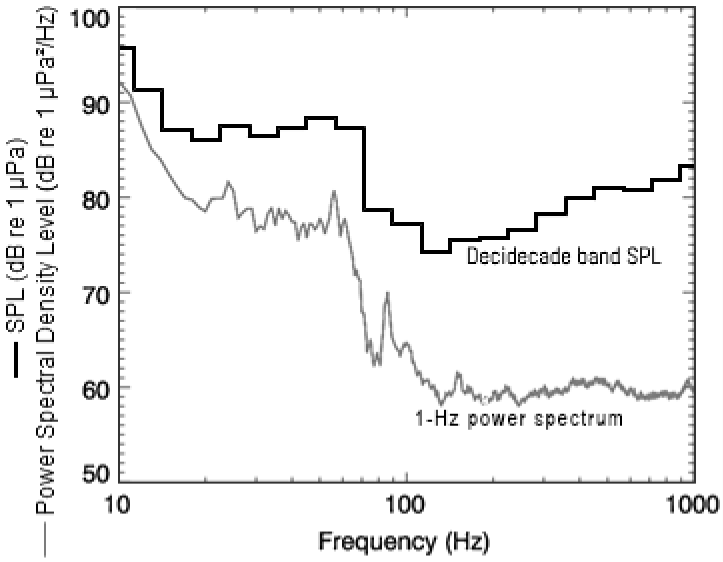


Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale.Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the power spectrum.

A.3. Marine Mammal Noise Effect Criteria

It has been long recognised that marine mammals can be adversely affected by underwater anthropogenic noise. For example, Payne and Webb (1971) suggest that communication distances of fin whales are reduced by shipping sounds. Subsequently, similar concerns arose regarding effects of other underwater noise sources and the possibility that impulsive sources—primarily airguns used in seismic surveys—could cause auditory injury. This led to a series of workshops held in the late 1990s, conducted to address acoustic mitigation requirements for seismic surveys and other underwater noise sources (NMFS 1998, ONR 1998, Nedwell and Turnpenny 1998, HESS 1999, Ellison and Stein 1999). In the years since these early workshops, a variety of thresholds have been proposed for auditory injury, impairment, and disturbance. The following sections summarise the recent development of thresholds; however, this field remains an active research topic.

A.3.1. Injury and Hearing Sensitivity Changes

In recognition of shortcomings of the SPL-only based auditory injury criteria, in 2005 NMFS sponsored the Noise Criteria Group to review literature on marine mammal hearing to propose new noise exposure criteria. Some members of this expert group published a landmark paper (Southall et al. 2007) that suggested assessment methods similar to those applied for humans. The resulting recommendations introduced dual auditory injury criteria for impulsive sounds that included peak pressure level thresholds and SEL_{24h} thresholds, where the subscripted 24h refers to the accumulation period for calculating SEL. The peak pressure level criterion is not frequency weighted whereas SEL_{24h} is frequency weighted according to one of four marine mammal species hearing groups: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively) and Pinnipeds in Water (PINN). These weighting functions are referred to as M-weighting filters (analogous to the A-weighting filter for humans; see Appendix A.4). The SEL_{24h} thresholds were obtained by extrapolating measurements of onset levels of Temporary Threshold Shift (TTS) in beluga whales by the amount of TTS required to produce Permanent Threshold Shift (PTS) in chinchillas. The Southall et al. (2007) recommendations do not specify an exchange rate, which suggests that the thresholds are the same regardless of the duration of exposure (i.e., it implies a 3 dB exchange rate).

Wood et al. (2012) refined Southall et al.'s (2007) thresholds, suggesting lower PTS and TTS values for LF and HF cetaceans while retaining the filter shapes. Their revised thresholds were based on TTS-onset levels in harbour porpoises from Lucke et al. (2009), which led to a revised impulsive sound PTS threshold for HF cetaceans of 179 dB re 1 $\mu Pa^2 \cdot s$. Because there were no data available for baleen whales, Wood et al. (2012) based their recommendations for LF cetaceans on results obtained from MF cetacean studies. In particular they referenced the Finneran and Schlundt (2010) research, which found mid-frequency cetaceans are more sensitive to non-impulsive sound exposure than Southall et al. (2007) assumed. Wood et al. (2012) thus recommended a more conservative TTS-onset level for LF cetaceans of 192 dB re 1 $\mu Pa^2 \cdot s$.

As of present, a definitive approach is still not apparent. There is consensus in the research community that an SEL-based method is preferable, either separately or in addition to an SPL-based approach to assess the potential for injuries. In August 2016, after substantial public and expert input into three draft versions and based largely on the above-mentioned literature (NOAA 2013, 2015, 2016), NMFS finalised technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing (NMFS 2016). The guidance describes auditory injury criteria with new thresholds and frequency weighting functions for the five hearing groups described by Finneran and Jenkins (2012). The latest revision to this work was published in 2018 (NMFS 2018). Southall et al. (2019) revisited the interim criteria published in 2007. All noise exposure criteria in NMFS (2018) and Southall et al. (2019) are identical (for impulsive and non-impulsive sounds); 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).

A.3.2. Behavioural Response

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. However, it is recognised that the context in which the sound is received affects the nature and extent of responses to a stimulus(Southall et al. 2007, Ellison and Frankel 2012, Southall et al. 2016).

NMFS currently uses step function (all-or-none) threshold of 120 dB re 1 µPa SPL (unweighted) for non-impulsive sounds to assess and regulate noise-induced behavioural impacts on marine mammals (NOAA 2019). The 120 dB re 1 µPa threshold is associated with continuous sources and was derived based on studies examining behavioural responses to drilling and dredging (NOAA 2018), referring toMalme et al. (1983), Malme et al. (1984), and Malme et al. (1986), which were considered in Southall et al. (2007). Malme et al. (1986) found that playback of drillship noise did not produce clear evidence of disturbance or avoidance for levels below 110 dB re 1 µPa (SPL), possible avoidance occurred for exposure levels approaching 119 dB re 1 µPa. Malme et al. (1984) determined that measurable reactions usually consisted of rather subtle short-term changes in speed and/or heading of the whale(s) under observation. It has been shown that both received level and proximity of the sound source is a contributing factor in eliciting behavioural reactions in humpback whales (Dunlop et al. 2017, Dunlop et al. 2018).

A.4. Marine Mammal Frequency Weighting

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).

A.4.1. Marine Mammal Frequency Weighting Functions

In 2015, a US 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:

$$G(f) = K + 10\log_{10}\left[\left(\frac{(f/f_{lo})^{2a}}{\left[1+(f/f_{lo})^2\right]^a\left[1+(f/f_{hi})^2\right]^b}\right)\right] \quad \text{(A-8)}$$

Finneran (2015) proposed five functional hearing groups for marine mammals in water: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively), 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 acoustic impacts on marine mammals (NMFS 2018), and in the latest guidance by Southall (2019). The updates did not affect the content related to either the definitions of frequency-weighting functions or the threshold values. Table A-1 lists the frequency-weighting parameters for each hearing group relevant to this assessment, and Figure A-3 shows the resulting frequency-weighting curves.

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019).

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
High-frequency cetaceans (most dolphins, plus sperm, beaked, and bottlenose whales)	1.6	2	8,800	110,000	1.20
Other marine carnivores (including otariids) in water	2	2	940	25,000	0.64

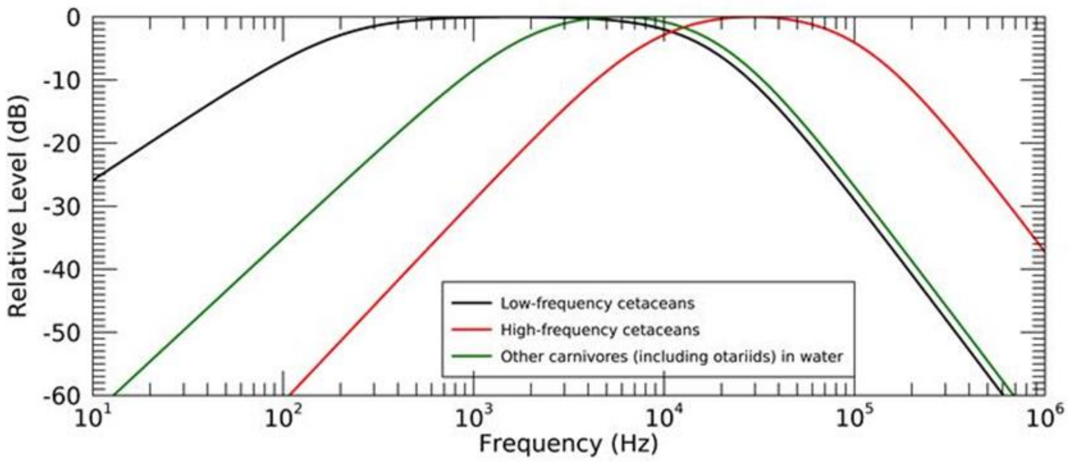


Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019).

Appendix B. Methods and Parameters

B.1. Environmental Parameters

B.1.1. Bathymetry

Bathymetry throughout the modelled area was client supplied and supplemented with bathymetry data extracted from the Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). The bathymetry data were re-gridded and combined onto a Map Grid of Australia (MGA) coordinate projection (Zone 50) with a regular grid spacing of 250 m × 250 m (Figure B-1).

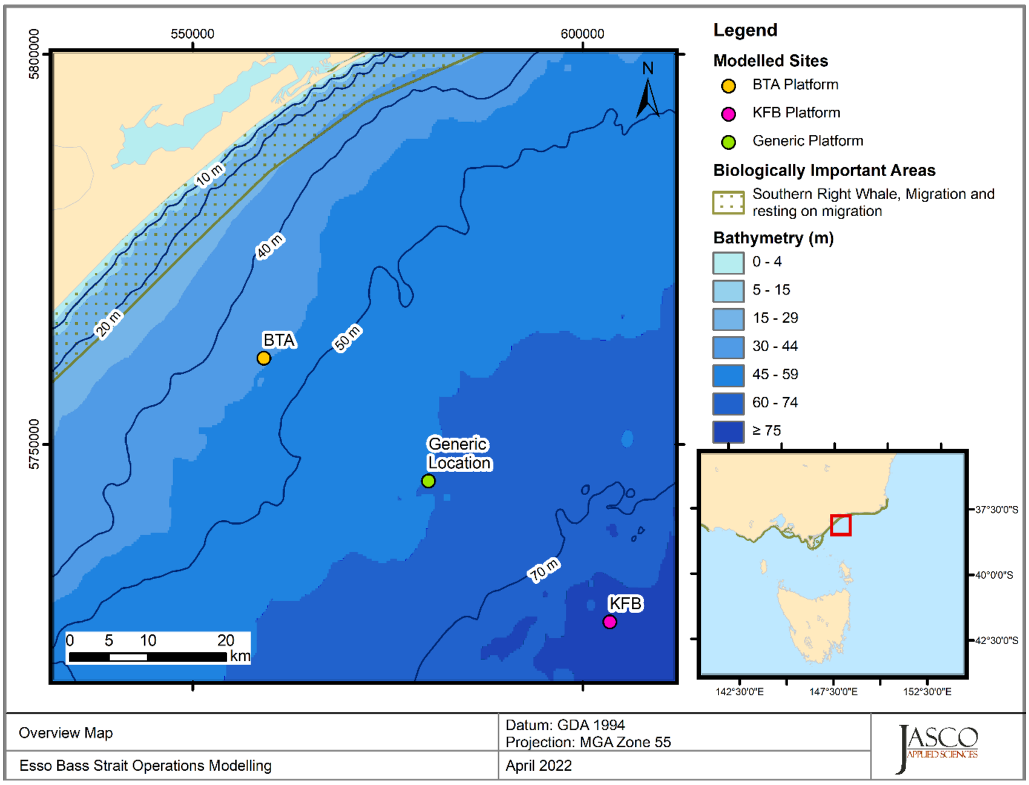


Figure B-1. Bathymetry in the modelled area.

B.1.2. Sound Speed Profile

The mean daily sound speed profiles were derived from the Global Ice Ocean Prediction System (GIOPS) forecasting system for the period when the monitoring program occurred (March 2021 to April 2021 inclusive; McPherson et al. 2022). A median profile determined to best represent potential propagation conditions over the period at each production platform. The GIOPS is a data assimilation system that combines satellite and in-situ measurements for ice and ocean analyses and forecasts. 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.

For longer-range sound propagation modelling, the profiles were extended using e sound speed profile in the area was derived from temperature and salinity profiles from the US 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 US 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).

s. Figure B-2 shows the profiles used as input to the sound propagation modelling at the BTA and KFB platforms. The same profiles were used for all scenarios; the profile at the KFB platform was also used for modelling at the generic production platform and the jack-up rig because it is the profile most favourable to long-range propagation.

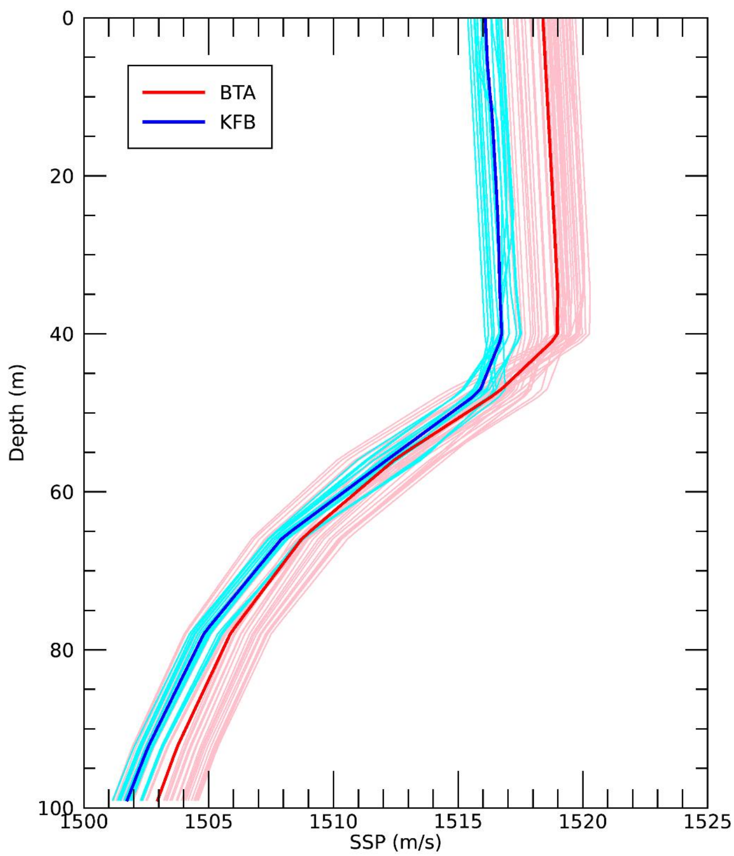


Figure B-2. The sound speed profiles used for modelling: The daily and median profiles for the first 100 m from Global Ice Ocean Prediction System (GIOPS)Geoacoustics.

The geoacoustic profile determines how energy is reflected from the seabed, as well as how it is transmitted and absorbed into the sediment layers. The geoacoustic profiles representing the seabed near the BTA and KFB platforms were derived in the monitoring program (McPherson et al. 2022); they are presented in Tables B-1 and B-2. The geoacoustic profile at the KFB platform was also used to represent the seabed at the generic platform and jack-up rig location, because it is the profile most favourable to long-range propagation.

Table B-1. Geoacoustic profile at the BTA platform. Each parameter varies linearly within the stated range.

Depth below seafloor (m)	Material	Density (g/cm³)	Compressional wave		Shear wave	
			Speed (m/s)	Attenuation (dB/λ)	Speed (m/s)	Attenuation (dB/λ)
0–5	Medium Sand	2.01–2.02	1720–1840	0.21-0.22	400	3.65
5–10		2.02	1840–1910	0.22-0.23		
10–20		2.02–2.03	1910–2010	0.23-0.24		
20–50		2.03–2.05	2010–2200	0.24-0.26		
50–1000	Limestone (semi-cemented calcarenite)	2.05	2200	0.26		
> 1000	Basement (rock)	3.0	3800	0.38		

Table B-2. Geoacoustic profile at the KFB platform. 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)
0–25	Very fine sand	2.00	1727.8-1819.5	0.570-0.900	250	3.65
25-100	Silt	1.97	1780.0-1909.1	0.851-1.217		

B.2. Sound Propagation Models

B.2.1. Propagation Loss

The propagation of sound through the environment was modelled by predicting the acoustic propagation loss—a measure, in decibels, of the decrease in sound level between a source and a receiver some distance away. Geometric spreading of acoustic waves is the predominant way by which propagation loss occurs. Propagation loss also happens when the sound is absorbed and scattered by the seawater, and absorbed scattered, and reflected at the water surface and within the seabed. Propagation loss depends on the acoustic properties of the ocean and seabed; its value changes with frequency.

If the acoustic energy source level (ESL), expressed in dB re 1 μPa²·s m², and propagation loss (PL), in units of dB, at a given frequency are known, then the received level (RL) at a receiver location can be calculated in dB re 1 μPa²·s by:

$$\mathrm{RL} = \mathrm{SL} - \mathrm{PL}. \tag{B-1}$$

B.2.2. MONM-BELLHOP

Long-range sound fields were computed using JASCO's Marine Operations Noise Model (MONM). While other models may be more accurate for steep-angle propagation in high-shear environment, MONM is well suited for effective longer-range estimation. This model computes sound propagation at frequencies of 10 Hz to 1.6 kHz via a wide-angle parabolic equation solution to the acoustic wave equation (Collins 1993) based on a version of the U.S. Naval Research Laboratory's Range-dependent Acoustic Model (RAM), which has been modified to account for a solid seabed (Zhang and Tindle 1995). MONM computes sound propagation at frequencies > 1.6 kHz via the BELLHOP Gaussian beam acoustic ray-trace model (Porter and Liu 1994).

The parabolic equation method has been extensively benchmarked and is widely employed in the underwater acoustics community (Collins et al. 1996). MONM accounts for the additional reflection loss at the seabed, which results from partial conversion of incident compressional waves to shear waves at the seabed and sub-bottom interfaces, and it includes wave attenuations in all layers. MONM incorporates the following site-specific environmental properties: a bathymetric grid of the modelled area, underwater sound speed as a function of depth, and a geoacoustic profile based on the overall stratified composition of the seafloor.

MONM computes acoustic fields in three dimensions by modelling propagation loss within two-dimensional (2-D) vertical planes aligned along radials covering a 360° swath from the source, an approach commonly referred to as N×2-D. These vertical radial planes are separated by an angular step size of $\Delta\theta$, yielding N = 360°/$\Delta\theta$ number of planes (Figure B-3).

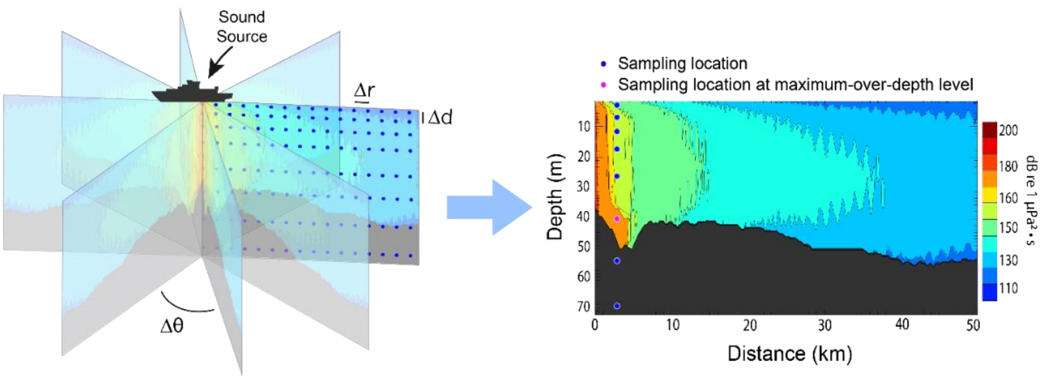


Figure B-3. The N×2-D and maximum-over-depth modelling approach used by MONM.

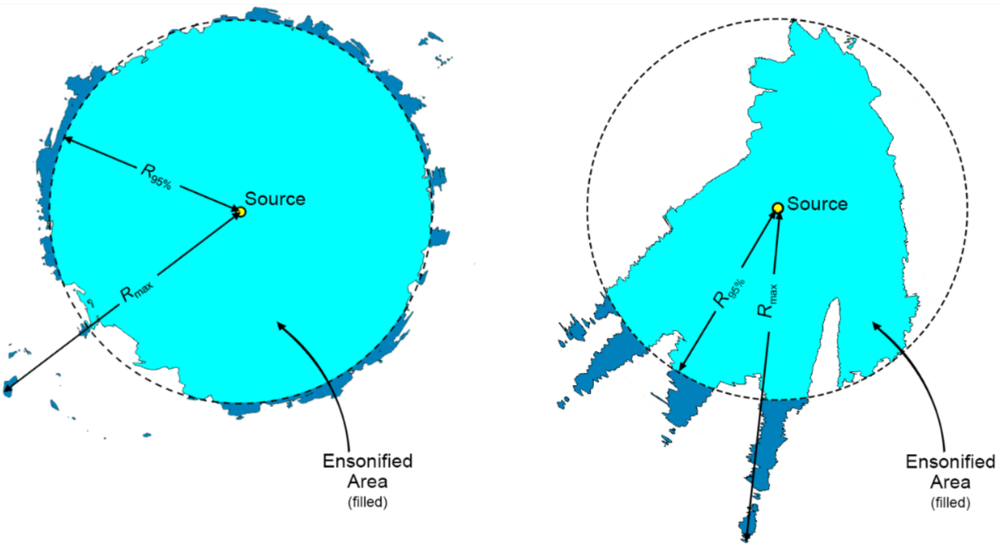
MONM treats frequency dependence by computing acoustic propagation loss at the centre frequencies of decidecade bands. Sufficiently many decidecade frequency-bands, starting at 10 Hz, are modelled to include most of the acoustic energy emitted by the source. At each centre frequency, the propagation loss is modelled within each of the N vertical planes as a function of depth and range from the source. The decidecade received per-second SEL are computed by subtracting the band propagation loss values from the directional source level in that frequency band. Composite broadband received per-second SEL are then computed by summing the received decidecade levels.

The received 1-s SEL sound field within each vertical radial plane is sampled at various ranges from the source, generally with a fixed radial step size. At each sampling range along the surface, the sound field is sampled at various depths, with the step size between samples increasing with depth below the surface. The step sizes are chosen to provide increased coverage near the depth of the source and at depths of interest in terms of the sound speed profile. For areas with deep water, sampling is not performed at depths beyond those reachable by marine mammals. The received per-pulse or per-second SEL at a surface sampling location is taken as the maximum value that occurs over all samples within the water column, i.e., the maximum-over-depth received per-second SEL. These maximum-over-depth per-second SEL are presented as colour contours around the source.

B.3. 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-4).

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-4(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-4(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.



(a) (b)

Figure B-4. 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.4. Model Validation Information

Predictions from JASCO's propagation models (MONM, FWRAM, and VSTACK) have been validated against experimental data from a number of underwater acoustic measurement programs conducted by JASCO globally, including the United States and Canadian Artic, Canadian and southern United States waters, Greenland, Russia and Australia (Hannay and Racca 2005, Aerts et al. 2008, Funk et al. 2008, Ireland et al. 2009, O'Neill et al. 2010, Warner et al. 2010, Racca et al. 2012a, Racca et al.

2012b, Matthews and MacGillivray 2013, Martin et al. 2015, Racca et al. 2015, Martin et al. 2017a, Martin et al. 2017b, Warner et al. 2017, MacGillivray 2018, McPherson et al. 2018, McPherson and Martin 2018).

In addition, JASCO has conducted measurement programs associated with a significant number of anthropogenic activities that have included internal validation of the modelling (including McCrodan et al. 2011, Austin and Warner 2012, McPherson and Warner 2012, Austin and Bailey 2013, Austin et al. 2013, Zykov and MacDonnell 2013, Austin 2014, Austin et al. 2015, Austin and Li 2016, Martin and Popper 2016).

Appendix J: JASCO Conductor DrivingSound modelling Report

ExxonMobil Marlin B Conductor Piling

Acoustic Modelling for Assessing Marine Fauna Sound Exposures

JASCO Applied Sciences (Australia) Pty Ltd

21 August 2023

Submitted to:

Pepper Sheppard
ExxonMobil
Contract: 4501789511

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Executive Summary

JASCO Applied Sciences (JASCO) performed a modelling study of underwater sound levels associated with the impact piling of a conductor casing at the Marlin B platform.

The study predicted ranges to acoustic thresholds that may result in injury to or behavioural disturbance of marine fauna. The fauna considered included marine mammals, sea turtles, fish including fish larvae and eggs, and invertebrates. The corresponding thresholds used in this study represented the best available science for behavioural response or disturbance, temporary threshold shift (TTS), and permanent threshold shift (PTS) or injury depending upon the fauna group.

This modelling study characterised the sound from impact piling and determined how it may propagate into the wider environment. The modelling considered dynamics of impact pile driving and range-dependent environmental properties. It was assumed that the piling activities could be performed at any time during the year, therefore the conservative criteria were employed when selecting the season for the modelling scenario.

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p); zero-to-peak pressure levels (PK, L_{pk}); and either single-strike (i.e., per-strike) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria and noise sources. In this report, the assessment period for SEL accumulation is defined as a 24-hour period over which sound energy may be integrated; the level is specified with the abbreviation SEL_{24h}.

SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels within 24 hours, based on the assumption that a receiver (e.g., an animal) is consistently exposed to such noise levels at a fixed position. More realistically, marine animals would not stay in the same location for 24 hours (especially in the absence of location-specific habitat) but rather a shorter period, depending on the animal’s behaviour and the source’s proximity and movements. Therefore, a reported radius for the SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be impaired, but rather that an animal could be exposed to the sound level associated with impairment (either PTS or TTS) if it remained at that location for 24 hours.

A summary of the acoustic modelling results for piling operations are included below.

Marine mammals

- The maximum distance where the NOAA (2019) marine mammal behavioural response criterion of 160 dB re 1 µPa (SPL) for impulsive noise could be exceeded varied between 0.31 and 0.45 km, depending on modelled penetration depth.
- The results for marine mammal injury considered the criteria from Southall et al. (2019). These criteria contain two metrics (PK and SEL_{24h}), both required for the assessment of marine mammal PTS and TTS. The longest distance associated with either metric is required to be applied for assessment; Table 1 summarises the maximum distances, along with the relevant metric.
- The distance to PTS and TTS was always furthest in the broadside direction; distances are shown in Table 1.

Table 1. Summary of maximum (R_{max}) horizontal distances (in km) from Marlin B platform to behavioural response thresholds and temporary threshold shift (TTS) and permanent threshold shift (PTS) for marine mammals showing the relevant metric.

Hearing group	Maximum modelled distance to effect threshold (R_{max})		
	Behavioural response[1]	Impairment (km): TTS[2]	Impairment (km): PTS[2]
LF cetaceans	0.45	2.93 (SEL_{24h})	0.67 (SEL_{24h})
HF cetaceans		–	–
VHF cetaceans		1.02 (SEL_{24h})	0.08 (SEL_{24h})

Noise exposure criteria: [1] NOAA (2019) and [2] Southall et al. (2019).
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Sea turtles

- The PK sea turtle injury criteria of 232 dB re 1 µPa for PTS and 226 dB re 1 µPa for TTS from Finneran et al. (2017) was not predicted to occur.
- The maximum distance to the SEL_{24h} metrics for PTS and TTS onset were not predicted to occur (Finneran et al. 2017). As is the case with marine mammals, a reported radius for SEL_{24h} criteria does not mean that sea turtles travelling within this radius of the source will be injured, but rather that an animal could be exposed to the sound level associated with either PTS or TTS if it remained in that location for 24 hours.
- Table 2 summarises the distances to where the criterion for behavioural response of turtles to 166 dB re 1 µPa (SPL) and the 175 dB re 1 µPa (SPL) threshold (McCauley et al. 2000) for behavioural disturbance could be exceeded.

Table 2. Summary of horizontal distances (in km) to turtle behavioural response criteria, temporary threshold shift (TTS), and permanent threshold shift (PTS).

Hearing group	Maximum modelled distance to effect threshold (R_{max})			
	Behavioural response[1]	Behavioural disturbance[2]	Impairment: TTS[3]	Impairment: PTS[3]
Sea Turtles	0.15	–	–	–

Noise exposure criteria: [1,2] (McCauley et al. 2000), and [3] Finneran et al. (2017)

Fish, fish eggs, and fish larvae

- This modelling study assessed the ranges for quantitative criteria based on Popper et al. (2014) and considered both PK and SEL_{24h} metrics associated with mortality and potential mortal injury as well as impairment in the following groups:
  - Fish without a swim bladder (also appropriate for sharks in the absence of other information),
  - Fish with a swim bladder that do not use it for hearing,
  - Fish that use their swim bladders for hearing,
  - Fish eggs and fish larvae.
- Table 3 summarises distances to effect criteria for fish, fish eggs, and fish larvae along with the relevant metric. Seafloor sound levels were assessed within the water column.

Table 3. Summary of maximum fish, fish eggs, and larvae injury and temporary threshold shift (TTS) onset distances for single impulse and 24 hour sound exposure level (SEL_{24h}) modelled scenarios.

Relevant hearing group	Effect criteria	Water column	
		Metric associated with longest distance to criteria	R_{max} (km)
Fish: No swim bladder	Recoverable injury	SEL_{24h} or PK	–
	TTS	SEL_{24h}	0.63
Fish: Swim bladder not involved in hearing and Swim bladder involved in hearing	Recoverable injury	SEL_{24h} or PK	–
	TTS	SEL_{24h}	0.63
Fish eggs, and larvae (relevant to plankton)	Injury	SEL_{24h} or PK	–

1. Introduction

JASCO Applied Sciences (JASCO) performed a numerical estimation study of underwater sound levels associated with piling operations at the Marlin B Platform to assist in understanding the potential acoustic effect on receptors including marine mammals, sea turtles, and fish including fish larvae and eggs.

The modelling study predicted the distances at which underwater sound levels from operations reached noise effect thresholds and criteria. Due to the variety of species considered, there are several different thresholds for evaluating effects, including: mortality, injury, temporary reduction in hearing sensitivity, and behavioural disturbance.

Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p); zero-to-peak pressure levels (PK, L_{pk}), and either single-strike (i.e., per-strike) or accumulated sound exposure levels (SEL, L_E) as appropriate for different noise effect criteria and noise sources. In this report, the duration period for SEL accumulation is defined as a 24-hour period over which sound energy is integrated; the level is specified with the abbreviation SEL_{24h}.

Section 1 outlines the specific details of modelling study. Section 2 details the metrics used to represent underwater acoustic fields and the associated effect criteria considered. Section 3 details the methodology for predicting the source levels and modelling the sound propagation, including source levels and environmental parameters required by the propagation models. Section 4 presents the results, which are then discussed in Section 5.

1.1. Modelling Scenarios

The acoustic modelling study for conductor piling operations at the Marlin B Platform is located to the east of Bass Strait and in approximately 58 m water depth. The study considered impulsive noise from installing a single conductor pile through impact piling. Full waveform acoustic modelling (Appendix C.3) was used in this report to estimate the noise impact on marine fauna.

JASCO modelled an IHC S-150 impact hammer for use with driving a single conductor pile at one location. Modelling included variable hammer energy derived from previous driven piles at the platform as well as client-supplied drivability logs sheets. The conductor pile dimensions of the pile considered for modelling were a length of 141.1 m and a diameter of 0.66 m (26 in).

The total noise exposure (SEL) for each scenario depends on the total number of hammer blows required to drive the pile. The provided drivability logs estimated that it would take approximately 5956 blows (1.9 h driving at 46 blows per minute) to drive the piles 77 m into the substrate with a similar 150 kJ hammer. These were also used for modelling here.

This location is detailed in Table 4 and indicated graphically in Figure 1.

Table 4. Location of the piling activities in MGA coordinates (Datum GDA94, MGA Zone 55).

Designation	Latitude (S)	Longitude (E)	MGA[1] Zone 55 (GDA94[2])		Water depth (m)
			X (m)	Y (m)	
Marlin B Platform	38° 13' 46"	148° 13' 16"	606877	5768022	58

[1] Map Grid of Australia
[2] Geocentric Datum of Australia 1994

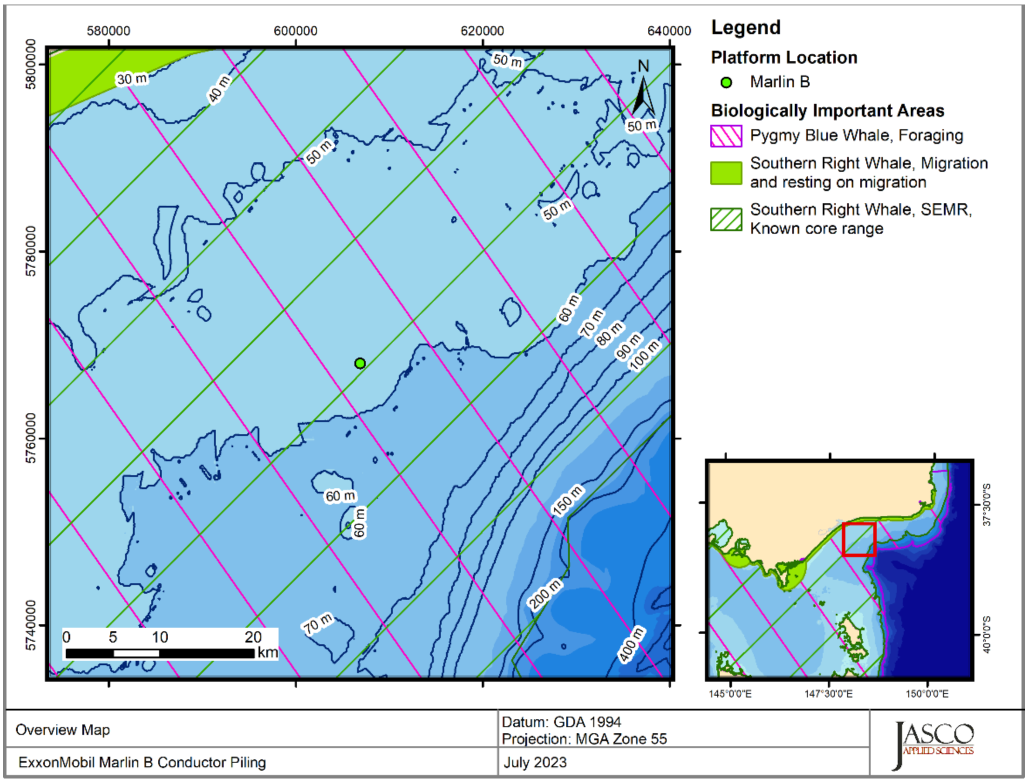

Figure 1. Overview of the modelled site and features associated with the Marlin B Platform.

2. Noise Effect Criteria

To assess the potential effects of a sound–producing activity, it is necessary to first 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.

The perceived loudness of sound, especially impulsive noise such as from pile driving, is not generally proportional to the instantaneous acoustic pressure. Rather, perceived loudness depends on the pulse rise-time and duration, and the frequency content. Several sound level metrics, such as PK, SPL, and SEL, are commonly used to evaluate noise and its effects on marine life (Appendix A). The period of accumulation associated with SEL is defined, with this report referencing either a “per-strike” assessment or over 24 h. For non-impulsive sound sources, such as vessels, SPL and SEL are the relevant metrics. The acoustic metrics in this report reflect the ISO standard for acoustic terminology, ISO/DIS 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. Marine mammals:
    a. Peak pressure levels (PK; L_{pk}) and 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 impulsive sources.
    b. Marine mammal behavioural thresholds based on the current interim U.S. National Oceanic and Atmospheric Administration (NOAA) (2019) unweighted criterion for marine mammals of 160 dB re 1 µPa (SPL; L_p) for impulsive sound sources.
2. Fish, fish eggs, and larvae:
    a. Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
3. Sea turtles:
    a. 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 and impulsive sound sources.
    b. Sea turtle behavioural response threshold of 166 dB re 1 µPa (SPL; L_p) for impulsive noise, along with a sound level associated with behavioural disturbance 175 dB re 1 µPa (SPL; L_p) (McCauley et al. 2000).

The following sections (Section 2.1 along with Appendices A.3 and A.4), expand on the thresholds, guidelines and sound levels for all marine fauna.

2.1. Impulsive Noise

Impact pile driving activities have been assessed as an impulsive noise source consistent with the considered thresholds and guidelines.

2.1.1. Marine Mammals

The criteria applied in this study to assess possible effects of impulsive noise sources on marine mammals are summarised Table 5; cetaceans were identified as the hearing group requiring assessment. Details on thresholds related to auditory threshold shifts or hearing loss and behavioural response are provided in Appendix A.3, with frequency weighting explained in detail in Appendix A.4. Of particular note, whilst the newly published 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. The criteria from the current interim U.S. National Oceanic and Atmospheric Administration (NOAA) (2019) has been applied.

Table 5. Acoustic effects of impulsive noise on marine mammals: Unweighted SPL, SEL_{24h}, and PK thresholds.

Hearing group	NOAA (2019)	Southall et al. (2019)			
	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 µPa²·s)	PK (L_{pk}; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	PK (L_{pk}; dB re 1 µPa)
Low–Frequency (LF) cetaceans	160	183	219	168	213
High–frequency (HF) cetaceans		185	230	170	224
Very–High–frequency (VHF) cetaceans		155	202	140	196

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset.
L_p denotes sound pressure level and has a reference value of 1 µPa.
L_{pk} denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.
$L_{E,24h}$ denotes cumulative sound exposure over a 24 h period and has a reference value of 1 µPa²s.

2.1.2. Fish, Sea turtles, Fish Eggs, and Fish Larvae

In 2006, the Working Group on the Effects of Sound on Fish and Sea Turtles was formed to continue developing noise exposure criteria for fish and sea turtles, work begun by a NOAA panel two years earlier. The Working Group developed guidelines with specific thresholds for different levels of effects for several species groups (Popper et al. 2014). The guidelines define quantitative thresholds for three types of immediate effects:

- Mortality, including injury leading to death,
- Recoverable injury, including injuries unlikely to result in mortality, such as hair cell damage and minor haematoma, and
- TTS.

Masking and behavioural effects can be assessed qualitatively, by assessing relative risk rather than by specific sound level thresholds. However, as these depend upon activity–based subjective ranges, these effects are not addressed in this report and are included in Tables 6 for completeness only. Because the presence or absence of a swim bladder has a role in hearing, fish's susceptibility to injury from noise exposure depends on the species and the presence and possible role of a swim bladder in hearing. Thus, different thresholds were proposed for fish without a swim bladder (also appropriate for sharks and applied to whale sharks in the absence of other information), fish with a swim bladder not used for hearing, and fish that use their swim bladders for hearing. Sea turtles, fish eggs, and fish larvae are considered separately.

Impulsive noise from pile driving is assessed in this study based on the relevant effects thresholds from Popper et al. (2014) listed in Table 6. In general, whether an impulsive sound adversely effects fish behaviour depends on the species, the state of the individual exposed, and other factors.

The SEL metric integrates noise intensity over some period of exposure. Because the period of integration for regulatory assessments is not well defined for sounds that do not have a clear start or end time, or for very long–lasting exposures, an exposure evaluation time must be defined. Southall et al. (2007) defines the exposure evaluation time as the greater of 24 h or the duration of the activity. Popper et al. (2014) recommend a standard period of the duration of the activity; however, the publication also includes caveats about considering the actual exposure times if fish move. Integration times in this study for piling have been applied over the time a single pile was driven because only one pile is expected to be driven per day.

Table 6. Criteria for pile driving noise exposure for fish, adapted from Popper et al. (2014).

Type of animal	Mortality and Potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: No swim bladder (particle motion detection)	> 219 dB SEL_{24h} or > 213 dB PK	> 216 dB SEL_{24h} or > 213 dB PK	>> 186 dB SEL_{24h}	Pile driving: (N) Moderate (I, F) Low Seismic: (N, I, F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	210 dB SEL_{24h} or > 207 dB PK	203 dB SEL_{24h} or > 207 dB PK	>> 186 dB SEL_{24h}	Pile driving: (N) Moderate (I, F) Low Seismic: (N, I, F) Low	(N) High (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{24h} or > 207 dB PK	203 dB SEL_{24h} or > 207 dB PK	186 dB SEL_{24h}	Pile driving: (N, I) High (F) Moderate Seismic: (N, I) Low (F) Moderate	(N, I) High (F) Moderate
Fish eggs and fish larvae	> 210 dB SEL_{24h} or > 207 dB PK	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	Pile driving: (N) Moderate (I, F) Low Seismic: (N, I, F) Low	(N) Moderate (I, F) Low

Peak sound pressure level: dB re 1 µPa; SEL_{24h} dB re 1µPa^2·s.
All criteria are presented as sound pressure even for fish without swim bladders since no data for particle motion exist.
Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

There is a paucity of data regarding responses of turtles to acoustic exposure, and no studies of hearing loss due to exposure to loud sounds. Popper et al. (2014) suggested thresholds for onset of mortal injury (including PTS) and mortality for sea turtles and, in absence of taxon–specific information, adopted the levels for fish that do not hear well (suggesting that this likely would be conservative for sea turtles). Finneran et al. (2017) in turn presented revised thresholds for sea turtle injury and hearing impairment (TTS and PTS). Their rationale is that sea turtles have best sensitivity at low frequencies and are known to have poor auditory sensitivity (Bartol and Ketten 2006, Dow Piniak et al. 2012). Accordingly, TTS and PTS thresholds for turtles are likely more similar to those of fishes than to marine mammals (Popper et al. 2014).

McCauley et al. (2000) observed the behavioural response of caged sea turtles—green (*Chelonia mydas*) and loggerhead (*Caretta caretta*)—to an approaching seismic airgun. For received levels above 166 dB re 1 µPa (SPL), the sea turtles increased their swimming activity, and above 175 dB re 1 µPa they began to behave erratically, which was interpreted as an agitated state. The Recovery Plan for Marine Turtles in Australia (Department of the Environment and Energy et al. 2017) acknowledges the 166 dB re 1 µPa SPL reported (McCauley et al. 2000) as the level that may result in a behavioural response to marine turtles. The 175 dB re 1 µPa level from McCauley et al. (2000) is recommended as a criterion for behavioural disturbance; these thresholds are shown in Table 7.

Table 7. Acoustic effects of impulsive noise on sea turtles: Unweighted sound pressure level (SPL), 24-hour sound exposure level (SEL_{24h}), and peak pressure (PK) thresholds

Effect type	Criterion	SPL (L_p; dB re 1 µPa)	Weighted SEL_{24h} ($L_{E,24h}$; dB re 1 µPa^2·s)	PK (L_{pk}; dB re 1 µPa)
Behavioural response	McCauley et al. (2000)	166	NA	
Behavioural disturbance		175		
PTS onset thresholds[1] (received level)	Finneran et al. (2017)	NA	204	232
TTS onset thresholds[1] (received level)			189	226

[1] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS and TTS onset.

L_p denotes sound pressure level and has a reference value of 1 µPa.

L_{pk} denotes peak sound pressure is flat weighted or unweighted and has a reference value of 1 µPa.

$L_{E,24h}$ denotes cumulative sound exposure over a 24 h period and has a reference value of 1 µPa^{2}s.

3. Methods

3.1. Per-strike Modelling

When driven with impact hammers, piles deform, creating a stress wave that travels down the pile and radiates sound into the surrounding air, water, and seabed. This sound may be received as a direct transmission from the sound source to biological receivers (such as marine mammals, sea turtles, and fish) through the water or as the result of reflected paths from the surface or re-radiated into the water from the seabed. Sound transmission depends on many environmental parameters, such as the sound speeds in water and substrates; material parameters of the pile and how it is driven, including the pile material, size (length, diameter, and thickness) and the type and energy of the hammer.

To predict the acoustic field from the pile driving, JASCO's Pile Driving Source Model (PDSM; Appendix B), a physical model of pile vibration and near-field sound radiation (MacGillivray 2014), was used in conjunction with the GRLWEAP 2010 wave equation model (GRLWEAP, Pile Dynamics 2010) to predict source levels associated with impact pile driving activities. Piles are modelled as a vertical installation using a finite-difference structural model of pile vibration based on thin-shell theory. The sound radiating from the pile itself was simulated using a vertical array of discrete point sources. GRLWEAP 2010 was used to compute the force at the top of each pile assuming direct contact between the representative hammers, helmets, and piles. The pile was modelled at three representitive depths to account for variability over the entire drive, detail is provided in Table 8.

Table 8. Modelled pile driving hammer parameters.

Hammer model	Modelled Depths (m)	Modelled Energy (kJ)	Hammer Efficiency (%)	Ram weight (t)	Hammer weight (t)	Modelled blow rate (per min)
IHC S-150	15.3	45.9	31	7.5	16.2	44
	40.0	42.0	28			
	64.7	61.0	41			

The forcing functions serve as inputs to JASCO's pile driving source model (PDSM), which was used to estimate equivalent acoustic source characteristics detailed in Appendix B.1.2. Forcing functions for the hammer were modelled assuming that driving was carried out using the associated hammer energy for each modelled segment by adjusting the hammers efficiency (Figure 2). As discussed earlier, these efficiencies/energies were derived from insitu pile drivability logs for similar conductor piles previously installed at the Marlin B Platform.

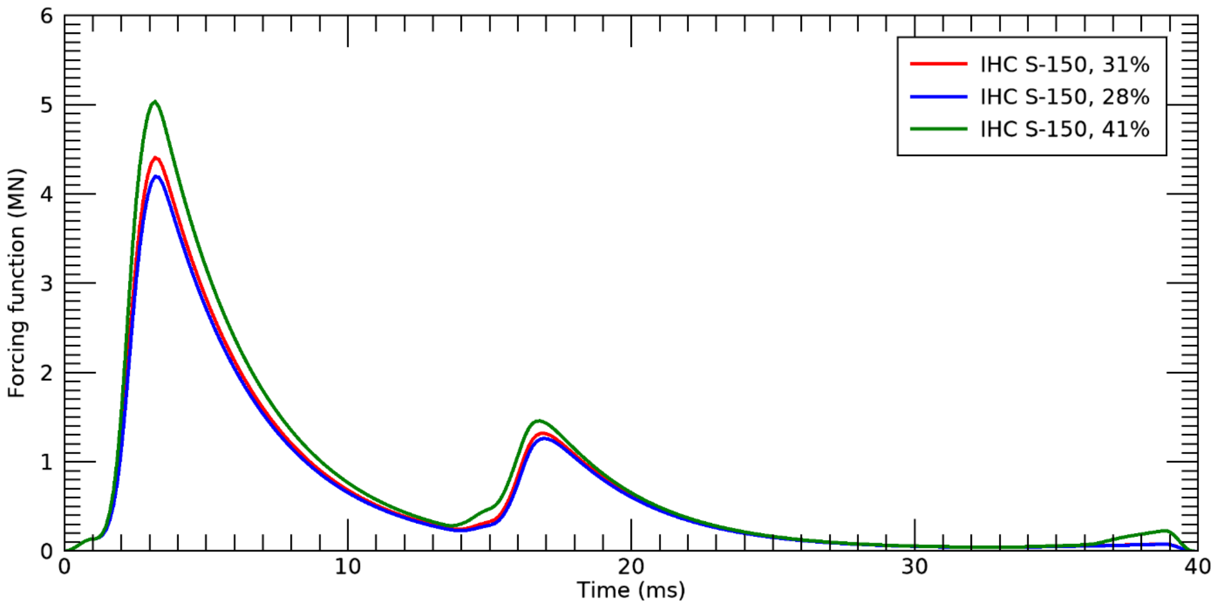

Figure 2. Modelled forcing function versus time for the IHC S-150 hydraulic impact hammer for 0.66 m diameter piles at three efficiencies.

JASCO's FWRAM (FWRAM, Appendix C.3) propagation model was used to combine the outputs of the source model with spatial environmental factors (e.g., location, oceanographic conditions, and seabed type, see Appendix C.1 for detail) to get time-domain representations of the sound signals in the environment and estimate sound field levels. This model is used to estimate the energy distribution per frequency (source spectrum) at a close distance from the source (10 m) from 10 Hz to 1024 Hz. In addition, an empirical extrapolation was applied to these results to extend the frequency range up to 25 kHz and a 20 dB/decade decay rate was applied to match acoustic measurements of impact pile driving of similarly-sized piles (Illingworth & Rodkin 2007, Matuschek and Betke 2009). Examples of decidecade band levels are provided in Section 4.1.1. Appendix A.1 describes the sound level metrics in further detail.

To produce maps of received sound level distributions and to calculate distances to specified sound level thresholds, the maximum-over-depth level is calculated at each modelled easting and northing position within the considered region. The radial grids of maximum-over-depth levels are then resampled (by linear triangulation) to produce a regular Cartesian grid with a cell size of 20 m. The contours and threshold ranges were calculated from these flat Cartesian projections of the modelled acoustic fields (Appendix C.4).

3.2. Accumulated SEL Modelling for Pile Driving

The modelling approach outlined in Sections 3.1 provides per-strike SEL for three stages of pile driving (i.e., three penetration depths). Because a single pile will be driven per day and the piling noise level far exceeds any background, the corresponding sound exposure level can be denoted as SEL_{24h} even though the effective period of accumulation is the estimated time for fully driving a single pile. The accumulated SEL over a single pile, or the SEL_{24h}, depends on the total number of strikes to drive the pile to the target penetration depth.

Total driving time was estimated assuming continuous piling at a rate of 44 strikes/minute for the IHC S-150. As per the pile design, likely hammer and installation approach, the number of strikes required for the driving of the pile were estimated using the provided drivability with a hammer of similar energy. The SEL_{24h} was computed by adjusting the single-strike SEL by $10*\log_{10}(N)$, where N is the total number of strikes. A summary of the total number of strikes per penetration depth and over the entire pile is provided in Table 9.

Table 9. Total number of strikes and driving time. Strikes were broken down into stages corresponding to the three modelled penetrations for the IHC S-150 hammer. Pile specifications are shown in Table 8.

Pile Type	Hammer	Full penetration depth (m)	Modelled penetration depth (m)	Penetration range for accumulated SEL (m)	Number of strikes	Average Penetration rate (mm/strike)	Total number of strikes	Time for full penetration (hr)
Conductor Pile	IHC S-150	77	15.3	24.7	1862	13.2	5956	2.26
			40.0	24.6	1464	16.8		
			64.7	24.7	2630	9.4		

4. Results

For the results and tables presented below where a dash is used in place of a horizontal distance, these thresholds may or may not be reached due to the discreetly sampled radial increments of the modelled sound fields. A dash therefore is an indication that effect levels for the associated metric may only be reached within a very close proximity to a given source.

4.1. Pile Driving

The maximum-over-depth sound fields for the modelled pile driving scenarios are presented in two formats: as tables of distances to sound levels (Section 4.1.2) and, where the distances are long enough, as contour maps showing the directivity and range to various sound levels (Section 4.1.3).

4.1.1. Received Levels at 10 m

Since piles are distributed and directional sources, they cannot be accurately approximated by a point source with corresponding source levels. It is possible to compare the maximum modelled levels at short distances from the piles. Figure 3 shows the decidecade–band levels for the receiver with the highest SEL at a horizontal range of 10 m, for each of the three modelled penetration depths.

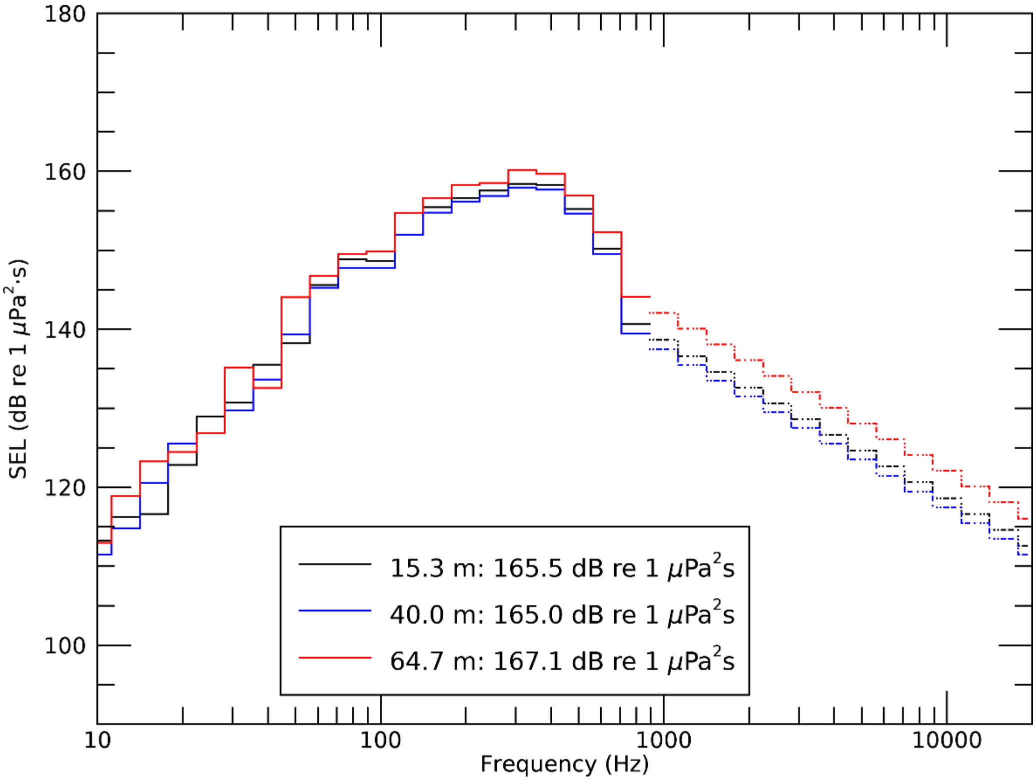

Figure 3. Decidecade–band levels for the receiver with highest SEL at 10 m horizontal range for impact pile driving using the IHC S-150 hammer, after high–frequency extrapolation (dashes indicate extrapolated portion of the spectrum above 1000 Hz). Legend items indicate the modelled pile penetration and the broadband SEL in dB re 1 μPa²·s.

4.1.2. Tabulated Results

This section presents the per-strike sound fields in terms of maximum-over-depth SPL, SEL, and PK. The different metrics are presented for the following reasons:

- SPL sound fields (Table 10) were used to determine the distances to marine mammal and turtle behavioural thresholds (see Section 2.1).
- SEL sound fields (Table 11) are used as inputs into the 24 h SEL scenario.
- PK metrics within the water column (Table 12) are relevant to thresholds and guidelines for marine mammals, sea turtles, fish, fish eggs and larvae (see Section 2.1).

Frequency-weighted SEL_{24h} sound fields were used to estimate the maximum distance and the area ($R_{max\ \%}$; calculated as detailed in Appendix C.4) to marine mammals and turtle PTS and TTS thresholds (listed in Table 13), and to estimate maximum distance and the area to injury and TTS guidelines for fish (Table 14).

Table 10. *Modelled maximum–over–depth per–strike SPL isopleths*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from each pile and for each penetration depth.

SPL (L_p; dB re 1 µPa)	Penetration depth					
	15.3 m		40.0 m		64.7 m	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
200	–	–	–	–	–	–
190	–	–	–	–	–	–
180	–	–	–	–	–	–
175[1]	–	–	–	–	–	–
170	0.05	0.05	0.05	0.05	0.09	0.09
166[2]	0.12	0.12	0.12	0.11	0.15	0.15
160[3]	0.32	0.31	0.31	0.30	0.45	0.44
150	1.15	1.06	1.04	1.01	1.57	1.40
140	3.03	2.77	2.91	2.66	3.42	3.15
130	5.26	4.86	5.04	4.74	5.80	5.40

11 Threshold for turtle behavioural disturbance from impulsive noise (McCauley et al. 2000).
[2] Threshold for turtle behavioural response to impulsive noise (McCauley et al. 2000).
[3] Marine mammal behavioural threshold for impulsive sound sources (NOAA 2019).
A dash indicates the threshold is not reached within the limits of the modelling resolution (20 m).

Table 11. *Modelled maximum–over–depth per–strike SEL isopleths*: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) from each pile and for each penetration depth.

Per–strike SEL (L_E; dB re 1 µPa²·s)	Penetration depth (m)					
	15.3 m		40.0 m		64.7 m	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
190	–	–	–	–	–	–
180	–	–	–	–	–	–
170	–	–	–	–	–	–
162[1]	0.04	0.04	0.02	0.02	0.06	0.06
160	0.07	0.07	0.06	0.06	0.11	0.10
150	0.34	0.33	0.33	0.32	0.49	0.48
140	1.41	1.22	1.28	1.12	1.75	1.57
130	3.29	3.03	3.17	2.91	3.77	3.47

11 Startle response level for squid (Fewtrell and McCauley 2012).

A dash indicates the threshold is not reached within the limits of the modelling resolution (20 m).

Table 12. Maximum (R_{max}) horizontal distances (in km) from the pile to modelled maximum-over-depth peak pressure level (PK) thresholds based on Southall et al. (2019) for marine mammals, and Popper et al. (2014) for fish and Finneran et al. (2017) for sea turtles, for relevant modelled site with water depth indicated.

Hearing group	PK threshold (L_{pk}; dB re 1 µPa)	Penetration Depth (m)		
		15.3	40	64.7
		R_{max} (km)	R_{max} (km)	R_{max} (km)
PTS				
LF cetaceans	219	–	–	–
HF cetaceans	230	–	–	–
VHF cetaceans	202	–	–	–
Sea turtles	232	–	–	–
TTS				
LF cetaceans	213	–	–	–
HF cetaceans	224	–	–	–
VHF cetaceans	196	–	–	–
Sea turtles	226	–	–	–
Fish				
Fish I (also applied to sharks)	213	–	–	–
Fish II, III Fish eggs, and larvae	207	–	–	–

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.

A dash indicates the threshold is not reached within the limits of the modelling resolution (20 m).

Table 13. Maximum-over-depth distances (in km) to frequency-weighted 24 h sound exposure level (SEL_{24h}) based PTS and TTS for marine mammals (Southall et al. 2019) and sea turtles (Finneran et al. 2017) considering the driving of the entire pile.

Fauna group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	Conductor pile	
		R_{max} (km)	Area (km²)
PTS			
LF cetaceans	183	0.67	1.25
HF cetaceans	185	–	–
VHF cetaceans	155	0.08	0.02
Sea turtles	203	–	–
TTS			
LF cetaceans	168	2.93	24.6
HF cetaceans	170	–	–
VHF cetaceans	140	1.02	2.81
Sea turtles	188	–	–

A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Table 14. Distances to 24 h sound exposure level (SEL_{24h}) based fish criteria in the water column.

Marine fauna group	Threshold for SEL_{24h} ($L_{E,24h}$; dB re 1 µPa²·s)	Conductor pile	
		R_{max} (km)	Area (km²)
Fish I	219	–	–
Fish II, fish eggs and fish larvae	210	–	–
Fish III	207	–	–
Recoverable injury			
Fish I	216	–	–
Fish II, III	203	–	–
Temporary threshold shift (TTS)			
Fish I, II, III	186	0.63	0.85

Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.
A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

4.1.3. Sound field maps

Maps of the per strike sound fields are presented as maximum-over-depth sound level contour maps in Figures 4–6 and as vertical slice plots in Figure 7–9 for selected azimuths. Accumulated SEL_{24h} maps are shown in Figures 10 and 11 for selected weightings.

4.1.3.1. SPL Sound level contour maps

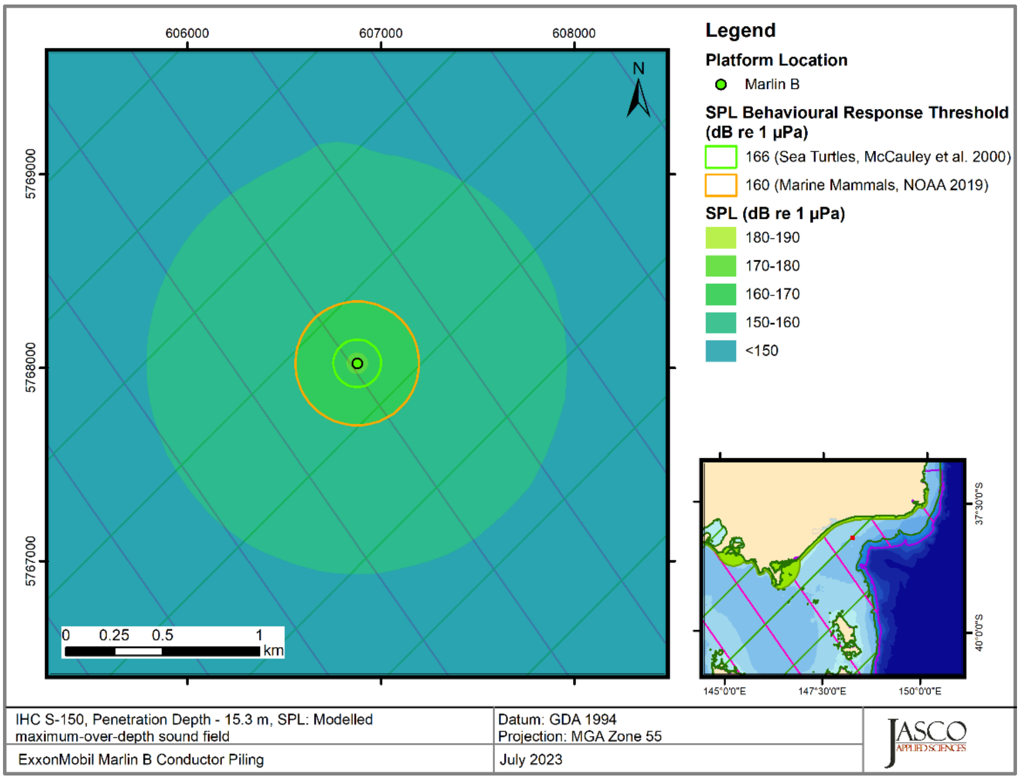

Figure 4. *Pile penetration depth – 15.3 m*, SPL: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleths for behavioural thresholds for marine mammals and sea turtles.

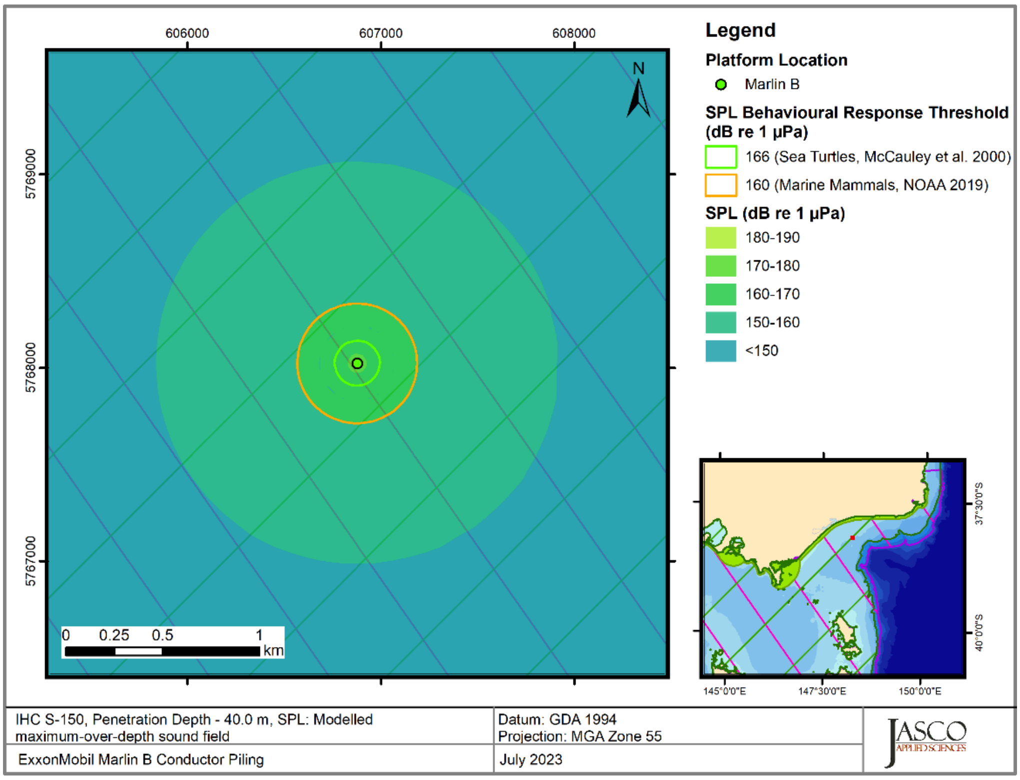

Figure 5. *Pile penetration depth – 40.0 m*, SPL: **Error! Reference source not found.**

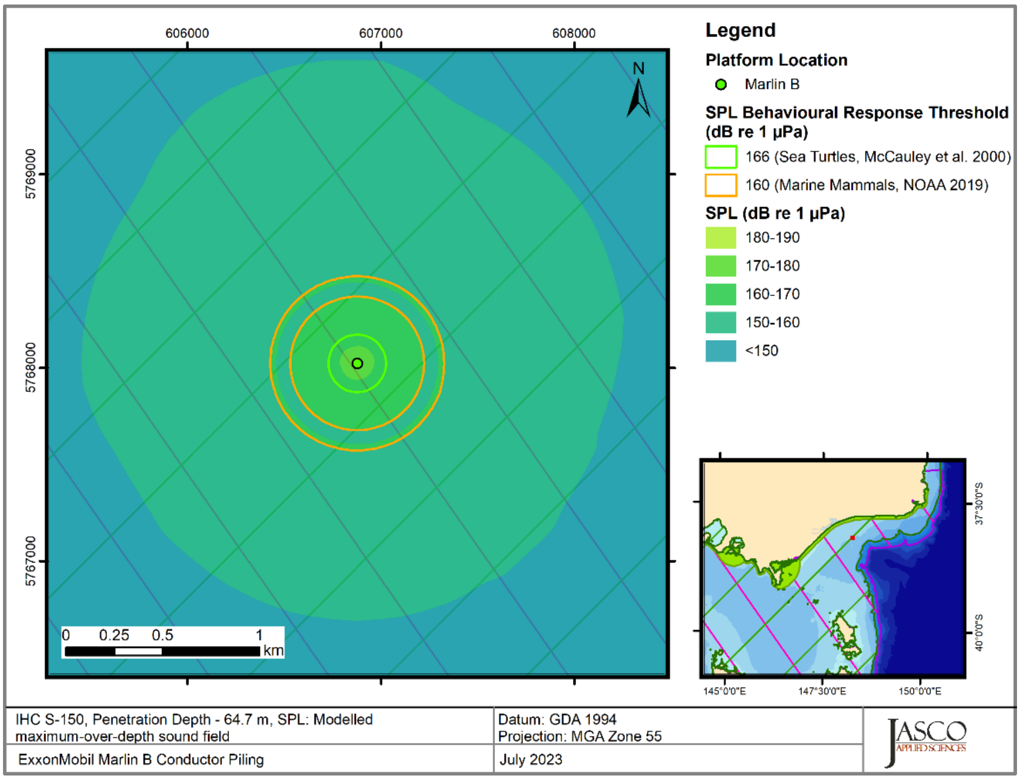

Figure 6. *Pile penetration depth – 64.7 m*, SPL: **Error! Reference source not found.**

4.1.3.2. SPL Per-strike Vertical Slice Plots

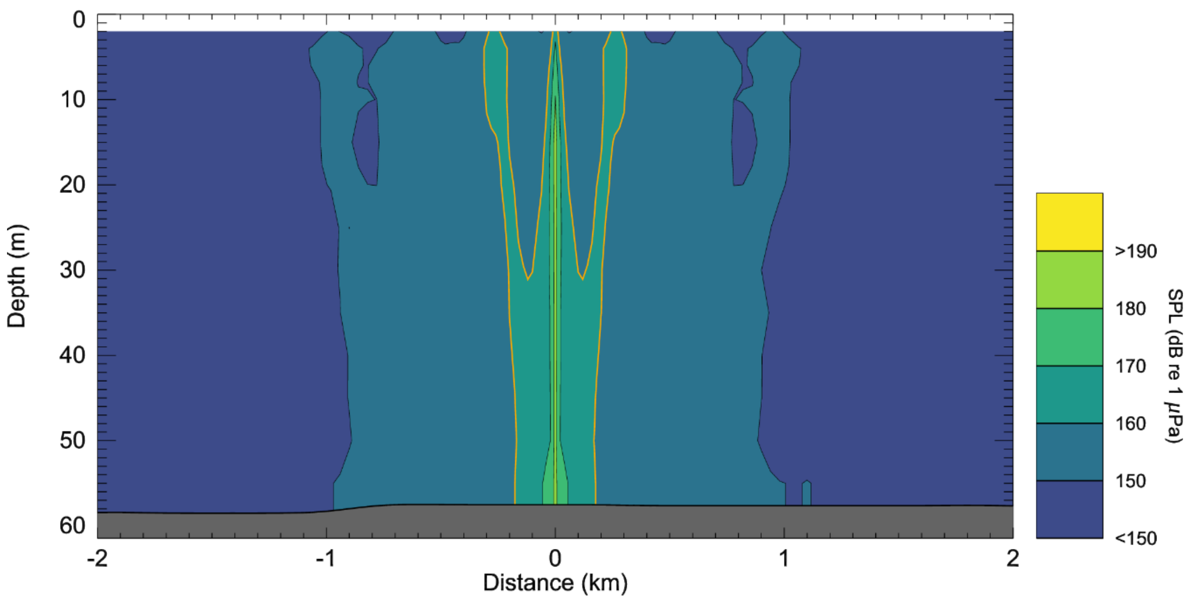

Figure 7. *Pile penetration depth – 15.3 m, SPL*: Vertical slice plot showing variations with depth and distance from the pile for the first penetration depth. The seabed is shown as dark grey. The orange contour indicates the marine mammal behavioural threshold for impulsive sound sources (NOAA 2019). Cross sections are along the 45°/225° transect.

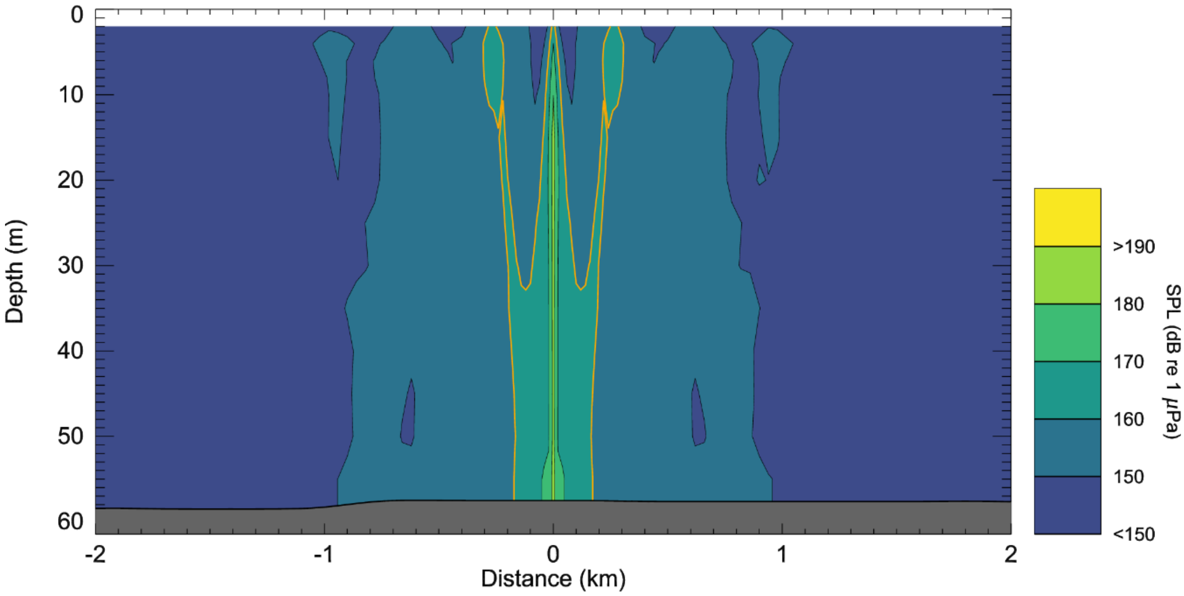

Figure 8. *Pile penetration depth – 40 m, SPL*: Vertical slice plot showing variations with depth and distance from the pile for the second penetration depth. The seabed is shown as dark grey. The orange contour indicates the marine mammal behavioural threshold for impulsive sound sources (NOAA 2019). Cross sections are along the 135°/315° transect.

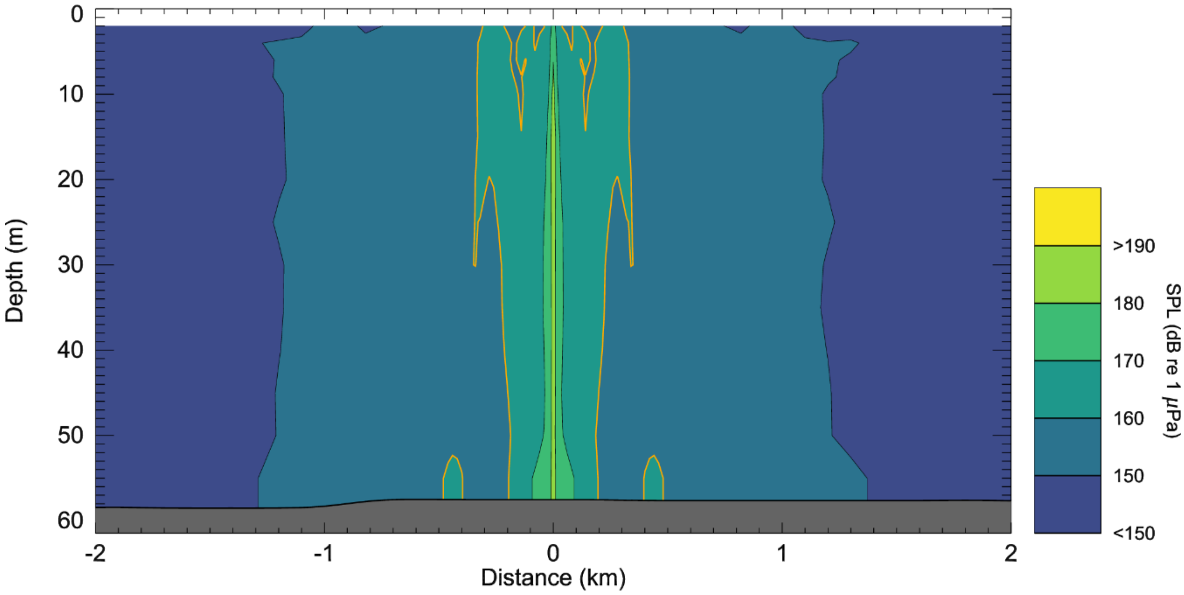

Figure 9. *Pile penetration depth – 64.7 m, SPL*: Vertical slice plot showing variations with depth and distance from the pile for the third penetration depth. The seabed is shown as dark grey. The orange contour indicates the marine mammal behavioural threshold for impulsive sound sources (NOAA 2019). Cross sections are along the 135°/315° transect.

4.1.3.3. Accumulated SEL_{24h} Sound level contour maps

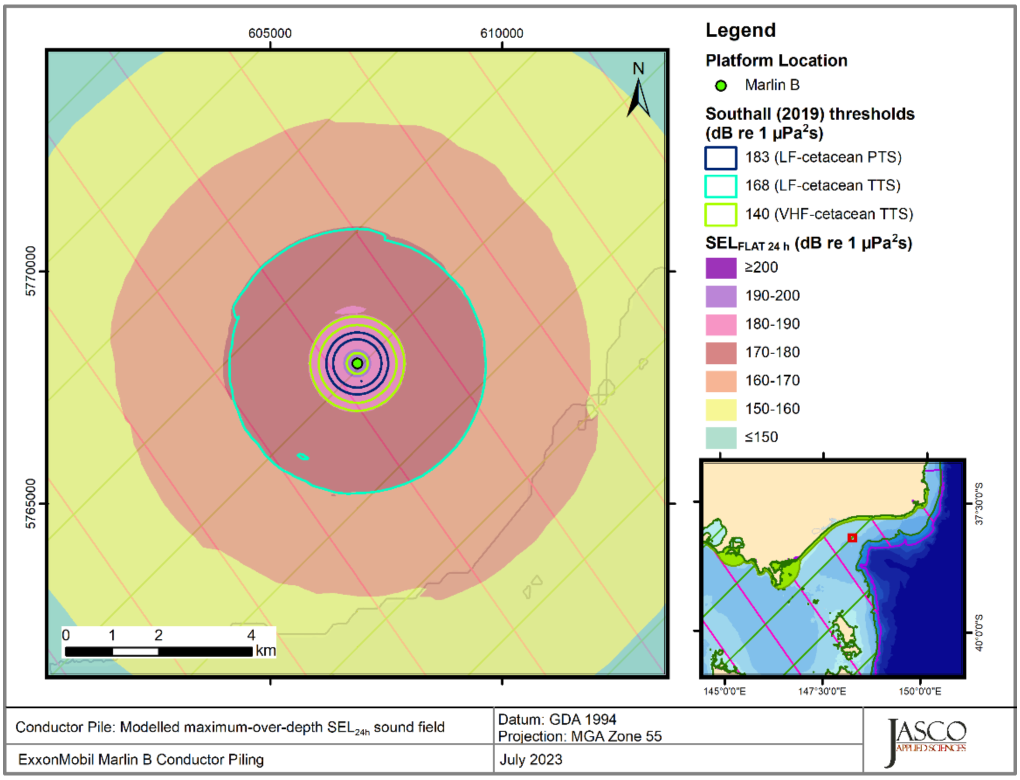

Figure 10. Sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths for cetaceans and sea turtles. Thresholds omitted here were not reached or not large enough to display graphically. Refer to Table 13 for threshold distances.

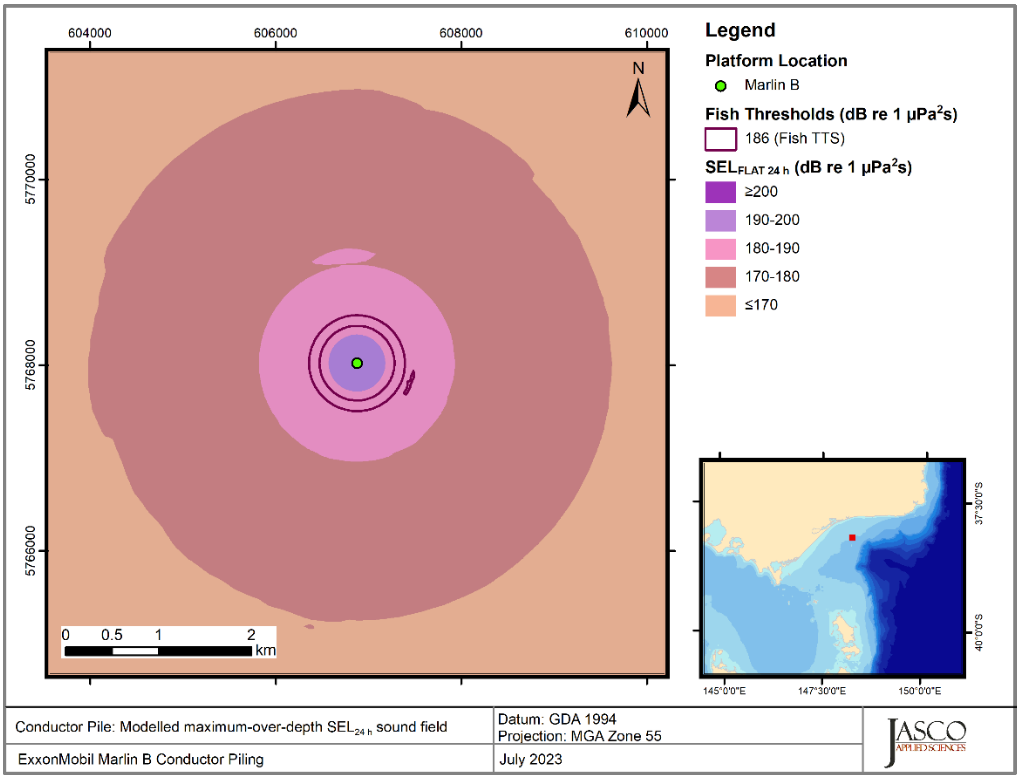

Figure 11. Sound level contour map of unweighted maximum-over-depth SEL_{24h} results, along with isopleths relevant to fish injury and TTS. Fish I–No swim bladder; Fish II–Swim bladder not involved with hearing; Fish III–Swim bladder involved with hearing.

5. Discussion and Conclusion

This study specifically predicted underwater sound levels associated with impact driving of a conductor pile at the Marlin B platform. An analysis of seasonal sound speed profiles indicated that June was most likely to result in furthest distance sound propagation due to the presence of an upward refracting layer near the sea surface. As such it was selected as part of a conservative approach to modelling distances to received sound level thresholds at any month of the year (Appendix C.1.2). Modelling also accounted for site-specific bathymetric variations (Appendix C.1.1), and local geoacoustic properties (Appendix C.1.3).

The modelled site encompassed water depths around 58 m across one defined geological area, comprised of unconsolidated sediments with some weakly cemented interbedded limestones, and a single representative water column profile. The Marlin B platform is on a continental shelf where the bathymetry within the activity area varied very gradually within the vicinity of the modelled site. The combination of low-frequency content from the pile driving and the water depths within the survey area resulted in the sound field substantially interacting with the seabed. The maximum-over-depth sound footprint maps and vertical slice plots (Section 4.1.3) assist in demonstrating the influence of the bathymetry, sound speed profile and seabed composition on the sound field.

The footprint maps and cross-sections in Section 4.1.3 show that the sound field is mostly axisymmetric. In some cases, the isopleths had several contours, for example see the sound field map Figure 6 and its corresponding vertical slice plot Figure 9. This can occur as a result of the reflection of the sound field off the seafloor, creating additional rings around the initial isopleth.

5.1. Pile Driving

This study predicted underwater sound levels associated with impact driving of subsea piles at the Marlin B platform. The pile driving scenario is based on the likely pile designs, hammer specifications, previous pile driving drivability logs.

The underwater sound field was modelled for a 141.1 m long pile with a 0.66 m diameter with 20.6 mm wall thickness. The anchor piles will be driven a total of 77 m into the seabed, but modelled at representative depths of 15.3, 40, and 64.7 m. The broadband sound energy at 10 m for each penetration depth ranged from 165.0 to 167.1 dB re 1 µPa^2·s with the peak sound energy concentrated in the frequency range 100 to 400 Hz (see Figure 3), with levels from the pile at the 67.4 m penetration depth having the highest energy.

Sound emissions from pile driving were considered here to be axially symmetric. As such, variations in propagation characteristics between azimuths are attributed to the bathymetry alone. When the hammer strikes the pile, noise propagates into the water as a downward Mach cone (see Appendix B-6). A portion of the energy from the strike is also reflected at the pile bottom, generating an upward Mach cone. This cycle of downward propagation, reflection, and upward propagation occurs multiple times per strike. At close range from the pile, noise levels are determined by the summation of Mach cones, which might add constructively (i.e., their summation results in a total wave with higher amplitude than the original ones) or destructively (i.e., wavefronts can cancel each other, resulting in lower amplitudes). The way in which Mach cones combine with each other is strongly dependent on their frequency content, which is determined by the hammer forcing function and the pile dimensions.

Due to the relation between the speed of sound in steel (~5000 m/s) relative to the speed of sound in the water (~1500 m/s at the depth of the pile), the Mach cone propagates away from the pile and impinges the seabed at an angle of ~17°.

The modelling of the three penetration depths for the pile provides a detailed quantification of the associated sound levels for each penetration. The distances to per-strike isopleths are generally farthest when the hammer is used at a higher energy.

For criteria based on SEL_{24h} metrics, the ranges above must be considered in context of the duration of operations. One pile will be driven per day; therefore, the corresponding sound level is denoted as SEL_{24h}. The estimated time for driving a single pile was 2.26 h (Table 9). The SEL_{24h} is a cumulative metric that reflects the dosimetric impact of noise levels within the driving period and assumes that an animal is consistently exposed to such noise levels at a fixed position. The radii that correspond to SEL_{24h} typically represent an unlikely worst-case scenario for SEL-based exposure since. More realistically, marine fauna (mammals, sea turtles or fish) would not stay in the same location or at the same range for an extended period. Therefore, a reported radius associated with the accumulated SEL criteria does not mean that any animal travelling within this radius of the source will be injured, but rather that it could be injured if it remained in that range for the entire period of driving. While it may be nominally feasible to install more than one pile per day, this scenario would need to be considered in the modelling.

A summary of distances to relevant acoustic thresholds for pile driving are shown in Table 15.

Table 15. *Piling Operations:* Maximum (R_{max}) horizontal distances (in km) to relevant thresholds for marine fauna.

Hearing group	Threshold Type	Metric	Threshold	Marlin B R_{max} (km)
Low frequency cetaceans	PTS [a]	$L_{E,24h}$	183	0.67
	TTS [a]	$L_{E,24h}$	168	2.93
High frequency cetaceans	PTS [a]	$L_{E,24h}$	185	–
	TTS [a]	$L_{E,24h}$	170	–
Very high-frequency cetaceans	PTS [a]	$L_{E,24h}$	155	0.08
	TTS [a]	$L_{E,24h}$	140	1.02
All Marine Mammal Groups	Behavioural Response [b]	L_p	160	0.45
Fish without swim bladder	Mortality and Potential mortal injury [c]	$L_{E,24h}$	219	–
	Recoverable injury [c]	$L_{E,24h}$	216	–
	TTS [c]	$L_{E,24h}$	186	–
	Recoverable injury [c]	L_{pk}	213	–
Fish with swim bladder not involved in hearing	Mortality and Potential mortal injury [c]	$L_{E,24h}$	210	–
	Recoverable injury [c]	$L_{E,24h}$	203	–
	TTS [c]	$L_{E,24h}$	186	0.63
	Recoverable injury [c]	L_{pk}	207	–
Fish with swim bladder involved in hearing	Mortality and Potential mortal injury [c]	$L_{E,24h}$	207	–
	Recoverable injury [c]	$L_{E,24h}$	203	–
	TTS [c]	$L_{E,24h}$	186	0.63
	Recoverable injury [c]	L_{pk}	207	–
Sea turtles	PTS [d]	$L_{E,24h}$	204	–
	TTS [d]	$L_{E,24h}$	189	–
	Behavioural disturbance [e]	L_p	166	0.15
	Behavioural response [e]	L_p	175	–

L_{pk}= unweighted peak sound pressure level (dB re 1 μPa)
L_p= unweighted root-mean-square sound pressure level (dB re 1 μPa)
L_E= sound exposure level for single strike (dB re 1 μPa^2 s)
$L_{E,24h}$= sound exposure level over 24 hours (dB re 1 μPa^2 s), unweighted for fish and frequency weighted for all other groups
[a] Southall et al. (2019) criteria for marine fauna
[b] NOAA (2019) recommended unweighted behavioural threshold for marine mammals
[c] Popper et al. (2014)

[d] Finneran et al. (2017)
[e] McCauley et al. (2000)

Glossary

Unless otherwise stated in an entry, these definitions are consistent with ISO 18405 (2017).

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).

1/3-octave-band

Frequency band whose bandwidth is one 1/3-octave. *Note*: The bandwidth of a 1/3-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. Used to compute the 90 % sound pressure level. Unit: second (s). Symbol: T_{90}.

90 % sound pressure level (90 % SPL)

The sound pressure level calculated over the 90 % energy time window of a pulse. Unit: decibel (dB).

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 impedance

The ratio of the sound pressure in a medium to the volume flow rate of the medium through a specified surface due to the sound wave. It is a measure of how well sound propagates through a particular 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). 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.

azimuth

A horizontal angle relative to a reference direction, which is often magnetic north or the direction of travel. In navigation it is also known as bearing.

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.

conductivity-temperature-depth (CTD)

Measurement data of the ocean's conductivity, temperature, and depth; used to compute sound speed profiles and salinity.

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 μPa^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.

Fourier transform, Fourier synthesis

A mathematical technique which, although it has varied applications, is referenced in a physical data acquisition context as a method used in the process of deriving a spectrum estimate from time-series data (or the reverse process, termed the inverse Fourier transform). A computationally efficient numerical algorithm for computing the Fourier transform is known as the fast Fourier transform (FFT).

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.

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 a sound with a fundamental frequency of f, the harmonics have frequencies of $2f$, $3f$, $4f$, etc.

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 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).

intermittent sound

A sound whose level abruptly drops below the background noise level multiple times during an observation period.

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.

manual analysis

Human examination of acoustic data via visual review of spectrograms and/or aural inspection of data.

masking

Obscuring of sounds of interest by other sounds at similar frequencies.

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.

multiple linear regression

A statistical method that seeks to explain the response of a dependent variable using multiple explanatory variables.

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*).

***N* percent exceedance level**

The sound level exceeded *N* % of the time during a specified time interval. See also percentile level.

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.

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.

peak sound pressure level (PK), zero-to-peak sound pressure level

The level ($L_{\rm pk}$) of the squared maximum magnitude of the sound pressure ($p_{\rm pk}^2$) in a stated frequency band and time window. Defined as $L_{\rm pk} = 10\log_{10}(p_{\rm pk}^2/p_0^2) = 20\log_{10}(p_{pk}/p_0)$. Unit: decibel (dB). Reference value (p_0^2) for sound in water: 1 μPa^2.

peak-to-peak sound pressure

The difference between the maximum and minimum sound pressure over a specified frequency band and time window. Unit: pascal (Pa).

percentile level

The sound level not exceeded N % of the time during a specified time interval. The Nth percentile level is equal to the (100−N) % exceedance level. See also N percent exceedance level.

permanent threshold shift (PTS)

An irreversible loss of hearing sensitivity caused by excessive noise exposure. Considered auditory injury. Compare with temporary threshold shift.

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).

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	δ_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.

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 intensity

Product of the sound pressure and the sound particle velocity (ISO 18405:2017). The magnitude of the sound intensity is the sound energy flowing through a unit area perpendicular to the direction of propagation per unit time. Unit: watt per metre squared (W/m^2). Symbol: I.

sound particle acceleration

The rate of change of sound particle velocity. Unit: metre per second squared (m/s^2). Symbol: a.

sound particle velocity

The velocity of a particle in a material moving back and forth in the direction of the pressure wave. Unit: metre per second (m/s). Symbol: u.

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^2_{rms}) in a stated frequency band and time window: $L_p = 10\log_{10}(p^2_{\mathrm{rms}}/p_0^2) = 20\log_{10}(p_{rms}/p_0)$, 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.

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

This section describes in detail the acoustic metrics, impact criteria, and frequency weighting relevant to the modelling study.

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 pulsed sound 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 sound and its effects on marine life. Here we provide specific definitions of relevant metrics used in the accompanying report. Where possible, we follow International Organization for Standardization definitions and symbols for sound metrics (e.g., ISO 2017, ANSI S1.1-2013).

The sound pressure level (SPL or L_p; dB re 1 μPa) is the root-mean-square (rms) pressure level in a stated frequency band over a specified time window (T; s). It is important to note that SPL always refers to an rms pressure level and therefore not instantaneous pressure:

$$L_p = 10\log_{10}\left(\frac{1}{T}\int_T g(t)\, p^2(t)\, dt/p_0^2\right) \text{ dB} \tag{A-1}$$

where $g(t)$ is an optional time weighting function. In many cases, the start time of the integration is marched forward in small time steps to produce a time-varying SPL function.

The sound exposure level (SEL or L_E; dB re 1 μPa^2·s) is the time-integral of the squared acoustic pressure over a duration (T):

$$L_E = 10\log_{10}\left(\int_T p^2(t)\, dt/T_0 p_0^2\right) \text{ dB} \tag{A-2}$$

where T_0 is a reference time interval of 1 s. SEL continues to increase with time when non-zero pressure signals are present. It is a dose-type measurement, so the integration time applied must be carefully considered for its relevance to impact to the exposed recipients.

SEL can be calculated over a fixed duration, such as the time of a single event or a period with multiple acoustic events. When applied to pulsed sounds, SEL can be calculated by summing the SEL of the N individual pulses. 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:

$$L_{E,N} = 10\log_{10}\left(\sum_{i=1}^{N} 10^{\frac{L_{E,i}}{10}}\right) \text{ dB} . \tag{A-3}$$

If applied, the frequency weighting of an acoustic event should be specified, as in the case of weighted SEL (e.g., $L_{E,LFC,24h}$; Appendix A.4). The use of fast, slow, or impulse exponential-time-averaging or other time-related characteristics should also be specified.

A.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. 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, $f_c(i)$, is defined as:

$$f_c(i) = 10^{\frac{i}{10}}\ \text{kHz} \tag{A-4}$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the ith decade band are defined as:

$$f_{lo,i} = 10^{\frac{-1}{20}} f_c(i) \quad \text{and} \quad f_{hi,i} = 10^{\frac{1}{20}} f_c(i) \tag{A-5}$$

The decidecade bands become wider with increasing frequency, and on a logarithmic scale the bands appear equally spaced (Figure A-1). The acoustic modelling spans from band 10 (f_c (10) = 10 Hz) to band 44 ($f_c(44)$ = 25 kHz).

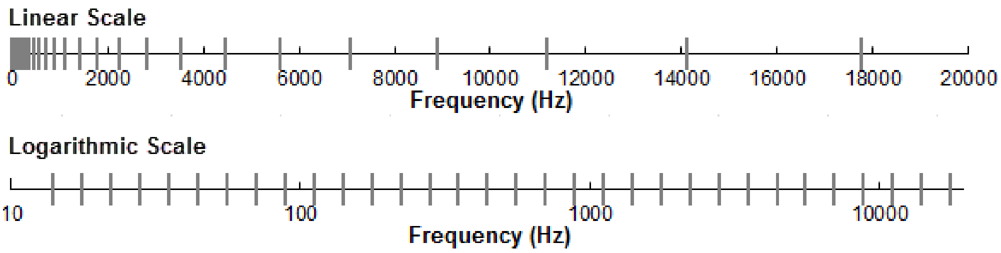

Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the ith band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{lo,i}$ and $f_{hi,i}$:

$$L_{p,i} = 10\, log_{10} \int_{f_{lo,i}}^{f_{hi,i}} S(f)\, \mathrm{d}f\ \ \text{dB} \tag{A-6}$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_i 10^{\frac{L_{p,i}}{10}}\ \text{dB} \tag{A-7}$$

Figure A-2 shows an example of how the decidecade band sound pressure levels compare to the sound pressure spectral density levels of an ambient sound signal. Because the decidecade bands are wider than 1 Hz, the decidecade band SPL is higher than the spectral levels at higher frequencies. Acoustic modelling of decidecade bands requires less computation time than 1 Hz bands and still resolves the frequency-dependence of the sound source and the propagation environment.

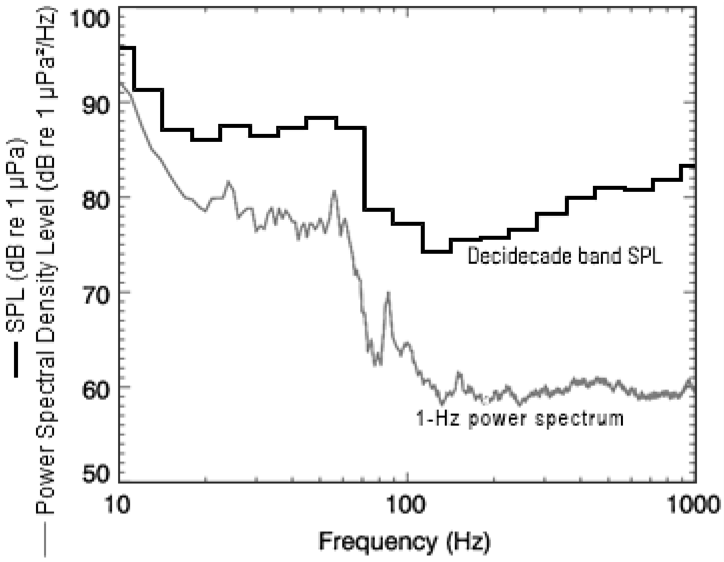

Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale.Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the power spectrum.

A.3. Marine Mammal Impact Criteria – Impulsive

It has been long recognised that marine mammals can be adversely affected by underwater anthropogenic noise. For example, Payne and Webb (1971) suggested that communication distances of fin whales are reduced by shipping sounds. Subsequently, similar concerns arose regarding effects of other underwater noise sources and the possibility that impulsive sources—primarily airguns used in seismic surveys—could cause auditory injury. This led to a series of workshops held in the late 1990s, conducted to address acoustic mitigation requirements for seismic surveys and other underwater noise sources (NMFS 1998, ONR 1998, Nedwell and Turnpenny 1998, HESS 1999, Ellison and Stein 1999). In the years since these early workshops, a variety of thresholds have been proposed for both injury and disturbance. The following sections summarize the recent development of thresholds; however, this field remains an active research topic.

A.3.1. Injury

In recognition of shortcomings of the SPL-only based injury criteria, in 2005 NMFS sponsored the Noise Criteria Group to review literature on marine mammal hearing to propose new noise exposure criteria. Some members of this expert group published a landmark paper (Southall et al. 2007) that suggested assessment methods similar to those applied for humans. The resulting recommendations introduced dual acoustic injury criteria for impulsive sounds that included peak pressure level thresholds and SEL_{24h} thresholds, where the subscripted 24h refers to the accumulation period for calculating SEL. The peak pressure level criterion is not frequency weighted whereas the SEL_{24h} is frequency weighted according to one of four marine mammal species hearing groups: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively) and Pinnipeds in Water (PINN). These weighting functions are referred to as M-weighting filters (analogous to the A-weighting filter for human; Appendix A.3). The SEL_{24h} thresholds were obtained by extrapolating measurements of onset levels of Temporary Threshold Shift (TTS) in belugas by the amount of TTS required to produce Permanent Threshold Shift (PTS) in chinchillas. The Southall et al. (2007) recommendations do not specify an exchange rate, which suggests that the thresholds are the same regardless of the duration of exposure (i.e., it implies a 3 dB exchange rate).

Wood et al. (2012) refined Southall et al.'s (2007) thresholds, suggesting lower injury values for LF and HF cetaceans while retaining the filter shapes. Their revised thresholds were based on TTS-onset levels in harbour porpoises from Lucke et al. (2009), which led to a revised impulsive sound PTS threshold for HF cetaceans of 179 dB re 1 µPa^2·s. Because there were no data available for baleen whales, Wood et al. (2012) based their recommendations for LF cetaceans on results obtained from MF cetacean studies. In particular they referenced Finneran and Schlundt (2010) research, which found mid-frequency cetaceans are more sensitive to non-impulsive sound exposure than Southall et al. (2007) assumed. Wood et al. (2012) thus recommended a more conservative TTS-onset level for LF cetaceans of 192 dB re 1 µPa^2·s.

As of present, an optimal approach is not apparent. There is consensus in the research community that an SEL-based method is preferable either separately or in addition to an SPL-based approach to assess the potential for injuries. In August 2016, after substantial public and expert input into three draft versions and based largely on the above-mentioned literature (NOAA 2013, 2015, 2016), NMFS finalised technical guidance for assessing the effect of anthropogenic sound on marine mammal hearing (NMFS 2016). The guidance describes injury criteria with new thresholds and frequency weighting functions for the five hearing groups described by Finneran and Jenkins (2012). The latest revision to this work was published in 2018; with the criteria defined in NMFS (2018). The latest criteria are from Southall et al. (2019) which is applied in this report.

A.3.2. Behavioural response

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. However, it is recognised that the context in which the sound is received affects the nature and extent of responses to a stimulus (Southall et al. 2007, Ellison and Frankel 2012, Southall et al. 2016).

For impulsive noise, NMFS currently uses step function thresholds of 160 dB re 1 µPa SPL (unweighted) to assess and regulate noise-induced behavioural impacts for marine mammals (NOAA 2018, NOAA 2019). The threshold for impulsive sound is derived from the High-Energy Seismic Survey (HESS) panel (HESS 1999) report that, in turn, is based on the responses of migrating mysticete whales to airgun sounds (Malme et al. 1984). The HESS team recognised that behavioural responses to sound may occur at lower levels, but significant responses were only likely to occur above a SPL of 140 dB re 1 µPa. Southall et al. (2007) found varying responses for most marine mammals between a SPL of 140 and 180 dB re 1 µPa, consistent with the HESS (1999) report, but lack of convergence in the data prevented them from suggesting explicit step functions.

A.4. Marine Mammal Frequency Weighting

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).

A.4.1. Marine Mammal Frequency Weighting Functions

In 2015, a US 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:

$$G(f) = K + 10\log_{10}\left[\left(\frac{(f/f_{lo})^{2a}}{\left[1+(f/f_{lo})^2\right]^a\left[1+(f/f_{hi})^2\right]^b}\right)\right] \quad \text{(A-8)}$$

Finneran (2015) proposed five functional hearing groups for marine mammals in water: low-, mid- and high-frequency cetaceans (LF, MF, and HF cetaceans, respectively), 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 acoustic impacts on marine mammals (NMFS 2018), and in the latest guidance by Southall (2019). The updates did not affect the content related to either the definitions of frequency-weighting functions or the threshold values, however, the terminology for mid- and high-frequency cetaceans was changed to high- and very high-frequency cetaceans. Table A-1 lists the frequency-weighting parameters for each hearing group relevant to this assessment, and Figure A-3 shows the resulting frequency-weighting curves.

Table A-1. Parameters for the auditory weighting functions used in this project as recommended by Southall et al. (2019).

Hearing group	a	b	flo (Hz)	fhi (kHz)	*K* (dB)
Low-frequency cetaceans (baleen whales)	1.0	2	200	19,000	0.13
High-frequency cetaceans (most dolphins, plus sperm, beaked, and bottlenose whales)	1.6	2	8,800	110,000	1.20
Very-high-frequency cetaceans (true porpoises, *Kogia*, river dolphins, *Cephalorhynchus* spp., *Lagenorhynchus cruciger* and *L. australis*)	1.8	2	12,000	140,000	1.36

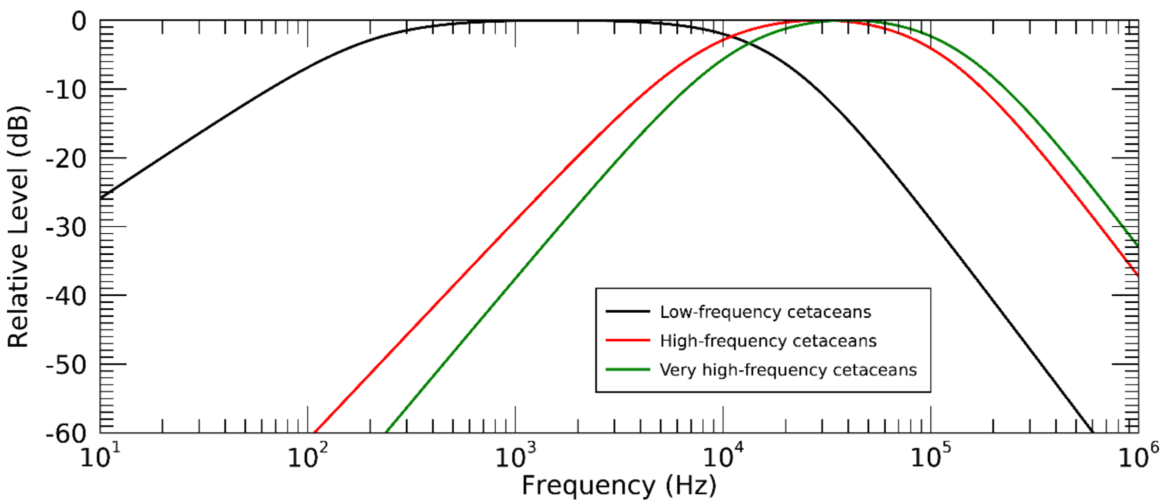

Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019).

Appendix B. Acoustic Source Model

B.1. Acoustic Source Model – Pile Driving

B.1.1. Source Properties

For most projects involving pile driving, there is potential for direct transmission from the sound source to biological receivers, and there are reflected sound paths from the water's surface and bottom that may be perceived by marine fauna. Normally, ground-radiated sound is dominated by low frequencies that cannot propagate efficiently through shallow water. When pile driving is the sound source, there is the potential for substrate-borne sound caused by the hammer's action on the pile to be re-radiated back into the water where it may reach a biological receiver. For pile driving, energy transmission through water depends on the following factors (Christopherson and Lundberg 2013):

1. Direct contact between the pile and the water
2. The depth of the water column
3. The size of the pile
4. The type of hammer
5. The hammer energy
6. The addition of re-radiation of substrate-borne sound

The way sound propagates in water is affected by obstructions (barges, breakwater walls, other piles, etc.) and the bathymetric characteristics (Buehler et al. 2015). Figure B-1 illustrates these basic propagation concepts.

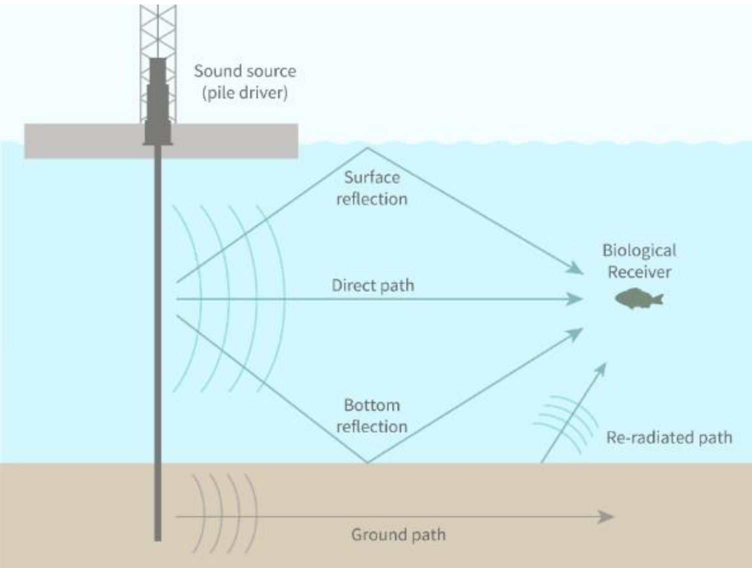

Figure B-1 Underwater sound propagation paths associated with pile driving (Buehler et al. 2015).

B.1.2. Source Model

A physical model of pile vibration and near-field sound radiation is used to calculate source levels of piles. The physical model employed in this study computes the underwater vibration and sound radiation of a pile by solving the theoretical equations of motion for axial and radial vibrations of a cylindrical shell. These equations of motion are solved subject to boundary conditions, which describe the forcing function of the hammer at the top of the pile and the soil resistance at the base of the pile, as shown in Figure B-2. Damping of the pile vibration due to radiation loading is computed for Mach waves emanating from the pile wall. The equations of motion are discretised using the finite difference (FD) method and are solved on a discrete time and depth mesh.

To model the sound emissions from the piles, the force of the pile driving hammers also had to be modelled. The force at the top of each pile was computed using the GRLWEAP 2010 wave equation model (GRLWEAP, Pile Dynamics 2010), which includes a large database of simulated hammers—both impact and vibratory—based on the manufacturer's specifications. The forcing functions from GRLWEAP were used as inputs to the FD model to compute the resulting pile vibrations.

The sound radiating from the pile itself is simulated using a vertical array of discrete point sources. The point sources are centred on the pile axis. Their amplitudes are derived using an inverse technique, such that their collective particle velocity, calculated using a near-field wave-number integration model, matches the particle velocity in the water at the pile wall. The sound field propagating away from the vertical source array is then calculated using a time-domain acoustic propagation model (FWRAM, Appendix C.3). MacGillivray (2014) describes the theory behind the physical model in more detail.

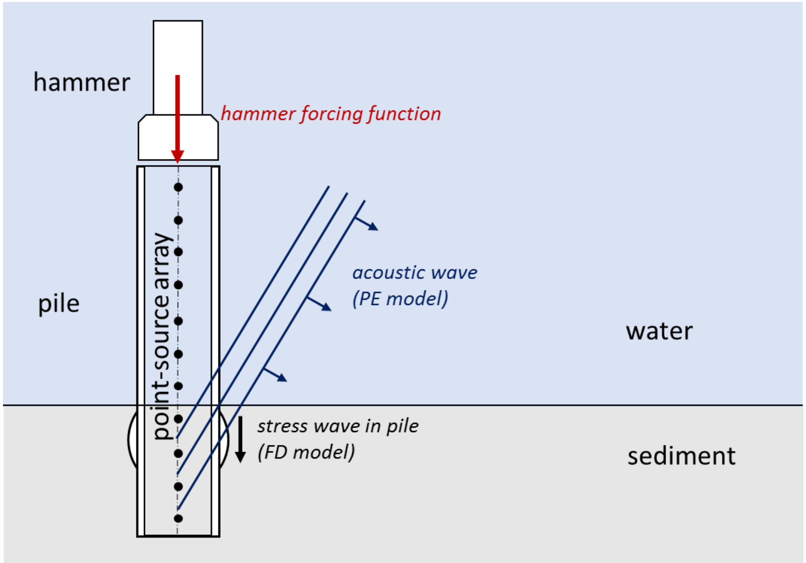

Figure B-2. Physical model geometry for impact driving of a cylindrical pile(vertical cross-section). The hammer forcing function is used with the finite difference (FD) model to compute the stress wave vibration in the pile. A vertical array of point sources is used with the parabolic equation (PE) model to compute the acoustic waves that the pile wall radiates.

Appendix C. Sound Propagation Models

C.1. Environmental Parameters

C.1.1. Bathymetry

Bathymetry throughout the modelled area was extracted from the High-resolution depth model for the Bass Strait (Beaman 2022), a 0.0003° grid rendered for the Bass Strait (equivalent to approximately 30 m resolution). Bathymetry data were re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 55) with a regular grid spacing of 250 m × 250 m resolution (Figure C-1).

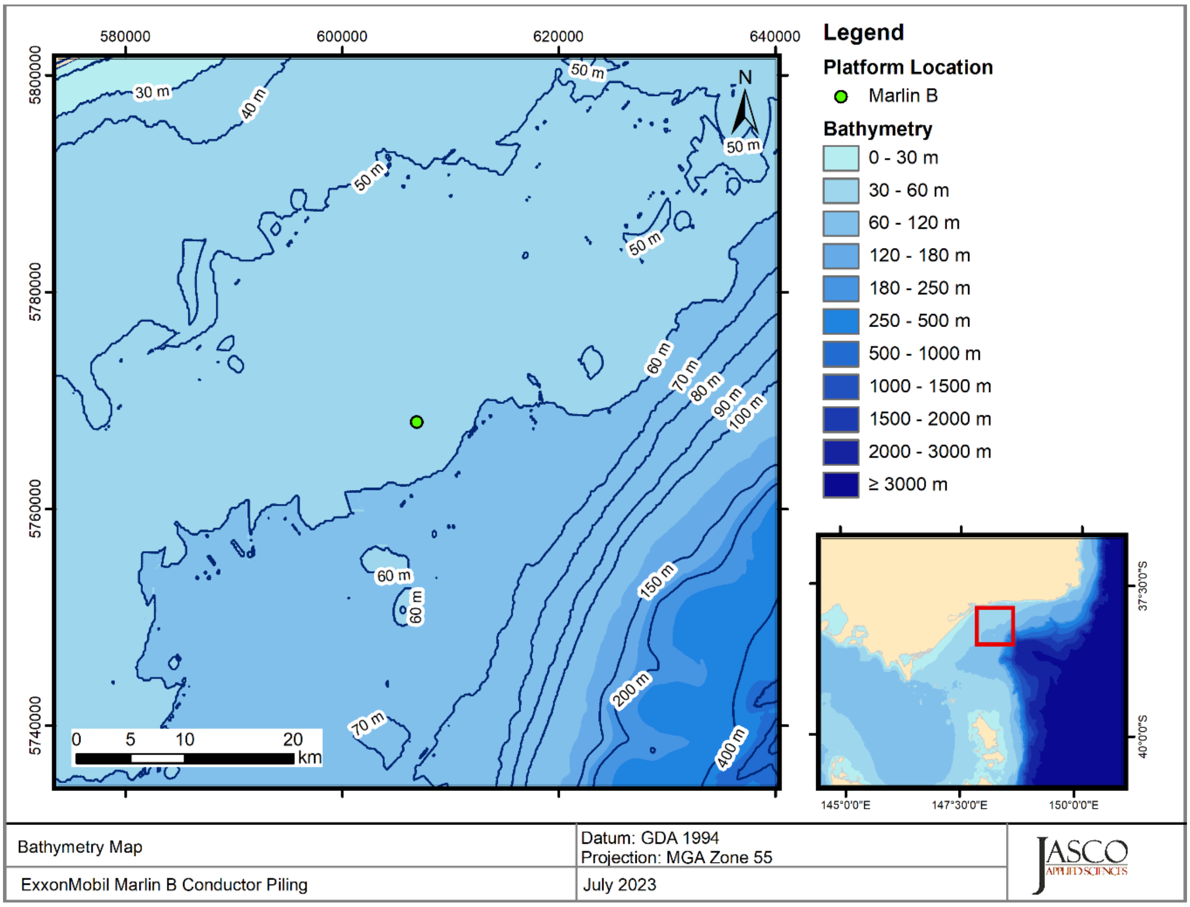

Figure C-1. Bathymetry of the region and the piling locations.

C.1.2. Sound Speed Profile

The sound speed profiles for the modelled sites were derived from temperature and salinity profiles from the US 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 US 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 within a 100 km box radius encompassing the modelling area. To determine the sound speed profile that is expected to be most favourable to longer-range sound propagation during the proposed survey time frame, each month was modelled for each area and the ranges were compared. As such, June was selected to as part of a conservative approach to estimate distances to received sound level thresholds. Figure C-2 shows the resulting profile used as an input to the sound propagation modelling.

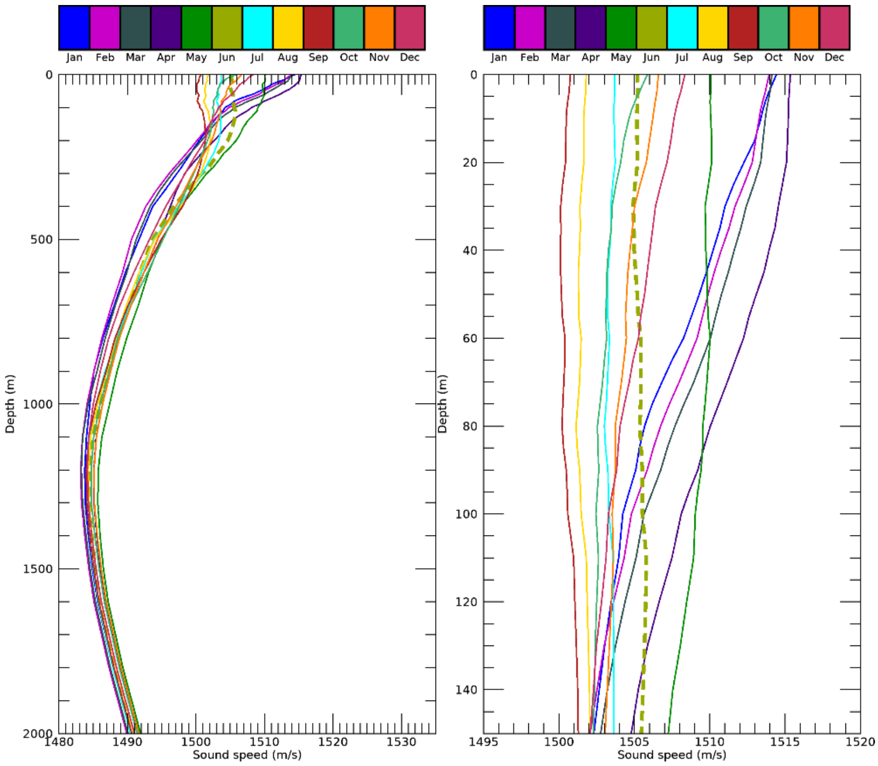

Figure C-2. The modelling sound speed profile corresponding to June: full profile (left) and top 150 m (right) Profiles are calculated from temperature and salinity profiles from Generalized Digital Environmental Model V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

C.1.3. Geoacoustics

The propagation model used in this study considered a single geoacoustic profile for all modelling. This profile determines how sound is reflected from the seabed, as well as how it is transmitted, reflected, and absorbed into the sediment layers. The geology in the area was generated by boreholes from Holdgate et al. (2003) and Mitchell et al. (2007). These boreholes extended approxaimtely 100 m below the seafloor. From these data, the seabed geologic profile within the vicinity of the Marlin B generally consists of unconsolidated sediments with some weakly cemented interbedded limestones. For the sediment layers, representative grain sizes and porosities were used in the grain-shearing model proposed by Buckingham (2005) to estimate the geoacoustic parameters required by the sound propagation models. Table C-1 presents the geoacoustic profile used for modelling of pile driving at the Marlin B well.

Table C-1. Geoacoustic profile at the Marlin B platform location

Depth below seafloor (m)	Material	Density (g/cm³)	P-wave speed (m/s)	P-wave attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0–10	Medium Carbonate Sand	2.0736	1643.2-1917.2	0.109-1.051	458.8	3.653
10-20	Medium fine carbonate sand	2.0663	1875.7-1956.8	0.950-1.169		
20-40	Medium fine carbonate sand intermixed with limestone	2.0663	1956.8-2064.8	1.169-1.422		
40-60	Medium fine sand	2.0663	2064.8-2144.0	1.422-1.584		
60-80	Consolidated Fine sand	2.0561	2070.7-2127.0	1.453-1.567		
80-100		2.0561	2127.0-2175.5	1.567-1.659		

C.2. Propagation Loss

The propagation of sound through the environment can be modelled by predicting the acoustic propagation loss—a measure, in decibels, of the decrease in sound level between a source and a receiver some distance away. Geometric spreading of acoustic waves is the predominant way by which propagation loss occurs. Propagation loss also happens when the sound is absorbed and scattered by the seawater, and absorbed scattered, and reflected at the water surface and within the seabed. Propagation loss depends on the acoustic properties of the ocean and seabed; its value changes with frequency.

If the acoustic energy source level ($L_{S,E}$), expressed in dB re 1 µPa²m²s, and energy propagation loss (PL_E), in units of dB, at a given frequency are known, then the received level ($L_{E,p}$) at a receiver location can be calculated in dB re 1 µPa²s by:

$$L_{E,p}(\theta,r) = L_{S,E}(\theta) - PL_E(\theta,r), \tag{C-1}$$

where θ defines the specific direction, and r is the range of the receiver from the source.

C.3. Full Waveform Range-dependent Acoustic Model: FWRAM

For impulsive sounds from impact pile driving, time-domain representations of the pressure waves generated in the water are required for calculating SPL and peak pressure level. Furthermore, the pile must be represented as a distributed source to accurately characterise vertical directivity effects in the near-field zone.

For this study, synthetic pressure waveforms were computed using the Full Waveform Range-dependent Model (FWRAM), which is a time-domain acoustic model based on the wide-angle parabolic equation (PE) algorithm (Collins 1993). FWRAM computes synthetic pressure waveforms versus range and depth for range-varying marine acoustic environments, and it takes bathymetry, water sound speed profile, and seabed geoacoustic profile, as environmental inputs. FWRAM computes pressure waveforms via Fourier synthesis of the modelled acoustic transfer function in closely spaced frequency bands.

FWRAM employs the array starter method to accurately model sound propagation from a spatially distributed source (MacGillivray and Chapman 2012). Synthetic pressure waveforms were modelled over the frequency range 10 – 1024 Hz, inside a 1 s window. These waveforms are post-processed, after applying a travel time correction, to calculate standard SPL and SEL metrics versus range and depth from the source.

C.4. 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 C-3).

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 C-3(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 C-3(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.

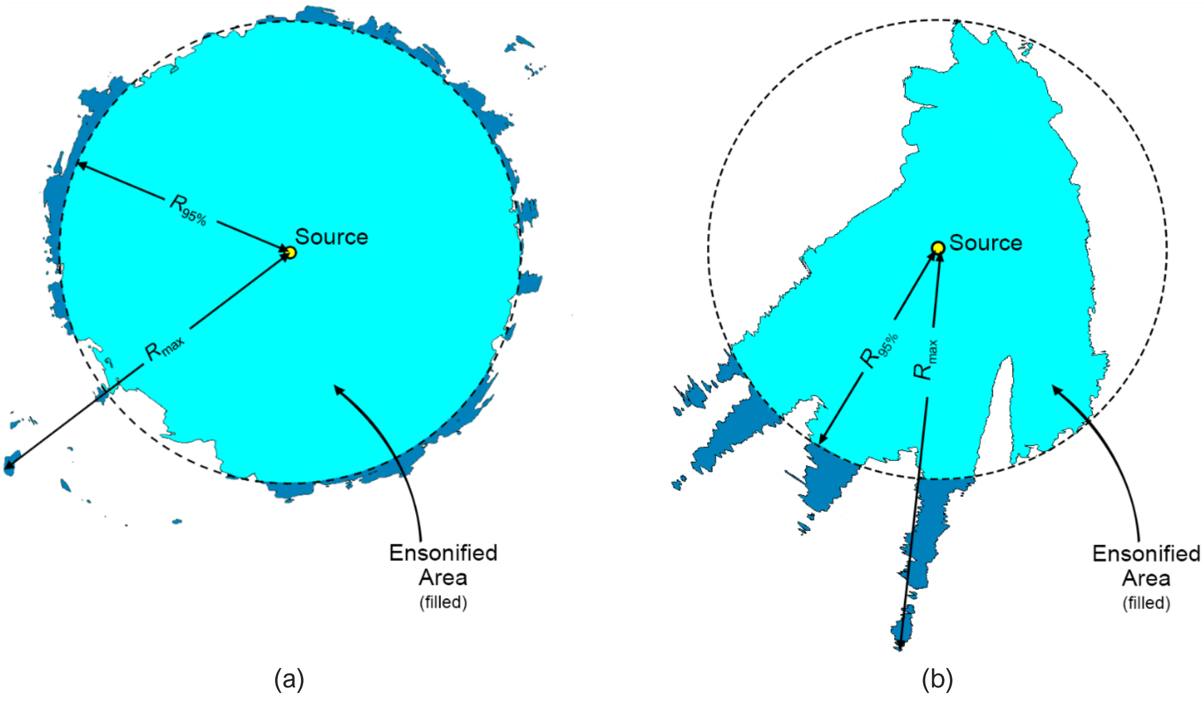

Figure C-3. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified areas bounded by $R_{95\%}$; darker blue indicates the areas outside this boundary which determine R_{max}.

C.5. Model Validation Information

Predictions from JASCO's propagation models (MONM, FWRAM, and VSTACK) have been validated against experimental data from a number of underwater acoustic measurement programs conducted by JASCO globally, including the United States and Canadian Artic, Canadian and southern United States waters, Greenland, Russia and Australia (Hannay and Racca 2005, Aerts et al. 2008, Funk et al. 2008, Ireland et al. 2009, O'Neill et al. 2010, Warner et al. 2010, Racca et al. 2012a, Racca et al. 2012b, Matthews and MacGillivray 2013, Martin et al. 2015, Racca et al. 2015, Martin et al. 2017a, Martin et al. 2017b, Warner et al. 2017, MacGillivray 2018, McPherson et al. 2018, McPherson and Martin 2018).

In addition, JASCO has conducted measurement programs associated with a significant number of anthropogenic activities that have included internal validation of the modelling (including McCrodan et al. 2011, Austin and Warner 2012, McPherson and Warner 2012, Austin and Bailey 2013, Austin et al. 2013, Zykov and MacDonnell 2013, Austin 2014, Austin et al. 2015, Austin and Li 2016, Martin and Popper 2016).