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Description of the Environment

Projects & Operations I EP

Document Control

Approvals	Name	Role	Signature	Document Control
Document Originator:	Xodus	Env Consultant		Document Number: COE-EN-EMP-0001
Document Reviewer:	J Morris	Env Advisor		Revision Number: 8
Document Approver:	D Bailey	Manager Operations	David Bailey <small>Digitally signed by David Bailey Date: 2024.01.29 17:09:22 +10'30'</small>	Revision Date: 25 January 2024

Revision History

Revision	Date	Originator	Revision Summary
0	20/10/2017	Xodus	For Submission
1	04/01/2018	Xodus	For Submission
2	29/04/2018	Xodus	For Submission.
3	12/10/2018	Xodus	For Submission. Annual updates and preparation of Otway Exploration EP.
4	19/10/2021	Xodus	For Submission. Annual updates and preparation of BMG Decom Phase 1 EP.
5	25/03/2022	JJM	For Submission. Additional detail and updates related to BMG Decom Phase 1 EP.

Revision	Date	Originator	Revision Summary
6	31/08/2023	Xodus	For Submission. Updates to support CHN and Gippsland / BMG EPs
7	14/12/2023	TV	For Submission. Updates to support BMG EP.
8	25/01/24	AH	For Submission. Updates to support Otway Ops EP. Updates to Gippsland Baseline.

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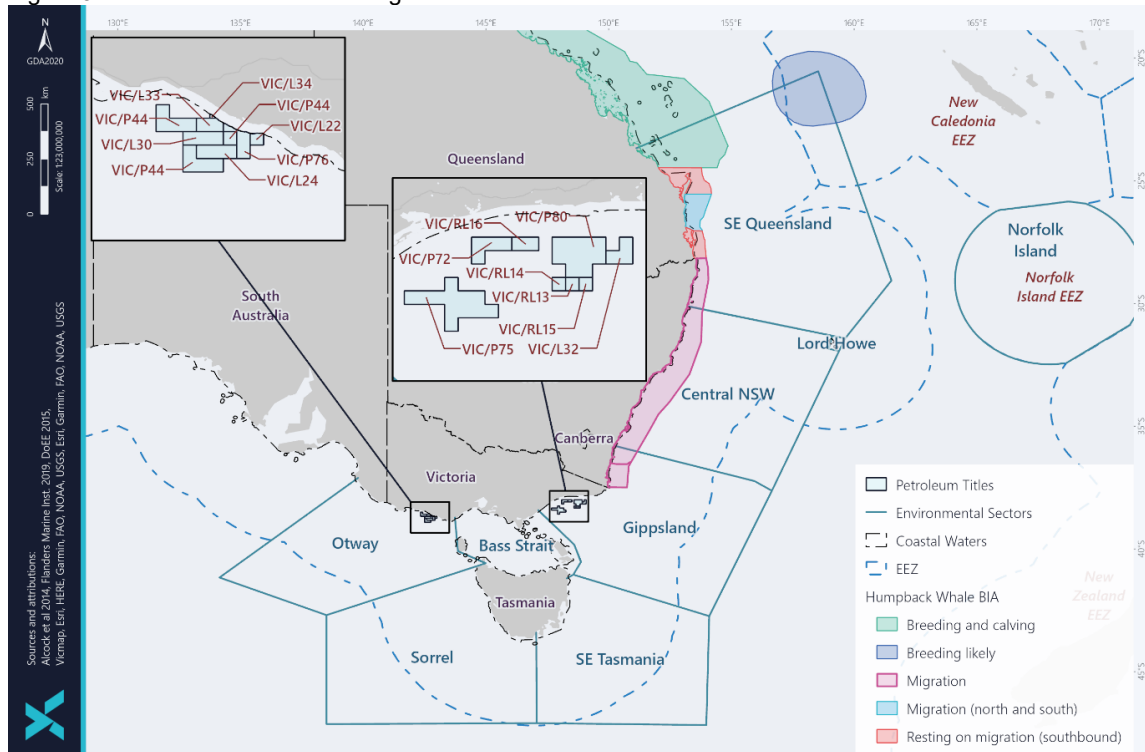


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1 Introduction

1.1 Regulatory Context

The Regulation 5 of the Offshore Petroleum Greenhouse and Gas Storage (Environment) (OPGGS(E)) Regulations 2023 Commonwealth define 'environment' as the ecosystems and their constituent parts, natural and physical resources, qualities and characteristics of location, places and areas, the heritage value of places and includes the social, economic and cultural features of those matters. In accordance with Regulation 21(2) of the OPGGS(E) Regulations, this document describes the physical (Section 2), ecological (Section 3), and social (Section 5) components of the environment.

A greater level of detail is provided for those particular values and sensitivities as defined by Regulation 21(3) of the OPGGS(E) Regulations which states that particular relevant values and sensitivities may include any of the following:

- (a) the world heritage values of a declared World Heritage property.
- (b) the national heritage values of a National Heritage place.
- (c) the ecological character of a declared Ramsar wetland.
- (d) the presence of a listed threatened species or listed threatened ecological community.
- (e) the presence of a listed migratory species.
- (f) any values and sensitivities that exist in, or in relation to, part or all of:
 - i. a Commonwealth marine area; or
 - ii. Commonwealth land within the.

With regards to 21(3)(d) and (e) more detail has been provided where threatened or migratory species have a spatially defined biologically important area (BIA), habitat critical to survival or identified biologically important behaviour such as breeding, foraging, resting or migration.

With regards to 21(3)(f) more detail has been provided for:

- Key Ecological Features (KEFs) as they are considered as conservation values under a Commonwealth Marine Area, and
- Australian Marine Parks (AMPs) as they are enacted under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

1.2 Environment Sectors

Due to the large area being described, smaller environmental sectors have been defined based on geology (e.g. petroleum geology) and ecology (e.g. IMCRA regions); these sectors are used throughout this document (Table 1-1, Figure 1-1).

As well as the environmental sectors within the Australian exclusive economic zone (EEZ), an additional sector has been defined for areas outside of the EEZ such as New Caledonia, New Zealand and international waters.

Cooper Energy petroleum titles are located in the Otway and Gippsland environmental sectors, therefore additional information is provided about receptors in each of these sectors.

Table 1-1: Bioregions and Geology of the Environment Sectors

Sector	General Boundary	IMCRA Provincial Bioregions ¹	Petroleum Geology ²
Otway	Cape Jaffa (South Australia) to Cape Otway (Victoria); west of King Island to Cape Grim (northwest Tasmania)	<ul style="list-style-type: none"> Western Bass Strait IMCRA Transition West Tasmania Transition 	<ul style="list-style-type: none"> Otway Basin
Bass Strait	Cape Otway to Woodside Beach (Victoria); northern Tasmanian coast; and includes King and Flinders Island (and associated island chains)	<ul style="list-style-type: none"> Western Bass Strait IMCRA Transition Bass Strait IMCRA Province Southeast IMCRA Transition 	
Gippsland	Woodside Beach (Victoria) to Batemans Bay (New South Wales); east of Flinders Island to Eddystone Point (north-east Tasmania)	<ul style="list-style-type: none"> Southeast IMCRA Transition Southeast Transition 	<ul style="list-style-type: none"> Gippsland Basin
Sorell	Western coast of Tasmania, from Cape Grim to South East Cape	<ul style="list-style-type: none"> Tasmanian IMCRA Province Tasmania Province West Tasmania Transition 	<ul style="list-style-type: none"> Sorell Basin
SE Tasmania	Eastern coast of Tasmania, from Eddystone Point to South East Cape	<ul style="list-style-type: none"> Tasmanian IMCRA Province Tasmania Province 	
Central NSW	Batemans Bay to Coffs Harbour (New South Wales)	<ul style="list-style-type: none"> Central Eastern IMCRA Province Central Eastern Province 	<ul style="list-style-type: none"> Sydney Basin
SE Queensland	Coffs Harbour (New South Wales) to Gladstone (Queensland)	<ul style="list-style-type: none"> Central Eastern IMCRA Province Central Eastern Transition Kenn Transition Kenn Province Central Eastern Province 	<ul style="list-style-type: none"> Capricorn Basin Clarence-Morton Basin Maryborough Basin Nambour Basin
Lord Howe	Lord Howe Island	<ul style="list-style-type: none"> Tasman Basin Province Lord Howe Province 	<ul style="list-style-type: none"> Lord Howe Rise
Norfolk Island	Norfolk Island	<ul style="list-style-type: none"> Norfolk Island Province 	
Area outside the Australia EEZ	New Caledonia EEZ, New Zealand EEZ, International Waters	N/A	

Notes:

1. IMCRA regions as described by Commonwealth of Australia (2006).
2. Petroleum geology as described by Geoscience Australia (2017).

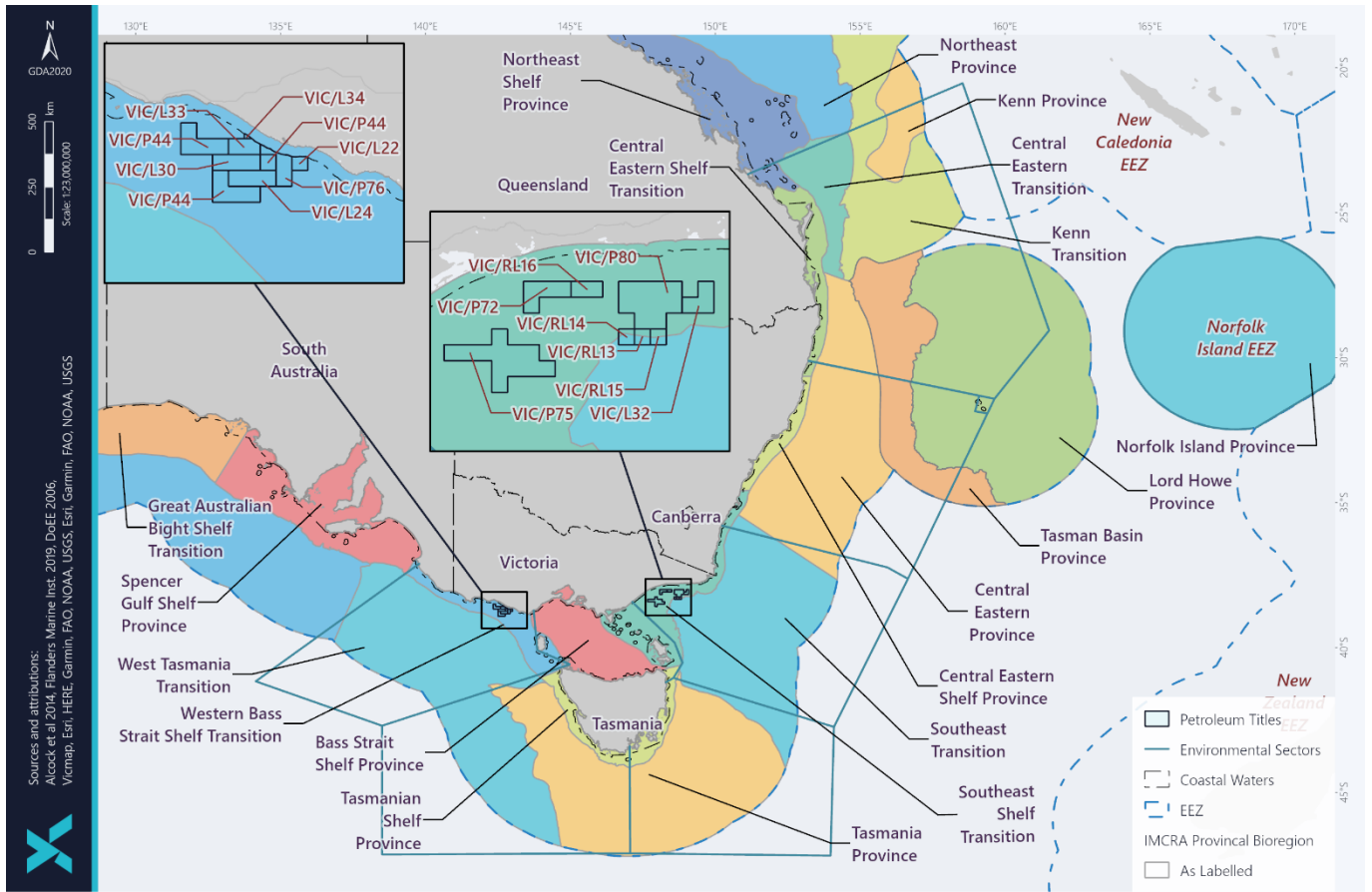


Figure 1-1: Environment Sectors (with IMCRA Provincial Bioregions)

2 Physical Environment

2.1 Bathymetry and Seabed Features

The geomorphology of Australia's continental margin is varied, with a number of different geomorphic features present, including basins, canyons, terraces, seamounts and plateaus (Figure 2-1, Figure 2-2). In the south-east, the continental shelf is broad, extending offshore to approximately 200 m water depth; in contrast, the shelf along eastern Australia is narrower and shallower, varying between approximately 10 km and 75 km offshore, and between 70–165 m water depth (Harris *et al.*, 2005). Some of the key features on the continental shelf include the Otway Depression and Otway Shelf, King Island Rise, Bass Basin and Gippsland Shelf (Figure 2-1, Figure 2-2). Geomorphic features on the continental slope and abyssal plain include: Bass Canyon, East Tasman Saddle and East Tasman Plateau, South Tasman Rise, Stradbroke Seamount and Moreton Seamount (Figure 2-1, Figure 2-2).

Bass Basin, a seaway separating the mainland and Tasmania, is a shallow depression approximately 120 km by 400 km, with water depths up to approximately 90 m (average water depth of approximately 60 m). The basin is bounded on the eastern and western margin by two granite plateaus: the Bassian Rise, and King Island Rise. The Bassian Rise (eastern margin) separates Bass Basin from the Gippsland Basin and is associated with the Furneaux Islands. King Island Rise (western margin) includes the shallow (<40 m water depth) Tail Bank, and King Island itself; and separates Bass Basin from Otway Basin. To the southwest, there is a relatively narrow, 60 m-deep channel between King Island and Tasmania. Sandwaves and tidal current ridges occur on the seabed of both Bassian and King Island Rises. The largest of the tidal sand ridges, Moriarty Bank, lies east of Clarke Island and is approximately 20 km long and four kilometres wide, orientated east-west, sub-parallel to the flow of tidal currents (Harris *et al.*, 2005).

East of Bass Strait, on the continental slope and rise, are a number of submarine canyons; the largest of which is Bass Canyon. This submarine canyon is oriented east-southeast and is 10–15 km wide at its mouth, and approximately 60 km long (Harris *et al.*, 2005). This canyon area is associated with two Key Ecological Features: Bass Cascade, and Big Horseshoe Canyon (see Section 4.6). Similarly, east of Tasmania and east of King Island Rise, there are a series of canyons through the continental slope. At abyssal water depths, south of Tasmania, the seabed is characterised by gently undulating relief with irregular faulted basement blocks and seamounts.

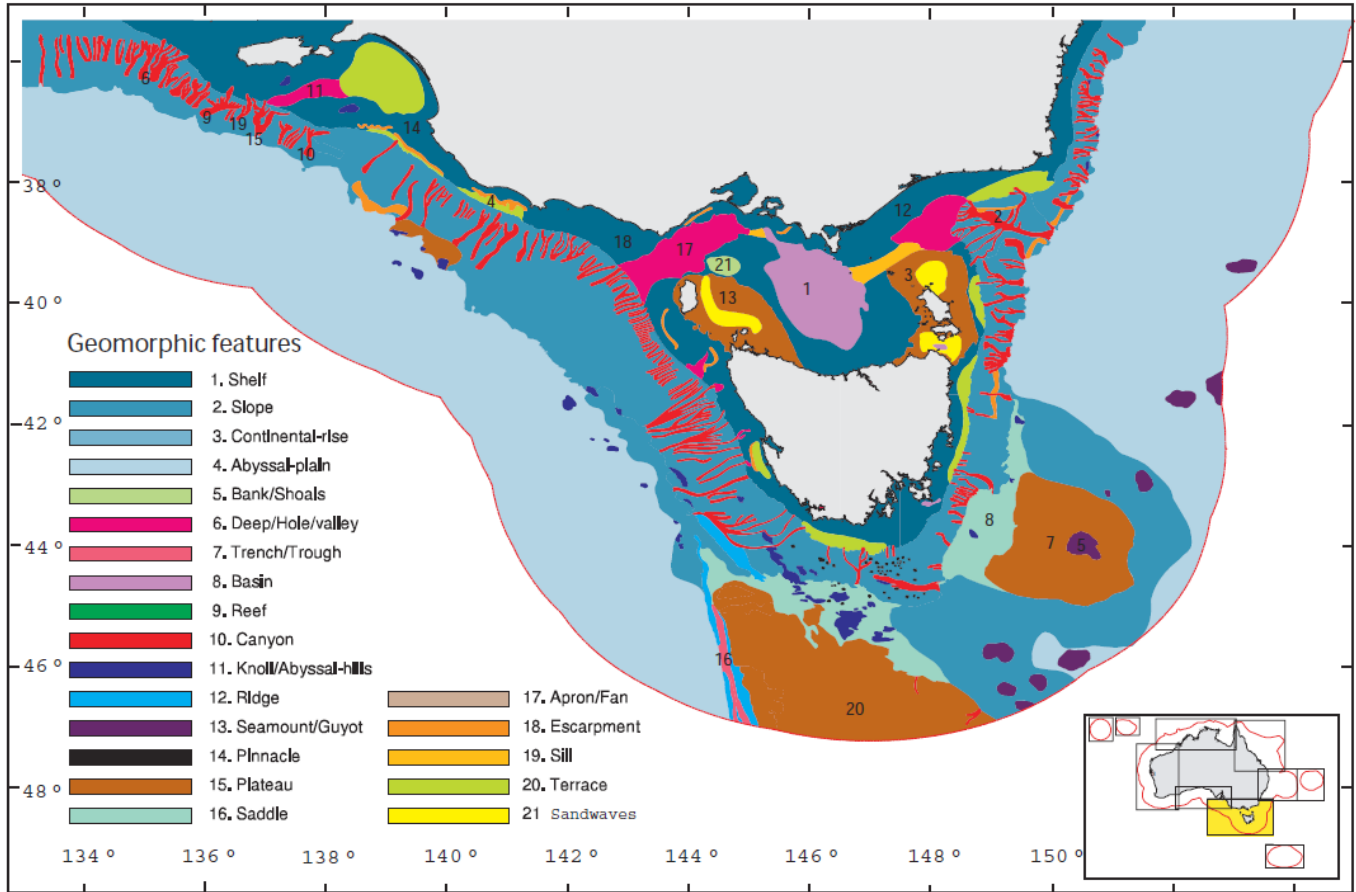
The volcanic seamounts of the Tasmantid Seamount Chain occur on the abyssal plain east of Australia, including Moreton Seamount, Brisbane Guyot, Queensland Guyot, Stradbroke Seamount, Derwent-Hunter Guyot, Barcoo Bank and Taupo Bank. These seamounts vary in size, Stradbroke Seamount rises to 900 m water depth, while Barcoo Bank rises to less than 1,400 m water depth (Harris *et al.*, 2005).

The seabed within the vicinity of the Gippsland sector tends to be slightly undulating (gradients <2°) and smooth. Noting however that the Basker-6 flowline (located between the BAM and Basker-6 wellhead) crosses the upper levels of the Bass Canyon scarp (decreasing from ~155–216 m water depth), and as a result has unique characteristics.

There have been no seabed anomalies identified in the Gippsland environmental sector from geophysical surveys. The seabed at and around the BMG wells tend to be featureless with the seabed comprised of silty sand. The underlying geological structure tends to be dipping and slightly irregular, grading from silty fine sand at the seabed to over consolidated sandy silty clay at 10 m below seabed. The flowline route also crosses a narrow zone of what has been interpreted as variably cemented silty sand and gravel, which corresponds with the area of steepest gradient along the scarp edge.

Basker-6 flowline route can be divided into three zones; above the Bass Canyon Scarp (~ 150 m); on the Bass Canyon Scarp (~150 m to ~220 m with maximum slope ~ 20°) and below the Bass Canyon Scarp (~ 220 m to 270 m) towards the Basker-6 well (CTC Marine, 2011). Geotechnical survey conducted (CTC Marine, 2011), reported that the zone above the Bass Canyon Scarp tend to be flat and featureless, comprising silty fine sand with an increase in shell towards the scarp edge. While the seabed on Bass Canyon Scarp was “irregular in profile, consistent with erosion”, with sediments comprising of clayey silty sand with a high proportion of shell and other carbonate fragments and areas of cemented soil at the base of the slope. Seabed below Bass Canyon Scarp was reported to have a gently undulating topography formed by slump material from the scarp area.

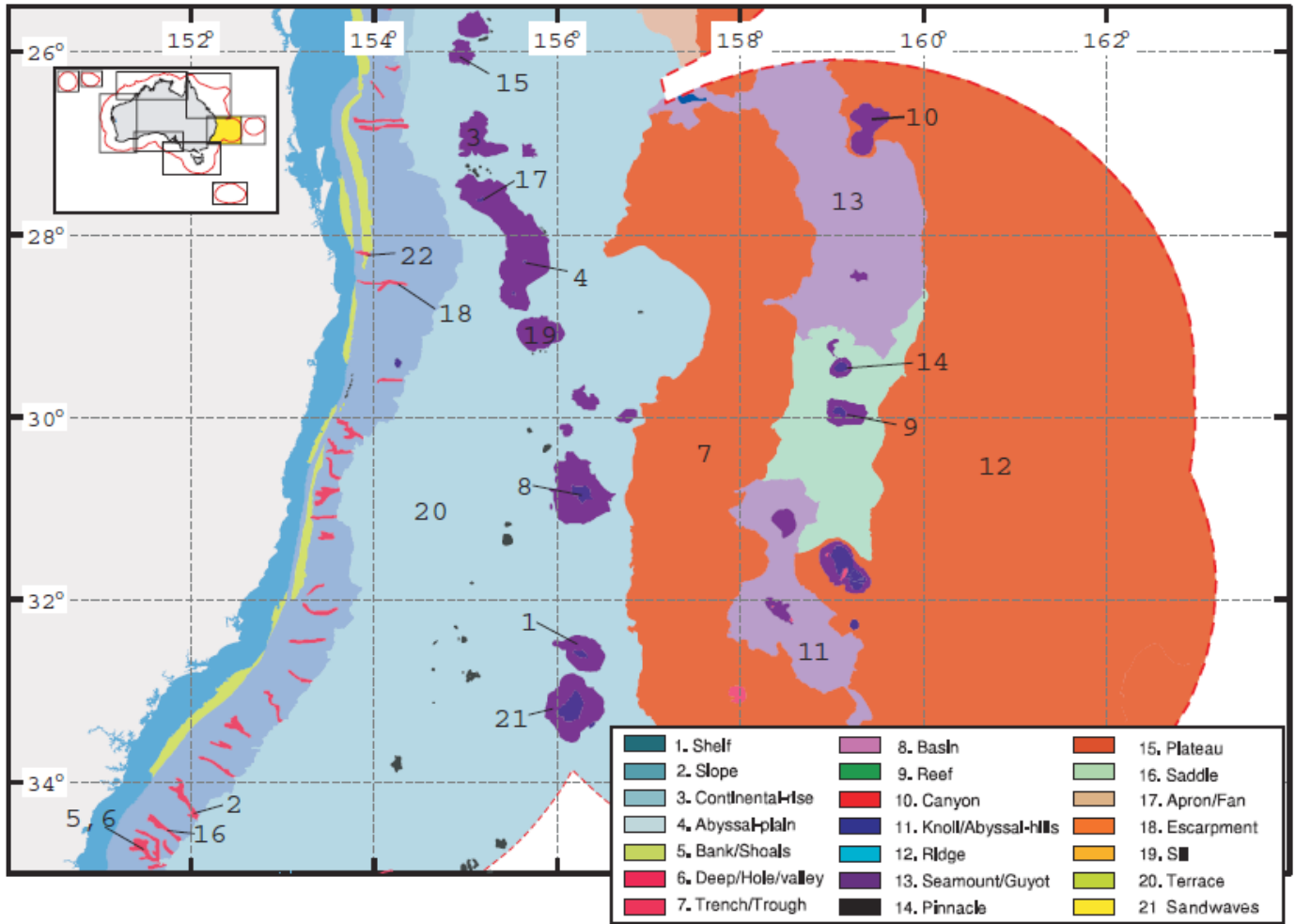
More recent surveys conducted by Ierodiaconou *et al.* (2020) confirmed that seabed surrounding subsea infrastructure tends to be dominated by a mix of sand and pebble/gravel.



(Source: Harris *et al.*, 2005)

Notes: Features within the Environmental Sectors, as labelled on above figure – (1) Bass Basin, (2) Bass Canyon, (3) Bassian Rise, (4) Beachport Plateau, (5) Cascade Seamount, (7) East Tasman Plateau, (8) East Tasman Saddle, (12) Gippsland Shelf, (13) King Island Rise, (16) Needwonne Ridge, (17) Otway Depression, (18) Otway Shelf, (20) South Tasman Rise, (21) South Tasman Saddle, (22) Tail Bank, (23) Toofee Ridge.

Figure 2-1: Geomorphic Features of the South-eastern Margin



(Source: Harris *et al.*, 2005)

Note: Features within the Environment Sectors, as labelled on above figure – (1) Barcoo Bank, (2) Beecroft Canyon, (3) Brisbane Guyot, (4) Britannia Guyots, (5) Conjola Canyon A, (6) Conjola Canyon B, (7) Dampier Ridge, (8) Derwent-Hunter Guyot, (9) Elizabeth Reef, (10) Gifford Guyot, (11) Lord Howe Basin, (12) Lord Howe Rise, (13) Middleton Basin, (14) Middleton Reef, (15) Moreton Seamount, (16) Perpendicular Canyon, (17) Queensland Guyot, (18) Richmond Canyon, (19) Stradbroke Seamount, (20) Tasman Basin, (21) Taupo Bank, (22) Tweed Canyon.

Figure 2-2: Geomorphic Features of the Eastern Margin

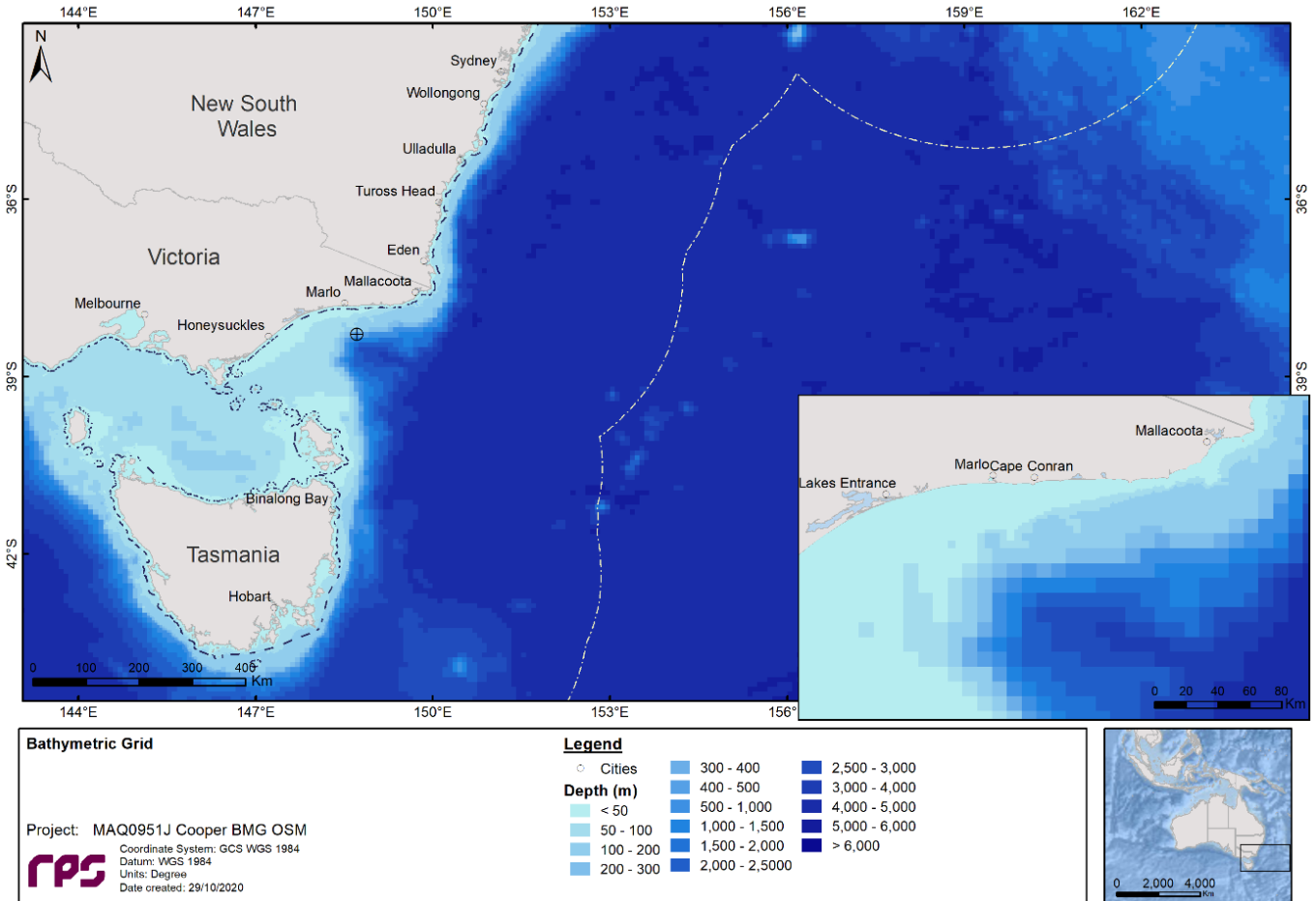


Figure 2-3 Bathymetry defined throughout Gippsland Basin region (RPS, 2021)

2.2 Oceanography

2.2.1 Currents

Australia is heavily influenced by four major currents: East Australian Current, Leeuwin Current, Indonesian Throughflow, and the Antarctic Circumpolar Current (Figure 2-4). These four currents have a driving influence on the conditions and biodiversity in Australian oceans and coastal environments. There are also a number of smaller and more complex current systems. All these ocean features can change from season to season, and may be more or less extensive and energetic, depending on climate factors.

The East Australian Current flows south along the east coast of Australia from near Queensland’s Fraser Island to Tasmania; and is an important feature of the Tasman Sea. This area has been warming faster than other parts of the ocean (CSIRO, no date). This has been driven by changes in atmospheric circulation causing an increase in strength of the South Pacific Gyre, resulting in the strengthening of the East Australian Current, so that the warm tropical waters from the Coral Sea region are forced further south, warming the Tasman Sea (CSIRO, no date).

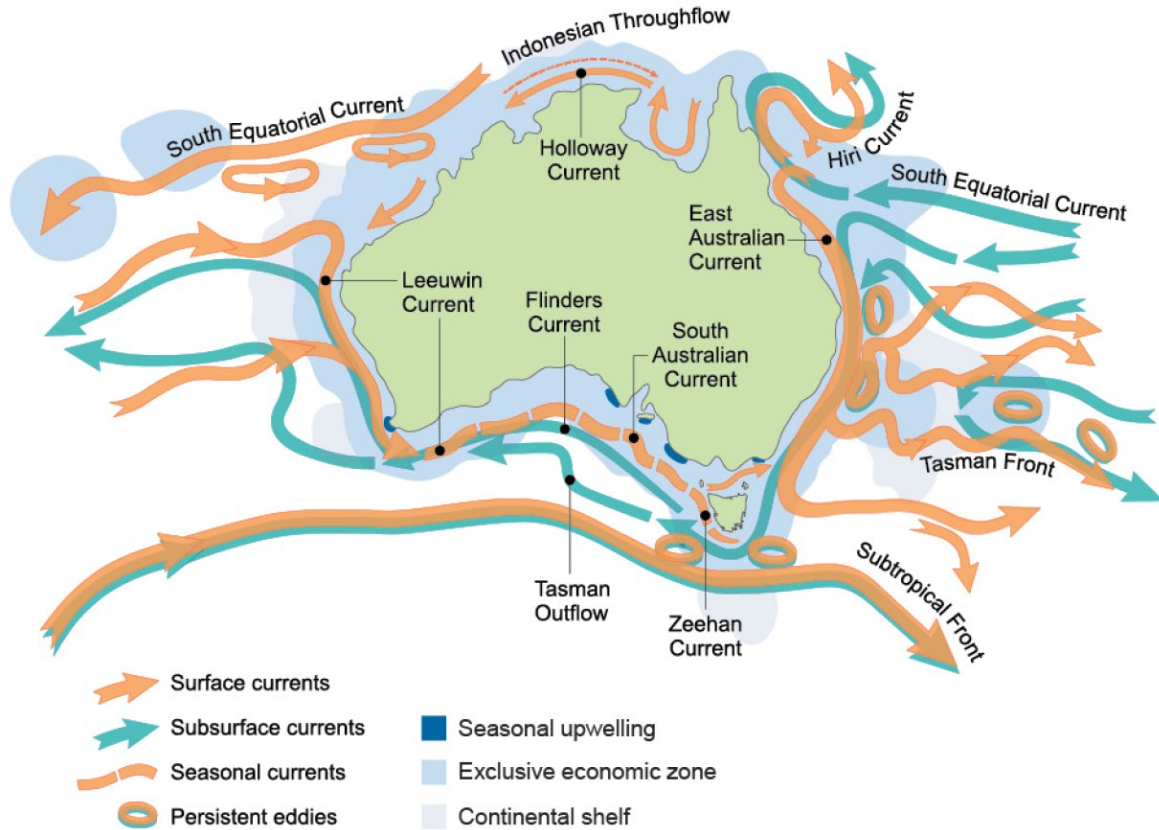


Figure 2-4: Major Ocean Currents and Features of Australia's Marine Environment

The Bass Strait region has a reputation for high winds and strong tidal currents (Jones, 1980). Currents within the Strait are primarily driven by tides, winds and density driven flows. Tides are semi-diurnal with some diurnal inequalities, generating tidal movements with a predominantly north-east to south-west orientation; with speeds ranging 0.1–2.5 m/s (Fandry, 1983). Tidal flows in Bass Strait come from the east and west during a rising (flood) tide, and flow out to the east and west during a falling (ebb) tide. During winter, the South Australian Current moves dense, salty water eastward from the Great Australian Bight into the western margin of the Bass Strait; and during summer, water flow reverses off Tasmania, King Island and the Otway Basin travelling eastward, as the coastal current develops due to south-easterly winds (RPS, 2017). In winter and spring, waters within the strait are well mixed with no obvious stratification, while during summer the central regions of the strait become stratified (RPS, 2017).

Bass Strait is a high-energy environment exposed to frequent storms and significant wave heights. The Otway coast has a predominantly south-westerly aspect and is highly exposed to swell from the Southern Ocean. Storms in Bass Strait can generate wave heights of 5 m or more (Cooper Energy 2019). In-situ wave measurements in the northern portion of the Casino pipeline, showed 2.0–3.5 m waves occur for 50% of the time, and waves over 7.6 m can occur during winter (Santos, 2004).

Within the Gippsland region, surface currents generally flow in a northeast to southwest axis with different intensities depending on the month. The average current speed ranged between 0.18 m/s and 0.24 m/s while maximum current speeds ranged between 0.59 m/s (December) and 0.96 m/s (March) (RPS, 2021).

The Key Ecological Feature (KEF) known as the Bass Cascade is present during winter, when down-welling is caused by the cooling of shallow waters of Bass Strait into Gippsland Basin. Down-welling currents that originate in the shallow eastern waters of Bass Strait flow down the continental slope to depths of several hundred metres or more into the Tasman Sea.

2.2.2 Sea Temperature and Salinity

Sea-surface temperatures vary throughout the year, from the monthly average temperatures range from 14.1°C (September) to 20.5°C (March). Salinity tends to remain consistent throughout the year, between 35.4–35.6 psu (RPS, 2021).

Waters of eastern Bass Strait are generally well mixed, but surface warming sometimes cause 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 of Bass Strait from the bottom well-mixed layer (Esso, 2009).

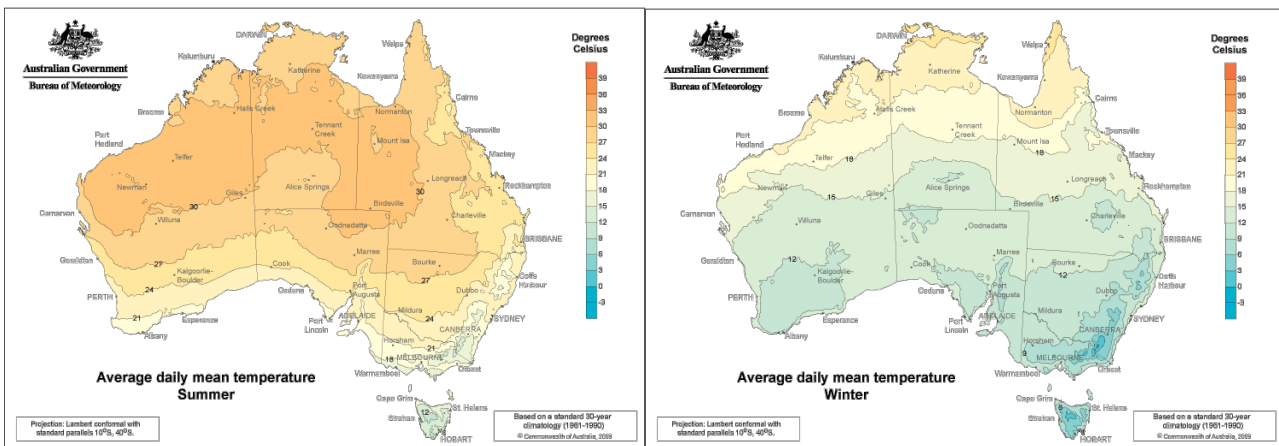
The southwest region of Victorian area has significant upwelling of colder, nutrient rich deep-water during summer (i.e., the Bonney Coast Upwelling KEF) that can cause sea surface temperatures to decrease by 3°C compared with offshore waters (Butler *et al.*, 2002).

2.3 Air Quality and Climate

Australia’s size and geography gives rise to a diverse range of climate patterns across the continent and offshore islands. The south-eastern coast (Victoria, Tasmania, New South Wales) is primarily described as being ‘temperate’; and the region extending into southern Queensland becomes ‘subtropical’. There are seasonal variations in mean temperatures and rainfall, with northern Australia (including Queensland), having higher summer rainfall, compared to southern Australia when winter rainfall is more dominant (Figure 2-5, Figure 2-6).

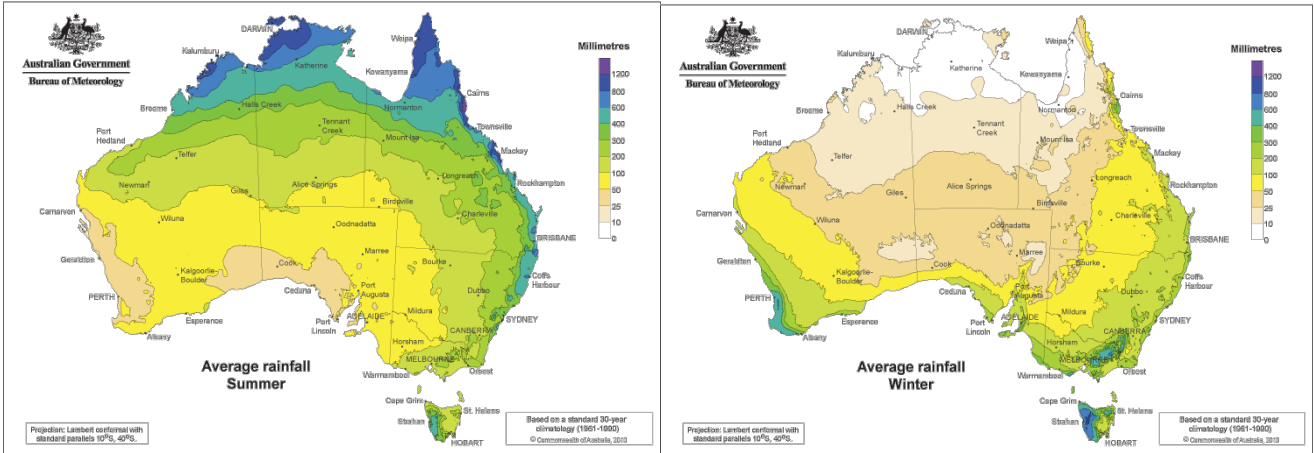
Victorian’s climate can be characterised as cool temperate, with cool wet winters and cool summers. The conditions are primarily influenced by weather patterns originating in the Southern Ocean. It is dominated by sub-tropical high-pressure systems in summer and sub-polar low-pressure systems in winter. The low-pressure systems are accompanied by strong westerly winds and rain-bearing cold fronts that move from west to east across the region.

Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Hindcast modelled wind data from the National Centres for Environmental Predictions Climate Forecast System Reanalysis for the period 2008 to 2012 (inclusive), showed winds were typically from a westerly (west-southwest to west-northwest) direction, with average monthly wind speeds ranging from 14.1–16.5 knots. The dataset shown in Figure 2-7 demonstrates that the Gippsland Basin typically experiences moderate to strong winds all year round and although the monthly average wind speeds remain under 10 knots, winds can at times blow over 25 knots. Winds in the region typically blow from the southwest during the summer months and west-southwest during the winter months. (RPS, 2017)



(Source: BoM, 2016)

Figure 2-5: Average daily mean temperatures in Summer (left) and Winter (right)

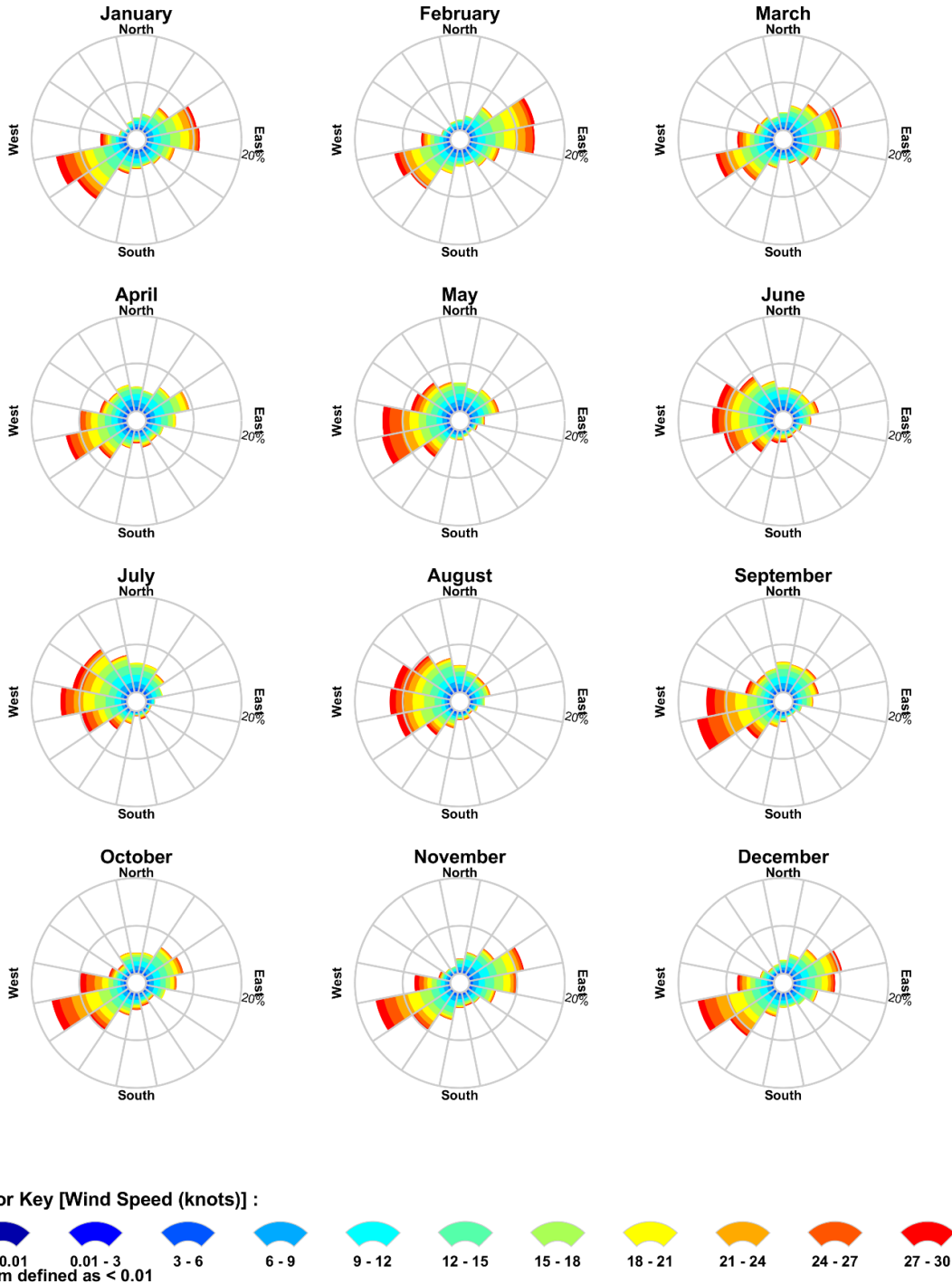


(Source: BoM, 2016)

Figure 2-6: Average rainfall in Summer (left) and Winter (right)

RPS Data Set Analysis Wind Speed (knots) and Direction Rose (All Records)

Longitude = 148.71°E, Latitude = 38.30°S
Analysis Period: 01-Jan-2008 to 31-Dec-2017



(Source: RPS, 2021)

Figure 2-7: Monthly wind rose distributions derived from CFSR model from 2008 to 2017 (inclusive), for the wind node closest to the B2 and M2A release locations.

Historical air quality data is available from the Environment Protection Authority (EPA) Victoria air quality monitoring stations, and Cape Grim Baseline Air Pollution Station on Tasmania's west coast, which is one of the three premier baseline air pollution stations in the World Meteorological Organisation-Global Atmosphere Watch (WMO-GAW) network, measuring greenhouse and ozone depleting gases and aerosols in clean air environments.

The Victorian air quality data is collected at 15 performance monitoring stations representing predominantly urban and industrial environments in the Port Phillip and Latrobe Valley regions of Victoria. Results are assessed against the requirements of the National Environment Protection (Ambient Air Quality) Measure for the pollutants carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulphur dioxide (SO₂), lead (Pb), particles less than 10 micrometres in diameter (PM₁₀) and particles less than 2.5 micrometres in diameter (PM_{2.5}). The most recent annual air monitoring report shows Victoria's air quality in 2015 was generally good with AAQ NEPM (Ambient Air Quality National Environmental Protection Measure) goals and standards being met for carbon monoxide (CO), nitrogen dioxide (NO₂), Ozone (O₃) and sulphur dioxide (SO₂). There were some exceedances for particles.

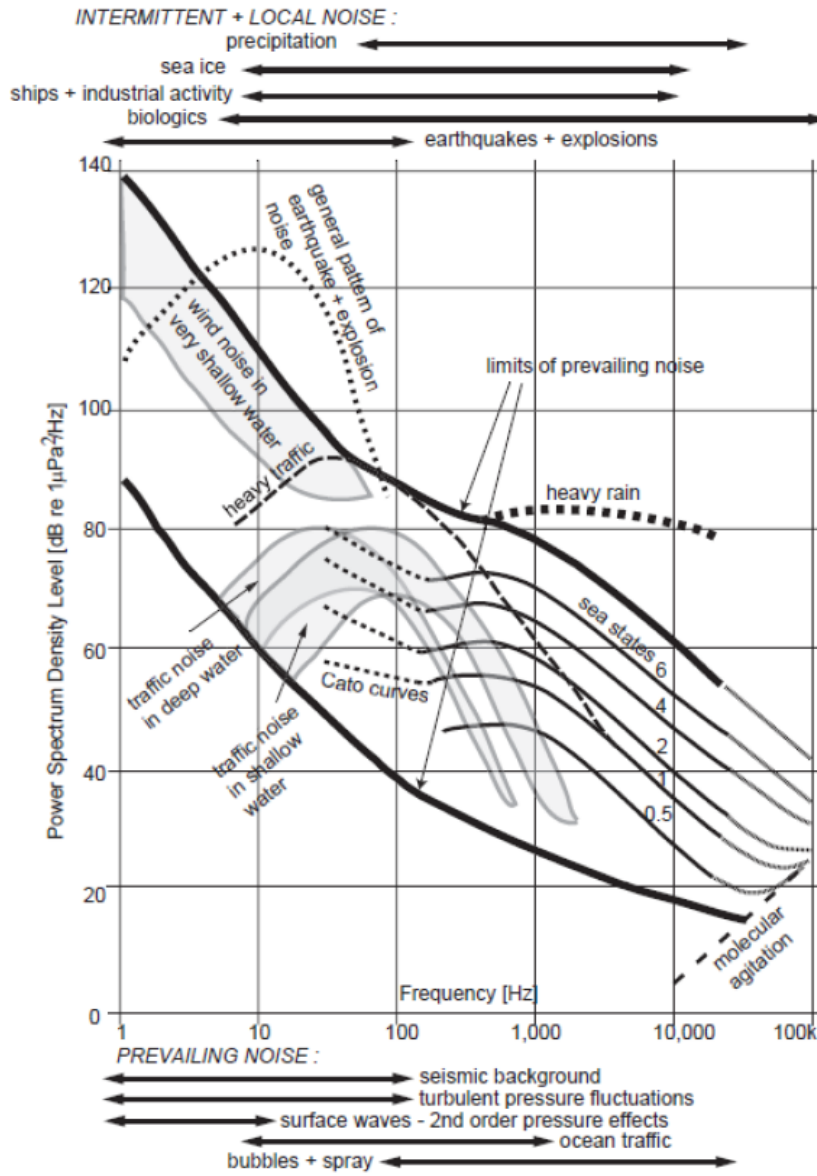
The Cape Grim station monitors greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and synthetic GHGs such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). Historical air quality data from Cape Grim show that most GHGs have shown continuous increases in concentration since the mid-to-late 1970s with carbon dioxide levels increasing by more than 15% since 1976, and concentrations of methane and nitrous oxide increasing by around 20% and 8% respectively since 1978. The increase in methane levels however has slowed recently and CFCs and halons are in decline. Increases have been attributed to anthropogenic causes, for example, fossil fuel consumption and agricultural practices (CSIRO, 2017). Increases have been attributed to anthropogenic causes, for example, fossil fuel consumption and agricultural practices (CSIRO, 2020).

2.4 Underwater Noise

Physical and biological processes contribute to natural background sound. Physical processes include that of wind and waves whilst biological noise sources include vocalisations of marine mammals and other marine species.

Iceberg calving, shoaling and disintegration has recently been identified as a dominant source of low frequency (<100 Hz) noise in the Southern Ocean. Wind is also a major contributor to noise between 30–100 Hz and can reach 85-95 dB re 1µPa²/Hz under extreme conditions (WDCS, 2004). Rain may produce short periods of high underwater sound with a flat frequency spectrum to levels of 80 dB re 1µPa²/Hz and magnitude four earthquakes have been reported to have spectral levels reaching 119 dB re 1µPa²/Hz at frequency ranges 5-15 Hz. It is noted that earthquakes of this magnitude are relatively frequent along Australia's continental shelf in the southern margin (i.e., tens of small earthquakes per year) (McCauley & Duncan, 2001). Figure 2-8 provides generalised ambient noise spectra attributable to various sources completed by Wenz (1962; cited in Richardson *et al.* 1995).

Since 2009 (paused 2017-2018 due to funding), the Integrated Marine Observing System (IMOS) has been recording underwater sound south of Portland, Victoria (38° 32.5' S, 115° 0.1' E). Prominent sound sources identified in recordings include blue and fin whales at frequencies below 100 Hz, ship noise at 20 to 200 Hz and fish at 1 to 2 kHz (Erbe *et al.* 2016). In the Gippsland Basin, primary contributors to background sound levels were wind, rain and current- and wave-associated sound at low frequencies under 2 kHz (Przeslawski *et al.* 2016). Biological sound sources including dolphin vocalisations were also recorded (Przeslawski *et al.* 2016). Ambient noise level in the Gippsland Basin at 100-500 Hz varied depending on recording location between 89.2 to 109.9 dB re 1 µPa²/Hz, likely due to a varied increase in distance from shipping activity, and water depth.



(Source: Richardson *et al.*, 1995)

Figure 2-8: Generalised ambient noise spectra

3 Ecological Environment

3.1 Shorelines

The coastal environment throughout southern and eastern Australia is varied, and includes areas of rocky cliffs, sandy beaches, and tidal flats (Table 3-1). Each of these shoreline types has the potential to support different flora and fauna assemblage due to the different physical factors (e.g., waves, tides, light etc.) influencing the habitat.

Smartline¹ established a nationally-consistent map of the coastal landform types (geomorphology) of continental Australia and most adjacent islands (OzCoasts, 2015a; Sharples *et al.*, 2009). The single line consists of multiple attributes describing landform characteristics of the coastal area (defined as a nominal distance of 500 m inland and offshore from mean high water), including distinct attributes for the backshore, intertidal and subtidal regions (Figure 3-1) (Sharples *et al.*, 2009).

The Smartline system also includes an ‘exposure’ attribute, which is the degree of exposure of a shoreline segment to oceanic swell and storm wave energy (i.e., it is not a measure of actual wave energy received). The categories represent the degree of exposure or sheltering of a coastal segment, e.g. coastal lagoons and estuaries are ranked with ‘very low’ exposure, while open coast environments may be ‘moderate’ or ‘high’. This attribute of Smartline was primarily sourced from previous OSRA shoreline mapping (Sharples *et al.*, 2009).

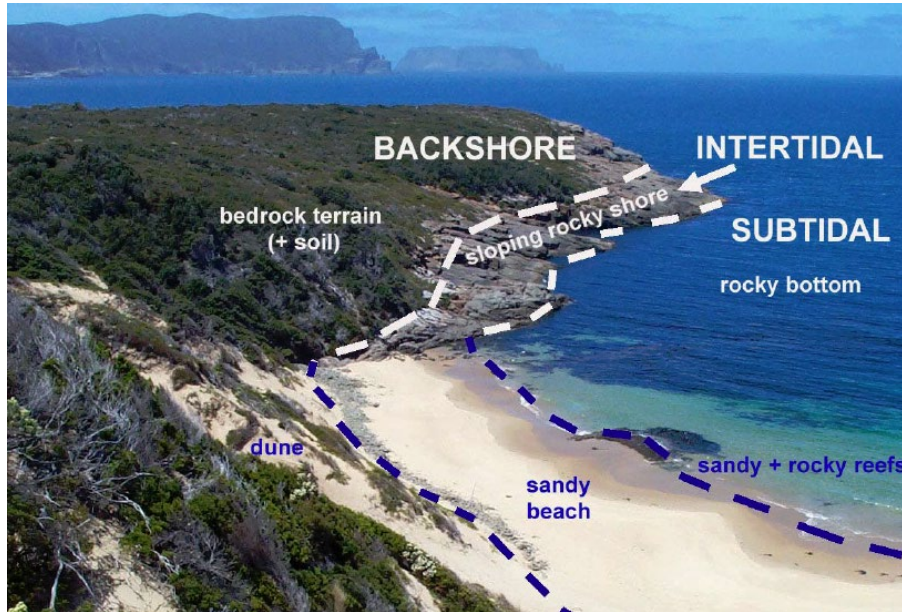
The coast of southern and eastern Australia has been mapped to show the variation in shoreline type (backshore, intertidal and subtidal attributes) and shoreline exposure (Figure 3-2).

Table 3-1: Shoreline types within the Environment Sectors

Shoreline Type	Description
Cliff	Hard and soft rock features, over five metres in height. This is a common shoreline type along stretches of the Tasmanian coast, including Cape Pillar, Cape Raoul, and Cape Hauy, on the Tasman Peninsula.
Rocky	Hard and soft rocky shores, including bedrock outcrops, platforms, low cliffs (less than five metres), and scarps. Depending on exposure, rocky shores can be host to a diverse range of flora and fauna, including barnacles, mussels, sea anemones, sponges, sea snails, starfish and algae. Australian fur-seals are also known to use rocky shores for haul-out and/breeding. This is common shoreline along southern and eastern Australian coasts, including the limestone coast and features along the Great Ocean Road, Victoria.
Gravel/Cobble	Beaches dominated by unconsolidated sediment with particle sizes > 2mm. Gravel beaches are typically steeper than sandy beaches, and fauna can include a variety of infauna, or small crustaceans. These are often co-located near cliff or rocky shoreline types; therefore similarly, are quite common along the southern Tasmania coast.
Sandy	Beaches dominated by sand-sized (0.063–2 mm) particles; 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 very common along the entire coast, including Ninety Mile Beach (East Gippsland, Victoria) and Apollo Bay (east of Cape Otway, Victoria).
Muddy	Shores with predominantly muddy (particle sizes <0.063 mm) shores. May also include mixed sediments (e.g., sands or gravel), where the mud fraction is dominant. This shoreline type typically occurs in more sheltered environments like estuaries or bays, including River Tamar estuary in northern Tasmania.
Tidal Flat	Shorelines exposed to high tidal variation; includes both sandy and muddy sediments. This shoreline type can often be associated with mangrove or saltmarsh environments.

¹ The Smartline Project was commissioned by Department of Climate Change and Geoscience Australia in 2007.

	This shoreline type is typically patchy in southern Australia but does occur (e.g., Corner Inlet, Victoria); it is more common in northern Australia (e.g. Queensland).
Artificial	Man-made structures along the coast, including breakwaters, piers, jetties. This is a common feature in urban areas, although does not typically extend for long stretches of coast.



(Source: Sharples et al., 2009)

Figure 3-1: Example illustration showing Backshore, Intertidal and Subtidal zones within a coastal area

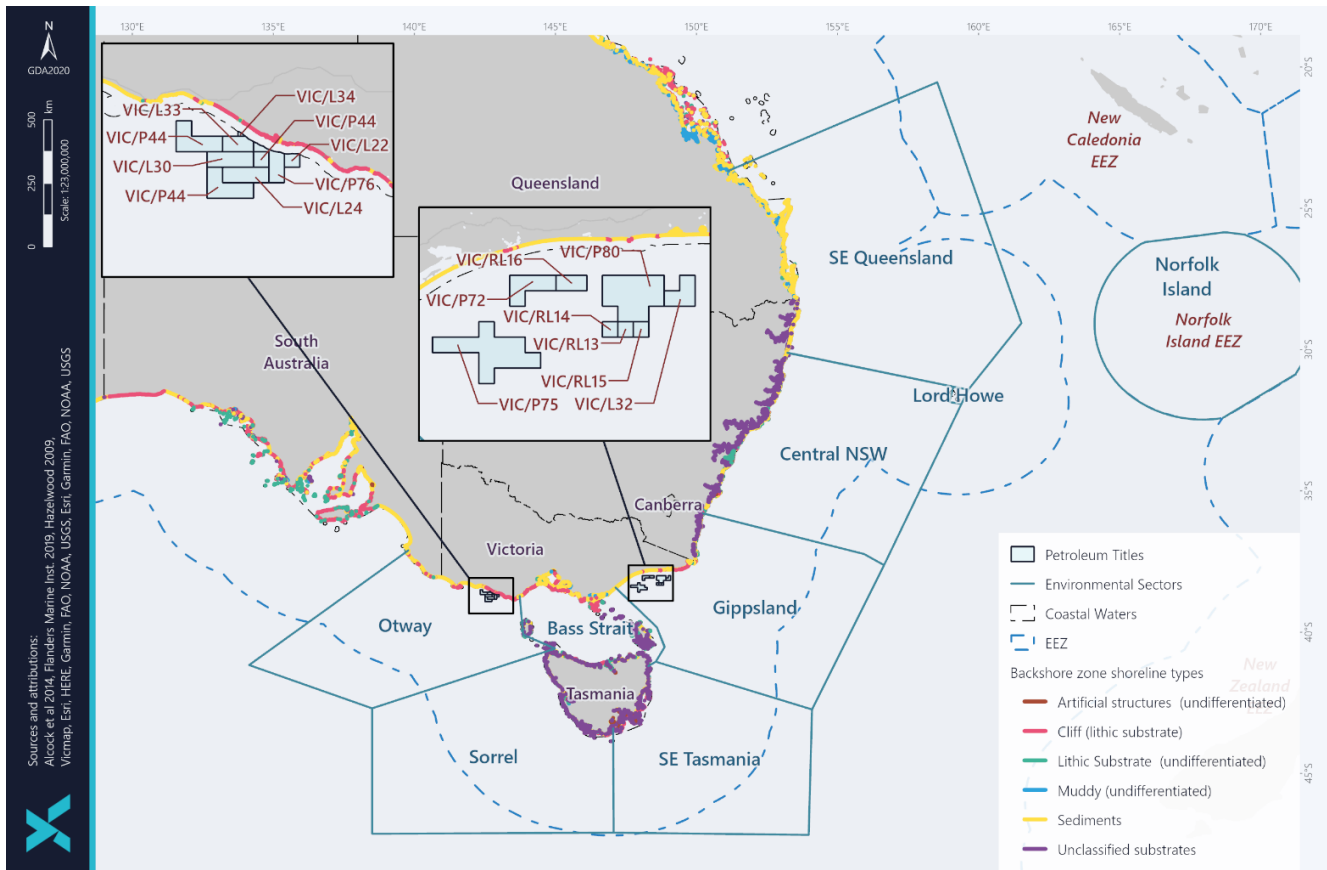


Figure 3-2: Shoreline types (Backshore) and Shoreline Exposure within the Environment Sectors

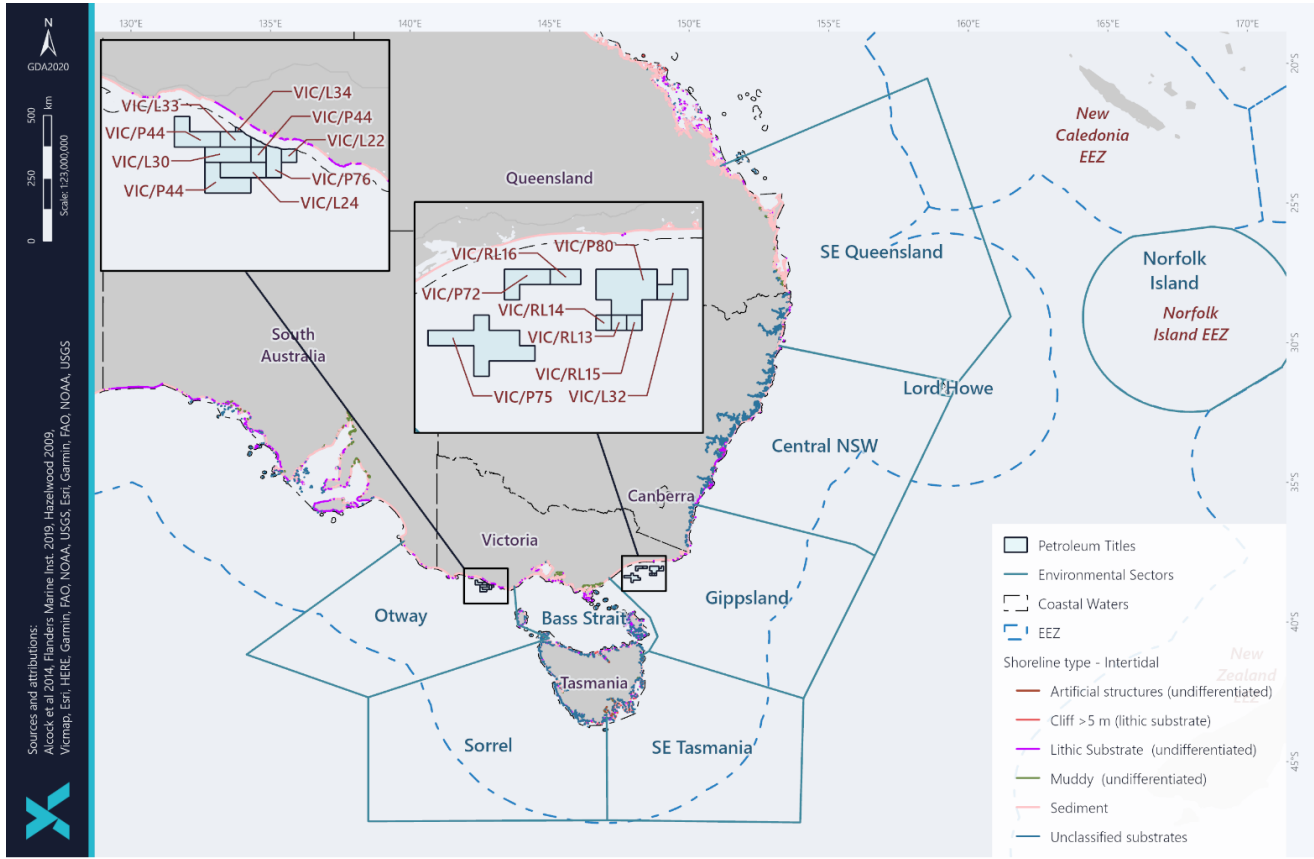


Figure 3-3: Shoreline types (Intertidal) and Shoreline Exposure within the Environment Sectors

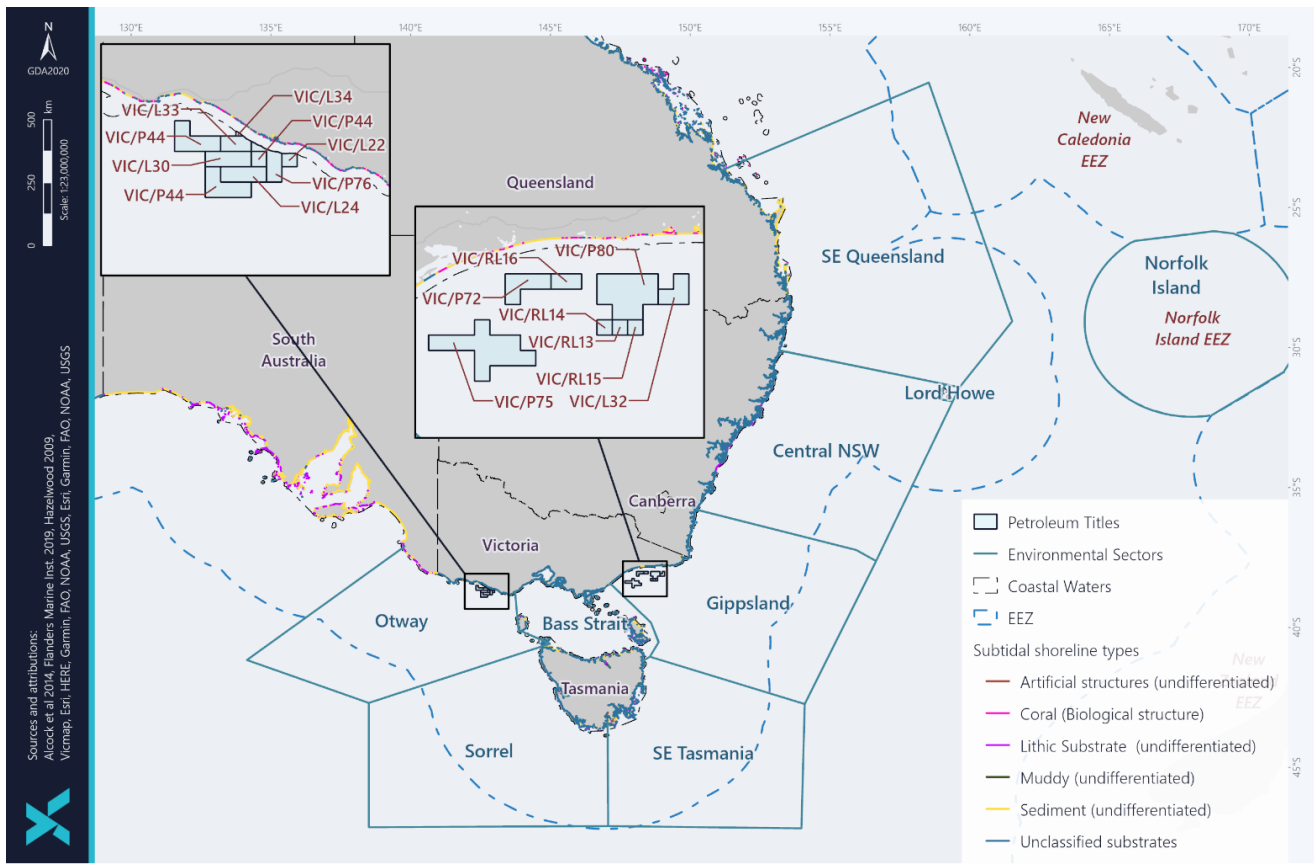


Figure 3-4: Shoreline types (Subtidal) and Shoreline Exposure within the Environment Sectors

3.2 Mangroves

Mangroves have been recorded in all Australian coastal states except Tasmania (Table 3-2, Figure 3-5). Mangroves grow in intertidal mud and sand, with specially adapted aerial roots (pneumatophores) that provide for gas exchange during low tide (McClatchie *et al.*, 2006). Mangrove forests can help stabilise coastal sediments, provide a nursery ground for many species of fish and crustacean, and provide shelter or nesting areas for seabirds (McClatchie *et al.*, 2006).

The mangroves in Victoria, found mostly along sheltered sections of the coast within inlets or bays, are the most southerly extent of mangroves found in the world (MESA, 2015). One species of mangrove, the white or grey mangrove (*Avicennia marina*) is the only species found in Victoria and is known to occur at Western Port and Corner Inlet, and also at larger estuaries like the Yarran and Barwon Rivers (Figure 3-5). The number of mangrove species increases as they occur further north, with six species found in New South Wales, and 39 in Queensland (MESA, 2015). In New South Wales, mangroves typically occur within tidal estuaries, coastal lakes and bays; but can occur across a diverse range of coastal and estuarine environments in Queensland (MESA, 2015).

The Estuarine, Coastal and Marine (ECM) National Habitat Map project² established a nationally consistent set of broad-scale habitat maps for Australia (Mount and Bricher, 2008). For the intertidal and subtidal environment, an area extending between approx. highest astronomical tide (HAT) and the outer limit of the photic benthic zone (approximately the 50-70 m depth contour), habitat classes were attributed using the National Intertidal/Subtidal Benthic (NISB) habitat classification scheme. The 'Mangrove Dominated' habitat class includes areas with greater than 10% coverage of mangroves (Figure 3-5) (Mount and Bricher, 2008; OzCoasts 2015b).

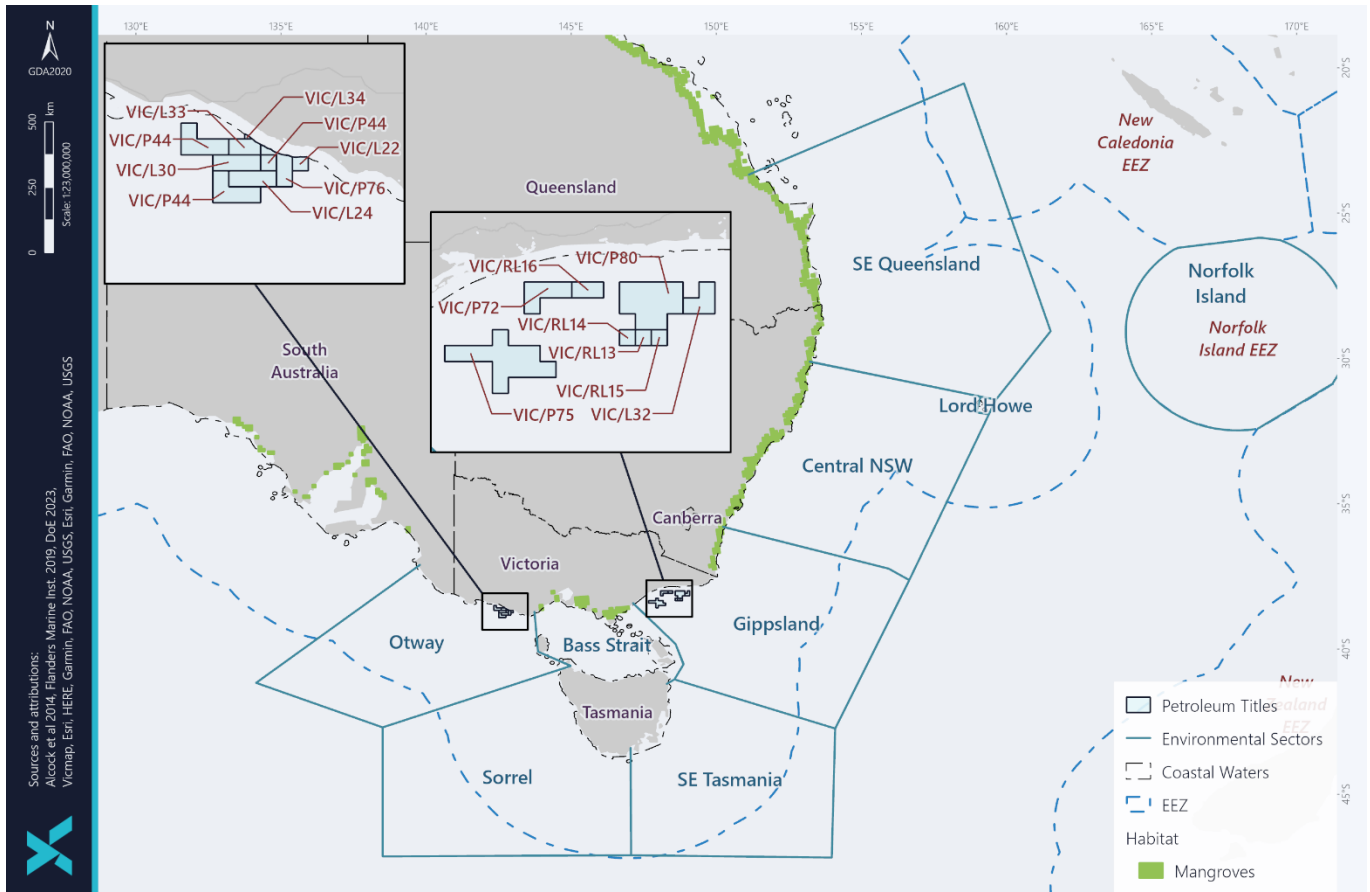
Table 3-2: Presence of mangroves within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Mangroves (Dominant Habitat)¹		✓	✓			✓	✓	✓	

Notes:

1. Mangrove as a dominant intertidal/subtidal habitat determined from national mapping available from OzCoasts (2015b), and local flora reports for Lord Howe Island (Sheringham *et al.*, 2016).

² The Estuarine, Coastal and Marine National Habitat Map project was prepared for Department of Climate Change, and Land & Water Australia (specifically the National Land and Water Resources Audit).



Note: Map shows the 'mangrove dominated' habitat from the NISB Habitat Classification Scheme

Figure 3-5: Distribution of mangrove dominated habitat within the photic zone

3.3 Saltmarshes

Saltmarshes are terrestrial halophytic (salt-adapted) ecosystems that mostly occur in the upper-intertidal zone, and are widespread along the coast (Table 3-3, Figure 3-6). The 'Saltmarsh Dominated' habitat class includes areas with greater than 10% coverage of saltmarshes (Mount and Bricher, 2008; OzCoasts 2015b).

They are typically dominated by dense stands of halophytic plants such as herbs, grasses and low shrubs. 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.

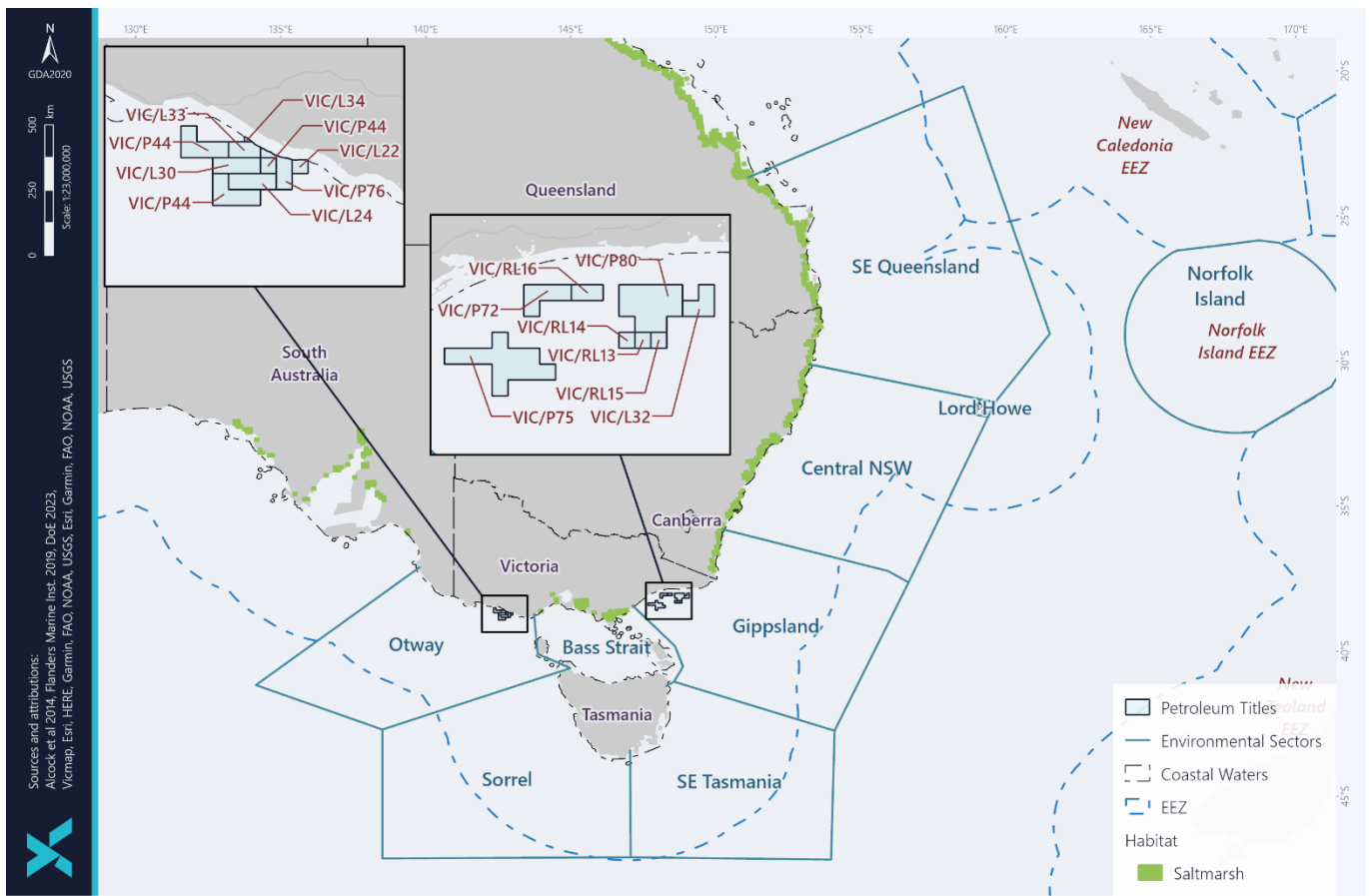
Saltmarsh is found along many parts of the Victorian coast, although is most extensive in western Port Phillip Bay, northern Western Port, within the Corner Inlet-Nooramunga complex, and behind the sand dunes of Ninety Mile Beach in Gippsland (Boon *et al.*, 2011) (Figure 3-6). Saltmarsh environments are much more common in northern Australia (e.g., Queensland), compared to the temperate and southern coasts (i.e. New South Wales, Victoria, Tasmania) (Boon *et al.*, 2011).

Table 3-3: Presence of saltmarsh within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Saltmarsh (Dominant Habitat)¹	✓	✓	✓	✓	✓	✓	✓	✓	
TEC: Subtropical and Temperate Coastal Saltmarsh²	✓	✓	✓	✓	✓	✓	✓		

Notes:

1. Saltmarsh as a dominant intertidal/subtidal habitat determined from national mapping available from OzCoasts (2015b), and local flora reports for Lord Howe Island (Sheringham *et al.*, 2016).
2. Presence of TEC determined from EPBC Protected Matters search reports.



Note: Map shows the 'saltmarsh dominated' habitat from the NISB Habitat Classification Scheme

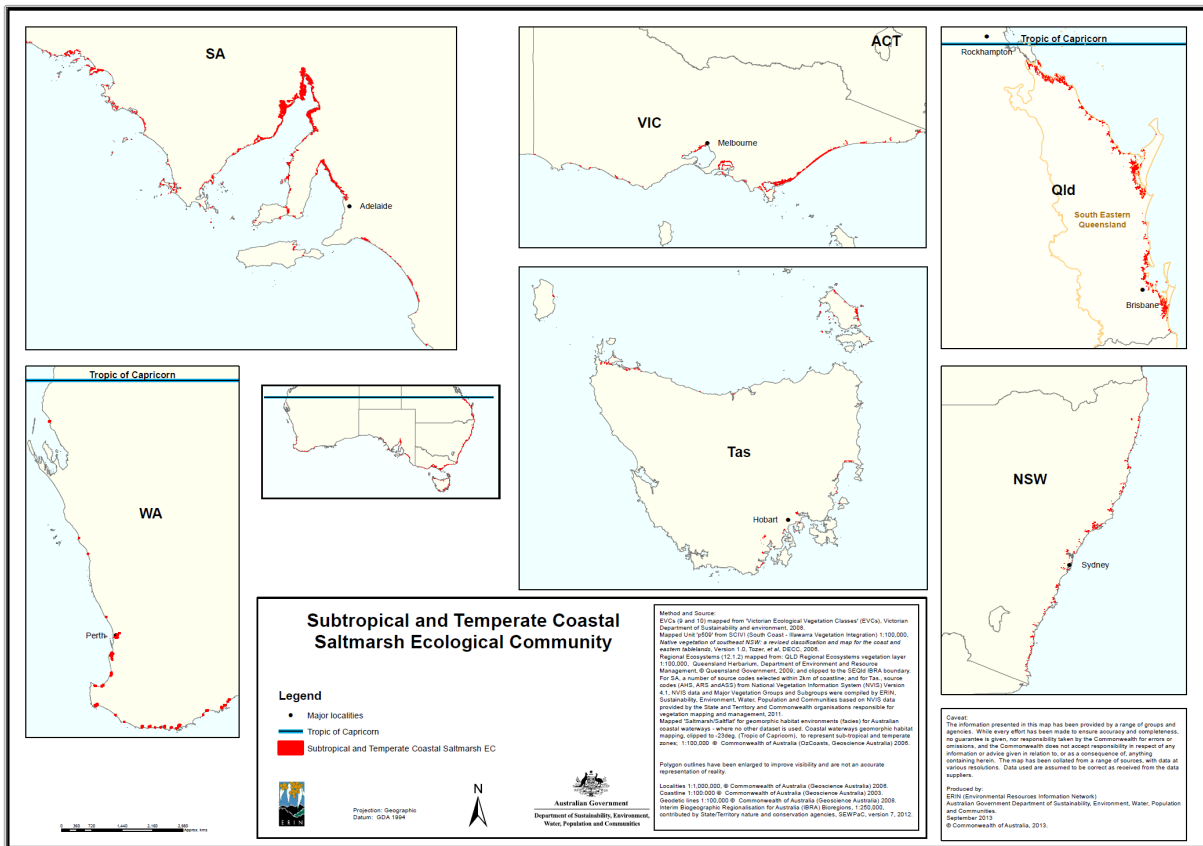
Figure 3-6: Distribution of saltmarsh dominated habitat within the photic zone

3.3.1 TEC: Subtropical and Temperate Coastal Saltmarsh

The ‘Subtropical and Temperate Coastal Saltmarsh’ is listed as a vulnerable Threatened Ecological Community (TEC) under the EPBC Act, and it’s known distribution includes the southern and eastern coasts of Australia (Table 3-3, Figure 3-7). The Subtropical and Temperate Coastal Saltmarsh ecological community occurs within a relatively narrow margin along the Australian coast, within the subtropical and temperate climatic zones; and includes coastal saltmarsh occurring on islands within these climatic zones (TSSC, 2013a). The physical environment for the ecological community is coastal areas under regular or intermittent tidal influence (TSSC, 2013a).

The ecological community consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, sedges, rushes and shrubs (TSSC, 2013a). Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats (TSSC, 2013a). 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) (TSSC, 2013a). Insects are also abundant and an important food source for other fauna, with some species being important pollinators (TSSC, 2013a). 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 (TSSC, 2013a).

The key threats affecting the ecological community include: clearing and fragmentation, infilling, altered hydrology/tidal restriction, invasive species, climate change, mangrove encroachment, damage from recreational activities, pollution (including oil spills), eutrophication, acid sulphate soils, grazing, insect control, salt and other mining activities, and inappropriate fire regimes (TSSC, 2013a).



(Source: TSSC, 2013a)

Figure 3-7: Distribution of the TEC Subtropical and Temperate Coastal Saltmarsh

3.3.2 TEC: Assemblages or species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community

The Assemblages or species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community is listed as an endangered TEC under the EPBC Act. The ecological community is a collection of native plants, animals and micro-organisms associated with the dynamic salt-wedge estuary systems

that occur within the temperate climate, microtidal regime (< 2 m), high wave energy coastline of western and central Victoria (DoEE, 2018). The composition of flora, Protista and fauna species may vary across the different estuaries within the ecological community. Invertebrate fauna species include worms, molluscs, crabs with estuarine fish to be considered the apex predators within the ecological community (DoEE, 2017).

Of critical importance to the survival of the ecological community is a hydrological regime sufficient to ensure salinity stratification; salt-wedge dynamics; connectivity; and ecological function between the estuary, river and ocean (and floodplain wetland components where applicable). Changes in catchment management (e.g., land-use changes that change water flow, sediments, water seasonality etc.) have the potential to, and have previously, affected the survival of the ecological community (DELWP, 2017).

The ecological community currently encompasses 25 estuaries and is defined by the border between South Australia and Victoria and the most southerly point of Wilsons Promontory (refer to Table 3-4 and Figure 3-8) (DoEE, 2018).

Table 3-4: Presence of assemblages or species associated with open-coast salt-wedge estuaries of western and central Victoria

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
TEC: Assemblages or species associated with open-coast salt-wedge estuaries of western and central Victoria	✓	✓							

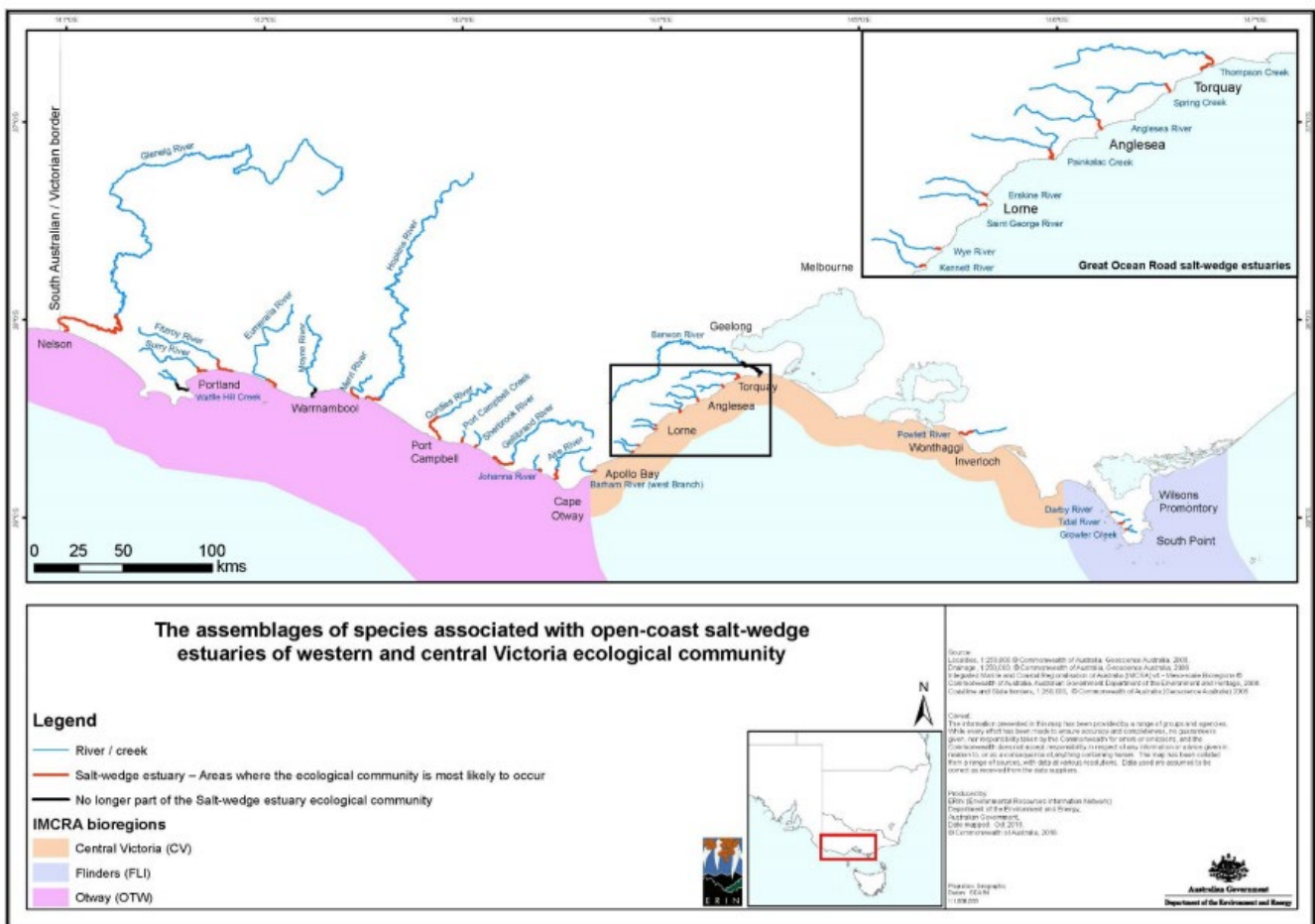


Figure 3-8: Distribution of Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community

3.4 Coastal Vine Thickets

3.4.1 TEC: Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

The ‘Littoral Rainforest and Coastal Vine Thickets of Eastern Australia’ is listed as a critically endangered TEC under the EPBC Act. The ecological community is a complex of rainforest and coastal vine thickets on the east coast of Australia influenced by its proximity to the sea; and provides habitat for over 70 threatened plants and animals, and also provides an important buffer to coastal erosion and wind damage (TSSC, 2015a; DEWHA 2009a).

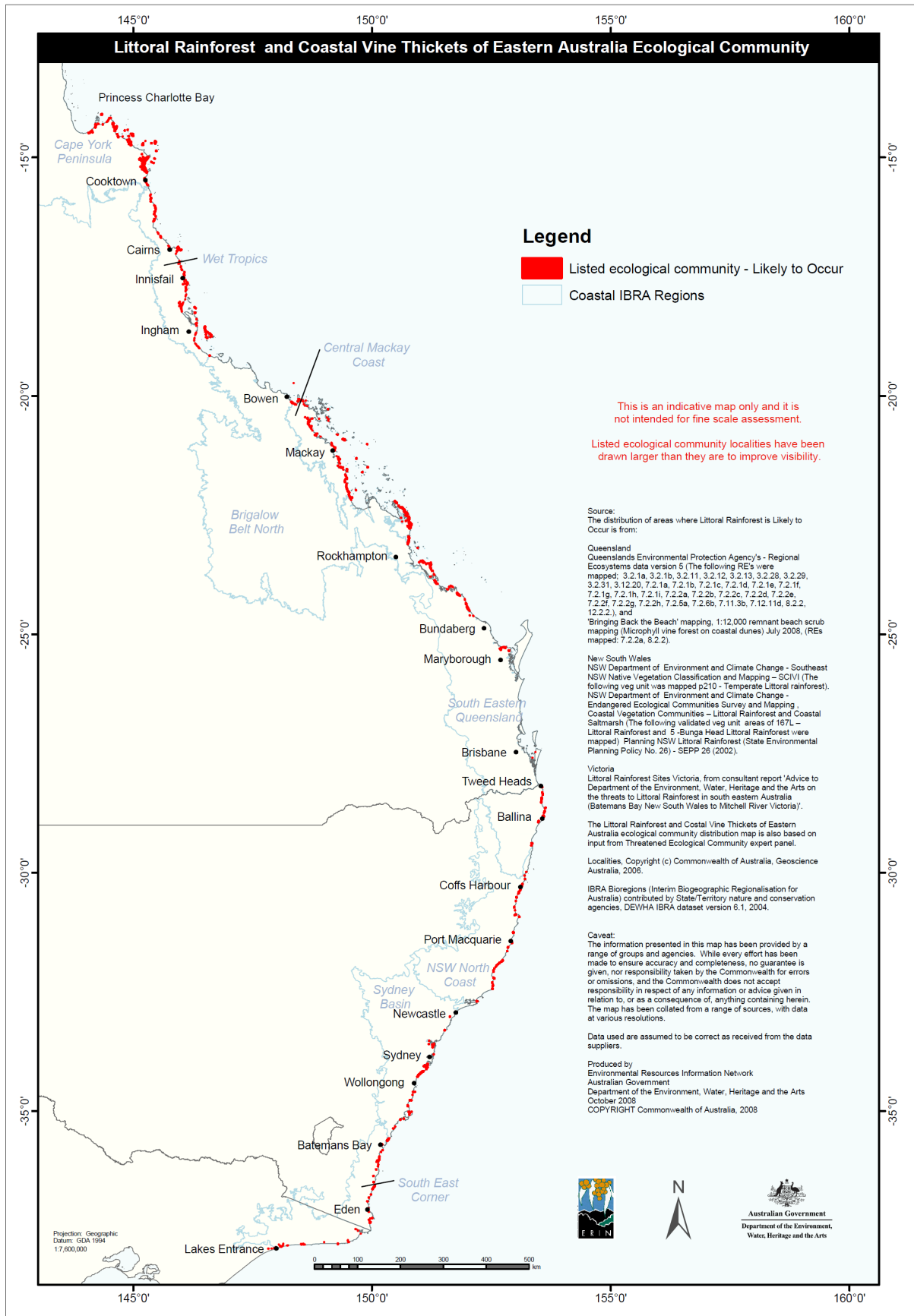
The ecological community occurs within two kilometres of the eastern coastline of Australia, including offshore islands, from Princess Charlotte Bay, Cape York Peninsula to the Gippsland Lakes in Victoria (TSSC, 2015a) (Table 3-5, Figure 3-9). It occurs as a series of naturally disjunct and localised stands, on a range of landforms which have been influenced by coastal processes including dunes and flats, headlands and sea-cliffs (DEWHA, 2009a).

Table 3-5: Presence of coastal vine thickets within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
TEC: Littoral Rainforest and Coastal Vine Thickets of Eastern Australia¹			✓			✓	✓		

Notes:

1. Presence of TEC determined from EPBC Protected Matters search reports.



(Source: DEWHA, 2009a)

Figure 3-9: Distribution of the TEC Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

3.5 Soft Sediment

Unvegetated soft sediments are a widespread habitat in both intertidal and subtidal areas, particularly in areas beyond the photic zone. Within the photic zone, this habitat appears more common through southern Australia, than along the east coast (Figure 3-10). The 'Sediment Dominated Habitat' class includes all areas dominated by particles of gravel size or smaller (i.e., including sands and silts) (Figure 3-10) (Mount and Bricher, 2008; OzCoasts 2015b). The biodiversity and productivity of soft sediment habitat can vary depending upon depth, light, temperature and the type of sediment present.

The substrate across Bass Strait comprises a variety of sediment types, with sediment particle size associated with tidal currents and wave energy. Near-shore sediments consist of coarse sands with isolated areas of gravels, shells and pebbles; and become progressively finer offshore (Esso, 2009). The inshore seabed of Bass Strait consists of symmetrical, wave-generated sandy ripples, becoming shelly in troughs as the depth increases. Finer, muddy sands occur further offshore in the mid-shelf regions (Esso, 2009).

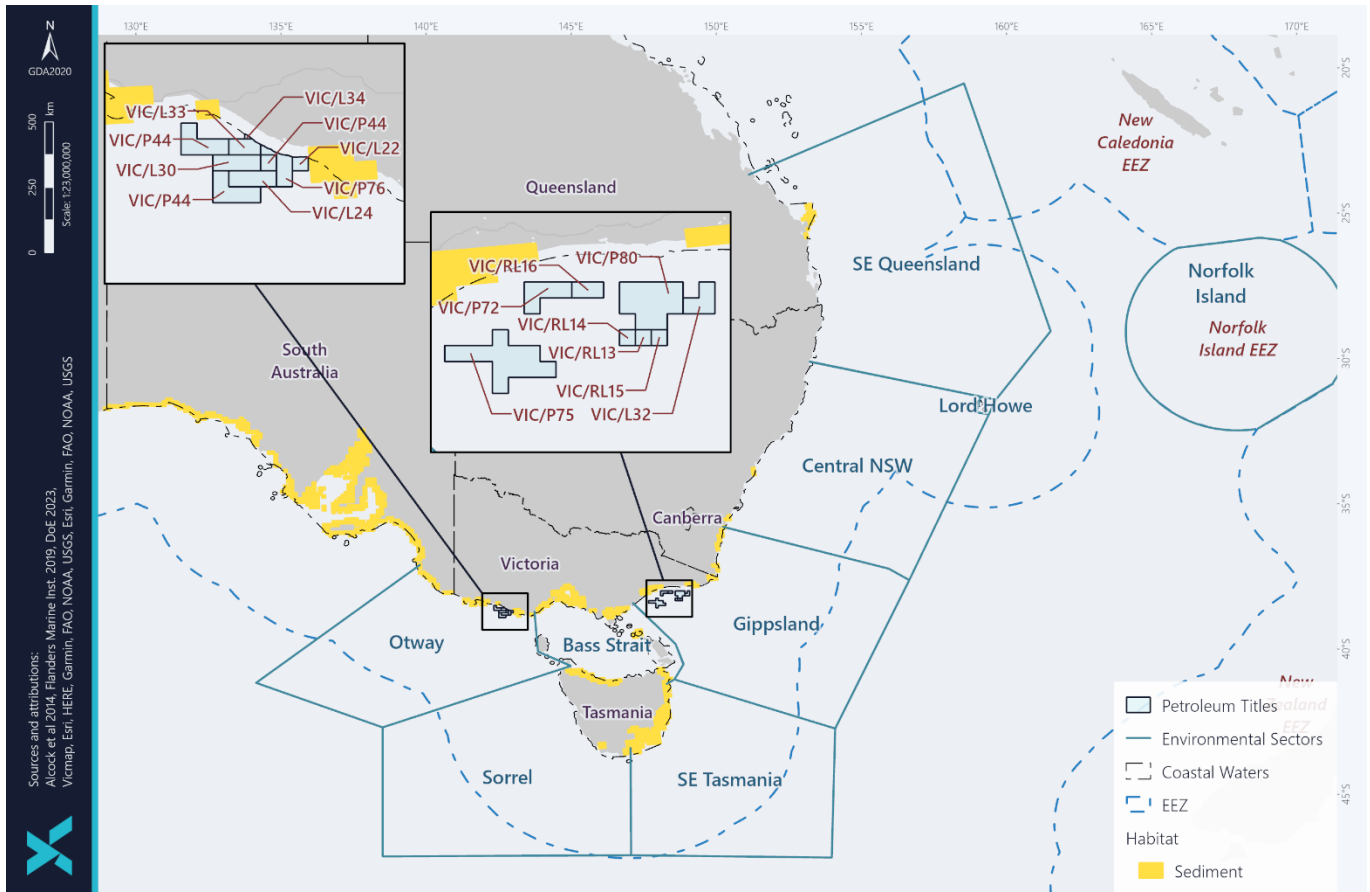
In the Gippsland Basin, seabed material is predominantly calcium carbonate comprised of calcarenite marls and marine shales (Esso, 2009). The Gippsland Basin is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment, submarine canyons, escarpments and a knoll that juts out from the base of the continental slope (Cooper Energy, 2017). The fine to coarse sandy plains and areas of shell 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 survey undertaken along the Patricia-Baleen pipeline identified four general habitat associations on the seabed (Cooper Energy, 2017):

1. Medium sand and shell grit; extensive areas with pronounced sand waves. Epibiotic was generally sparse to commonly occurring sea pens, occasional sponges and stalked colonial ascidians.
2. Shell accumulations; areas of seabed comprised of old large shells, predominantly bivalves and scallops.
3. Sponge garden; small and distinct area of large sponges and bryozoans at approximately 50 m water depth. Sponges included fans, spheres, massives, cups and fingers. Bryozoans included lace-like corals, concertina fans, perforated rigid sheets and fern-like branches. This suggests that although the seabed is predominantly sand and grit it is stable enough to allow these associations to grow. Sponge gardens attracted schools of jackass morwong, butterfly perch and individual gurnard and leatherjackets.
4. Introduced New Zealand screw shell aggregations; NZ screw shell (*Maoricolpus roseus*) was commonly found at water depths greater than 40 m, sometimes forming dense beds covering 100% of the seabed.

A survey of the sole pipeline route showed a featureless seabed comprised of clays, silts, sands and gravel, and some consolidated bedded sediments (Cooper Energy, 2018). Extensive demersal fishing in the area may have resulted in modified seabed biota due to trawling and netting activities (CEE, 2003).

Scientific surveys have shown that some shallow Victorian sandy environments have the highest levels of animal diversity in the sea ever recorded (Parks Victoria, 2016). In the area around the Ninety Mile Beach Marine National Park in Gippsland more than 600 different marine animal species, many of them very small, have been found within an area of 10 m² (Parks Victoria, 2016). 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*) (Parks Victoria, 2016).



Note: Map shows the 'sediment and sand dominated' habitat from the NISB Habitat Classification Scheme

Figure 3-10: Distribution of sediment dominated habitat within the photic zone

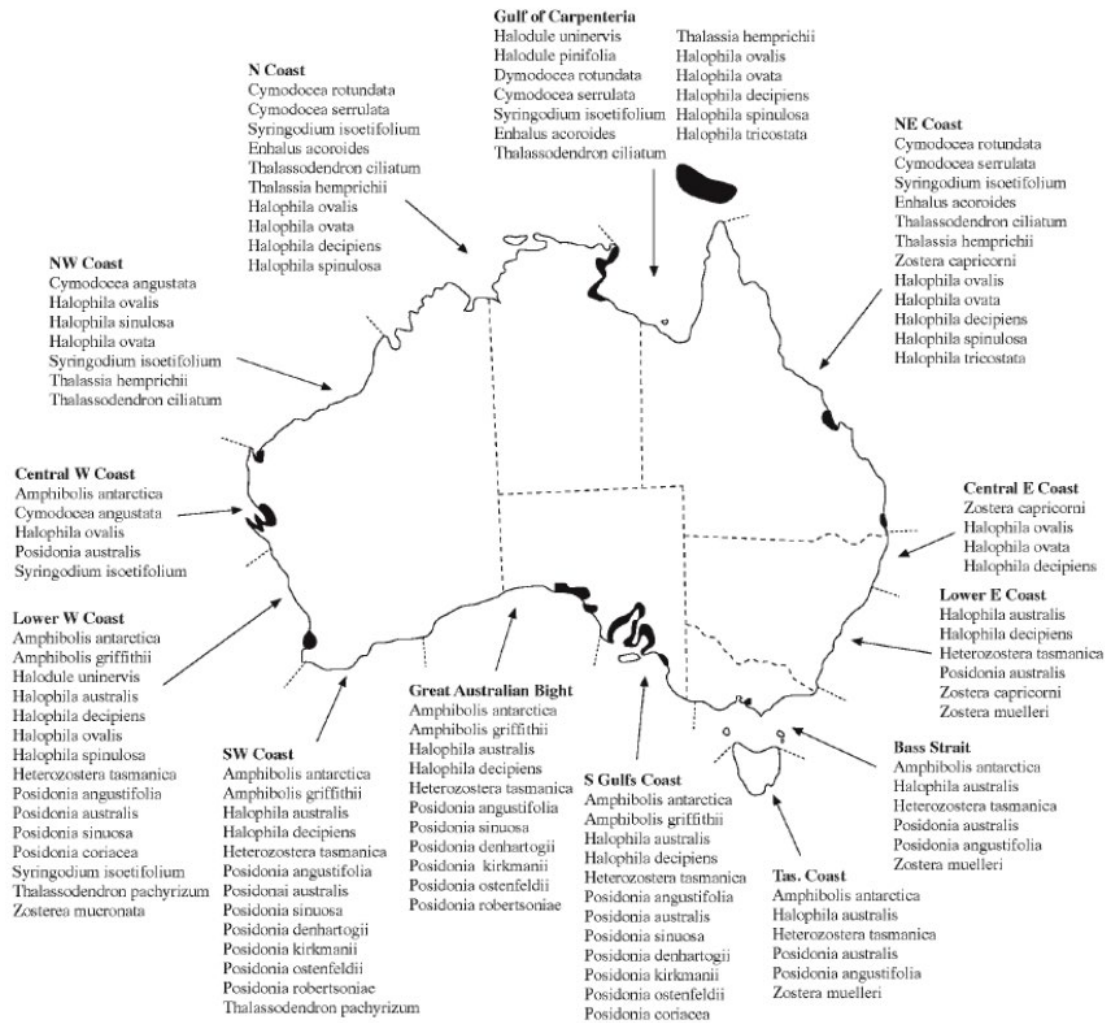
3.6 Seagrass

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) (Kirkham, 1997); the variation in seagrass species around Australia is shown in Figure 3-11. While seagrass meadows are present throughout southern and eastern Australia (Table 3-6, Figure 3-12), the proportion of seagrass habitat within the south-eastern sector is not high compared to the rest of Australia (in particular with parts of South Australia and Western Australia) (Kirkham, 1997). The mapped 'Seagrass Dominated' habitat class includes areas with greater than 5% coverage of seagrass (Figure 3-12) (Mount and Bricher, 2008; OzCoasts 2015b).

Seagrass generally grows in soft sediments within intertidal and shallow subtidal waters where there is sufficient light, and are common in sheltered coastal areas such as bays, lees of islands and fringing coastal reefs (McClatchie *et al.*, 2006; McLeay *et al.*, 2003). Known seagrass meadows within this stretch of coast include Jervis Bay and Botany Bay (New South Wales), Norfolk Bay and Pittwater (south-eastern Tasmania), Corner Inlet, Port Phillip Bay and Western Port Bay (Victoria), and Moreton Bay (Queensland). Seagrass meadows are important in stabilising seabed sediments, and providing nursery grounds for fish and crustaceans, and a protective habitat for the juvenile fish and invertebrates species (Huisman, 2000; Kirkman, 1997).

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(Source: Kirkham, 1997)

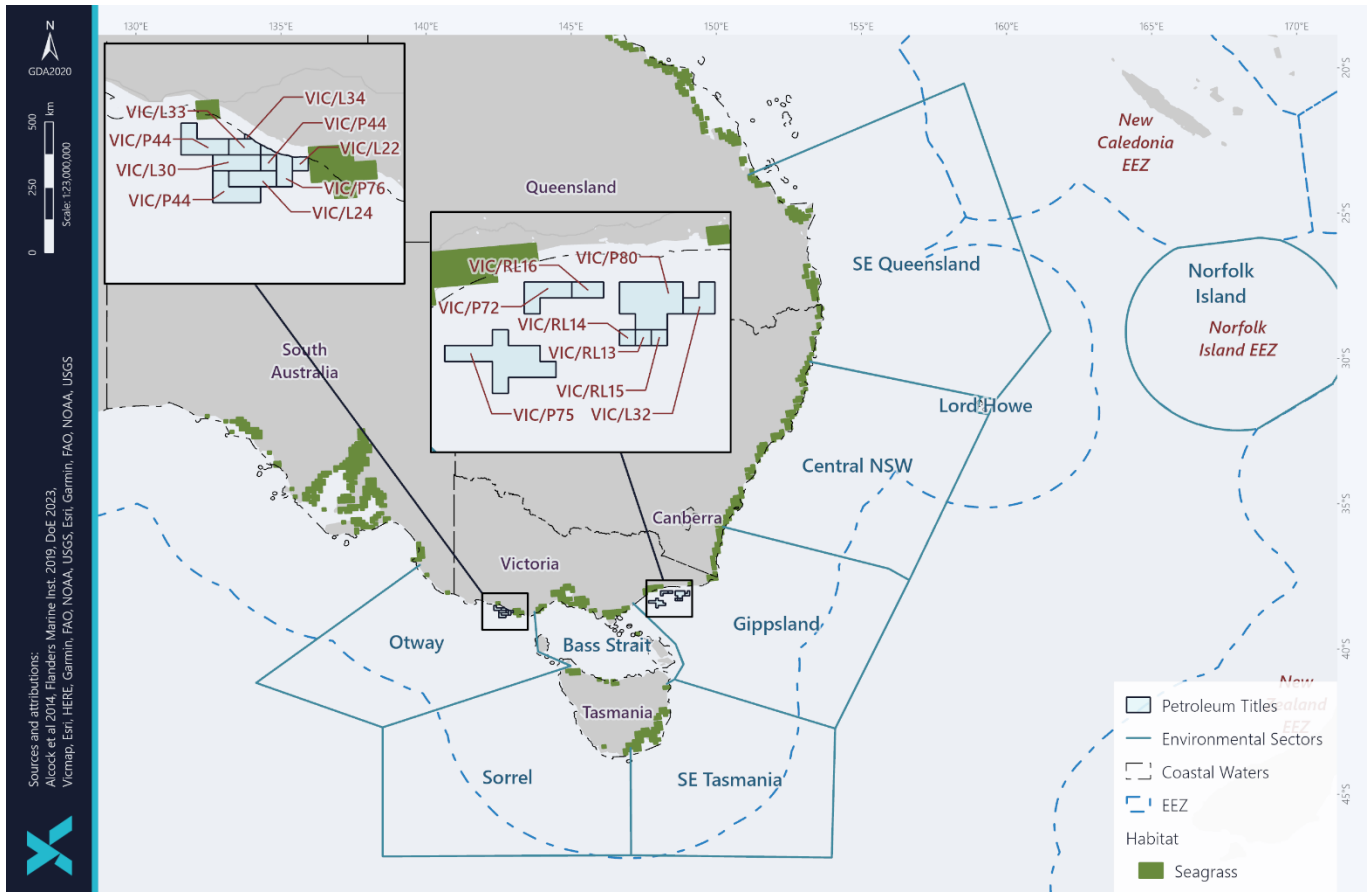
Figure 3-11: Distribution of seagrass species along the Australian coast

Table 3-6: Presence of seagrass within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Seagrass (Dominant Habitat)¹	✓	✓	✓	✓	✓	✓	✓	✓	
TEC: <i>Posidonia australis</i> seagrass meadows of the Manning-Hawkesbury ecoregion²						✓			

Notes:

1. Seagrass as a dominant intertidal/subtidal habitat determined from national mapping available from OzCoasts (2015b), and local flora reports for Lord Howe Island (NSW DPI, no date).
2. Presence of TEC determined from EPBC Protected Matters search reports.



Note: Map shows the 'seagrass dominated' habitat from the NISB Habitat Classification Scheme

Figure 3-12: Distribution of seagrass dominated habitat within the photic zone

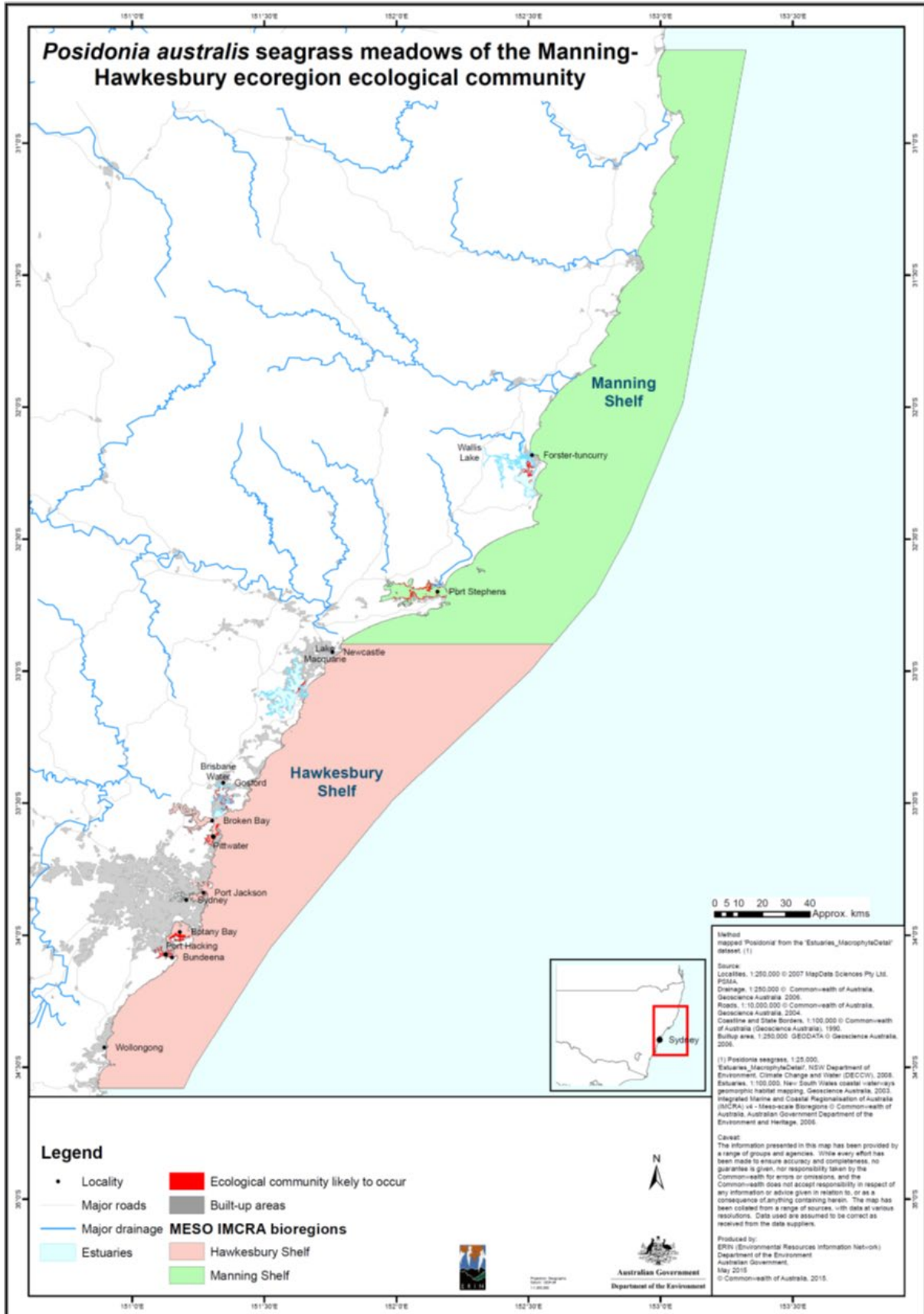
3.6.1 TEC: *Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion

The '*Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion' is listed as an endangered TEC under the EPBC Act. The ecological community is the assemblage of plants, animals and micro-organisms associated with seagrass meadows (dominated by *Posidonia australis*) that occurs within the warm temperate Manning Shelf and Hawkesbury Shelf bioregions (TSSC, 2015b). The ecological community occurs mostly within the sheltered environments of permanently open estuaries along the New South Wales coast; and is known to occur at Wallis Lake, Port Stephens, Lake Macquarie, Brisbane Water, Hawkesbury River, Pittwater, Port Jackson (Sydney Harbour), Botany Bay, Port Hacking, and Broughton Island (Table 3-6, Figure 3-13) (TSSC, 2015b).

The ecological community provides important ecosystem functions (TSSC, 2015b), including:

- Provide habitat for a diverse range of plants and animals including nursery habitat for many important fish and invertebrate species (including commercially harvested species);
- Support estuarine food webs by providing a surface for the establishment of epiphytes, epifauna and infauna which provide an important food and detrital resource for larger invertebrates, fish and other foraging fauna;
- Stabilise sediments and prevent erosion of nearshore areas by mitigating currents and reducing wave energy; and
- Protect water quality and sequester carbon.

The key threats affecting the ecological community have been identified as: coastal development, dredging, boat mooring (and other boat related activities), catchment disturbance and pollution, and climate change (TSSC, 2015b).



(Source: TSSC, 2015b)

Figure 3-13: Distribution of the TEC *Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion

3.7 Algae

3.7.1 Microalgae

Benthic microalgae are ubiquitous in aquatic areas where sunlight reaches the sediment surface. Benthic microalgae are often much more highly concentrated in the surficial sediment layer in comparison to the concentration of planktonic microalgae (i.e. phytoplankton) in water (Ansell *et al.*, 1999). Benthic microalgae can assist with the exchange of nutrients across the sediment-water interface; and in sediment stabilisation due to the secretion of extracellular polymeric substances (Ansell *et al.*, 1999). Benthic microalgae can also provide a food source to grazers such as gastropod and amphipods (Ansell *et al.*, 1999).

3.7.2 Macroalgae

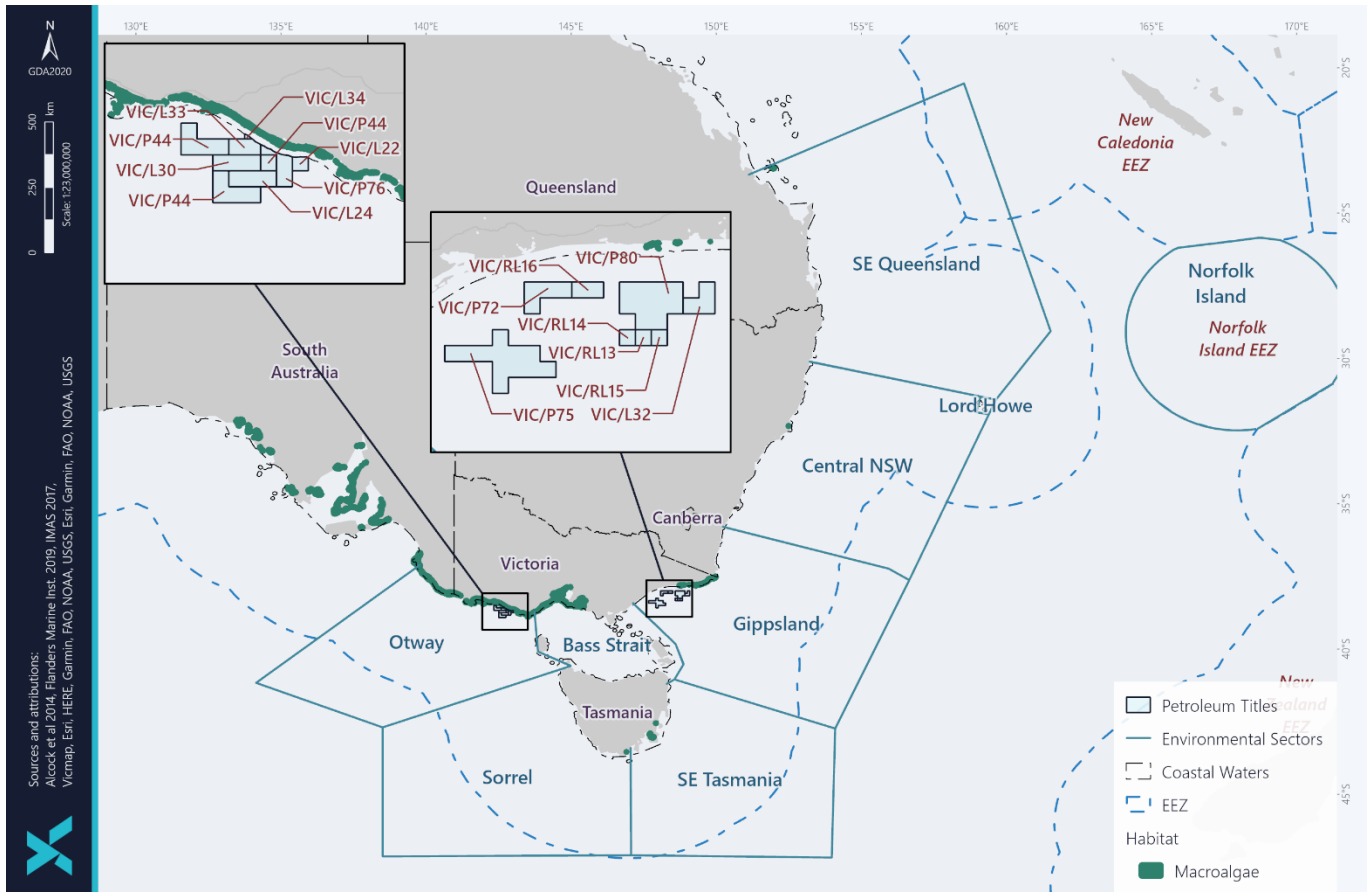
Macroalgae communities are generally found on intertidal and shallow subtidal rocky substrates and can occur throughout the Australian coast (Table 3-7). Macroalgal systems are an important source of food and shelter for many ocean species; including in their unattached drift or wrack forms (McClatchie *et al.*, 2006). Macroalgae are divided into three groups: Phaeophyceae (brown algae), Rhodophyta (red algae), and Chlorophyta (green algae). Brown algae are typically the most visually dominant and form canopy layers (McClatchie *et al.*, 2006). The principal physical factors affecting the presence and growth of macroalgae include temperature, nutrients, water motion, light, salinity, substratum, sedimentation and pollution (Sanderson, 1997). Macroalgae assemblages vary, but *Ecklonia radiata* and *Sargassum* sp. are typically common in deeper areas. Known areas of macroalgae communities within this stretch of coast include Port Philip Bay (Victoria; Figure 3-14), D’Entrecasteaux Channel and George III Reef (Tasmania), and Jervis and Botany Bays (New South Wales).

Table 3-7: Presence of macroalgae within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Macroalgae (Dominant Habitat)¹	✓	✓	✓	✓	✓	✓	✓	✓	
TEC: Giant Kelp Marine Forests of South East Australia²	✓	✓	✓	✓	✓				

Notes:

1. Macroalgae as a dominant intertidal/subtidal habitat determined from national mapping available from OzCoasts (2015b), and management plans for Lord Howe Island (Commonwealth of Australia, 2002).
2. Presence of TEC determined from EPBC Protected Matters search reports.



Note: Map shows the 'macroalgae dominated' habitat from the NISB Habitat Classification Scheme

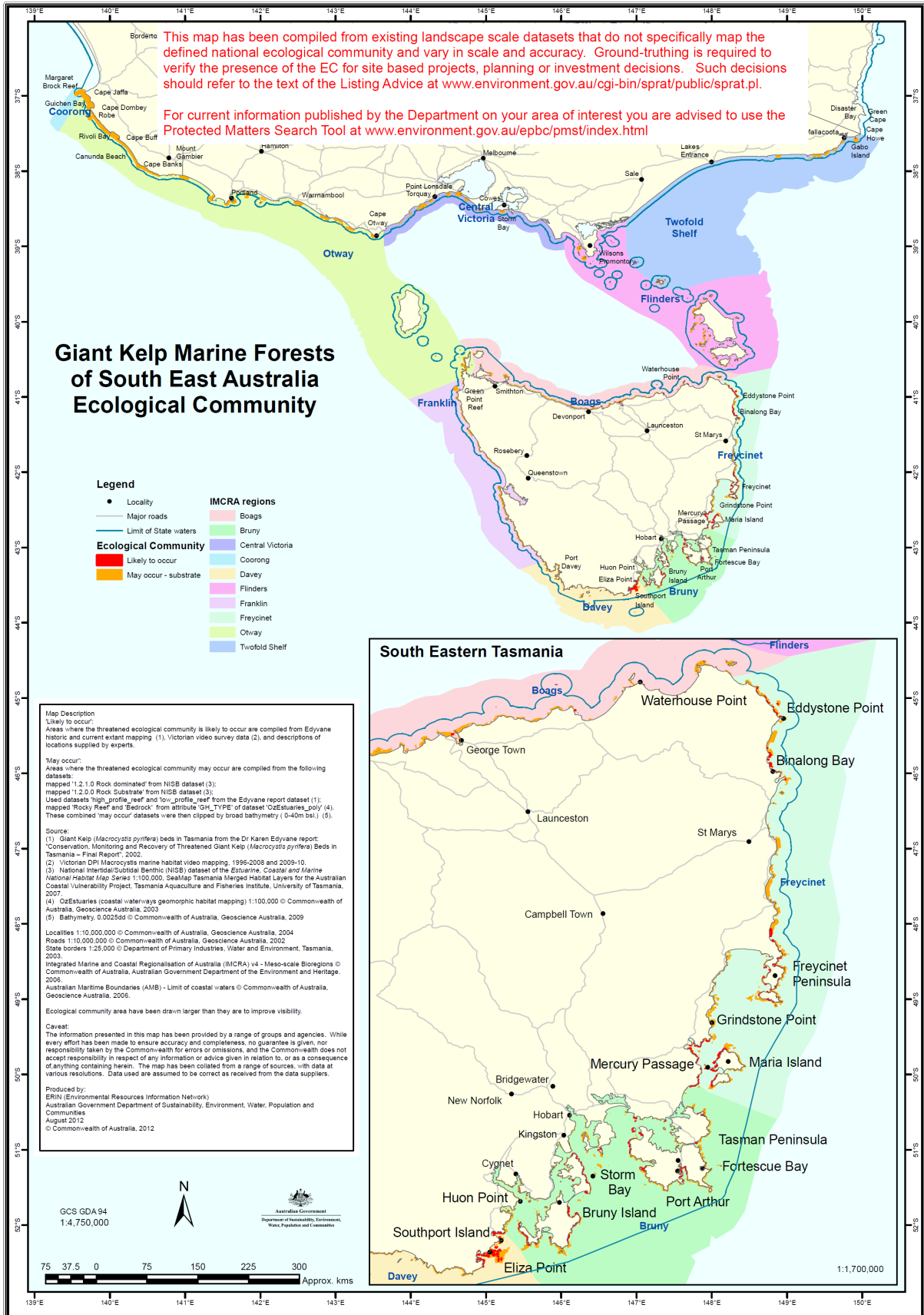
Figure 3-14: Distribution of macroalgae dominated nearshore habitat within the photic zone

3.7.3 TEC: Giant Kelp Marine Forests of South East Australia

The 'Giant Kelp Marine Forests of South East Australia' is listed as an endangered TEC under the EPBC Act and is known to occur within southern Australia (Table 3-7). The ecological community is characterised by a closed to semi-closed surface or subsurface canopy of *Macrocystis pyrifera*, and extends between the ocean floor and ocean surface, exhibiting a 'forest-like' structure with a diverse range of organisms occupying its benthic, pelagic and upper-canopy layers (TSSC, 2012a). *M. pyrifera* is the only species of kelp to provide this three-dimensional structure from the sea floor to the sea surface (TSSC, 2012a). This ecological community occurs on rocky substrate along the east and south coastlines of Tasmania; some patches may also occur in the coastal waters of western and northern Tasmania, south eastern South Australia, and Victoria (Figure 3-15) (TSSC, 2012a).

The high primary and secondary productivity of the giant kelp forests create and provide a number of ecosystem services to the local environment including settlement habitat for juvenile life stages of commercially important fisheries, improvements in local water quality conditions and coastal protection via buffering strong wave conditions from reaching the shore (TSSC, 2012a).

The key threats affecting the ecological community include increasing sea surface temperatures, changes in nutrient availability in warmer waters, changes in weather patterns and large-scale oceanographic conditions, and associated range expansion of invasive species (TSSC, 2012a). Other threats include impacts on water quality from land-based activities and aquaculture and potential loss from catastrophic storm events (TSSC, 2012a).



(Source: TSSC, 2012a)

Figure 3-15: Distribution of the TEC Giant Kelp Marine Forests of South East Australia

3.8 Coral

Corals are generally divided into two broad groups: the zooxanthellate ('reef-building', 'hermatypic' or 'hard') corals, which contain symbiotic microalgae (zooxanthellae) that enhance growth and allow the coral to secrete large amounts of calcium carbonate; and the azooxanthellate ('ahermatypic' or 'soft') corals, which are generally smaller and often solitary (Tzioumis and Keable, 2007). Hard corals are generally found in shallower (<50 m) waters while the soft corals are found at most depths, particularly those below 50 m (Tzioumis and Keable, 2007).

Corals may only occur as the dominant habitat type in Queensland (Table 3-8, Figure 3-16), however their presence has been recorded throughout the Temperate East Marine Region (Figure 3-17), and further south into the South-east Marine Region (e.g. Kent Group Marine Protected Area near Flinders Island; Freycinet Commonwealth Marine Park, eastern Tasmania; Wilsons Promontory National Park and Cape Otway, Victoria). The southern limit of reef development is seen at Lord Howe Island; however, many hard-coral species are present in non-reef environments in coastal areas such as Moreton Bay (Queensland) and the Solitary Islands (New South Wales) (Tzioumis and Keable, 2007). Soft corals are typically present in deeper waters throughout the continental shelf, slope and offshore regions, to well below the limit of light penetration.

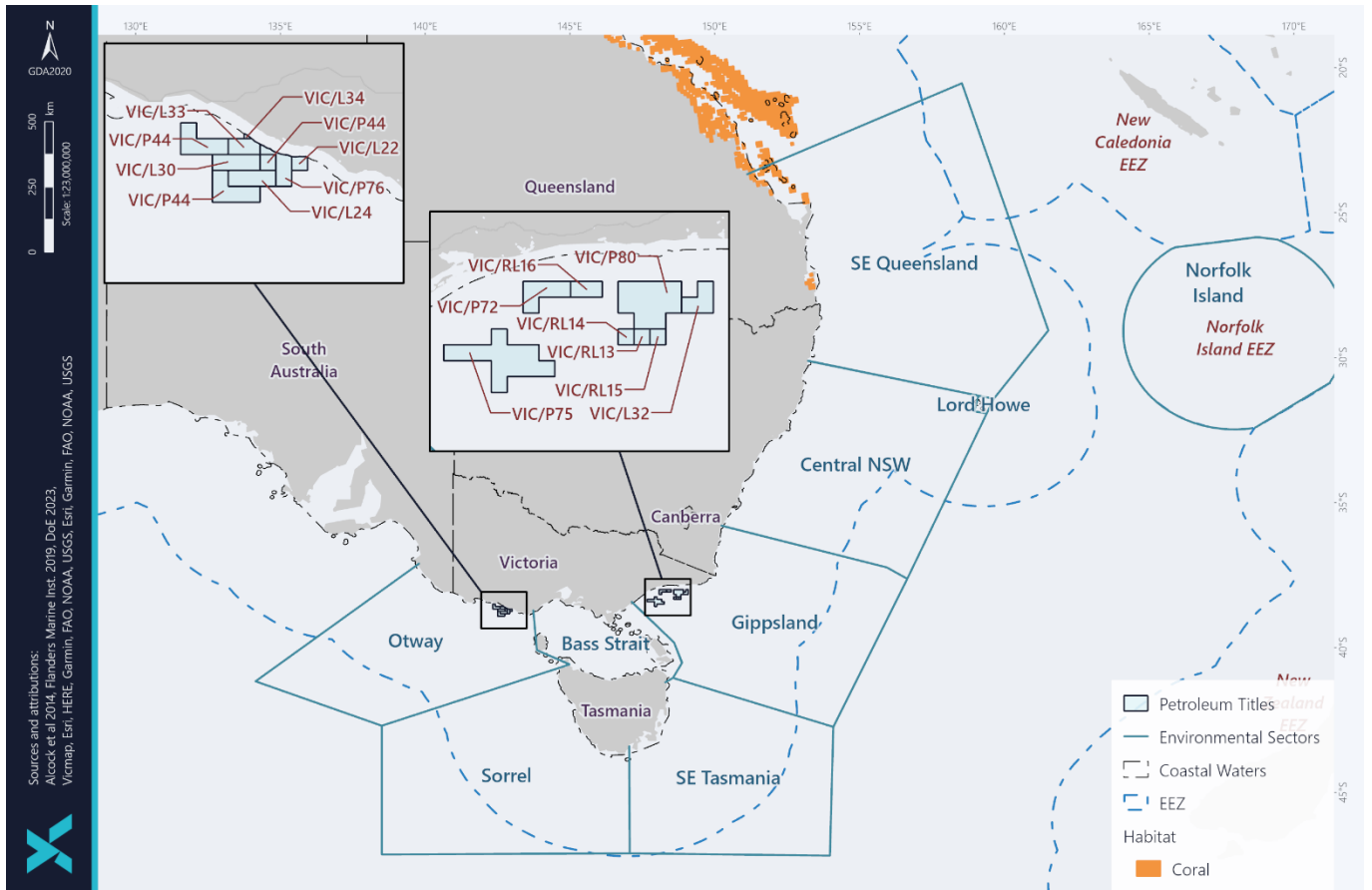
There are three factors that appear to drive the spawning of warm water corals – a gradual rise in sea temperature (this triggers the gametes to mature), the lunar cycle, and the diurnal light cycle. As such, the timing of coral spawning events varies around Australia. Large spawning events for Great 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 *et al.*, 2009).

Table 3-8: Presence of coral within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Coral (Dominant Habitat)¹							✓	✓	
Coral (Presence)²	✓	✓	✓	✓	✓	✓	✓	✓	✓

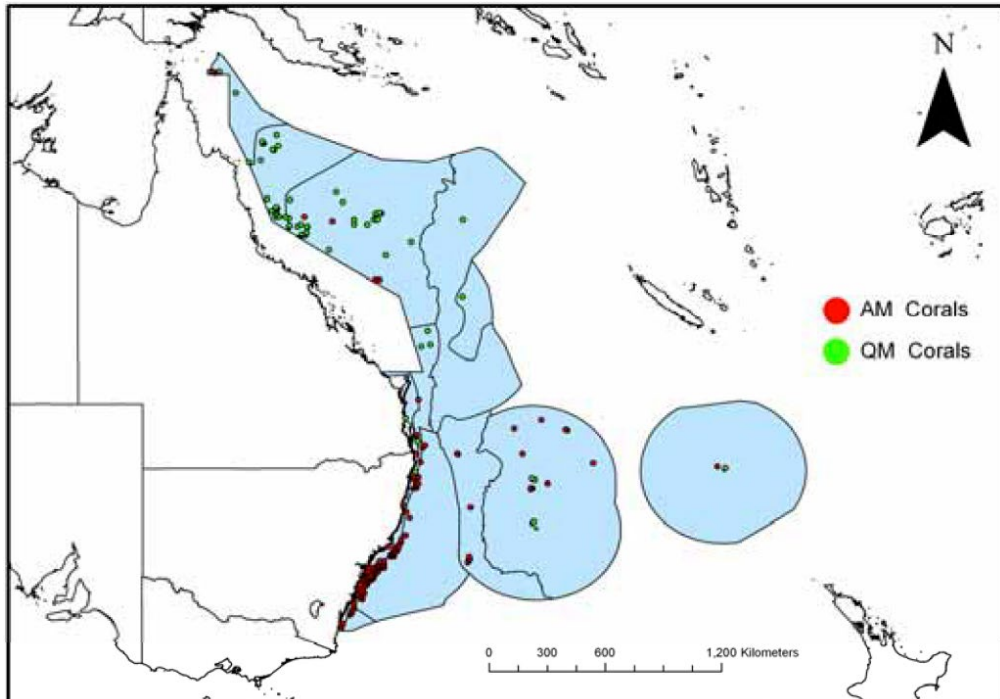
Notes:

1. Coral as a dominant intertidal/subtidal habitat determined from national mapping available from OzCoasts (2015b), and management plans for Lord Howe Island (Commonwealth of Australia, 2002).
2. Coral where a record exists for any coral presence.



Note: Map shows the 'coral dominated' habitat from the NISB Habitat Classification Scheme

Figure 3-16: Distribution of coral dominated habitat within the photic zone



(Source: Tzioumis and Keable, 2007)

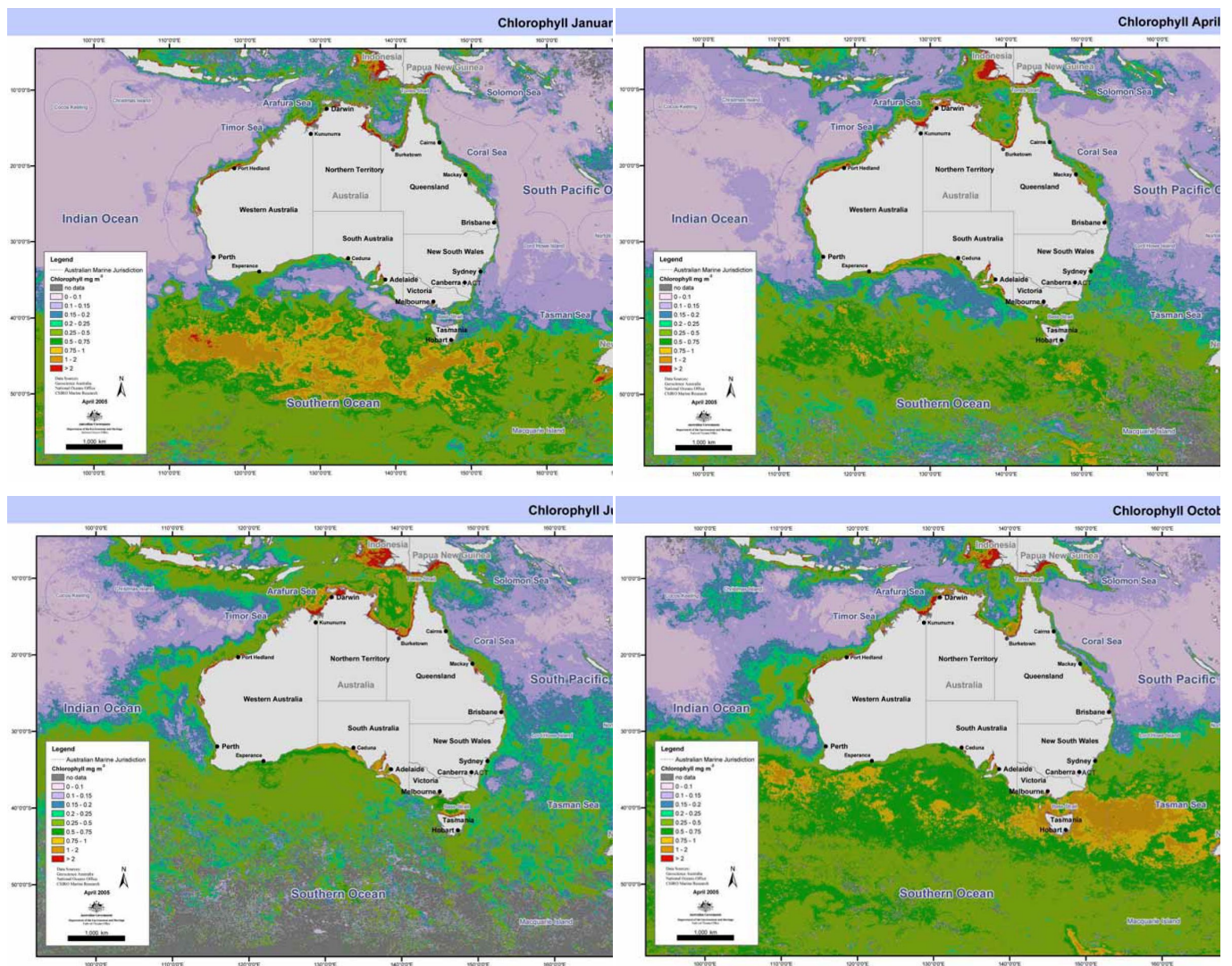
Figure 3-17: Hard coral records for the Temperate East Marine Region based on Queensland (QM) and Australian (AM) Museum datasets

3.9 Plankton

Plankton species, including both phytoplankton and zooplankton, are a key component in oceanic food chains.

Phytoplankton are autotrophic planktonic organisms living within the photic zone; and are the start of the food chain in the ocean (McClatchie *et al.*, 2006). Phytoplankton communities are largely comprised of protists, including green algae, diatoms, and dinoflagellates (McClatchie *et al.*, 2006). There are three size classes of phytoplankton: microplankton (20-200 μm), nanoplankton (2-20 μm) and picoplankton (0.2-2 μm). 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 *et al.*, 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 3-18).

Zooplankton is the faunal component of plankton, comprised of small protozoa, crustaceans (e.g. krill) and the eggs and larvae from larger animals. Zooplankton includes species that drift with the currents and also those that are motile. 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). Copepods make up approximately half of the species encountered (Watson and Chaloupka, 1982).



(Source: McClatchie *et al.*, 2006)

Figure 3-18: Monthly composites of MODIS ocean colour data showing seasonal phytoplankton growth

3.10 Seabirds and Shorebirds

There are 130 seabird and shorebird species (or species habitat) that may occur within the Environment Sectors; this includes species classified as threatened and migratory (Table 3-9). A list of the relevant conservation advice and/or recovery plans is also provided in Table 3-9, with relevant management actions in Table 3-10. The type of presence varies between species and location, and includes important behaviours (e.g. foraging, roosting, breeding) and multiple type of presence for some species (Table 3-9).

There is also a listed critical habitat for the shy albatross (*Thalassarche cauta*) present on islands off the coast of Tasmania (Table 3-9).

3.10.1 Albatross

There are 15 species of albatross that may occur within the Environment Sectors, and all except one (Sooty Albatross) has been identified as using the area for foraging (Table 3-9). Albatross species exhibit a broad range of diets and foraging behaviours; this combined with their ability to cover vast oceanic distances, means all waters within Australian jurisdiction can be considered foraging habitat for this species (DSEWPaC, 2011a). However, the most critical foraging habitat is considered to be in waters south of 25°S where most species spend the majority of their foraging time (DSEWPaC, 2011a).

Albatross's typically feed offshore, mainly along the edge of the continental shelf and over open waters, where they catch fish and cephalopods (e.g. squid, cuttlefish) by diving into the water (DSEWPaC, 2012a). A BIA for foraging, has been identified for the following albatross species: antipodean, wandering, Buller's, shy, campbell, black-browed and white-capped (Figure 3-19, Figure 3-20).

There is only one species, the shy albatross, that is known to breed within the waters off mainland Australia (Table 3-9) (DSEWPaC, 2011a). Albatross Island (off north-west Tasmania), and Mewstone and Pedra Branca (in southern Tasmania) are known breeding locations, and also listed as Critical Habitat under the EPBC Act for this species (Table 3-9). This species is not known to breed outside of Australian jurisdiction (DSEWPaC, 2011a). Previous breeding population estimates suggest approximately 5,200 at Albatross Island, 9–11,000 at Mewstone, and <250 at Pedra Branca (DSEWPaC, 2011a). The breeding season is highly synchronised, with all eggs in a colony laid during a short period in late-September. The egg is protected during incubation by one of the parents until it hatches approx. 70 days later.

3.10.2 Petrels

There are 13 species of petrel that may occur within the Environment Sectors, with most either foraging and/or breeding within the area (Table 3-9). Similar to albatrosses, the petrels have a diverse foraging range, and all waters within Australian jurisdiction can be considered foraging habitat for this species (DSEWPaC, 2011a). Typical diet for petrels includes cephalopods (e.g. squid) and fish, and prey is predominately caught by surface-seizing (DSEWPaC, 2011b).

BIAs, for foraging and breeding, have been identified for the following species: white-bellied storm-petrel, white-faced storm petrel, common diving-petrel, and the Gould's, soft-plumaged, black-winged, providence and kermadec petrels (Figure 3-20, Figure 3-21, Figure 3-22, Figure 3-23). BIAs for foraging have also been established for the northern and southern giant petrel and the great-winged petrel (Figure 3-21, Figure 3-22).

The white-bellied storm petrel, black-winged, kermadec and providence petrel all breed within the Lord Howe and/or Norfolk Island groups. Breeding season is typically October through to May, with the exception of the Providence petrel that breeds during winter. Nesting is usually in burrows, or in sheltered rocky crevices (DECC, 2007; DEE 2017a; DEE 2017b; DEE 2017c; Hutton and Priddel, 2002).

Gould's petrel is Australia's rarest endemic seabird. Breeding for Gould's petrel is restricted to Cabbage Tree Island, located offshore from Port Stephens, New South Wales (NSW DEC, 2006). Gould's Petrels begin to arrive on Cabbage Tree Island to breed from mid to late September; egg laying takes place over a six-week period commencing in early November (NSW DEC, 2006).

In Australian waters, the soft-plumaged petrel breeds at two sites: Maatsuyker Island (off Tasmania) and Macquarie Island (TSSC, 2015c). The main factor causing the species to be listed as vulnerable is its small breeding population size – only seven breeding pairs are known to have occurred on Maatsuyker Island (TSSC, 2015c).

Both the common diving-petrel and the white-faced storm petrel are not listed as threatened species under the EPBC Act, and have large populations within Australia, accounting for 5% and 25% respectively of the global population (DoE, 2015a). The common diving-petrel breeds on islands off south-east Australia and Tasmania; there

are 30 sites with significant breeding colonies (defined as more than 1,000 breeding pairs) known in Tasmania, and 12 sites in Victoria (including Seal Island, Wilson's Promontory and Lady Julia Percy Island) (DoE, 2015a). There are 15 sites with significant breeding colonies in Tasmania, and three sites with Victoria, for the White-faced Storm Petrel (DoE, 2015a).

3.10.3 Shearwaters

The shearwaters represent the most abundant seabird in Australia. There are six species of shearwater that may occur within the Environment Sectors, and all but one (Streaked Shearwater) have been identified as using the area for foraging and breeding (Table 3-9). BIAs, for foraging and breeding, have been identified for the following other five species: Little, Flesh-footed, Sooty, Wedge-tailed, and Short-tailed shearwaters (Figure 3-24, Figure 3-25).

Shearwaters are typically pelagic species, except during breeding seasons where they are found on remote islands or coastal headlands. Known breeding locations include:

- Lord Howe Island group (flesh-footed shearwater, wedge-tailed shearwater, little shearwater);
- Queensland oceanic islands (e.g. Capricorn Group, Mudjimba Island) (wedge-tailed shearwater)
- New South Wales oceanic islands (e.g. Solitary Island, Cabbage Tree Island, Muttonbird Island, Bird Island) (sooty shearwater, wedge-tailed shearwater)
- Tasmanian oceanic islands (e.g. Babel Island) (sooty shearwater, short-tailed shearwater).

Breeding season in eastern and south-eastern Australia for shearwaters is typically over summer; late-August/early-September to May (DEE 2017d, 2017e, 2017f, 2017g). However, the little shearwater breeds during winter and spring (DEE 2017h). Shearwater nests are usually in burrows or rock crevices.

Shearwaters are known to forage for a variety of pelagic prey, including krill, cephalopods, fish and crustaceans. Food is usually taken by pursuit-plunging, surface plunging or surface-seizing; however other methods (e.g. hydroplaning, deep plunging) may be used.

The short-tailed shearwater is one of few native birds that is commercially harvested (Tasmania Parks & Wildlife Service, 2014).

3.10.4 Terns

There are 11 species of tern that may occur within the Environment Sectors, and all have been identified as using the area for breeding (Table 3-9). A BIA, for foraging and breeding, has been identified for the following three tern species: crested, sooty and white-fronted (Figure 3-24, Figure 3-25, Figure 3-26).

Many of the tern species are widespread and occupy beach, wetland, grassland and beach 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 (DEWHA, 2007).

Terns breed in colonies on small offshore islands, including those of the Furneaux Group in eastern Bass Strait, and the Lord Howe island group. Nests are typically in sand or coral scrapes (Birdlife Australia, 2017a, 2017b; NSW OEH, 2017).

3.10.5 Other

A variety of the seabird and shorebird species aggregate in areas of the Environment Sectors to roost (Table 3-9), including:

- Seven species of plover (double-banded, greater sand, lesser sand, red-capped, oriental, pacific golder, and grey plover)
- Five species of sandpiper (sharp-tailed, broad-billed, wood, marsh, and Terek sandpiper)
- Three species of snipe (Latham's, Swinhoe's, and pin-tailed snipe)
- Two species of tattler (grey-tailed and wandering tattler)
- Two species of stint (red-necked and long-toed stint); and
- Numerous individuals: ruddy turnstone, sanderling, great knot, Asian dowitcher, black-tailed godwit, little curlew, whimbrel, red-necked phalarope, ruff, red-necked advocet, and Australian proatincole.

Many other species also breed within areas of the Environment Sectors (Table 3-9), including:

- black and common noddy
- great and cattle egret
- Tasmanian wedge-tailed eagle
- little penguin
- white-bellied sea eagle
- kelp, silver and pacific gulls
- cape and Australian gannet
- satin flycatcher
- orange-bellied parrot
- osprey
- red-tailed tropicbird
- black-faced cormorant
- grey ternlet
- masked and brown booby

The black and common noddy can be found off the Queensland coast, and around Lord Howe Island. They are typically pelagic during non-breeding season, but during breeding season can be found on or near islands, rocky islets or rocky cliff areas. Breeding is not synchronised and can occur at varied times throughout the year. A BIA for breeding and foraging, has been identified around Lord Howe Island and offshore Queensland (Figure 3-26).

The Little Penguin is the smallest species of penguin in the world and are permanent residents on a number of inshore and offshore islands. The Australian population is large but not thought to exceed one million birds (DoE, 2015a). Bass Strait has the largest proportion (approximately 60%) of the known breeding colonies in Australia; however, breeding populations are also found on the New South Wales coast. Individuals exhibit strong site fidelity, returning to the same breeding colony each year to breed in the winter and spring months (Gillanders *et al.*, 2013). The diet of a Little Penguin includes small school fish, squid and krill. Prey is typically caught with rapid jabs of the beak and swallowed whole. A BIA for breeding and foraging, has been identified for the little penguin (Figure 3-26). Little penguins are also an important component of the Australian and New Zealand fur-seals' diet (Parliament of South Australia, 2011).

The Australasian gannet generally feeds over the continental shelf or inshore waters. Their diet is comprised mainly of pelagic fish, but also squid and garfish. Prey is caught mainly by plunge-diving, but it is also seen regularly attending trawlers. Breeding is highly seasonal (October–May), nesting on the ground in small but dense colonies (DoE, 2015a). Important breeding locations for the Australian Gannet within the Environment Sectors include Pedra Branca, Eddystone Rocks, Sidmouth Rocks, and Black Pyramid (Tasmania) and Lawrence Rocks (Victoria). A BIA, for foraging and aggregation, has been established (Figure 3-26).

The red-tailed tropicbird is an oceanic seabird widely distributed through the tropical Pacific and Indian Oceans. It is typically a pelagic species but comes onshore during breeding season. The red-tailed tropicbird nests individually or in small breeding colonies and is territorial. Breeding is known to occur on Lord Howe Island; and a BIA around this region has been established (Figure 3-27). The birds forage on fish and squid by diving deeply into the water.

The black-faced cormorant is endemic to southern Australia (DoE, 2015a); 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, recognised as BIAs (Figure 3-26). Breeding usually occurs on rocky islands, but also on stacks, slopes and sea cliffs in colonies of up to 2500 individuals (DoE, 2015a).

Within Australia waters, the grey ternlet is found on both the Lord Howe and Norfolk Island groups; and may occasionally occur in waters off the eastern coast of Australia. A BIA has been established for this species around Lord Howe Island (Figure 3-20). They typically nest and roost in coastal regions, usually on steep cliff faces; and forage over waters close to shore. In Australia, breeding takes place during spring and summer; eggs have been recorded from early-September to early-January, and nestlings from early-October to mid-March.

The masked booby occurs across northern Australia, extending to Brisbane and islands offshore of the east coast of Australia (including Lord Howe Island). The masked booby is a pelagic marine bird using tropical and subtropical waters. The masked booby breeds on oceanic islands, atolls and cays, usually far from mainland area; and areas of level open ground are preferred for nest sites. The breeding population on Lord Howe Island is the most southerly breeding colony in the world; on Lord Howe Island, peak laying is in December. A BIA, for breeding, has been identified around Lord Howe Island and offshore from Queensland (Figure 3-26).

Table 3-9: Seabird and Shorebird species or species habitat that may occur within the Environment Sectors

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Albatross															
<i>Diomedea antipodensis</i>	Antipodean Albatross	V	✓(M)	✓	*	[1]	FLO* _f	FLO	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO	FLO	FLO
<i>Diomedea epomophora</i>	Southern Royal Albatross	V	✓(M)	✓		[1]	FLO	FLO	FLO	FLO	FLO	FLO	FLO	FLO	FLO
<i>Diomedea exulans</i>	Wandering Albatross	V	✓(M)	✓	*	[1]	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO	FLO
<i>Diomedea gibsoni</i>	Gibson's Albatross	V		✓		[1]		FLO	FLO	FLO	FLO	FLO	FLO	FLO	FLO
<i>Diomedea sanfordi</i>	Northern Royal Albatross	E	✓(M)	✓		[1]	FLO	FLO	FLO	FLO	FLO	LO		MO	
<i>Phoebastria fusca</i>	Sooty Albatross	V	✓(M)	✓		[1]	LO	LO	LO	LO	LO	MO	MO		
<i>Thalassarche bulleri</i>	Buller's Albatross	V	✓(M)	✓	*	[1]	FLO* _f	FLO* _f	MO* _f	FLO* _f	FLO* _f	LO	MO	MO	MO
<i>Thalassarche bulleri platei</i>	Pacific Albatross	V		✓		[1]	FLO	FLO	MO	FLO	FLO	LO	MO	MO	MO
<i>Thalassarche carteri</i>	Indian Yellow-nosed Albatross	V	✓(M)	✓	*	[1]	LO* _f	LO* _f	LO* _f	LO* _f	LO* _f	LO* _f	LO* _f	LO	LO
<i>Thalassarche cauta</i>	Shy Albatross	E	✓(M)	✓	*	[1]	BKO* _{b,f}	FLO* _f	FLO* _f	BKO* _{b,f}	BKO* _{b,f}	FLO* _f	MO	MO	
<i>Thalassarche chrysostoma</i>	Grey-headed Albatross	E	✓(M)	✓		[2],[1]	MO	MO	MO	FLO	FLO				
<i>Thalassarche eremita</i>	Chatham Albatross	E	✓(M)	✓		[1]		FMO	FMO		FMO	FMO		FMO	FMO
<i>Thalassarche impavida</i>	Campbell Albatross	V	✓(M)	✓	*	[1]	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	MO* _f	MO* _f	MO	MO

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Thalassarche melanophris</i>	Black-browed Albatross	V	✓(M)	✓	*	[1]	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO* _f	FLO	FLO
<i>Thalassarche salvini</i>	Salvin's Albatross	V	✓(M)	✓		[1]	FLO	FLO	FLO	FLO	FLO	FLO	FLO	FLO	FLO
<i>Thalassarche steadi</i>	White-capped Albatross	V	✓(M)	✓	*	[1]	FKO	FKO	FKO* _f	FKO	FKO	FKO* _f	LO	MO	MO
Petrel															
<i>Fregetta grallaria grallaria</i>	White-bellied Storm-Petrel	V			*	[3]	LO	LO	LO	LO	LO	BKO	LO	BKO* _{b,f}	
<i>Halobaena caerulea</i>	Blue Petrel	V		✓		[4]	MO	MO	MO	MO	MO				
<i>Macronectes giganteus</i>	Southern Giant Petrel	E	✓(M)	✓	*	[1]	FLO	FLO	MO* _f	FLO	FLO	MO* _f	MO* _f	MO	MO
<i>Macronectes halli</i>	Northern Giant Petrel	V	✓(M)	✓	*	[1]	MO	MO	FLO* _f	FLO	FLO	MO* _f	MO* _f	MO	MO
<i>Pelagodroma marina</i>	White-faced Storm Petrel			✓	*		BKO	BKO* _{b,f}	BKO* _{b,f}		BKO* _{b,f}	BKO			
<i>Pelecanoides urinatrix</i>	Common Diving-Petrel			✓	*		BKO* _{b,f}	BKO* _{b,f}	BKO* _f	BKO* _{b,f}	BKO* _{b,f}				
<i>Pterodroma cervicalis</i>	White-necked Petrel			✓					MO						BKO
<i>Pterodroma heraldica</i>	Herald Petrel	CE				[5]						LO	LO	MO	
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	E			*	[6]	MO	MO	BKO	MO	MO	BKO* _{b,f}	MO	MO	
<i>Pterodroma macroptera</i>	Great-winged Petrel			✓	*		FKO		* _f			* _f	* _f	* _f	
<i>Pterodroma mollis</i>	Soft-plumaged Petrel	V		✓	*	[7]	FLO	MO		BKO* _{b,f}	MO* _f				

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<i>Pterodroma nigripennis</i>	Black-winged Petrel			✓	*							BKO	BKO	BKO* b,f	BKO
<i>Pterodroma solandri</i>	Providence Petrel			✓	*									BKO* b,f	BKO
<i>Pterodromoa neglecta neglecta</i>	Kermadec Petrel (western)	V			*	[8],[3]			FMO			BKO	FMO	BKO	
Plover															
<i>Charadrius bicinctus</i>	Double-banded Plover		✓(W)	✓			RKO	RKO	RKO	RKO	RKO	RKO	RKO		
<i>Charadrius leschenaultii</i>	Greater Sand Plover	V	✓(W)	✓		[9]	RKO	RKO	KO	RKO		RKO	RKO		
<i>Charadrius mongolus</i>	Lesser Sand Plover	E	✓(W)	✓		[10]	RKO	RKO		RKO	KO	RKO	RKO		
<i>Charadrius ruficapillus</i>	Red-capped Plover			✓			RKO	RKO	RKO	RKO	RKO	RKO	RKO		
<i>Charadrius veredus</i>	Oriental Plover		✓(W)	✓				KO	KO		KO	RKO	RKO		
<i>Pluvialis fulva</i>	Pacific Golden Plover		✓(W)	✓			RKO	RKO		RKO	RKO	RKO	RKO		
<i>Pluvialis squatarola</i>	Grey Plover		✓(W)	✓			RKO	RKO		RKO	KO	RKO	RKO		
<i>Thinornis rubricollis</i>	Hooded Plover			✓			KO	KO	KO	KO	KO	KO			
<i>Thinornis rubricollis rubricollis</i>	Hooded Plover (eastern)	V		✓		[11]	KO	KO	KO	KO	KO	KO			
Sandpiper															
<i>Actitis hypoleucos</i>	Common Sandpiper		✓(W)	✓			KO	KO	MO	MO	KO	KO	KO	KO	KO
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		✓(W)	✓			RKO	RKO	MO	RKO	KO	RKO	RKO	KO	KO
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE	✓(W)	✓		[12]	KO	KO	MO	KO	KO	KO	KO	KO	
<i>Calidris melanotos</i>	Pectoral Sandpiper		✓(W)	✓			KO	KO	MO	MO	KO	KO	KO	KO	KO

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Limicola falcinellus</i>	Broad-billed Sandpiper		✓(W)	✓				RKO				RKO	RKO		
<i>Tringa glareola</i>	Wood Sandpiper		✓(W)	✓			RKO	RKO				FKO	RKO		
<i>Tringa stagnatilis</i>	Marsh Sandpiper		✓(W)	✓			RKO	RKO				RKO	RKO		
<i>Xenus cinereus</i>	Terek Sandpiper		✓(W)	✓			RKO	RKO		RKO	KO	RKO	RKO		
Shearwater															
<i>Calonectris leucometas</i>	Streaked Shearwater		✓(M)	✓					KO			KO	KO		
<i>Puffinus assimilis</i>	Little Shearwater			✓	*							BKO		BKO* b,f	BKO
<i>Puffinus carneipes</i>	Flesh-footed Shearwater		✓(M)	✓	*		KO	FLO	LO* _f	FLO	FLO	BKO* f	KO* _f	BKO* b,f	KO
<i>Puffinus griseus</i>	Sooty Shearwater		✓(M)	✓	*		MO	MO	MO* _f	BKO* b,f	BKO* b,f	BKO* b,f	LO		KO
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater		✓(M)	✓	*		*b,f	*b,f	BKO* b,f			BKO* b,f	BKO* b,f	BKO* b,f	BKO
<i>Puffinus tenuirostris</i>	Short-tailed Shearwater		✓(M)	✓	*		BKO* f	BKO* b,f	BKO* b,f	BKO* b,f	BKO* b,f	BKO* b,f			
Tern															
<i>Sterna albifrons</i>	Little Tern		✓(M)	✓			BKO	BKO	BKO	MO	BKO	BKO	BKO		
<i>Sterna anaethetus</i>	Bridled Tern		✓(M)	✓									BKO		
<i>Sterna bengalensis</i>	Lesser Crested Tern			✓									BKO		
<i>Sterna bergii</i>	Crested Tern			✓	*		BKO	BKO	BKO* b,f	BKO		BKO	BKO* b,f		

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Sterna caspia</i>	Caspian Tern		✓(M)	✓			BKO	BKO	BKO	BKO	BKO		BKO		
<i>Sterna dougallii</i>	Roseate Tern		✓(M)	✓									BKO		
<i>Sterna fuscata</i>	Sooty Tern			✓	*		BKO	BKO	BKO						
<i>Sterna nereis</i>	Fairy Tern			✓			BKO	BKO	BKO						
<i>Sterna striata</i>	White-fronted Tern			✓	*			BKO*							
<i>Sterna sumatrana</i>	Black-naped Tern		✓(M)	✓									BKO		
<i>Sternula nereis nereis</i>	Australian Fairy Tern	V				[13]	KO	KO	KO	KO	KO	KO			
<i>Thalasseus bergii</i>	Greater Crested Tern		✓(W)				BKO		BKO	BKO					
Other															
<i>Anous minutus</i>	Black Noddy			✓	*								BKO*	*b,f	
<i>Anous stolidus</i>	Common Noddy		✓(M)	✓	*		LO	LO	LO			BKO	BKO*	BKO*	BKO
<i>Anseranas semipalmata</i>	Magpie Goose			✓			MO						MO		
<i>Apus pacificus</i>	Fork-tailed Swift		✓(M)	✓			LO	LO	LO	LO	LO	LO	LO		
<i>Ardea ibis</i>	Cattle Egret			✓			BLO	LO	MO	MO	MO	BLO	BLO		
<i>Arenaria interpres</i>	Ruddy Turnstone		✓(W)	✓			RKO	RKO	RKO	RKO	RKO	RKO	RKO		
<i>Aulia audax fleayi</i>	Tasmanian Wedge-tailed Eagle	E				[14]	BLO	BKO		BLO	BLO				
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E				[15]	KO	KO	KO	KO	KO	KO	KO		
<i>Calidris alba</i>	Sanderling		✓(W)	✓			RKO	RKO	RKO	RKO	RKO	RKO	RKO		

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Calidris canutus</i>	Red Knot	E	✓ (W)	✓	[16]	KO	KO	MO	KO	KO	KO	KO	KO	KO	MO
<i>Calidris ruficollis</i>	Red-necked Stint		✓ (W)	✓		RKO	RKO	RKO	RKO	RKO	RKO	RKO			
<i>Calidris subminuta</i>	Long-toed Stint		✓ (W)	✓			RKO				RKO	RKO			
<i>Calidris tenuirostris</i>	Great Knot	CE	✓ (W)	✓	[17]	RKO	RKO	RKO	RKO	KO	RKO	RKO			
<i>Catharacta skua</i>	Great Skua			✓		MO	MO	MO	MO	MO	MO	MO			
<i>Cuculus optatus</i>	Oriental Cuckoo		✓ (T)	✓				KO			KO	KO			
<i>Dasyomis brachypterus</i>	Eastern Bristlebird	E			[18]			KO			KO	KO			
<i>Epthianura crocea macgregori</i>	Capricorn Yellow Chat	CE			[19]							MO			
<i>Erythrotriorchis radiatus</i>	Red Goshawk	V			[20]						KO	KO			
<i>Eudyptula minor</i>	Little Penguin			✓	*	BKO	BKO* b,f	BKO* b,f	BKO* b,f	BKO* b,f	BKO* b,f				
<i>Fregata ariel</i>	Lesser Frigatebird		✓ (M)	✓				LO			KO	KO	LO	KO	
<i>Fregata minor</i>	Great Frigatebird		✓ (M)	✓				MO			KO	KO	KO	KO	
<i>Gallinago hardwickii</i>	Latham's Snipe		✓ (W)	✓		KO	KO	KO	KO	KO	KO	KO			
<i>Gallinago megala</i>	Swinhoe's Snipe		✓ (W)	✓		RLO	KO	RLO	RLO	RLO	RLO	RLO	RKO		
<i>Gallinago stenura</i>	Pin-tailed Snipe		✓ (W)	✓		RLO	RKO	RLO	RLO	RLO	RLO	RLO			
<i>Glareola maldivarum</i>	Oriental Pratincole		✓ (W)	✓								RKO			
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle			✓		BKO	BKO	BKO	BKO	BKO	BKO	BKO			
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler		✓ (W)	✓		RKO	RKO	FKO	RKO	KO	RKO	RKO			

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<i>Heteroscelus incanus</i>	Wandering Tattler		✓ (W)	✓				RKO				RKO	RKO		
<i>Himantopus himantopus</i>	Black-winged Stilt			✓			RKO	RKO	FKO	RKO	KO	RKO	RKO		
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	✓ (T)	✓			RKO	RKO	KO	RKO	KO	KO	RKO		
<i>Larus dominicanus</i>	Kelp Gull			✓				BKO				BKO			
<i>Larus novaehollandiae</i>	Silver Gull			✓			BKO	BKO	BKO	BKO	BKO	BKO	BKO		
<i>Larus pacificus</i>	Pacific Gull			✓			BKO	BKO	BKO	BKO	BKO				
<i>Lathamus discolor</i>	Swift Parrot	CE		✓		[21]	KO	BKO	KO	KO	BKO	KO	KO		
<i>Limnodromus semipalmatus</i>	Asian Dowitcher		✓ (W)	✓				RKO	MO				RKO		
<i>Limosa lapponica</i>	Bar-tailed Godwit		✓ (W)	✓			KO	KO	KO	KO	KO	KO	KO	KO	KO
<i>Limosa lapponica baueri</i>	Western Alaskan Bar-tailed Godwit (baueri)	V				[22]	KO	KO	KO	KO	KO	KO	KO	KO	
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit	CE				[23]		MO	MO	MO	MO	MO	MO	MO	
<i>Limosa limosa</i>	Black-tailed Godwit		✓ (W)	✓			RKO	RKO		RKO	KO	RKO	RKO		
<i>Merops ornatus</i>	Rainbow Bee-eater			✓			MO	MO	MO			MO	MO		
<i>Monarcha melanopsis</i>	Black-faced Monarch		✓ (T)	✓			MO	KO	KO			KO	KO		
<i>Monarcha trivirgatus</i>	Spectacled Monarch		✓ (T)	✓					KO			KO	KO		
<i>Morus capensis</i>	Cape Gannet			✓			BKO	BKO							

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Morus serrator</i>	Australasian Gannet			✓	*		BKO* a,f	BKO* a,f		BKO* a,f					BKO
<i>Motacilla cinerea</i>	Grey Wagtail		✓(T)	✓			KO								
<i>Motacilla flava</i>	Yellow Wagtail		✓ (T)	✓			KO	KO	MO	KO		KO	KO		
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		✓ (T)	✓			BKO	BKO	KO	KO	BKO	BKO	BKO		
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CE		✓		[24]	Mr	Mr	MO	BKO		MO			
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V		✓					KO						
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	✓ (W)	✓		[25]	KO	KO	MO	KO	KO	KO	KO	KO	KO
<i>Numenius minutus</i>	Little Curlew		✓ (W)	✓			RLO	RKO	RLO	RLO	RLO	RLO	RKO		
<i>Numenius phaeopus</i>	Whimbrel		✓ (W)	✓			RKO	RKO	RKO	RKO	KO	RKO	RKO		
<i>Pachyptila turtur</i>	Fairy Prion			✓			KO	KO	MO	KO	KO	KO	KO	KO	
<i>Pachyptila turtur subantarctica</i>	Fairy Prion (southern)	V				[26]	KO	KO	KO	KO	KO	KO	KO	KO	
<i>Pandion haliaetus</i>	Osprey		✓ (W)	✓			KO	KO	KO			BKO	BKO		
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird		✓ (M)	✓	*							BKO	BKO	BKO* b,f	BKO
<i>Phaethon lepturus</i>	White-tailed Tropicbird		✓ (M)	✓					KO						
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant			✓	*		BKO	BKO* b,f	BKO	BKO* b,f	BKO* b,f				
<i>Phalaropus lobatus</i>	Red-necked Phalarope		✓ (W)	✓				RKO							

		Threatened Species	Migratory Species	Listed Marine	BIA	Conservation/	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
<i>Philmachus pugnax</i>	Ruff		✓ (W)	✓			RKO	RKO		RKO	KO	RKO	RKO			
<i>Procelsterna cerulea</i>	Grey Ternlet, Grey noddy, Blue noddy			✓	*							BKO		BKO* b,f	BKO	
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet			✓			RKO	RKO			KO	RKO	RKO			
<i>Rhipidura rufifrons</i>	Rufous Fantail		✓ (T)	✓			KO	KO	KO			KO	KO			
<i>Rostratula australis</i>	Australian Painted Snipe	E		✓		[27]	KO	LO	KO			KO	KO			
<i>Stiltia isabella</i>	Australian Pratincole			✓				RKO								
<i>Sula dactylatra</i>	Masked Booby		✓ (M)	✓	*									BKO* b,f	BKO	
<i>Sula leucogaster</i>	Brown Booby		✓ (M)	✓									BKO			
<i>Tringa nebularia</i>	Common Greenshank		✓ (W)	✓			KO	KO	KO	KO	KO	KO	KO	MO		
Listed Critical Habitat																
<i>Thalassarche cauta</i> (Shy Albatross) - Albatross Island, The Mewstone, Pedra Branca								✓		✓	✓					
<u>Threatened Species:</u>		<u>Type of Presence:</u>				<u>Plan Reference:</u>										
V	Vulnerable	MO	Species of species habitat may occur within area				[1] National Recovery Plan for Threatened Albatrosses and Giant Petrels, 2011-2016 (DSEWPaC, 2011a)									
E	Endangered	LO	Species or species habitat likely to occur within area				[2] Approved Conservation Advice for <i>Thalassarche chrysostoma</i> (grey-headed Albatross) (TSSC, 2009a)									
CE	Critically Endangered	KO	Species or species habitat known to occur within area				[3] Lord Howe Island Biodiversity Management Plan (DECC, 2007)									
		Mr	Migration route known to occur within area				[4] Approved Conservation Advice for <i>Halobaena caerulea</i> (Blue Petrel) (TSSC, 2015d)									
		FMO	Foraging, feeding or related behaviour may occur within area				[5] Approved Conservation Advice for <i>Pterodroma heraldica</i> (Herald Petrel) (TSSC, 2015e)									
M	Marine	FLO	Foraging, feeding or related behaviour likely to occur within area													
W	Wetland	FKO	Foraging, feeding or related behaviour known to occur within area													
T	Terrestrial	BLO	Breeding likely to occur within area													
<u>Biologically Important Area</u>		BKO	Breeding known to occur within area													
		RMO	Roosting may occur within area													

		Threatened Species	Migratory Species	Listed Marine BIA	Conservation/ Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
*	BIA Present	RLO	Roosting likely to occur within area										
	a	Aggregation	RKO	Roosting known to occur within area									
	b	Breeding											
	f	Foraging											
					[6]								Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>) Recovery Plan (NSW DEC, 2006)
					[7]								Approved Conservation Advice for <i>Pterodroma mollis</i> (Soft-plumaged Petrel) (TSSC, 2015c)
					[8]								Norfolk Island Region Threatened Species Recovery Plan (DNP, 2010)
					[9]								Approved Conservation Advice for <i>Charadrius leschenaultia</i> (Greater Sand Plover) (TSSC, 2016a)
					[10]								Approved Conservation Advice for <i>Charadrius mongolus</i> (Lesser Sand Plover) (TSSC, 2016b)
					[11]								Approved Conservation Advice for <i>Thinornis rubricollis rubricollis</i> (Hooded Plover, Easter) (TSSC, 2014a)
					[12]								Approved Conservation Advice for <i>Calidris ferruginea</i> (Curlew Sandpiper) (TSSC, 2015f)
					[13]								Approved Conservation Advice for <i>Sternula nereis nereis</i> (Fairy Tern) (TSSC, 2011a)
					[14]								Threatened Tasmanian Eagles Recover Plan, 2006-2010 (AGDEW, 2006)
					[15]								Approved Conservation Advice for <i>Botaurus poiciloptilus</i> (Australasian Bittern) (TSSC, 2019)
					[16]								Approved Conservation Advice for <i>Calidris canutus</i> (Red Knot) (TSSC, 2016c)
					[17]								Approved Conservation Advice for <i>Calidris tenuirostris</i> (Great Knot) (TSSC, 2016d)
					[18]								National Recovery Plan for Eastern Bristlebird (<i>Dasyornis brachypterus</i>) (NSW OEH, 2012)
					[19]								Yellow chat (<i>Capricorn subspecies</i>) <i>Epthianura crocea macgregori</i> recovery plan (Houston and Melzer, 2008)
					[20]								Approved Conservation Advice for <i>Erythrotriorchis radiates</i> (red Goshawk) (TSSC, 2015g)

		Threatened Species	Migratory Species	Listed Marine BIA	Conservation/ Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
				[21]	Approved Conservation Advice for <i>Lathamus discolor</i> (Swift Parrot) (TSSC, 2016e)								
				[22]	Approved Conservation Advice for <i>Limosa lapponica baueri</i> (western Alaskan Bar-tailed Godwit) (TSSC, 2016f)								
				[23]	Approved Conservation Advice for <i>Limosa lapponica menzbieri</i> (Northern Siberian Bar-tailed Godwit) (TSSC, 2016g)								
				[24]	National Recovery Plan for the Orange-bellied Parrot (<i>Neophema chrysogaster</i>) (DELWP, 2016)								
				[25]	Approved Conservation Advice for <i>Numenius madagascariensis</i> (Eastern Curlew) (TSSC, 2015h)								
				[26]	Approved Conservation Advice for <i>Pachyptila turtur subantarctica</i> (Fairy Prion Southern) (TSSC, 2015i)								
				[27]	Approved Conservation Advice for <i>Rostratula australis</i> (Australian Painted Snipe) (TSSC, 2013b)								

Table 3-10: Seabird and Shorebird threatened species management advice relevant to petroleum activities under this EP

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities ¹	Applicable Management Advice relevant to activities under this EP
<ul style="list-style-type: none"> • Antipodean Albatross • Southern Royal Albatross • Wandering Albatross • Gibson's Albatross • Northern Royal Albatross • Sooty Albatross • Buller's Albatross • Pacific Albatross • Shy Albatross • Grey-headed Albatross • Chatham Albatross • Campbell Albatross • Black-browed Albatross • Salvin's Albatross • White-capped Albatross 	National Recovery Plan for Threatened Albatrosses and Giant Petrels, 2011-2016 (DSEWPaC, 2011a)	<ul style="list-style-type: none"> • Marine pollution 	<ul style="list-style-type: none"> • Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented • Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented • Note: Shy Albatross is the only species that breeds within the Environment Sectors
<ul style="list-style-type: none"> • Grey-headed Albatross 	Approved Conservation Advice for <i>Thalassarche chrysostoma</i> (grey-headed Albatross) (TSSC, 2009a)	<ul style="list-style-type: none"> • Marine pollution, including marine debris 	<ul style="list-style-type: none"> • See above (for National Recovery Plan for Threatened Albatrosses and Giant Petrels, 2011-2016) • Note: Grey-headed Albatross breeding locations are outside of the Environment Sectors
<ul style="list-style-type: none"> • White-bellied Storm-Petrel 	Lord Howe Island Biodiversity Management Plan (DECC, 2007)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Blue Petrel 	Approved Conservation Advice for <i>Halobaena caerulea</i> (Blue Petrel) (TSSC, 2015d)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Southern Giant Petrel • Northern Giant Petrel 	National Recovery Plan for Threatened Albatrosses and Giant Petrels, 2011-2016 (DSEWPaC, 2011a)	<ul style="list-style-type: none"> • Marine pollution, including marine debris 	<ul style="list-style-type: none"> • Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented • Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented • Note: breeding locations are outside of the Environment Sectors

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities ¹	Applicable Management Advice relevant to activities under this EP
<ul style="list-style-type: none"> Herald Petrel 	Approved Conservation Advice for <i>Pterodroma heraldica</i> (Herald Petrel) (TSSC, 2015e)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Gould's Petrel 	Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>) Recovery Plan (NSW DEC, 2006)	<ul style="list-style-type: none"> Oil spills Note: oil spills in the vicinity Cabbage Tree Island are not considered a threat because the Gould's Petrel does not feed in coastal waters however, oceanic oil spills may pose some risk (NSW DEC, 2006) 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Soft-plumaged Petrel 	Approved Conservation Advice for <i>Pterodroma mollis</i> (Soft-plumaged Petrel) (TSSC, 2015c)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Kermadec Petrel (western) 	Norfolk Island Region Threatened Species Recovery Plan (DNP, 2010) Lord Howe Island Biodiversity Management Plan (DECC, 2007)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Greater Sand Plover 	Approved Conservation Advice for <i>Charadrius leschenaultia</i> (Greater Sand Plover) (TSSC, 2016a)	<ul style="list-style-type: none"> Habitat loss and degradation from pollution 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Lesser Sand Plover 	Approved Conservation Advice for <i>Charadrius mongolus</i> (Lesser Sand Plover) (TSSC, 2016b)		
<ul style="list-style-type: none"> Hooded Plover (eastern) 	Approved Conservation Advice for <i>Thinornis rubricollis</i> (Hooded Plover, Easter) (TSSC, 2014a)	<ul style="list-style-type: none"> Oil spills Entanglements and ingestion of marine debris 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities ¹	Applicable Management Advice relevant to activities under this EP
			<ul style="list-style-type: none"> Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Curlew Sandpiper 	Approved Conservation Advice for <i>Calidris ferruginea</i> (Curlew Sandpiper) (TSSC, 2015f)	<ul style="list-style-type: none"> Habitat loss and degradation from pollution Environmental pollution 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Australian Fairy Tern 	Approved Conservation Advice for <i>Sternula nereis nereis</i> (Fairy Tern) (TSSC, 2011a)	<ul style="list-style-type: none"> Oil spills, particularly in Victoria, where the close proximity of oil facilities poses a risk of oil spills that may affect the species' breeding habitat 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Tasmanian Wedge-tailed Eagle 	Threatened Tasmanian Eagles Recover Plan, 2006-2010 (AGDEW, 2006)	<ul style="list-style-type: none"> Oiling, entanglement, Pollution 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Australasian Bittern 	Approved Conservation Advice for <i>Botaurus poiciloptilus</i> (Australasian Bittern) (TSSC, 2019)	<ul style="list-style-type: none"> Reduced water quality as a result of increasing salinity, siltation and pollution 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Red Knot 	Approved Conservation Advice for <i>Calidris canutus</i> (Red Knot) (TSSC, 2016c)	<ul style="list-style-type: none"> Habitat loss and degradation from environmental Pollution 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Great Knot 	Approved Conservation Advice for <i>Calidris tenuirostris</i> (Great Knot) (TSSC, 2016d)	<ul style="list-style-type: none"> Pollution or contamination impacts 	
<ul style="list-style-type: none"> Eastern Bristlebird 	National Recovery Plan for Eastern Bristlebird (<i>Dasyornis brachypterus</i>) (NSW OEH, 2012)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities ¹	Applicable Management Advice relevant to activities under this EP
<ul style="list-style-type: none"> • Capricorn Yellow Chat 	Approved Conservation Advice for <i>Epthianura crocea macgregori</i> (Yellow Chat) (TSSC, 2002)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Red Goshawk 	Approved Conservation Advice for <i>Erythrotriorchis radiates</i> (Red Goshawk) (TSSC, 2015g)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Swift Parrot 	Approved Conservation Advice for <i>Lathamus discolor</i> (Swift Parrot) (TSSC, 2016e)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Western Alaskan Bar-tailed Godwit (baueri) 	Approved Conservation Advice for <i>Limosa lapponica baueri</i> (western Alaskan Bar-tailed Godwit) (TSSC, 2016f)	<ul style="list-style-type: none"> • Habitat loss and degradation from pollution • Pollution/contamination 	<ul style="list-style-type: none"> • Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> • Northern Siberian Bar-tailed Godwit 	Approved Conservation Advice for <i>Limosa lapponica menzbieri</i> (Northern Siberian Bar-tailed Godwit) (TSSC, 2016g)		
<ul style="list-style-type: none"> • Orange-bellied Parrot 	National Recovery Plan for the Orange-bellied Parrot (<i>Neophema chrysogaster</i>) (DELWP, 2016)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Eastern Curlew 	Approved Conservation Advice for <i>Numenius madagascariensis</i> (Eastern Curlew) (TSSC, 2015h)	<ul style="list-style-type: none"> • Habitat loss and degradation from pollution • Environmental pollution 	<ul style="list-style-type: none"> • Marine pollution: Evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> • Fairy Prion (southern) 	Approved Conservation Advice for <i>Pachyptila turtur subantarctica</i> (Fairy Prion Southern) (TSSC, 2015i)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified
<ul style="list-style-type: none"> • Australian Painted Snipe 	Approved Conservation Advice for <i>Rostratula australis</i> (Australian Painted Snipe) (TSSC, 2013b)	<ul style="list-style-type: none"> • None identified 	<ul style="list-style-type: none"> • None identified

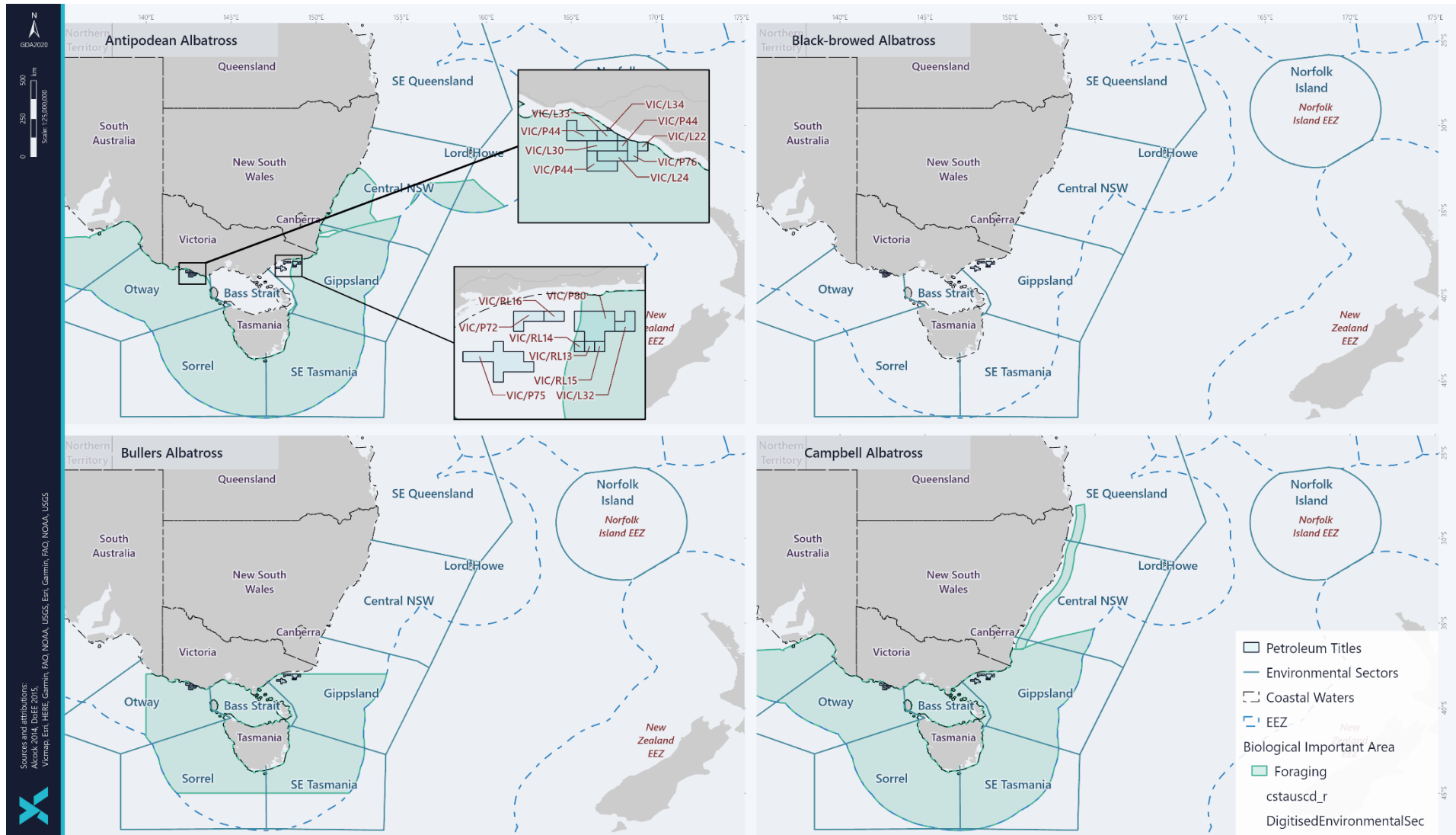


Figure 3-19: BIAs for the Antipodean, Black-browed, Buller's and Campbell Albatross

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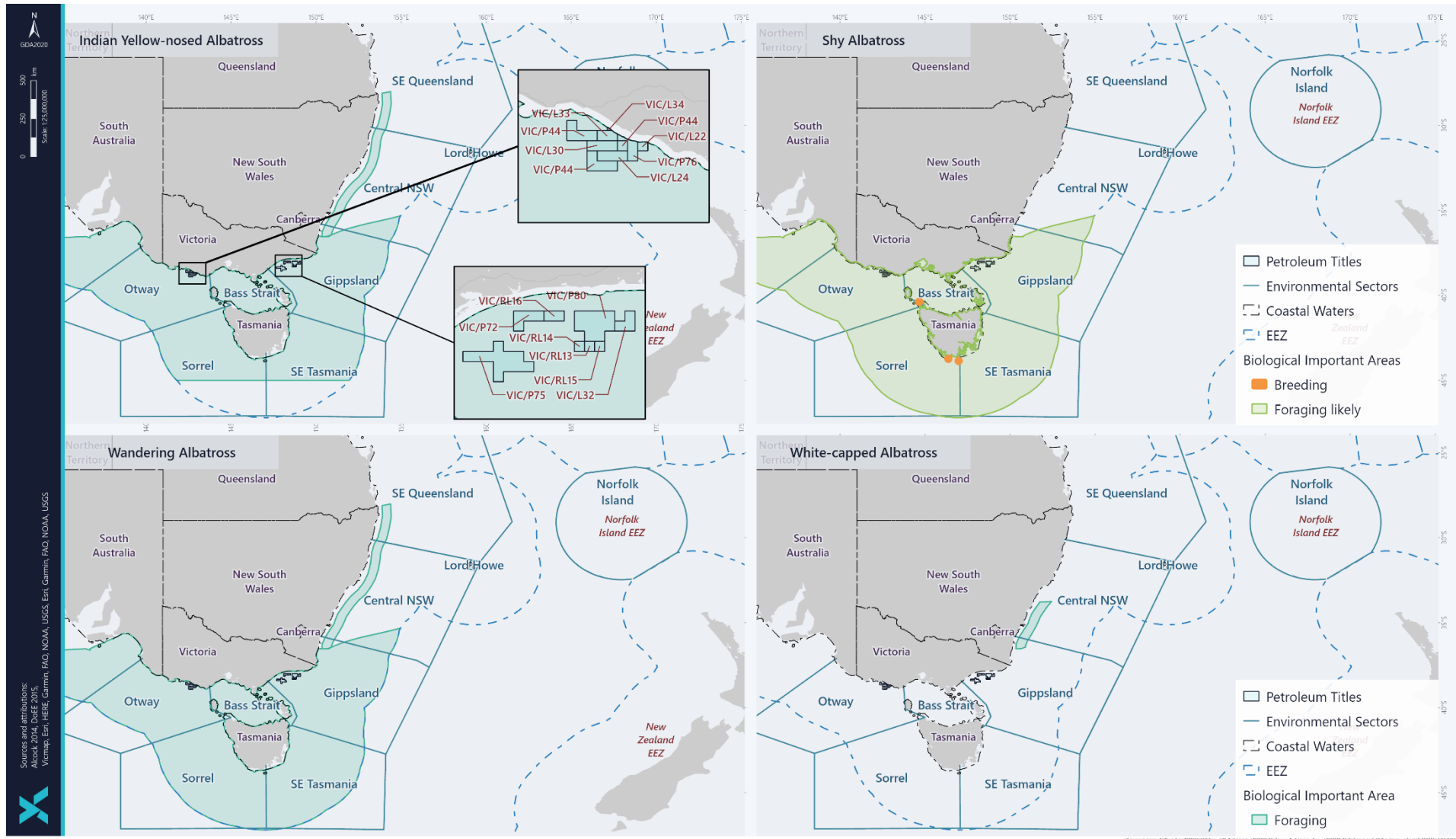


Figure 3-20: BIAs for the Indian Yellow-nosed Albatross, wandering albatross, shy albatross and white-capped albatross

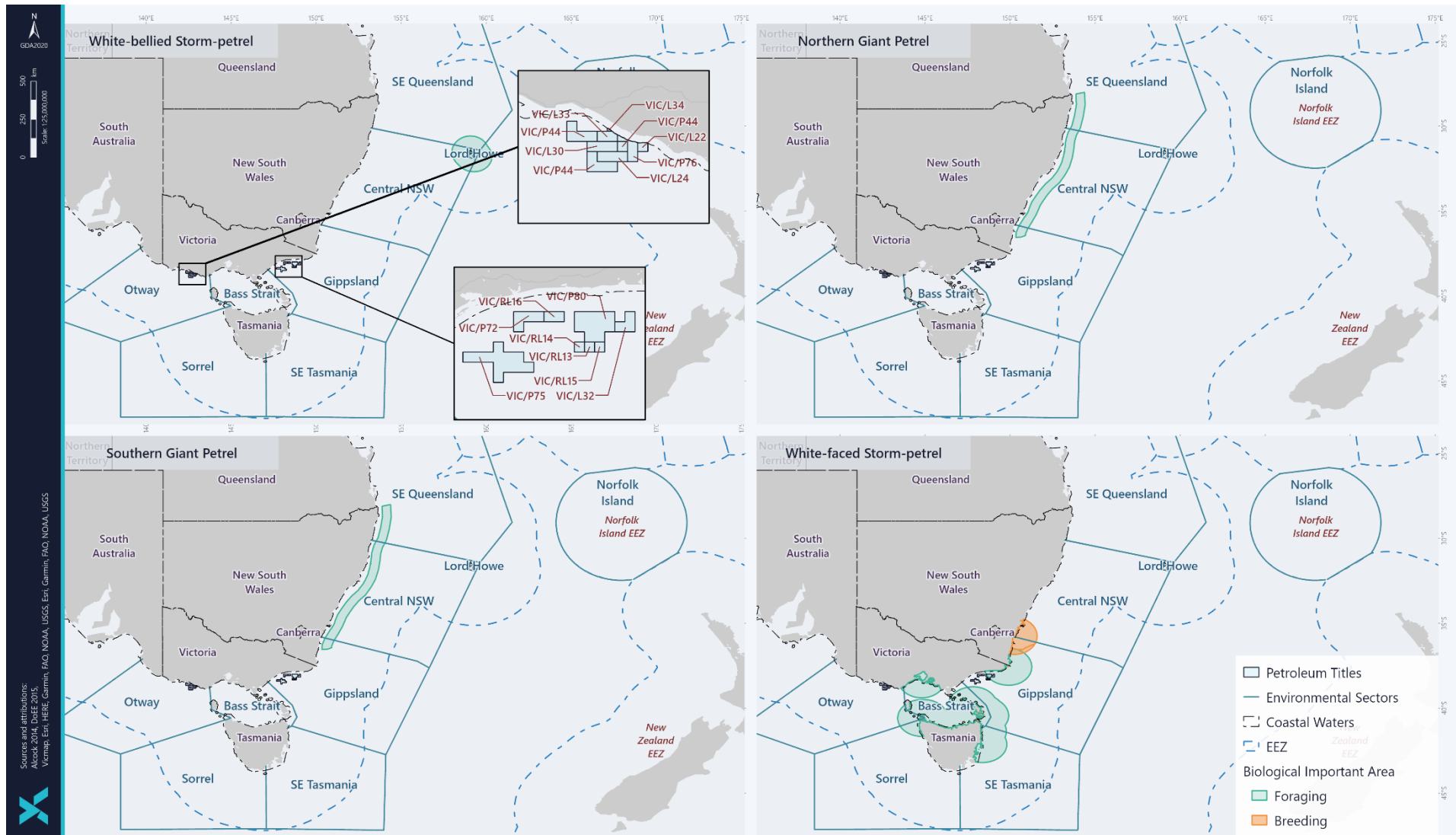


Figure 3-21: BIAs for the White-bellied Storm Petrel, Northern Giant, Southern Giant and White-faced Petrel

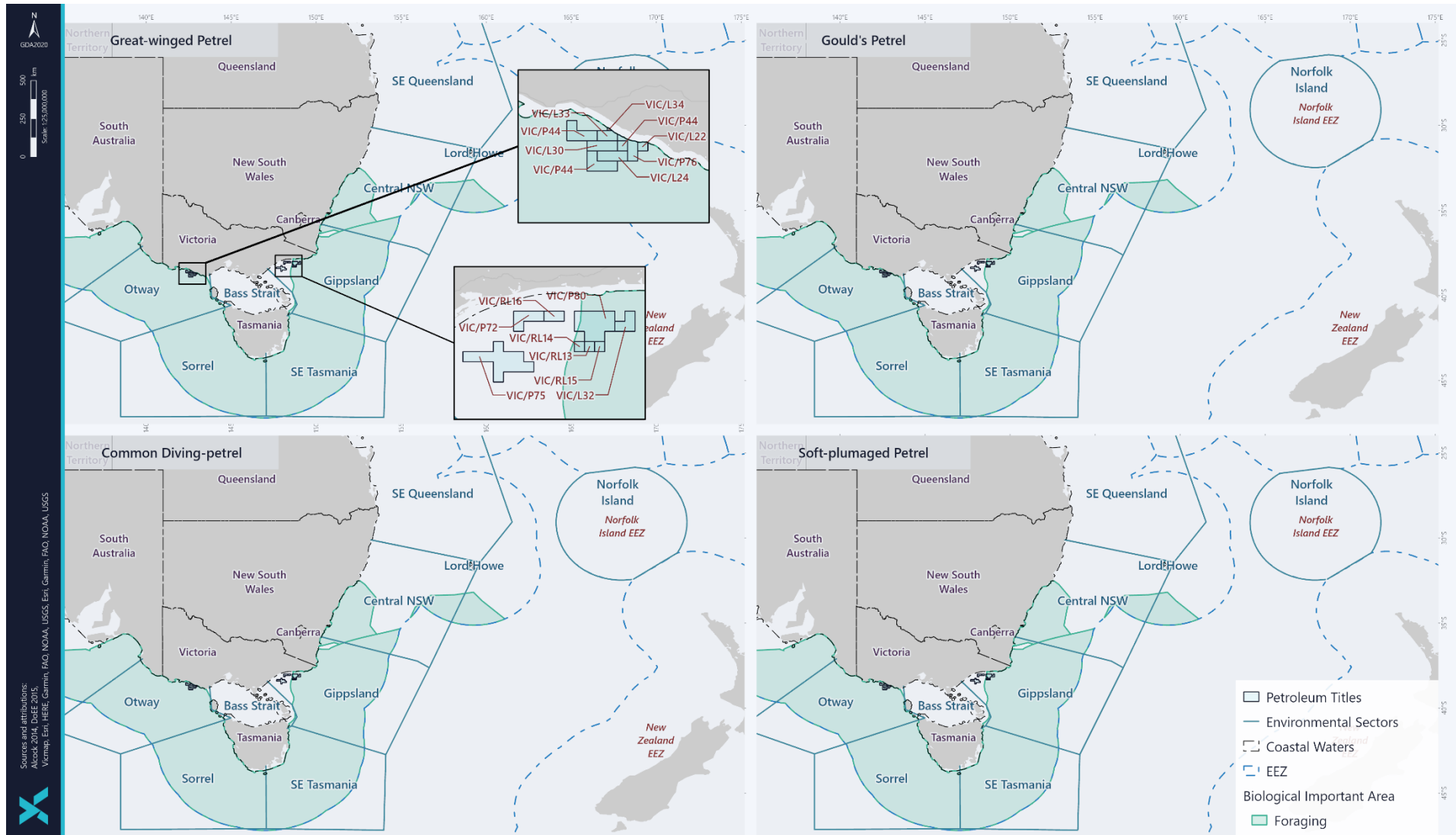


Figure 3-22: BIAs for the great-winged petrel, Gould's petrel, common diving petrel and soft-plumage petrel

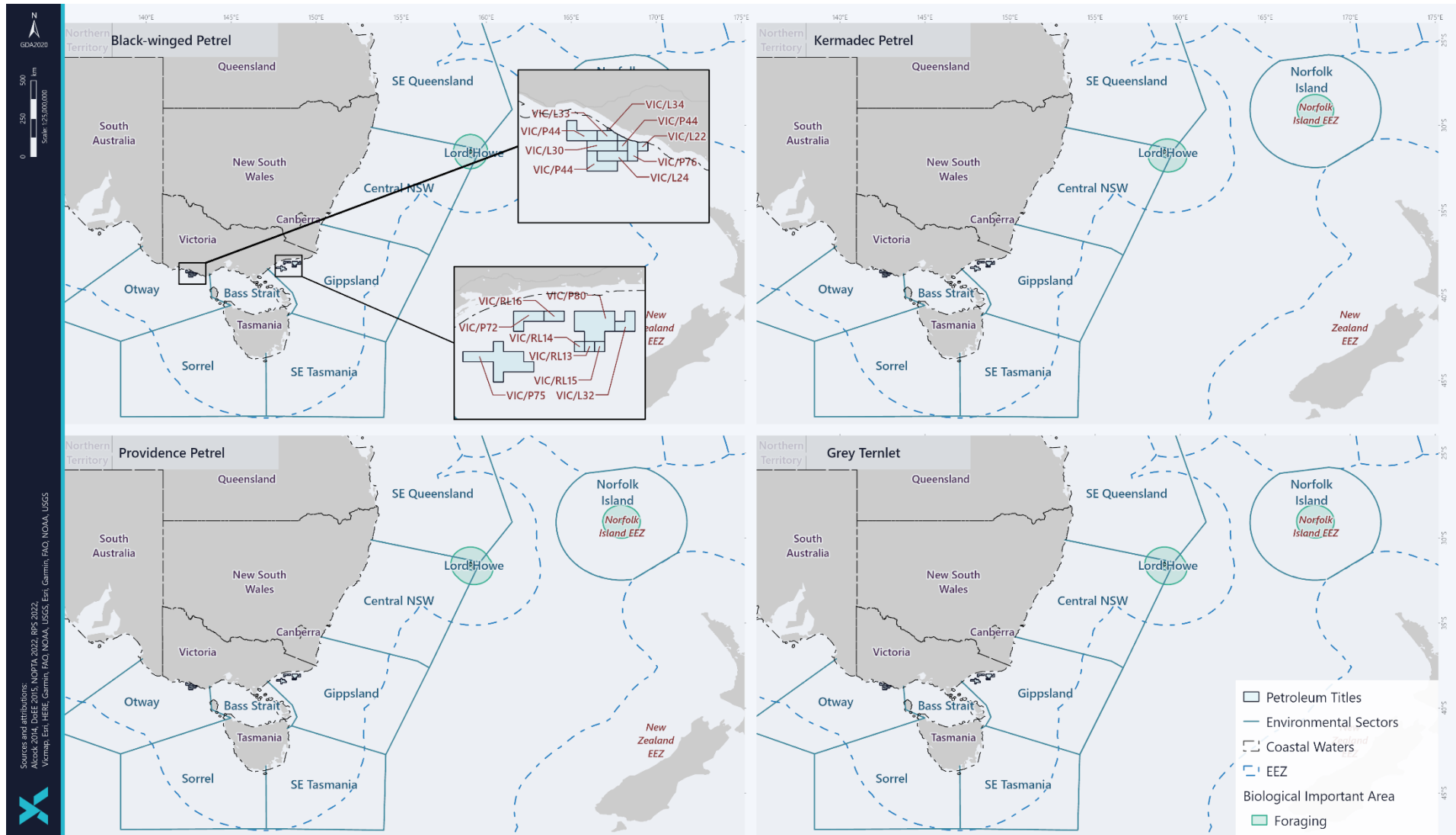


Figure 3-23: BIAs for the black-winged petrel, Kermadec petrel, Providence petrel and grey ternlet

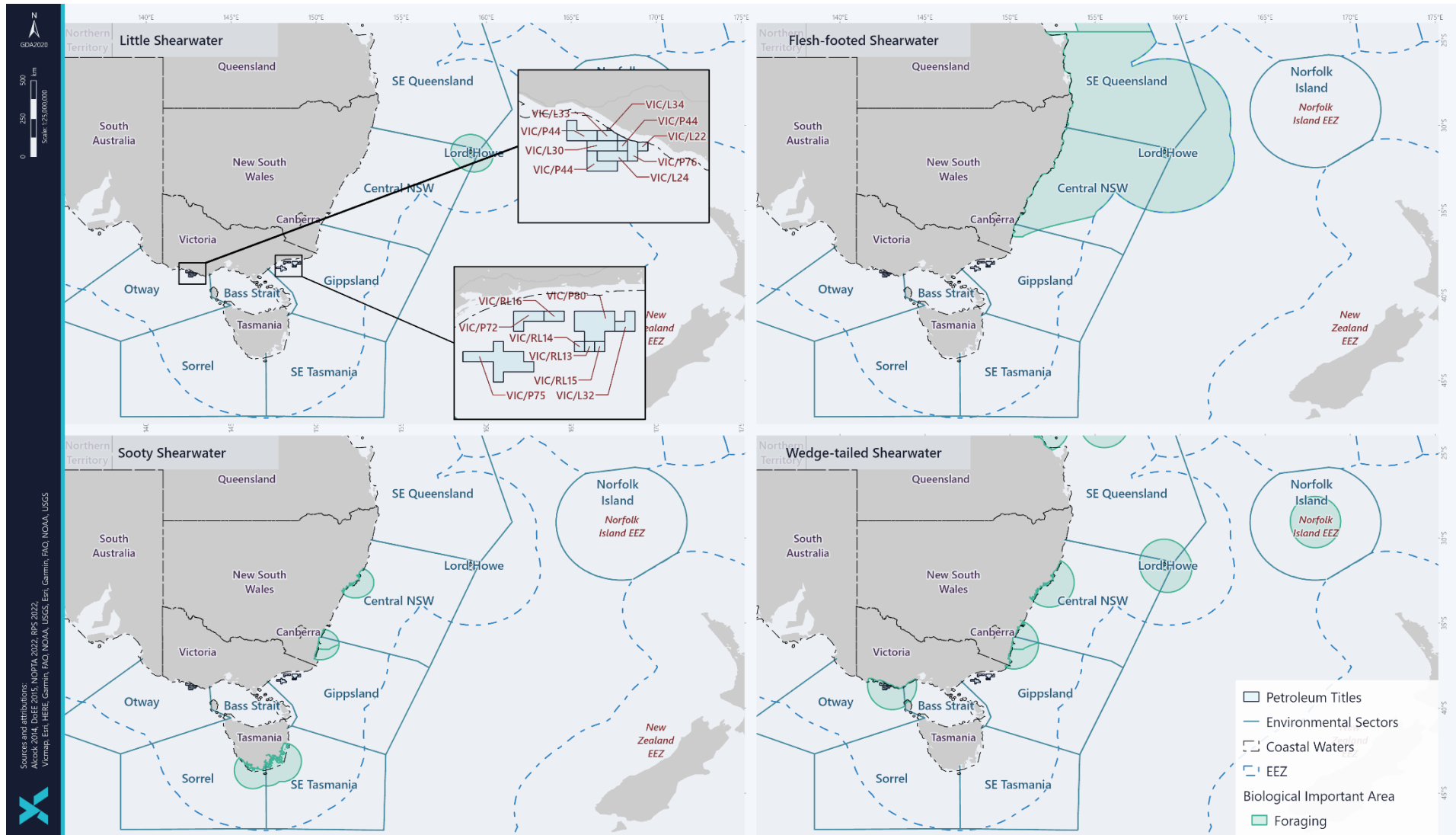


Figure 3-24: BIAs for the little shearwater, flesh-footed shearwater, sooty shearwater and wedge-tailed shearwater

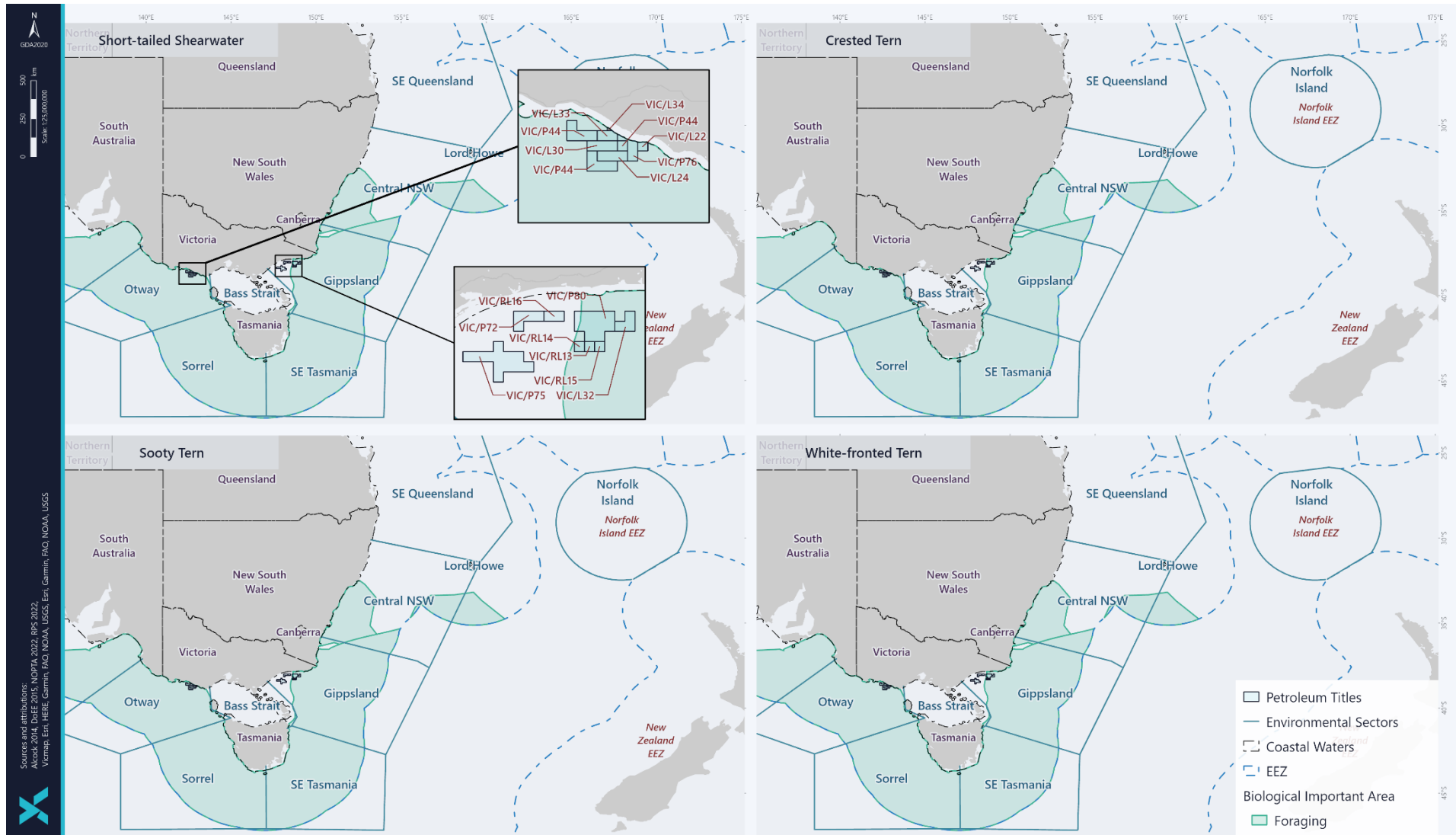


Figure 3-25: BIAs for the short-tailed shearwater, crested tern, sooty tern, white-fronted tern

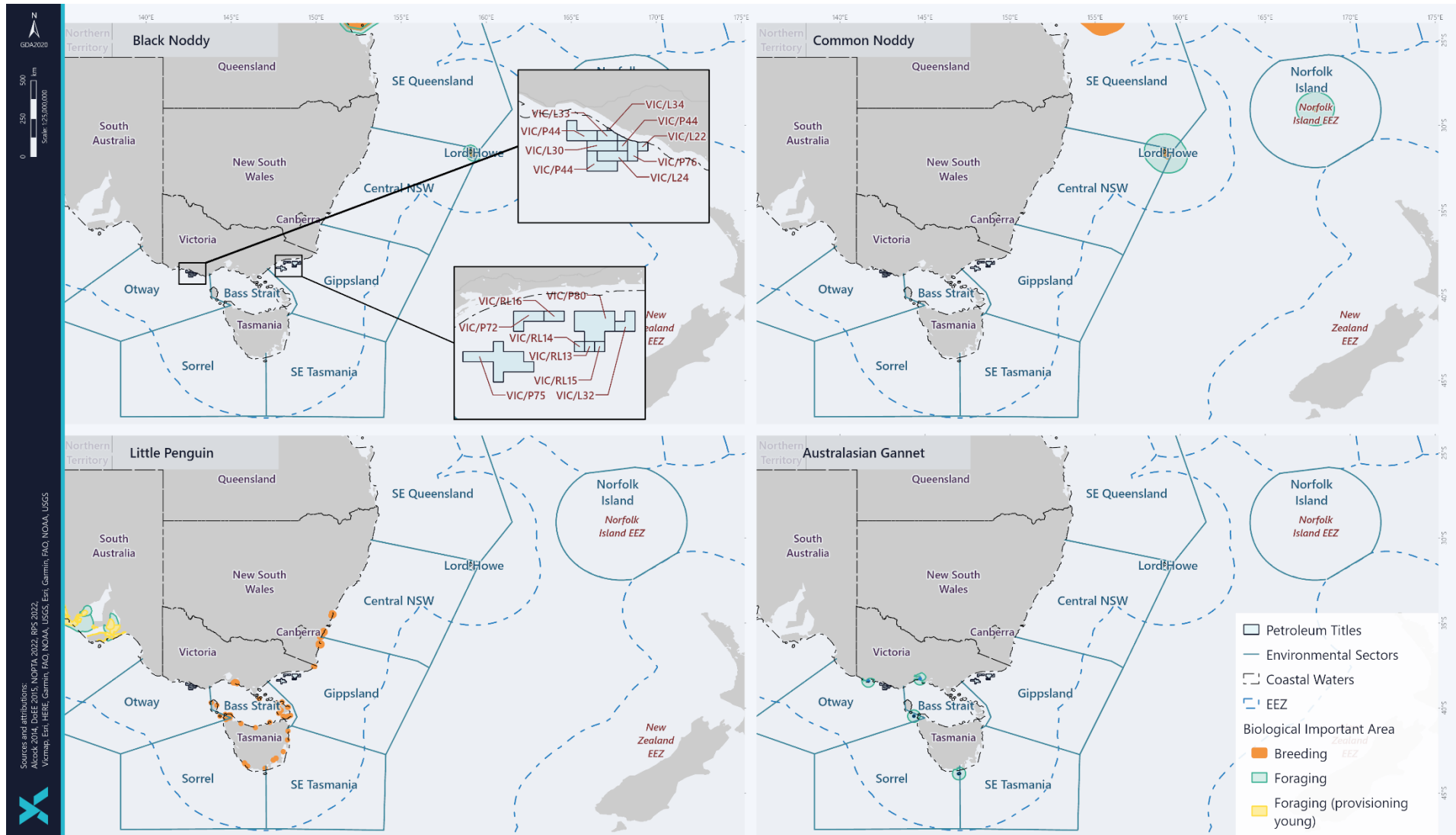


Figure 3-26: BIAs for the black noddy, common noddy, little penguin and Australasian gannet

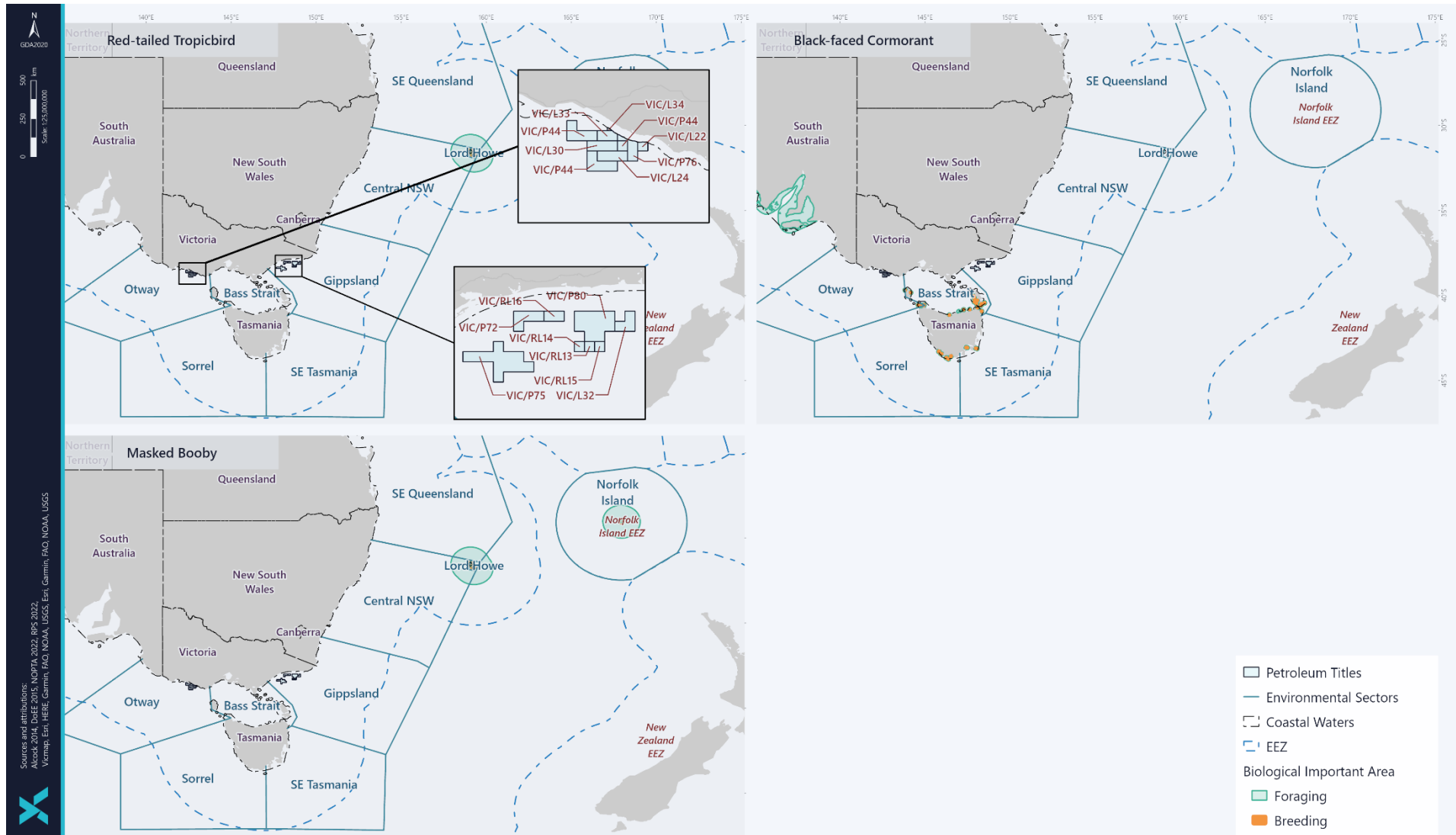


Figure 3-27: BIAs for the red-tailed tropicbird, black-faced cormorant and masked booby

3.11 Marine Invertebrates

Marine invertebrates comprise a variety of different organisms that can live in either the benthic or pelagic zone. The most common marine invertebrates include:

- Sponges
- Cnidarians (e.g. hydroids, anemones, jellyfish)
- Marine worms
- Arthropods (e.g. krill, prawn, crabs, lobster)
- Molluscs (e.g. nudibranch, sea slugs, mussels, oysters, squid, octopus)
- Echinoderms (e.g. sea stars, sea urchins, sea cucumbers)
- Hemichordates (e.g. acorn worms); and
- Lophophorates (e.g. bryozoans).

Studies by the Museum of Victoria found that invertebrate diversity was high in southern Australian waters, although the distribution of species was patchy, with little evidence of any distinct biogeographic regions (Wilson and Poore, 1987; Poore *et al.*, 1985). Results of sampling in shallower inshore sediments also reported high diversity and patchy distribution (Parry *et al.*, 1990).

In 1998 the Department of Natural Resources and Environment commissioned a survey of infauna along the entire length of the open Victorian coast (the 'Victorian coastal benthos study') (Heislars and Parry, 2007). The survey collected samples at three depths (10 m, 20 m and 40 m) on 50 transects running perpendicular to the coast. Data from the survey provided evidence that species diversity in Bass Strait was higher than that recorded in other regions, with a particular region of elevation species diversity in East Gippsland (Heislars and Parry, 2007). Crustaceans (particularly amphipods) were the dominant taxa in each depth class, representing more than half of the twenty most abundant families; followed by polychaetes. There was no clear difference in the representation of families between bioregions (e.g. between Otway and Two-fold Shelf regions) (Heislars and Parry, 2007). The total number of species per site increased with depth (Heislars and Parry, 2007).

Habitat characterisation surveys along the Patricia-Baleen pipeline route (OMV Australia, 2002) showed a sand and shell/rubble seabed, with sparse epibiotic (e.g. sponges) coverage, with no reef systems (OMV Australia, 2002).

A video survey undertaken along the Patricia-Baleen pipeline in 2003 (CEE, 2003) indicates that there are four general habitat associations on the seabed along the pipeline route. Large epibiota are very sparse, with extensive areas of sandy and shell/rubble seabed being devoid of large epibiota except for introduced screw shells and sponges. The biota identified are described below:

- large patches of seabed comprised of old large shells, predominantly bivalves and scallops, with New Zealand screw shells present in large numbers.
- Sponge garden – a small and distinct area of large sponges and bryozoans occurs at about 50 m water depth. The sponges varied in form and colour and included fans, spheres, massives, cups and fingers. Bryozoans included lace-like corals, concertina fans, perforated rigid sheets and fern-like branches. These associations indicate that although the seabed is comprised predominantly of sand and shell grit, it is stable enough to allow these associations to grow. Schools of jackass morwong, butterfly perch and individual gurnard and leatherjackets were attracted to the sponge garden.

There is limited information on the location, distribution and dispersion, or species composition of the epibenthic fauna in Gippsland Basin region. However, records demonstrate that within the Bass Strait (eastern Gippsland Basin) region, beyond the 'mud line' greater than ~110 m, a muddy sand biotope dominates that is recognised as quite different to the upper inner shelf areas in the region (Beaman *et al.* 2005).

Epifauna within the vicinity of the BMG field is expected to be sparse compared to nearshore regions given the water depths, coverage of silty sand and limited availability of hard substrate. During habitat surveys conducted within the BMG field (Ierodiaconou *et al.*, 2020), observed epibenthic communities on the surface of subsea structures to consist primarily of sand, biofilm (thin layer of epibenthos) and shells along flowlines, with the presence of some black corals/octocorals and encrusting sponges observed on well infrastructure.

Black/octocorals, bryozoans and ascidians were not observed on flowlines. Along flowlines, burrows from infauna biota in mid shelf muddy sands were identified indicating extensive bioturbation.

Lerodiaconou et al (2020) identified commercially fished species including arrow squid (*Nototodarus gouldi*), Balmain bug (*Ibacus peronii*), Cuttlefish (*Sepiidae* spp.), red prawn (*Haliporoides sibogae*), Tasmanian giant crab (*Pseudocarcinus gigas*) and octopus (*Octopodiadea* spp.).

Commercially important invertebrates include lobsters, prawns, scallop species (see Section 5.1).

There is one threatened echinoderm species (or species habitat) that may occur within the Environment Sectors (Table 3-11, Table 3-12). The Tasmanian live-bearing seastar inhabits sheltered waters in the upper intertidal zone of rocky areas of southeast Tasmania, with an estimated population size of at least 350,000 individuals within 13 isolated populations (TSSC, 2009c). The species is listed as vulnerable due to its restricted geographic distribution.

Table 3-11: Marine Invertebrate species or species habitat that may occur within the Environment Sectors

		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Echinoderms															
Parvulastra vivipara	Tasmanian Live-bearing Seastar	V				[1]				LO	LO				
Crustaceans															
Engaeus martigener	Furneaux Burrowing Crayfish	E				[2]		MO							
Threatened Species:		Type of Presence:				Plan Reference:									
V	Vulnerable	MO	Species of species habitat may occur within area			[1] Approved Conservation Advice for <i>Patriella vivipara</i> (Tasmanian Live-bearing Seastar) (TSSC, 2009c)									
E	Endangered	LO	Species or species habitat likely to occur within area			[2] Approved Conservation Advice for <i>Engaeus martigener</i> (Furneaux burrowing crayfish) (TSSC, 2016)									

Table 3-12: Marine Invertebrate threatened species management advice relevant to petroleum activities under this EP

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under this EP
Tasmanian Live-bearing Seastar	Approved Conservation Advice for <i>Patriella vivipara</i> (Tasmanian Live-bearing Seastar) (TSSC, 2009c)	<ul style="list-style-type: none"> Habitat modification and destruction 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact and, if required, appropriate mitigation measures are implemented

3.12 Fish and Sharks

There are five fish, 12 shark and ray, and 77 syngnathid species (or species habitat) that may occur within the Environment Sectors; this includes species classified as threatened and migratory (Table 3-13). A list of the relevant conservation advice and/or recovery plans is also provided in Table 3-13, with relevant management actions in Table 3-14. The type of presence varies between species and location, and includes important behaviours (e.g. foraging, breeding) for some species (Table 3-13).

Commercially important fish include salmon and tuna species (see Section 5.1).

Note that the seabed in the vicinity of Cooper Energy assets is predominantly sediment; and the absence of any reef structures is expected to reduce the likelihood of fish species (threatened or commercial) to aggregate in the immediate areas. That is, any presence of fish species within the immediate area is expected to be transitory.

3.12.1 Sharks and Rays

In Australia, the grey nurse shark primarily has an inshore coastal distribution in sub-tropical to cool temperate waters on the continental shelf (DoE, 2014). The east coast population covers a range extending from the Capricornia coast (central Queensland) to Narooma in southern New South Wales (DoE, 2014), and is listed as critically endangered (TSSC, 2001). The Grey Nurse Shark generally occurs as solitary individuals or in small schools; larger aggregations of individuals may occur for courtship and mating (DoE, 2014). A number of key aggregation sites and habitat critical for the survival of the grey nurse shark have been identified within the Environment Sectors (Table 3-15). The grey nurse shark migrates within its range, making seasonal north–south movements to form aggregations at critical habitat sites, thought to be related to breeding (DEE, 2017i). The precise timing of mating and pupping in Australian waters is unknown; however, in South Africa mating occurs between late-October and late-November (DEE, 2017i). A BIA for breeding and distribution has been identified for the grey nurse shark along the east coast of Australia (Figure 3-30).

The great white shark has a range extending from central Queensland, around the south coast, to north-west Western Australia (DSEWPaC, 2013a). The shark is primarily found on the continental shelf and coastal waters, including inshore waters around oceanic islands. Though the Great White Shark is not evenly distributed throughout its range, the entire South-east Marine Region is considered a BIA for the species with observations more frequent in some areas, including those around fur-seal or sea-lion colonies (DSEWPaC, 2013a). In the South-east Marine Region waters surrounding pinniped colonies are considered BIAs for foraging for the species. Juveniles appear to aggregate seasonally in key areas, including Wilsons Promontory (Victoria), and the coast between Newcastle and Forster (New South Wales) (DSEWPaC, 2013a). Recent studies have found that juvenile white sharks (<3m) occupy estuaries at Port Stephens, New South Wales and Corner Inlet, Victoria during October to January (Harasti *et al.*, 2017). A BIA for breeding (nursery ground) has been established in the coastal region extending east from Wilsons Promontory; and a BIA for aggregation off the Newcastle coast (Figure 3-29). The great white shark 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. The Great White Shark is not known to form and defend territories, however, its ability to return on a seasonal basis implies a degree of site fidelity (DSEWPaC, 2013a).

The shortfin mako shark (*Isurus oxyrinchus*) has been recorded in offshore waters all around the Australian coastline except for the Arafura Sea, Gulf of Carpentaria and Torres Strait in the north (TSSC, 2014b). It is a pelagic species, primarily occurring in offshore, oceanic waters (Last and Stevens, 2009). The shortfin mako is highly migratory and can cover large distances, migrating from Australian waters to areas well beyond the Australian Exclusive Economic Zone (Rogers *et al.*, 2009). The shortfin mako inhabits depths down to 600 m, with a slight trend indicating the species spend the majority of the night in shallow water, and the majority of daylight hours in deeper waters (Rogers *et al.*, 2009). It is not normally found in waters below 16 °C (RPS, 2015). Satellite tracking data for shortfin makos showed a potential for year-round occupation of the Otway, Bass Strait and Gippsland Basins (Rogers and Bailleul, 2015).

The green sawfish is a species of ray that has a historic range extending from northern Australia down the east coast to Jervis Bay in New South Wales (DEE, 2017j). However, no records of this species exist south of Cairns since the 1960's (DEE, 2017j). The green sawfish prefers muddy bottom habitats, and has previously been recorded in inshore marine waters, estuaries, river mouths, embankments and along sandy and muddy beaches. Sawfish return seasonally to inshore coastal waters to breed and pup; pupping may occur during the summer wet season (DEE, 2017j). Given the contraction of the green sawfish's range, this species is not expected to be encountered within the Environment Sectors.

3.12.2 Handfish

Site specific habitat surveys of BMG subsea infrastructure conducted by Ierodiaconou et al (2020) noted that fish assemblages present along wells and flowlines generally reflect those known to occur in the region. During analysis of survey footage, a tentative identification of handfish (Family Brachionichthyidae) was made. The species could not be confirmed due to image resolution.

Stuart-Smith et. Al 2020 reports 14 different species of handfish. Seven species of handfish are listed on the IUCN red list as either Critically Endangered or Endangered. Three of these IUCN listed species are also EPBC listed either Vulnerable or Endangered.

Handfish are relatively small (60–151 mm) marine fishes with distributions restricted to the temperate waters of south-eastern Australia, predominantly concentrated in Tasmania (Last and Gledhill, 2009). They are demersal, generally cryptic in nature. Lacking a swim bladder, they prefer to use their ‘hands’ to ‘walk’ across the sea floor, rather than swim (although can do so over short distances when disturbed).

The images captured of the Handfish were done so by ROV mounted high definition camera flying over the known flowline routes. These sections of flowlines were trenched and buried in 2012 (or have been naturally buried since installation). The specimens observed at BMG were all seen on areas of seabed covering the B6 EHU and B6 Oil Flowline (Figure 3-28). The seabed appears sandy/shell/silty/muddy. There is evidence of infauna (burrows/mounds) and epifauna. It is not obvious that the seabed was trenched, or that a flowline is buried beneath. Whilst detailed footage was taken (and analysed by Deakin) of exposed sections of flowlines at similar depths; no specimens were observed on or around the exposed flowlines. This may indicate that the handfish specimens are not interacting with the flowline directly. The specimens observed were at least 200 m from the well centres.

Based on recorded distributions (Stuart-Smith *et al* 2020), the more likely explanation as to what species of handfish were observed around BMG is the Australian handfish. This species is not EPBC listed threatened, and is listed by the IUCN as ‘least concern’. Other handfish species with recorded localities and depth ranges resembling the BMG area include the warty handfish, Moulton’s handfish, narrowbody handfish and humpback handfish. These species are listed by the IUCN as ‘data deficient’. No EPBC listed handfish species are expected to be found within the Operational Area, due to the depth (listed species are found in water depths up to 60 m) and the location (listed species have been observed in Tasmania only).

The combination of poor dispersal potential with highly localised distributions and generally low population numbers means that they are highly susceptible to local disturbance events and broader environmental change (Bruce et al., 1998; Last and Gledhill, 2009; Last et al., 1983). Threats to handfish are noted as 'Prolonged Trawl and Dredge effort within its range possibly causing both habitat destruction and direct mortality' (Stuart-Smith et al 2020).



Figure 3-28 Suspected handfish sighting (Ierodiaconou et al (2021))

3.12.3 Pipefish, Seahorse and Seadragons

Syngnathidae is a group of bony fishes that includes seahorses, pipefishes, pipehorses and sea dragons; the closely related Solenostomidae family includes ghost pipefish. These species occupy a range of habitats, however, generally display a preference for seagrass and macroalgal beds, coral reefs, mangroves or sponge gardens (i.e. a habitat offering a protective environment) (DSEWPaC, 2012b). Habitat that supports syngnathid populations is generally patchy, so populations of syngnathid species may be dispersed and fragmented (DSEWPaC, 2012b). Syngnathids are typically carnivorous, feeding in the water column on or near the sea floor; their diet including small crustaceans, invertebrates, and zooplankton.

Table 3-13: Fish species or species habitat that may occur within the Environment Sectors

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Priority Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Fish															
<i>Brachionichthys hirsutus</i>	Spotted Handfish	CE				[1],[2]				MO	KO				
<i>Brachiopsilus ziebelli</i>	Ziebell's Handfish	V				[2]				LO	LO				
<i>Epinephelus daemeli</i>	Black Rockcod	V				[3]			LO			LO	LO	LO	KO
<i>Hoplostethus atlanticus</i>	Orange Roughy	CD					LO	LO	LO	LO	LO	LO	LO	LO	LO
<i>Prototroctes maraena</i>	Australian Grayling	V				[4]	KO	KO	KO	KO	KO	KO			
<i>Rexea solandri</i>	Eastern Gemfish	CD				[12]	MO	LO	LO	LO	LO	LO	LO		
<i>Seriolella brama</i>	Blue Warehou	CD				[13]	KO	KO	KO	KO	KO	KO	KO		
<i>Thunnus maccoyii</i>	Southern Bluefin Tuna	CD				[14]	LO	LO	LO	LO	LO	LO	LO	LO	LO
<i>Thymichthys politus</i>	Red Handfish	CE				[5],[2]		MO	MO	LO	KO				
Sharks and Rays															
<i>Anoxupristis cuspidata</i>	Narrow Sawfish		✓										MO		
<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark		✓						MO						
<i>Carcharias taurus</i>	Grey Nurse Shark (east coast population)	CE			*	[6]			KO* _{.m}			KO* _{.m}	KO* _{.m}		
<i>Carcharodon carcharias</i>	Great White Shark	V	✓		*	[7]	FKO* _{*d}	BKO* _{*b,d}	KO* _{.d}	FKO* _{*d}	KO* _{.d}	BKO* _{*a,d}	C/A* _{.d}	LO	LO
<i>Centrophorus harrissoni</i>	Harrisson's Dogfish	CD				[15]		LO	LO	LO	LO	LO	LO		LO

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Centrophorus zeehaani</i>	Little Gulper Shark	CD				[16]	LO	LO	LO	LO	LO	LO			
<i>Galeorhinus galeus</i>	School Shark	CD				[17]	LO	LO	LO	LO	LO	MO	MO	MO	MO
<i>Isurus oxyrinchus</i>	Shortfin Mako		✓				LO	LO	LO	LO	LO	LO	LO		
<i>Isurus paucus</i>	Longfin Mako		✓									LO	LO		
<i>Lamna nasus</i>	Porbeagle, Mackerel Shark		✓				LO	LO	LO	LO	LO	LO	MO	MO	
<i>Manta alredi</i>	Reef Manta Ray		✓									KO	KO	LO	
<i>Manta birostris</i>	Giant Manta Ray		✓						KO			LO	LO	LO	
<i>Pristis zijsron</i>	Green Sawfish	V	✓			[8],[9]							BLO		
<i>Rhincodon typus</i>	Whale Shark	V	✓			[10]		MO	LO			MO	MO		
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CD				[18]						KO	KO	LO	LO
<i>Zearaja maugeana</i>	Maugean Skate	E				[11]				KO					
Pipefish, Seahorse and Seadragons															
<i>Acentronura australe</i>	Southern Pygmy Pipehorse			✓			MO								
<i>Acentronura tentaculate</i>	Shortpouch Pygmy Pipehorse			✓					MO			MO	MO		
<i>Campichthys tryoni</i>	Tryon's Pipefish			✓			MO					MO	MO		
<i>Choeroichthys brachysoma</i>	Pacific Short-bodied Pipefish			✓									MO		
<i>Corythoichthys amplexus</i>	Fijian Banded Pipefish			✓								MO	MO		
<i>Corythoichthys flavofasiatus</i>	Reticulate Pipefish			✓									MO		

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Corythoichthys haematopterus</i>	Reef-top Pipefish			✓									MO		
<i>Corythoichthys intestinalis</i>	Australian Messmate Pipefish			✓									MO		
<i>Corythoichthys ocellatus</i>	Orange-spotted Pipefish			✓								MO	MO		
<i>Corythoichthys paxtoni</i>	Paxton's Pipefish			✓									MO		
<i>Corythoichthys schultzi</i>	Schultz's Pipefish			✓									MO		
<i>Cosmocampus howensis</i>	Lord Howe Pipefish			✓					MO			MO		MO	
<i>Doryrhamphus excisus</i>	Bluestripe Pipefish			✓									MO		
<i>Festuclex cinctus</i>	Girdled Pipefish			✓								MO	MO		
<i>Filicampus tigris</i>	Tiger Pipefish			✓								MO	MO		
<i>Halicampus boothae</i>	Booth's Pipefish			✓								MO		MO	MO
<i>Halicampus dunckeri</i>	Red-hair Pipefish			✓									MO		
<i>Halicampus grayi</i>	Mud Pipefish			✓									MO		
<i>Halicampus nitidus</i>	Glittering Pipefish			✓									MO		
<i>Halicampus spinirostris</i>	Spiny-snout Pipefish			✓									MO		
<i>Heraldia nocturna</i>	Upside-down Pipefish			✓			MO	MO	MO	MO	MO	MO			
<i>Hippichthys cyanospilos</i>	Blue-speckled Pipefish			✓								MO	MO		
<i>Hippichthys heptagonus</i>	Madura Pipefish			✓								MO	MO		
<i>Hippichthys peniculls</i>	Beady Pipefish			✓								MO	MO		
<i>Hippocampus abdominalis</i>	Big-belly Seahorse			✓			MO	MO	MO	MO	MO	MO			
<i>Hippocampus bargibanti</i>	Pygmy Seahorse			✓									MO		

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Hippocampus berrinceps</i>	Short-head Seahorse			✓			MO	MO	MO	MO	MO				
<i>Hippocampus kelloggi</i>	Kellogg's Seahorse			✓								MO	MO	MO	
<i>Hippocampus kuda</i>	Spotted Seahorse			✓								MO	MO		
<i>Hippocampus minotaur</i>	Bullneck Seahorse			✓			MO	MO	MO						
<i>Hippocampus planifrons</i>	Flat-face Seahorse			✓								MO	MO		
<i>Hippocampus trimaculatus</i>	Three-spot Seahorse			✓								MO	MO		
<i>Hippocampus whitei</i>	White's Seahorse	E		✓				MO				KO	MO		
<i>Hippocampus zebra</i>	Zebra Seahorse			✓									MO		
<i>Histiogamphelus briggsii</i>	Crested Pipefish			✓			MO	MO	MO	MO	MO	MO			
<i>Histiogamphelus cristatus</i>	Rhino Pipefish			✓			MO	MO	MO	MO					
<i>Hypseognathus rostratus</i>	Knifesnout Pipefish			✓			MO	MO	MO	MO	MO				
<i>Kaupus costatus</i>	Deepbody Pipefish			✓			MO	MO	MO	MO	MO				
<i>Kimblaesus bassensis</i>	Trawl Pipefish			✓			MO	MO	MO	MO	MO	MO			
<i>Leptoichthys fistularius</i>	Brushtail Pipefish			✓			MO	MO	MO	MO					
<i>Lissocampus caudalis</i>	Australian Smooth Pipefish			✓			MO	MO	MO	MO					
<i>Lissocampus runa</i>	Javeline Pipefish			✓			MO	MO	MO	MO	MO	MO	MO		
<i>Maroubra perserrata</i>	Sawtooth Pipefish			✓			MO	MO	MO	MO	MO	MO	MO		
<i>Micrognathus andersons</i>	Anderson's Pipefish			✓								MO	MO		
<i>Micrognathus brevirostris</i>	Thorntail Pipefish			✓								MO	MO		
<i>Microphis manadensis</i>	Manado Pipefish			✓								MO	MO		
<i>Mitotichthys mollisoni</i>	Mollison's Pipefish			✓			MO	MO	MO	MO	MO				

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Mitotichthys semistriatus</i>	Halfbanded Pipefish			✓			MO	MO	MO	MO	MO				
<i>Mitotichthys tuckeri</i>	Tucker's Pipefish			✓			MO	MO	MO	MO	MO				
<i>Nannocampus pictus</i>	Painted Pipefish			✓									MO		
<i>Notiocampus ruber</i>	Red Pipefish			✓			MO	MO	MO	MO	MO	MO			
<i>Phycodurus eqques</i>	Leafy Seadragon			✓			MO	MO	MO	MO					
<i>Phyllopteryx taeniolatus</i>	Common Seadragon			✓			MO	MO	MO	MO	MO	MO			
<i>Pugnaso curtirostris</i>	Pugnose Pipefish			✓			MO	MO	MO	MO	MO				
<i>Solegnathus dunckeri</i>	Duncker's Pipehorse			✓								MO	MO	MO	
<i>Solegnathus harwickii</i>	Pallid Pipehorse			✓								MO	MO		
<i>Solegnathus robustus</i>	Robust Pipehorse			✓			MO	MO	MO	MO	MO				
<i>Solegnathus spinosissimus</i>	Spiny Pipehorse			✓			MO	MO	MO	MO	MO	MO	MO		
<i>Solenostomus cyanopterus</i>	Robust Ghostpipefish			✓					MO			MO	MO		
<i>Solenostomus paradoxus</i>	Ornate Ghostpipefish			✓								MO	MO		
<i>Stigmatopora argus</i>	Spotted Pipefish			✓			MO	MO	MO	MO	MO	MO			
<i>Stigmatopora nigra</i>	Widebody Pipefish			✓			MO	MO	MO	MO	MO	MO	MO		
<i>Stipecampus cristatus</i>	Ringback Pipefish			✓			MO	MO	MO	MO					
<i>Syngnathoides biaculeatus</i>	Double-end Pipehorse			✓				MO	MO			MO	MO		
<i>Trachyrhamphus bicoarctatus</i>	Bentstick Pipefish			✓								MO	MO		
<i>Urocampus carinirostris</i>	Hairy Pipefish			✓			MO	MO	MO	MO	MO	MO	MO		

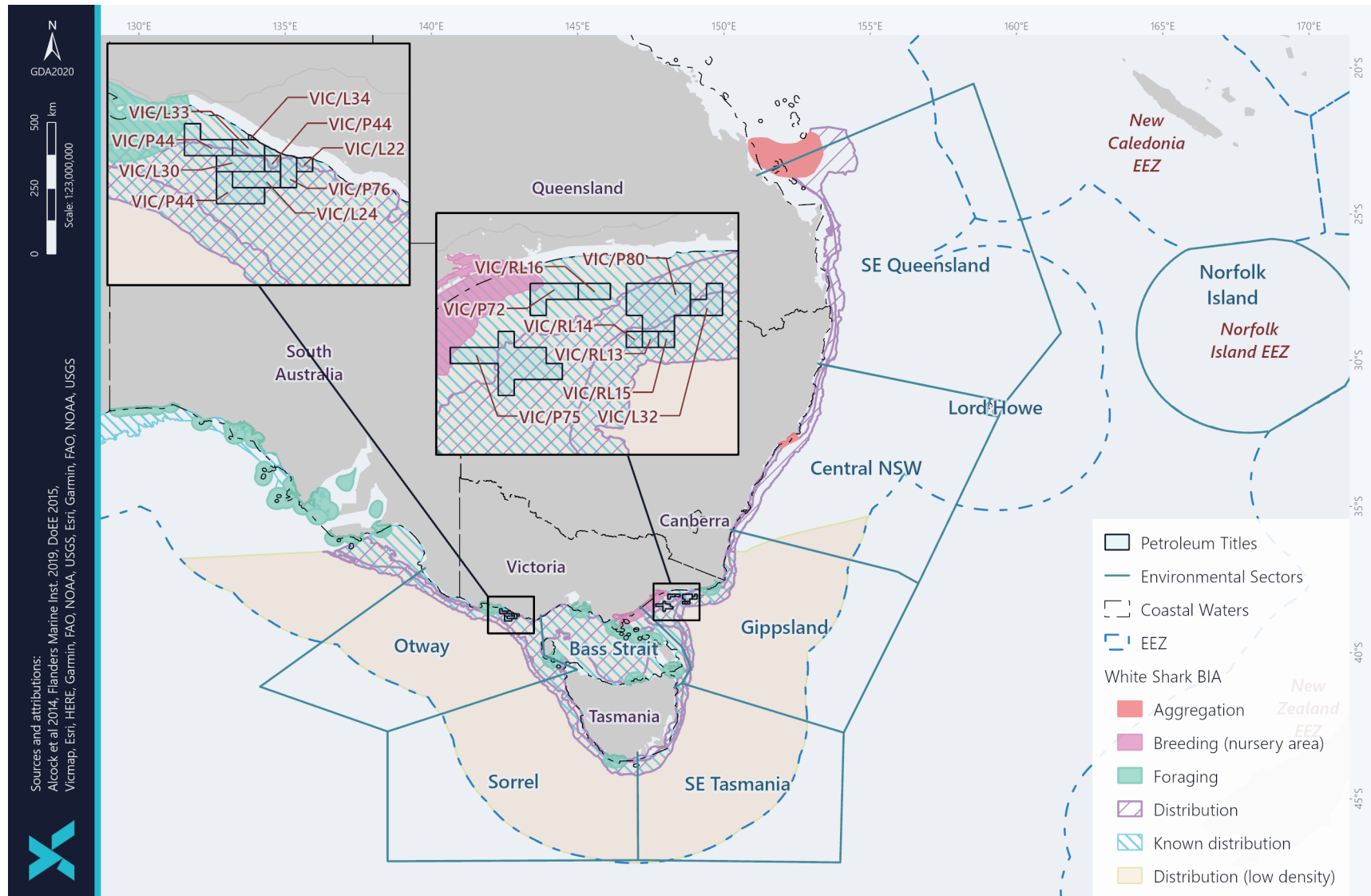
Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
<i>Vanacampus margaritifer</i>	Mother-of-pearl Pipefish			✓			MO	MO	MO	MO		MO	MO			
<i>Vanacampus phillipi</i>	Port Phillip Pipefish			✓			MO	MO	MO	MO	MO	MO				
<i>Vanacampus poecilolaemus</i>	Longsnout Pipefish			✓			MO	MO	MO	MO	MO					
<i>Vanacampus vercoi</i>	Verco's Pipefish			✓			MO									
<p><u>Threatened Species:</u></p> <p>V Vulnerable</p> <p>E Endangered</p> <p>CE Critically Endangered</p> <p>CD Conservation Dependent</p> <p>Biologically Important Area</p> <p>* BIA Present</p> <p>a Aggregation</p> <p>b Breeding</p> <p>d Distribution</p>		<p><u>Type of Presence:</u></p> <p>MO Species or species habitat may occur within area</p> <p>LO Species or species habitat likely to occur within area</p> <p>KO Species or species habitat known to occur within area</p> <p>Tr Translocated population known to occur within area</p> <p>C/A Congregation or aggregation known to occur within area</p> <p>FKO Foraging, feeding or related behaviour known to occur within area</p> <p>BMO Breeding may occur within area</p> <p>BKO Breeding known to occur within area</p>		<p><u>Plan Reference:</u></p> <p>[1] Approved Conservation Advice on <i>Brachionichthys hirsutus</i> (Spotted Handfish) (TSSC 2012b)</p> <p>[2] Recovery Plan for Three Handfish Species: Spotted Handfish (<i>Brachionichthys hirsutus</i>), Red Handfish (<i>Thymichthys politus</i>), and Ziebell's Handfish (<i>Branchiopsilus ziebelli</i>) (DoE, 2015b)</p> <p>[3] Approved Conservation Advice for <i>Epinephelus daemeli</i> (Black Rock-cod) (TSSC, 2012c)</p> <p>[4] National Recovery Plan for Australian Grayling (DEWHA, 2008)</p> <p>[5] Approved Conservation Advice for <i>Thymichthys politus</i> (Red Handfish) (TSSC, 2012d)</p> <p>[6] Recovery Plan for the Grey Nurse Shark (<i>Carcharias Taurus</i>) (DoE, 2014)</p> <p>[7] Recovery Plan for the White Shark (<i>Carcharodon carcharias</i>) (DSEWPaC, 2013a)</p> <p>[8] Approved Conservation Advice for <i>Pristis zijsron</i> (Green Sawfish) (TSSC, 2008a)</p> <p>[9] Sawfish and River Sharks Multispecies Recovery Plan (DoE, 2015c)</p> <p>[10] Approved Conservation Advice for <i>Rhincodon typus</i> (Whale Shark) (TSSC, 2015j)</p> <p>[11] Approved Conservation Advice for <i>Raja sp. L</i> (Maugean Skate) (TSSC, 2008b)</p>												

Scientific Name	Common Name	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
				[12]		Commonwealth Listing Advice on <i>Rexea solandri</i> (TSSC, 2009)									
				[13]		Listing Advice <i>Seriolella brama blue warehou</i> (TSSC, 2014b)									
				[14]		Commonwealth Listing Advice on <i>Thunnus maccoyii</i> (<i>Southern Bluefin Tuna</i>) (TSSC, 2010)									
				[15]		Commonwealth Listing Advice on <i>Centrophorus harrissoni</i> (<i>Harrisson's dogfish</i>) (TSSC, 2013c)									
				[16]		Commonwealth Listing Advice on <i>Centrophorus zeehaani</i> (<i>southern dogfish</i>). (TSSC, 2013d)									
				[17]		Commonwealth Listing Advice on <i>Galeorhinu galeus</i> (TSSC, 2009b)									
				[18]		<i>Sphyrna lewini</i> (<i>scalloped hammerhead</i>) Listing Advice (TSSC, 2017)									

Table 3-14: Fish threatened species management advice relevant to petroleum activities under this EP

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under this EP
Fish			
<ul style="list-style-type: none"> Spotted Handfish Ziebell's Handfish Red Handfish 	Recovery Plan for Three Handfish Species: Spotted Handfish (<i>Brachionichthys hirsutus</i>), Red Handfish (<i>Thymichthys politus</i>), and Ziebell's Handfish (<i>Branchiopsilus ziebelli</i>) (DoE, 2015b)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Spotted Handfish 	Approved Conservation Advice on <i>Brachionichthys hirsutus</i> (Spotted Handfish) (TSSC 2012b)		
<ul style="list-style-type: none"> Red Handfish 	Approved Conservation Advice for <i>Thymichthys politus</i> (Red Handfish) (TSSC, 2012d)		

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under this EP
<ul style="list-style-type: none"> Black Rockcod 	Approved Conservation Advice for <i>Epinephelus daemeli</i> (Black Rock-cod) (TSSC, 2012c)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Australian Grayling 	National Recovery Plan for Australian Grayling (DEWHA, 2008)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
Sharks and Rays			
<ul style="list-style-type: none"> Grey Nurse Shark (east coast population) 	Recovery Plan for the Grey Nurse Shark (<i>Carcharias Taurus</i>) (DoE, 2014)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Great White Shark 	Recovery Plan for the White Shark (<i>Carcharodon carcharias</i>) (DSEWPaC, 2013a)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Green Sawfish 	Approved Conservation Advice for <i>Pristis zijsron</i> (Green Sawfish) (TSSC, 2008a) Sawfish and River Sharks Multispecies Recovery Plan (DoE, 2015c)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified
<ul style="list-style-type: none"> Whale Shark 	Approved Conservation Advice for <i>Rhincodon typus</i> (Whale Shark) (TSSC, 2015j)	<ul style="list-style-type: none"> Vessel strike Habitat disruption from mineral exploration, production and transportation Marine debris 	<ul style="list-style-type: none"> Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Maugean Skate 	Approved Conservation Advice for <i>Raja sp. L</i> (Maugean Skate) (TSSC, 2008b)	<ul style="list-style-type: none"> None identified 	<ul style="list-style-type: none"> None identified



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Figure 3-29: BIAs for the Great White Shark

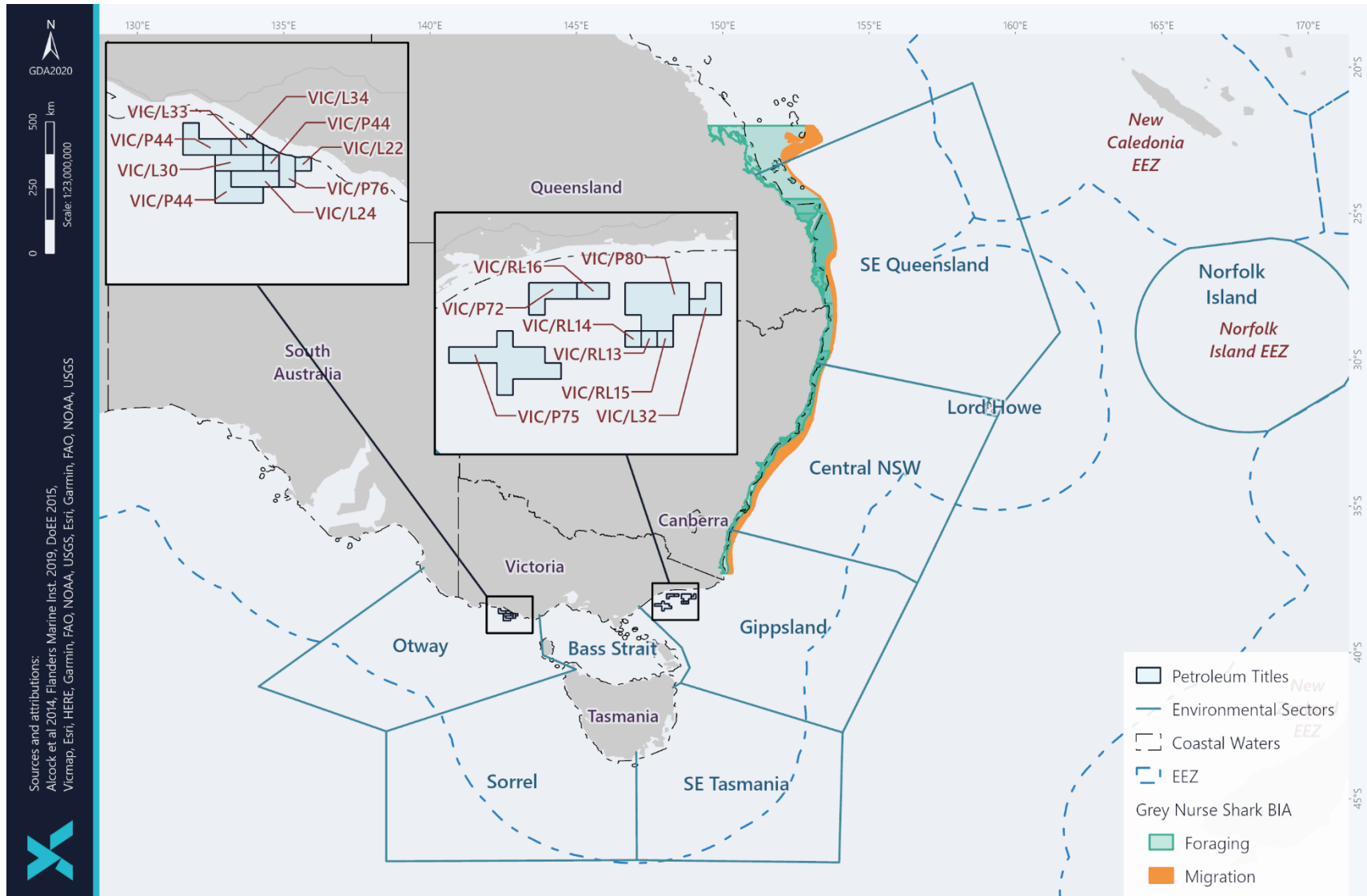


Figure 3-30: BIAs for the Grey Nurse Shark

Table 3-15: Known key aggregation sites¹ critical for the survival of the Grey Nurse Shark in Australian waters

Queensland Waters	New South Wales Waters	Commonwealth Waters
<ul style="list-style-type: none"> • Wolf Rock off Rainbow Beach • Cherubs Cave off Moreton Island • Henderson’s Rock off Moreton Island • Flat Rock off North Stradbroke Island 	<ul style="list-style-type: none"> • Julian Rocks near Byron Bay • North Solitary Island (Anemone Bay) • South Solitary Island (Manta Arch) • Green Island near South West Rocks • Fish Rock near South West Rocks • Mermaid Reef near Laurieton • The Pinnacle near Forster • Big Seal, Seal Rocks • Little Seal, Seal Rocks • Little Broughton Island near Port Stephens • Magic Point at Maroubra, Sydney • Tollgate Islands near Batemans Bay • Montague Island near Narooma 	<ul style="list-style-type: none"> • Pimpernel Rock off Brooms Head (northern section of Solitary Islands Marine Park) • Cod Grounds off Laurieton

Notes:

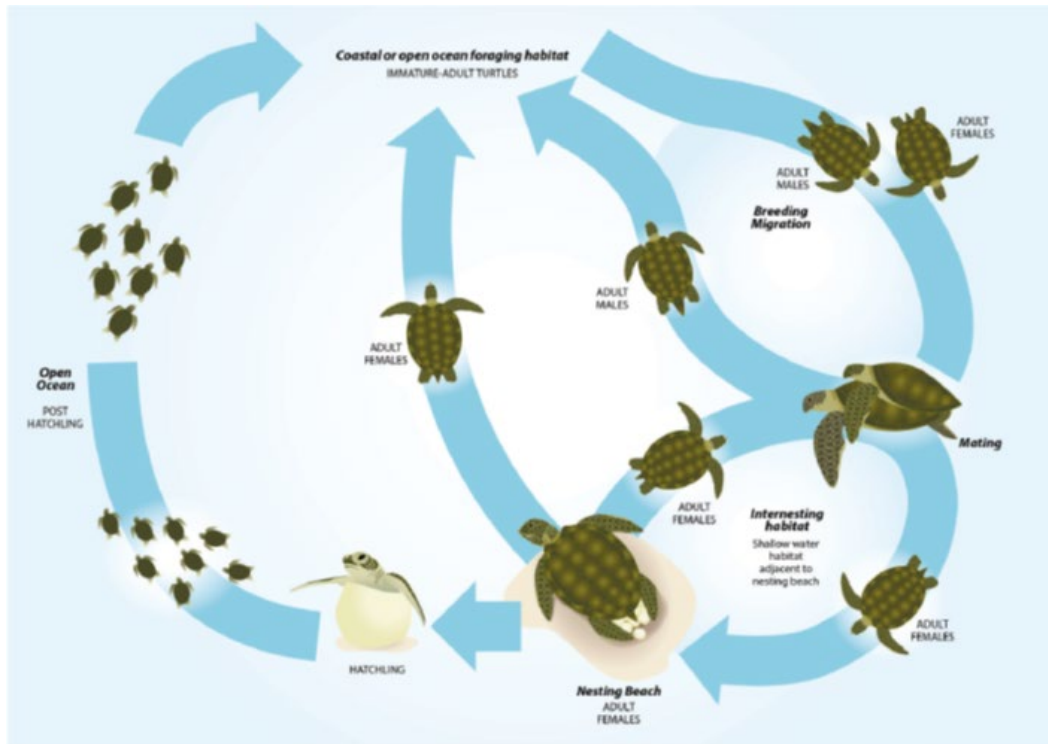
1. 'Key Aggregation Sites' defined as being locations where five or more Grey Nurse Sharks were consistently found throughout the year (DoE, 2014).

3.13 Marine Reptiles

There are six marine turtles, 13 sea snakes, and one crocodile species (or species habitat) that may occur within the Environment Sectors; this includes species classified as threatened and migratory (Table 3-16). A list of the relevant conservation advice and/or recovery plans is also provided in Table 3-16, with relevant management actions in Figure 3-15. The type of presence varies between species and location, and includes important behaviours (e.g. foraging, breeding) for some species (Table 3-16).

3.13.1 Marine Turtles

Adult marine turtles spend the majority of their lives in the ocean, typically only coming onshore to nest (Figure 3-31). Females can lay (on average) between two and six clutches per season (DEE, 2017k); 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 approximately two months (DEE, 2017k). 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 (DEE, 2017k). Flatback turtles also lack an oceanic phase and remain in the surface waters of the continental shelf.



(Source: DEE, 2017k)

Figure 3-31: Generalised life cycle of a Marine 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 (DEE, 2017l). 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 (Figure 3-32) (DEE, 2017l). Nesting on the east coast typically occurs between October and March each year (Table 3-18). A BIA, for nesting and internesting, has also been identified for this species in this area (Figure 3-33). More recent information released in the Recovery Plan (DEE, 2017k) presents draft critical habitat areas for the loggerhead turtle; some of which overlap with previously defined BIAs (Figure 3-33). 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 (DEE, 2017l).

Important local foraging areas for the species, include the Great Barrier Reef area and Moreton Bay (DEE, 2017l). Loggerhead turtles are carnivorous, feeding primarily on benthic invertebrates (DEE, 2017l).

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 (DEE, 2017m). Within Australia, green turtles typically nest, forage and migrate across tropical northern Australia (Figure 3-32) (DEE, 2017m). There is one nesting stock for green turtles within the Environment Sectors, with nesting typically occurring between October and April; and peaking in January (Figure 3-32, Table 3-18). A BIA, for nesting, internesting, and foraging, has also been identified for this species in this area (Figure 3-33). More recent information released in the Recovery Plan (DEE, 2017k) presents draft critical habitat areas for the Green Turtle; some of which overlap with previously defined nesting BIAs (Figure 3-33). 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 (DEE, 2017m). 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 (DEE, 2017m).

The leatherback turtle has the widest distribution of any marine turtle, occurring in tropical to sub-polar oceans (TSSC, 2008c). In Australia, the leatherback turtle has been recorded foraging in all Australian states, but no large nesting populations have been recorded (Figure 3-32) (TSSC, 2008c). Small numbers of nesting females have previously been recorded in central Queensland, northern NSW, and the Northern Territory; however, no nesting has been recorded in eastern Australia since 1996 (TSSC, 2008c). There is a BIA established, for nesting and internesting, for a small area in central Queensland (Figure 3-33). The leatherback turtle is a highly pelagic species, venturing close to shore mainly during the nesting season (DEE, 2017n). Adults feed mainly on pelagic soft-bodied creatures such as jellyfish, tunicates, salps, squid (DEE, 2017n).

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 (DEE, 2017o). All known nesting locations for this species are within Australia (Figure 3-32) (DEE, 2017o). A BIA for nesting has been identified for this species, with the southern extent of this occurring within the 'SE Queensland' Environment Sector (Figure 3-33); the majority of flatback turtle nesting in Queensland occurs further north. More recent information released in the Recovery Plan (DEE, 2017k) presents draft critical habitat areas for the flatback turtle; some of which overlap with previously defined BIAs (Figure 3-33). In Queensland nesting occurs between October and March, with a peak in December (Table 3-18) (DEE, 2017o). Nesting trends at Mon Repos and Curtis Island show no signs of decline (DEE, 2017o). Flatback turtles are primarily carnivorous, feeding on soft-bodied invertebrates; juveniles eat gastropod molluscs, squid, siphonophores (DEE, 2017o). Limited data also indicate that cuttlefish, hydroids, soft corals, crinoids, molluscs and jellyfish may also form part of their diet (DEE, 2017o).

The hawksbill turtle is found in tropical, subtropical and temperate waters all around the world (DEE, 2017p). Nesting within Australia for the hawksbill turtle occurs outside the Environment Sectors; however, their known range does extent into the temperate waters of southern Queensland and New South Wales (Figure 3-32). Hawksbill turtles are omnivorous, feeding on sponges, hydroids, cephalopods (octopus and squid), gastropods (marine snails), cnidarians (jellyfish), seagrass and algae (DEE, 2017k, 2017p). During their pelagic phase (while drifting on ocean currents), young hawksbill turtles will feed on plankton (DEE, 2017p). 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 New South Wales originate (DEE, 2017k).

The Olive Ridley turtle is found in waters across northern Australia and to the southern Queensland border (Figure 3-32). No nesting for Olive Ridley turtles occurs within the Environment Sectors (Figure 3-32) (DEE, 2017q). Olive Ridley Turtles are primarily carnivorous, feeding on soft-bodied invertebrates such as sea pens, soft corals, sea cucumbers, and jellyfish (DEE, 2017k). Both juveniles and adults have been observed foraging over shallow benthic habitats from northern Western Australia to south-east Queensland; although occurrences in pelagic foraging habitats also occur (DEE, 2017q). The Great Barrier Reef area is an important foraging area for this specie (DEE, 2017q).

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Table 3-16: Marine Reptile species or species habitat that may occur within the Environment Sectors

		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Turtles															
<i>Caretta caretta</i>	Loggerhead Turtle	E	✓	✓	*	[1]	BLO	FKO	BLO		LO	BKO	BKO ^{*n,i}	LO	LO
<i>Chelonia mydas</i>	Green Turtle	V	✓	✓	*	[1]	MO	FKO	FKO	MO	MO	FKO	BKO ^{*n,i,f}	LO	LO
<i>Dermochelys coriacea</i>	Leatherback Turtle	E	✓	✓	*	[1], [2]	FKO	FKO	FKO	BLO	LO	FKO	BKO ^{*n,i}	LO	LO
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	V	✓	✓		[1]			FKO			FKO	FKO	LO	LO
<i>Lepidochelys olivacea</i>	Olive Ridley Turtle	E	✓	✓		[1]							FKO		
<i>Natator depressus</i>	Flatback Turtle	V	✓	✓	*	[1]			FKO			FKO	BKO ^{*n}	LO	LO
Sea Snakes															
<i>Acalyptophis peroni</i>	Horned Seasnake			✓									MO		
<i>Aipysurus duboissi</i>	Dubois' Seasnake			✓									MO		
<i>Aipysurus eydouxii</i>	Spine-tailed Seasnake			✓									MO		
<i>Aipysurus laevis</i>	Olive Seasnake			✓									MO		
<i>Astrotia stokesii</i>	Stoke's Seasnake			✓									MO		
<i>Disteiria kingii</i>	Spectacled Seasnake			✓									MO		
<i>Disteira major</i>	Olive-headed Seasnake			✓									MO		
<i>Emydocephalus annulatus</i>	Turtle-headed Seasnake			✓									MO		
<i>Hydrophis elegans</i>	Elegant Seasnake			✓								MO	MO		

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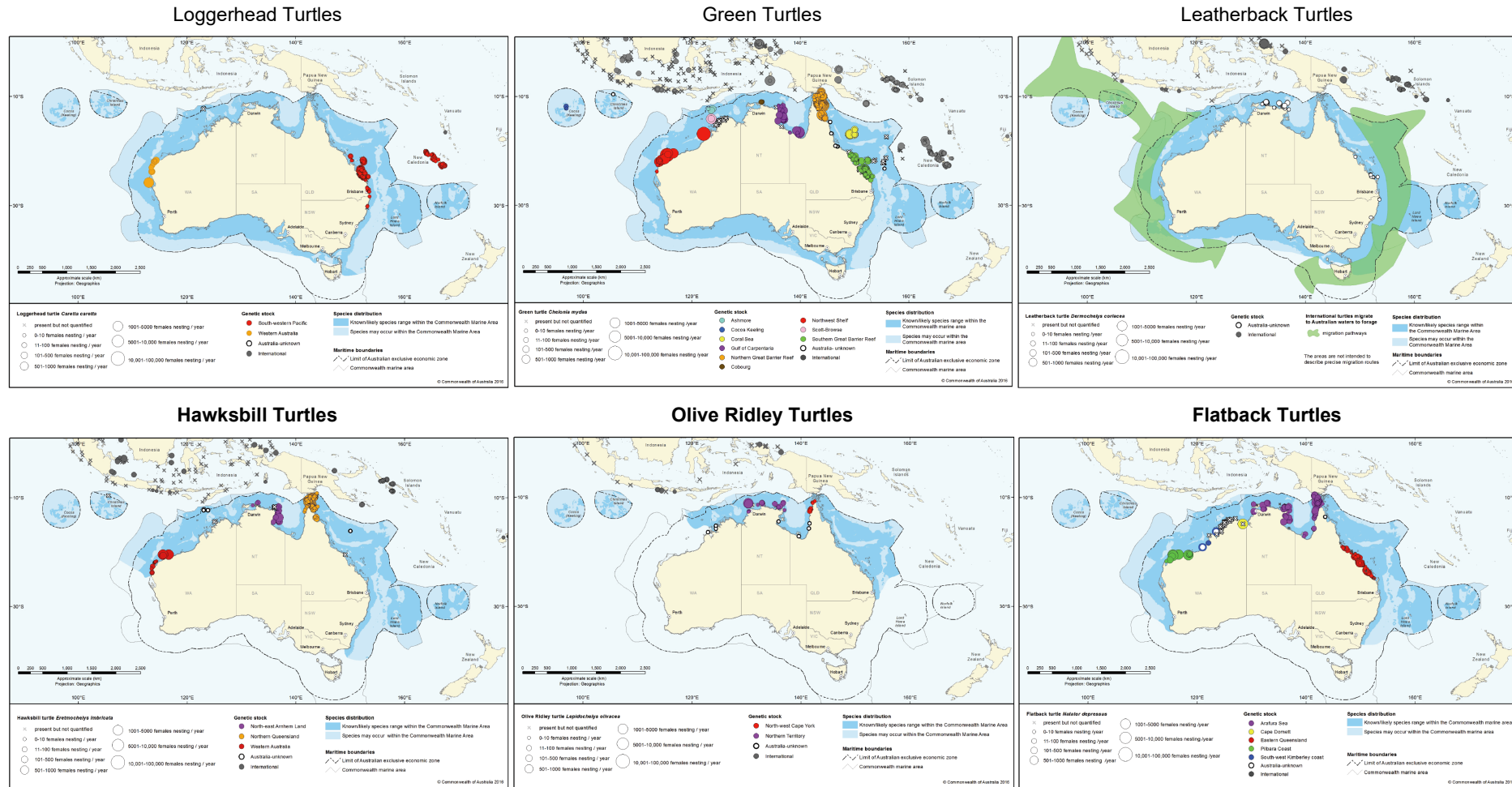
		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Lapemis hardwickii</i>	Spine-bellied Seasnake			✓									MO		
<i>Laticauda colubrina</i>	a sea krait (1092)			✓									MO		
<i>Laticauda laticaudata</i>	a sea krait (1093)			✓									MO		
<i>Pelamis platurus</i>	Yellow-bellied Seasnake			✓								MO	MO		
Crocodile															
<i>Crocodylus prorsus</i>	Salt-water Crocodile		✓	✓									LO		
<u>Threatened Species:</u>		<u>Type of Presence:</u>					<u>Plan Reference:</u>								
V	Vulnerable	MO	Species of species habitat may occur within area					[1]	Recovery Plan for Marine Turtles in Australia, 2017-2027 (DEE, 2017k)						
E	Endangered	LO	Species or species habitat likely to occur within area					[2]	Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (TSSC, 2008c)						
<u>Biologically Important Area</u>		KO	Species or species habitat known to occur within area												
*	BIA Present	FKO	Foraging, feeding or related behaviour known to occur within area												
f	Foraging	area													
i	Interesting	BLO	Breeding likely to occur within area												
n	Nesting	BKO	Breeding known to occur within area												

Table 3-17: Marine Reptile threatened species management advice relevant to petroleum activities under this EP

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under this EP
Marine Turtles			
<ul style="list-style-type: none"> • Loggerhead Turtle • Green Turtle • Leatherback Turtle • Hawksbill Turtle • Olive Ridley Turtle • Flatback Turtle 	Recovery Plan for Marine Turtles in Australia, 2017-2027 (DEE, 2017k)	<ul style="list-style-type: none"> • Marine debris • Chemical discharge • Light pollution • Habitat modification • Vessel disturbance • Noise interference 	<ul style="list-style-type: none"> • Marine pollution: Evaluate risk of oil spill impact to marine turtles and, if required, appropriate mitigation measures are implemented • Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented • Noise interference: Evaluate risk of noise impacts to marine turtles and, if required, appropriate mitigation measures are implemented • Light interference: Evaluate risk of light impacts to marine turtles and, if required, appropriate mitigation measures are implemented • Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> • Leatherback Turtle 	Approved Conservation Advice for <i>Dermochelys coriacea</i> (Leatherback Turtle) (TSSC, 2008c)	<ul style="list-style-type: none"> • Ingestion of marine debris • Boat strike • Degradation of foraging areas and changes to breeding sites 	<ul style="list-style-type: none"> • See above (for Recovery Plan for Marine Turtles in Australia, 2017-2027)

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(Source: DEE, 2017k)

Figure 3-32: Marine Turtle nesting sites in Australia and surrounding regions

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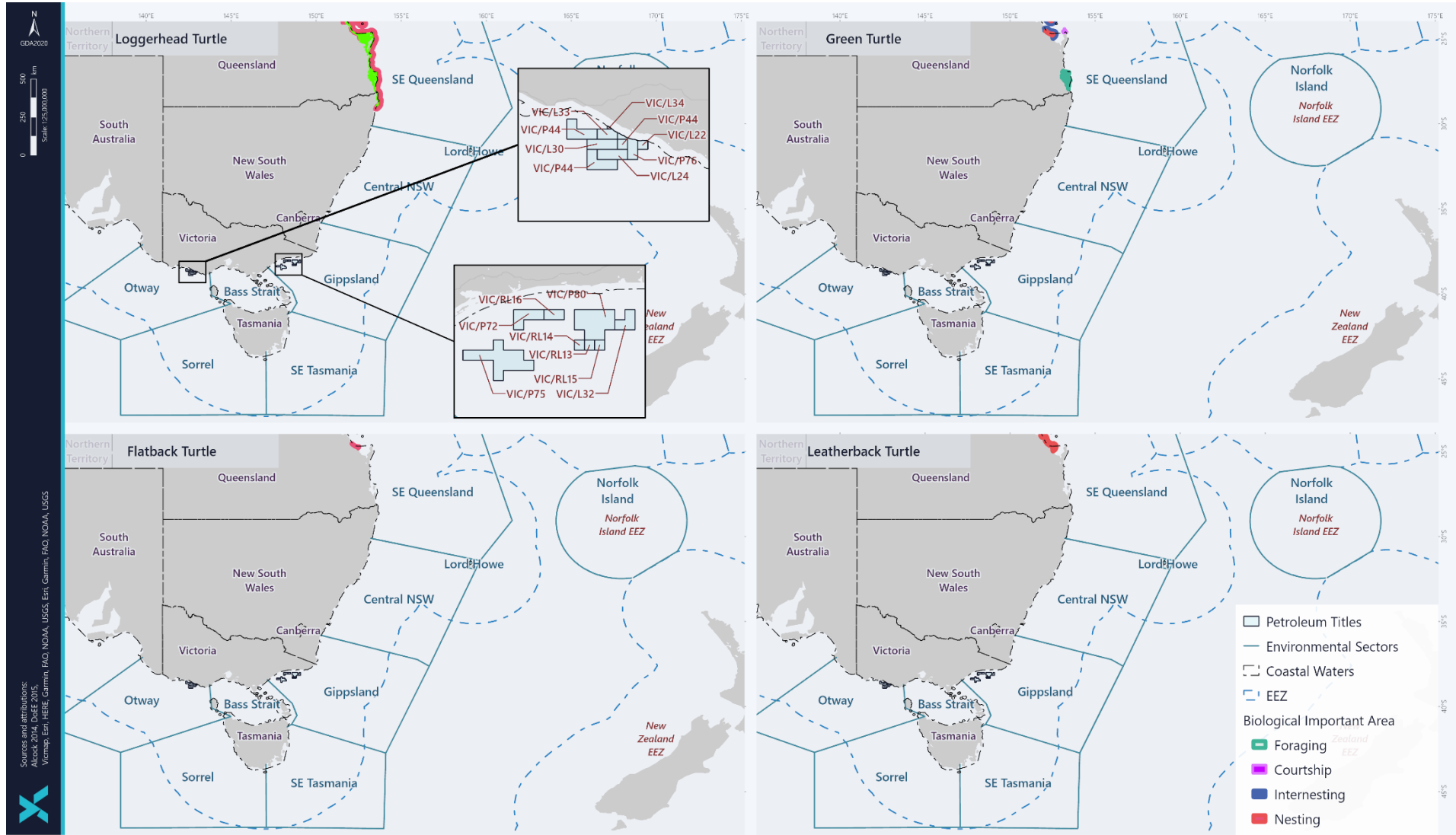


Figure 3-33: BIAs and Critical Habitat for the Loggerhead, Green, Leatherback and Flatback Turtles

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Table 3-18: Nesting and interesting areas identified as Critical Habitat¹ for Marine Turtles present within the Environment Sectors

Species (Genetic Stock)	Nesting Locations	Interesting Buffer	Time of Year
Loggerhead Turtles (South-west Pacific)	Coastal beaches from Elliot River to Bustard Head, Swain Reefs. Tryon, Capriconia-Bunker Group, Pumistone Passage to Double Island Point.	20 km	Oct–Mar
Green Turtles (Southern GBR)	Islands of the Capriconia-Bunker Group, Wreck Rock to Burnett Head	20 km	Oct–Apr
Flatback Turtles (Eastern Queensland)	Curtis Island, Mon Repos	60 km	Oct–Mar

Notes:

1. Critical habitat to the survival of a marine turtle species was determined by a panel of experts and includes habitat for at least 70% of nesting for the stock (DEE, 2017k).

3.14 Marine Mammals

There are four pinniped, one sirenian, 26 whales, 18 dolphins, and one porpoise species (or species habitat) that may occur within the Environment Sectors; this includes species classified as threatened and migratory (Table 3-20). A list of the relevant conservation advice and/or recovery plans is also provided in Table 3-20, with relevant key threats and management actions further discussed in Table 3-21. The type of presence varies between species and location, and includes important behaviours (e.g. foraging, breeding) for some species (Table 3-20).

3.14.1 Pinnipeds

The New Zealand fur-seal (long-nosed fur-seal) and the Australian fur-seal have the widest range of the pinnipeds, occurring in coastal regions from South Australia through to New South Wales (Table 3-20). While breeding for the New Zealand fur-seal does occur along the coasts of Victoria and southern Tasmania (Table 3-19, Figure 3-34), the main breeding sites (accounting for over 80% of the national population) are located further east in Western and South Australia (i.e. outside of the define Environment Sectors) (TSS, 2017; Kirkwood et al, 2009; DSEWPaC, 2012c). Conversely, the main breeding locations for the Australian fur-seal are within the Environment Sectors, typically on islands within Bass Strait (Table 3-19, Figure 3-35) (DEE, 2017r; Kirkwood *et al.*, 2010).

New Zealand fur-seal breeding colonies are typically found in rocky habitat with jumbled boulders; Australian fur-seal prefer flatter rocky shelves (Shaughnessy, 1999). Colonies for both species are typically occupied year-round, with greater activity during breeding seasons (Shaughnessy, 1999; DEE, 2017r). Numbers of Australian fur-seals on Montague Island (New South Wales), fluctuate through the year, with peak numbers occurring in September and October; this reflects the northward migration over the winter, and the subsequent return to the breeding colonies of the Bass Strait in late spring (DEE, 2017r). The Australian and New Zealand fur-seals have been recorded using Beware Reef (approximately 40 km north-west of the Sole wells, and 50 km north-northeast of the BMG wells) as a haul-out site (Parks Victoria, 2017).

Reports by Arnould and Kirkwood (2008 and 2011) tracked the foraging habits of female Australian fur seals from four breeding sites in northern Bass Strait during the winters of 2001-2003. The studies found that all individuals foraged over the shallow continental shelf of Bass Strait and none of the foraging trips recorded any individuals venturing beyond the continental shelf-edge of Bass Strait. This data supports earlier studies that suggested the species is an exclusively benthic forager, although will opportunistically hunt throughout their transit to feeding grounds. Analysis of habitat use indicated that individuals selected areas with depths of 60–80 m and sea surface temperature of 16.0-16.8°C with several areas regularly frequented and considered 'hot spots', while others with similar bathymetries were never entered by the individuals in this study. Furthermore, while there was substantial inter-individual variation, most seals displayed some degree of foraging site fidelity (Arnould and Kirkwood, 2008 and 2011).

Hoskins et al (2015) considered the role of intensive foraging zones for Australian fur seal, finding that foraging intensity 'hot spots' occur in a mosaic throughout the Bass Basin (within the Bass strait), primarily to the SW of the known colonies. Diving data suggests that individuals were maximising their time within the benthic foraging zone.

Arnould and Kirkwood (2011) also evaluated the degree of overlap between foraging sites of female Australian fur seals and marine reserves. Foraging areas of seals tracked in this study overlapped with only two reserves of the South-east Commonwealth Marine Reserve Network for <1% of the time-at-sea. Very little overlap in foraging habitat use by lactating females and the network of reserves suggests that several important habitats in south-eastern Australian waters may be poorly represented in the current marine reserve network.

McIntosh et al. (2018) undertook a critical analysis of existing population data for Australian fur seal, which identified a drop in live pup numbers which could indicate stabilisation or decline in the population within the study area (SE Australia). The study concluded that further data was necessary to understand the reasons behind and implications of this perceived drop in live pup numbers, however stressed the importance of accurate population statistics for management.

The Australian sea-lion is the only endemic, and least abundant, pinniped that breeds in Australia (DoE, 2015a). All current breeding populations are outside of the Environment Sectors, being located from the Abrolhos Islands (Western Australia) to the Pages Islands (South Australia) (Table 3-20, Table 3-19). The Australian sea-lion uses a variety of shoreline types but prefer the more sheltered side of islands and typically avoid rocky exposes coasts

(Shaughnessy, 1999). The Australian sea-lion is considered to be a specialised benthic forager; i.e. it feeds primarily on the sea floor (DSEWPaC, 2013b). The Australian sea-lion feeds on the continental shelf, most commonly in depths of 20–100 m, with adult males foraging further and into deeper waters (DSEWPaC, 2013b). They typically forage up to 60 km from their colony but can travel up to 190 km when over shelf waters (Shaughnessy, 1999).

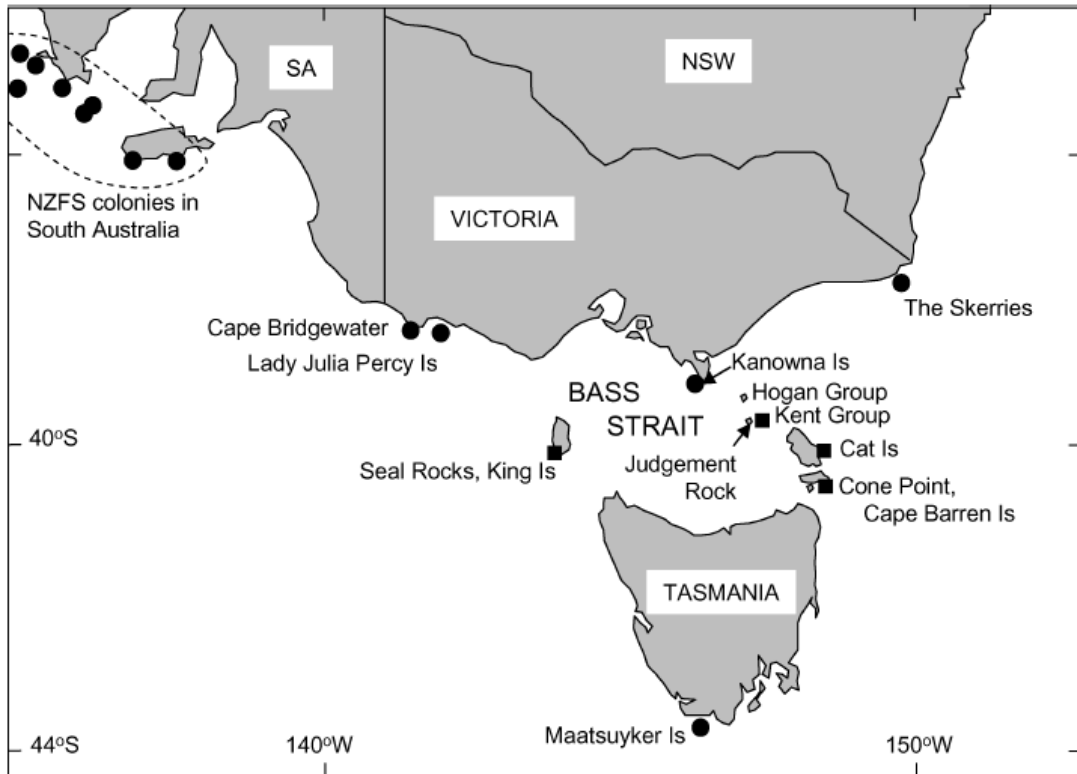
Southern elephant seals are the largest of all seals and have a nearly circumpolar distribution. Main breeding colonies in Australian waters are located outside of the define Environment Sectors at Heard and Macquarie Islands; however occasional pupping has been recorded on Maatsuyker Island, off the southern Tasmanian coast (Table 3-19) (Shaughnessy, 1999). Southern elephant seals spend most of their lives at sea and prefer to haul-out on gently sloping sandy and cobblestone beaches (but will also utilise sea ice, snow and rocky terraces) (TSSC, 2016h).

During site specific habitat surveys of BMG subsea infrastructure within the BMG field (Ierodiaconou et al 2020), Australian fur-seals (*Arctocephalus pusillus doriferus*) were observed actively foraging along flowline infrastructure. Fur seals are also frequently reported by vessel crews during offshore projects in both the Otway and Gippsland Regions. Marine mammals observed during Cooper Energy activities are reported to the Australian Marine Mammal Centre.

Australian fur-seal populations are in a phase of slow recovery following near-extinction after commercial sealing during 18th and 19th centuries (Shaughnessy, 1999), with current populations thought to be <60% of estimated pre-exploitation levels (Arnould et al., 2015). All but one of the known 20 breeding colonies (total number quoted in McIntosh, 2018) occur on islands within Bass Strait, characterised by a shallow continental shelf region with a relatively uniform bathymetry (average depth 60 m) with few features and is considered to be a region of low primary productivity (Arnould et al., 2015). The Australian Fur-seal is considered to be ICUN “Lower Risk, conservation dependent” species due to the cessation of a “habitat specific conservation program” which due to the species’ slow recovery rate could lead to it becoming Threatened if disturbance of breeding sites during the breeding season is ongoing (Shaughnessy, 1999). Critical habitat for Australian seals comprises breeding colonies of the terrestrially breeding species in Australian mainland waters (Shaughnessy, 1999) The largest breeding colonies are at Lady Julia Percy Island and Seal Rocks in Victoria (McIntosh, 2018).

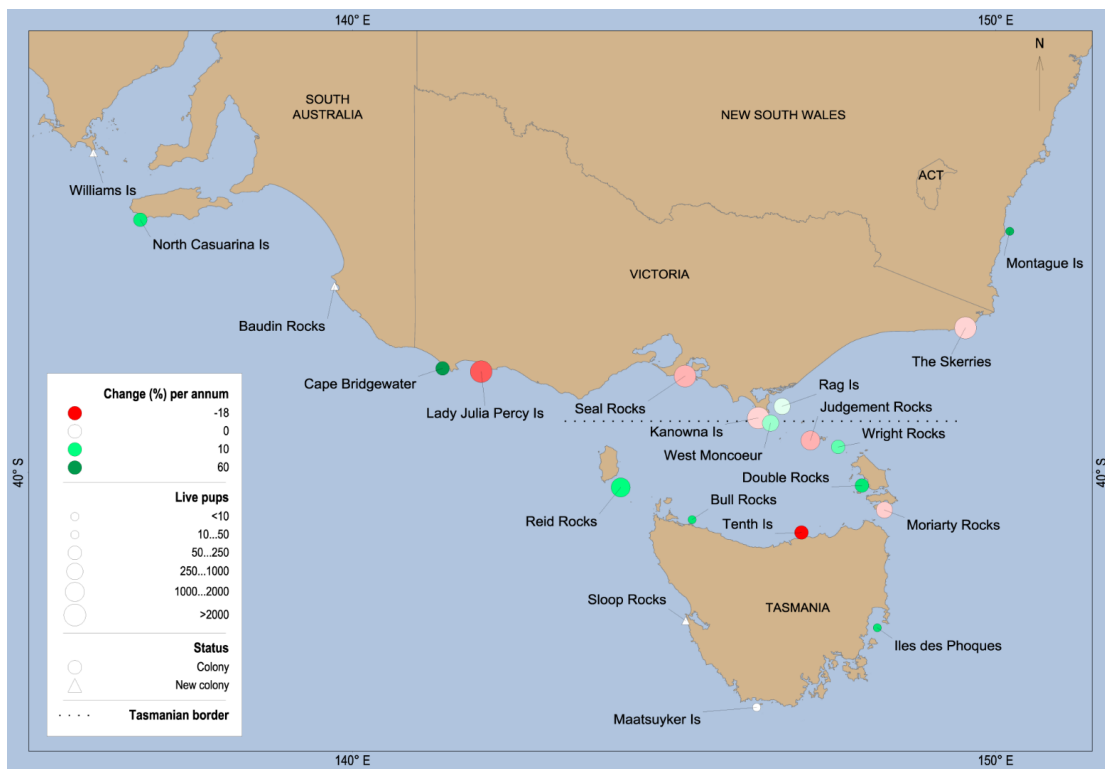
Table 3-19: Known breeding locations (within the Environment Sectors) for Pinnipeds

Species	Location	Pupping Season
New Zealand Fur-seal	Remote islands off southern coast of Tasmania; the largest breeding colonies occur at Flat Witch, Maatsuyker and Tasman Islands. Kanowna Island, Lady Julia Percy Island, The Skerries and Cape Bridgewater off the Victorian coast	Nov–Jan
Australian Fur-seal	There are 20 breeding colonies, all located at islands within Bass Strait; the largest colonies occurring at Lady Julia Percy Island and Seal Rocks off the Victorian coast (McIntosh, 2018).	Oct–Dec
Australian Sea-lion	None identified	Asynchronous
Elephant Seal	Occasional pupping has been recorded on islands off the southern coast of Tasmania (Maatsuyker Island).	Sep–Nov



(Source: Kirkwood et al., 2009)

Figure 3-34: Historic (■) and current (●) breeding colonies for the New Zealand Fur-seal



(Source: McIntosh et al, 2018)

Figure 3-35: Range of the Australian fur seal with change (%) per annum between the 2007 census and the 2013 census

3.14.2 Whales

3.14.2.1.1 Southern right whale

Southern right whales generally occur along the southern coast of Australia, and can occur as far north as Exmouth (Western Australia) and Hervey Bay (Queensland); they typically occur within two kilometres of the coast and group together in aggregation areas (Figure 3-40) (DCCEEW 2022). Known reproductive grounds in the south-east region are Warrnambool, Port Fairy, Port Campbell and Portland in Victoria, and Encounter Bay in South Australia (DCCEEW 2022). The (draft) recovery plan for southern right whales indicates there are 10 reproductive BIAs (includes mating, calving and nursing) regularly used by female southern right whales in Australia, two of which are within the south-east region (DCCEEW 2022). The Victorian reproductive BIA runs between Portland and Port Campbell and one South Australia reproductive BIA is located within Encounter Bay. Further, all reproductive BIAs for the southern right whale have been defined as habitat critical to the survival of the species as these areas are essential to the species recovery due to the strong site fidelity exhibited by females (DCCEEW 2022). Nursery grounds are occupied from May to October and appear to be exclusively coastal, with female-calf pairs generally staying in the area for two to three months (DSEWPaC, 2012d; Charlton, 2017). Female southern right whales show strong site fidelity to breeding locations, typically returning to the same location to give birth (DCCEEW 2022). Calving itself usually occurs in very shallow (<10 m 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 Southern Right Whales is largely unknown but is known to include directly southern and western migration pathways (Burnell, 2001; Mackay et al., 2015). BIAs for the southern right whale, for migration and reproduction, exists within southern Australian waters (Figure 3-44).

There is the potential for southern right whales to be transiting through the area offshore Victoria during May-June and September-October as they move to and from coastal reproduction areas. Occasionally entry to coastal waters happens as early as April and exit as late as November (DCCEEW 2022). Very few southern right whales move through the Gippsland region, movements tend towards western aggregation areas in the Otway and south coast.

A sighting of two southern right whales was reported during Cooper Energy projects in the Otway region in 2018. Sighting cues were body and blow. The sighting was in April, which may seem unusually early for southern right whale occurrence in the region, though is not unprecedented; the ALA reports eight southern right whale sightings in April between 2000 and 2019. Whales observed during Cooper Energy activities were reported to the Australian Marine Mammal Centre.

3.14.2.1.2 Humpback whale

Humpback whales have a near global distribution, migrating annually between high latitude feeding areas and low latitude breeding and calving areas; the Australian migration period is from May to November each year (Figure 3-41) (TSSC, 2015k). Peak migration time occurs between June and July each year (northern migration); there has been no such peak observed during the southern migration (Figure 3-41) (TSSC, 2015k). Predominantly humpback whales migrate within 50 km of the coast of mainland Australia (TSSC, 2015k). There are some narrow corridors along the migration pathways where the whale population passes within 30 km of the coast, including east of Moreton Island (Queensland) and Cape Byron (New South Wales). Known calving areas for Humpback Whales within the Environment Sectors are within the Great Barrier Reef area (approximately 14–27°S), and less frequently, along the migratory pathways (TSSC, 2015k). Predictive habitat modelling has identified two core areas for calving: the region east of Mackay, and the Capricorn and Bunker Island groups off Gladstone (Figure 3-41) (TSSC, 2015k). After breeding and calving during the winter months, the humpback whales migrate south. Resting areas are used by cow-calf pairs and attendant males during this southern migration; locations include Hervey Bay and Moreton Bay (Queensland), and Twofold Bay and Jervis Bay (New South Wales) (Figure 3-41, Figure 3-42). A BIA for the humpback whale, for migration and breeding, has been identified along the east coast of Australia (Figure 3-45). Humpback whales in the southern Hemisphere primarily feed on Antarctic krill (*Euphausia superba*) (TSSC, 2015k). 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 New South Wales, and east coast of Tasmania (TSSC, 2015k).

Humpback whales have been sighted during Cooper Energy projects in the Gippsland region, including multiple sightings 2018, 2019 and 2023. Many of the sightings were of whales moving in close proximity to vessels. Over the course of a 33-day period of in-field and in-transit activities in 2023 in the Gippsland, there were approximately 435 whales sighted by marine mammal observers on board the work vessel (Figure 3-36). Sightings were primarily

of humpback whales undertaking their southerly migration, including mothers and calves. Whales were observed at distances between 0.05 km and 6.2 km from the vessel. Behaviours observed include fast and slow travel, milling and surface active (e.g. fin slapping and breaching), with the majority being surface active and slow travel within 3km of the vessel (Figure 3-37). Sightings were reported to the Australian Marine Mammal Centre.

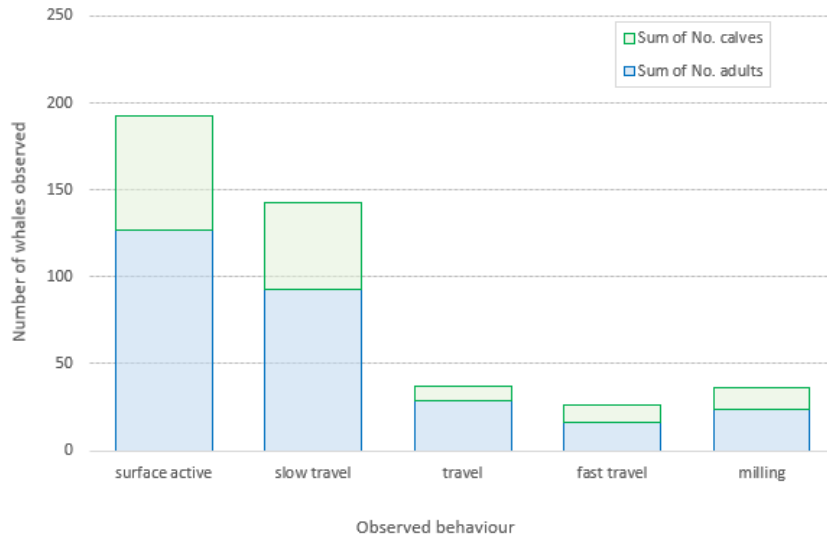


Figure 3-36: Whale observations (behaviour). Cooper Energy vessel based IMR activity. Gippsland 2023.

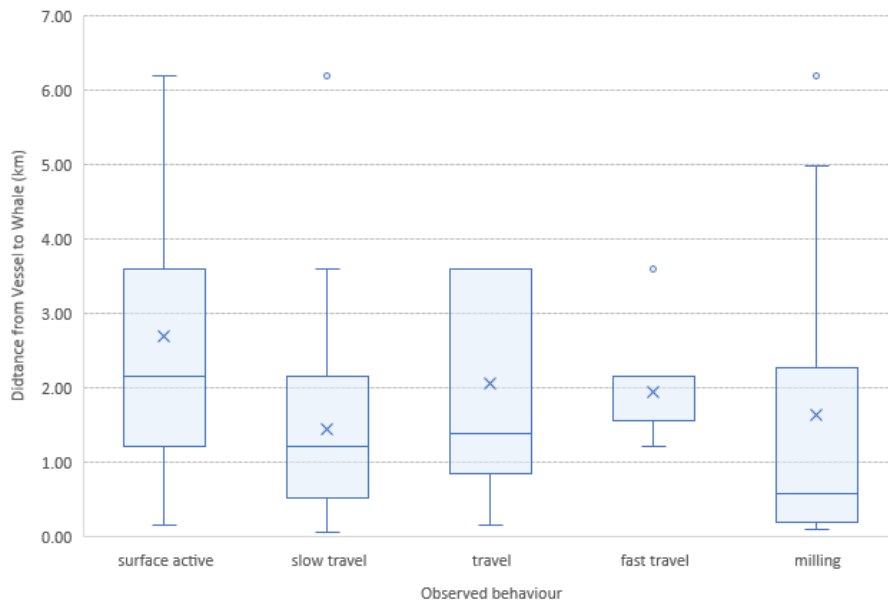


Figure 3-37: Whale observations (behaviour with distance from vessel). Cooper Energy vessel based IMR activity. Gippsland 2023.

3.14.2.1.3 Blue whale

There are two subspecies of blue whale that occur within Australian waters: Antarctic blue whale and the pygmy blue whale. There are populations of pygmy blue whale that are known to visit Australian waters; Indo-Australian (IA) pygmy blue whales occupying or passing through waters from Indonesia to western and southern Australia, and the Tasman-Pacific pygmy blue whale occupying or passing through waters in south east Australia and the Pacific (DoE 2015d). Blue whales have the highest known prey requirements, consuming up to two tonnes of krill per day (DoE, 2015d). Blue whale sightings in Australia are widespread, and much of the shelf and coastal waters are unlikely to hold significance for this species with the exception of some foraging locations. Australia has two known seasonal feeding aggregations of pygmy blue whales; one occurs adjacent to the Bonney Upwelling system off South Australia and Victoria (Figure 3-43).

The IA Pygmy blue whale population shows three migratory stages around Australia, a “southbound migratory stage” where whales travel southwards from Indonesian waters down the WA coast, mostly over October to December but possibly into January of the following year, a protracted “southern Australian stage” (January to June) where animals spread across southern waters of the Indian Ocean and south of Australia, then a northbound migratory stage (April to August) where whales meander north back to Indonesia again (McCauley et al., 2018).

Pygmy blue whale (TP blue whale population) are identified as possibly exhibiting foraging behaviours within the Gippsland Environmental Sector (Figure 3-46). The pygmy blue whale possible foraging BIA has been identified where evidence for feeding is based on limited direct observations or through indirect evidence, such as occurrence of krill in close proximity of whales, or satellite tagged whales showing circling tracks. Blue whales travel through on a seasonal basis, possibly as part of their migratory route (Commonwealth of Australia, 2015c). Blue whale feeding grounds are typically in areas of high primary productivity that can support sufficient densities of krill, such as oceanographic upwelling or frontal systems (DoE, 2015d). Typically, blue whale migrate between breeding grounds (low latitudes) where mating and calving take place in the winter, to feeding grounds (high latitudes) where foraging occurs in the summer.

IA Pygmy blue whale typically forage off eastern South Australia and Victoria (e.g. between Robe, SA and Cape Otway, Vic) between January and April (DoE, 2015d), with some studies suggesting foraging could occur for an extended season of November to May (Gill et al., 2002; Gill et al., 2011). The abundance of whales in the area varies within and between seasons and is closely in-sync with the strength of the Bonney Upwelling (DoE, 2015d., Gill et al., 2011, McCauley et al., 2018). This has been confirmed by ongoing studies from 2002-2011, which conclude that blue whales are twice as likely to be found to the west of Portland (Western side of the Bass strait) than to its east (Gill, 2011). Blue whale presence in the Bonney Upwelling is associated with several seascape variables, but with sea surface temperature appearing to play a major role (Gill et al., 2011). Prey availability is also key, with krill likely responding to prevailing environmental conditions from previous seasons (Szesciorka et al., 2020). This makes upwelling events and subsequent foraging presence difficult to predict.

Outside of these main feeding areas, foraging areas for pygmy blue whale include the Bass Strait, and diving and presumably feeding at depth off the west coast of Tasmania (DoE, 2015d). There is a paucity of data to support predictions of presence in these areas adjacent to the key feeding grounds of the Bonney Upwelling, and even less data available for waters in the Gippsland region. Three groups of blue whale - Eastern Indian Ocean pygmy blue, South West Pacific Ocean pygmy blue, and Antarctic blue, have been recorded acoustically in the Bass Strait (McCauley et al. 2018), with scientists now considering the Bass Strait to be the boundary between the East Indian Ocean and South West Pacific Ocean populations. No East Indian Ocean pygmy blues have been recorded on Australia's east coast (Balcazar et al. 2015) or in New Zealand, where South West Pacific Ocean pygmy blue gather to forage in the South Taranaki Bight west of Cook Strait (Barlow et al. 2018).

The unique song of TP pygmy blue whales feeding in New Zealand predominates in the western South Pacific (Balcazar et al., 2015; Barlow et al., 2018). New Zealand subpopulations of pygmy blue whale are typically found in New Zealand waters year round, with studies indicating that individuals do not move far from feeding grounds in the South Taranaki Bight (Barlow et al., 2020).

Sightings of NZ pygmy blue whale have been recorded in the SE region, and Antarctic blue whale have been recorded on noise loggers. It is possible that Antarctic blue whales and TP pygmy blue whales may be present within the Gippsland offshore region. Based on current knowledge of patterns of behaviour elsewhere, it can be assumed that if blue whale are sighted, they are most likely foraging (Peter Gill pers comms July 2021).

Sightings of blue whales in the Gippsland region have been reported recently in June 2020 (2 sightings, CGG pers comms), and historically, individual sightings in October and November (ALA database)). The ALA holds <10 sightings records since the 1970's, though based on historical catch data (Cwth Australia 2015), the low sightings may in part be a function of lower levels of monitoring compared to the Otway. Contemporary acoustic recording of blue whales in the region are considered to be more reliable than historic sightings; based on their migration patterns (as described above), and acoustic detection of both TP and Antarctic blue whale populations within the Bass Strait (McCauley et al., 2018), blue whales may be more likely to be moving through the region in April, May and June; outside of this time period, presence is very unlikely. April and June are considered shoulder times given detections of both Antarctic Blues and TP pygmy in central Bass Strait blues between April-June followed by detections of whales moving north, off mid NSW and Tonga from June/July (Balthaer et al. 2015) (Figure 3-38). McCauley et al. (2018) indicates that in some years there is evidence physical mechanisms drive productive water into the Bass Strait over April to May inferring this period as being potentially favourable for foraging in the region.

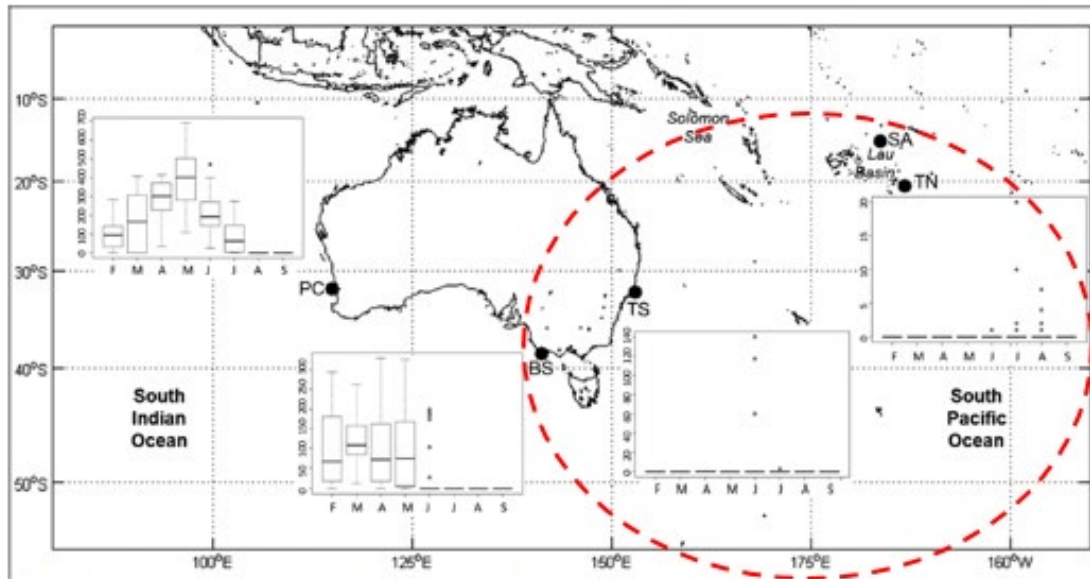


Fig. 2.—Box plots represent the median (with 0.25 and 0.75 quantile) number of calls detected per month (February to September) for AUSB at the PC = Perth Canyon and BS = Bass Strait and NZB at the TS = Tasman Sea and TN = Tonga. No AUSB or NZB whale calls were detected off SA = Samoa. Bars indicate maximum and minimum values and outliers are plotted as individual points.

Figure 3-38: Acoustic detections of blue whale populations in the Indian ocean and Pacific ocean (Balcazar et al. 2015).

However, studies published in 2023, and which review in detail the existing records base, indicate that these recent historical records of TP Pygmy blue whales in the Gippsland are considered to be vagrant individuals from the NZ pygmy blue whale population. Sightings of Antarctic blues are expected to be of those on migration to/from breeding grounds at lower latitudes (Barlow et al., 2023). Overall numbers of blue whales are expected to be low in the Gippsland region at any time of year, with the Gippsland being outside of predominant feeding grounds for any population of blue whales (Figure 3-39).

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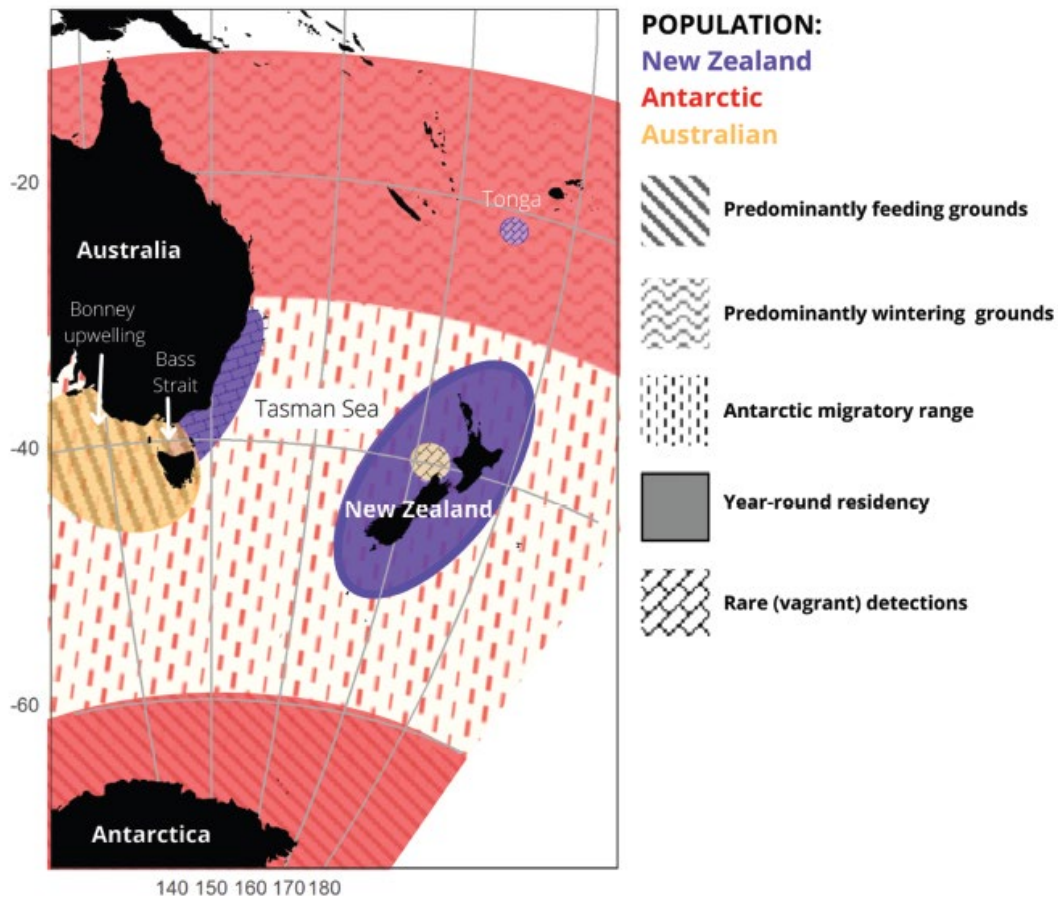


Figure 3-39: Conceptual map illustrating the current understanding of the approximate typical range of each blue whale population (Barlow et al., 2023).

3.14.2.1.4 Sei whale

Sei whales have been infrequently recorded in Australian waters; however occasional sightings have been recorded off Tasmania, New South Wales, Queensland and within the Great Australian Bight (DEE, 2017s). Sei whales typically feed between the Antarctic and Subtropical convergences, and their diet is planktonic crustacea, in particular copepods and amphipods (DEE, 2017s). However, sei whales 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 (DEE, 2017s).

3.14.2.1.5 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) (DEE, 2017t). Fin whales frequently lunge or skim feed, at or near the surface, feeding on planktonic crustacea, some fish and cephalopods (DEE, 2017t). 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 (DEE, 2017t). Fin whales have also been detected acoustically south of Portland, Victoria (Erbe et al., 2016).

3.14.2.1.6 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 (DEE, 2017u). Areas of coastal upwelling events appear to be an important component regulating pygmy right whale distribution. Pygmy right whales have primarily been recorded in areas associated with upwellings and with high zooplankton abundance, particularly copepods and small euphausiids which

constitute their main prey (DEE, 2017u). 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 (DEE, 2017u).

3.14.3 Dolphins

The Indo-Pacific humpback dolphin is found in coastal and estuarine waters of Queensland and New South Wales. Species have been recorded in the Great Sandy Strait, and Moreton Bay (Queensland), and further south to Cabarita Beach (northern New South Wales) (DSEWPaC, 2012e). They inhabit a variety of inshore (<20 m water depth) habitats including, inshore reefs, tidal and dredged channels, mangroves and river mouths. It is a generalist feeder, preying on bottom-dwelling and pelagic fish and cephalopods (DSEWPaC, 2012e). A BIA for both foraging and breeding has been identified in Queensland waters (Figure 3-47).

The Indian Ocean bottlenose dolphin is distributed continuously around Australia (DEE, 2017v). The Indian Ocean bottlenose dolphin occurs mainly in riverine and shallow coastal waters (on the shelf or around oceanic islands) (DSEWPaC, 2012e). Known populations include Jervis Bay, Twofold Bay, and Port Phillip Bay (New South Wales), and Moreton Bay and Hervey Bay (Queensland) (DSEWPaC, 2012e). Calving peaks occur in spring and summer or spring and autumn (DEE, 2017v). Gestation lasts approximately 12 months, so peak mating period coincides with peak calving period in each location (DEE, 2017v). A BIA for both breeding has been identified within Queensland and New South Wales coastal waters (Figure 3-48).

A new species of dolphin, the Burrunan dolphin, has been identified and is considered endemic to south-eastern Australian waters (Charlton-Robb *et al.*, 2011). The current distribution of the Burrunan dolphin ranges from South Australia, east to Victoria and south to Tasmania (Charlton-Robb *et al.*, 2011). Resident populations have been found in Port Phillip Bay (approx. 90 animals) and Gippsland Lakes (approx. 50 animals) (Charlton-Robb *et al.*, 2011). A tentative sighting of a Burrunan dolphin was recorded during vessel transit for a Cooper Energy project in September 2018 off Bullock Island Quay, Lakes Entrance. The sighting was reported to the Australian Marine Mammal Centre. This dolphin species does not yet appear in the DEE Species Profile and Threats Database (or consequently the Protected Matters Search tool) but has been added to the species listed within Table 3-20. In May 2013 the Burrunan dolphin was listed as threatened under Victoria's Flora and Fauna Guarantee Act 1988.

Table 3-20: Marine Mammal Species or Species Habitat that may occur within the Environment Sectors

		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Pinnipeds															
<i>Arctocephalus forsteri</i>	New Zealand Fur-seal			✓			MO	MO	MO	BKO	MO	MO			
<i>Arctocephalus pusillus</i>	Australian Fur-seal			✓			BKO	BKO	MO	MO	MO	MO			
<i>Neophoca cinerea</i>	Australian Sea-lion	V		✓	*	[1]	KO								
<i>Mirounga leonina</i>	Southern Elephant Seal	V		✓		[2]				BMO					
Sirenians															
<i>Dugong dugon</i>	Dugong		✓	✓								MO	KO		
Whales and other cetaceans															
Whales															
<i>Balaenoptera acutorostrata</i>	Minke Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Balaenoptera bonaerensis</i>	Antarctic Minke Whale		✓				LO		LO	LO	LO	LO	LO	LO	LO
<i>Balaenoptera borealis</i>	Sei Whale	V	✓			[3]	FKO	FLO	FLO	FLO	FLO	FLO	FLO	LO	LO
<i>Balaenoptera edeni</i>	Bryde's Whale		✓				MO	MO	MO		MO	LO	LO	LO	LO
<i>Balaenoptera musculus</i>	Blue Whale	E	✓		*	[4]	FKO _{d,f} *	FKO ^{*f}	LO ^{*f}	LO ^{*f}	LO ^{*f}	MO	MO	MO	MO

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		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Balaenoptera physalus</i>	Fin Whale	V	✓			[5]	FKO	FLO	FLO	FLO	FLO	FLO	FLO	LO	LO
<i>Berardius arnuxii</i>	Arnoux's Beaked Whale						MO	MO	MO	MO	MO	MO			MO
<i>Caperea marginata</i>	Pygmy Right Whale		✓				FLO	FMO	FLO	FMO	FMO	FLO			
<i>Eubalaena australis</i>	Southern Right Whale	E	✓		*	[6] [9]	BKO* ^{m, a, cr, r}	KO* ^{m, c}	KO* ^m	KO* ^c	KO* ^{b, c}	KO	LO	MO	MO
<i>Feresa attenuata</i>	Pygmy Killer Whale											MO			
<i>Globicephala macrorhynchus</i>	Short-finned Pilot Whale						MO	MO	MO	MO		MO	MO	MO	MO
<i>Globicephala melas</i>	Long-finned Pilot Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Hyperoodon planifrons</i>	Southern Bottlenose Whale						MO		MO	MO	MO	MO	MO		
<i>Koogia breviceps</i>	Pygmy Sperm Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Koogia simus</i>	Dwarf Sperm Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Megaptera novaeangliae</i>	Humpback Whale		✓		*	[7,8]	KO	KO	KO* ^f	KO	FKO	KO* ^{f, m}	BKO* ^{f, m, r}	MO	MO
<i>Mesoplodon bowdoini</i>	Andrew's Beaked Whale						MO	MO	MO	MO	MO	MO		MO	MO
<i>Mesoplodon densirostris</i>	Blainville's Beaked Whale						MO		MO	MO	MO	MO	MO	MO	MO
<i>Mesoplodon ginkgodens</i>	Ginkgo-toothed Beaked Whale								MO			MO	MO		MO

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		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Mesoplodon grayi</i>	Gray's Beaked Whale						MO		MO	MO	MO	MO	MO	MO	MO
<i>Mesoplodon hectori</i>	Hector's Beaked Whale						MO	MO	MO	MO	MO	MO			
<i>Mesoplodon layardii</i>	Strap-toothed Beaked Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Mesoplodon mirus</i>	True's Beaked Whale						MO	MO	MO	MO	MO	MO		MO	MO
<i>Peponocephala electra</i>	Melon-headed Whale											MO	MO	MO	MO
<i>Physeter macrocephalus</i>	Sperm Whale		✓				MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Tasmacetus shepherdi</i>	Shepherd's Beaked Whale						MO		MO	MO	MO	MO			
<i>Ziphius cavirostris</i>	Cuvier's Beaked Whale						MO	MO	MO	MO	MO	MO	MO	MO	MO
Dolphins															
<i>Delphinus delphis</i>	Common Dolphin						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Feresa attenuata</i>	Pygmy Killer Whale											MO	MO	MO	MO
<i>Grampus griseus</i>	Risso's Dolphin						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Lagenodelphis hosei</i>	Fraser's Dolphin												MO		MO
<i>Lagenorhynchus cruciger</i>	Hourglass Dolphin									MO	MO				
<i>Lagenorhynchus obscurus</i>	Dusky Dolphin		✓				LO	MO	LO	LO	LO	LO			

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		Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>Lissodelphiss peronii</i>	Southern Right Whale Dolphin						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Orcaella brevirostris</i>	Irrawaddy Dolphin		✓										KO		
<i>Orcinus orca</i>	Killer Whale		✓				LO	LO	LO	LO	LO	LO	MO	MO	MO
<i>Pseudorca crassidens</i>	False Killer Whale						LO	MO	LO	LO	LO	LO	LO	LO	LO
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin		✓		*							LO	BKO ^{*b,f}		
<i>Stenella attenuata</i>	Spotted Dolphin											MO	MO	MO	MO
<i>Stenella coeruleoalba</i>	Striped Dolphin											MO	MO	MO	MO
<i>Stenella longirostris</i>	Long-snouted Spinner Dolphin											MO	MO	MO	MO
<i>Steno bredanensis</i>	Rough-toothed Dolphin											MO	MO	MO	MO
<i>Tursiops aduncus</i>	Indian Ocean Bottlenose Dolphin				*		LO	LO	LO ^{*b}			LO ^{*b,f}	LO ^{*b}		
<i>Tursiops australis sp. nov.</i> ¹	Burrnunan Dolphin ¹							KO ¹	KO ¹						MO
<i>Tursiops truncatus s. str.</i>	Bottlenose Dolphin						MO	MO	MO	MO	MO	MO	MO	MO	MO
<i>Phocoena dioptrica</i>	Spectacled Porpoise		✓							MO	MO				
<u>Threatened Species:</u> V Vulnerable	<u>Type of Presence:</u> MO Species of species habitat may occur within area LO Species or species habitat likely to occur within area					<u>Plan Reference:</u> [1] Recovery Plan for the Australian Sea Lion (<i>Neophoca cinerea</i>) (DSEWPaC, 2013b)									

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	Threatened Species	Migratory Species	Listed Marine Species	BIA	Conservation/ Recovery Plan	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
<i>E Endangered</i>	KO	Species of species habitat known to occur within area			[2]	Approved Conservation Advice for <i>Mirounga leonine</i> (Southern Elephant Seal) (TSSC, 2016h)								
<i>Biologically Important Area</i>	FLO	Foraging, feeding or related behaviour likely to occur within area			[3]	Approved Conservation Advice for <i>Balaenoptera borealis</i> (Sei Whale) (TSSC, 2015l)								
* BIA Present	FKO	Foraging, feeding or related behaviour known to occur within area			[4]	Conservation Management Plan for the Blue Whale, 2015-2025 (DoE, 2015d)								
A Aggregation	BMO	Breeding may occur within area			[5]	Approved Conservation Advice for <i>Balaenoptera physalus</i> (Fin Whale) (TSSC, 2015m)								
B Reproduction	BKO	Breeding known to occur within area			[6]	Conservation Management Plan for the Southern Right Whale, 2011-2021 (DSEWPaC, 2012d)								
C Connecting habitat					[7]	Approved Conservation Advice for <i>Megaptera novaeangliae</i> (Humpback Whale) (TSSC, 2015k)								
F Foraging					[8]	Listing Advice for <i>Megaptera novaeangliae</i> (Humpback Whale) (TSSC, 2022)								
M Migration					[9]	Draft National Recovery Plan for the Southern Right Whale (DCCEEW, 2022)								
R Resting														
Cr														
Connecting range														

Note: 1. Burrunan Dolphin is not included in the DEE Species Profile and Threats Database; and has been manually added to this table of results. Distribution of the dolphin has been identified from Charlton-Robb et al. 2011.

Table 3-21: Marine Mammal threatened species management advice relevant to petroleum activities under this EP

Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under tis EP
Pinnipeds			

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Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under tis EP
<ul style="list-style-type: none"> Australian Sea-lion 	Recovery Plan for the Australian Sea Lion (<i>Neophoca cinerea</i>) (DSEWPaC, 2013b)	<ul style="list-style-type: none"> Marine debris Pollution and oil spills 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to pinnipeds and, if required, appropriate mitigation measures are implemented Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Southern Elephant Seal 	Approved Conservation Advice for <i>Mirounga leonine</i> (Southern Elephant Seal) (TSSC, 2016h)	<ul style="list-style-type: none"> Pollution (including marine debris) 	<ul style="list-style-type: none"> Marine pollution: Evaluate risk of oil spill impact to pinnipeds and, if required, appropriate mitigation measures are implemented Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented
Whales and other Cetaceans			
<ul style="list-style-type: none"> Sei Whale 	Approved Conservation Advice for <i>Balaenoptera borealis</i> (Sei Whale) (TSSC, 2015i)	<ul style="list-style-type: none"> Anthropogenic noise and acoustic disturbance Habitat degradation including pollution Pollution (persistent toxic pollutants) Vessel strike 	<ul style="list-style-type: none"> Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Blue Whale 	Conservation Management Plan for the Blue Whale, 2015-2025 (DoE, 2015d)	<ul style="list-style-type: none"> Noise interference Habitat modification from marine debris or chemical discharge Vessel strike 	<ul style="list-style-type: none"> Noise interference: Evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures are implemented Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Fin Whale 	Approved Conservation Advice for <i>Balaenoptera physalus</i> (Fin Whale) (TSSC, 2015m)	<ul style="list-style-type: none"> Anthropogenic noise and acoustic disturbance Pollution (persistent toxic pollutants) Vessel strike 	<ul style="list-style-type: none"> Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented

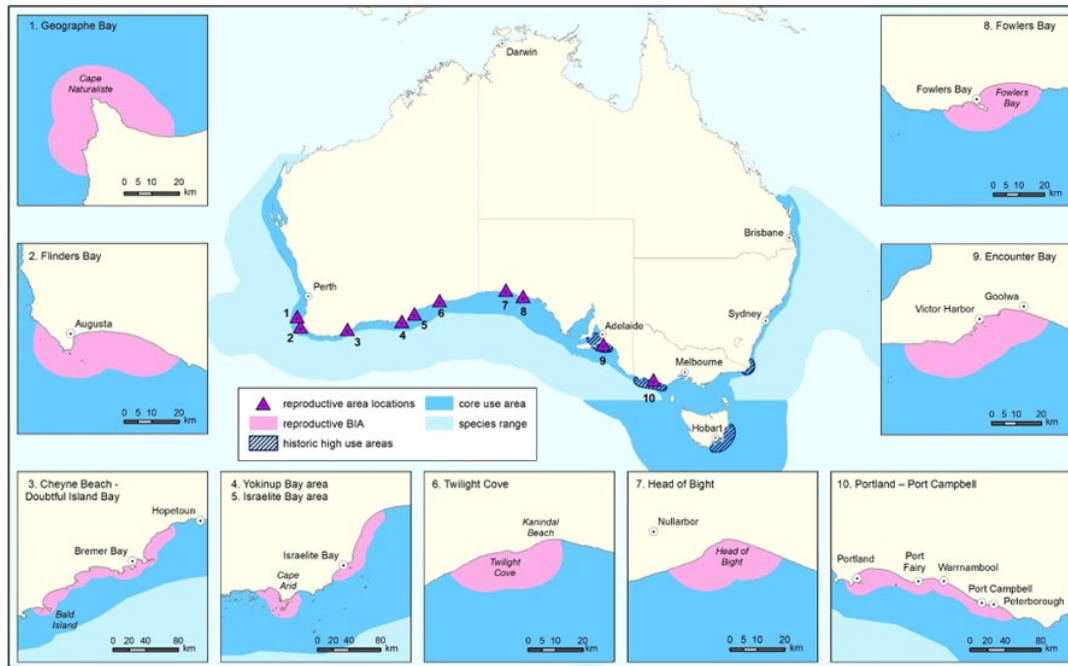
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Species	Conservation Advice / Recovery Plan	Key Threats relevant to Petroleum Activities	Management Actions relevant to activities under tis EP
<ul style="list-style-type: none"> Southern Right Whale 	<p>Conservation Management Plan for the Southern Right Whale, 2011-2021 (DSEWPaC. 2012d)</p> <p>Draft National Recovery Plan for the Southern Right Whale (<i>Eubalaena australis</i>) (DCCEEW, 2022)</p>	<ul style="list-style-type: none"> Entanglement Vessel strike Noise Interference Habitat modification Pollution (acute chemical discharge) 	<ul style="list-style-type: none"> Noise interference: Evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures are implemented Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented Marine pollution: Evaluate risk of oil spill impact to cetaceans and, if required, appropriate mitigation measures are implemented
<ul style="list-style-type: none"> Humpback Whale (removed from Threatened species list as of 26 February 2022). 	<p>Listing Advice for <i>Megaptera novaeangliae</i> (Humpback Whale) in effect from 26 February 2022.</p>	<ul style="list-style-type: none"> Noise interference Habitat degradation Entanglement Vessel disturbance and strike 	<p>Current impacts*:</p> <ul style="list-style-type: none"> Noise interference: Evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures are implemented Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented. Marine debris: Evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures are implemented. <p>Current impacts* and future threats:</p> <ul style="list-style-type: none"> Vessel disturbance: Evaluate risk of vessel strikes and, if required, appropriate mitigation measures are implemented. <i>*not threatening or preventing population growth (DAWE 2022).</i>

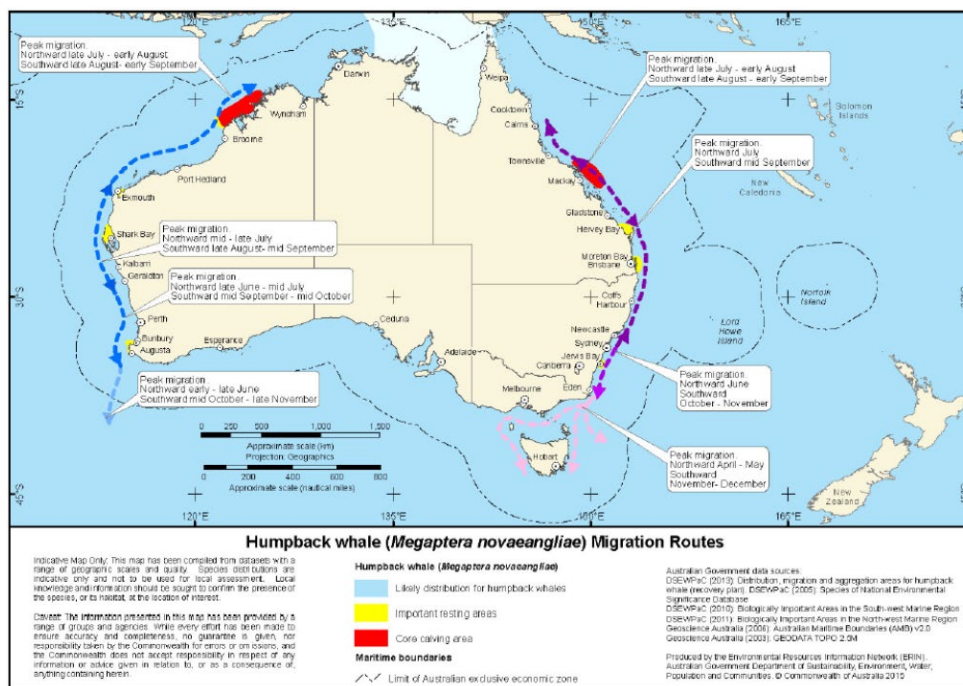
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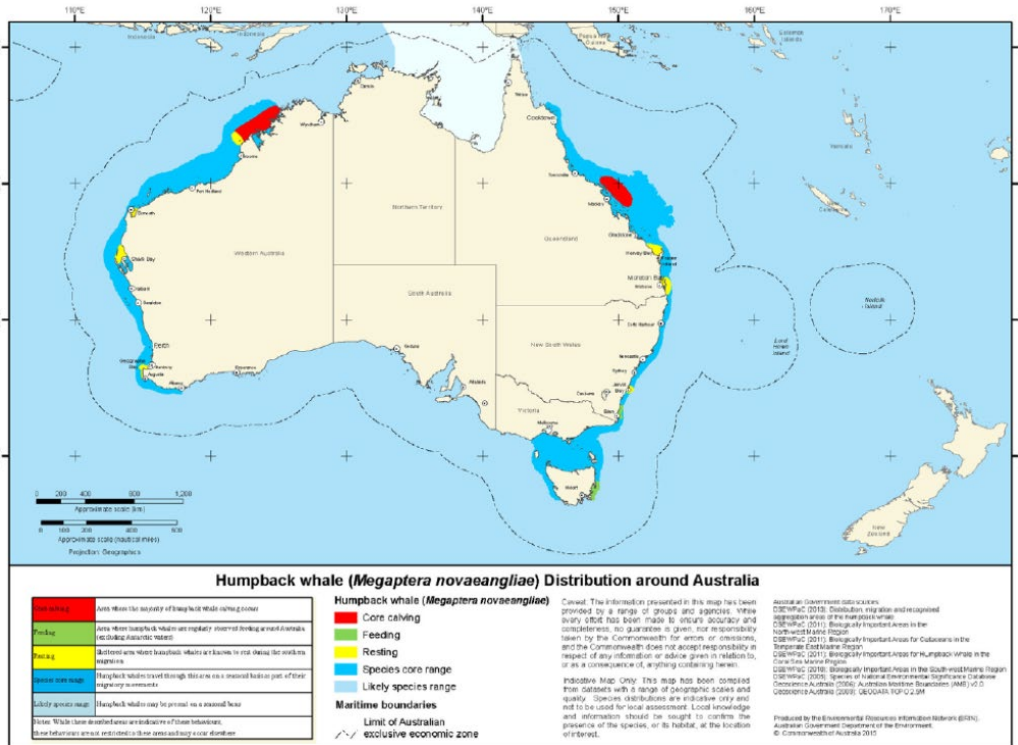
(Source: DCCEEW, 2022)

Figure 3-40: Southern Right Whale reproductive Biologically Important Areas and Habitat Critical to the Survival



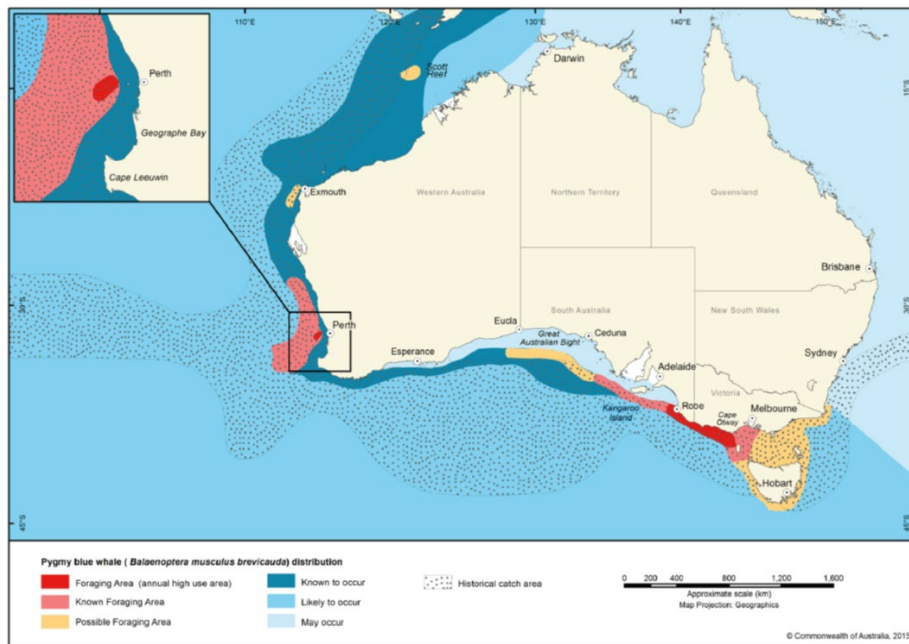
(Source: TSSC, 2015k)

Figure 3-41: Migration routes for Humpback Whales around Australia



(Source: TSSC, 2015k)

Figure 3-42: Distribution of Humpback Whales around Australia



(Source: DoE, 2015d)

Figure 3-43: Distribution and foraging areas for the Pygmy Blue Whale

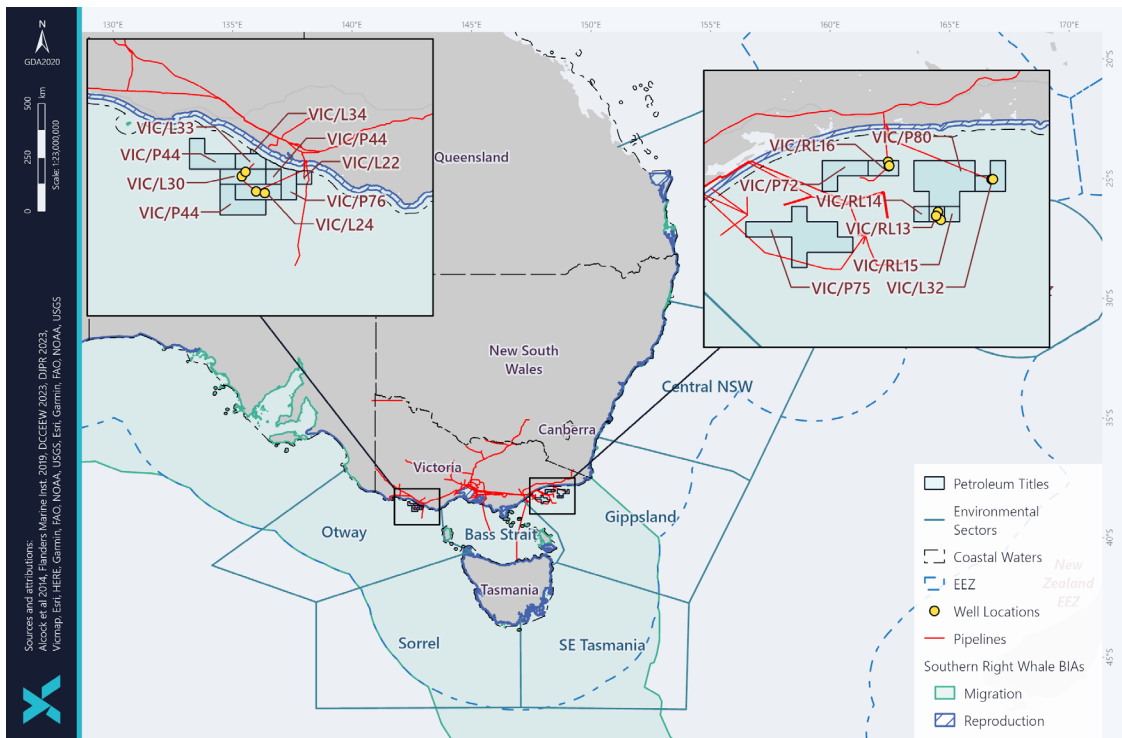


Figure 3-44: BIAs for the Southern Right Whale

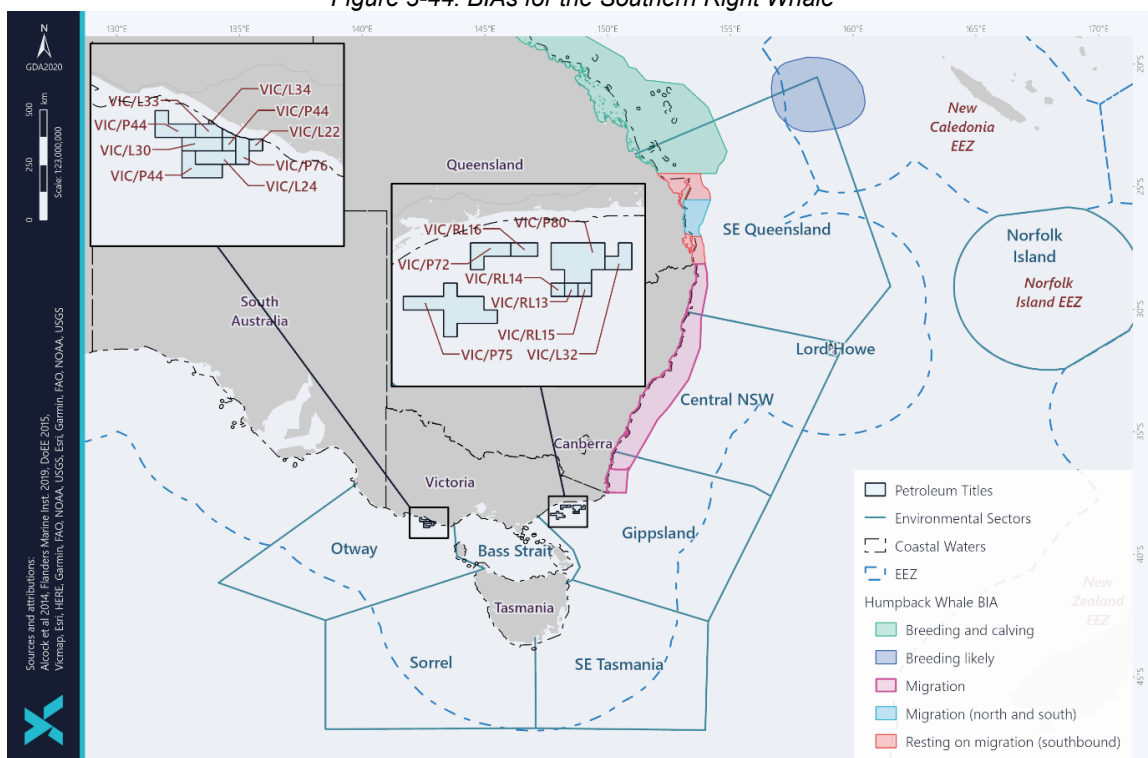


Figure 3-45: BIAs for the Humpback Whale

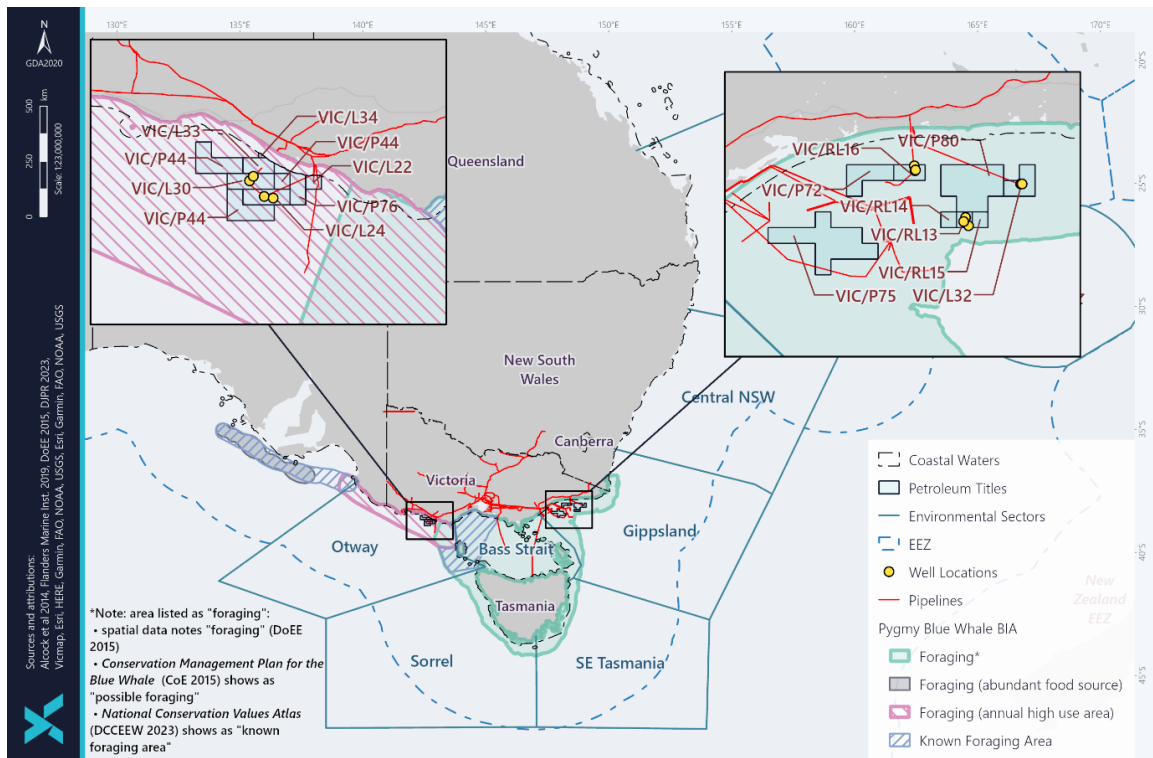


Figure 3-46: BIAs for the Pygmy Blue Whale

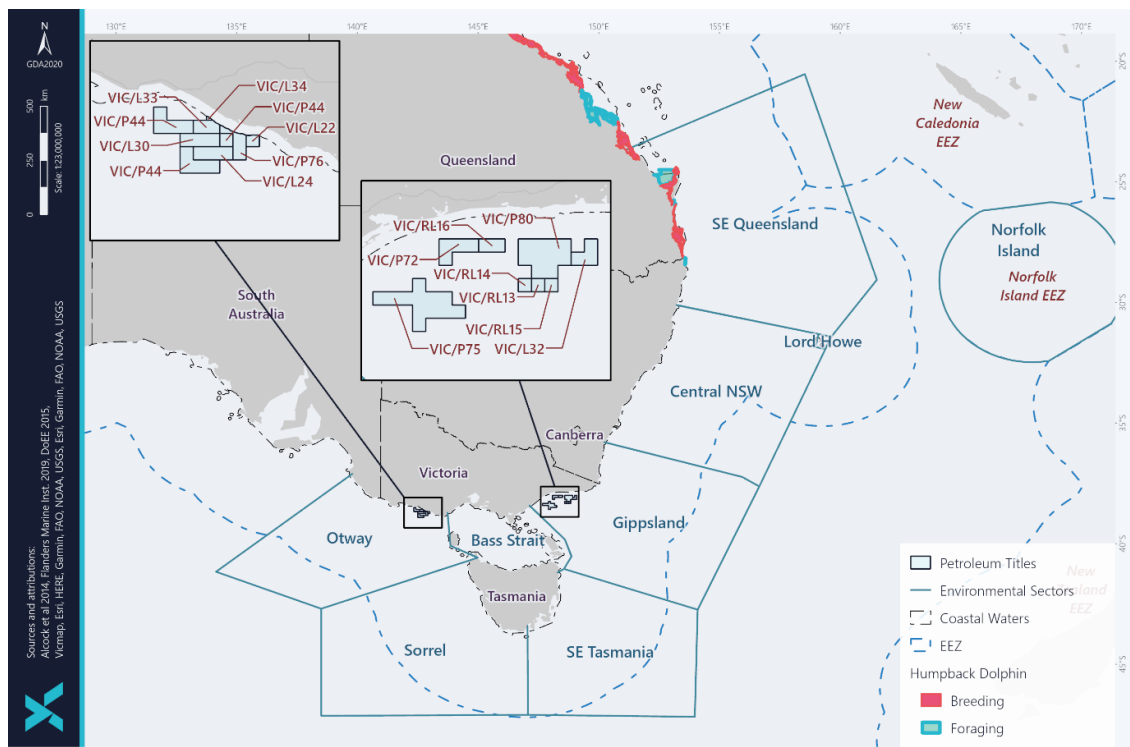


Figure 3-47: BIAs for the Humpback Dolphin

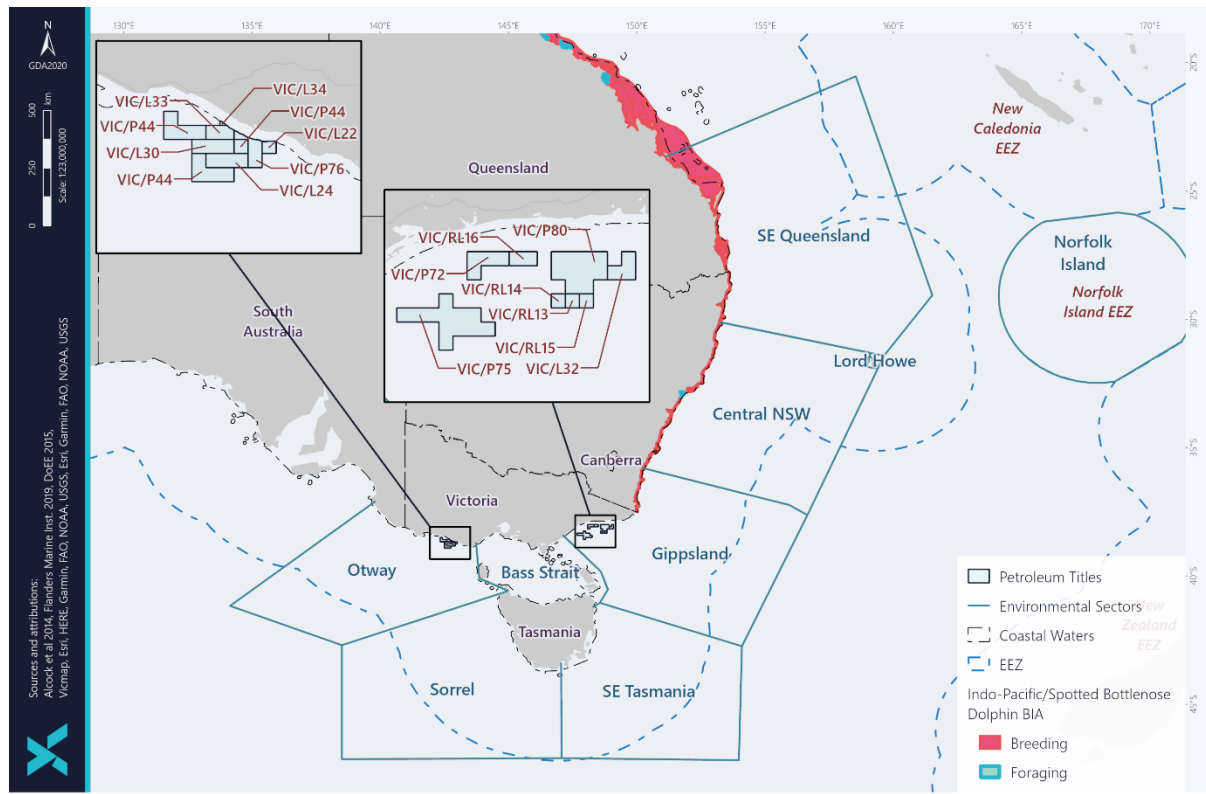


Figure 3-48: BIAs for the Indo-Pacific Humpback Dolphin

3.15 Marine Pests

Estuarine and marine non-native species are typically introduced and spread through coastal waters by vessel movements and, to a lesser extent, the aquarium trade and aquaculture (Clark and Johnston, 2017). Over 250 introduced marine plants and animals have been recorded in Australian waters (DAFF, 2017). Marine pests are non-native plants or animals which can have a detrimental impact on native marine ecosystems. Not all non-native species become pests, but, when they do, they are classified as invasive. Invasive species often occur in high proportions on artificial substrates (Clark and Johnston, 2017).

The Australian Government National Introduced Marine Pest Information System (NIMPIS) provides information on marine pests in Australian Waters (Table 3-22). Two locations identified on NIMPIS are in the same regions as Cooper Energy Operational Areas: Portland (Otway Region), and Melbourne (Gippsland Region). Both have multiple IMS established.

The introduced conical New Zealand screw shell (*Maoricolpus roseus*) are approximately 40 mm long and 14 mm diameter at the base. The density of screw shells on the seabed was highly variable, but they formed dense beds covering 100% of the available seabed in some places. The New Zealand screw shell, which feeds by filtering particles from the water and seabed surface, was the most abundant visible living animal on the seabed at these depths along the pipeline corridor. The New Zealand Screw Shell (*Maoricolpus roseus*) was previously (2018) considered common generally in water depths greater than 40 m along the Sole and PB pipeline corridors, offshore of Marlo in the Gippsland Basin. However recent habitat survey conducted by Ierodiaconou et al. (2020) did not identify invasive species within the vicinity of BMG subsea structure during opportunistic habitat surveys conducted.

Table 3-22 IMS Recorded in Victorian Waters³

Scientific name	Common Name	Gippsland Lakes / surrounds	Corner Inlet / surrounds	Western port	Port Phillip Bay	Apollo Bay	Portland Harbour
<i>Asterias amurensis</i>	Northern Pacific sea star	Y	Y	Previous	Y		
<i>Carcinus maenas</i>	European green shore crab	Y	Y	Y	Y		
<i>Codium fragile (subsp. fragile)</i>	Dead man's fingers	Y		Y	Y		Y
<i>Varicorbula gibba</i>	European or basket clam			Y	Y		Y
<i>Magallana gigas</i>	Pacific oyster	Y	Y	Y	Y		
<i>Grateloupia turuturu</i>	Red seaweed				Y		
<i>Maoricolpus roseus</i>	New Zealand screwshell ⁴	Y	Y				
<i>Arcuatula senhousia</i>	Asian bag mussel	Y		Y	Y		Y
<i>Sabella spallanzanii</i>	European fan worm			Y	Y		Y
<i>Undaria pinnatifida</i>	Wakame ⁵		Y		Y	y	
<i>Styela Clava</i>	Stalked sea squirt	Y		Y	Y		
<i>Styela plicata</i>	Pleated sea squirt	Y		Y	Y		
<i>Ciona intestinalis</i>	Sea vase tunicate	Y		Y	Y		

³ Information provided by the DJPR (now DEECA) (*pers comms* Richard Stafford Bell March 2019).

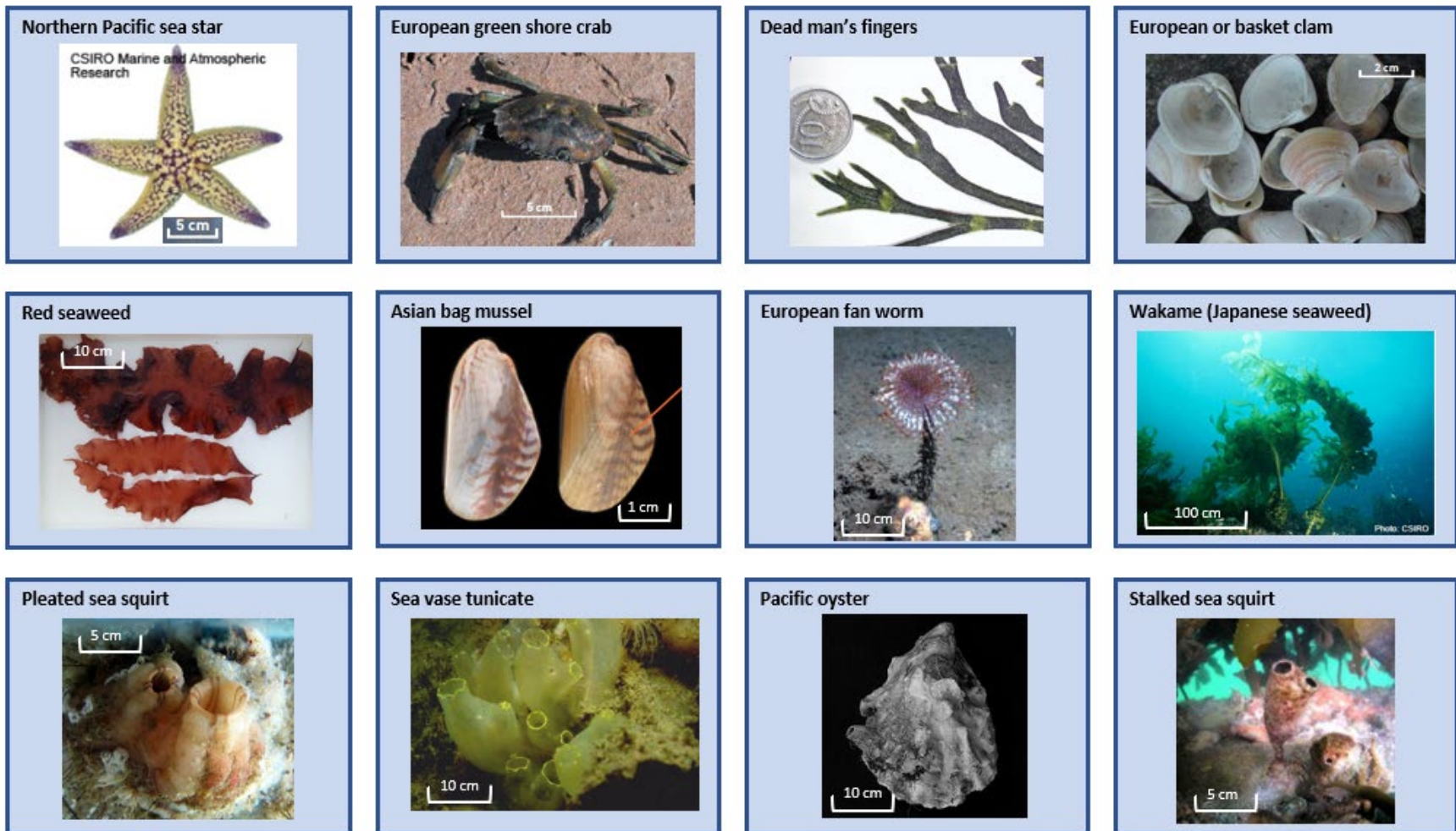
⁴ New Zealand Screw Shell (*Maoricolpus roseus*) – somewhat widespread in Gippsland. No records of it occurring in Port Phillip Bay or elsewhere in Victoria. It remains an IMS for the Melbourne region.

⁵ Japanese Kelp (*Undaria pinnatifida*) – widespread in Port Phillip Bay and recently detected in Port Welshpool (roughly 7km from Barry Beach marine terminal). Reducing the potential spread of this species is a priority.

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Figure 3-49 Images of IMS recorded in Victorian marine environment



4 Conservation Values and Sensitivities

4.1 World Heritage Properties

World heritage properties within the environmental sectors are listed in Table 4-1. There are no world heritage properties in the Gippsland region. There is one declared property in the Otway region (Budj Bim Cultural Landscape), located near Portland, VIC. Budj Bim holds an ancient and complex freshwater aquaculture system developed by Gunditjmara to trap and harvest short-finned eel (*Anguilla australis*) which migrate to/from oceanic breeding grounds from freshwater habitat (budjbim.com.au, ari.vic.gov.au).

Table 4-1: World Heritage Properties within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Australian Convict Sites (Cascades Female Factory and Buffer Zone)					✓				
Australian Convict Sites (Coal Mines Historic Site and Buffer Zone)					✓				
Australian Convict Sites (Cockatoo Island Convict Site and Buffer Zone)						✓			
Australian Convict Sites (Darlington Probation Station and Buffer Zone)					✓				
Australian Convict Sites (Hyde Park Barracks and Buffer Zone)						✓			
Australian Convict Sites (Kingston and Arthurs Vale Historic Area)									✓
Australian Convict Sites (Port Arthur Historic Site and Buffer Zone)					✓				
Budj Bim Cultural Landscape	✓								
Fraser Island							✓		
Gondwana Rainforests of Australia						✓			
Gondwana Rainforests of Australia							✓		
Great Barrier Reef							✓		
Lord Howe Island Group						✓		✓	
Sydney Opera House						✓			
Tasmanian Wilderness				✓					

4.2 National Heritage Places

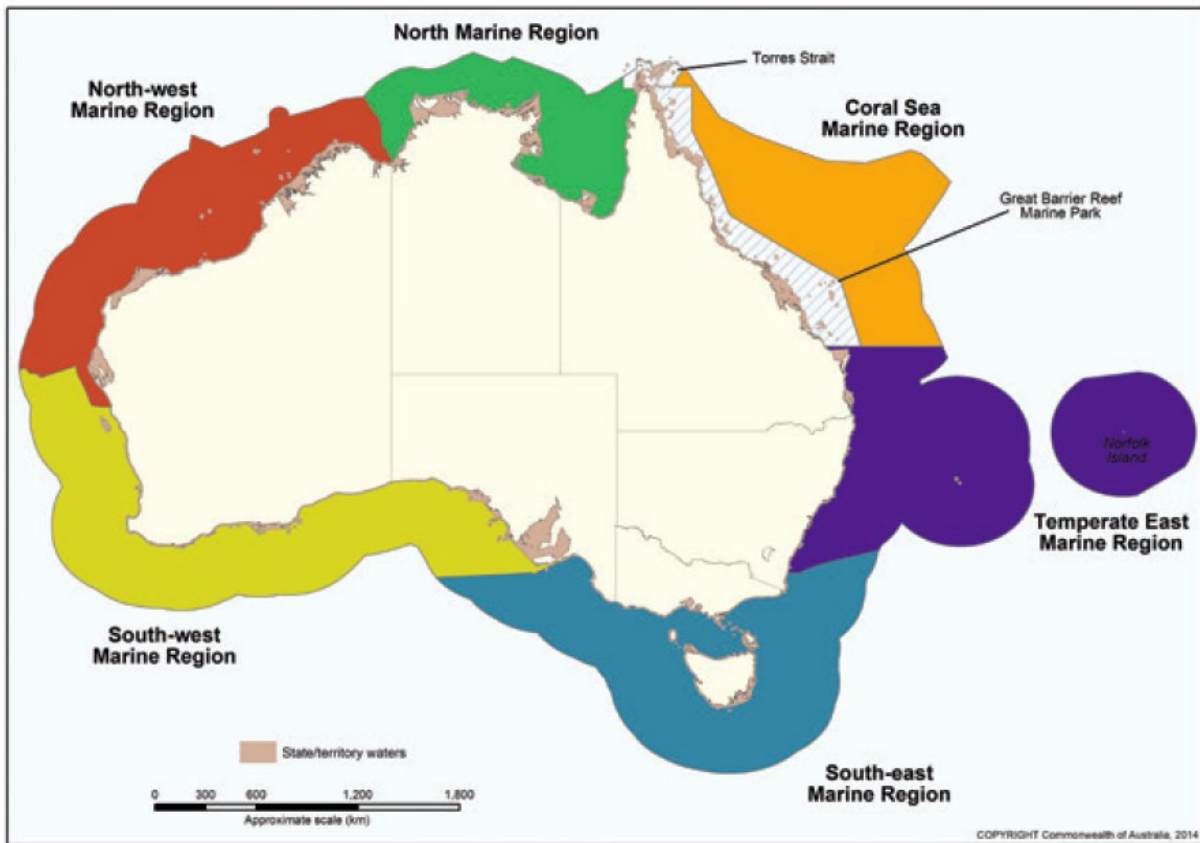
Listed national heritage places within the environmental sectors are mostly onshore / coastal sites. Section 5.6.2 lists all Natural Heritage Places identified within the Environment Sectors.

4.3 Australian Marine Parks

Six marine regions have been identified in Commonwealth waters around Australia (Figure 4-1). Three of these regions (South-east, Temperate East and Coral Sea), as well as the Great Barrier Reef Marine Park, intersect with the Environment Sectors. Key conservation values for each of the marine regions are listed in Table 4-2.

Within each region is a series of Australian Marine Parks (AMP) which are managed for the primary purpose of conserving the biodiversity found in them, while also allowing for sustainable use of natural resources. Under the EPBC Act, once a marine park has been proclaimed, a management plan must be developed by the Director of National Parks. The management plans describe the activities allowed within the park and must be consistent with the relevant Australian IUCN Reserve Management Principles (Table 4-3). Management plans are in place for each marine region.

AMPs which intersect with the Environment Sectors and shown in Figure 4-2 and described in Table 4-4.



(Source: DoE, 2015a)

Figure 4-1: Australia's Commonwealth Marine Regions

Table 4-2: Key Conservation Values for the South-east, Temperate East and Coral Sea Marine Regions

Region	Key Conservation Values ¹
South East Marine Region (SEMR) (DNP, 2013)	<ul style="list-style-type: none"> 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, Bonney coast upwelling. Breeding and resting areas for Southern Right Whale. Migration areas for Blue, Fin, Sei, Southern Right 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 <i>MV City of Rayville</i>, <i>SS Cambridge</i> and ketch <i>Eliza Davies</i>. 10 provincial bioregions and 17 seafloor types are represented in the network.

Region	Key Conservation Values ¹
Temperate East Marine Region (TEMR) (DNP, 2018a)	<ul style="list-style-type: none"> • Important habitat for the critically endangered Grey Nurse Shark (east coast population) • Important offshore reef habitat at Elizabeth and Middleton Reefs, Lord Howe Island and Norfolk Island that support the threatened black cod. • Significant seamount ridges that run parallel to the coast and support hundreds of species, including some previously unknown to science. The seamounts rise from seafloor depths of approximately 4800 metres to up to 130 metres from the surface—more than twice the height of Mt Kosciuszko—and are home to deepwater shark species that are only found in Australia. • The Temperate East network provides additional protection to a number of species listed as endangered or vulnerable under Commonwealth legislation or international agreements, including the White Shark, Bleekers devil fish, the Little Tern and other seabirds. • Unique subtropical corals considered the southernmost coral reefs in the world. • Seven Key Ecological Features including shelf rocky reefs, Tasmantid and Lord Howe seamount chains, Elizabeth and Middleton Reefs, Norfolk Ridge, Canyons on the eastern continental slope, and the Tasman Front. • Seven provincial bioregions, three meso-scale bioregions, 73 depth ranges within provincial bioregions, and 15 seafloor types are represented in the network.
Coral Sea Marine Region (CSMR) (DNP, 2018b)	<ul style="list-style-type: none"> • Habitat and important areas for a range of species have been identified in the region, including for: <ul style="list-style-type: none"> ○ Humpback whales during their annual migration along the east coast of Australia; ○ Nesting and inter-nesting sites for Green Turtles; ○ Breeding and foraging areas for multiple seabird species including noddies, terns, boobies, frigatebirds, and tropic birds; ○ White Shark distribution and Whale Shark aggregation. • Transient populations of highly migratory pelagic species, including small fish schools, billfish, tuna and sharks. • The East Australian Current forms in the region and is considered a major pathway for mobile predators such as billfish and tunas. Black marlin undergo seasonal movements into the Queensland Plateau area. • Includes three Key Ecological Features: the reefs, cays and herbivorous fish of the Queensland Plateau and the Marion Plateau, and the northern extent of the Tasmantid seamount chain. • Heritage values include several historic shipwrecks including three World War II shipwrecks from the Battle of the Coral Sea. • The reserve represents the full range of seafloor features found in the region, including numerous reefs ranging from Ashmore and Boot Reefs in the north of the region to Cato Island and surrounding reefs in the south. The reserve includes canyons, troughs and plateaux, including Bligh Canyon approximately 200 kilometres off the coast from Lockhart River and the Townsville Trough, which separates the Queensland and Marion Plateaux. The reserve extends into the deeper waters of the Coral Sea Basin in the north, and provides protection for the pinnacles of the northern extent of the Tasmantid seamount chain. • Six provincial bioregions, 94 depth ranges, and 16 seafloor types are represented.

Table 4-3: IUCN categories and management principles

IUCN Category Number	IUCN Category Name	IUCN Category Description	IUCN Reserve Management Principles
IA	Strict Nature Reserve	Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or	<ul style="list-style-type: none"> • The reserve or zone should be managed primarily for scientific research or environmental monitoring based on the following principles. • Habitats, ecosystems and native species should be preserved in as undisturbed a state as possible. • Genetic resources should be maintained in a dynamic and evolutionary state. • Established ecological processes should be maintained. • Structural landscape features or rock exposures should be safeguarded. • Examples of the natural environment should be secured for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded.

IUCN Category Number	IUCN Category Name	IUCN Category Description	IUCN Reserve Management Principles
		environmental monitoring.	<ul style="list-style-type: none"> Disturbance should be minimised by careful planning and execution of research and other approved activities. Public access should be limited to the extent it is consistent with these principles.
II	National Park	Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for this and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.	<ul style="list-style-type: none"> The reserve or zone should be protected and managed to preserve its natural condition according to the following principles. Natural and scenic areas of national and international significance should be protected for spiritual, scientific, educational, recreational or tourist purposes. Representative examples of physiographic regions, biotic communities, genetic resources, and native species should be perpetuated in as natural a state as possible to provide ecological stability and diversity. Visitor use should be managed for inspirational, educational, cultural and recreational purposes at a level that will maintain the reserve or zone in a natural or near natural state. Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur. Respect should be maintained for the ecological, geomorphologic, sacred and aesthetic attributes for which the reserve or zone was assigned to this category. The needs of indigenous people should be taken into account, including subsistence resource use, to the extent that they do not conflict with these principles. The aspirations of traditional owners of land within the reserve or zone, their continuing land management practices, the protection and maintenance of cultural heritage and the benefit the traditional owners derive from enterprises, established in the reserve or zone, consistent with these principles should be recognised and taken into account.
IV	Habitat/Species Management Area	Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species	<ul style="list-style-type: none"> The reserve or zone should be managed primarily, including (if necessary) through active intervention, to ensure the maintenance of habitats or to meet the requirements of collections or specific species based on the following principles. Habitat conditions necessary to protect significant species, groups or collections of species, biotic communities or physical features of the environment should be secured and maintained, if necessary through specific human manipulation. Scientific research and environmental monitoring that contribute to reserve management should be facilitated as primary activities associated with sustainable resource management. The reserve or zone may be developed for public education and appreciation of the characteristics of habitats, species or collections and of the work of wildlife management. Management should seek to ensure that exploitation or occupation inconsistent with these principles does not occur. People with rights or interests in the reserve or zone should be entitled to benefits derived from activities in the reserve or zone that are consistent with these principles. If the reserve or zone is declared for the purpose of a botanic garden, it should also be managed for the increase of knowledge, appreciation and enjoyment of Australia's plant heritage by establishing, as an integrated resource, a collection of living and herbarium specimens of Australian

IUCN Category Number	IUCN Category Name	IUCN Category Description	IUCN Reserve Management Principles
VI	Managed Resource Protected Areas	Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.	<p>and related plants for study, interpretation, conservation and display.</p> <ul style="list-style-type: none"> The reserve or zone should be managed mainly for the sustainable use of natural ecosystems based on the following principles. The biological diversity and other natural values of the reserve or zone should be protected and maintained in the long term. Management practices should be applied to ensure ecologically sustainable use of the reserve or zone. Management of the reserve or zone should contribute to regional and national development to the extent that this is consistent with these principles.

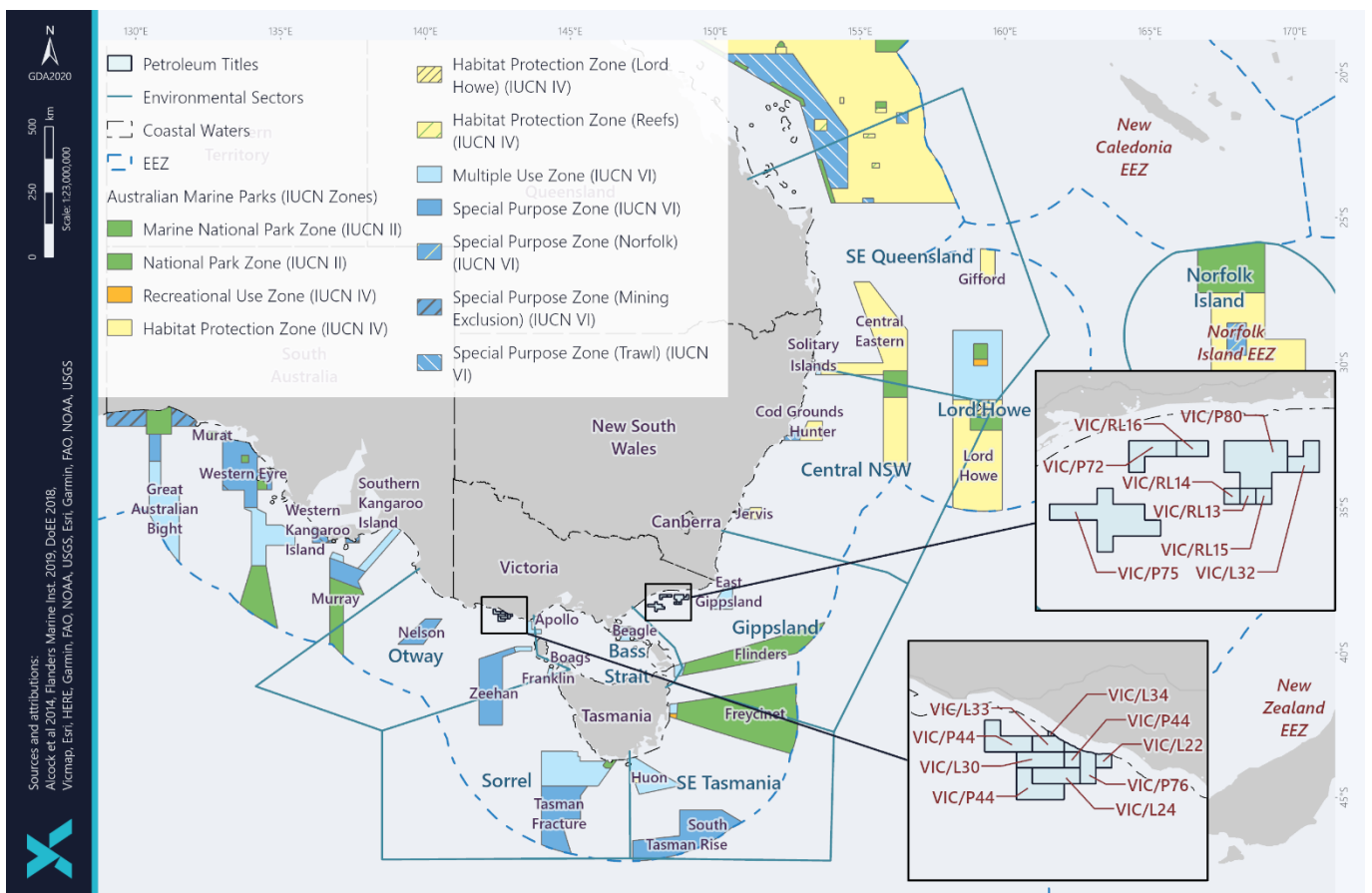


Figure 4-2: Australian Marine Parks present within the Environment Sectors

4.3.1 Great Barrier Reef Marine Park

The Great Barrier Reef was World Heritage listed in 1981 on the basis of its outstanding universal value (GBRMPA, 2014). It is the largest coral reef system in the world, stretching over 2,300 km and containing coral reefs, islands and other habitats (e.g. mangroves, seagrass, algal and sponge gardens, open water) (GBRMPA, 2014). These habitats support many threatened or migratory species listed under the EPBC Act (GBRMPA, 2014). The variety of marine species in the area includes 600 types of hard and soft corals, over 100 species of jellyfish, 3,000 varieties of molluscs, 500 species of worms, 1,625 types of fish, 133 varieties of sharks and rays, and more than 30 species of whales and dolphins (GBRMPA, 2017). The Great Barrier Marine Park was declared in sections between 1979 and 2001; and amalgamated in 2003. The Marine Park includes all waters seaward of low water mark (excluding internal waters), and approximately 70 Commonwealth Islands⁶.

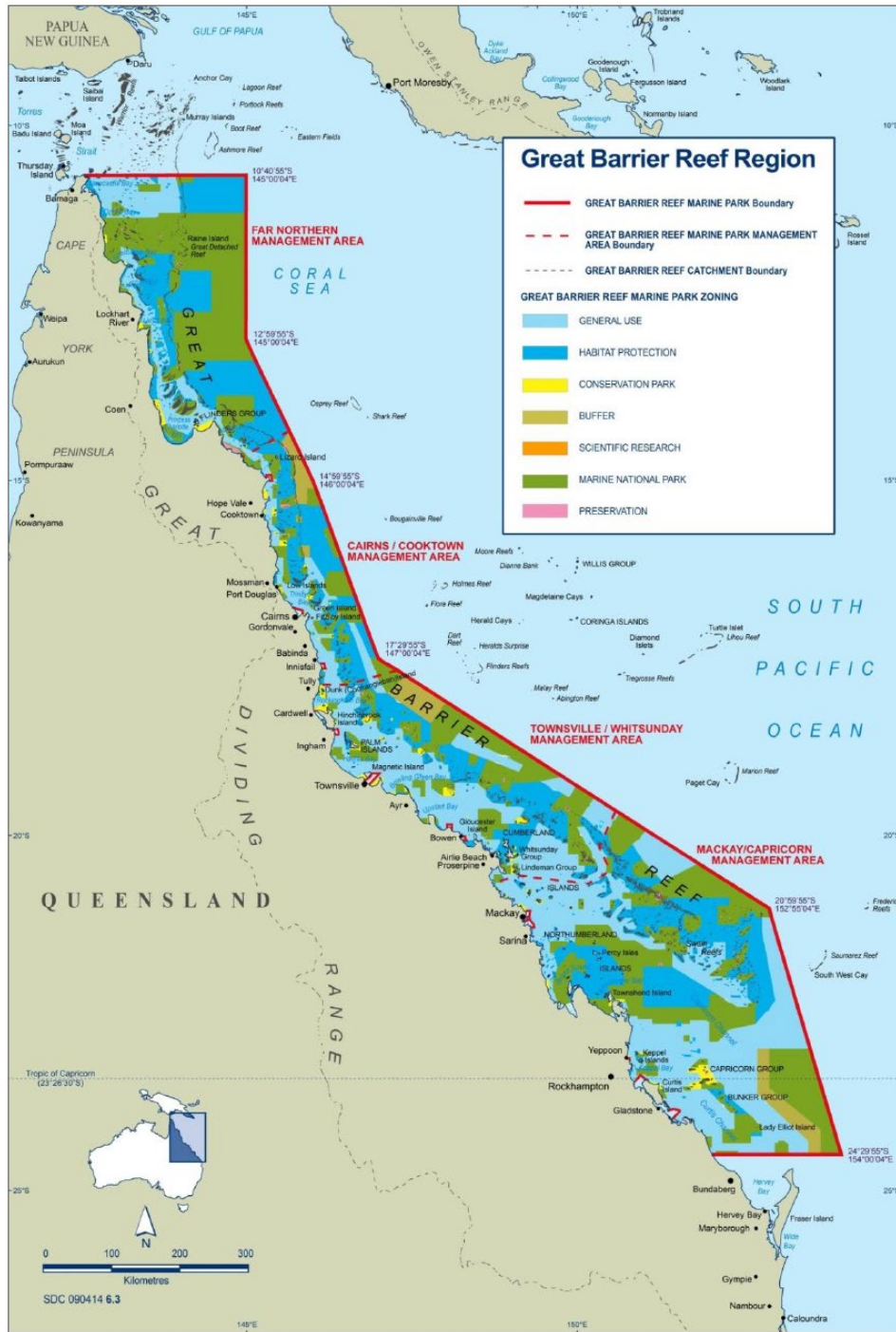
The Great Barrier Reef Marine Park extends into the northern part of the 'SE Queensland' Environment Sector (Figure 4-2). The following management zones are present within the Environment Sectors (Figure 4-3):

- General Use – IUCN Category VI
- Habitat Protection – IUCN Category VI
- Conservation Park – IUCN Category IV
- Buffer – IUCN Category IV
- Scientific Research – IUCN Category IA
- Marine National Park – IUCN Category II
- Preservation – IUCN Category IA

One Commonwealth island, Lady Elliot Island (IUCN Category II) is also present within the Environment Sectors.

Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Great Barrier Reef area, and they maintain a continuing connection to the Reef and adjacent coastal areas (GBRMPA, 2014). There are approximately 70 Aboriginal and Torres Strait Islander Traditional Owner clan groups whose customary estates include land and sea country within the Great Barrier Reef (GBRMPA, 2014).

⁶ The Marine Park does not include the approximately 980 Queensland islands (although these are included in the Great Barrier Reef World Heritage Area).



(Source: GBRMPA, 2014)

Figure 4-3: Great Barrier Reef Zoning Plan

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Table 4-4: Australian Marine Parks present within the Environment Sectors

Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Apollo	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Ecosystems, habitats and communities associated with the Western Bass Strait Shelf Transition and the Bass Strait Shelf Province and associated with the sea-floor features: deep/hole/valley and shelf Important migration area for: Blue, Fin, Sei and humpback whales Important foraging area for: Black-browed and Shy albatross, Australasian Gannet, Short-tailed Shearwater, and Crested tern Cultural and heritage site: wreck of the <i>MV City of Rayville</i> 	✓	✓							
Beagle	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Ecosystems, habitats and communities associated with the Southeast Shelf Transition and associated with the sea-floor features: basin, plateau, shelf and sill Important migration and resting on migration area for: southern right whale Important foraging area for: Australian fur seal, killer whale, white shark, shy albatross, Australasian gannet, short-tailed shearwater, pacific and silver gulls, crested tern, common diving petrel, fairy prion, black-faced cormorant and little penguin Cultural and heritage sites: the wreck of the steamship <i>SS Cambridge</i> and the wreck of the ketch <i>Eliza Davies</i>. 		✓							
Boags	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Ecosystems, habitats and communities associated with the Bass Strait Shelf Province and associated with the sea-floor features: plateau and tidal sandwave/sandbank Important foraging area for: shy albatross, Australasian gannet, short-tailed shearwater, fairy prion, black-faced cormorant, common diving petrel and little penguin 		✓							
East Gippsland	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Southeast Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, escarpment and knoll/abyssal hillslope Features with high biodiversity and productivity: Bass Cascade; upwelling east of Eden 			✓						

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Important foraging area for: wandering, black-browed, yellow-nosed and shy albatrosses; great-winged petrel; wedge-tailed shearwater; and cape petrel Important migration area for: humpback whale 									
Flinders	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmania Province, the Tasmanian Shelf Province, the Southeast Transition and the Southeast Shelf Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, plateau, seamount/guyot, shelf and slope Features with high biodiversity and productivity: east Tasmania subtropical convergence zone Important foraging area for: wandering, black-browed, yellow-nosed and shy albatrosses, northern giant petrel, Gould's petrel and cape petrel, killer whale, white shark and Harrison's dogfish Important migration area for: humpback whale. 		✓	✓		✓				
Franklin	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmanian Shelf Province and the Western Bass Strait Shelf Transition and associated with the sea-floor features: shelf, deep/hole/valley, escarpment and plateau Important foraging area for: shy albatross, short-tailed shearwater, Australasian gannet, fairy prion, little penguin, common diving petrel, black-faced cormorant and silver gull 	✓	✓		✓					
Freycinet	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Recreational Use Zone - IUCN Category IV Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmania Province, the Tasmanian Shelf Province and the Southeast Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, escarpment, knoll/abyssal hill, saddle, seamount/guyot, shelf and terrace Features with high biodiversity and productivity: east Tasmania subtropical convergence zone Important foraging area for: wandering, black-browed and shy albatross, cape petrel and fairy prion, sei whales and killer whales Important migration and resting on migration area for: southern right whale Important migration area for: humpback whale. 			✓		✓				

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Huon	<ul style="list-style-type: none"> Habitat Protection Zone - IUCN Category IV Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmanian Shelf Province and the Tasmania Province and associated with the sea-floor features: canyon, knoll/abyssal hill (seamount), pinnacle, saddle, shelf and terrace Features with high biodiversity and productivity: seamounts south and east of Tasmania Important foraging area for: black-browed, Buller's and shy albatrosses, great-winged petrel, short-tailed shearwater, fairy prion, Australian fur seal and killer whale Important migration area for: humpback whale. 				✓	✓				
Murray	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Special Purpose Zone - IUCN Category VI Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Spencer Gulf Shelf Province, the Southern Province and the West Tasmanian Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, escarpment, knoll/abyssal hill, shelf, slope and terrace Features with high biodiversity and productivity: Bonney coast upwelling, shelf rocky reefs and hard substrate Important foraging areas for: blue, sei and fin whales, Australian sea lion, wandering, black-browed, yellow-nosed and shy albatrosses, great-winged petrels, flesh-footed and short-tailed shearwaters, and white-faced storm petrel Important breeding area for: southern right whale Important migration area for: humpback whale 	✓								
Nelson	<ul style="list-style-type: none"> Special Purpose Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the West Tasmanian Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, knoll/abyssal hill, plateau and slope Important migration area for: humpback whale, blue, fin and sei whales (likely migration) 	✓								
South Tasman Rise	<ul style="list-style-type: none"> Special Purpose Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmanian Province and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, plateau, seamount/guyot and slope 					✓				

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Important foraging areas for: wandering and black-browed albatross, short-tailed shearwater, white-headed and white-chinned petrels. 									
Tasman Fracture	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Special Purpose Zone - IUCN Category VI Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmania Province, the Tasmanian Shelf Province and the West Tasmania Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, basin, canyon, knoll/abyssal hill, pinnacle, plateau, ridge, saddle, shelf, slope, terrace and trench/trough Important migration area for: humpback whale Important foraging areas for: white shark, New Zealand fur seal, wandering, black-browed and shy albatross, white-chinned petrel, common diving petrel, short-tailed shearwater and fairy prion 				✓					
Zeehan	<ul style="list-style-type: none"> Special Purpose Zone - IUCN Category VI Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Examples of ecosystems, habitats and communities associated with the Tasmania Province, the West Tasmania Transition and the Western Bass Strait Shelf Transition and associated with the sea-floor features: abyssal plain/deep ocean floor, canyon, deep/hole/valley, knoll/abyssal hill, shelf and slope Important migration area for: blue and humpback whales Important foraging areas for: black-browed, wandering and shy albatrosses, and great-winged and cape petrels 	✓	✓		✓					
Central Eastern	<ul style="list-style-type: none"> Marine National Park - IUCN Category II Habitat Protection Zone - IUCN Category IV Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Biologically important areas for the protected humpback whale, vulnerable white shark and a number of migratory seabirds Examples of the ecosystems of the Central Eastern Province, Central Eastern Shelf Transition, and Tasman Basin Province provincial bioregions and the Tweed-Moreton meso-scale bioregion Represents seafloor features including abyssal-plain/deep ocean floor, canyon, pinnacle, slope, knoll/abyssal-hills/hills/mountains/peak, and seamount/guyot Includes two key ecological features: Canyons on the eastern continental slope (part of one of three shelf-incising canyons occurring in the region is represented) interact with currents and ocean gyres resulting in upwellings that influence biological productivity. 					✓	✓			

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Upwellings attract aggregations of tuna, whales, albatrosses and support over 50 fish species endemic to the area. Tasmanian seamount chain (known breeding and feeding areas for a number of open ocean species such as billfish and marine mammals) 									
Cod Grounds	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II 	<ul style="list-style-type: none"> Established in May 2007 in Commonwealth waters just south of Port Macquarie in NSW, to protect a significant aggregation site for the critically endangered east coast population of grey nurse sharks Biologically important areas for the protected humpback whale, vulnerable white shark and a number of migratory seabirds Examples of the ecosystems of the Central Eastern Shelf Transition provincial bioregion and the Manning Shelf meso-scale bioregion The area is a series of underwater pinnacles, which is a significant aggregation site for the critically endangered east coast population of grey nurse sharks Representation of the shelf seafloor feature. 					✓				
Gifford	<ul style="list-style-type: none"> Habitat Protection Zone - IUCN Category IV 	<ul style="list-style-type: none"> Biologically important areas for protected humpback whales and a number of migratory seabirds Examples of the ecosystems of the Lord Howe Province Represents seafloor features including basin, plateau and seamount/guyot (Gifford Tablemount) 							✓		
Hunter	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI Special Purpose Zone (Trawl) - IUCN Category VI 	<ul style="list-style-type: none"> Important habitat for the critically endangered east coast population of grey nurse sharks Biologically important areas for the protected humpback whale, vulnerable white sharks and a number of migratory seabirds Examples of the ecosystems of the Central Eastern Province and the Central Eastern Shelf Province provincial bioregions and the Manning Shelf meso-scale bioregion A range of seafloor features including abyssal-plain/deep ocean floor, canyons, shelf, slope, and terrace geomorphic features Includes one key ecological feature: Shelf rocky reefs (unique sea-floor feature with ecological properties of regional significance) 					✓				

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Jervis	<ul style="list-style-type: none"> Multiple Use Zone - IUCN Category VI Special Purpose Zone (Trawl) - IUCN Category VI 	<ul style="list-style-type: none"> Biologically important areas for protected humpback whales, grey nurse sharks and a number of migratory seabirds Some canyons incise the mid-slope at depths of 1500-3500 metres and some extend to a depth of 5000 metres Seafloor features represented in the park include abyssal-plain/deep ocean floor, canyons, shelf, and slope Examples of the ecosystems of the Central Eastern Province, the Southeast Shelf Transition and the Batemans Shelf meso-scale bioregion Includes two key ecological features: <ul style="list-style-type: none"> one of three shelf-incising canyons occurring in the region (unique sea-floor feature with ecological properties of regional significance) shelf rocky reefs (unique sea-floor feature with ecological properties of regional significance) 					✓				
Lord Howe	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Recreational Use Zone - IUCN Category IV Habitat Protection Zone (Lord Howe) - IUCN Category IV Habitat Protection Zone - IUCN Category IV Multiple Use Zone - IUCN Category VI 	<ul style="list-style-type: none"> Biologically important areas for protected humpback whales and a number of migratory seabirds A major seabird breeding area, with 14 species found on the islands including masked boobys, grey ternlets, red-tailed tropic birds, black-winged petrels and Kermadec petrels Key location for the black cod and the Galapagos shark Due to the convergence of warmer tropical and cooler temperate waters in the area of the park, many species found there are at the northern or southern extent of their range Examples of the ecosystems of the Lord Howe Province and the Tasman Basin Province provincial bioregions Represents seafloor features including: basin, plateau, saddle, seamount/guyot and deep ocean valley Includes three key ecological features: <ul style="list-style-type: none"> the Lord Howe seamount chain (high productivity; aggregations of marine life; biodiversity and endemism). Elizabeth and Middleton reefs (aggregations of marine life; biodiversity and endemism). 					✓	✓	✓		

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Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Tasman Front and eddy field (high productivity; aggregations of marine life; biodiversity and endemism) 									
Norfolk Marine Park	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Habitat Protection Zone - IUCN Category IV Special Purpose Zone (Norfolk) - IUCN Category VI 	<ul style="list-style-type: none"> Significant because it contains habitats, species and ecological communities associated with the Norfolk Island Province. Breeding and foraging habitat for seabirds Migratory pathway for humpback whales Includes two key ecological features: <ul style="list-style-type: none"> the Norfolk Ridge (support relatively productive and diverse benthic habitats, and are thought to act as steppingstones for faunal dispersal, connecting deep-water fauna from New Caledonia to New Zealand). Tasman Front and Eddy Field (increased nutrients and plankton aggregations, and enhanced productivity that attracts mobile species such as turtles, cetaceans, tuna and billfish.) 								✓	
Solitary Islands	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Multiple Use Zone - IUCN Category VI Special Purpose Zone (Trawl) - IUCN Category VI 	<ul style="list-style-type: none"> Important habitat for the critically endangered east coast population of vulnerable grey nurse sharks Biologically important areas for the protected humpback whale, vulnerable white shark, number of migratory seabirds and the Indo-Pacific (spotted) dolphin. Many species found are at, or close to, their southern or northern geographical limits. Examples of the ecosystems of the Central Eastern Shelf Transition and the Tweed-Moreton meso-scale bioregion Representation of the shelf seafloor feature 					✓	✓			

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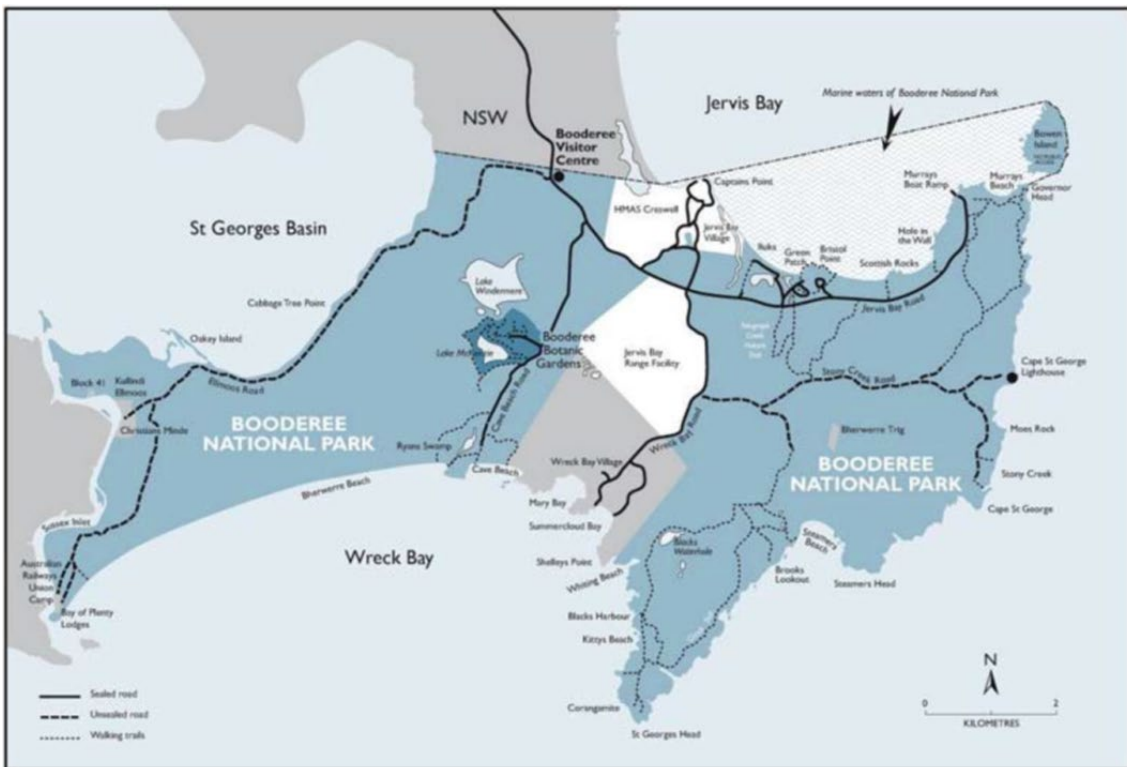
Park	Zoning ¹	Major Conservation Values ¹	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Coral Sea	<ul style="list-style-type: none"> Marine National Park Zone - IUCN Category II Habitat Protection Zone - IUCN Category IV Habitat Protection Zone (Reefs) – IUCN Category IV Special Purpose Zone (Trawl) – IUCN Category VI 	<ul style="list-style-type: none"> Habitat and important areas for a range of species have been identified in the region, including for: <ul style="list-style-type: none"> humpback whales during their annual migration along the east coast of Australia; nesting and inter-nesting sites for green turtles; breeding and foraging areas for multiple seabird species including noddies, terns, boobies, frigatebirds, and tropic birds; white shark distribution and whale shark aggregation. Transient populations of highly migratory pelagic species, including small fish schools, billfish, tuna and sharks. The East Australian Current forms in the region and is considered a major pathway for mobile predators such as billfish and tunas. Black marlin undergo seasonal movements into the Queensland Plateau area. South Equatorial Current, Hiri Current and East Australian current form a barrier to reduce mixing of species between the north and south, forming distinct ecological communities. Includes three Key Ecological Features: the reefs, cays and herbivorous fish of the Queensland Plateau and the Marion Plateau and the northern extent of the Tasmantid seamount chain. Heritage values include several historic shipwrecks including three World War II shipwrecks from the Battle of the Coral Sea. The park represents the full range of seafloor features found in the region, including numerous reefs ranging from Ashmore and Boot Reefs in the north of the region to Cato Island and surrounding reefs in the south. The park includes canyons, troughs and plateaux, including Bligh Canyon approximately 200 kilometres off the coast from Lockhart River and the Townsville Trough, which separates the Queensland and Marion Plateaux. The reserve extends into the deeper waters of the Coral Sea Basin in the north, and provides protection for the pinnacles of the northern extent of the Tasmantid seamount chain. Six provincial bioregions, 94 depth ranges, and 16 seafloor types are represented in the park. 							✓		

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4.3.2 Commonwealth Terrestrial Reserves

One Commonwealth National Park is located within the Environment Sectors: Booderee National Park. The Booderee National Park was established in 1992 and is jointly managed by Parks Australia and Wreck Bay Aboriginal Community Council (DNP, 2015). The Park stretches across 6,379 ha at Jervis Bay, and includes 875 ha of marine environment, and 80 ha of Botanic Garden (Australia’s only Aboriginal-owned and managed Botanic Gardens). Booderee National Park is considered both nationally and regional significant for its natural and cultural values; and the Park contains many species that are at the limits of their bio-geographical range (DEE, 2017x).

The marine environment of Booderee National Park is characterised by a wide range of tidal and subtidal habitats including shallow rock reefs and sand zones, seagrass meadows, deeper silty sand flats and deep-water rocky reefs, cliffs, platforms, blocks, boulders and caves (DEE, 2017x). The intertidal rock platforms of Bowen Island host a variety of intertidal species including large numbers and varieties of sea urchins, crabs, abalone, and oysters (DEE, 2017x). Bowen Island also supports a colony of Little Penguin, and breeding colonies of three species of shearwater; making it of high conservation significance. The Park area also includes the largest seagrass meadows in New South Wales; *Posidonia* species are dominant, but *Zostera* and *Halophila* sp. are also present. These areas provide habitat for a diversity and abundance of fish and macroinvertebrates. Subtidal and intertidal platforms support a diversity of rocky reef algae with *Hormosira*, *Ecklonia*, *Sargassum*, *Phyllospora* and *Cystophora* being the dominant genera. The littoral communities of the National Park are of both local and state-wide significance and include: mangrove communities along Sussex Inlet and south of Whiting Beach; saltmarsh communities at Flat Rock Creek and on the southern section of Bowen Island; and intertidal rocky platforms (DEE, 2017x). The mangrove communities provide habitat for a number of intertidal estuarine organisms, fish and terrestrial species. Saltmarsh communities are of high conservation value as bird feeding areas. The area also supports a population of bottlenose dolphins (DEE, 2017x). The Park protects coastal dune systems and their associated habitats, which are otherwise disturbed or potentially threatened in the region; the preservation as a southern representative of the sandstone ecosystems is highly important (DEE, 2017x).



(Source: DNP, 2015)

Figure 4-4: Location of Booderee National Park

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4.4 Wetlands

4.4.1 Wetlands of International Importance

Under the Ramsar Convention, wetland types have been defined to identify the main wetland habitats represented at each site. The classification system uses three categories (with a number of wetland types within each): (i) Marine/Coastal Wetlands; (ii) Inland Wetlands; and (iii) Human-made Wetlands. The classification of a marine/coastal wetland is extensive and includes those wetlands that while predominantly based inland have some form of connection with the coast and/or marine waters.

Twenty four marine/coastal Wetlands of International Importance have been identified within the Environment Sectors (Table 4-5, Figure 4-5). A summary of key features of the wetlands is provided in Appendix 1.

Table 4-5: Marine/Coastal Zone Wetlands of International Importance within the Environment Sectors

Wetland	Otway	Bass Strait	Gippsland	Sorell ¹	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
South Australia									
Piccaninnie Ponds Karst Wetlands	✓								
Victoria									
Corner Inlet		✓							
Edithvale-seafood wetlands		✓							
Floor plain lower Ringarooma river		✓							
Gippsland Lakes			✓						
Glenelg Estuary and Discovery Bay	✓								
Port Phillip Bay (Western Shoreline) and Bellarine Peninsula		✓							
West district lakes		✓							
Western Port		✓							
Tasmania									
Apsley Marshes					✓				
East Coast Cape Barren Island Lagoons		✓	✓						
Flood Plain Lower Ringarooma River		✓							
Jocks Lagoon					✓				
Lavinia		✓							
Little Waterhouse Lake		✓							
Logan Lagoon		✓	✓						
Moulting Lagoon					✓				
Pitt Water-Orielton Lagoon					✓				
New South Wales									
Hunter Estuary Wetlands						✓			
Myall Lakes						✓			
Towra Point Nature Reserve						✓			
Queensland									
Great Sandy Strait							✓		
Moreton Bay							✓		

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Wetland	Otway	Bass Strait	Gippsland	Sorell ¹	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
External Territories									
Elizabeth and Middleton Reefs Marine National Nature Reserve							✓		

Notes:

1. No Wetlands of International Importance are present within Sorell, Lord Howe or Norfolk zones.

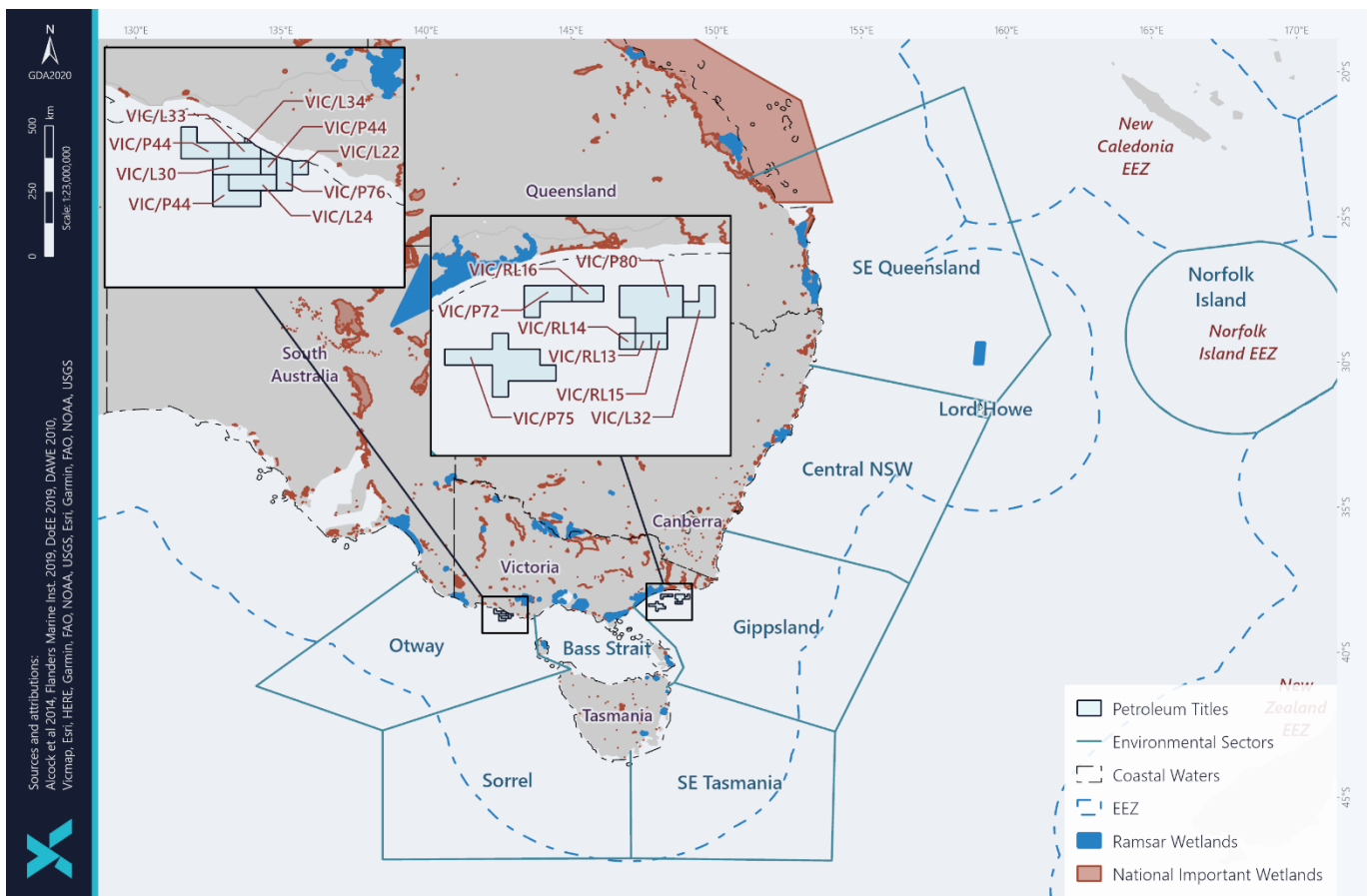


Figure 4-5: Marine/Coastal Wetlands of International Importance within the Environment Sectors

4.4.2 Wetlands of National Importance

A classification system based on that used by the Ramsar Convention, but modified to suit the Australia, has been used to classify Wetlands of National Importance. The classification system uses three categories (with a number of wetland types within each): (i) Marine and Coastal Zone wetlands; (ii) Inland wetlands; and (iii) Human-made wetlands. The classification of a marine and coastal zone wetland is extensive and includes those wetlands that while predominantly based inland have some form of connection with the coast and/or marine waters.

One hundred and forty-six (146) marine and coastal zone Wetlands of National Importance have been identified within the Environment Sectors (Table 4-6). A summary of key ecological and social features is provided in Appendix 2.

Table 4-6: Marine and Coastal Zone Wetlands of National Importance within the Environment Sectors

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Wetland	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
South Australia									
Piccaninnie Ponds	✓								
South East Coastal Salt Lakes	✓								
Victoria									
Anderson Inlet		✓							
Corner Inlet		✓	✓						
Ewing's Marsh			✓						
Glenelg Estuary	✓								
Jack Smith Lake State Game Reserve		✓	✓						
Lake Bunga			✓						
Lake Connewarre State Wildlife Reserve		✓							
Lake King Wetlands			✓						
Lake Tyers			✓						
Lake Victoria Wetlands			✓						
Lake Wellington Wetlands			✓						
Long Swamp	✓								
Lower Aire River Wetlands	✓								
Lower Merri River Wetlands	✓								
Lower Snowy River Wetlands System			✓						
Mallacoota Inlet Wetlands			✓						
Mud Islands		✓							
Point Cook & Laverton Saltworks		✓							
Powlett River Mouth		✓							
Princetown Wetlands	✓								
Shallow Inlet Marine & Coastal Park		✓							
Sydenham Inlet Wetlands			✓						
Swan Bay & Swan Island		✓							
Tamboon Inlet Wetlands			✓						
Werribee-Avalon Area		✓							
Western Port		✓							
Yambuk Wetlands	✓								
Tasmania									
Blackmans Lagoon		✓							
Boullanger Bay – Robbins Passage		✓							
Calverts Lagoon					✓				
D'Arcy's Lagoon					✓				
Earlham Lagoon					✓				
Fergusons Lagoon		✓							
Flyover Lagoon 1		✓							
Flyover Lagoon 2		✓							
Freshwater Lagoon					✓				

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Wetland	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
Hogans Lagoon		✓							
Jocks Lagoon					✓				
Lavinia Nature Reserve		✓							
Little Thirsty Lagoon		✓							
Little Waterhouse Lake		✓							
Logan Lagoon		✓							
Maria Island Marine Reserve					✓				
Moulting Lagoon					✓				
Orielton Lagoon					✓				
Pearshape Lagoon 1		✓							
Pearshape Lagoon 2		✓							
Pearshape Lagoon 3		✓							
Pearshape Lagoon 4		✓							
Rocky Cape Marine Area		✓							
Sellars Lagoon		✓	✓						
South East Cape Lakes				✓					
Syndicate Lagoon		✓							
The Chimneys		✓							
Tregaron Lagoons 1		✓							
Tregaron Lagoons 2		✓							
Unnamed Wetland TAS008		✓			✓				
Unnamed Wetland TAS009		✓							
Unnamed Wetland TAS010		✓							
Unnamed Wetland TAS011		✓							
Unnamed Wetland TAS012		✓							
Unnamed Wetland TAS013		✓							
Unnamed Wetland TAS014		✓							
Unnamed Wetland TAS038					✓				
Unnamed Wetland TAS051		✓							
Unnamed Wetland TAS052		✓							
Unnamed Wetland TAS081				✓					
New South Wales									
Avoca Lagoon						✓			
Beecroft Peninsula						✓			
Bondi Lake			✓						
Brisbane Water Estuary						✓			
Bundjalung National Park							✓		
Clarence River Estuary							✓		
Clybucca Creek Estuary						✓			
Clyde River Estuary			✓			✓			
Cockrone Lagoon						✓			

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Wetland	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
Coila Creek Delta			✓						
Coomaditchy Lagoon						✓			
Coomonderry Swamp						✓			
Cormorant Beach						✓			
Crowdy Bay National Park						✓			
Cudgen Nature Reserve							✓		
Cullendulla Creek and Embayment						✓			
Durras Lake						✓			
Eve St. Marsh, Arncliffe						✓			
Five Islands Nature Reserve						✓			
Jervis Bay						✓			
Jervis Bay Sea Cliffs						✓			
Killalea Lagoon						✓			
Kooragang Nature Reserve						✓			
Lagoon Head						✓			
Lake Illawarra						✓			
Lake Hiawatha and Minnie Water							✓		
Limeburners Creek Nature Reserve						✓			
Merimbula Lake			✓						
Meroo Lake Wetland Complex						✓			
Minnamurra River Estuary						✓			
Moruya River Estuary Saltmarshes			✓						
Myall Lakes						✓			
Nadgee Lake and tributary wetlands			✓						
Nargal Lake			✓						
Nelson Lagoon			✓						
Pambula Estuarine Wetlands			✓						
Port Stephens Estuary						✓			
Shoalhaven/Crookhaven Estuary						✓			
Solitary Islands Marine Park							✓		
St Georges Basin						✓			
Swan Lagoon						✓			
Swan Pool/Belmore Swamp						✓			
Tabourie Lake						✓			
Termeil Lake Wetland Complex NSW						✓			
Terrigal Lagoon						✓			
Towra Point Estuarine Wetlands						✓			
Tuggerah Lake						✓			
Tuross River Estuary			✓						
Twofold Bay			✓						
Ukerebagh Nature Reserve							✓		

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Wetland	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe ¹	Norfolk Island
Waldrons Swamp			✓						
Wallaga Lake			✓						
Wallagoot Lagoon			✓						
Wallis Lake and adjacent estuarine islands						✓			
Wamberal Lagoon						✓			
Wollumboola Lake						✓			
Wooloweyah Lagoon							✓		
Queensland									
Bribie Island							✓		
Burrum Coast							✓		
Bustard Bay Wetlands							✓		
Colosseum Inlet – Rodds Bay							✓		
Deepwater Creek							✓		
Fraser Island							✓		
Great Barrier Reef Marine Park							✓		
Great Sandy Strait							✓		
Lake Coombabah							✓		
Lake Weyba							✓		
Lower Mooloolah River							✓		
Moreton Bay Aggregation							✓		
Noosa River Wetlands							✓		
North Stradbroke Island							✓		
Northeast Curtis Island							✓		
Pine River and Hays Inlet							✓		
Port Curtis							✓		
Pumicestone Passage							✓		
The Narrows							✓		
Upper Pumicestone Coastal Plain							✓		

Notes:

1. No Wetlands of National Importance are present within the Lord Howe or Norfolk Island sectors.

4.5 State Parks and Reserves

4.5.1 Marine Protected Areas

State marine protected areas are declared under each individual state's legislation and are managed by state authorities. There are 73 state marine protected areas within the Environment Sectors (Table 4-7).

Table 4-7: State Marine Protected Areas within the Environment Sectors

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Marine Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
South Australia									
Upper South East Marine Park	✓								
Lower South East Marine Park	✓								
Victoria									
Barwon Bluff Marine Sanctuary		✓							
Beware Reef Marine Sanctuary			✓						
Bunurong Marine National Park		✓							
Cape Howe Marine National Park			✓						
Churchill Island Marine National Park		✓							
Corner Inlet Marine & Coastal Park		✓							
Corner Inlet Marine National Park		✓							
Discovery Bay Marine National Park	✓								
Eagle Rock Marine Sanctuary		✓							
French Island Marine National Park		✓							
Jawbone Marine Sanctuary		✓							
Marengo Reefs Marine Sanctuary		✓							
Merri Marine Sanctuary	✓								
Mushroom Reef Marine Sanctuary		✓							
Ninety Mile Beach Marine National Park			✓						
Nooramunga Marine & Coastal Park		✓							
Point Addis Marine National Park		✓							
Point Cooke Marine Sanctuary		✓							
Point Danger Marine Sanctuary		✓							
Point Hicks Marine National Park			✓						
Port Phillip Heads Marine National Park		✓							
Ricketts Point Marine Sanctuary		✓							
Shallow Inlet Marine & Coastal Park		✓							
The Arches Marine Sanctuary	✓								
Twelve Apostles Marine National Park	✓								
Wilson's Promontory Marine National Park		✓							
Wilson's Promontory Marine Park		✓							
Wilson's Promontory Marine Park		✓							
Yaringa Marine National Park		✓							
Tasmania									
Blackman Rivulet Marine Conservation Area					✓				
Central Channel Marine Conservation Area					✓				
Cloudy Bay Marine Conservation Area					✓				
Governor Island Marine Park					✓				
Hippolyte Rocks Marine Conservation Area					✓				
Huon Estuary Marine Conservation Area					✓				
Kent Group Marine Park		✓							

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Marine Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Maria Island Marine Park					✓				
Monk Bay Marine Conservation Area					✓				
Ninepin Point Marine Park					✓				
Opossum Bay Marine Conservation Area					✓				
Port Cygnet Marine Conservation Area					✓				
Port Davey Marine Park				✓					
River Derwent Marine Conservation Area					✓				
Roberts Point Marine Conservation Area					✓				
Simpsons Point Marine Conservation Area					✓				
Sloping Island Marine Conservation Area					✓				
South Arm Marine Conservation Area					✓				
Tinderbox Marine Park					✓				
Waterfall–Fortescue Marine Conservation Area					✓				
New South Wales									
Barrenjoey Head Aquatic Reserve						✓			
Batemans Marine Park			✓			✓			
Boat Harbour Aquatic Reserve						✓			
Bronte-Coogee Aquatic Reserve						✓			
Bushranger's Bay Aquatic Reserve						✓			
Cabbage Tree Bay Aquatic Reserve						✓			
Cape Banks Aquatic Reserve						✓			
Cape Byron Marine Park							✓		
Cook Island Aquatic Reserve							✓		
Jervis Bay Marine Park						✓			
Long Reef Aquatic Reserve						✓			
Lord Howe Island Marine Park								✓	
Narrabeen Head Aquatic Reserve						✓			
North (Sydney) Harbour Aquatic Reserve						✓			
Port Stephens Great Lakes Marine Park						✓			
Shiprock Aquatic Reserve						✓			
Solitary Islands Marine Park						✓	✓		
Towra Point Aquatic Reserve						✓			
Queensland									
Great Barrier Reef Coast Marine Park							✓		
Great Sandy Marine Park							✓		
Moreton Bay Marine Park							✓		
External Territories									
Norfolk Marine Park									✓

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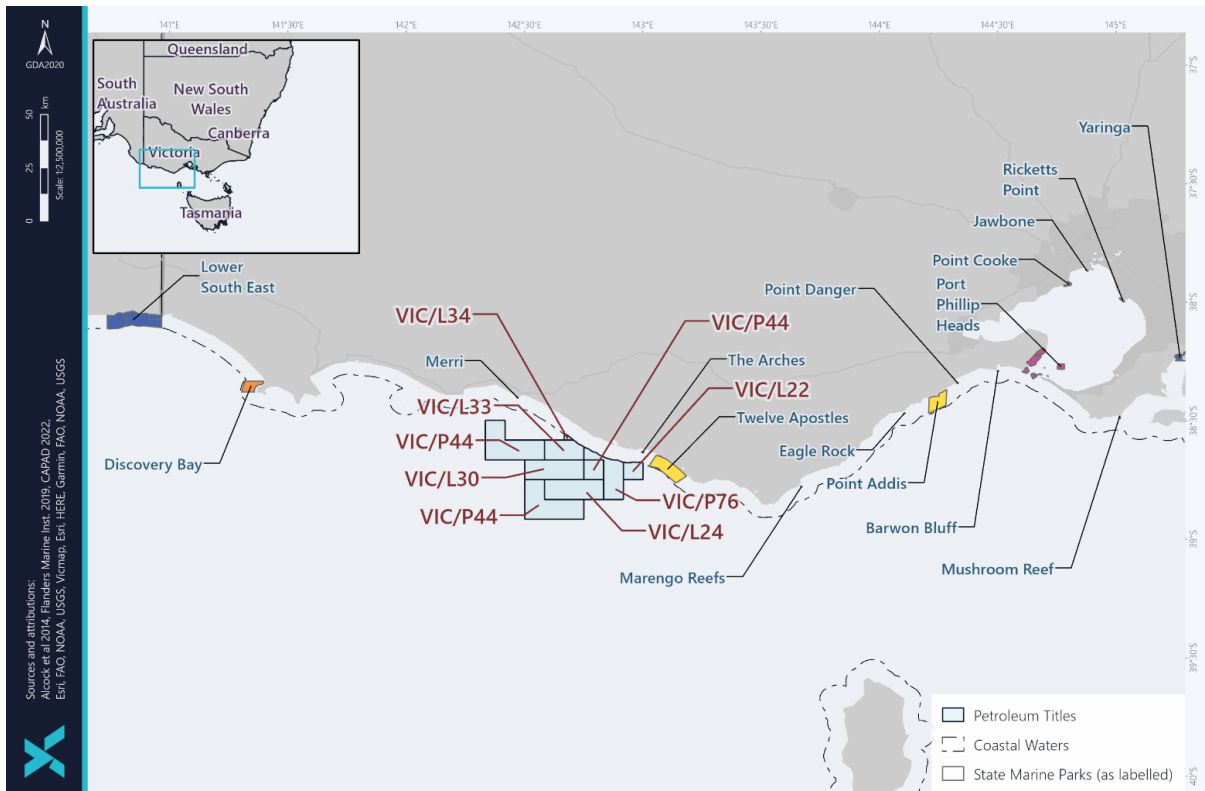


Figure 4-6: State Marine Parks within the vicinity of the CHN assets

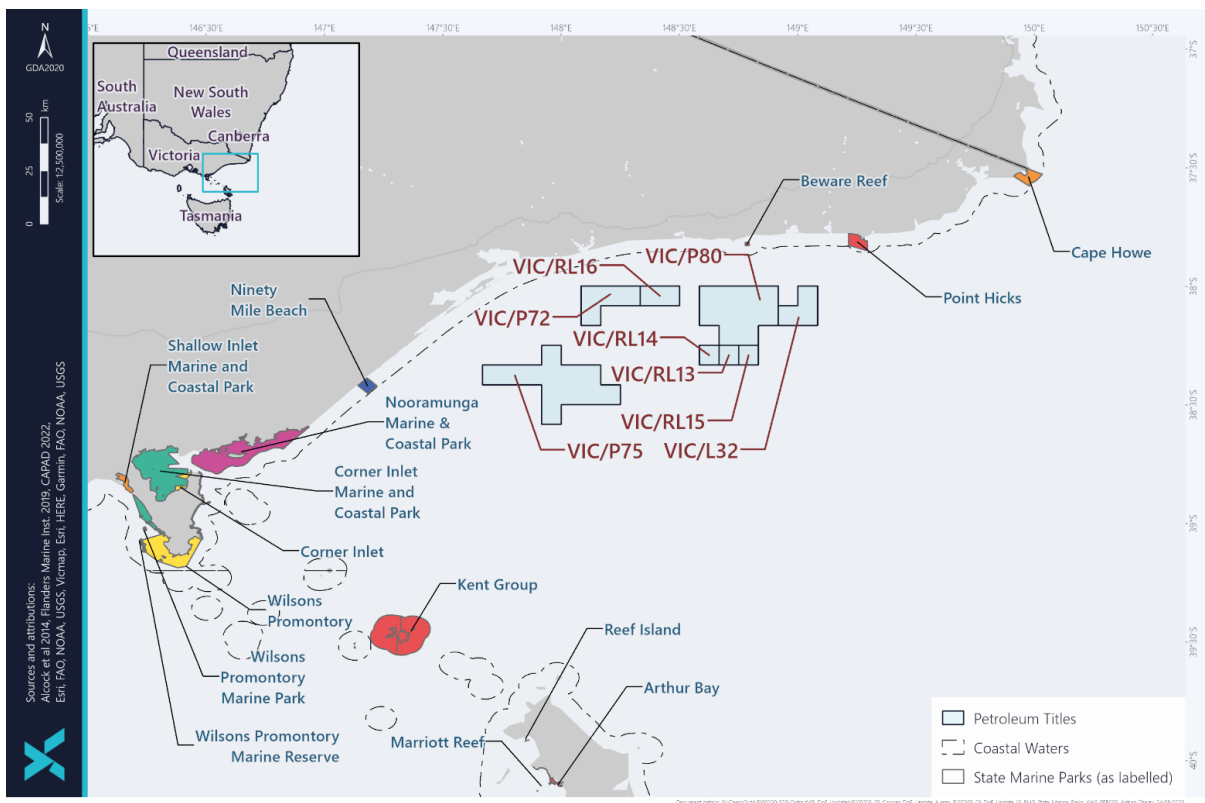


Figure 4-7: State Marine Parks within the vicinity of the BMG assets

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4.5.2 Terrestrial Protected Areas

State terrestrial protected areas are declared under each individual state's legislation and are managed by state authorities. There are several state terrestrial protected areas within the Environment Sectors (Table 4-8).

Table 4-8: State Terrestrial Protected Areas within the Environment Sectors

Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
South Australia									
Beachport Conservation Park	✓								
Canunda National Park	✓								
Douglas Point Conservation Park	✓								
Guichen Bay Conservation Park	✓								
Little Dip Conservation Park	✓								
Penguin Island Conservation Park	✓								
Piccaninnie Ponds Conservation Park	✓								
Victoria									
Aire River Heritage River	✓								
Anser Island Reference Area		✓							
Bay of Islands Coastal Park	✓								
Bemm, Goolengook, Arte and Errinundra Rivers Heritage River			✓						
Cape Conran Coastal Park			✓						
Cape Howe Wilderness Zone			✓						
Cape Liptrap Coastal Park		✓							
Cape Nelson State Park	✓								
Croajingolong National Park			✓						
Discovery Bay Coastal Park	✓								
East Gippsland Coastal streams Natural Catchment Area			✓						
Entrance Point Reference Area		✓							
Ewing Morass W.R. Natural Feature Reserve			✓						
Fossil Beach G.R. Natural Features Reserve		✓							
French Island National Park		✓							
Gippsland Lakes Coastal Park			✓						
Glenelg Riverv Heritage River	✓								
Great Otway National Park	✓	✓							
Jawbone F.F.R. Nature Conservation Reserve		✓							
Lady Julia Percy Island W.R. Nature Conservation Reserve	✓								
Lake Tyres State Park			✓						
Lawrence Rocks W.R. Nature Conservation Reserve	✓								
Limeburners Lagoon (Hovells Creek) F.F.R. Nature Conservation Reserve		✓							
Mornington Peninsula National Park		✓							

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Mount Vereker Creek Natural Catchment Area		✓							
North Western Port N.C.R. Natural Features Reserve		✓							
Phillip Island Nature Park		✓							
Point Nepean National Park		✓							
Port Campbell National Park	✓								
Rame Head Remote and Natural Area			✓						
Reef Island and Bass River Mouth N.C.R Natural Features Reserve		✓							
Sandpatch Wilderness Zone			✓						
Seal Islands W.R. Nature Conservation Reserve		✓							
Southern Wilsons Promontory Remote and Natural Area		✓							
Swan Bay - Edwards Point W.R Nature Conservation Reserve		✓							
The Spit W.R. Nature Conservation Reserve		✓							
Vereker Creek Reference Area		✓							
Wilsons Promontory Islands Remote and Natural Area		✓							
Wilsons Promontory National Park		✓							
Wilsons Promontory Wilderness Zone		✓							
Yambuk F.F.R. Nature Conservation Reserve	✓								
Tasmania									
Actaeon Island Game Reserve				✓					
Albatross Island Nature Reserve	✓								
Anderson Islands Conservation Area		✓							
Apex Point Conservation Area					✓				
Bass Pyramid Nature Reserve		✓							
Battery Island Conservation Area		✓							
Bay of Fires Conservation Area		✓			✓				
Baynes Island Nature Reserve		✓							
Bellettes Bay Conservation Area					✓				
Betsey Island Nature Reserve					✓				
Big Bay Conservation Area		✓							
Big Green Island Nature Reserve		✓							
Bird Island Game Reserve	✓								
Bligh Point Conservation Area					✓				
Blyth Point Conservation Area		✓							
Boltons Beach Conservation Area					✓				
Boobyalla Conservation Area		✓							
Boot Bay Conservation Area					✓				
Boxen Island Conservation Area		✓							
Brick Islands Conservation Area		✓							
Briggs Islet Conservation Area		✓							

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Brother and Sister Conservation Area					✓				
Bruny Island Neck Game Reserve					✓				
Bull Rock Conservation Area		✓							
Bun Beetons Point Conservation Area		✓							
Burnett Point Conservation Area					✓				
Calm Bay State Reserve				✓					
Cape Bernier Nature Reserve					✓				
Cape Contrariety Private Sanctuary					✓				
Cape de la Sortie Conservation Area					✓				
Cape Deslacs Nature Reserve					✓				
Cape Portland Conservation Area		✓							
Cape Portland Private Sanctuary		✓							
Cape Wickham Conservation Area	✓								
Cat Island Conservation Area		✓							
Cataraqui Point Conservation Area	✓								
Chalky Island Conservation Area		✓							
Christmas Island Nature Reserve	✓								
Chronicle Point Conservation Area					✓				
Chuckle Head Conservation Area					✓				
City of Melbourne Bay Conservation Area	✓								
Clifton Beach Conservation Area					✓				
Coal Point Conservation Area					✓				
Coles Bay Conservation Area					✓				
Cone Islet Conservation Area		✓							
Coningham Nature Recreation Area					✓				
Coswell Beach Conservation Area					✓				
Cressy Beach Conservation Area					✓				
Councillor Island Nature Reserve	✓								
Craggy Island Conservation Area		✓							
Crooked Billet Bay Conservation Area					✓				
Curtis Island Nature Reserve		✓							
Dart Island State Reserve					✓				
Denison Rivulet Conservation Area					✓				
Devils Tower Nature Reserve		✓							
Diamond Island Nature Reserve					✓				
Doctors Rocks Conservation Area		✓							
Don Heads Conservation Area		✓							
Double Sandy Point Conservation Area		✓							
Doughboy Island Conservation Area		✓							
Disappointment Bay State Reserve	✓								
Eaglehawk Bay State Reserve					✓				

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Eaglehawk Bay-Flinders Bay Conservation Area					✓				
East Kangaroo Island Nature Reserve		✓							
East Moncoeur Island Conservation Area		✓							
East Risdon State Reserve					✓				
Echo Sugarloaf State Reserve					✓				
Edgcumbe Beach Conservation Area		✓							
Egg Beach Egg Beach		✓							
Emita Nature Recreation Area		✓							
Esperance Point Conservation Area					✓				
Fannys Bay Conservation Area		✓							
Five Mile Bluff Conservation Area		✓							
Foochow Conservation Area		✓							
Forsyth Island Conservation Area		✓							
Forwards Beach Conservation Area		✓							
Fossil Bluff Conservation Area		✓							
Fossil Cove Conservation Area					✓				
Foster Island Nature Reserve		✓							
Fotheringate Bay Conservation Area		✓							
Four Mile Beach Regional Reserve				✓					
Four Mile Creek Conservation Area					✓				
Freycinet National Park					✓				
Gellibrand Point Nature Recreation Area					✓				
George Rocks Nature Reserve		✓							
Goose Island Conservation Area		✓							
Granite Point Conservation Area		✓							
Green Island Nature Reserve					✓				
Greens Beach Conservation Area		✓							
Gull Island Conservation Area		✓							
Harbour Islets Conservation Area	✓								
Harcus Island Conservation Area		✓							
Henderson Islets Conservation Area	✓								
Hogan Group Conservation Area		✓							
Holts Point Conservation Area		✓							
Hope Island Nature Recreation Area					✓				
Humbug Point Nature Recreation Area					✓				
Hunter Island Conservation Area	✓								
Ile des Phoques Nature Reserve					✓				
Iron Pot State Reserve					✓				
Isabella Island Nature Reserve		✓							
Jacksons Cove Conservation Area		✓							
Kangaroo Island Conservation Area		✓							

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Kelvedon Beach Conservation Area					✓				
Killiecrankie Nature Recreation Area		✓							
Lachlan Island Nature Reserve					✓				
Lagoons Beach Conservation Area					✓				
Lavinia State Reserve	✓								
Little Chalky Island Conservation Area		✓							
Little Dog Island Game Reserve		✓							
Little Green Island Conservation Area		✓							
Little Island Conservation Area		✓							
Little Peggs Beach State Reserve		✓							
Little Swan Island Nature Reserve		✓							
Little Trefoil Conservation Area	✓								
Little Waterhouse Island Nature Reserve		✓							
Lime Bay State Reserve					✓				
Little Beach Conservation Area					✓				
Little Christmas Island Nature Reserve					✓				
Little Swanport Conservation Area					✓				
Logan Lagoon Conservation Area		✓							
Long Bay Conservation Area					✓				
Long Island Conservation Area		✓							
Long Spit Private Nature Reserve					✓				
Low Head Conservation Area		✓							
Low Islets Nature Reserve		✓							
Low Point Conservation Area		✓							
Maria Island National Park					✓				
Marion Beach Conservation Area					✓				
Marks Point Conservation Area					✓				
Marshall Beach Conservation Area		✓							
Mayfield Bay Conservation Area					✓				
Mile Island Conservation Area		✓							
Millingtons Beach Conservation Area					✓				
Montagu Island Conservation Area		✓							
Mount Heemskirk Regional Reserve				✓					
Mount Tanner Nature Recreation Area		✓							
Mount William National Park		✓			✓				
Musselroe Bay Conservation Area		✓							
Narawntapu National Park		✓							
Nares Rocks Conservation Area	✓								
Neds Reef Conservation Area		✓							
New Year Island Game Reserve	✓								
Night Island Conservation Area		✓							

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Ninth Island Conservation Area		✓							
Norfolk Bay Conservation Area					✓				
North East Islet Nature Reserve		✓							
North East River Game Reserve		✓							
North Passage Point Conservation Area					✓				
North West Head Conservation Area					✓				
Ocean Beach Conservation Area				✓					
Outer North Head Conservation Area					✓				
Oyster Rocks Conservation Area		✓							
Palana Beach Nature Recreation Area		✓							
Passage Island Conservation Area		✓							
Pasco Group Conservation Area		✓							
Patriarchs Conservation Area		✓							
Peggs Beach Conservation Area		✓							
Pelican Island Conservation Area				✓					
Penguin Islet Nature Reserve		✓							
Perkins Island Conservation Area		✓							
Petrel Islands Game Reserve		✓							
Pitt Water Nature Reserve					✓				
Porky Beach Conservation Area	✓								
Prime Seal Island Conservation Area		✓							
Ram Island Conservation Area		✓							
Recherche Bay Nature Recreation Area				✓					
Red Hut Point Conservation Area	✓								
Rocky Cape National Park		✓							
Rodondo Island Nature Reserve		✓							
Roydon Island Conservation Area		✓							
Sea Elephant Conservation Area	✓								
Seal Rocks State Reserve	✓								
Seacrow Islet Conservation Area	✓								
Sellars Lagoon Game Reserve		✓							
Sentinel Island Conservation Area		✓							
Settlement Point Conservation Area		✓							
Seymour Conservation Area					✓				
Single Tree Plain Conservation Area		✓							
Sisters Island Conservation Area		✓							
Slaves Bay Conservation Area				✓					
Snake Bay Conservation Area					✓				
South Bruny National Park					✓				
Southport Lagoon Conservation Area				✓					
Southwest National Park				✓					

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Spike Island Conservation Area		✓							
Stack Island Game Reserve	✓								
Stanley Conservation Area		✓							
Stokes Point Conservation Area	✓								
Storehouse Island Conservation Area		✓							
Strzelecki National Park		✓							
Sugarloaf Rock Conservation Area		✓							
Sundown Point State Reserve				✓					
Table Cape Conservation Area		✓							
Table Cape State Reserve		✓							
Tasman National Park					✓				
Tatlows Beach Conservation Area		✓							
Tenth Island Nature Reserve		✓							
The Doughboys Nature Reserve	✓								
The Nut State Reserve		✓							
Three Hummock Island State Reserve		✓							
Three Sisters-Goat Island Nature Reserve		✓							
Trial Harbour State Reserve				✓					
Trousers Point Beach Conservation Area		✓							
Vansittart Island Conservation Area		✓							
Wallaby Islands Conservation Area		✓							
Waterhouse Conservation Area		✓							
Waterhouse Island Conservation Area		✓							
Wedge Island Conservation Area					✓				
West Coast Range Regional Reserve				✓					
West Moncoeur Island Nature Reserve		✓							
West Point State Reserve				✓					
White Beach Conservation Area		✓							
Wright Rock Nature Reserve		✓							
Wybalenna Island Conservation Area		✓							
New South Wales									
Arakoon National Park						✓			
Arakwal National Park							✓		
Awabakal Nature Reserve						✓			
Belowla Nature Reserve						✓			
Ben Boyd National Park			✓						
Biamanga National Park			✓						
Billinudgel Nature Reserve							✓		
Bird Island Nature Reserve						✓			
Bongil Bongil National Park						✓			

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Booderee National Park (Commonwealth) ⁷						✓			
Boondelbah Nature Reserve						✓			
Booti Booti National Park						✓			
Bouddi National Park						✓			
Bournda National Park			✓						
Brisbane Water National Park						✓			
Broken Head Nature Reserve							✓		
Broulee Island Nature Reserve			✓						
Brush Island Nature Reserve						✓			
Bundjalung National Park							✓		
Bushy Island Nature Reserve						✓			
Cape Byron State Conservation Area							✓		
Coffs Coast Regional Park						✓	✓		
Comerong Island Nature Reserve						✓			
Conjola National Park						✓			
Cook Island Nature Reserve							✓		
Corrie Island Nature Reserve						✓			
Crowdy Bay National Park						✓			
Cudgen Nature Reserve							✓		
Cullendulla Creek Nature Reserve			✓			✓			
Darawank Nature Reserve						✓			
Eagles Claw Nature Reserve			✓						
Eurobodalla National Park			✓						
Five Islands Nature Reserve						✓			
Gaagal Wanggaan (South Beach) National Park						✓			
Gir-um-bit National Park						✓			
Gir-um-bit State Conservation Area						✓			
Glenrock State Conservation Area						✓			
Goolawah National Park						✓			
Goolawah Regional Park						✓			
Hat Head National Park						✓			
Jagun Nature Reserve						✓			
Jervis Bay National Park						✓			
John Gould Nature Reserve						✓			
Julian Rocks Nguthungulli Nature Reserve							✓		
Kamay Botany Bay National Park						✓			
Kattang Nature Reserve						✓			

⁷ Booderee National Park is located in NSW, however, it is under DCCEEW (Commonwealth) authority.

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Karuah Nature Reserve						✓			
Khappinghat Nature Reserve						✓			
Ku-ring-gai Chase National Park						✓			
Limeburners Creek National Park						✓			
Lion Island Nature Reserve						✓			
Little Broughton Island Nature Reserve						✓			
Long Island Nature Reserve						✓			
Lord Howe Island Permanent Park Preserve								✓	
Malabar Headland National Park						✓			
Marramarra National Park						✓			
Meroo National Park						✓			
Mimosa Rocks National Park			✓						
Montague Island Nature Reserve			✓						
Moon Island Nature Reserve						✓			
Moonee Beach Nature Reserve						✓			
Munmorah State Conservation Area						✓			
Muogamarra Nature Reserve						✓			
Murramarang National Park						✓			
Muttonbird Island Natures Reserve						✓			
Myall Lakes National Park						✓			
Nadgee Nature Reserve			✓						
Narrawallee Creek Nature Reserve						✓			
North Rock Nature Reserve							✓		
North Solitary Island Nature Reserve							✓		
North West Solitary Island Nature Reserve							✓		
One Tree Island Nature Reserve						✓			
Richmond River Nature Reserve							✓		
Royal National Park						✓			
Saltwater National Park						✓			
Sea Acres National Park						✓			
Seal Rocks Nature Reserve						✓			
Shark Island Nature Reserve						✓			
Snapper Island Nature Reserve						✓			
South West Solitary Island Nature Reserve							✓		
Spectacle Island Nature Reserve						✓			
Split Solitary Island Nature Reserve						✓			
Stormpetrel Nature Reserve						✓			
Sydney Harbour National Park						✓			
Tilligerry Nature Reserve						✓			
Tollgate Islands Nature Reserve			✓						
Tomaree National Park						✓			

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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Towra Point Nature Reserve						✓			
Tyagarah Nature Reserve							✓		
Wallarah National Park						✓			
Wamberal Lagoon Nature Reserve						✓			
Wooyung Nature Reserve							✓		
Worimi Regional Park						✓			
Wyrabalong National Park						✓			
Yuragir National Park							✓		
Queensland									
Beachmere Conservation Park							✓		
Bird Island Conservation Park							✓		
Bribie Island National Park							✓		
Broadwater Conservation Park							✓		
Buckleys Hole							✓		
Burleigh Head National Park							✓		
Burrum Coast National Park							✓		
Cabbage Tree Point Conservation Park							✓		
Capricornia Cays National Park							✓		
Curtis Island National Park							✓		
Deepwater National Park							✓		
Eurimbula National Park							✓		
Eurimbula Resources Reserve									
Ex-HMAS Brisbane Regional Park							✓		
Fort Lytton National Park							✓		
Goat Island Conservation Park							✓		
Great Sandy Conservation Park							✓		
Great Sandy National Park							✓		
Joseph Banks Conservation Park							✓		
Main Beach Conservation Park							✓		
Maroochy River Conservation Park							✓		
Mon Repos Regional Park							✓		
Moreton Island							✓		
Mouth of Baffle Creek							✓		
Mouth of Kolan River Conservation Park							✓		
Mud Island Conservation Park							✓		
Naree Budjong Djara National Park							✓		
Noosa National Park							✓		
South Stradbroke Island Conservation Park							✓		
Southern Moreton Bay Islands National Park							✓		
St Helena Island National Park							✓		
Teerk Roo Ra Conservation Park							✓		

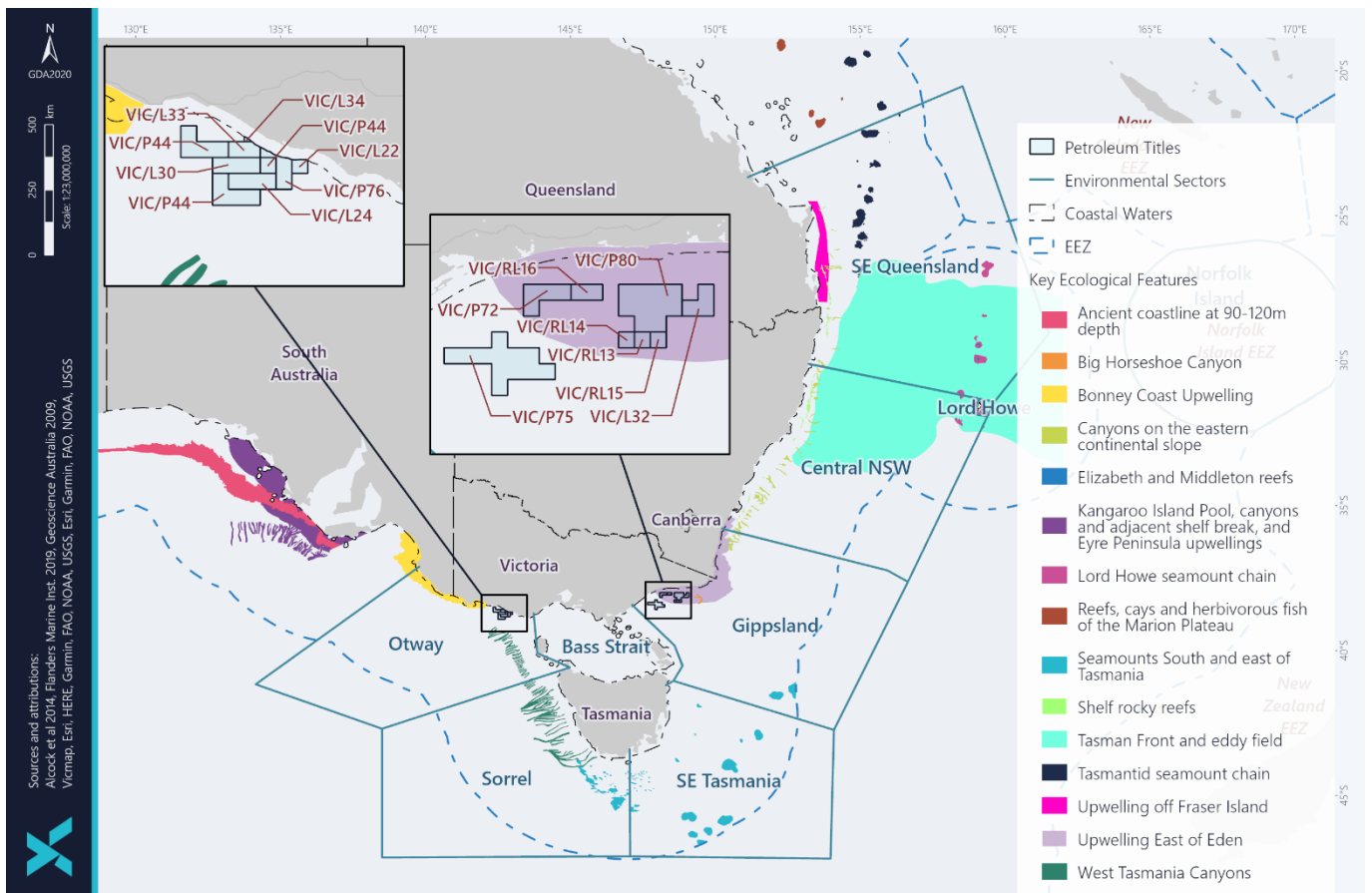
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Terrestrial Protected Area	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Teerk Roo Ra National Park Aboriginal							✓		
Wild Cattle Island National Park							✓		
External Territories									
Norfolk Island Botanic Gardens									✓
Norfolk Island National Park									✓

4.6 Key Ecological Features

Key Ecological Features (KEF) are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region’s biodiversity or its ecosystem function and integrity. Seventeen KEFs occur within the Environment Sectors (Figure 4-8, Table 4-9).



Note: Not all features can be spatially mapped, refer to below table for full list of features.

Figure 4-8: Key Ecological Features within the Environment Sectors

Table 4-9: Key Ecological Features present within the Environment Sectors

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Key Ecological Feature	Values and Description ^{1,2,3}	South-east Marine Region ¹								
		Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Bass Cascade	<p>High productivity</p> <p>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.</p>			✓						
Big Horseshoe Canyon	<p>High productivity, aggregations of marine life</p> <p>The Big Horseshoe Canyon is the easternmost arm of the Bass Canyon systems.</p> <p>The steep, rocky slopes provide hard substrate habitat for attached large megafauna. Sponges and other habitat forming species provide structural refuges for benthic fishes, including the commercially important pink ling. It is the only known temperate location of the stalked crinoid <i>Metacrinus cyaneu</i>.</p>			✓						
Bonney Coast Upwelling	<p>High productivity, aggregations of marine life</p> <p>The Bonney Coast Upwelling is a predictable, seasonal upwelling bringing cold nutrient rich water to the sea surface and supporting regionally high productivity and high species diversity in an area where such sites are relatively rare and mostly of smaller scale.</p> <p>It is one of 12 widely recognised and well-known areas worldwide where blue whales are known to feed in relatively high numbers.</p> <p>The area is significant as one of the largest and most predictable upwellings in south-eastern Australia. This is not the only upwelling in southeast Australia driven by the prevailing south-easterly winds, but it is the most prominent. In addition to whales, many endangered and listed species frequent the area, possibly also relying on the abundance of krill that provide a food source to many seabirds and fish. The high productivity of the Bonney Upwelling is also capitalised on by other higher predator species such as little penguins and Australian fur seals feeding on baitfish.</p>	✓								
East Tasmania Subtropical Convergence Zone	<p>High productivity, aggregations of marine life</p> <p>This zone of enhanced pelagic productivity occurs where eddies of the East Australian Current interact with subantarctic waters driven by westerly winds. The northern and southern extent</p>					✓				

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Key Ecological Feature	Values and Description ^{1,2,3}	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	<p>of the feature are approximately level with the north-east tip of Tasmania and the Tasman Peninsula.</p> <p>This is a complex feature that is characterised by autumn and spring phytoplankton blooms that form the basis of a productive food chain which supports cetaceans, seals, sharks and seabirds.</p> <p>The phytoplankton blooms also attract migratory commercial fish stocks such as Southern bluefin tuna, barracouta, and jack mackerel. Phytoplankton blooms are important for krill, which in turn form an important component of the diet of many pelagic species.</p>									
Seamounts South and East of Tasmania	<p>High productivity, aggregations of marine life</p> <p>These seamounts are a chain or cluster of seamounts rising from the abyssal plain, continental rise or plateau situated 200 km or more from shore (east of Flinders Island to south east of southern Tasmania).</p> <p>Seamounts can sometimes influence and intensify currents, creating localised upwelling and turbulent mixing. Accelerated water flows are thought to create upwellings of nutrient rich waters from the seafloor.</p> <p>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.</p>				✓	✓				
Shelf Rocky Reefs and Hard Substrates	<p>High productivity, aggregations of marine life</p> <p>Rocky reefs and hard grounds are located in all areas of the South-east Marine Region continental shelf including Bass Strait, from the sub-tidal zone shore to the continental shelf break. The continental shelf break generally occurs in 50 m to 150–220 m water depth. The shallowest depth at which the rocky reefs occur in Commonwealth waters is approximately 50 m.</p> <p>On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity.</p>	✓	✓	✓	✓	✓				
Upwelling East of Eden	<p>High productivity, aggregations of marine life</p> <p>Dynamic eddies of the East Australian Current 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.</p>			✓						

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Key Ecological Feature	Values and Description ^{1,2,3}	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	<p>The upwelling supports regionally high primary productivity that supports fisheries and biodiversity, including top order predators, marine mammals and seabirds.</p> <p>This area is one of two feeding areas for blue whales and humpback whales, known to arrive when significant krill aggregations form. The area is also important for seals, other cetaceans, sharks and seabirds.</p>									
<p>West Tasmania Canyon</p>	<p>High productivity, aggregations of marine life</p> <p>The West Tasmania Canyons are located on the edge of the continental shelf offshore of the north-west corner of Tasmania and as far south as Macquarie Harbour. These canyons can influence currents, act as sinks for rich organic sediments and debris, and can trap waters or create upwellings that result in productivity and biodiversity hotspots. For example, plumes of sediment and nutrient-rich water can be seen at or near the heads of canyons. Sponges are concentrated near the canyon heads, with the greatest diversity between 200 m and 350 m depth. Sponges are associated with abundance of fishes and the canyons support a diversity of sponges comparable to that of seamounts.</p>	✓			✓					
<p>Temperate East Marine Region²</p>										
<p>Canyons on the Eastern Continental Slope</p>	<p>Unique sea-floor feature with ecological properties of regional significance</p> <p>Canyon systems have a marked influence on the diversity and abundance of species, driven by the combined effects of steep and rugged topography, ocean currents, sea-floor types and nutrient availability. They significantly contribute to the overall habitat diversity of the sea floor, by providing hard surfaces in depth zones where soft sediment habitats prevail. Large benthic animals such as sponges and feather stars are abundant, with particularly high diversity found in the upper slope regions (150–700 m). Canyons also create localised changes in productivity in the water column above them, providing feeding opportunities for a range of species, many of which are commercially important or threatened.</p>			✓			✓	✓		
<p>Elizabeth and Middleton Reefs</p>	<p>Aggregations of marine life; biodiversity and endemism</p> <p>Elizabeth and Middleton reefs are small, isolated, oceanic platform reefs that occur on top of the volcanic seamounts of the Lord Howe seamount chain. The reefs are impacted by the East Australian Current, exposing the area to its warm waters as well as the surrounding cooler ocean. This key ecological feature supports tropical and temperate marine life, including both warm and cold-water corals and over 300 fish species. The lagoons of both reefs are</p>								✓	

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Key Ecological Feature	Values and Description ^{1,2,3}	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	important areas for populations of black cod and the Galapagos shark.									
Lord Howe Seamount Chain	<p>High productivity; aggregations of marine life; biodiversity and endemism</p> <p>The Lord Howe seamount chain runs for approximately 1000 km along the western margin of the Lord Howe Rise, extending from Lord Howe Island in the south to Nova Bank in the north. It supports tropical shallow coral reefs and deep cold-water corals.</p>								✓	
Shelf Rocky Reefs	<p>Unique sea-floor feature with ecological properties of regional significance</p> <p>Along the continental shelf south of the Great Barrier Reef, communities associated with the shift from algae-dominated sea-floor communities to those dominated by attached invertebrates (including large sponges, moss animals and soft corals). This shift generally occurs at a depth of 45 m. These invertebrates create a complex habitat that supports a multitude of animals including crabs, snails, worms and starfish. The habitats also contain a diverse assemblage of bottom-dwelling fishes that show distinct patterns of association with shelf-reef habitats.</p>			✓			✓	✓		
Tasman Front and Eddy Field	<p>High productivity; aggregations of marine life; biodiversity and endemism</p> <p>The Tasman Front is a region of intermediate productivity that separates the warm, nutrient-poor waters of the Coral Sea from the cold, nutrient-rich waters of the Tasman Sea. The front is located between 27° S and 33° S, moving north during winter and south in summer. It is associated with warm-core eddies, a number of which are semipermanent features.</p>						✓	✓	✓	✓
Tasmantid Seamount Chain	<p>High productivity; aggregations of marine life; biodiversity and endemism</p> <p>The Tasmantid seamount chain is a prominent chain of underwater volcanic mountains, plateaux and terraces that runs north–south at approximately 155° E, extending into the Tasman Basin. At the deepest point of the chain, features rise to a depth of 1400–900 m below sea level. At the northernmost extent, features rise to a depth of 400–150 m below sea level, with some breaking the surface to form islands. The Tasmantid seamount chain contains a range of habitats, from deep sea sponge gardens to near-pristine tropical coral reef systems. Collectively, these are biological hotspots with high species diversity. They are also known feeding and breeding grounds for a number of open ocean species (e.g. billfish, marine turtles, marine mammals) and have high species endemism.</p>						✓	✓		

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Key Ecological Feature	Values and Description ^{1,2,3}	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Upwelling off Fraser Island	<p>High productivity; aggregations of marine life</p> <p>In two areas near Fraser Island, upwellings of cold, deep waters mix with surface waters. Tides, wind and currents draw these nutrient-rich waters onto the shelf, where they generate blooms of phytoplankton that support animals higher in the food chain, including a number of commercially valuable and threatened species.</p>							✓		
Norfolk Ridge	<p>Enhanced ecological functioning and integrity, and biodiversity, which apply to both its benthic and pelagic habitats</p> <p>Stretching across the Temperate East Marine Region, the Norfolk Ridge provides a rich biological source of benthic biodiversity and endemism. Similarly, to the Lord Howe chain, the ridge also generates localised oceanographic changes which create sites of enhanced productivity and aggregate marine species.</p>									✓
Coral Sea Marine Region³										
Reefs, cays and herbivorous fish of the Marion Plateau	<p>Marion Plateau lies to the south of the Queensland Plateau and is separated from it by the deep water of the Townsville Trough. This feature supports reefs and cays, most notably Marion and Saumarez Reefs. As with the reefs of the Queensland Plateau, these sites support diverse and abundant invertebrate and fish communities. Due to the flow of the East Australian Current, it is thought that these communities may be distinct from their Queensland Plateau neighbours.</p>							✓		

Notes:

1. Values and Descriptions as provided in DoE, 2015a.
2. Values and Descriptions as provided in DSEWPaC, 2012f.
3. Values and Descriptions as provided in DNP, 2018b.

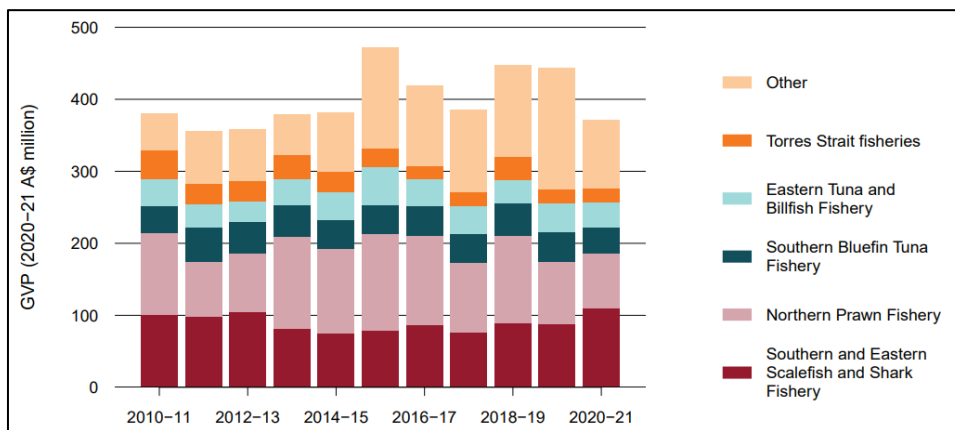
5 Social Environment

5.1 Commercial Fisheries

5.1.1 Commonwealth-managed Fisheries

Commonwealth fisheries are managed by the Australian Fisheries Management Authority (AFMA), with the fisheries typically operating within 3 nm to 200 nm offshore (i.e. to the extent of the Australian Fishing Zone).

In 2020-21 the Gross Value of Production (GVP) from Commonwealth fisheries was estimated at \$374 million; accounting for 27% of wild-catch fisheries GVP in Australia (\$1.39 billion, Figure 5-1) (Patterson, et al., 2022).



(Source: (Patterson, et al., 2022))
 Figure 5-1: 2016-2017 Gross Value of Production of Commonwealth Fisheries

There are ten commonwealth-managed commercial fisheries occurring within the Environment Sectors (Table 5-1). Of these fisheries six managed commercial fisheries had fishing efforts during 2021 within Otway and/or Gippsland Environment Sectors (Patterson, et al., 2022):

- Bass Strait Central Zone Scallop Fishery
- Eastern Tuna and Billfish Fishery
- Southern Bluefin Tuna Fishery
- Southern and Eastern Scalefish and Shark Fishery
- Small Pelagic Fishery
- Southern Squid Jig Fishery

Cooper Energy recently commissioning SETFIA (the South East Trawl Fishing Industry Association) to undertake a study into the commercial fishing effort (Commonwealth and State) within the BMG field area (SETFIA, 2020); located within the Gippsland Environmental Sector. Results of this study are included in the sections below where relevant.

Table 5-1: Commonwealth-managed Commercial Fisheries within the Environment Sectors

Fishery	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Bass Strait Central Zone Scallop	✓	✓	✓						
Coral Sea Fishery							✓		
Eastern Tuna and Billfish Fishery	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Fishery	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Norfolk Island Offshore Demersal Finfish Fishery [^]									✓
Skipjack Tuna Fishery [^]	✓	✓	✓	✓	✓	✓	✓	✓	✓
Southern Bluefin Tuna Fishery	✓	✓	✓	✓	✓	✓	✓	✓	✓
Southern and Eastern Scafish and Shark Fishery	✓	✓	✓	✓	✓	✓	✓		
Small Pelagic Fishery	✓	✓	✓	✓	✓	✓	✓	✓	
Southern Squid Jig Fishery	✓	✓	✓	✓	✓	✓	✓	✓	
Western Tuna and Billfish Fishery	✓								

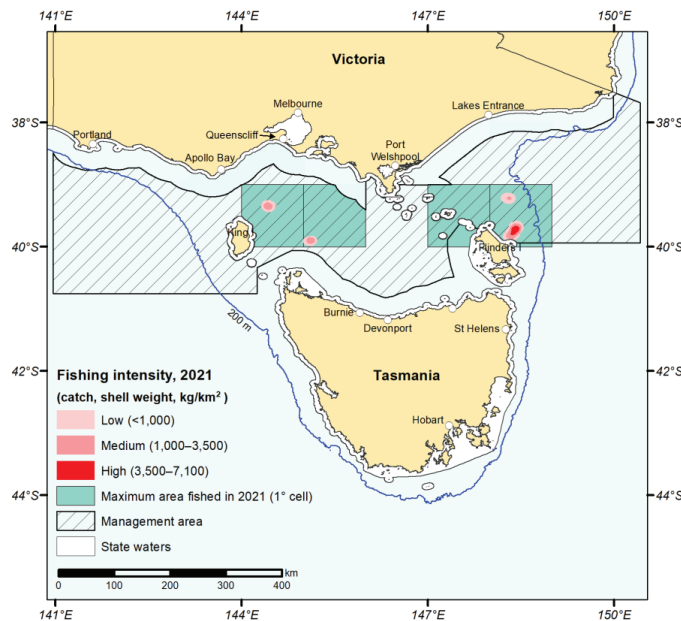
[^]The Fishery is not currently active

5.1.1.1 Bass Strait Central Zone Scallop Fishery

The Bass Strait Central Zone Scallop Fishery (BSCZSF) operates in the Bass Strait above Tasmania and extends from the Victoria/NSW border, around southern Australia to the Victoria /South Australia border (Figure 5-2). The fishing season is typically July to 31 December (AFMA, 2023a); and the target species is Commercial Scallop (*Pecten fumatus*). Scallop spawning occurs from winter to spring (June to November); however, the timing is dependent on environmental conditions such as wind and water temperature (Sause *et al.*, 1987). Fishing method is via scallop dredge.

In 2021, fishing was permitted throughout the area of the fishery, except in 4 scallop beds that were closed under the BSCZSF harvest strategy. Fishing in 2021 was concentrated on beds in both eastern and western Bass Strait.

The fishery has a history of boom and bust, with the catch peaks (1982 to 1983, 1994 to 1996, 2003 and 2018) generally becoming progressively smaller with time. The number of active vessels has declined over the past decades, from 103 during the period 1994 to 10 vessels during 2021 fishing season. Fishing efforts vary from 4,727 dredge-hours in 2020 fishing season to 4,704 dredge-hours in 2021 season.



Source: (Patterson, et al., 2022)

Figure 5-2: Bass Strait Central Zone Scallop Fishery Management Area and 2021 Relative Fishing Intensity

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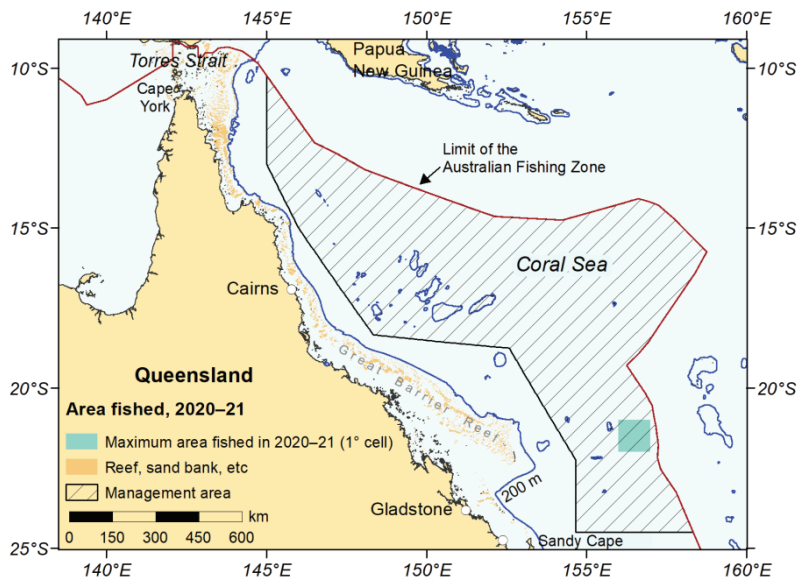
5.1.1.2 Coral Sea Fishery

The Coral Sea Fishery (CSF) operates in Commonwealth waters extending from Sandy Cape to Cape York in Queensland (Figure 5-3). It is bounded on the east by the Australian Fishing Zone and on the west by a boundary line 10 to 100 nm east of the boundary of the Great Barrier Reef Marine Park (Patterson, et al., 2022). The Coral Sea Fishery is a multi-species fishery, targeting a variety of fish, sea cucumbers and crustaceans. The target species include:

- Black teatfish (*Holothuria whitmaei*)
- Prickly redfish (*Thelenota ananas*)
- Surf redfish (*Actinopyga mauritiana*)
- White teatfish (*Actinopyga mauritiana*)
- Other sea cucumber species (~11 species)
- Greenfish (*Stichopus chloronotus*)
- Aquarium Sector (>500 species)
- Lobster and Trochus Sector
- Line Sector (numerous finfish and shark species)

There is a 12 month fishing season, commencing on 1 July (AFMA, 2023b). Fishing methods include hand collection (includes barbless hooks and line, scoop, cast and seine nets), demersal line, dropline, mechanised handline, rod and reel, and trotline (Patterson, et al., 2022). The number of active vessels has declined from 5 vessels during the 2019-20 to 2 vessels during 2020-21 fishing season. Approximately 10.5 t of fish products (excluding the Aquarium Sector, where catch is recorded as the number of individuals) was taken in the Coral Sea Fishery during the 2020-21 season, representing a significant decrease from the 20.0 t taken in the 2019–20 season (Patterson, et al., 2022).

During 2020-21 season, fishing was concentrated in one area offshore of southern Queensland (Figure 5-3).



Source: (Patterson, et al., 2022)

Figure 5-3: Coral Sea Fishery Management Area and 2020-2021 Relative Fishing Intensity

5.1.1.3 Eastern Tuna and Billfish Fishery

The Eastern Tuna and Billfish Fishery operates in the Exclusive Economic Zone and adjacent high seas, from Cape York (Queensland) to the Victoria – South Australia border, including waters around Tasmania and the high seas of the Pacific Ocean (Figure 5-4). Primary target species are:

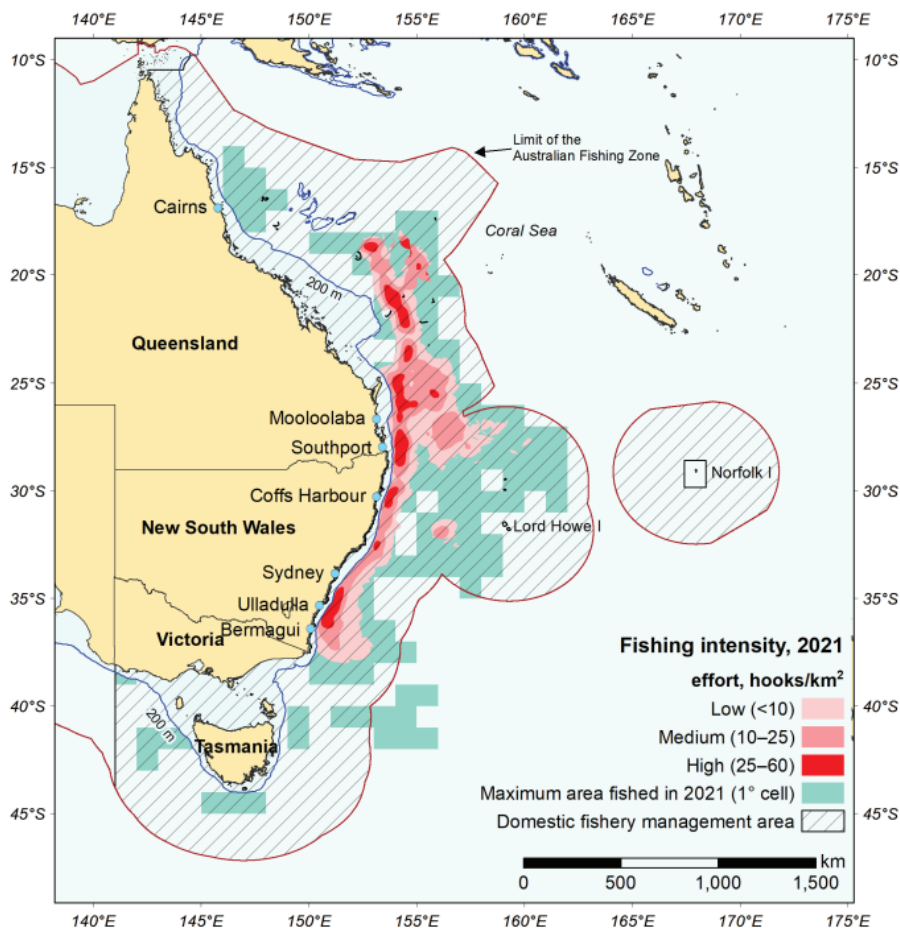
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- Albacore Tuna (*Thunnus alulunga*)
- Bigeye Tuna (*Thunnus obesus*)
- Yellowfin Tuna (*Thunnus albacares*)
- Broadbill Swordfish (*Xiphias gladius*)
- Striped Marlin (*Tetrapturus audux*)

There is a 12 month fishing season, commencing on 1 January (AFMA, 2023c). Fishing methods include pelagic longline, and minor line (trolling, rod and reel, handline). Most of the catch in the fishery was taken with pelagic longlines (7.64 million hooks in 2021), although a small quantity is taken using minor-line methods (284 lines in 2021). The number of active vessels has been steady during 2020 and 2021 season, with a total of 41 vessels engaged in both longline and minor line fishing methods. Fishing efforts vary from 5,239 t in 2020 to 5,148 t in the 2021 season.

During 2021, fishing was concentrated offshore of New South Wales and southern/central Queensland coasts (Figure 5-4).



Source: (Patterson, et al., 2022)

Figure 5-4: Eastern Tuna and Billfish Fishery Management Area and 2021 Relative Fishing Intensity

5.1.1.4 Norfolk Island Fishery

No commercial fishing permits currently exist in the inshore waters adjacent to Norfolk Island although fishing is undertaken by residents of Norfolk Island (AFMA, 2023d).

The Norfolk Island Offshore Demersal Finfish Fishery extends 200 nm from Norfolk Island, excluding the area of the Norfolk Island Inshore Fishery and abuts the New Caledonian EEZ in the north and New Zealand EEZ in the

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south. The Norfolk Island Inshore Fishery covers an area of approximately 67 x 40 nm and was designed to include all shelf waters surrounding Norfolk Island (AFMA, 2023d).

The Norfolk Island Fishery consists of an inshore shelf/upper slope fishery and an exploratory offshore deepwater fishery. The catch is dominated by redthroat emperor (*Lethrinus miniatus*), known locally as ‘trumpeter’ (AFMA, 2023d). Other important species include:

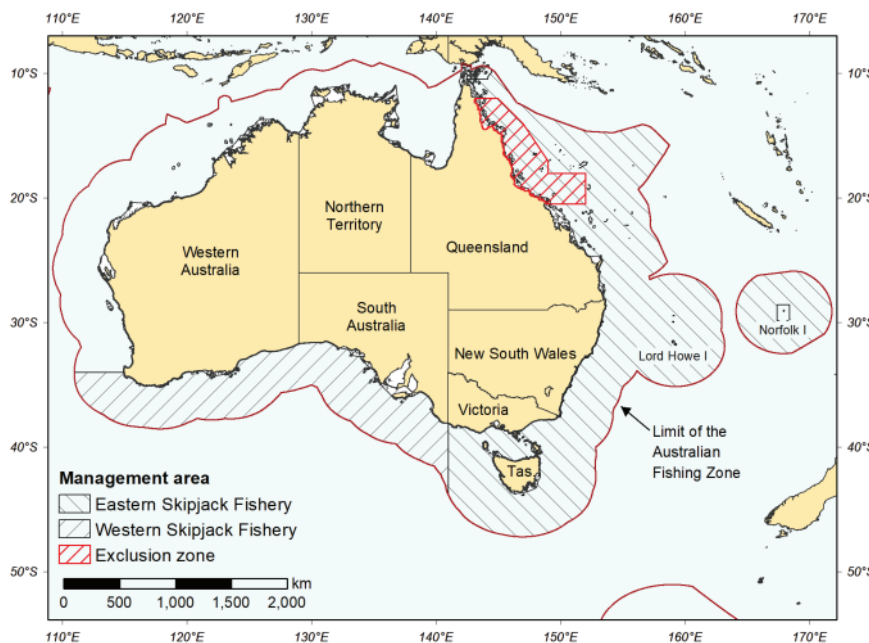
- Chinaman Rockcod (*Epinephelus rivulatus*, 5-10%)
- Amberjack (*Seriola dumerili*, 1-5%; first recorded as being captured on the island in 1980)
- Cook’s Scorpionfish (*Scorpaena cookii*)
- Queensland Groper (*Promicrops lanceolatus*)
- Western Pigfish (*Bodianus vulpinus*)
- Giant Trevally (*Caranx ignobilis*).

Species composition was reported to change only slightly with season but was always the same relative order (AFMA, 2010).

No stock assessments or biomass estimates for species taken within the inshore fisheries have been made. No stock status classifications have been given to this fishery, since there are no defined stocks for management purposes.

5.1.1.5 Skipjack Tuna Fishery (Western)

There has been no fishing effort in the Skipjack Tuna Fishery (STF) since the 2008-2009 fishing season, due to availability of target species and prices received for the product (Patterson, et al., 2022). The management area for the STF covers the entire sea area around Australia to 200 nm offshore; and is split into two sub-fisheries: eastern and western (Figure 5-5). Primary target species were Skipjack Tuna (*Katsuwonus pelamis*).



Source: (Patterson, et al., 2022)
Figure 5-5: Skipjack Tuna Fishery Management Area, 2021

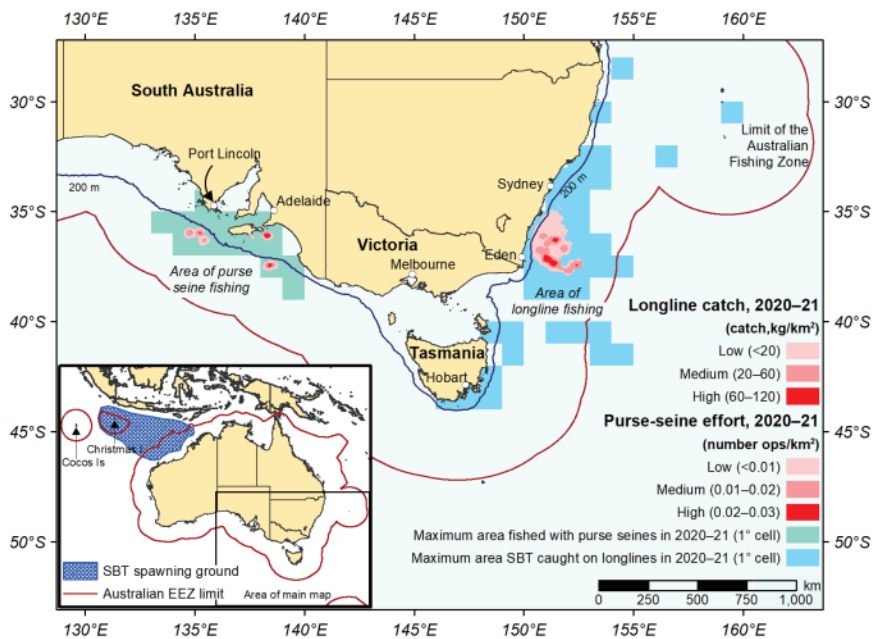
5.1.1.6 Southern Bluefin Tuna Fishery

The Southern Bluefin Tuna Fishery operates within the Australian Fishing Zone, covers the entire sea area around Australia, out to 200 nm from the coast (AFMA, 2023e). The Australian Southern Bluefin Tuna Fishery is managed by limiting the catch of southern bluefin tuna. In this fishery, fish are caught in a net and transferred to floating pontoons, where they are raised until they are big enough to be sold (AFMA, 2023e). Southern bluefin tuna is also

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caught by many other countries. Australia’s catch of southern bluefin tuna is a part of the total catch internationally (AFMA, 2023e). Primary target species is the Southern Bluefin Tuna (*Thunnus maccoyii*).

There is a 12-month fishing season, commencing on 1 December each year (AFMA, 2023e). The spawning ground is in Western Australia (i.e. outside of the Environment Sectors). Longline fishing is used off the east coast of NSW, and the fishing intensity is variable (Figure 5-6). The number of vessels in the purse-seine fishery has been fairly stable, ranging from 5 to 8 since the 1994–95 fishing season (Patterson, et al., 2022). The number of longline vessels fishing for southern bluefin tuna off the east coast of Australia has been more variable, ranging from 11 to 24 vessels during the past 10 years (Patterson, et al., 2022). The total of catch has increased from 5,429 t in 2019-2020 fishing season to 5,646 t in 2020-21.



Source: (Patterson, et al., 2022)

Figure 5-6: Purse-seine effort and longline catch in the Southern Bluefin Tuna Fishery, 202-21 fishing season

5.1.1.7 Southern and Eastern Scalefish and Shark Fishery

The Southern and Eastern Scalefish and Shark Fishery (SESSF) is a multisector, multigear and multispecies fishery, targeting a variety of stocks. The Southern and Eastern Scalefish and Shark Fishery stretches south from Fraser Island in southern Queensland, around Tasmania, to Cape Leeuwin in southern Western Australia (Source: (Patterson, et al., 2022)

Figure 5-12: Fishing intensity in the shark hook sector of the SESSF, 2021–22 fishing season). Primary target species include:

- Blue grenadier (*Macrurus novaezelandiae*)
- Tiger flathead (*Neoplatycephalus richardsoni*)
- Silver warehou (*Seriola punctata*)
- Gummy shark (*Mustelus antarcticus*)
- Pink ling (*Genypterus blacodes*)
- Eastern school whiting (*Sillago flindersi*)

The fishery is comprised of the following major sectors (Source: (Patterson, et al., 2022)

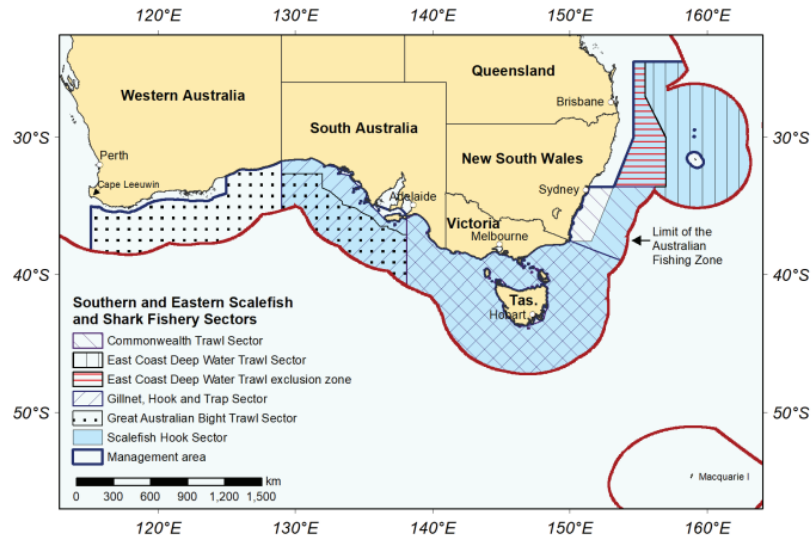
Figure 5-12: Fishing intensity in the shark hook sector of the SESSF, 2021–22 fishing season):

- Commonwealth South East Trawl Sector
- East Coast Deepwater Trawl Sector

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- Scalefish Hook Sector
- Shark Gillnet and Shark Hook Sectors
- Trap Sector
- Great Australian Bight Trawl Sector (outside of the Environment Sectors)

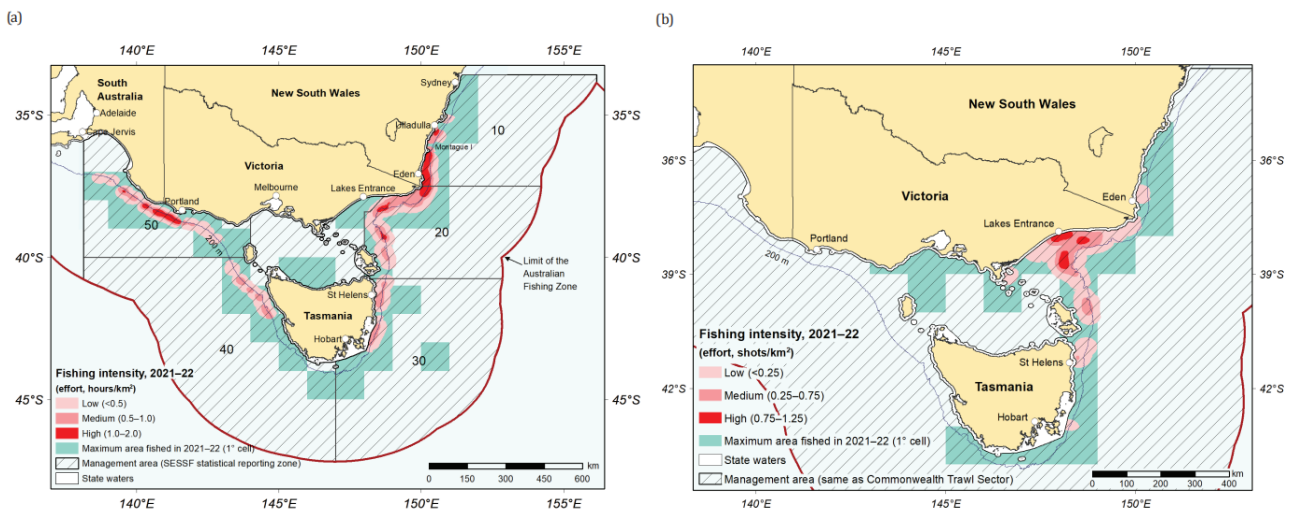


Source: (Patterson, et al., 2022)

Figure 5-7: SESSF Sectors

There is a 12 month fishing season, commencing 1 May (AFMA, 2023f).

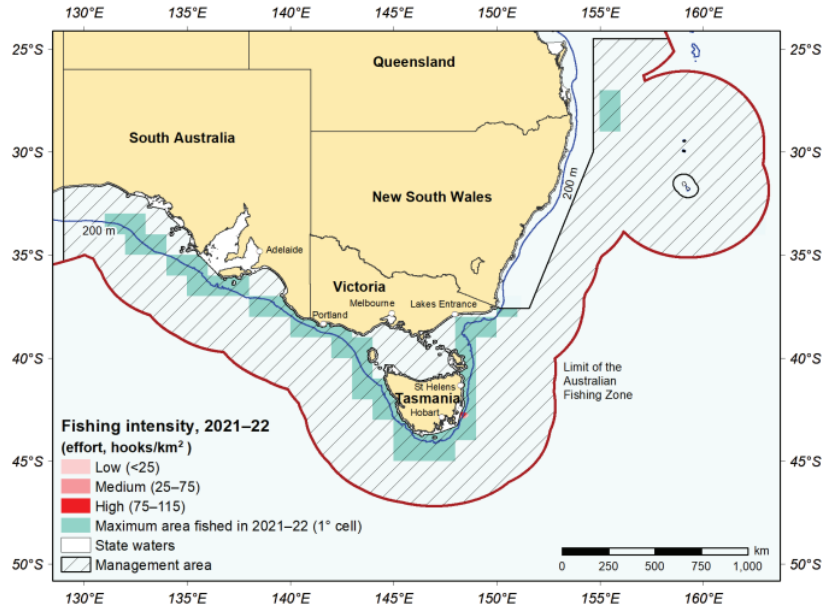
The Commonwealth Trawl Sector (CTS) extends south from Barrenjoey Point in northern NSW to east of Kangaroo Island off South Australia (Figure 5-8) and the Scalefish Hook Sector (SHS) extends around south-eastern Australia to the border between South Australia and Western Australia (Figure 5-9). Effort in these fisheries is widely distributed. However, since 2007 – after the closure to trawling of most SESSF waters deeper than 700 m – effort has become increasingly concentrated on the shelf (up to 200 m) rather than on the slope (Patterson, et al., 2022). The CTS predominantly uses demersal otter trawl and Danish-seine fishing methods. Pair trawling and midwater trawling methods are also permitted under the SESSF management plan but are rarely used. The SHS uses a variety of longline and dropline hook fishing methods, some of which are automated (Patterson, et al., 2022). In 2021–22 in the CTS, otter-board trawlers reported 45,281 hours of fishing effort – a decrease from 51,220 hours in 2020–21; the SHS decreased from 4.43 million hooks in 2020–21 to 3.42 million hooks (Patterson, et al., 2022). The total catch, which includes CTS and SHS sectors, decreased from 20,883 t in 2020–21 to 19,501 t in 2021-22 season.



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Source: (Patterson, et al., 2022)

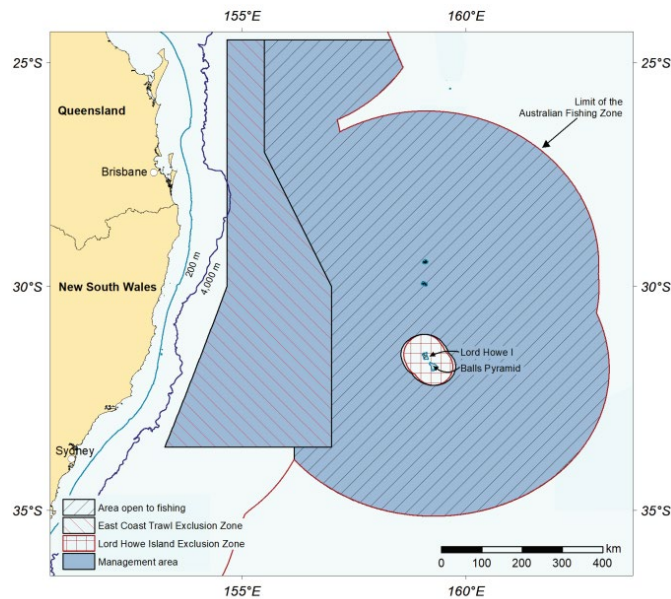
Figure 5-8: Fishing intensity in the Commonwealth Trawl Sector for (a) otter-board trawl and (b) Danish-seine, 2021–22 fishing season



Source: (Patterson, et al., 2022)

Figure 5-9: Fishing intensity in the Scalefish Hook Sector, 2021–22 fishing season

The East Coast Deepwater Trawl Sector (ECDTS) is located beyond the 4,000 m isobath of the continental margin off eastern Australia (Figure 5-10). Effort in this fishery is variable. There was no effort in the fishery between 2013–14 and 2017–18, in 2020–21 or in 2021–22. Only 9 trawl-hours was reported during 2018–19 (Patterson, et al., 2022). The ECDTS uses midwater trawl, demersal otter trawl, Danish-seine and pair trawling gears methods. (Patterson, et al., 2022).



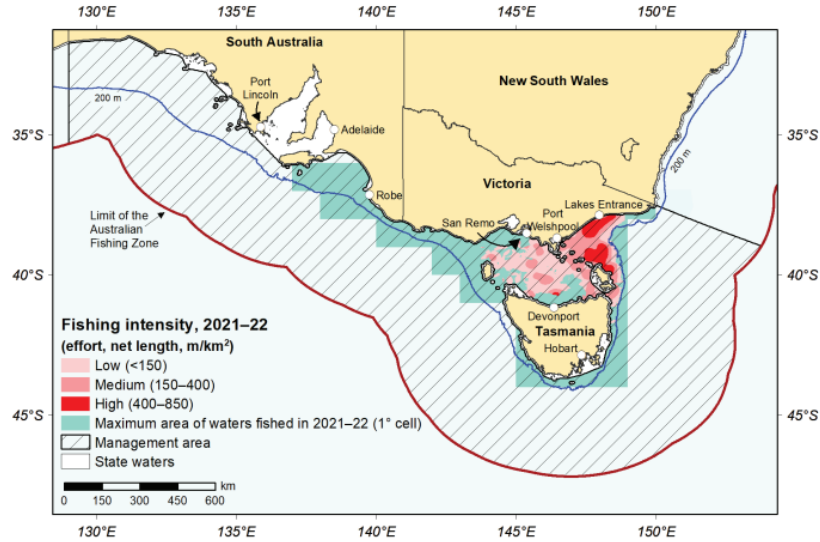
Source: (Patterson, et al., 2022)

Figure 5-10: Area of the East Coast Deepwater Trawl Sector, 2021–22 fishing season

The Shark Gillnet and Shark Hook Sectors (SGSHS) are part of the Gillnet, Hook and Trap Sector (GHTS) and it extends from the Victoria/NSW border, around southern Australia to the South Australia / Western Australia border (Figure 5-11 and Figure 5-16). Most fishing in the SGSHS using nets occurs in Bass Strait, while most fishing using

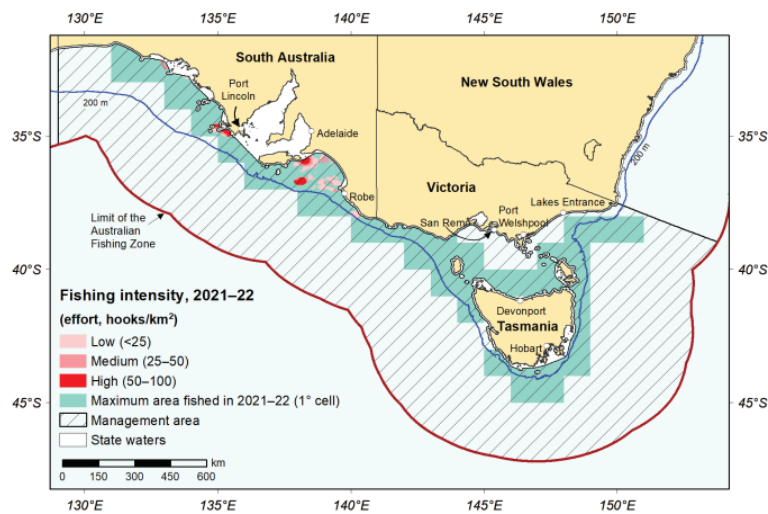
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hooks occurs off South Australia. The number of active gillnet vessels has decreased, from 31 in 2020-21 fishing season to 27 in 2021-22, while the number of active shark hook vessels has increased, from 38 in 2020-21 fishing season to 40 in 2021-22. Fishing efforts varied from 2,415 t in 2020-21 to 2,150 t in 2021-22 season. (Patterson, et al., 2022).



Source: (Patterson, et al., 2022)

Figure 5-11: Fishing intensity in the shark gillnet sector of the Southern and Eastern Scalefish and Shark Fishery, 2021–22 fishing season



Source: (Patterson, et al., 2022)

Figure 5-12: Fishing intensity in the shark hook sector of the SESSF, 2021–22 fishing season

According to research undertaken by Boag and Koopman 2021, though multiple different fisheries have rights to fish around BMG, it is only the SESSF managed fisheries that actively fish around BMG; these are:

- SESSF Commonwealth Trawl sector (Otter trawl and Danish seine)
- SESSF Shark Gillnet and Shark Hook sectors
- SESSF Scalefish Hook sector

As reported by Boag and Koopman 2021, high levels of otter trawl effort and medium to low levels of Danish seine were reported around BMG during 2018-2019. A total of 12 CTS Danish seine vessels fished within a 5 km radius of BMG from July 2010-June 2020, undertaking 51 shots and landing 4.7 t of fish valued at about \$30,000. The

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main species caught was flathead (81%). A total of 13 CTS otter trawl vessels fished within a 5 km radius of BMG from July 2010–June 2020, undertaking 573 shots and landing 195 t of fish valued at about \$1.09 million. Main species caught included flathead (27%), Pink Ling (19%) and Squids (9%).

Average annual catch of fish in the area (a 5km polygon surrounding BMG) equates to approximately \$112,000. This is a very small amount of fish and value relative to the size of the SESSF fishery. The two largest SESSF sectors only rely on the area around BMG for only 0.26% and 0.01% of their annual catch from this area. The BMG polygon is probably as important as any other area of that size (relatively small) to the trawl fishery.

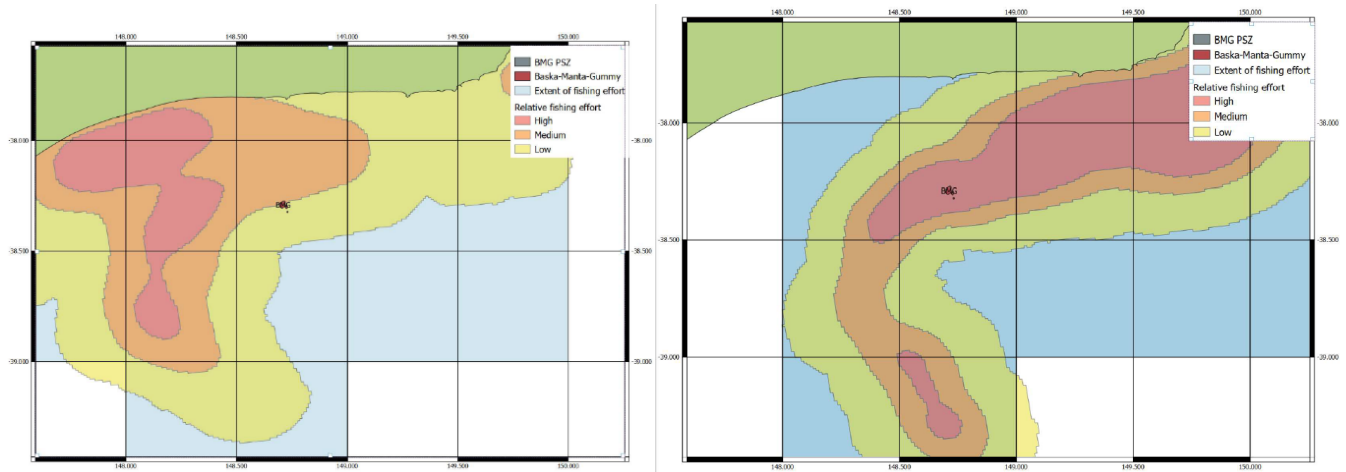


Figure 5-13 Relative fishing intensity and total area fished by the CTS relative to BMG (2018-2019). Left: Trawl Board Sector. Right: Danish Seine Sector. Boag and Koopman 2021.

5.1.1.8 Small Pelagic Fishery

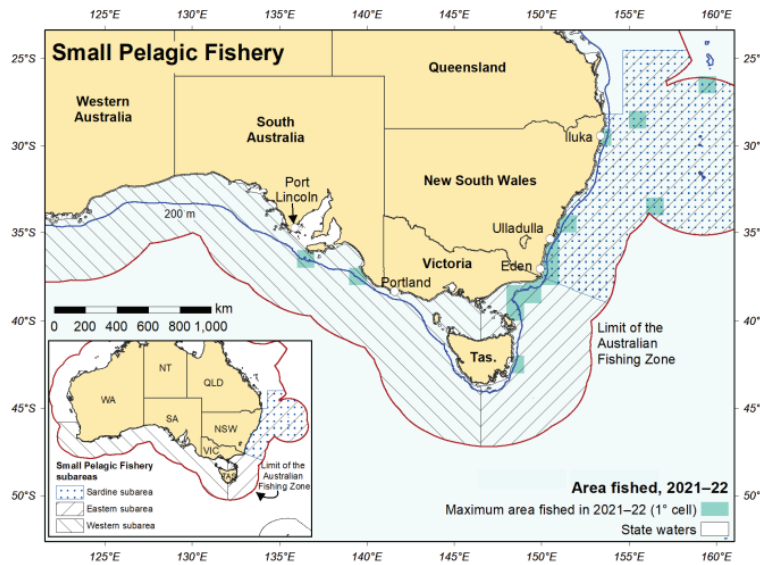
The Small Pelagic Fishery operates in Commonwealth waters from southern Queensland to southern Western Australia (Figure 5-14). It is split into three subareas (east, west and sardine) for management purposes. Most historical fishing efforts has occurred off the east coast of Tasmania (Patterson, et al., 2022). Primary target species are:

- Australian sardine (*Sardinops sagax*)
- Blue mackerel (*Scomber australasicus*)
- Jack mackerel (*Trachurus declivis*, *T. murphyi*)
- Redbait (*Emmelichthys nitidus*)

It is a 12-month fishing season, commencing on 1 May each year (AFMA, 2023g). Fishing methods include purse seine and midwater trawl fishing vessels (Patterson, et al., 2022); midwater trawl has been the main method since 2002. Until recently, minimal catch and effort in the small pelagic fishery have reflected a lack of markets and processing facilities. The operation of a factory freezer trawler in the 2014–15, 2015–16 and 2016–17 fishing seasons led to increased catches, reaching a peak of around 12,000 t in 2015–16. After the factory freezer trawler left the fishery during the 2016–17 season, total catch decreased. Catches increased when another midwater trawler operation began in the east subarea in 2016–17 and reached 18,878 t in 2021–22 (Patterson, et al., 2022).

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Source: (Patterson et al., 2020).

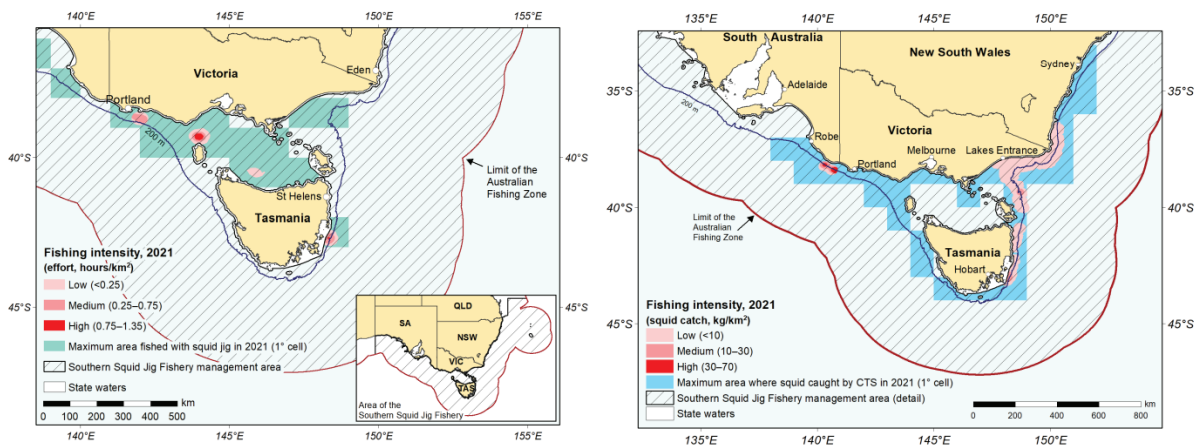
Figure 5-14: Small Pelagic Fishery Management Area and 2021-22 Fishing season

5.1.1.9 Southern Squid Jig Fishery

The Southern Squid Jig Fishery is located in waters off NSW, Victoria, Tasmania and South Australia, and in a small area off southern Queensland (Figure 5-15) (Patterson, et al., 2022). The Southern Squid Jig Fishery is a single-method (jigging) fishery, primarily targeting the Gould’s squid (*Nototodarus gould*) (SETFIA, 2016). Vessels typically operate at night in continental shelf waters between 60–120 m water depth. Squid are also caught in the Commonwealth Trawl Sector and GAB Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery.

Gould’s Squid is a short-lived species that is characterised by highly variable recruitment from year to year, resulting in a “boom and bust” fishery (SETFIA, 2016).

It has a 12-month fishing season, commencing on 1 January each year (AFMA, 2023g). Squid are caught using demersal trawl gear, and in state-managed fisheries using a variety of gears, including trawl, jigging, and hook and line (Patterson, et al., 2022). In 2021, there were 4,800 gear Statutory fishing rights, 8 active vessels and a total of 2,899 jig-hours in the Fishery. From 1996 to 2005, annual average jig fishing effort was 8,878 jig-hours before declining to just 50 jig-hours by 2014. Since 2015, annual jig fishing effort has fluctuated (Patterson, et al., 2022).



Source: (Patterson et al., 2020)

Figure 5-15: (a) Fishing intensity in the Southern Squid Jig Fishery and (b) Commonwealth Trawl Sector squid catch, 2021

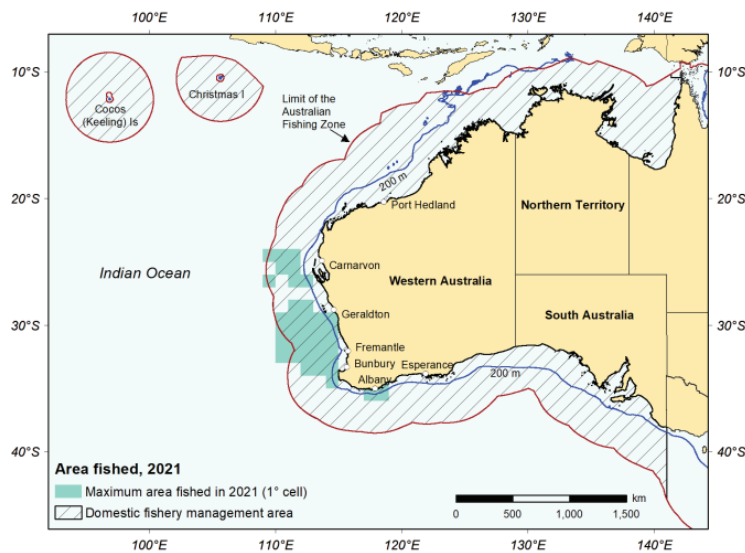
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5.1.1.10 Western Tuna and Billfish Fishery

The Western Tuna and Billfish Fishery operates in waters extending west from the South Australia / Victoria border (Figure 5-16). It has a 12-month season, commencing 1 February each year. Primary target species include:

- Bigeye tuna (*Thunnus obesus*)
- Yellowfin tuna (*Thunnus albacares*)
- Broadbill swordfish (*Xiphias gladius*)
- Striped marlin (*Tetrapturus audax*), being a minor component of the catch.

Fishing methods in the Western Tuna and Billfish Fishery are predominantly pelagic longline, with some minor-line fishing. In recent years, fishing effort has concentrated off south-west Western Australia, with occasional activity off South Australia (Patterson, et al., 2022). Since 2005, fewer than five vessels have been active in the fishery each year (Patterson, et al., 2022). In 2021, only 2 vessels were active. The total catch of the fishery has significantly increased from 164 t in 2020 to 252 t in 2021 season.



Source: (Patterson et al., 2020)

Figure 5-16: Western Tuna and Billfish Fishery Management Area and 2021 Fishing Area

5.1.2 State-managed Fisheries

The Offshore Constitutional Settlement (OCS) allows for individual fisheries to be managed under relevant State government, with fishing areas extending into both Commonwealth and State waters. In terms of state management, Tasmanian fisheries are managed under the Living Marine Resources Management Act 1995; in South Australia under the Fisheries Management Act 2007; in Victoria under the Fisheries Act 1995; in New South Wales under the Fisheries Management Act 1994, and in Queensland under the Fisheries Act 1994.

There are 35 state-managed commercial fisheries occurring within the Environment Sectors (Table 5-2).

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Table 5-2: State-managed Commercial Fisheries within the Environment Sectors

Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Environment Sectors								
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
South Australia (PIIRSA 2021)												
Abalone Fishery	The commercial sector of the South Australian Abalone Fishery has been managed as three separate fishery management zones known as the Southern, Central and Western Zone Abalone fisheries (Figure 5-17(a)). Within these fishery management zones, there are some aquatic reserves, which have prohibitions and restrictions on what species can be taken, including abalone.	Yes	<ul style="list-style-type: none"> Greenlip Abalone (<i>Haliotis laevigata</i>) Blacklip Abalone (<i>Haliotis rubra</i>) 	✓								
Blue crab fishery	The blue crab fishery takes blue swimmer crabs. Other species may be landed and sold as by-products or used as personal bait. The blue crab fishery uses crab pots and bait nets. Most of the South Australian commercial catch is sold to Sydney and Melbourne markets.	No	<ul style="list-style-type: none"> Blue swimmer crab (<i>Portunus armatus</i>) 	✓								
Charter Boat Fishery	The South Australian Charter Boat Fishery is a commercial platform for recreational fishing activities; as such, all catch from the fishery is regarded as recreational catch. The charter boat fishery is managed through a licensing and registration system. The Charter Boat Fishery operates within South Australian marine waters, from the Western Australian border to the Victorian border. The South Australian marine waters are divided into marine fishing areas, which are used to distinguish harvest locations and enable spatial research and management of the fishery: West Coast; Spencer Gulf / Coffin Bay; Gulf St. Vincent / Kangaroo Island; Victor Harbor / South East; Other (offshore areas). The fishery is generally managed at a	No	Primary Species: <ul style="list-style-type: none"> Snapper (<i>Pagrus auratus</i>) King George Whiting (<i>Sillaginodes punctatus</i>) Other Species: <ul style="list-style-type: none"> Western Australian Salmon (<i>Arripis truttacea</i>) Bight Redfish (<i>Centroberyx gerrardi</i>) Snook (<i>Sphyaena novaehollandiae</i>) 	✓								

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	whole-of-state level with size and catch limits in place for individual species, although there are some specific management arrangements that apply to particular regions of the fishery.		<ul style="list-style-type: none"> Yellowtail Kingfish (<i>Seriola lalandi</i>) Samsonfish (<i>Seriola hippos</i>) 									
Marine Scalefish Fishery	<p>The commercial Marine Scalefish Fishery is a multi-species and multi-gear fishery. There are over 60 species of marine scalefish taken commercially.</p> <p>The Marine Scalefish Fishery operates in all coastal waters of South Australia between the Western Australian and Victorian border; however, for some species the OCS extends the fishery area out to 200 nm (Figure 5-17(b)).</p> <p>The fishing area includes gulfs, bays and estuaries (excluding the Coorong).</p>	Yes (only for some species)	<p>Primary Species:</p> <ul style="list-style-type: none"> King George Whiting (<i>Sillaginodes punctata</i>) Southern Garfish (<i>Hyporhamphus melanochir</i>) Snapper (<i>Pagrus auratus</i>) Southern Calamari (<i>Sepioteuthis australis</i>) <p>Other Species:</p> <ul style="list-style-type: none"> Vongole spp. Australian Herring Western Australian Salmon Yellowfin Whiting Shark spp. 	✓								
Miscellaneous Fishery	<p>The Miscellaneous fishery includes:</p> <ul style="list-style-type: none"> species that are not in management arrangements of existing commercial fisheries specialised fisheries multiple types of fishing gear. <p>Many of the fisheries included are low production, low value, or both. Biological information on most of the miscellaneous species is limited.</p>	No	<ul style="list-style-type: none"> Sea urchins Scallop Native oyster Giant crab Western Australian salmon Beachcast seagrass and macro-algae Eyre golden perch Welch's grunter Barcoo grunter 	✓								

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Geographic Regions									
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
Rock Lobster Fishery	The South Australian Rock Lobster fishery is based on the capture of Southern Rock Lobster, however other species (including giant crabs and octopus) are permitted to be landed and sold. The Rock Lobster fishery is separated into a Southern Zone and Northern Zone (Figure 5-17(c)).	Yes	<ul style="list-style-type: none"> Southern Rock Lobster (<i>Jasus edwardsii</i>) 	✓									
Sardine Fishery	The Sardine Fishery is a component of the Marine Scalefish Fishery; access to the sardine fishery is provided through a licence for the Marine Scalefish Fishery with a sardine net endorsement. The area of the fishery includes all South Australian waters out to the 200 nautical mile Australian Exclusive Economic Zone.	Yes	<ul style="list-style-type: none"> Australian Sardine (<i>Sardinops sagax</i>) Australian Anchovy (<i>Engraulis australis</i>) 	✓									
Victoria (Victorian Fisheries Authority 2021)													
Abalone Fishery	Abalone are caught along the majority of the Victorian coastline. Abalone diving activity typically occurs close to the shoreline (generally up to water depths of 30 m). The fishery is quota managed, with a total allowable commercial catch set annually based on the outcomes of a stock assessment process. There are three (Western, Central and Eastern) management zones (Figure 5-18(a)).	Yes	<ul style="list-style-type: none"> Greenlip Abalone (<i>Haliotis laevis</i>) Blacklip Abalone (<i>Haliotis rubra</i>) 	✓	✓	✓							
Sea Urchin	Sea urchins inhabit coastal subtidal reefs in 6-10m of water although <i>Heliocidaris erythrogramma</i> has been reported at water depths between 10-40m in the coastal waters of NSW. The Sea Urchin Fishery occurs in waters adjacent to Victoria (State coastal waters only, with exclusions). The commercial fishery is managed spatially on the basis of four separate management zones: the Eastern Zone	No	<ul style="list-style-type: none"> White sea urchin (<i>Heliocidaris erythrogramma</i>) Black, long-spined sea urchin (<i>Centrostephanus rodgersii</i>) 	✓	✓	✓							

Description of the Environment

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	(EZ), Port Phillip Bay Zone (PPBZ), Central Zone (CZ) and Western Zone (WZ). Fishing season is open all year and the fishery is managed under a conservative Total Allowable Commercial Catch and divers may only collect sea urchin by hand.											
Eel Fishery	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 (Figure 5-18(b)).	No	<ul style="list-style-type: none"> Short-finned eel (<i>Anguilla australis</i>) Long-finned eel (<i>Anguilla reinhardtii</i>) 	✓	✓	✓						
Giant Crab Fishery	The commercial fishery has two management zones, the Western Zone and Eastern Zone, a division which reflects the zonal boundaries of the rock lobster fishery (Figure 5-18(c)). The fishery is based in the Western Zone; at the time of writing there was no giant crab fishing in the Eastern Zone. Giant crabs inhabit the continental slope at approximately 200 m depth and are most abundant along the narrow band of the shelf edge.	Yes	<ul style="list-style-type: none"> Giant crab (<i>Pseudocarcinus gigas</i>) 	✓								
Pipi Fishery	Pipi is the common name given to the small bivalve which is found on high-energy sandy beaches in the intertidal zone. The fishery covers the entire Victorian coastline, with the exception of Port Phillip Bay and Marine National Parks where shellfish cannot be harvested in the intertidal region. However, the fishery is only currently open at Discovery Bay (targeted primarily by commercial fishers) and Venus Bay (primarily a recreational fishery) (Figure 5-18(d)). Most of the Pipi harvest to date has been taken under Ocean Fishery Access Licences.	No	<ul style="list-style-type: none"> Pipi (<i>Donax deltoids</i>) 	✓	✓							

Description of the Environment

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species										
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
Rock Lobster Fishery	The Rock Lobster fishery expands the length of the Victorian coast. The fishery is divided into two separately managed zones: Eastern and Western (Figure 5-18(e)). The Eastern Zone extends west from the New South Wales 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. In the Western Zone, most catch is landed through Portland, Port Fairy, Warrnambool, Port Campbell and Apollo Bay. Southern Rock Lobsters are found to depths of 150 m, with most of the catch coming from inshore waters less than 100 m deep.	Yes	<ul style="list-style-type: none"> Southern rock lobster (<i>Jasus edwardsii</i>) 	✓	✓	✓							
Scallop Fishery	The Victorian Scallop Fishery is one of three scallop zones in the Bass Strait and extends out from the coastline to 20 nm (Figure 5-18(f)). Historically, the majority of the fishing activity in the Victorian zone has occurred in the eastern waters of the State, with most vessels launching from the ports of Lakes Entrance and Welshpool.	Yes	Primary: <ul style="list-style-type: none"> Commercial scallop (<i>Pecten fumatus</i>) Other: <ul style="list-style-type: none"> Doughboy scallop (<i>Chlamys asperimus</i>) 	✓	✓	✓							
Wrasse Fishery	The commercial fishery extends along the entire length of the Victorian coastline and out to 20 nm offshore, except for marine parks. Most wrasse is harvested by hook and line although commercial rock lobster fishers who also hold a commercial wrasse licences can keep those fish that they catch in their rock lobster pots.	Yes	Primary targets: <ul style="list-style-type: none"> Bluethroat Wrasse (<i>Notolabrus tetricus</i>) Purple Wrasse (<i>N. fucicola</i>) Other: <ul style="list-style-type: none"> Rosy Wrasse (<i>Pseudolabrus psittaculus</i>) Senator Wrasse (<i>Pictilabrus laticlavus</i>) 	✓	✓	✓							

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Geographic Regions									
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
			<ul style="list-style-type: none"> Southern Maori Wrasse (<i>Ophthalmolepis lineolatus</i>) 										
Bays and Inlet Fisheries	Victorian bay, inlet and estuarine finfish fisheries are multi-species, multi-method fisheries. The fishery area includes Western Port, Port Phillip Bay, Corner Inlet/Nooramunga and the Gippsland Lakes.	No	Multiple species	✓		✓							
Tasmania (DPIPWE 2021)													
Abalone Fishery	The Tasmanian wild abalone industry is a major contributor to the Tasmanian economy; and is the largest wild abalone fishery in the world, providing approximately 25% of the annual harvest. The fishery is managed as zones: eastern blacklip; western blacklip; central western blacklip; northern blacklip; Bass Strait blacklip; and greenlip.	Yes	<ul style="list-style-type: none"> Greenlip Abalone (<i>Haliotis laevigata</i>) Blacklip Abalone (<i>Haliotis rubra</i>) 		✓		✓	✓					
Commercial Dive Fishery	A number of different species are collected by the Commercial Dive Fishery. The Commercial Dive Fishery is divided into five zones: south eastern, central eastern, north eastern, northern and western.	Yes	Primary targets: <ul style="list-style-type: none"> Sea Urchin (<i>Haliocidaris erythrogramma</i>) Periwinkles Other: <ul style="list-style-type: none"> Pacific Oyster Wakame (<i>Undaria pinnatifida</i>) Whelks 		✓		✓	✓					
Giant Crab Fishery	A comparatively small fishery but is of relatively high value. The fishery has been commercially targeted since the early 1990's, changing from being open access to	Yes	<ul style="list-style-type: none"> Giant crab (<i>Pseudocarcinus gigas</i>) 		✓		✓	✓					

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species										
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
	limited entry and is now managed by individual transferable quota.												
Rock Lobster Fishery	The rock lobster fishery is a major Tasmanian industry providing significant benefits from exports from the commercial fishery. The rock lobster lives in a variety of habitats ranging from shallow rocky inshore pools out to the continental shelf. The fishery has two catch areas with individual cap limits; east coast catch cap and north east catch cap. Season opening varies for male and females; females 1 May, Male 1 September for waters south of St Helens Pt to Sandy Cape and 1 October for all other State waters.	Yes	<ul style="list-style-type: none"> Southern Rock Lobster (<i>Jasus edwardsii</i>) 		✓		✓	✓					
Scalefish Fishery	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.	No	<p>Some of the species commercially targeted include:</p> <ul style="list-style-type: none"> Banded Morwong Southern Calamari Octopus Tiger Flathead School Whiting Southern Garfish Wrasse Gould's Squid Bastard Trumpeter Blue Warehou Silver Warehou Flounder Silver Trevally Striped Trumpeter. 		✓		✓	✓					
Scallop Fishery	The fishery is managed under the provisions of the Living Marine Resources Management Act 1995 and Fisheries (Scallop) Rules 2011. It is primarily based on	No	<p>Primary:</p> <ul style="list-style-type: none"> Commercial scallop (<i>Pecten fumatus</i>) 		✓		✓	✓					

Description of the Environment

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	New South Wales (DPI 2021)								
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	the harvest of the commercial scallop. Although commercial fishers can legally take the doughboy scallop and the queen scallop; these species have only minor commercial significance in Tasmania.		Other: <ul style="list-style-type: none"> Doughboy scallop (<i>Chlamys asperimus</i>) Queen scallop (<i>Aequipecten opercularis</i>) 									
Seaweed Fishery	The main components of this fishery are the collection of cast bull kelp and harvesting of the introduced seaweed, Undaria. In addition, there are several minor components, including a single operation harvesting red and brown seaweeds and several small operations collecting cast seaweed from specific beaches around the State.	No	<ul style="list-style-type: none"> Bull Kelp Undaria 		✓		✓	✓				
Shellfish Fishery	The commercial shellfish fishery includes clams in Georges Bay (two licences), cockles in Ansons Bay (3 licences), native oysters in Georges Bay (two licences), and wild Pacific oysters (no licence cap).	No	<ul style="list-style-type: none"> Katelysia cockles Venerupis clams Native oysters Wild Pacific oysters 		✓		✓	✓				
New South Wales (DPI 2021)												
Abalone Fishery	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. New size limits and endorsement conditions in force from 10 July 2018.	No	<ul style="list-style-type: none"> Blacklip abalone (<i>Haliotis rubra</i>) 			✓			✓	✓		
Estuary General Fishery	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	No	Catch includes: <ul style="list-style-type: none"> Sea Mullet (<i>Mugil cephalus</i>) 			✓			✓	✓		

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	to regional and state economies providing high quality seafood and bait to the community. On average, the 10 species that make up over 80% of landings by weight are sea mullet (40%), luderick (8%), yellowfin bream (8%), school prawn (5%), blue swimmer crab (4%), dusky flathead (4%), sand whiting (3%), pipi (3%), mud crab (3%) and silver biddy (2%).		<ul style="list-style-type: none"> Luderick (<i>Girella tricuspidata</i>) Yellowfin bream (<i>Acanthopagrus australis</i>) School Prawn (<i>Metapenaeus macleayi</i>) Blue Swimmer Crab (<i>Portunus pelagicus</i>) Dusky Flathead (<i>Platycephalus fuscus</i>) Sand Whiting (<i>Sillago ciliata</i>) Pipi (<i>Donax deltooides</i>) Mud Crab (<i>Scylla serrata</i>) Silver Biddy (<i>Gerres subfasciatus</i>) 									
Estuary Prawn Trawl Fishery	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. The majority of prawn catches are landed during the 'dark' of the moon (between the last and first quarter), on either run out or 'slack' tides.	No	<ul style="list-style-type: none"> School Prawns Eastern King Prawns 						✓	✓		
Lobster Fishery	The NSW Lobster Fishery is small but valuable. The Fishery extends from the Queensland border to the Victorian border and includes all waters under jurisdiction of NSW to around 80 miles from the coast.	Yes	Primary: <ul style="list-style-type: none"> Eastern rock lobster (<i>Sagmaraisus verreauxi</i>) Other catch:			✓			✓	✓		

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species									
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	It is characterised by inshore and offshore sectors. Inshore fishers use small beehive or square traps in waters up to 10 metres in depth, whilst offshore fishers use large rectangular traps.		<ul style="list-style-type: none"> Southern Rock Lobster (<i>Jasus edwardsii</i>) Tropical Rock Lobster (<i>Panulirus longipes</i> and <i>P. ornatus</i>). 									
Ocean Hauling Fishery	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 3 nautical miles of the coast.	No	Catch includes: <ul style="list-style-type: none"> Pilchards (<i>Sardinops sagax</i>) Sea Mullet (<i>Mugil cephalus</i>) Australian Salmon (<i>Arripis trutta</i>) Blue Mackerel (<i>Scomber australasicus</i>) Yellowtail Scad (<i>Trachurus novaezelandiae</i>) Yellowfin Bream (<i>Acanthopagrus australis</i>) 			✓			✓	✓		
Ocean Trap & Line Fishery	<p>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.</p> <p>The Ocean Trap and Line 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. There are six types of Ocean Trap and Line endorsements in NSW; line fishing western</p>	Yes	Primary catch: <ul style="list-style-type: none"> Snapper Yellowtail kingfish Leatherjackets Bonito Silver trevally Other: <ul style="list-style-type: none"> Rubberlip (grey) Morwong Blue-eye Trevalla Sharks Bar Cod 			✓			✓	✓		

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species										
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
	zone, line fishing eastern zone, demersal fish trap, school and gummy shark, spanner crab northern zone and spanner crab southern zone.		<ul style="list-style-type: none"> Yellowfin Bream Spanner Crabs 										
Ocean Trawl Fishery	<p>There are two sectors to the Ocean Trawl Fishery: the prawn trawl sector and the fish trawl sector. Both sectors use otter trawl nets.</p> <p>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.</p>	Yes	<p>Primary catch:</p> <ul style="list-style-type: none"> School whiting (comprising of stout whiting and red spot whiting) Eastern King, School and Royal Red prawns Tiger Flathead Silver Trevally Various species of sharks and rays, squid, octopus and bugs 			✓			✓	✓			
Sea Urchin & Turban Shell Restricted Fishery	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.	No	<ul style="list-style-type: none"> Sea Urchin Turban Shell 			✓			✓	✓			
Queensland (Queensland Government 2021)													
Crab Fisheries	There are three fisheries (mud crab, blue swimmer crab, and spanner crab) that operated within the Queensland Crab Fishery. The fishery operates throughout the state's coastal waters, including the Gulf of Carpentaria, except for areas that are closed to fishing in general or to crabbing in particular. Fishing methods include wire-mesh or trawl-mesh crab pots, and dillies.	Yes	<ul style="list-style-type: none"> Mud Crab Blue Swimmer Crab Spanner Crab 							✓			

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species										
				Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
Eel Fisheries	The commercial eel fishery has two components: adults and juveniles. A commercial harvest fishery licence authorises fishers for both the adult and juvenile components. Commercial capture/harvest of adult eels is only permitted using baited eel traps or round traps.	Yes	<ul style="list-style-type: none"> Long-finned eel (<i>Anguilla reinhardtii</i>) Short-finned eel (<i>Anguilla australis</i>). 								✓		
Harvest Fisheries	<p>The Harvest Fishery includes the following individually managed fisheries: sea cucumber, marine aquarium fish, coral, trochus, tropical rock lobster, and minor harvest. These fisheries are characterised by their harvesting method, which is primarily by hand or by using hand-held implements. Commercial harvesting methods often involve the use of underwater breathing apparatus, such as scuba or hookah.</p> <p>On a smaller scale, commercial harvest fisheries exist in Queensland for:</p> <ul style="list-style-type: none"> beachworms, bloodworms and yabbies (i.e. the 'bait fisheries') shells, shell grit and star sand pearl shells wild-caught oysters. 	Yes	<p>Sea Cucumber:</p> <ul style="list-style-type: none"> Blackfish (<i>Actinopyga palauensis</i>) Burrowing Blackfish (<i>Actinopyga spinea</i>) Sandfish (<i>Holothuria scabra</i>) White Teatfish (<i>Holothuria fuscogilva</i>) <p>Prickly Redfish (<i>Thelenota ananas</i>)</p> <p>Marine Aquarium:</p> <ul style="list-style-type: none"> Damselfish (family Pomacentridae) Butterflyfish and Bannerfish (family Chaetodontidae) Angelfish (family Pomacanthidae) Wrasses (family Labridae) Surgeonfish (family Acanthuridae) Gobies (family Gobiidae) <p>Coral:</p>							✓			

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
			<ul style="list-style-type: none"> • Live corals, such as Euphyllidae, Zoanthida, Corallimorpharia and Fungidae families • Sea Anemones • Ornamental (non-living) corals, such as Acroporidae and Pocilloporidae families • Live rock (dead coral skeletons with algae and other organisms living on them) • Coral rubble (coarsely broken up coral fragments) • Coral sand (finely ground-up particles of coral skeleton) <p>Trochus:</p> <ul style="list-style-type: none"> • Giant Top Shell (<i>Trochus niloticus</i>) <p>Tropical Rock Lobster:</p> <ul style="list-style-type: none"> • Tropical Spiny Rock Lobster (<i>Panulirus ornatus</i>) <p>Minor Harvest:</p> <ul style="list-style-type: none"> • Bait fisheries, such as beachworms, bloodworms and yabbies • Marine specimen shells • Pearl shells 									

Description of the Environment

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
			<ul style="list-style-type: none"> Wild-caught oysters 									
Line Fishing	<p>Line fishing is one of Queensland's main forms of commercial fishing, producing approximately 2200 t of product, valued at about \$34.5 million a year.</p> <p>There are five line fisheries:</p> <ul style="list-style-type: none"> Coral Reef Fin Fish Fishery Rocky Reef Fin Fish Fishery Pelagic Fishery Gulf of Carpentaria Fin Fish Fishery Deepwater Multiple-Hook Fishery. <p>The line fisheries operate in specified tidal waters out to the Queensland OCS boundary.</p> <p>All five fisheries use fishing lines, with a restriction on the number of lines and hooks that can be used. Boats used range from fleets with sophisticated equipment to small dinghies.</p>	Yes	<p>Primary catch:</p> <ul style="list-style-type: none"> Coral Trout Spanish Mackerel Red-throat Emperor <p>Other catch:</p> <ul style="list-style-type: none"> Snapper Jobfish Red Emperor Nannygai Trevally Spotted Mackerel 							✓		
Net Fisheries	<p>Net fishing is one of Queensland's main forms of commercial fishing, producing approximately 6670 t of product valued at about \$31.9 million each year.</p> <p>There are two commercial net fisheries:</p> <ul style="list-style-type: none"> Gulf of Carpentaria Inshore Fin Fish Fishery East Coast Inshore Fin Fish Fishery <p>The net fisheries are multi-species fisheries, with fishers targeting different species at different times of the year. The net fisheries operate along the entire Queensland coastline as far out as the Queensland OCS boundary.</p>	Yes	<p>East Coast Inshore Fin Fish Fishery (southern):</p> <ul style="list-style-type: none"> Mullet Tailor Whiting Flathead Bream Mulloway School Mackerel 							✓		
Trawl Fishery	<p>The trawl fishery is Queensland's largest commercial fisheries, producing up to 7800 t of product worth about \$99 million each year. It has four main trawl fisheries:</p> <ul style="list-style-type: none"> East Coast Otter Trawl Fishery 	Yes	<p>Primary catch:</p> <ul style="list-style-type: none"> Prawns (Tiger Prawn, Endeavour Prawn, Red Spot King Prawn, Banana Prawn, 							✓		

Description of the Environment

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Fishery	Area / Description	Extends into Commonwealth Waters	Target Species	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	<ul style="list-style-type: none"> • Moreton Bay Otter Trawl Fishery • River and Inshore Beam Trawl Fishery • Fin Fish (Stout Whiting) Trawl Fishery. <p>The trawl fisheries cover all tidal waters out to the Queensland East Coast OCS boundary between Cape York and the New South Wales border.</p>		<p>Eastern King Prawn, Bay Prawn)</p> <ul style="list-style-type: none"> • Scallops • Whiting • Moreton Bay Bugs • Squid (Pencil Squid, Tiger Squid, Arrow Squid) <p>Other catch:</p> <ul style="list-style-type: none"> • Blue Swimmer Crabs • Barking Crayfish • Cuttlefish • Mantis Shrimp • Octopuses • Pinkies • Pipefish • Red Spot Crabs • Balmain Bugs 									

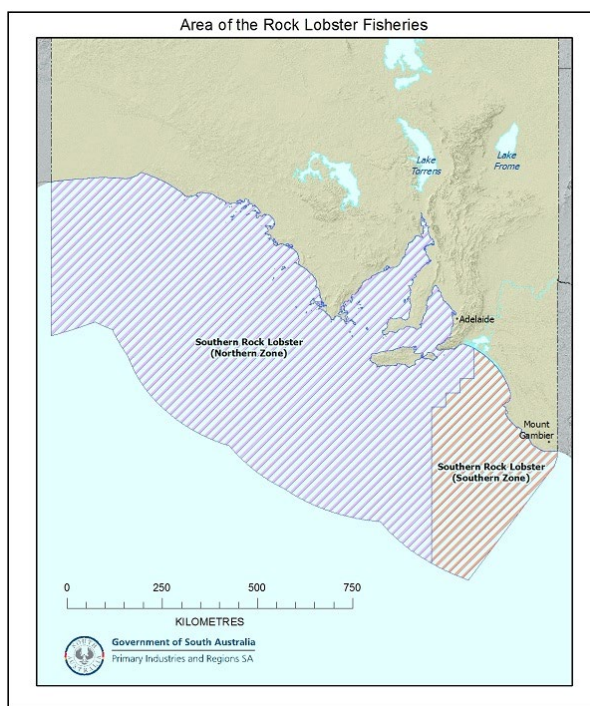
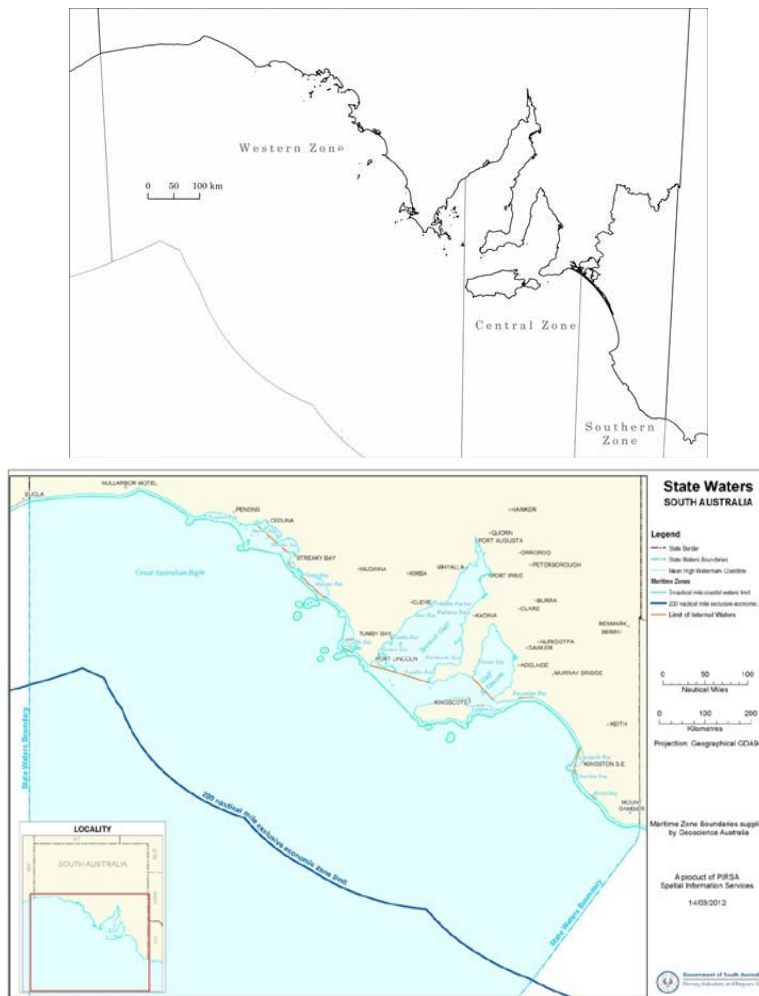
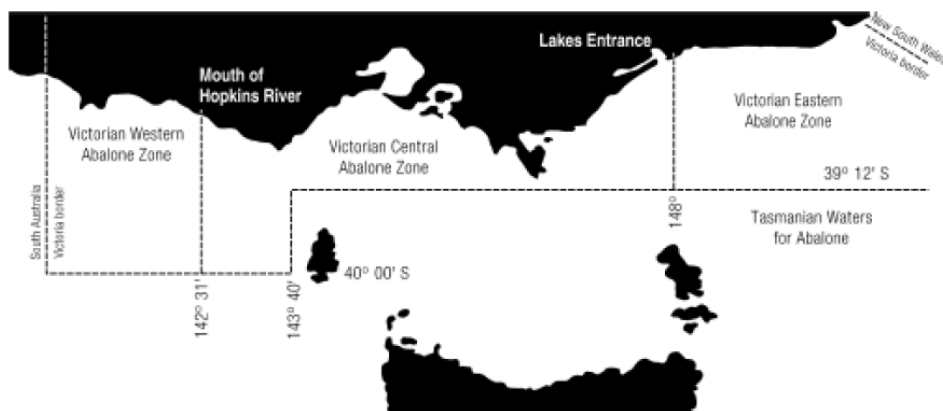
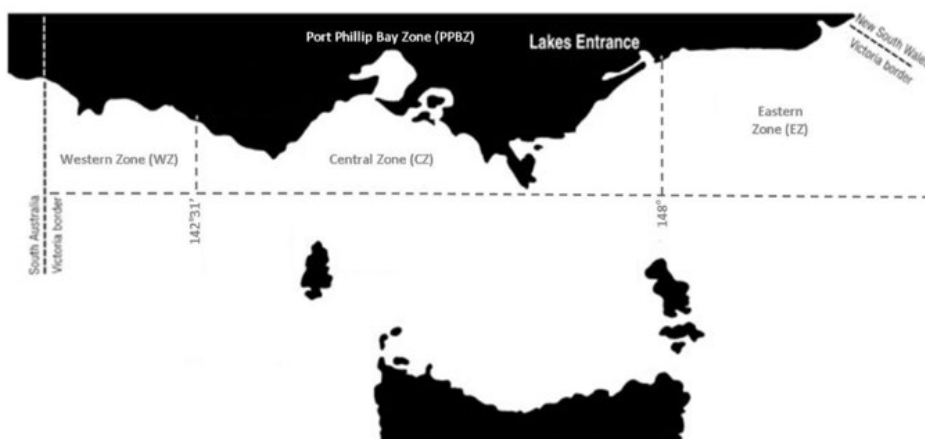


Figure 5-17: South Australian Commercial Fisheries (a) Abalone, (b) Marine Scalefish Fishery, (c) Rock Lobster (d) Sea urchin

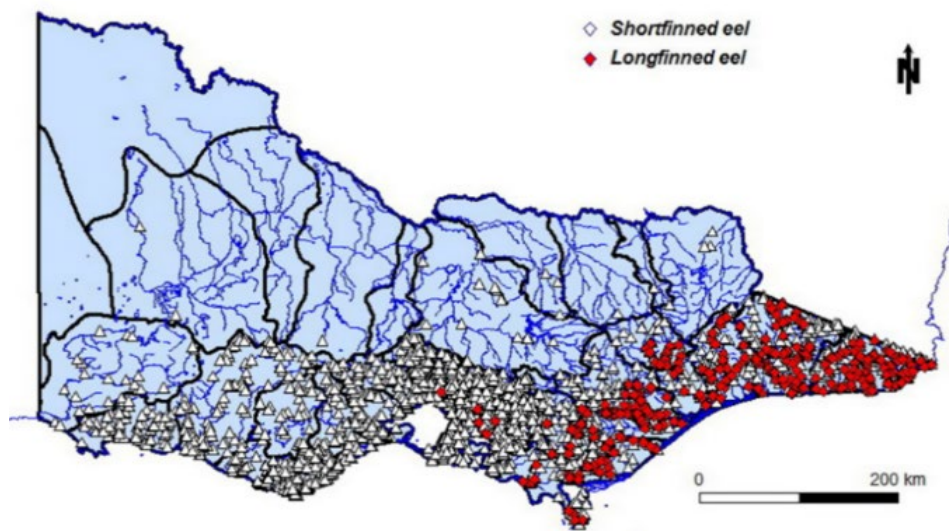
a)



b)



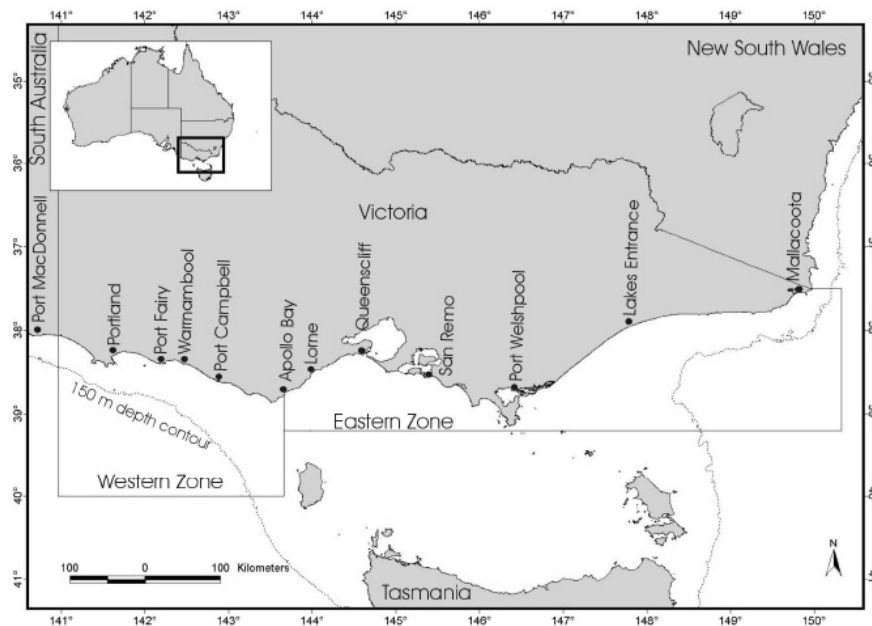
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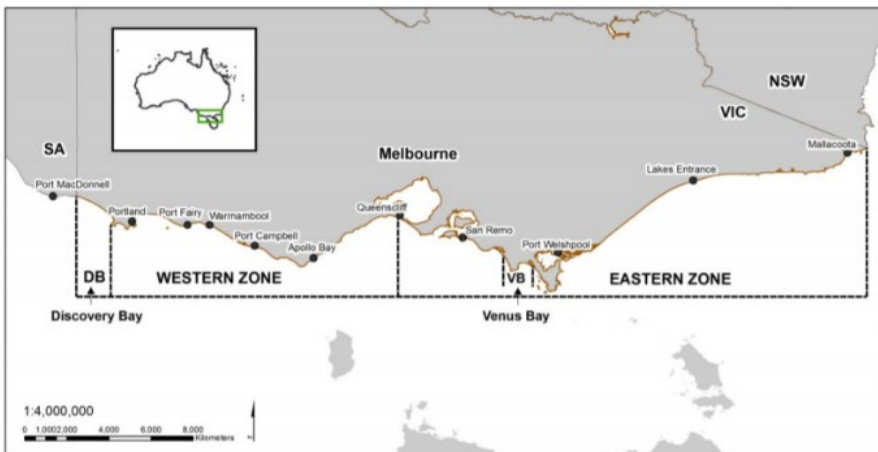
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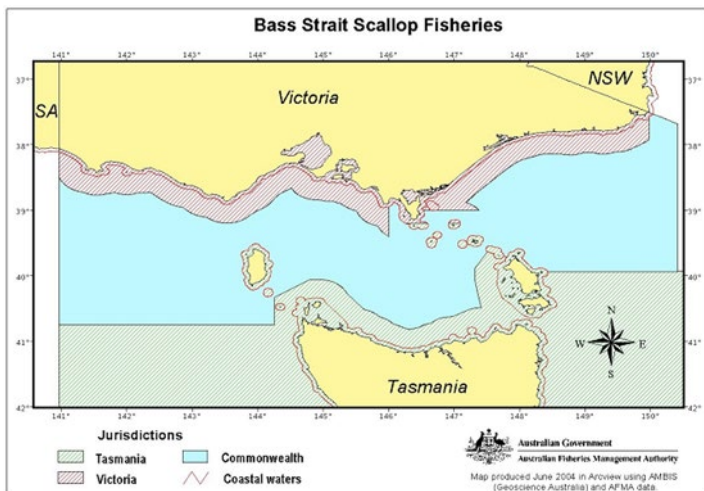
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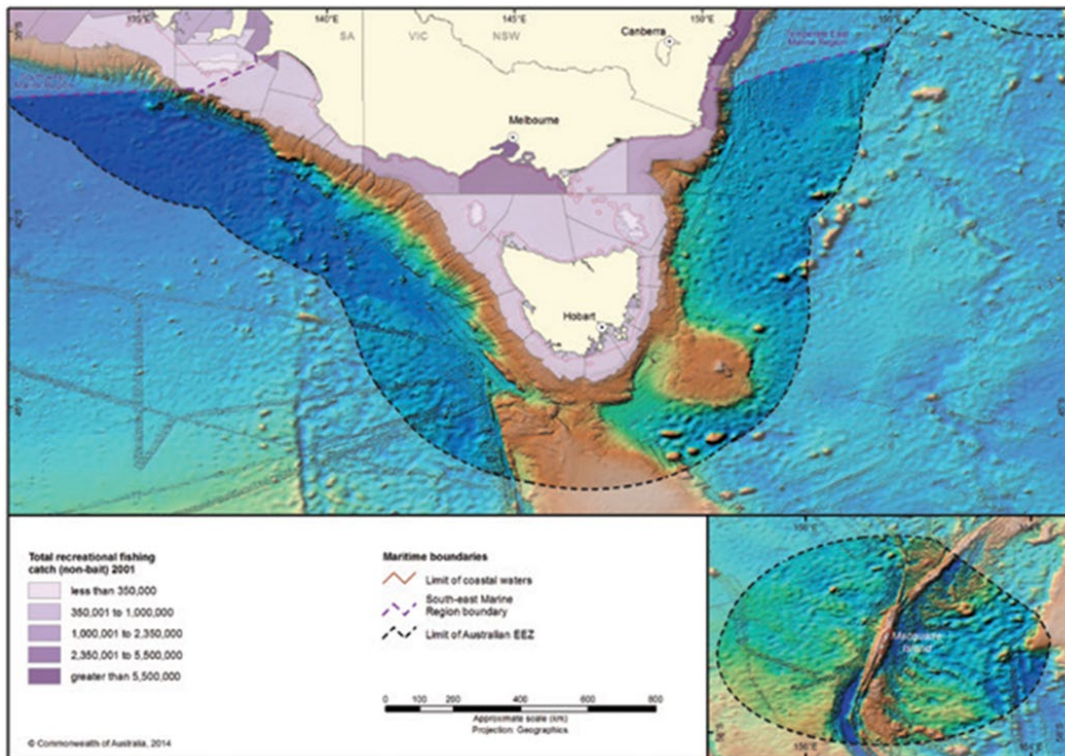
g)



Figure 5-18: Victorian Commercial Fisheries (a) Abalone, (b) Sea Urchin, (c) Eel, (d) Giant Crab, (e) Pipi, (f) Rock Lobster, and (g) Scallop

5.2 Recreational Fisheries

Recreational fishing in Australia is a multi-billion dollar industry. Most recreational fishing typically occurs in nearshore coastal waters (shore or inshore vessels), and within bays and estuaries; offshore (>5 km) fishing only accounts for approximately 4% of recreational fishing activity in Australia. Charter fishing vessels are likely to account for the majority of offshore fishing activity. The variation in recreational fishing intensity along the coast is illustrated in Figure 5-19. Common recreational fish species include tiger flathead, bream, snapper, Australian salmon, and lobster; and offshore catches can include mackerel, tuna, groper and shark.



(Source: DoE, 2015a)

Figure 5-19: Recreational Fishing Catch in South-eastern Marine Region

5.3 Coastal Settlements

Australian's have a strong affinity to the coast, with over 80% of the population living within 50 km of the coast (Hugo *et al.*, 2013). Some of the Australia's most populated places occur on the coast within the Environment Sectors. Based on the top ten highest population places in each state, the 22 places listed in Table 5-3 occur along the coast of the Environment Sectors.

The communities of Orbost, Newmerella and Marlo (within the Shire of East Gippsland) are the closest coastal settlements to Cooper Energy's BMG and Gippsland assets. At the 2016 Australian census, the estimated resident population for East Gippsland was 44,542 (an increase from 42,926 in 2011) (.id Consulting, 2017a). The Shire of East Gippsland has an aging population (.id Consulting, 2017a).

Port Campbell is the nearest town to Cooper Energy's Casino assets. At the 2016 Australian census, the estimated resident population for Colac Otway was 21,359 (an increase from 20,799 in 2011) (.id Consulting, 2017b). Other coastal communities along the Colac Otway coast include Apollo Bay, Princetown, Peterborough, Warrnambool, Port Fairy and Portland; all provide services to the commercial and recreational fishing industries in southwest Victoria. Portland is Victoria's western-most commercial port and is a deep-water port with breakwaters sheltering a marina and boat ramp. The Port of Warrnambool has a breakwater and yacht club and provides shelter for commercial fishing boats. Port Fairy has both harbour and fish processing facilities, but is not suitable for use by large vessels, nor is Port Campbell.

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Table 5-3: Highest Population Places occurring on the coast¹ within the Environment Sectors

	Otway	Bass Strait	Gippsland	Sorell ²	SE Tasmania	Central NSW	SE Queensland	Lord Howe ²	Norfolk Island ²
South Australia³									
Victoria	<ul style="list-style-type: none"> Warrnambool 	<ul style="list-style-type: none"> Melbourne Geelong 							
Tasmania		<ul style="list-style-type: none"> Launceston Devonport Burnie Ulverstone Wynyard George Town 			<ul style="list-style-type: none"> Hobart Kingston Sorell 				
New South Wales						<ul style="list-style-type: none"> Sydney Newcastle Central Coast Wollongong Coffs Harbour 			
Queensland							<ul style="list-style-type: none"> Gold Coast-Tweed Heads Brisbane Sunshine Coast Bundaberg Hervey Bay 		

Notes:

1. Top ten highest population places for each state determined from 2016 Census data (those not on the coast, or not within the Environment Sectors, are not included in this table).
2. None of the top ten highest population places occur on the coast of Gippsland, Sorell, Lord Howe or Norfolk sectors.
3. All the top ten highest population places in South Australia, are either located to the east of the 'Otway' Environment Sector, or inland (e.g. Mount Gambier).

5.4 Recreation and Tourism

The coast and marine region within the Environment Sectors 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. Popular tourist destinations adjacent include Phillip Island, the Great Ocean Road (Victoria); Strahan and the Freycinet Peninsula (Tasmania); Merimbula, Bermagui (New South Wales); and Gold and Sunshine Coasts, and Fraser Island (Queensland). Norfolk Island is a popular tourist destination known for its history and culture, beaches and National Park.

In 2021-22 tourism in Victoria was estimated to be worth \$16 billion to the economy in Gross State Product and generated approximately 171,000 jobs (Tourism Research Australia, 2023). The latest data from Tourism Research Australia shows that total tourism expenditure in Victoria was \$35.0 billion in the year ending March 2023, an increase of 113% compared to the year ending March 2022. Total tourism spend has fully recovered and was back above the pre-pandemic level (+17%) (Business Victoria, 2023).

The Gippsland region, which stretches from Melbourne's eastern outskirts all the way to the state border with NSW (Figure 5-20), is characterised for its tourist attractions. Coastal assets include the Gippsland lakes, Wilsons Promontory National Park, Phillip Island and Croajingolong National Park (Aither, 2019). Tourism sector contributes 10.5% to the Gross Value Add to the Gippsland region. In 2020, 8.94 million tourists contribute \$1.68 billion annually to the Gippsland economy (RDV, n.d).



(Source: Tourism Victoria, 2017)

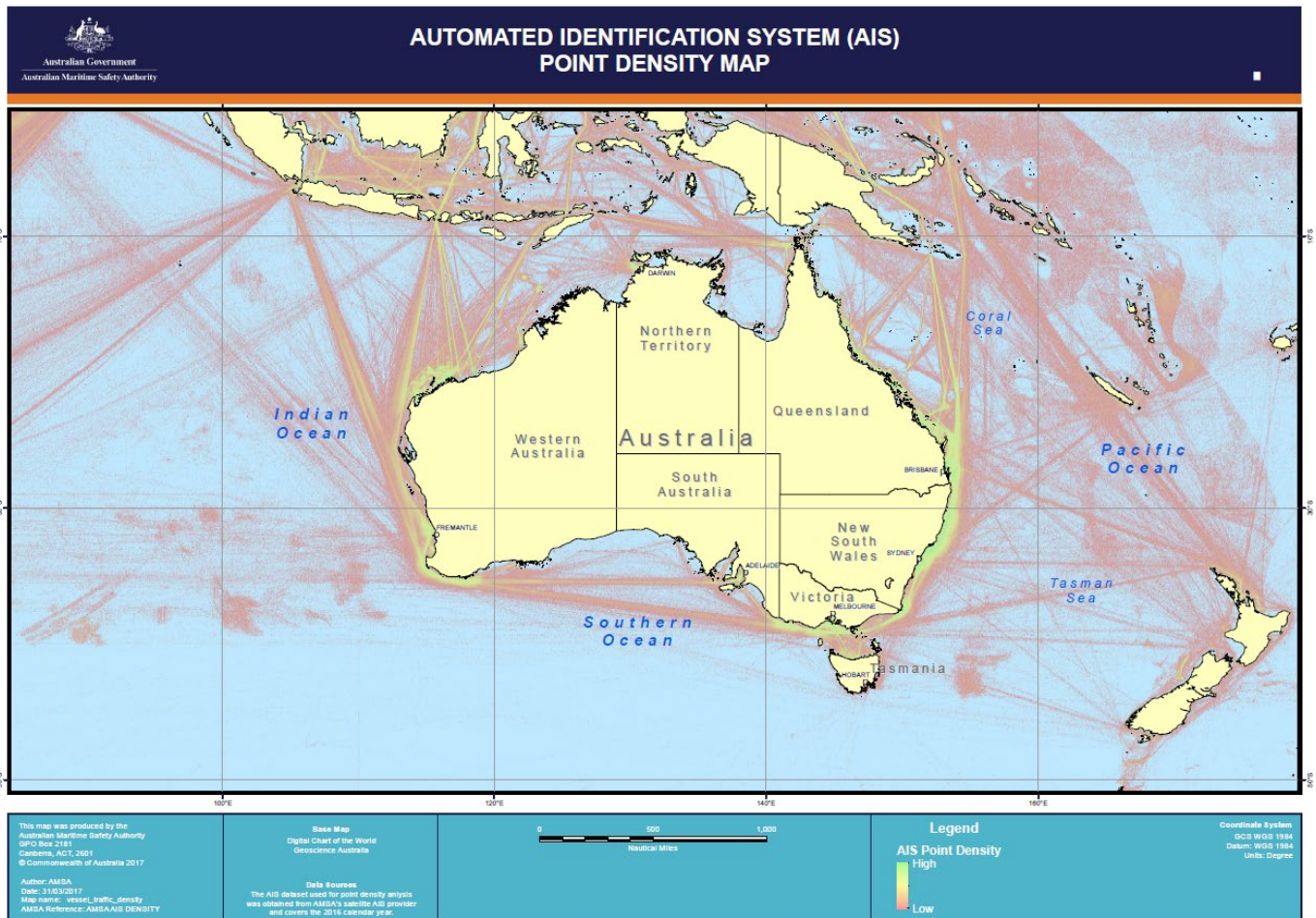
Figure 5-20: Victoria's Tourism Regions

5.5 Industry

5.5.1 Shipping

The south-east and eastern coasts are some of Australia’s busiest in terms of shipping activity and volumes (Figure 5-21). 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.

Cooper Energy’s assets do not coincide with major routes; with higher volumes of traffic located to the south of the wells within the Petroleum Titles VIC/L24, VIC/L32 and VIC/RL13 (Figure 5-22). A shipping exclusion zone (‘area to be avoided’) also exists around the operating oil and gas platforms in the Gippsland Basin, whereby unauthorised vessels larger than 200 gross tonnes are excluded from entry (Figure 5-23). Two traffic separation schemes have been implemented to enhance safety of navigation around the ‘Area to be Avoided’ by separating shipping into one-direction lanes for vessels heading north eastwards and those heading south westwards. One separation area is located south of Wilson’s Promontory, and the other south of the Kingfisher B platform.



(Source: AMSA, 2017)

Note: Point density analysis of satellite Automated Identification System data, 1 January to 31 December 2016.

Figure 5-21: Vessel Traffic Density

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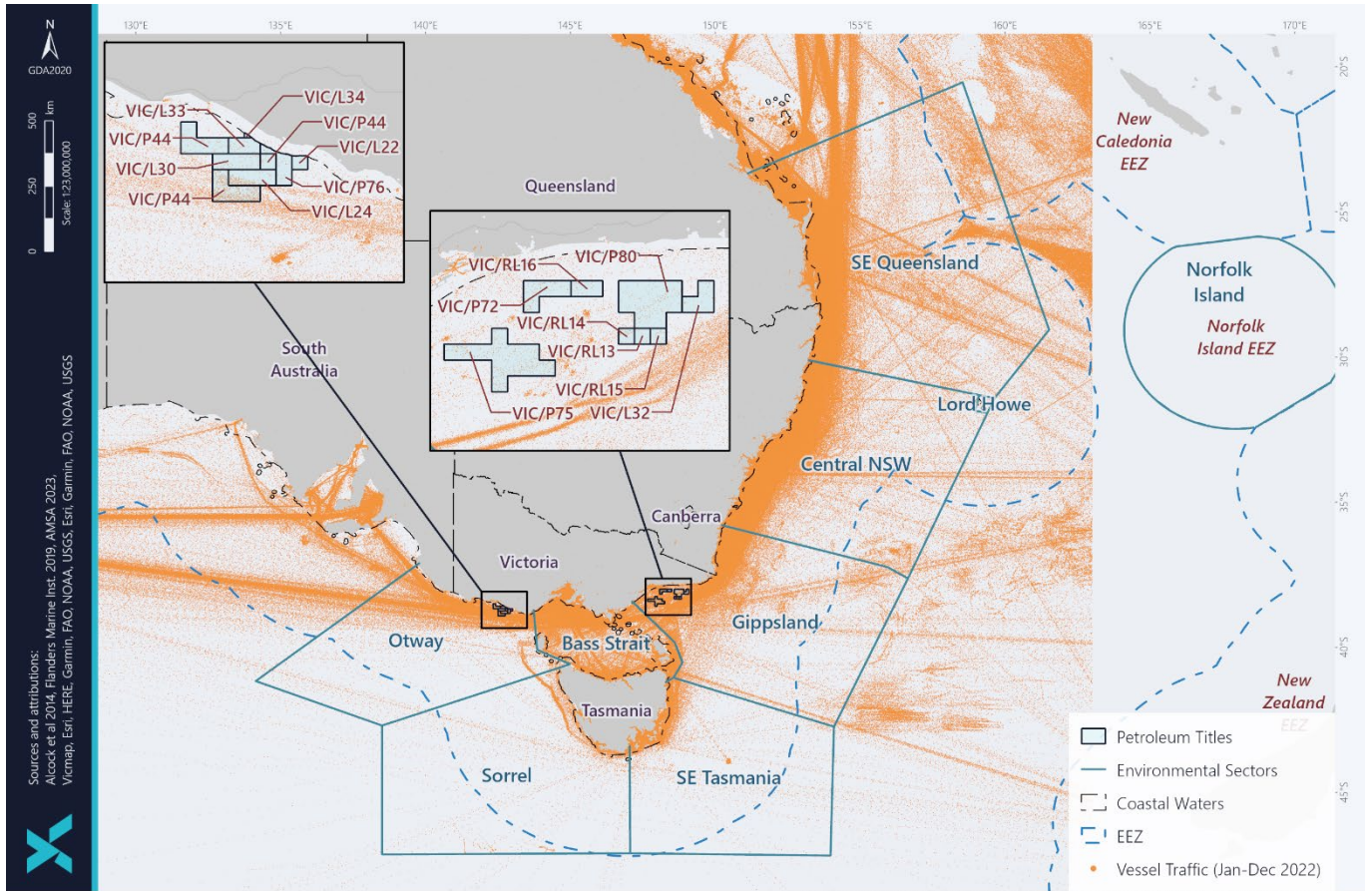
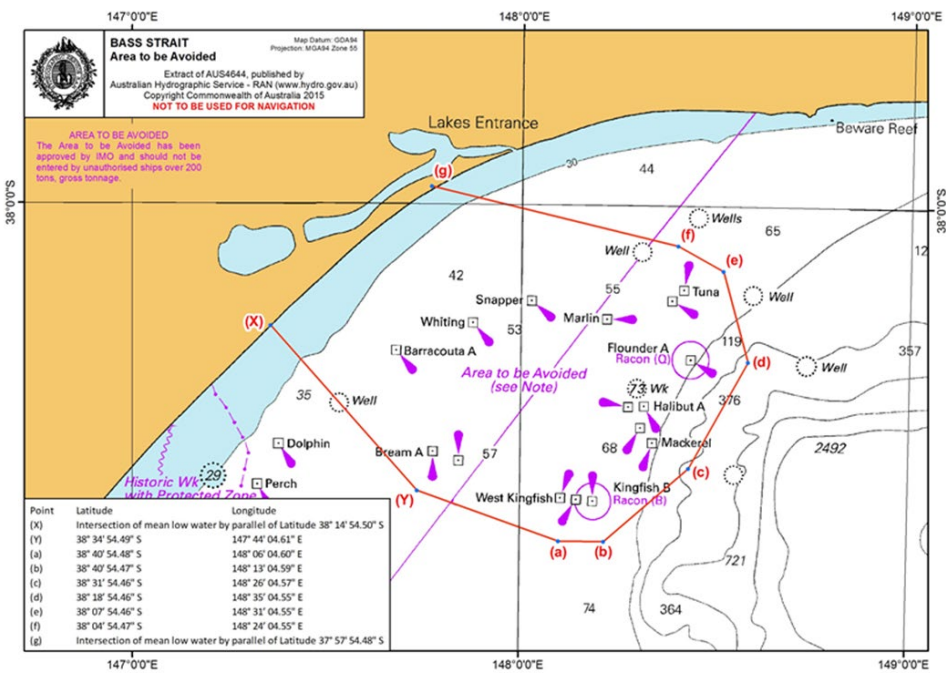


Figure 5-22: Vessel Traffic (6-hourly tracking) in the vicinity of Petroleum Titles



(Source: ABF, 2017)

Figure 5-23: Shipping Exclusion Zones (Area to be Avoided)

5.5.2 Oil and Gas Exploration and Production

In 2019-20, oil comprised ~ 37% of all energy consumed in Australia whilst natural gas accounted for 27% of primary energy sources. Renewables increased to 7% from 6.4% in 2018–19 (APPEA, 2023). In 2019–20, Australia recorded a A\$15.9 billion surplus in the trade of oil and gas — down from the record surplus of \$27.9 billion in 2019–20. Liquefied natural gas (LNG) exports (primarily from northern WA and Queensland) continue to make a significant contribution to Australia’s economy) .

Victoria’s petroleum (oil and gas) exploration and production within the Environment Sectors is concentrated in the offshore Commonwealth waters of the Otway and Gippsland basins. There are a number of current offshore petroleum titles within both basins (Figure 5-24).

Production from offshore Victoria has been a fundamental in supplying energy to homes and industry in Australia’s southern and eastern population centres for over 50 years. From 1967–2015, the Gippsland Basin Joint Venture alone produced 54% of Australia’s crude oil and gas (DIIS, 2017). Petroleum infrastructure in Gippsland Basin is well developed, with a network of pipelines transporting hydrocarbons produced offshore to onshore petroleum processing facilities. Several petroleum wells and oil and gas pipelines are located within the Otway, Gippsland and Bass Strait Environment Sectors (Figure 5-25). Overall production of crude oil and condensate from the Gippsland Basin had been declining for over three decades, while gas production remained steady. In recent years, hydrocarbon production has remained relatively strong due to infill drilling in the developed fields and work-overs undertaken to renew down hole equipment and to open new zones (DIIS, 2017). Total petroleum production from the Gippsland Basin was 74.8 MMboe (11.9 GL) in 2016, up from 61.4 MMboe (9.76 GL) in 2015 (DIIS, 2017).

The Otway Basin is a northwest-trending passive margin rift basin that extends from southeast of South Australia to a boundary with the contiguous Sorell Basin to the west of King Island. The Otway Basin is an established gas producing region; however, most discoveries are confined to the onshore and shallow water inboard parts of the basin. Current offshore production in the Otway Basin includes the Minerva, Thylacine, Geographe, Casino, Henry and Netherby fields (Figure 5-26). No production is currently occurring in the Torquay or deep-water sub-basins (DIIS, 2017).

Energy transition has been rapidly growing in Australia. Several offshore areas are declared or waiting to be declared to support the energy transition. Offshore wind farm areas can only be built in areas approved by the Australian Government. In 2023, two areas have been declared as suitable for offshore wind energy. These are Gippsland in Victoria and Hunter in NSW. The area of the Bass Strait off Gippsland was the first offshore wind zone declared. This spans approximately 15,000 km² in Australian waters, running from Lakes Entrance in the east to south of Wilsons Promontory in the west. Another two areas have been proposed for offshore renewable energy projects:

- the Southern Ocean, which extends offshore from Warrnambool, Victoria to Port MacDonnell
- South Australia, and the Pacific Ocean off the Illawarra, NSW, which extends offshore from Wombarra to Kiama area (DCCEE, 2023).

Offshore wind areas within the Otway, Bass Strait or Gippsland Environment Sectors are shown in Figure 5-26.

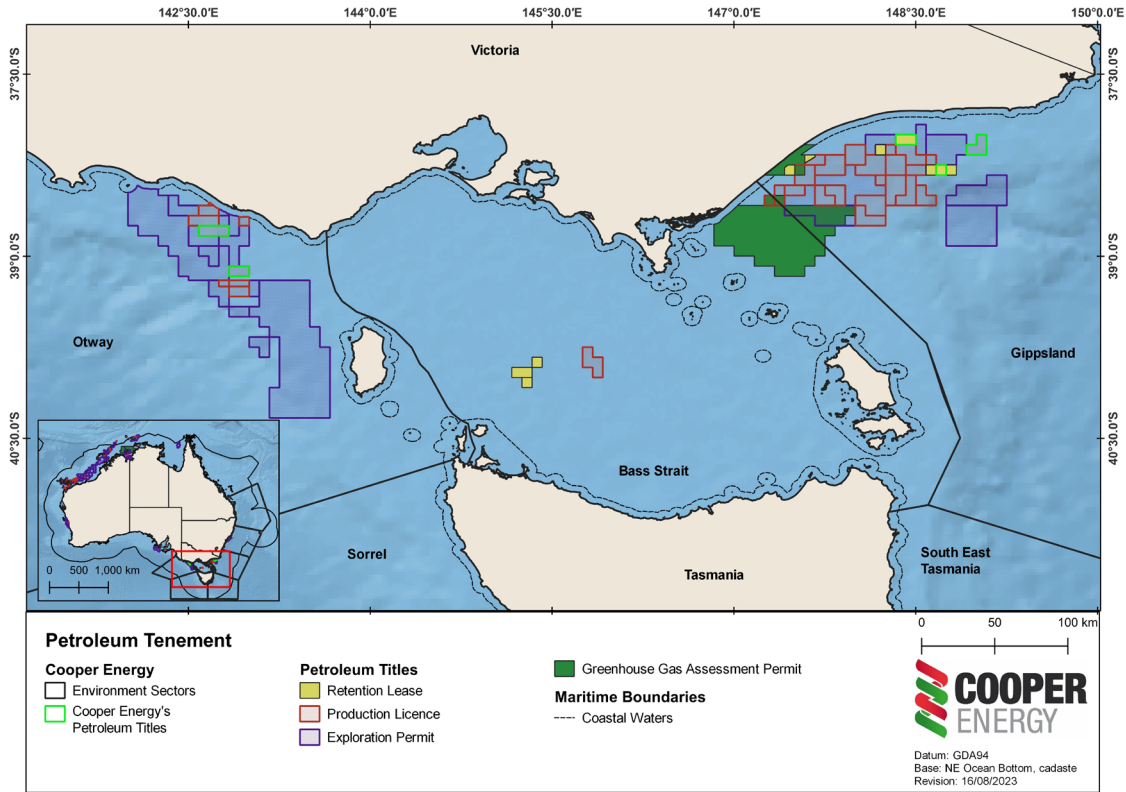


Figure 5-24: Gippsland Basin Oil and Gas Petroleum Titles

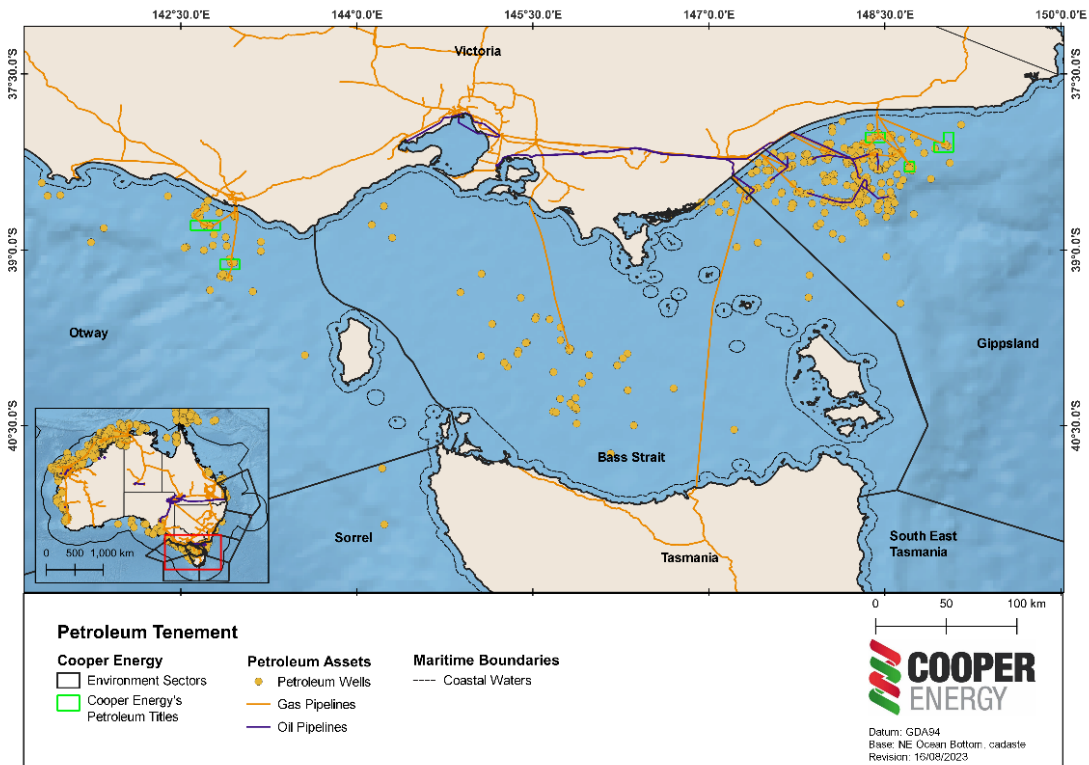


Figure 5-25: Gippsland Basin Oil and Gas Pipelines and Petroleum Wells

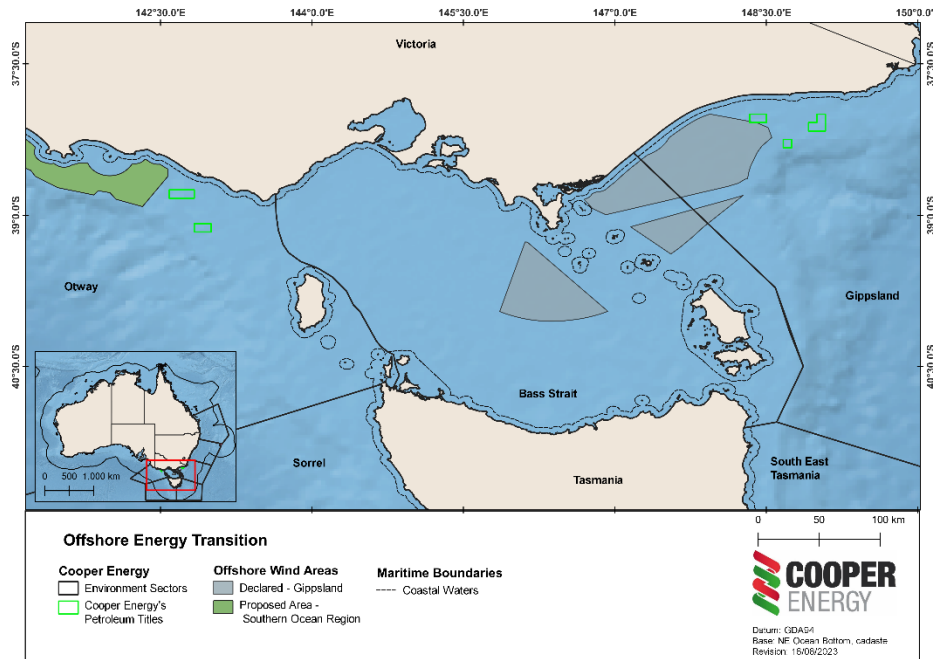


Figure 5-26: Offshore Wind Farm Declared Area

5.5.3 Submarine Cables and Pipelines

Submarine cables are underwater infrastructure linking to other zones of Australia or with other countries; the submarine communications cables carry the bulk of Australia’s international voice and data traffic. Several submarine cables were identified within the Environment Sectors, including (but not limited to):

- Bass Strait: two operational submarine transmission lines (both Telstra fibre optic cables)
- Basslink: a subsea interconnector, completed in 2006 which joins the Tasmanian and national electricity grid
- Indigo Central: a subsea interconnector, completed in 2019 offering direct, low latency connectivity from Sydney to Perth. Three communication cables extend from Sydney (the Australia-Japan Cable, Southern Cross Cable, and Tasman 2 Cable); these supporting most of the voice and data traffic vital to Australia’s national infrastructure.

Two additional cables with a landing point in Melbourne, the East Coast Cable System and Hawaiki Nui, are expected to be installed by 2024 and 2025, respectively. The East Coast Cable will connect two existing cable systems (the North West Cable System and the Australia-Singapore Cable); the Hawaiki Nui will connect Australia, New Zealand, American Samoa, Hawaii and the west coast of the United States.

Under the *Telecommunications and Other Legislation Amendment (Protection of Submarine Cables and Other Measures) Act 2005*, the Australian Communications and Media Authority (ACMA) can propose cable protection zones over these assets if they are considered to be of national significance (DEWHA, 2009b). Two protection zones have been declared in Sydney. The Northern Sydney Protection Zone which extends 74 km offshore from Narrabeen beach and to the depth of 2000 m, and the Southern Sydney Protection Zone which extends 55 km offshore from Tamarama and Clovelly beaches, and to the depth of 2000 m (ACMA, 2022). No protection zones have been declared within the Otway or Gippsland Environment Sectors.

5.5.4 Defence

The Australian Defence Force conducts a range of training, research activities, and preparatory operations (Figure 5-27). Australian Defence Force activities within the Environment Sectors 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 bases within the Environment Sectors include:

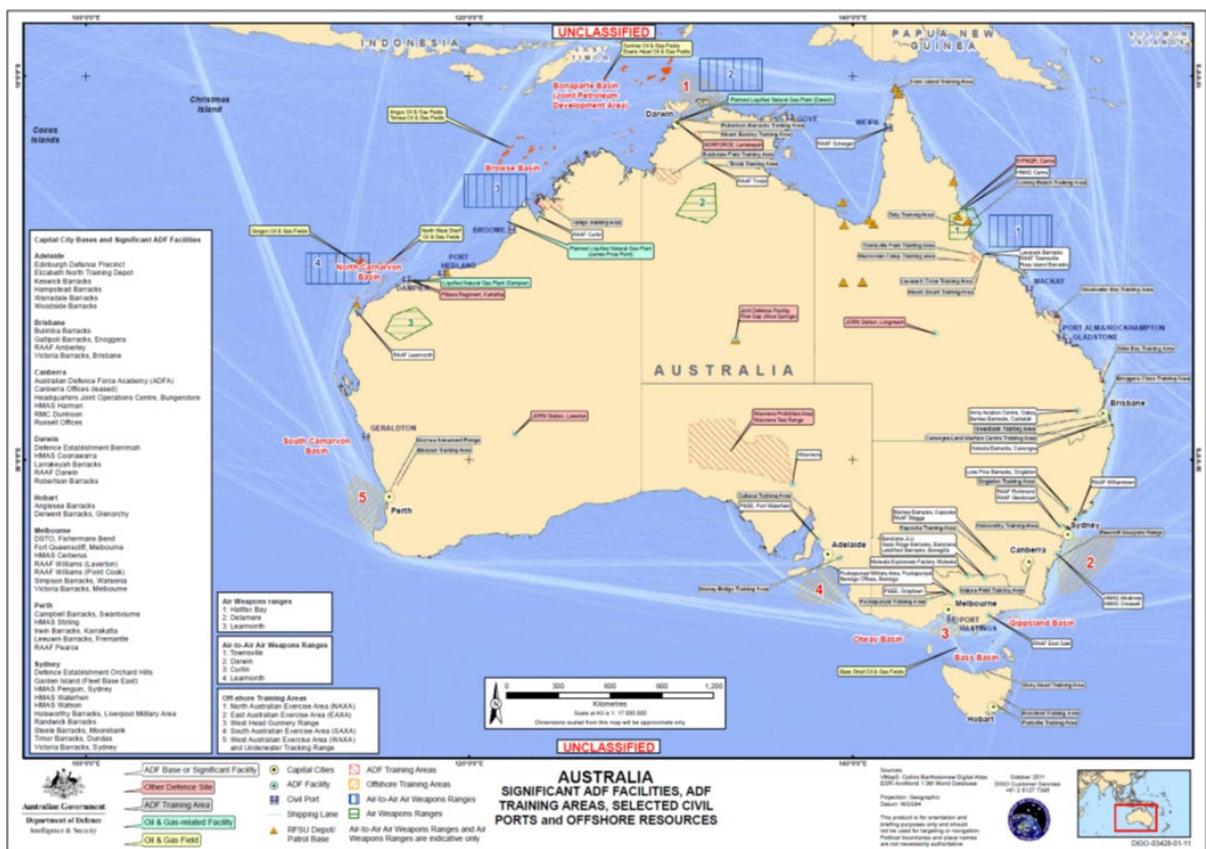
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- HMAS Cerberus in Western Port Bay, Melbourne (naval training)
- The multi-purpose wharf at Twofold Bay, Eden (naval operations)
- Fleet Base East in Sydney (Navy destroyers and support ships)
- HMAS Waterhen in Sydney (Navy minehunting vessels)
- Wollongong and Jervis Bay (Defence training).

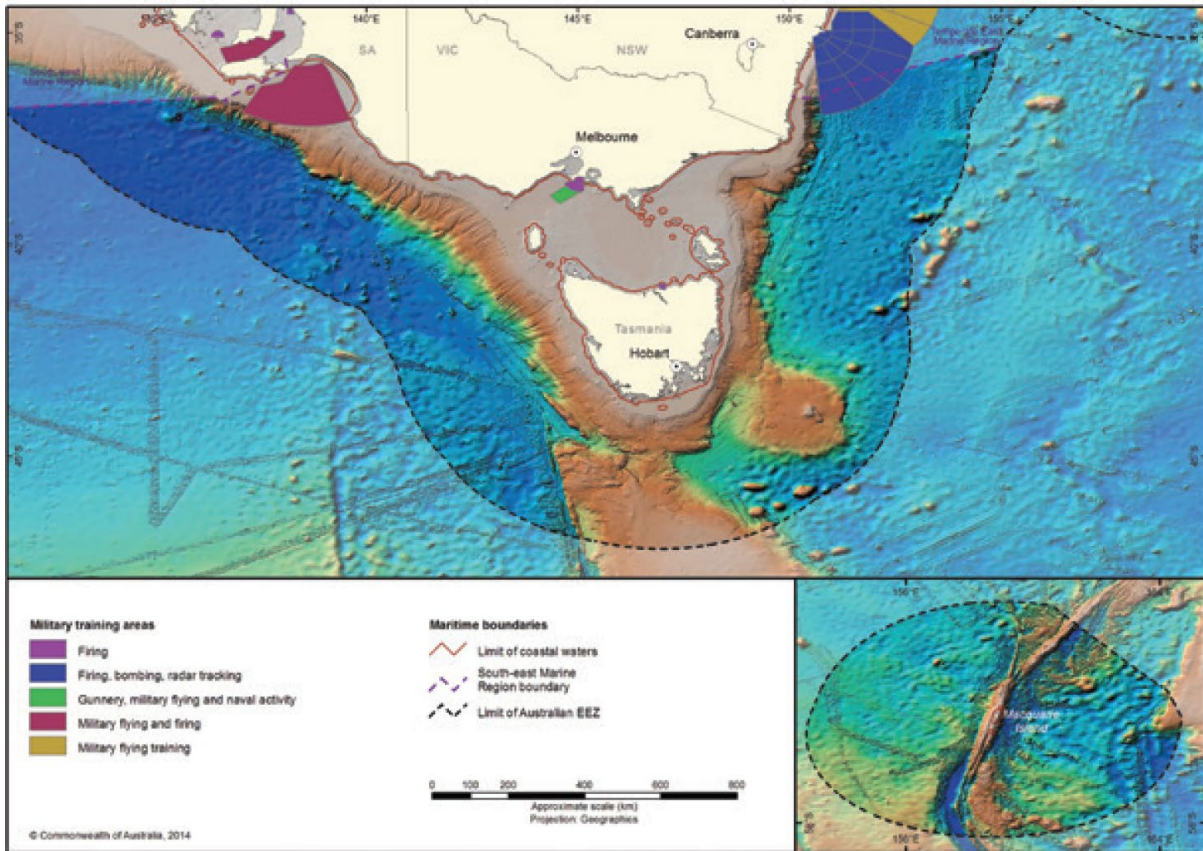
Primary training locations within the Environment Sectors include East Australia Exercise Area off the south coast of New South Wales, and the Royal Australian Air Force flying training areas and air-to-air ranges off the north coast of New South Wales (Figure 5-28).

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.



(Source: Department of Defence, 2014)

Figure 5-27: Significant Defence Bases and Facilities



(Source: DEWHA 2009b)

Figure 5-28: Defence Training Areas within the South-eastern Marine Regions

5.6 Heritage

5.6.1 Maritime

Australia protects its shipwrecks and their associated relics that are older than 75 years through the Historic Shipwrecks Act 1976 and Heritage (Historical Shipwrecks) Regulations 2007, administered in collaboration between the Commonwealth and the States, Northern Territory and Norfolk Island. No historic shipwrecks within VIC/L24, VIC/L23, VIC/RL16 or VIC/L32 were identified on the Australian National Shipwreck Database (DEE, 2017y); however, the database indicates that the Barque shipwreck is located within VIC/RL13. Further consultation with DAWE in 2020 (as part of the BMG closure project) resolved that the resting location of the Barque is unknown. Numerous records exist for the wider area (Figure 5-29); the closest known historic shipwrecks are:

- VIC/L24 (Casino): approximately 16 km west to *S.S Selje*, and 16 km to south of several shipwrecks off Peterborough coast
- VIC/L23 (Sole): approximately 29 km southwest to *S.S Selje*
- VIC/RL16 (PB): approximately 7 km south to *Anne And Mary* and, 9 km north to *Level Lass*
- VIC/L32 (Sole) approximately 15 km southwest to *Commissioner*
- VIC/RL13 (BMG): approximately 20 km southeast to *Level Lass*, and 28 km northwest to AHO 6528 – Unknown.

Some historic shipwrecks lie within protected or no-entry zones. These zones cover an area around a wreck site, ensures that a fragile or sensitive historic shipwreck is actively managed. Seven of these protected zones do occur

within inshore coastal waters of the Environment Sectors (Figure 5-30).

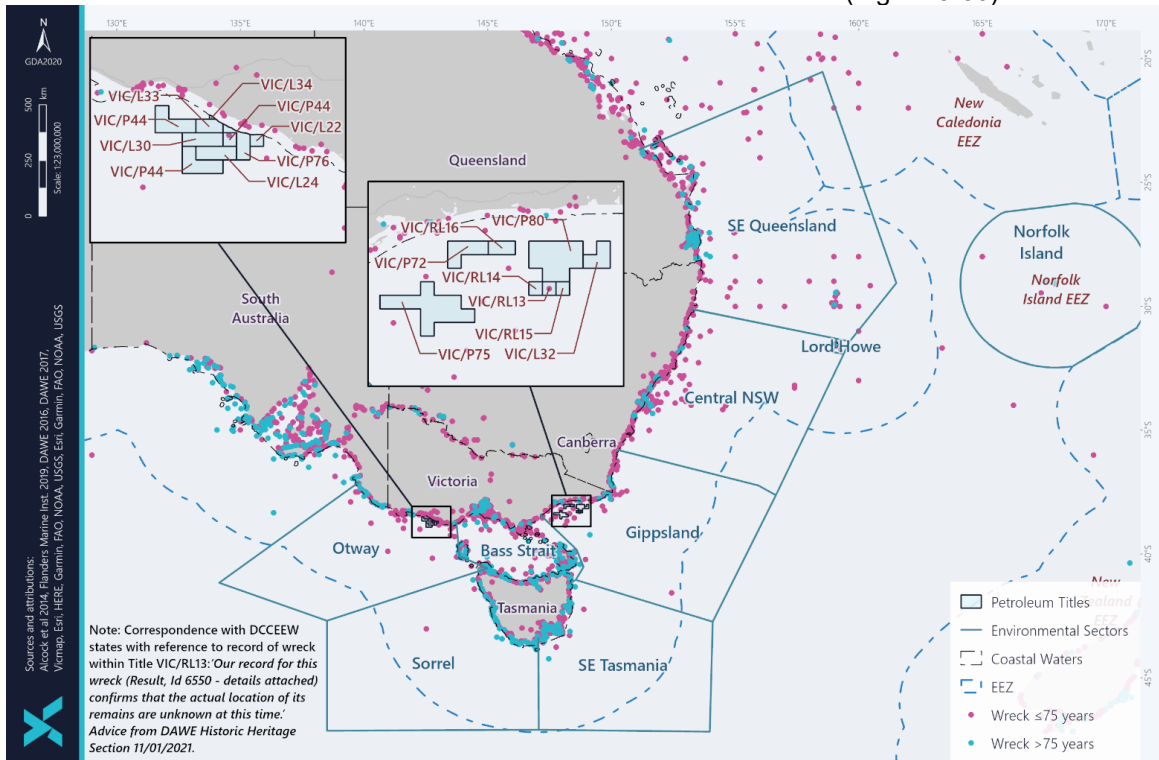
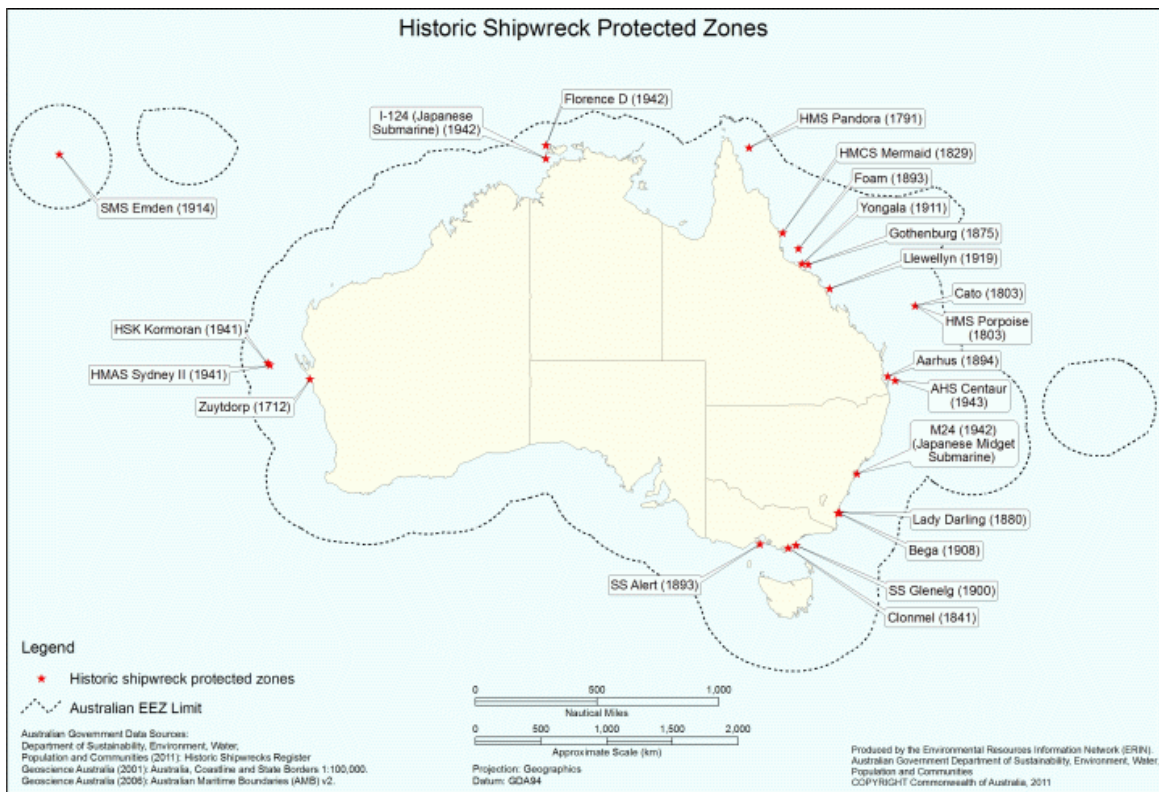


Figure 5-29: Locations of Historic Shipwrecks



(Source: DEE, 2017z)

Figure 5-30: Commonwealth Historic Shipwrecks with Protected Zones

5.6.2 Cultural

There are eight Commonwealth Heritage Places, and 14 National Heritage places with a marine or coastal interface within the Environment Sectors (Table 5-4). This includes places that have been listed for natural, historic and indigenous features. Listed World Heritage Properties are described in Section 4.1.

Table 5-4: Cultural Heritage Places within the Environment Sectors

Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
Commonwealth Heritage Places	Beecroft Peninsula	<p>The Beecroft Peninsula is the best example of a Permian cliffed coast in New South Wales. 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 New South Wales. This floristically rich vegetation provides important habitat for a variety of bird species, including the vulnerable ground parrot. Beecroft Peninsula occurs near the southern boundary of the Hawkesbury Sandstone geological unit. Accordingly, the place has a high number of flora and fauna species at the limit of their distribution.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Natural Criterion: Processes, Rarity, Research, Characteristic values, Aesthetic characteristics Other: includes indigenous heritage areas at Crocodile Head and Currarong Rockshelters 						✓			
	HMAS Penguin	<p>The HMAS Penguin site comprises a series of defence-related buildings and areas and includes the waterfront areas (and jetty complex). HMAS Penguin is highly valued by the Mosman community for its symbolic, cultural and social associations.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Historic Criterion: Processes, Rarity, Aesthetic characteristics, Social value 						✓			
	Jervis Bay Territory	<p>The Commonwealth owned Jervis Bay Territory, occurs near the southern boundary of the Hawkesbury Sandstone. Accordingly, it has a high diversity of plants and represents a northern or southern</p>						✓			

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>distribution limit for 33 species of plants. Dominant vegetation types include forests, woodlands, heathlands and shrublands. The place includes well preserved examples of mangrove, saltmarsh and littoral rainforest communities.</p> <p>The area is home to the Koori people of Wreck Bay who have always lived in, and have strong cultural ties to, the area. The place contains a large number of prehistoric Aboriginal sites. Rock shelters, stone-flaking sites and axe-sharpening grooves and shell middens demonstrate the length of Aboriginal occupation of the area. Ceremonial BUNAN or BORA grounds, used for initiation, are known only from the immediate hinterland of Wreck Bay, and nearly all known grinding groove sites are in the catchments of Mary and Summercloud Bays. These sites demonstrate past cultural practices and are important to the Wreck Bay community.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Natural Criterion: Processes, Rarity. Research, Characteristic values, Aesthetic characteristics <p>Other: includes indigenous heritage areas at Crocodile Head and Currarong Rockshelters</p>									
	Malabar Headland	<p>Malabar Headland contains two significant bushland remnants; representing one of the largest areas 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 vegetation communities of Malabar Headland are of scientific and educational significance because they contain rare examples of coastal communities growing on Pleistocene sand deposits within the Sydney region. These communities have different species composition to those found elsewhere in the Sydney region.</p>						✓			

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Listed: 2004 Class: Indigenous Criterion: Processes, Rarity, Research, Social value, Indigenous tradition 									
	Point Wilson Defence Natural Area	<p>Point Wilson is an important part of the Western Port Phillip Bay Ramsar Area, an internationally significant wetland that provides habitat for many migratory and resident wading birds and waterfowl. It is one of the most important sites in Australia for the Double-banded Plover, regularly attracting a large population in winter. Point Wilson is also visited during winter by the endangered Orange-bellied Parrot. Other birds often recorded at the place in large numbers include Pacific Golden Plovers, Ruddy Turnstones, Curlew Sandpipers, Sharp-tailed Sandpipers and Pied Oystercatchers. The low rainfall regime of the place and the adjoining Murtcaim Wildlife Area produces dry coastal salt marshes atypical of any other coastal salt marshes in Victoria. These dry salt marshes are located very close to wet salt marshes and, where these two forms coincide, they produce the most structurally and floristically diverse salt marshes in Victoria.</p> <p>The Point Wilson Defence Natural Area is an important cultural site for the Wathaurong people. The cultural significance of the place arises from sites and artefacts recorded there, the land on which they rest and the ecological values of the area.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Natural Criterion: Processes, Rarity, Characteristic values, Social value 		✓							
	Snapper Island	<p>Snapper Island, comprising the original sandstone area, fore and aft areas of made ground, a range of utilitarian buildings and maritime structures, is historically important as the primary expression of the Navy League UK, established at Drummoyne in 1921 by Len Forsythe, who saw the need to establish a voluntary training scheme</p>						✓			

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>for young boys, as naval cadets. Snapper Island is highly valued by Sydney's naval cadet groups and the local communities for its symbolic, cultural, educational and social associations.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Historic Criterion: Processes, Characteristic values, Aesthetic characteristics, Social value, Significant people 									
	Swan Island and Naval Waters	<p>Swan Island is the largest emergent sand accumulation feature in Port Phillip Bay. The island, which has been built principally by wave actions rather than by aeolian forces, has played a major role in determining the pattern of sedimentation in Swan Bay and preserves geomorphological evidence of changing Quaternary sea levels. The eastern and northern shores of the eastern arm of Swan Island are of regional significance as an example of active coastal depositional and erosional processes. The patterns of erosion and accretion on these shores provide a good indicator of sand movements into Port Phillip Bay. Swan Island and Naval Waters is an integral part of Swan Bay, an internationally significant wetland which is important as wader and waterfowl habitat, and provides important habitat for 46 water bird species: of which 26 species are listed under the Japan-Australia and China-Australia migratory bird agreements; and 8 species are listed under the Bonn Convention on Migratory Species.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Natural Criterion: Processes, Rarity, Research, Characteristic values 		✓							
	Tasmanian Seamounts Area	<p>The Tasmanian pinnacle seamounts support intact benthic communities that differ markedly from the sediment dwelling faunas of the surrounding deep-sea floor. The seamounts are dominated by cold-water coral species and characterized by a relatively high species richness and endemism. They can be regarded as oases of</p>					✓				

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>comparative productivity in the open ocean, with the coral matrix which provides habitat otherwise lacking in the dark and deep abyssal waters and dense schools of seamount-associated fish. The seamounts communities are very vulnerable to disturbance being dominated by long-lived species with low growth rates. Research on the Tasmanian seamounts has already substantially contributed to the nation's knowledge of deep-sea organisms and has potential to continue to do so. They are regionally unusual ecosystems that represent the principal characteristics of seamounts as species-rich, deep sea communities.</p> <ul style="list-style-type: none"> Listed: 2006 Class: Natural Criterion: Processes, Rarity, Research, Characteristic values 									
	HMS Sirius Shipwreck	<p>The archaeological remains of HMS Sirius represent a tangible link to the most significant vessel associated with early migration of European people to Australia. HMS Sirius was guardian of the first fleet during its epic voyage to Australia between 1787 and 1788, which brought the convicts, soldiers and sailors who became Australia's first permanent European settlers.</p> <ul style="list-style-type: none"> Listed: 2011 Class: Historic <p>Criterion: Processes, Rarity, Research, Social value, Significant people</p>									✓
National Heritage Places	Bondi Beach	<p>Bondi Beach is an urban beach cultural landscape of waters and sands, where the natural features have been altered by development associated with beach use and consisting of promenades, parks, sea baths, the surf pavilion and pedestrian bridges. The predominant feature of the beach is the vastness of the open space within an urban setting. Bondi Beach is significant in the course of Australia's cultural history as the site of the foundation of</p>						✓			

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>Australia's first recognised surf lifesaving club in 1907. Bondi Beach is one of the world's most famous beaches and is of important social value to both the Australian community and to visitors.</p> <ul style="list-style-type: none"> Listed: 2008 Class: Historic Criterion: Events, Processes, Social value Other: includes the Bondi Beach Surf Pavilion 									
	Cockatoo Island	<p>Cockatoo Island is highly significant for its associations with convicts and the nature and extent of its remains demonstrate the principal characteristics of a dual use convict site where incarceration is combined with hard labour. Cockatoo Island is also important to the nation as a pre and post Federation shipbuilding complex.</p> <ul style="list-style-type: none"> Listed: 2007 Class: Historic Criterion: Events, Processes, Research, Principal characteristics of a class of places 					✓				
	Fraser Island	See description under World Heritage Properties.							✓		
	Great Barrier Reef	See description under World Heritage Properties.							✓		
	Great Ocean Road and Scenic Environs	<p>The geomorphological features of the Port Campbell Limestone Coast are rare in their diversity, and it is the definitive place in Australia to observe limestone geomorphology and coastal erosion processes on rocky coasts. The Cretaceous coast of the Otway's displays geomorphological processes that are contributing to research into the origins of significant shore platforms that illustrate the environment prior to the breakup of Gondwana. Recreational tourism was among the purposes for the road's construction, and the cultural and natural tourism experiences it offers, including the iconic Twelve Apostles and the treacherous Shipwreck Coast, are greatly valued by the Australian community. The iconic Bells Beach is valued by Australia's surfing community for its place in Australian</p>	✓	✓							

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>surfing. It was the world's first Surfing Recreation Reserve and remains the location of the world's longest running international surfing carnival and home to one the most prestigious trophies in surfing.</p> <ul style="list-style-type: none"> Listed: 2011 Class: Historic Criterion: Events, Processes, Rarity, Research, Principal characteristics of a class of places, Aesthetic characteristics, Social value, Significant people 									
	HMVS Cerberus	<p>The HMVS Cerberus is important as evidence of the development of Australia as a nation and as part of the British Empire. The British Parliament passed the Colonial Naval Defence Act 1865 giving the colonies the power to make laws to provide for their own naval defence. The construction of HMVS Cerberus (1867-1870) reflects a period in Australia's history when the colonies were thought vulnerable to coastal attack and invasion.</p> <ul style="list-style-type: none"> Listed: 2005 Class: Historic Criterion: Events, Processes, Rarity 		✓							
	Ku-ing-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	<p>Ku-ring-gai Chase National Park and Long Island, Lion Island and Spectacle Island Nature Reserves contain an exceptional representation of the Sydney region biota, a region which is recognised as a nationally outstanding centre of biodiversity. The place contains a complex pattern of 24 plant communities, including heathland, woodland, open forest, swamps and warm temperate rainforest, with a high native plant species richness of over 1000 species and an outstanding diversity of bird and other animal species. This diversity includes an outstanding representation of the species that are unique to the Sydney region, particularly those restricted to the Hawkesbury Sandstone landform.</p> <ul style="list-style-type: none"> Listed: 2006 					✓				

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<ul style="list-style-type: none"> Class: Natural Criterion: Events, Processes 									
	Kurnell Peninsula Headland	<p>Kurnell Headland (comprising Botany Bay National Park and the Sydney Water land at Potter Point), Kurnell Peninsula, is of outstanding heritage value to the nation as the site of first recorded contact between Indigenous people and Britain in eastern Australia. The Meeting Place Precinct, including Captain Cook's Landing Place, features memorials and landscape plantings celebrating the events. Attributes specifically associated with its Indigenous values include the watering point and immediate surrounds, and the physical evidence of Indigenous occupation in the area broadly encompassed by the watering place and the landing stage. The story of Cook's first landing on the east coast of Australia is nationally important and an integral part of Australian recorded history and folklore.</p> <ul style="list-style-type: none"> Listed: 2004 Class: Historic Criterion: Events, Processes, Rarity, Social value, Significant people 					✓				
	Lord Howe Island Group	See description under World Heritage Properties.						✓			
	North Head (Sydney)	<p>North Head is important as the northern expression of the seaward entrance to Sydney Harbour (Port Jackson) and played a major role in the cultural and military life of the colony of New South Wales, 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.</p> <ul style="list-style-type: none"> Listed: 2006 Class: Historic Criterion: Events, Processes, Rarity, Research, Principal characteristics of a class of places, Aesthetic characteristics 					✓				

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	Point Nepean Defence Sites and Quarantine Station Area	<p>Point Nepean is the site of the oldest, surviving, purpose-built, barracks-style, quarantine accommodation buildings in Australia, as well as fortifications demonstrating the primary importance of coastal defence to the Australian colonies. Point Nepean is an historic landscape, which features a range of values relating to both Victorian and national quarantine processes from the 1850s and to the history of coastal defence from the 1870s.</p> <ul style="list-style-type: none"> Listed: 2006 Class: Historic Criterion: Events, Processes, Rarity, Research, Principal characteristics of a class of places, Significant people 		✓							
	Recherche Bay (North East Peninsula) Area	<p>The north-east peninsula of Recherche Bay has an important association with the French scientific and exploratory expedition of Rear Admiral Bruni D'Entrecasteaux. It stopped at Recherche Bay in 1792 and in 1793 for about seven weeks in total. The relatively extensive, well-documented encounters on the coast of the north-east peninsula of Recherche Bay, compared to those in other places and involving other expeditions, between the expedition members and the Tasmanian Aborigines, provided a very early opportunity for meetings and mutual observation. The recordings, from the French perspective, of these encounters, are important observations of the lives of the Tasmanian Aboriginal people.</p> <ul style="list-style-type: none"> Listed: 2005 Class: Historic Criterion: Events, Processes, Research, Creative or technical achievement, Social value, Significant people 					✓				
	Tasmanian Wilderness	See description under World Heritage Properties.				✓	✓				
	Western Tasmania Aboriginal Cultural Landscape	The Western Tasmania Aboriginal Cultural Landscape represents the best evidence of an Aboriginal economic adaptation which included the development of a semi-sedentary way of life with				✓					

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Type	Name	Description	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
		<p>people moving seasonally up and down the north-west coast of Tasmania. This way of life began approximately 1 900 years ago and lasted until the 1830s. Dotted along the wind-swept coastline of the Western Tasmania Cultural Landscape are the remains of numerous hut depressions found in Aboriginal shell middens. These huts and middens are the remnants of an unusual, specialised and more sedentary Aboriginal way of life which was based on the hunting of seals and land mammals, and the gathering of shellfish.</p> <ul style="list-style-type: none"> • Listed: 2013 • Class: Indigenous • Criterion: Events, Processes 									

5.6.3 Indigenous

5.6.3.1 History of Sea Country

Sea Country is not distinguishable from land based country to First Nations Peoples. It includes parts of open ocean, beaches, land and freshwater on the coast and encompasses all living things, beliefs, values, creation spirits and cultural obligations connected to an area (The University of Adelaide, 2023). Water is of particular cultural significance to First Nations Peoples 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, Egan, & Kennett, 2018)

Indigenous groups hold strong connections to the south-east marine region, as occupation of coastal areas dates back over at least 40,000 years (DoE, 2015a). The coastal area of south-east Australia was amongst the most densely populated regions of pre-colonial Australia; these areas provided an abundance of marine and other resources that were not available away from the coast and oceans (NOO, 2002). First Nations Peoples relationship with offshore waters was based on travel to islands in bark rafts and canoes, and the use and management of coastal species (e.g., migratory eels and bull kelp) that are part of ocean ecosystems far from the coast (NOO, 2002). During recent ice age periods (the last ending approximately 14,000 years ago), sea levels were significantly lower, and the coastline was a significant distance seaward of its present location, enabling occupation and travel across land that is now submerged.

During consultation with the Chair of the Eden Local Aboriginal Lands Council, stories were shared on strong links to killer whales that would push baleen whales to the shallows where local warriors would kill the whales and share the soft parts of the whale with the killer whales. This knowledge was shared with whaling fleets circa 1800's, who also hired some of the local First Nations community for their whaling skills.

There was both a practical symbiotic connection as described, and a spiritual connection, with some clans believing that ancestral spirits would pass into the killer whales.

Their Chair also described connections to porpoises that would herd fish to shore with fish then being captured by the community.



Figure 5-31 Image showing mural at Eden Killer Whale Museum depicting First Nations Killer Whale Legend

The offshore Otway waters in proximity to COE assets are almost entirely in waters of <95m depth. It is highly likely that the palaeo shelf was exposed and incised by fluvial systems over glacial maximum periods from the time of Australia's First Nations Peoples (~60ka to present day). There is therefore potential for sites of archaeological significance to exist when considering those regions where present-day water depth is <95m (De Decker, et. Al., 2020).

Research by Holdgate, et. Al. (Holdgate, et. Al., 2003) indicates the offshore Gippsland area was subject to a maximum sea-level fall of ~120m below present and that there are preserved fluvial features created by the exposure of the marine shelf at the last glacial maximum. For a maximum retreat of 120m below present day, this indicates some COE Gippsland permits would have been, and some would not have been terrestrial regions or shallow marine regions.

5.6.3.2 Modern Indigenous Coastal Uses and Interests

The Victorian coast is of significance with respect to aboriginal cultural heritage. This includes areas where there may be no physical evidence of past cultural activities but includes places of spiritual or ceremonial significance, places where traditional plant or mineral resources occur or trade and travel routes (Aboriginal Victoria, 2008).

Contemporary indigenous interests in the region are wide ranging, with indigenous people living within major conurbations, regional hubs, small towns and on Indigenous land (NOO, 2002). However, Indigenous communities of the South-east and Temperate East Marine Regions continue to strengthen their cultural and spiritual connection to the ocean, and to use ocean resources for food, traditional purposes and income.

5.6.3.3 Values and Sensitivities

Values and sensitivities relating to Sea Country may be tangible (physical or material) or intangible (spiritual connection to place) and can include features as shown below (Parks Victoria, 2019):

- Ancestral remains
- Earth features and stone arrangements
- Middens
- Flaked stone tools, ground edge axes, axe-grinding grooves and grinding stones
- Historic and contemporary cultural harvesting of marine fauna and flora
- Sea and landscape features that hold dreamtime and creation stories, such as offshore islands
- Different marine and avian species that hold deep connections to lore and represent spiritual emblems or totems

Locations and landforms where Aboriginal burials may have been more likely to occur include sandy lunettes and alongside water, sand dunes near beaches, aboriginal middens, in bushland, near trees or rock shelters (Parks Victoria, 2019). Earth features include mounds, rings and hearths which are the result of Indigenous people living in particular places of the landscape. Stone arrangements comprise a construct of stones or boulders resulting in a place of cultural significance and are usually found in volcanic areas of Victoria. These include stone houses, fish or eel traps, ceremonial arrangements and rockwells (Parks Victoria, 2019).

Middens are shell deposits that have built up over time, often as a result of Indigenous people gathering and eating shellfish and molluscs (Parks Victoria, 2019). They can be found near water sources throughout Victoria and may be present alongside bones, grinding stones, charcoal and ancestral remains (Parks Victoria, 2019). Coastal shell middens, charcoal and hearth stones from fires, and items such as bone and stone artefacts are typically located within sheltered positions in the dunes, coastal scrub and woodlands, within rock shelters or on exposed cliff tops with good vantage points (Aboriginal Victoria, 2008). Coastal shell middens are found as layers of shell exposed in the side of dunes, banks or cliff tops or as scatters of shell exposed on eroded surfaces. Threats to coastal shell middens include exposure by wind and water erosion; degradation by human or animal interference; burrowing animals; people destabilizing ground using unregulated tracks or off-road vehicles.

Stone tools are flakes of stone shaped into tools such as scrapers, blades or spears. These are found everywhere across Victoria and were made in many forms from many types of stone. Ground edge axes are stone axe-heads made from large flakes of hard stone. Axe-grinding grooves occur from the sharpening and shaping of stones axes along stone platforms or outcrops. They can be found in many places across Victoria, especially near water. Grinding stones are large slabs of abrasive rocks often left at camps. used (Parks Victoria, 2019).

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5.6.3.4 Indigenous Groups - Otway

The coastal areas of the Otway Basin are associated with a number of traditional owner groups. Groups with connection to land and sea country in the Otway include:

- Eastern Maar
- Gunditj Mirring – Specific beliefs and values identified on Gunditjmara Country include known resting sites for Koontapool (southern right whales), which is directly related to Gunditjmara Neeyn (midwives), and explains why Gunditjmara is a Matrilineal Nation (DCCEEW 2022b). Gunditjmara historically developed a complex freshwater aquaculture system in the Budj Bim Cultural Landscape located within the Otway. This was established to trap and harvest short-finned eel (*Anguilla australis*) which migrate to/from oceanic breeding grounds from freshwater habitat (Section 4.1). Wadawurrung – The Wadawurrung People are represented by the Wadawurrung Traditional Owners Aboriginal Corporation.

5.6.3.5 Indigenous Groups - Gippsland

The coastal areas of the Gippsland are associated with a number of traditional owner groups. The primary group with potential connection to land and sea country in Gippsland is:

Gunai Kurnai – The GunaiKurnai People are represented by the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) whose Sea Country extends from Corringile, west towards Wilson's Promontory.



Figure 5-32 Gunaikurnai Country and Sea Country

(Source <https://gunaikurnai.org/our-country/>)

During consultation with GLaWAC, the organisation shared knowledge of some sites and types of artefacts known in the Orbost area. A strong desire to be involved in protecting Country was expressed, whether this be during operations (possibly supporting marine mammal observation programs), or during emergency events in providing local cultural advice to the response agency and potentially being able to support oiled wildlife response (under direction of DEECA).

5.6.3.6 Indigenous Groups – Southeast NSW

The Gippsland Environment Sector also includes part of Southeast NSW. The coastal areas of Southeast NSW comprise a number of clans with many using various Yuin dialects. Collectively they form the claimant group known as South Coast Peoples. Administratively community services are supported through 13 Local Aboriginal Land Councils, each with its own board and CEO.

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During consultation with the southern-most LALC stories have been shared with Cooper Energy representatives regarding connections to marine mammals (see 5.6.3.1). A strong desire to be involved in supporting any emergency response activities was expressed in the unlikely case of an oil spill threatening Country.

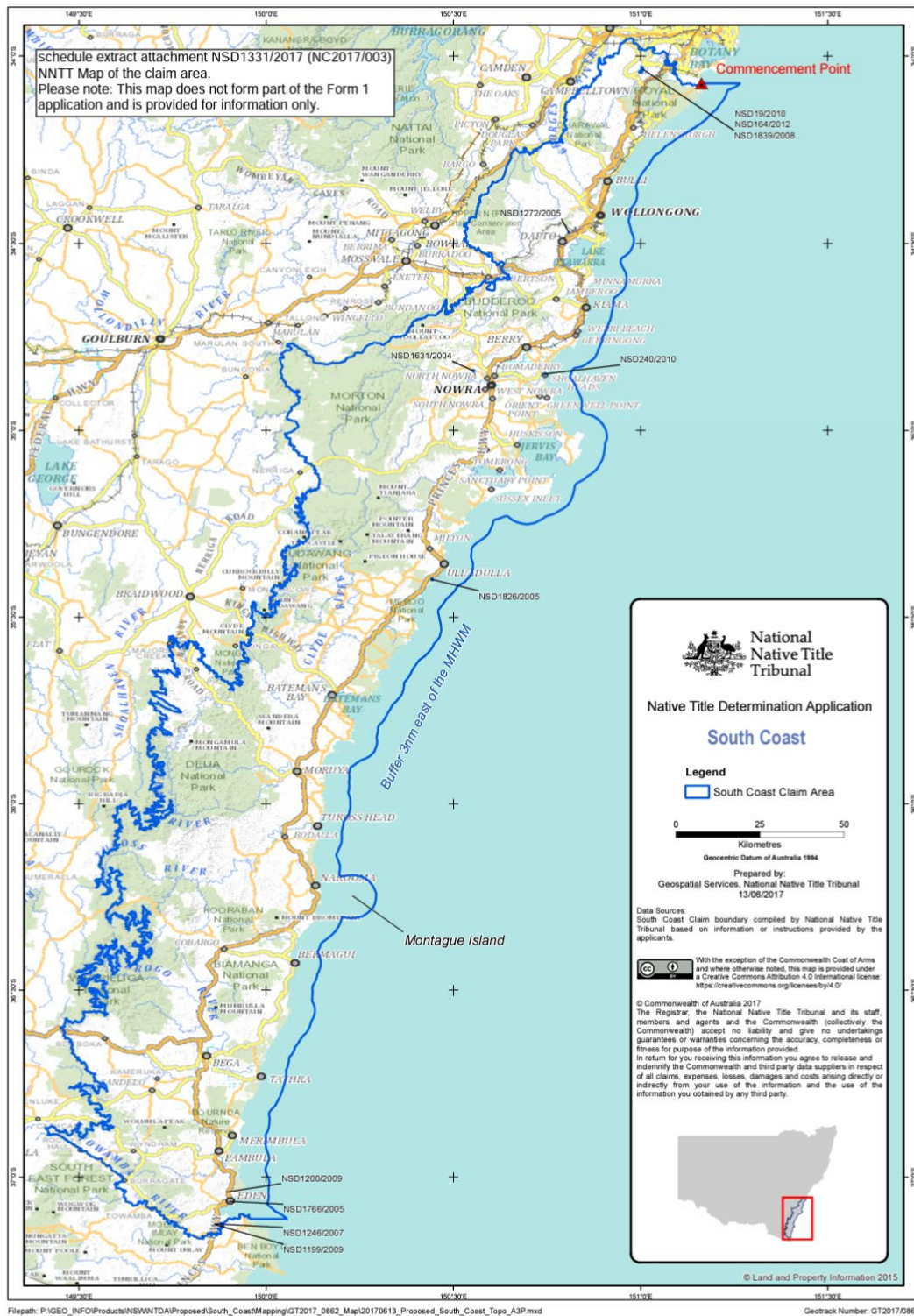


Figure 5-33 Native Title Determination Application - South Coast Map

Map reproduced with the kind permission of the National Native Title Tribunal (NNTT, 2017)

5.6.3.7 Indigenous Land Use Agreements

Indigenous Land Use Agreements (ILUA) across Australia within the Environment Sectors. ILUAs are voluntary agreements regarding the management of portions of land agreed upon by native title parties and others.

5.6.3.7.1 Indigenous Land Use Agreements – Otway Environment Sector

On the Victorian coastline there are the following ILUAs recorded on the National Native Title Tribunal associated with the groups listed in section 5.6.3.4:

- Gunditj Mirring people and the State of Victoria (VI2006/004)
- Gunditj Mirring Non-Extinguishment Principle ILUA (VI2010/001).

Further, there has been multiple ILUAs between proponents and Indigenous communities with agreements including:

- BHPP – Minerva (VIA1999/001)
- SEAGAS Port Campbell VIC to Torrens Island SA Pipeline with the Gunditjmarra people (VI2015/002).

5.6.3.7.2 Indigenous Land Use Agreements – Gippsland Environment Sector

On the Victorian coastline there are the following ILUAs recorded on the National Native Title Tribunal associated with the groups listed in section 5.6.3.5

- Gunaikurnai Fee Simple Grants ILUA – Terms of Access (VI2023/001)
- Gunaikurnai and Icon Energy ILUA – Exploration (VI2013/008)
- Gunaikurnai Settlement ILUA – Native Title Settlement (VI2010/003)

Further, there has been multiple ILUAs between proponents and Indigenous communities with agreements including:

- Twofold Bay ILUA (NI2001/003)
- Gumbaynggirr (Boney) Settlement ILUA (NI2018/004)
- Yaegl Interim Licences ILUA (NI2018/006)
- Bandjalang Interim Licences ILUA (NI2018/008)
- Bunjalung of Byron Bay (NIA2001/001)
- Bunjalung People of Byron Bay (NI2006/004)
- Ti Tree Lane ILUA (NI2006/005)
- Cavanbah (Byron Bay) Arakwal ILUA (NI2019/005)
- Quandamooka Redland City Council ILUA (QI2011/039)
- Quandamooka State ILUA (QI2011/038)

5.6.3.8 Native Title

There are current Native Title determinations, with non-exclusive Native Title established, in areas of the Victorian, northern New South Wales, and southern Queensland coast, within the Environment Sectors (Figure 5-34).

There are also further Native Title claims along sections of the coast within the Environment Sectors (Figure 5-35)

5.6.3.8.1 Native Title - Otway

In the Otway, existing native title includes:

- VCD2023/001 - Eastern Maar People. Eastern Maar Aboriginal Corporation Registered Native Title Body Corporate (RNTBC)
- VCD2011/001 - Gunditjmarra & Eastern Maar. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC, Eastern Maar Aboriginal Corporation RNTBC
- VCD2007/001 - Gunditjmarra - Part A. Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC.

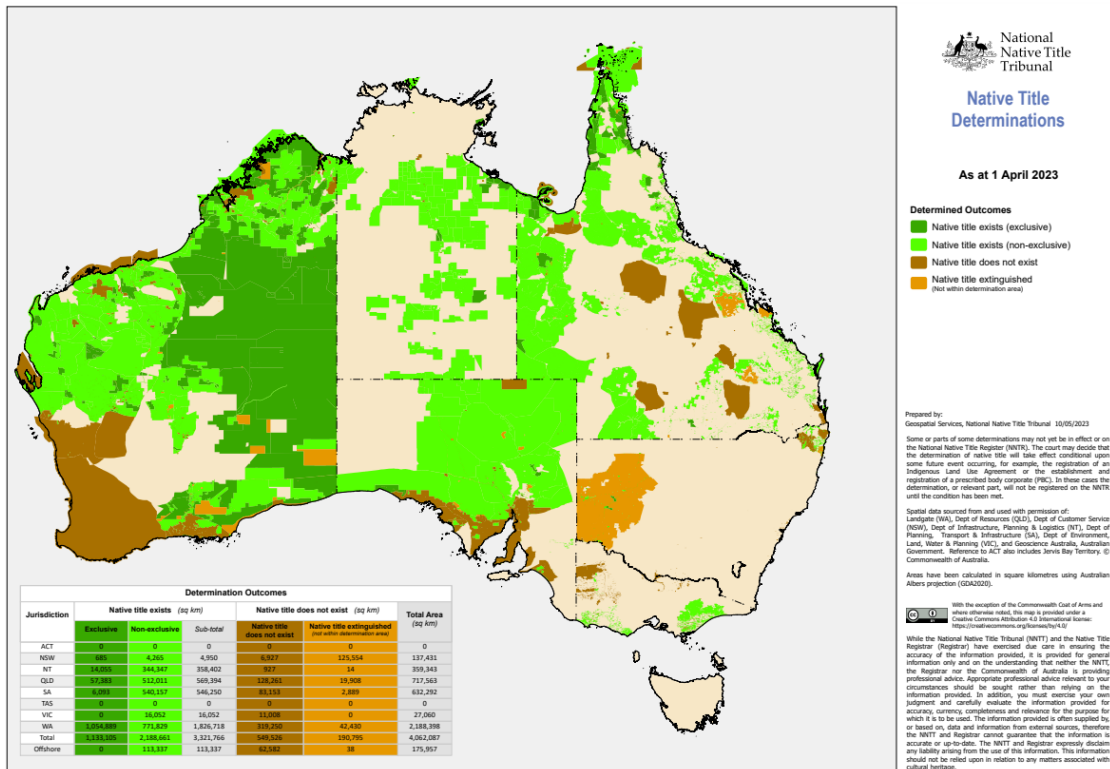
5.6.3.8.2 Native Title - Gippsland

In the Gippsland Environment Sector, existing native title includes:

- VCD2010/001 - Gunai/Kurnai People. Gunaikurnai Land & Waters Aboriginal Corporation RNTBC

A large number of Native Title determinations held across the Environment Sectors in NSW and Queensland with none held in Tasmania. These include:

- NCD2019/001 - Bundjalung People of Byron Bay #3
- NCD2021/001 - Bandjalang People No 3
- NCD2013/001 - Bandjalang People #1
- NCD2013/002 - Bandjalang People #2
- NCD2015/002 - Yaegl People #1
- NCD2015/003 - Yaegl People #2
- NCD2017/003 - Yaegl People #2 (Part B)
- NCD2019/002 - Gumbaynggirr People #3
- NCD2017/004 - Gumbaynggirr People
- NCD2014/001 - Gumbaynggirr People
- QCD2019/007 - Quandamooka People #4
- QCD2011/001 - Quandamooka People #1
- QCD2011/002 - Quandamooka People #2



(Source: Map reproduced with the kind permission of the National Native Title Tribunal, 2023)

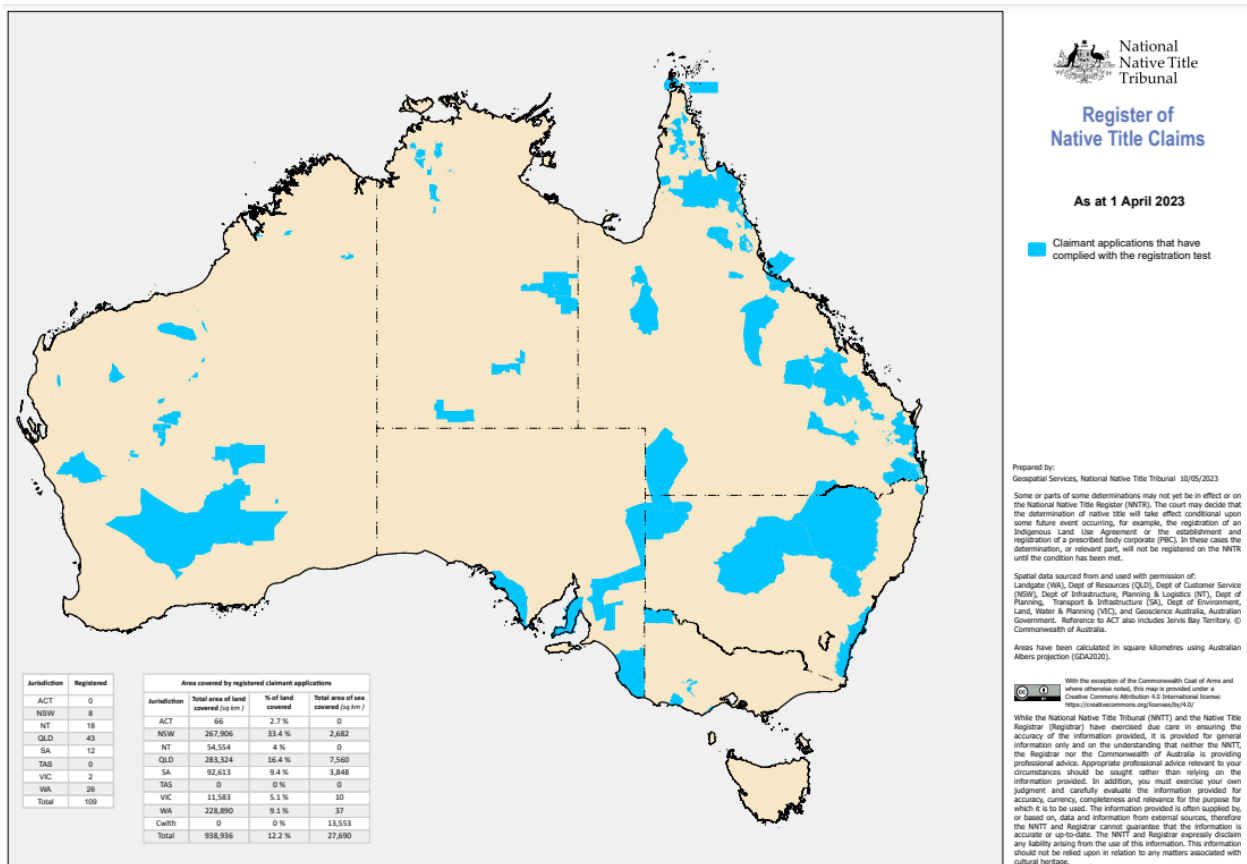
Figure 5-34: Native Title Determinations

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There are also a number of Native Title claims along the coastal regions of Victoria, NSW and Queensland. These include:

- NC2017/003 - South Coast Peoples
- NC2020/002 - Tweed River Bundjalung People
- QC2022/006 - Kombumerri Ngarang Wal Saltwater People
- QC2018/007 - Kabi Kabi First Nation Traditional Owners Native Title Claim
- QC2017/007 - Dangan Balun (Five Rivers) People



(Source: Map reproduced with the kind permission of the National Native Title Tribunal, 2023)

Figure 5-35: Native Title Registered Claims

5.6.3.9 Indigenous Protected Areas (IPAs)

IPAs are a key element of Australia’s National Reserve System (parks, reserves and protected areas) designed to protect the nation’s biodiversity. IPAs protect cultural heritage, provide employment opportunities, education and training for Indigenous people. The program strengthens the conservation and protection of marine and coastal environments. On 7 May 2022 numerous sea country IPA consultation projects were announced to support Indigenous-led consultation with Traditional Owners and other stakeholders, management planning, and on-sea/on-land management with five of these included within the Otway and Gippsland Environment Sectors as shown in Figure 5-36.



Source: (DCCEEW, 2022b)

Figure 5-36: Sea Country Indigenous Protected Areas Programs - Consultation Projects

5.6.3.9.1 Indigenous Protected Areas – Otway Environment Sector

Indigenous land and sea management projects on coastal areas in the Otway Environment Sector as shown by the National Indigenous Australians Agency include:

- Deen Maar IPA – sand dunes, limestone ridges, river, lake and wetlands proximate to Yambuk

5.6.3.9.2 Indigenous Protected Areas – Gippsland Environment Sector

Indigenous land and sea management projects on coastal areas in the Gippsland Environment Sector as shown by the National Indigenous Australians Agency include:

- Babel Island IPA – mutton bird rookery and cultural resource on the east of Flinders Island
- Badger Island IPA – former indigenous community with current boxthorn control program west of Flinders Island
- Mount Chappell Island IPA – mutton bird rookery with native revegetation and weed control west of Flinders Island
- Big Dog Island IPA – mutton birding island south of Flinders Island
- lungatalanana (Clarke Island) IPA – study of fire regrowth with strong links to the Tasmanian Aboriginal community
- Risdon Cove and putalina IPA – cultural and spiritual sites for the Tasmanian aboriginal community either side of Hobart
- Gumma IPA – diverse aquatic interface habitats south of Nambucca Heads on the north coast of NSW
- Minyumai IPA – floodplain wetlands and rainforests in northern NSW
- Ngunya Jargoona IPA – Wildlife corridors and refuge for biodiversity within a fragmented landscape on the northern coast of NSW
- In 2022, GIaWAC 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 Vic/NSW Border.

6 Summary

The following tables show the presence of ecological (Table 6-1) and social (Table 6-2) receptors that may occur within each of the Environment Sectors (Figure 1-1).

Examples of values and sensitivities associated with each of the ecological or social receptors have been included in the tables. These values and sensitivities have been identified based on:

- Presence of listed threatened or migratory species, or threatened ecological communities
- Presence of BIAs
- Presence of important behaviours (e.g. foraging, roosting or breeding) by fauna, including those identified in the EPBC Protected Matter searches
- Provides an important link to other receptors (e.g. nursery habitat, food source, commercial species), or
- Provides an important human benefit (e.g. community engagement, economic benefit).

For a summary of the receptors present within operational areas and EMBA's, refer to the relevant Environment Plans.

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Table 6-1: Presence of Ecological Receptors within the Environment Sectors

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
Habitat	Shoreline	Cliff	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) Nesting or Breeding habitat (e.g. birds) 		✓		✓	✓	✓	✓	✓	✓	
		Rocky	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) Nesting or Breeding habitat (e.g. birds, pinnipeds) Haul-out sites (e.g. pinnipeds) 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Gravel/Cobble	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) Nesting or Breeding habitat (e.g. birds, pinnipeds) Haul-out sites (e.g. pinnipeds) 	✓	✓		✓	✓	✓				
		Sandy	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) Nesting or Breeding habitat (e.g. birds, pinnipeds, turtles) Haul-out sites (e.g. pinnipeds) 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Muddy	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) 		✓		✓	✓					
		Tidal Flat	<ul style="list-style-type: none"> Foraging habitat (e.g. birds) 		✓	✓	✓	✓	✓	✓	✓	✓	✓
		Artificial structure	<ul style="list-style-type: none"> Community engagement Economic benefit 	✓	✓	✓	✓	✓	✓	✓	✓		
	Mangroves	Mangrove strands	<ul style="list-style-type: none"> Nursery habitat (e.g. crustaceans, fish) 		✓	✓			✓	✓	✓		
	Saltmarshes	Saltmarsh ecosystems	<ul style="list-style-type: none"> Nursery habitat (e.g. crustaceans, fish) 	✓	✓	✓	✓	✓	✓	✓	✓		
			<ul style="list-style-type: none"> Threatened Ecological Community 	✓	✓	✓	✓	✓	✓	✓			
	Coastal Vine Thicket	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	<ul style="list-style-type: none"> Threatened Ecological Community 			✓			✓	✓			
	Soft Sediment	Unvegetated soft sediment substrates	<ul style="list-style-type: none"> Key habitat (e.g. benthic invertebrates) 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Seagrass	Seagrass meadows	<ul style="list-style-type: none"> Nursery habitat (e.g. crustaceans, fish) 	✓	✓	✓	✓	✓	✓	✓	✓			

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Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island		
			<ul style="list-style-type: none"> Food source (e.g. dugong, turtles) Threatened Ecological Community 						✓					
		Algae	Benthic Microalgae	<ul style="list-style-type: none"> Food source (e.g. gastropods) 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			Macroalgae beds	<ul style="list-style-type: none"> Nursery habitat (e.g. crustaceans, fish) Food source (e.g. birds, fish) Threatened Ecological Community 	✓	✓	✓	✓	✓	✓	✓	✓		
				<ul style="list-style-type: none"> Threatened Ecological Community 		✓			✓					
		Coral	Hard and soft coral communities	<ul style="list-style-type: none"> Nursery habitat (e.g. crustaceans, fish) Breeding habitat (e.g. fish) 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MARINE FAUNA	Plankton	Phytoplankton and zooplankton assemblages	<ul style="list-style-type: none"> Food Source (e.g. whales, turtles) 	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Seabirds and Shorebirds		<ul style="list-style-type: none"> Listed Marine Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			<ul style="list-style-type: none"> Threatened Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			<ul style="list-style-type: none"> Migratory Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			<ul style="list-style-type: none"> BIA – Aggregation 	✓	✓		✓	✓						
			<ul style="list-style-type: none"> BIA – Breeding 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			<ul style="list-style-type: none"> BIA – Foraging 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			<ul style="list-style-type: none"> Behaviour - Breeding 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			<ul style="list-style-type: none"> Behaviour - Foraging 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			<ul style="list-style-type: none"> Behaviour - Roosting 	✓	✓	✓	✓	✓	✓	✓	✓		✓	
	Marine Invertebrates		<ul style="list-style-type: none"> Food Source (e.g. whales, turtles) Commercial Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			<ul style="list-style-type: none"> Threatened Species 				✓	✓						
Fish	Fish	<ul style="list-style-type: none"> Threatened Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
		<ul style="list-style-type: none"> Commercial Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
		Sharks and Rays	<ul style="list-style-type: none"> Threatened Species 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
			• Migratory Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	
			• BIA – Aggregation						✓	✓			
			• BIA – Breeding		✓	✓			✓	✓			
			• BIA – Distribution	✓	✓	✓	✓	✓	✓	✓			
			• Behaviour - Breeding		✓	✓			✓	✓			
			• Behaviour – Congregation/Aggregation							✓			
			• Behaviour - Foraging	✓			✓	✓					
		Syngnathids	• Listed Marine Species	✓	✓	✓	✓	✓	✓	✓	✓		
	Marine Reptiles	Turtles	• Listed Marine Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• Threatened Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• Migratory Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• BIA – Foraging							✓			
			• BIA – Interesting							✓			
			• BIA – Nesting							✓			
			• Behaviour - Breeding	✓		✓	✓	✓	✓	✓			
		• Behaviour – Foraging	✓	✓	✓			✓	✓				
			Sea Snakes	• Listed Marine Species						✓	✓		
			Crocodiles	• Listed Marine Species							✓		
			• Migratory Species							✓			
	Marine Mammals	Pinnipeds	• Listed Marine Species	✓	✓	✓	✓	✓	✓				
			• Threatened Species	✓			✓						
			• BIA – Foraging	✓									
			• Behaviour - Breeding	✓	✓	✓	✓						
• Behaviour - Foraging			✓	✓	✓	✓	✓	✓					

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Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
		Sirenians	• Listed Marine Species						✓	✓			
			• Migratory Species						✓	✓			
		Whales	• Listed Marine Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• Threatened Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• Migratory Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• BIA – Aggregation	✓									
			• BIA – Breeding					✓		✓			
			• BIA – Connecting Habitat		✓		✓	✓					
			• BIA - Distribution										
			• BIA – Foraging	✓	✓	✓	✓	✓					
			• BIA – Migration	✓	✓	✓			✓	✓			
			• Behaviour - Breeding	✓						✓			
			• Behaviour - Foraging	✓	✓	✓	✓	✓	✓	✓			
		Dolphins	• Listed Marine Species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			• Migratory Species	✓	✓	✓	✓	✓	✓	✓			
			• BIA – Breeding							✓			
			• BIA – Calving							✓			
			• BIA – Foraging							✓			
		Porpoise	• Behaviour - Breeding						✓		✓		
			• Listed Marine Species				✓	✓					
• Migratory Species					✓	✓							

Table 6-2: Presence of Social Receptors within the Environment Sectors

Receptor Group	Receptor Type	Receptor Description	Values and Sensitives	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island	
Natural System	Commonwealth Parks	Key Ecological Features	<ul style="list-style-type: none"> Various; e.g. high productivity, aggregations of marine life Refer to Section 4.6 for specific values and sensitivities associated with each KEF 	✓	✓	✓	✓	✓	✓	✓	✓		
		Australian Marine Park	<ul style="list-style-type: none"> Various; e.g. migration route, foraging areas, heritage sites Refer to Section 4.3 for values and sensitivities associated with each AMP 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Commonwealth National Park	<ul style="list-style-type: none"> Various; e.g. breeding areas, cultural sites Refer to Section 4.3.2 for values and sensitivities associated with National Park 						✓				
	State Parks and Reserves	Marine Protected Areas	<ul style="list-style-type: none"> Various; e.g. foraging or breeding areas 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Terrestrial Protected Areas	<ul style="list-style-type: none"> Various; e.g. shorelines 	✓	✓	✓	✓	✓	✓	✓	✓		
	Wetlands	International (Ramsar) Importance	<ul style="list-style-type: none"> Various; e.g. high biodiversity, habitat for threatened species Refer to Section 4.4.1 for values and sensitivities associated with each wetland 	✓	✓	✓		✓	✓	✓			
		National Importance	<ul style="list-style-type: none"> Various; e.g. high biodiversity, habitat for threatened species Refer to Section 4.4.2 for values and sensitivities associated with each wetland 	✓	✓	✓	✓	✓	✓	✓			
Human System	Commercial Fisheries	Commonwealth-managed	<ul style="list-style-type: none"> Economic benefit 	✓	✓	✓	✓	✓	✓	✓		✓	
		State-managed	<ul style="list-style-type: none"> Economic benefit 	✓	✓	✓	✓	✓	✓	✓			
	Recreational Fisheries	<ul style="list-style-type: none"> Community engagement 	✓	✓	✓	✓	✓	✓	✓				
	Coastal Settlements	<ul style="list-style-type: none"> Community engagement Economic benefit 	✓	✓	✓	✓	✓	✓	✓			✓	

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Receptor Group	Receptor Type	Receptor Description	Values and Sensitives	Otway	Bass Strait	Gippsland	Sorell	SE Tasmania	Central NSW	SE Queensland	Lord Howe	Norfolk Island
	Recreation and Tourism		<ul style="list-style-type: none"> Community engagement Economic benefit 	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Industry	Shipping	<ul style="list-style-type: none"> Community engagement Economic benefit 	✓	✓	✓	✓	✓	✓	✓	✓	
		Oil and Gas Exploration and/or Operation	<ul style="list-style-type: none"> Economic benefit 	✓	✓	✓	✓	✓	✓			
		Submarine Cables and Pipelines	<ul style="list-style-type: none"> Economic benefit 		✓				✓			
		Military	<ul style="list-style-type: none"> Protection and surveillance 		✓				✓			
	Heritage	Maritime	<ul style="list-style-type: none"> Shipwrecks 	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Cultural	<ul style="list-style-type: none"> Commonwealth Heritage Places World Heritage Properties National Heritage Places 	✓	✓	✓	✓	✓	✓	✓		✓
Indigenous		<ul style="list-style-type: none"> Indigenous use or connection Native Title Indigenous Land Use Agreements 	✓	✓	✓	✓	✓	✓	✓	✓		

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Appendix 1 - Marine/Coastal Wetlands of International Importance

The classification of a 'marine/coastal wetland' is extensive and includes those wetlands that while predominantly based inland have some form of connection with the coast and/or marine waters. The Ramsar classification for 'marine/coastal wetlands' includes:

- A — Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits.
- B — Marine subtidal aquatic beds; includes kelp beds, sea-grass beds, tropical marine meadows.
- C — Coral reefs.
- D — Rocky marine shores; includes rocky offshore islands, sea cliffs.
- E — Sand, shingle or pebble shores; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.
- F — Estuarine waters; permanent water of estuaries and estuarine systems of deltas.
- G — Intertidal mud, sand or salt flats.
- H — Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.
- I — Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.
- J — Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea.
- K — Coastal freshwater lagoons; includes freshwater delta lagoons.
- Zk(a) —Karst and other subterranean hydrological systems, marine/coastal.

The key features of the wetland sites, as described within the Australian Wetland Database, are provided in the below table.

Table A-1: Key Features of Internationally Important Wetlands

Wetland	Key Features
South Australia	
Piccaninnie Ponds Karst Wetlands	<p>The Piccaninnie Ponds Karst Wetlands are an example of karst spring wetlands, with the largest and deepest of the springs reaching a depth of more than 110 m. The majority of the water comes from an unconfined regional aquifer and is consistently 14-15°C. The karst springs support unique macrophyte and algal associations, with macrophyte growth extending to 15 m below the surface as a result of exceptional water clarity. A number of different wetland types exist on the site, including a large area of peat fens.</p> <p>There are four distinct areas of the Ramsar site. Piccaninnie Ponds (also known as Main Ponds) consists of three interconnected bodies of water - First Pond, The Chasm and Turtle Pond - rounded by an area of shrub dominated swamp. Western Wetland consists of dense closed tea-tree and paperbark shrubland over shallow dark clay on limestone soils. Eastern Wetland includes the spring-fed Hammerhead Pond. Pick Swamp, on the extreme west of the site, includes areas of fen, marshes and sedgeland as well as the spring-fed Crescent Pond on peat soils.</p> <p>The system is an important remnant of an extensive system of wetlands that once occupied much of the south-east of South Australia. The major groundwater discharge points are Main Ponds, Hammerhead Pond and Crescent Pond. Water principally leaves the site via Outlet Creek and the Pick Swamp drain outlet, which connect the site to the sea. There are a number of fresh groundwater beach springs located on the site.</p> <p>The geomorphic and hydrological features of the site produce a complex and biologically diverse ecosystem which supports considerable biodiversity, including a significant number of species of national and/or international conservation value. These include the Orange-bellied Parrot, Australasian Bittern and Yarra Pygmy Perch.</p> <p>The site attracts 20,000 visitors annually for cave diving, snorkelling, bushwalking, educational activities and birdwatching. The site also has spiritual and cultural value. The Traditional Owners of the land, the</p>

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Wetland	Key Features
	<p>Bunganditj (Boandik) and local Indigenous people have a strong connection with the site. Traditionally the site provided a good source of food and fresh water, and evidence of previous occupation still exists.</p> <p><u>Reference</u> <i>Department of Agriculture, Water and the Environment. Piccaninnie Ponds Karst Wetlands, in Australian Wetlands Database. Department of Agriculture, Water and the Environment. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=66. Accessed May 2019.</i></p>
Victoria	
Corner Inlet	<p>The Corner Inlet Ramsar site is located on the south-east coast of Victoria. It is bounded to the west and north by the South Gippsland coastline, in the south-east by a series of barrier islands and sandy spits lying end to end and separated by narrow entrances, and to the south by the hills of Wilsons Promontory. Corner Inlet includes the chain of barrier islands, multiple beach ridges, lagoons and swamps, tidal creeks, tidal deltas, and tidal washovers.</p> <p>The mainland coast and several sandy islands are covered with mangroves, saltmarshes, sandy beaches and very extensive intertidal mudflats. The area contains the only extensive bed of the Broad-leaved Seagrass in Victoria.</p> <p>The islands of Corner Inlet, although not rich in plant diversity, are of high biogeographical significance as a result of their geological history and connectivity to the mainland during ice ages. The islands also contain significant areas of saltmarsh and mangroves, both of which are communities of very limited distribution.</p> <p>Corner Inlet supports more than 390 species of marine invertebrates and 390 species of native flora. The Ramsar site also has a high diversity of bird species with thirty-two wader species recorded. Corner Inlet provides extensive tidal flats that are exposed at low tide, which are important feeding areas for waders. It is estimated that nearly 50 per cent of the overwintering migratory waders in Victoria occur in Corner Inlet.</p> <p>The nationally threatened species utilising the Ramsar site include the Orange-bellied Parrot, Growling Grass Frog, Australian Grayling and Swift Parrot.</p> <p>Corner Inlet was used traditionally by Indigenous people and many archaeological sites including scarred trees, burial sites, artefact scatters, shell middens and camps have been found. Currently, the Ramsar site is used for biological conservation, ports with servicing facilities for off-shore oil and natural gas exploration, commercial fishing, recreational fishing, and other recreational activities. Diving is popular around the numerous shipwreck sites in Corner Inlet and around the barrier islands.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Corner Inlet, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=13. Accessed 25 Jul 2017.</i></p>
Edithvale-seafood wetlands	<p>The Edithvale-Seaford wetlands are located in the south-eastern suburbs of Edithvale and Seaford in Melbourne, Victoria. They are the last remnants of the once extensive Carrum Carrum Swamp, a large inter-dunal lagoon that was largely drained in the late 19th century. The Ramsar site is used for flood control, conservation, recreation and education.</p> <p>The wetlands in the Ramsar site are naturally fresh to brackish marshes and open water wetlands, underlain by peat beds that limit the entry of saline groundwater. Both wetlands receive waters from the surrounding urban and semi-rural catchment and discharge to Port Phillip Bay via drains.</p> <p>The wetlands provide habitat in an urban setting for remnant species, supporting a range of native and introduced vegetation. A total of 202 plant species have been recorded for the wetlands, including a significant extension to the range of the native Southern Water Ribbons.</p> <p>Remnant habitats support a variety of native bird, mammal, frog, reptile, fish and invertebrate populations, several of which are of regional and state conservation significance. Seaford Swamp is a site of international importance for the Sharp-tailed Sandpiper.</p> <p>The Carrum Carrum Swamp was part of the extensive lands traditionally occupied the Bunerong people, providing important sources of food and material. The wetlands are now in the midst of an urban environment and are managed as an integral part of the regional drainage system. They are a significant resource for passive and nature-based recreation, and offer environmental education opportunities for local schools, tertiary institutions and the wider community.</p> <p><u>Reference</u></p>

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Wetland	Key Features
<p>Flood plain lower Ringarooma river</p>	<p>http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=57</p> <p>The Flood Plain Lower Ringarooma River Ramsar site is located on the far north-east coast of Tasmania, between Cape Portland and Waterhouse Point. The site is situated on the sandy flood plain of the Lower Ringarooma River which encompasses extensive marshlands and a number of shallow lagoons; Shantys Lagoon, Blueys Lagoon and Bowlers Lagoon. The Ringarooma River drains out into Ringarooma Bay.</p> <p>The hydrology of this site is influenced by tidal flows, river flows and local groundwater. The bulk of the wetland area is above the tidal limit and is largely controlled by inflows from the Ringarooma River.</p> <p>The Ramsar site is dominated by scrub and tussock grassland vegetation, and includes substantial areas of freshwater marsh habitat in the flood plain. The varieties of habitats support the following vegetation communities: Saltmarsh, Coastal grass and herbfield, Lowland Sedgy heathland, Wet heathland, Coastal heathland, Coastal scrub, Allocasuarina verticillata forest and Eucalyptus coastal forest.</p> <p>The Flood Plain Lower Ringarooma River is considered to be a good foraging area for dabbling ducks and other waterbirds due to the large area of shallow water. A number of bird species listed under international migratory conservation agreements have also been recorded at the site. These include: Cattle Egret, Great Egret, Latham's Snipe, Curlew Sandpiper, Red-necked Stint, Bar-tailed Godwit, Caspian Tern and Greenshank. Australasian Shoveler, Little Tern, Hooded Plover and Fairy Tern are also known to breed within the Ramsar site.</p> <p>The Ramsar site also provides habitat for threatened species, including four wetland-dependent species:</p> <ul style="list-style-type: none"> • green and gold frog; • dwarf galaxias; • fairy tern; and • Australian grayling. <p>The Flood Plain Lower Ringarooma River was traditionally used by Indigenous people. It also has a history of European occupation and mining exploitation since the early 1800s. Currently, the Ramsar site is used for duck hunting and cattle grazing.</p>
<p>Gippsland Lakes</p>	<p>The Gippsland Lakes Ramsar site is located approximately 300 km east of Melbourne on the low-lying South East Coastal Plain bioregion. Covering a vast area, the lakes are a series of large, shallow, coastal lagoons approximately 70 km in length and 10 km wide, separated from the sea by sand dunes. The surface area of the lakes is approximately 364 km² and the three main water bodies are Lakes Wellington, Victoria, and King. The Gippsland Lakes together form the largest navigable inland waterway in Australia and create a distinctive regional landscape of wetlands and flat coastal plains of considerable environmental significance.</p> <p>The Mitchell Delta of the Ramsar site is a classic form of digitate delta and ranks as one of the finest examples of this type of landform in the world. The silt jetties of the delta extend almost eight kilometres into the lake as low, narrow tongues of sediment that were formerly bordered by a wide zone of reedswamp.</p> <p>The Ramsar site contains 11 Ramsar wetland habitat types including most notably, coastal lagoons, subtidal seagrass and algal beds, and a range of saline, brackish and freshwater marsh environments. The site supports a broad range of ecosystem services including nationally and internationally threatened wetland species, waterbird breeding and fish spawning sites. Cultural and socio-economic values are equally diverse, noting the particular importance of the site in a regional context in terms of recreational activities such as boating, recreational fishing and holiday tourism</p> <p>The Gippsland Lakes support three nationally vulnerable and endangered wetland-associated flora species (Dwarf Kerrawang, Swamp Everlasting and Metallic Sun-orchid), and the nationally threatened Growling Grass Frog and Green and Golden Bell Frog . The bird diversity of the Ramsar wetland is high with 86 species of waterbirds being recorded including large numbers of the Red-necked Stint, Black Swan, Sharp-tailed Sandpiper, Chestnut Teal, Musk Duck, Fairy Tern and Little Tern.</p> <p>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.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Gippsland Lakes, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=21. Accessed 25 Jul 2017.</i></p>
<p>Glenelg Estuary and Discovery Bay Wetlands</p>	<p>The Glenelg Estuary and Discovery Bay Ramsar Site is situated in western Victoria. It covers approximately 22,289 hectares and comprises portions of the Lower Glenelg National Park, the Discovery Bay Coastal Park and the Nelson Streamside Reserve. The Glenelg River estuary is the longest in the bioregion, extending 75 kilometres. The Ramsar site comprises three broad systems that support different wetland types: freshwater wetlands, the Glenelg Estuary and the beach and dune system. The site contains several regionally (and internationally) rare wetland types: intact fen peatlands and a humid dune slack system.</p> <p>The site:</p> <ul style="list-style-type: none"> • supports the nationally vulnerable coastal saltmarsh ecological community and eight nationally / internationally listed threatened flora and fauna species. • provides habitat for 95 waterbird species including 24 species listed under international agreements: CAMBA (24), JAMBA (24), ROKAMBA (21), BONN (21). Beach nesting birds such as hooded plover (<i>Thinornis rubricollis</i>) and red-capped plover (<i>Charadrius ruficapillus</i>) are regularly recorded nesting on the dunes of the Discovery Bay Coastal Park. • supports 14 species of native fish which are diadromous, migrating between habitats for part of their lifecycle by providing food, spawning grounds and nurseries. It also acts as a migration path on which diadromous fishes of the region depend. • provides habitat for obligate aquatic species in the permanent wetlands of the Long Swamp complex and Bridgewater Lakes when the surrounding landscape is dry and during drought conditions. • supports > 1% of the population of the wetland dependent invertebrate species the Ancient greenling (<i>Hemiphysalia mirabilis</i>) in the Baumea sedgeland. <p>The area is popular for recreational and tourism activities, including sightseeing, walking, camping, and recreational fishing. Importantly, the Gunditjmara Indigenous people have a living association with the Ramsar site, which has great cultural significance for them, as it is part of their Koonang (sea) and Bocara Woorwarook (river forest) country.</p> <p>The ecological character of the site is defined by 10 critical components, processes and services:</p> <p>Components:</p> <ul style="list-style-type: none"> • Hydrology • Vegetation type and extent • Fish diversity and abundance • Waterbird diversity and abundance <p>Process:</p> <ul style="list-style-type: none"> • Stratification <p>Services:</p> <ul style="list-style-type: none"> • Special features (dune slacks) • Supports a diversity of wetland types • Supports threatened species • Provides physical habitat for waterbirds • Ecological connectivity <p><u>Reference</u></p> <p><i>Department of Agriculture, Water and the Environment. 2021. Glenelg Estuary and Discovery Bay Wetlands in Australian Wetlands Database. Department of Agriculture, Water and the Environment, Canberra. Available from: https://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=67 Accessed 14 May 2021.</i></p>
<p>Port Phillip Bay (Western Shoreline) and Bellarine Peninsula</p>	<p>The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site is located in the western portion of Port Phillip Bay, near the city of Geelong in Victoria. The site comprises six distinct areas that include Point Cook/Cheetham, Werribee/Avalon, Point Wilson/Limeburners Bay, Swan Bay, Mud Islands, and the Lake Connewarre Complex.</p> <p>The Ramsar site is a low-lying area and a natural discharge point for the rivers draining southern central Victoria. The tidal amplitude within the bay is reduced compared with Bass Strait due to the narrow opening of the Bay (Port Phillip Heads).</p> <p>Port Phillip Bay (Western Shoreline) and Bellarine Peninsula support a variety of wetland types ranging from shallow marine waters to seasonal freshwater swamps and extensive sewage ponds. Wetland areas include freshwater lakes, estuaries, some with White Mangrove, saltmarshes, intertidal mudflats</p>

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Wetland	Key Features
	<p>and seagrass beds. The Ramsar site supports some plants species threatened in Victoria, such as Small Scurf-pea and Rare Bitter-bush.</p> <p>This Ramsar site is the sixth most important area in Australia for migratory waders and the most important in Victoria. Large numbers of bird species including Pied Oystercatchers, Banded Stilts, Red-necked Stint, Sharp-tailed Sandpiper, Fairy Tern, Australasian Shoveler, Red-necked Avocets, Blue-billed Duck, and Freckled Duck, have been recorded at the site. Furthermore, the Melbourne Water Corporation Sewage Farm and Western Treatment Plant at Werribee support many waterbirds on its retention ponds.</p> <p>Port Phillip Bay (Western Shoreline) and Bellarine Peninsula provides important habitat for threatened species such as the Little Tern and Striped Legless Lizard. In particular, large numbers of the nationally threatened Orange-bellied Parrot utilise Port Phillip Bay during the winter after their summer migration to Tasmania to breed. Swan Bay and Limeburners Lagoon are also valuable fish breeding grounds for many of the commercial species caught in Port Phillip Bay.</p> <p>There are a number of important indigenous sites within the wetlands, including burial sites, middens and artefacts, with the oldest midden in the area being at least 5,000 years old. Currently over three million people live around Port Phillip Bay, which is used intensively for recreation, nature conservation, sewage treatment, aquaculture, fishing, and salt production.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Port Phillip Bay (Western Shoreline) and Bellarine Peninsula, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=18. Accessed 25 Jul 2017.</i></p>
<p>West district lakes</p>	<p>The Western District Lakes Ramsar site is located within the western volcanic plains region of Victoria, near the township of Colac. It lies within the landlocked Lake Corangamite catchment and is comprised of nine separate lakes.</p> <p>The lakes vary in size, depth and salinity, depending on their method of formation, catchment area and outlet. Lake Corangamite is the largest, covering approximately 25 000 hectares. The only significant river in the region, the Woody Yallock River, drains into this lake.</p> <p>The Ramsar site is roughly equivalent to the high-water mark of the nine lakes and vegetation within the site is therefore limited. Approximately 10-20% of the lake margins are vegetated, mostly with saltmarsh communities. A total of five submerged aquatic plant species have been recorded. Two nationally threatened species, the salt-lake tussock-grass (<i>Poa sallacustris</i>) and spiny peppergrass (<i>Lepidium aschersonii</i>) occur within the Ramsar site.</p> <p>The Ramsar site provides habitat for approximately 70 waterbird species, 20 of which are listed under international migratory species treaties and 11 of which breed within the Ramsar site. Some species congregate there in large numbers, including the Australian shelduck, chestnut teal, Australasian shoveler, Eurasian coot and banded stilt.</p> <p>Six native species of fish have been recorded within the lakes of the Ramsar site. Of the invertebrates recorded, molluscs dominate most of the saline and mesosaline lakes whilst Lake Colongulac is dominated by oligochaetes.</p> <p>Hydrology is variable across the site. Some of the lakes are permanent whilst others are seasonal or intermittent. All are connected to saline, surficial groundwater and all except Lakes Beeac and Cundare are groundwater flow-through lakes. Most of the water is received through direct rainfall and lost via evaporation. All lakes are highly turbid and have high nutrient levels.</p> <p>The region is spiritually and culturally significant for the Djargurd Wurrung and Gulidjan Indigenous groups. There are several important archaeological sites in the Ramsar site, which was particularly significant for the provision of food.</p>
<p>Western Port</p>	<p>Western Port is a large bay in southern Victoria incorporating around 260 km of coastline, connected to Bass Strait by a wide channel between Flinders and Phillip Island, and a narrow channel between San Remo and Phillip Island. Six rivers from the north and east of the catchment flow into the northern and eastern shores of Western Port and several minor rivers and creeks on the eastern slopes of the Mornington Peninsula drain into the western shores.</p> <p>The Ramsar site has a wide variety of habitat types, ranging from deep channels, seagrass flats, intertidal mudflats, extensive mangrove thickets and saltmarsh vegetation. The white mangrove communities within Western Port are the most well-developed and extensive in Victoria and are the only</p>

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Wetland	Key Features
	<p>large communities situated so far from the Equator. Threatened plant species that are found within the Ramsar site include Dense Leek-orchid, Creeping Rush, and Tiny Arrow Grass.</p> <p>Western Port is one of the three most important areas for waders in Victoria and the site supports numerous migratory species listed under international migratory bird conservation agreements. High numbers of Eastern Curlew, Whimbrel, Bar-tailed Godwit, Grey-tailed Tattler, Greenshank and Terek Sandpiper have been recorded at the site. Nationally threatened species that utilise Western Port include the Orange-bellied Parrot, Swift Parrot, Helmeted Honeyeater, Little Tern, Southern Right Whale, and listed migratory Humpback Whale. The site supports the globally threatened Fairy Tern which is listed as vulnerable on the IUCN Red List of Threatened Species.</p> <p>A number of Indigenous cultural heritage sites on the shores of Western Port have been identified. Currently, Western Port is used for commercial fishing and recreational activities such as boating, swimming and fishing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Western Port, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=18. Accessed 25 Jul 2017.</i></p>
Tasmania	
Apsley Marshes	<p>The Apsley Marshes Ramsar site covers the freshwater marshes at the mouth of the Apsley River, located on the east coast of Tasmania. The Apsley Marshes stores and filters flood waters from the Apsley River for slow release into the adjacent Moulting Lagoon Ramsar wetland. Both these wetlands are geologically significant as they were formed in a long-lived graben system, which is possibly related to the break up of Gondwanaland.</p> <p>The Apsley Marshes contain large areas of woody vegetation dominated by Swamp Paperbark. Saltmarsh communities occur in the southern section near Moulting Lagoon. Parts of the site are important for swan nesting, and it is an important feeding and breeding area for waterfowl which require a freshwater habitat.</p> <p>The marshes have a long history of human use, including use by Indigenous communities. The land is private freehold and used for grazing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Apsley Marshes, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=7. Accessed 25 Jul 2017.</i></p>
East Coast Cape Barren Island Lagoons	<p>The East Coast Cape Barren Island Lagoons Ramsar site is located on the east coast of Cape Barren Island, one of the Furneaux Group of islands which lie in Bass Strait to the north-east of Tasmania. The site extends from just north of Tar Point down to Jamieson's Bay and extends westwards from the coast for a distance varying from one to four kilometres.</p> <p>It comprises a complex of freshwater, brackish, saline and sometimes hypersaline lagoons, wetlands and estuaries that owe their existence to a dune system which has been slowly developing in an easterly direction, leaving shallow sandy soils, depressions and intermittently flowing water courses. The vegetation of the site is characterised by a tussock grassland of the exotic species Marram Grass on the foredunes, with a closed-scrub of Coastal Wattle, Prickly Moses and Marram Grass stabilising the hind dunes. Coastal Wattle, Silver Banksia and Southern Grass Tree form an open scrub on the sand plains behind these dunes, with further inland areas dominated by Manna Gum, Swamp Gum and Smithton Peppermint.</p> <p>This extensive system of shallow coastal lagoons contains a number of species that are considered to be of special botanical interest, including the Scarce Centrolepis which is rare at both a state and national level. Pointed Centrolepis, Sharpleaf Rush, Water Milfoil, Sago Pondweed, and Round-leaf Wilsonia are also found within the site.</p> <p>Locally significant numbers of duck species for the Flinders bioregion utilise this area. In addition, the Ramsar site is of great importance for the Hooded Plover.</p> <p>This area 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, with a single bush track for 4WD vehicles providing access for duck hunters to Flyover Lagoon.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. East Coast Cape Barren Island Lagoons, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=8. Accessed 25 Jul 2017.</i></p>
<p>Flood Plain Lower Ringarooma River</p>	<p>The Flood Plain Lower Ringarooma River Ramsar site is located on the far north-east coast of Tasmania, between Cape Portland and Waterhouse Point. The site is situated on the sandy flood plain of the Lower Ringarooma River which encompasses extensive marshlands and a number of shallow lagoons; Shantys Lagoon, Blueys Lagoon and Bowlers Lagoon. The Ringarooma River drains out into Ringarooma Bay.</p> <p>The hydrology of this site is influenced by tidal flows, river flows and local groundwater. The bulk of the wetland area is above the tidal limit and is largely controlled by inflows from the Ringarooma River.</p> <p>The Ramsar site is dominated by scrub and tussock grassland vegetation, and includes substantial areas of freshwater marsh habitat in the flood plain. The varieties of habitats support the following vegetation communities: Saltmarsh, Coastal grass and herbfield, Lowland Sedgy heathland, Wet heathland, Coastal heathland, Coastal scrub, Allocasuarina verticillata forest and Eucalyptus coastal forest.</p> <p>The Flood Plain Lower Ringarooma River is considered to be a good foraging area for dabbling ducks and other waterbirds due to the large area of shallow water. A number of bird species listed under international migratory conservation agreements have also been recorded at the site. These include: Cattle Egret, Great Egret, Latham's Snipe, Curlew Sandpiper, Red-necked Stint, Bar-tailed Godwit, Caspian Tern and Greenshank. Australasian Shoveler, Little Tern, Hooded Plover and Fairy Tern are also known to breed within the Ramsar site.</p> <p>The Ramsar site also provides habitat for threatened species, including four wetland-dependent species: Green and Gold Frog; Dwarf Galaxias; Fairy Tern; and Australian Grayling.</p> <p>The Flood Plain Lower Ringarooma River was traditionally used by Indigenous people. It also has a history of European occupation and mining exploitation since the early 1800s. Currently, the Ramsar site is used for duck hunting and cattle grazing.</p> <p><u>Reference</u></p> <p><i>Department of the Environment and Energy. 2017. Flood Plain Lower Ringarooma River, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=9. Accessed 25 Jul 2017.</i></p>
<p>Jocks Lagoon</p>	<p>The Jocks Lagoon Ramsar Site is located about five kilometres south-east of the township of St Helens on the north-east coast of Tasmania. It is one of a chain of lagoons, swamps and wetlands occurring along St Helens Point.</p> <p>Jocks Lagoon is a small freshwater lagoon which is fed from surface runoff and groundwater. The site is located in sands and clays separated from the sea by a beach and sand dunes.</p> <p>The dominant vegetation community within the lagoon itself is freshwater aquatic sedgeland and rushland, with several beds of tall sedges and waterribbons as emergent plants. Spreading Swordsedge open sedgeland and Jointed Twigsedge dominate a small edge zone on the south-west side in a mixture with scrub. Melaleuca swamp forest dominates along the eastern side of the lagoon. On higher ground these communities become coastal heathland and Acacia coastal scrub with some areas dominated by the introduced Marram Grass. Most of the vegetation communities on the site are threatened in Tasmania. The site also contains two regionally rare plant species, the Jointed Twigsedge and Erect Marshflower.</p> <p>The lagoon supports microcrustaceans and macrocrustaceans, including Burrowing Freshwater Crayfish. The Brown Froglet and Eastern Banjo Frog also occur within the site.</p> <p>Most of the site is private freehold land, with a small section at the south-east end falling within the St Helens Point Conservation Area. The site is mainly used for conservation and recreation.</p> <p><u>Reference</u></p> <p><i>Department of the Environment and Energy. 2017. Jocks Lagoon, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=10. Accessed 25 Jul 2017.</i></p>
<p>Lavinia</p>	<p>The Lavinia Ramsar site is located on the north-east coast of King Island, Tasmania. The boundary of the site forms the Lavinia State Reserve, with major wetlands in the reserve including the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps.</p>

Description of the Environment

Wetland	Key Features
	<p>The shifting sands of the Sea Elephant River's mouth have caused a large back-up of brackish water in the site, creating the saltmarsh which extends up to five kilometres inland. The present landscape is the result of several distinct periods of dune formation.</p> <p>The extensive Nook Swamps, which run roughly parallel to the coast, occupy a flat depression between the newer parallel dunes to the east of the site and the older dunes further inland.</p> <p>Water flows into the wetlands from the catchment through surface channels and groundwater, and leaves mainly from the bar at the mouth of the Sea Elephant River and seepage through the young dune systems emerging as beach springs.</p> <p>The Lavinia State Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. The vegetation communities present on the site include Succulent Saline Herbland, Coastal Grass and Herbfield, Coastal Scrub and King Island Eucalyptus globulus Woodland. The freshwater areas of the Nook Swamps are dominated by swamp forest. Nook Swamps and the surrounding wetlands contain extensive peatlands.</p> <p>The site is an important refuge for a collection of regional and nationally threatened species, including the nationally endangered Orange-bellied Parrot. This parrot is heavily dependent upon the samphire plant, which occurs in the saltmarsh, for food during migration. They also roost at night in the trees and scrub surrounding the Sea Elephant River estuary.</p> <p>Several species of birds which use the reserve are rarely observed on the Tasmanian mainland, including the Dusky Moorhen, Nankeen Kestrel, Rufous Night Heron and the Golden-headed Cisticola.</p> <p>The site is currently used for conservation and recreation, including boating, fishing, camping and off-road driving. There are artefacts of Indigenous Australian occupation on King Island that date back to the last ice age when the island was connected to Tasmania and mainland Australia via the Bassian Plain.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lavinia, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=5. Accessed 25 Jul 2017.</i></p>
<p>Little Waterhouse Lake</p>	<p>Little Waterhouse Lake is located seven kilometres south-west of Waterhouse Point, and lies between the towns of Bridport and Tomahawk on the north-east coast of Tasmania. The site forms part of the Waterhouse Point wetlands complex which incorporates Blackmans Lagoon, lakes, marshlands, and creeks with active sand dunes along the coast.</p> <p>The lake is a coastal freshwater lagoon that has formed in a depression between two sand dune systems after drainage to the sea was blocked by some mobile coastal dunes. Little Waterhouse Lake is brackish and has a maximum depth of 2-4 m. Lake levels fluctuate depending on rainfall, with water losses controlled by the rate of surface flow in the outflow stream, seepage through the sand, and evaporation.</p> <p>Little Waterhouse Lake has dense aquatic growth and high species richness. Around the fringes of the lake, freshwater aquatic sedgeland and rushland vegetation communities are dominant. Other vegetation communities at the site include open Coastal scrub, Marram grassland, Sharp Clusledge sedgeland and <i>Acacia longifolia</i> coastal scrub. Tiny Duckweed also occurs on the site and has limited distribution in Tasmania.</p> <p>The Ramsar site provides habitat for the threatened Dwarf Galaxias, and the lake has a high diversity of crustacean species, such as the Burrowing Freshwater Crayfish. Three of Tasmania's eleven frog species are known to occur in the site.</p> <p>The area around the Little Waterhouse Lake was significant to Indigenous groups. The North East people used the heaths and plains behind the coast, which they kept open and clear by burning. The Ramsar site is currently used for various recreational activities, particularly fishing for the introduced Brown Trout and Rainbow Trout.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Little Waterhouse Lake, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=12. Accessed 25 Jul 2017.</i></p>
<p>Logan Lagoon</p>	<p>The Logan Lagoon Ramsar site is enclosed within the Logan Lagoon Conservation Area and is located on the south-east corner of Flinders Island in Bass Strait, Tasmania. The site is an excellent, regionally</p>

Description of the Environment

Wetland	Key Features
	<p>representative example of a coastal estuarine wetland system and includes Logan, Syndicate and Wilsons Lagoons, Pot Boil Point and part of Planters Beach.</p> <p>The catchment of Logan Lagoon is low lying, with the water table very close to the soil surface, and water flows into the lagoons mainly from groundwater. The water level in Logan Lagoon fluctuates seasonally with rainfall, generally being high during winter and spring and low during late summer and autumn. Only one small natural watercourse, Pot Boil Creek, flows directly into Logan Lagoon. In extended dry periods the lagoon dries out and water is only contained in the southern most section of the lagoon.</p> <p>The dominant vegetation communities present within the site are saline aquatic herbland, saline sedgeland and rushland, succulent saline herbland, coastal grass and herbfield and <i>Acacia longifolia</i> coastal scrub.</p> <p>When full, the lagoon provides feeding and resting habitat for a number of migratory waders including the Red-necked Stint, Common Greenshank, Eastern Curlew, Bar-tailed Godwit and Double-banded Plover. The wetland is an important part of the East Asian - Australasian Flyway, and twenty migratory bird species listed under international agreements use the site.</p> <p>The Ramsar site is used for conservation, education, research, and recreation such as walking, sightseeing, bird watching, off-road vehicle driving and beach fishing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Logan Lagoon, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=4. Accessed 25 Jul 2017.</i></p>
<p>Moultng Lagoon</p>	<p>Moultng Lagoon is situated on the central east coast of Tasmania, between the townships of Swansea and Bicheno and approximately six kilometres north-west of the township of Coles Bay. The lagoon is a large estuary at the mouths of the Swan and Apsley Rivers. The estuary lies at the head of Great Oyster Bay where the Freycinet Peninsula extends offshore to the south.</p> <p>The lagoon formed with the partial closure of the mouths of the Swan and Apsley Rivers, due to the creation of a bayhead spit and associated dunefield between 10,000 and 6,000 years ago.</p> <p>The lagoon contains areas of both shallow and deep water and is surrounded by periodically exposed mudflats and saltmarsh. The plant communities around Moultng Lagoon reflect the wide diversity of terrain and consequent soil drainage patterns. Aquatic vegetation in the estuary is largely composed of seagrasses. Succulent saline herbland and saline sedgeland and rushland, both saltmarsh communities, surround the lagoon.</p> <p>Vegetation in the shallower areas, mainly Beaded Grasswort and Sea Rush, provides an important nesting, roosting and feeding habitat for the numerous resident waterfowl. The Ramsar site is an important breeding area for Black Swan and an important staging area for all the other species of waterfowl in Tasmania, with particularly large summer concentrations of Australian Shelduck and Chestnut Teal. It also supports the largest known Tasmanian flocks of Greenshank.</p> <p>Moultng Lagoon is part of the Moultng Lagoon Game Reserve. The area historically was used for the harvest of waterfowl and their eggs by Indigenous people who lived around the lagoon. Current use of the Ramsar site includes recreational activities such as fishing and hunting, and commercial activities such as aquaculture and tourism.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Moultng Lagoon, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=3. Accessed 25 Jul 2017.</i></p>
<p>Pitt Water-Orielton Lagoon</p>	<p>The Pitt Water-Orielton Lagoon Ramsar site is located on the south-east coast of Tasmania, approximately 20 km east of the city of Hobart, between the towns of Cambridge and Sorell. Pitt Water is an almost land-locked body of tidal salt water with a narrow entrance to Frederick Henry Bay. Orielton Lagoon is separated from Pitt Water by a causeway constructed in 1868. The whole area is protected from the open sea by a large mid-bay spit and associated dunefield.</p> <p>Most of the Ramsar site is open water fringed by saltmarsh communities, mudflats and rocky shores. The large areas of tidal mud and sand flats leaves extensive areas exposed as suitable feeding areas for wading birds.</p> <p>The vegetation communities present include succulent saline herbland, saline sedgeland/rushland and coastal grassland. The site provides breeding habitat for a number of beach-nesting shorebirds</p>

Description of the Environment

Wetland	Key Features
	<p>including the Caspian Tern and Red-capped Plover. Migratory birds that utilise the Ramsar wetland include the Eastern Curlew, Bar-tailed Godwit, Common Greenshank, Curlew Sandpiper, Double-banded Plover and Red-necked Stint. Threatened species listed in Tasmania recorded at the site include the Great-crested Grebe, Fairy Tern and Little Tern.</p> <p>Pitt Water-Orielton Lagoon was traditionally used by Indigenous people of the area and the Ramsar site contains some middens and other evidence of Indigenous occupation. Currently the area has a diversity of land uses including pastureland grazing, forestry, irrigated cropland, residential development, shellfish aquaculture, recreation and nature conservation.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pitt Water-Orielton Lagoon, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=6. Accessed 25 Jul 2017.</i></p>
New South Wales	
<p>Hunter Estuary Wetlands</p>	<p>The Hunter Estuary Wetlands Ramsar site is comprised of two components, Kooragang and Hunter Wetlands Centre Australia. The Kooragang component of the Hunter Estuary Wetlands Ramsar site is located in the estuary of the Hunter River, approximately seven kilometres north of Newcastle on the coast of NSW. Hunter Wetlands Centre Australia is 2.5 km from Kooragang. Although the sites are not contiguous they have significant linkages, both hydrologically and by a wildlife corridor consisting of Ironbark Creek, the Hunter River and Ash Island.</p> <p>The Kooragang component includes Kooragang Island and Fullerton Cove, two areas that lie in the estuarine section of the Hunter River. Kooragang Island originally consisted of seven islands that were mostly separated by narrow mangrove lined channels. In the 1950s these islands were reclaimed and became "Kooragang Island". Habitat types within the Reserve include mangrove forests dominated by Grey Mangrove, Samphire saltmarsh, Paperbark and Swamp she-oak swamp forests, brackish swamps, mudflats, and sandy beaches.</p> <p>Hunter Wetlands Centre Australia is a small but unique complex of wetland types surrounded by urban development along three boundaries. Previously degraded, this urban wetland has been restored. Habitat types at the Hunter Wetlands Centre Australia include restored semi-permanent/seasonal freshwater ponds and marshes, natural semi-permanent/seasonal brackish ponds and marshes, freshwater swamp forests and a coastal estuarine creek.</p> <p>The Hunter Estuary Wetlands Ramsar site is extremely important as both a feeding and roosting site for a large seasonal population of shorebirds and as a waylay site for transient migrants. Over 250 species of birds have been recorded within the Ramsar site, including 45 species listed under international migratory conservation agreements. In addition, the Ramsar site provides habitat for the nationally threatened Green and Golden Bell Frog, Red Goshawk and Australasian Bittern.</p> <p>The Ramsar site was traditionally used by the Worimi, Awabakal and Pambalong peoples. There are numerous middens and campsites scattered throughout the lower Hunter River, particularly within the dunes along Stockton Bight. The Hunter Wetlands Centre Australia also contains an archaeological site that is believed to have been an area for the production of stone tools.</p> <p>Currently, the Kooragang component is used for recreational and nature-based activities. The Hunter Wetlands Centre Australia actively promotes wetland conservation and wise use through communication and education, passive recreation and community involvement.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Hunter Estuary Wetlands, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=24. Accessed 25 Jul 2017.</i></p>
<p>Myall Lakes</p>	<p>The Myall Lakes Ramsar wetland is located within the Myall Lakes National Park, approximately 75 km north of Newcastle on the central coast of NSW. Myall Lakes National Park comprises four main lakes (the Bombah Broadwater, Boolambayte, Two Mile and Myall Lakes), together with the lesser areas of Nerong Creek, sections of the Upper and Lower Myall River, Boolambayte Creek, Fame Cove Inlet and Broughton Island. The Ramsar site incorporates a number of distinct wetlands associated with the waterways and dune systems.</p> <p>The waters of the Myall Lake system are shallow and of roughly uniform depth (2.4–3.7 m) and lake level fluctuations are associated with rainfall rather than tidal influences. The main input of fresh water</p>

Description of the Environment

Wetland	Key Features
	<p>to the lake system is from the Myall and Crawford Rivers. The Myall Lakes comprise a series of fresh, saline and brackish water bodies of differing depths and associated vegetation types.</p> <p>Myall Lakes support a high plant diversity with 968 species of plants and ten TECs. The major vegetation communities associated with Myall Lakes are: swamp, swamp forest, wet heath, fringe forest and Lepironia swamp.</p> <p>Similarly, the animal species diversity is high and over 300 species have been recorded, with approximately two thirds being bird species. The wetlands regularly support large numbers of waterbirds and waders including ducks, swans, egrets and terns. In addition, Myall Lakes provide habitat for state-listed threatened species such as Masked Owl, Powerful Owl, Black-necked Stork, Wompoo Fruit-Dove, Turquoise Parrot, Little Tern, Little Bent-wing Bat, Tiger Quoll, Eastern Chestnut Mouse and Wallum Froglet.</p> <p>Myall Lakes National Park contains numerous middens, which are the major items of indigenous heritage. No canoe trees have been identified to date, although canoes were obviously used to reach Broughton and Little Broughton Islands.</p> <p>Contemporary use of the Ramsar site is mostly recreational activities such as sailing, swimming, power boating, canoeing, bush walking, four-wheel driving and bird watching. The area is also popular with commercial and recreational fishers.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Myall Lakes, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=52. Accessed 25 Jul 2017.</i></p>
<p>Towra Point Nature Reserve</p>	<p>Towra Point Nature Reserve lies on the northern side of Kurnell Peninsula, forming the southern and eastern shores of Botany Bay, and is approximately 16 km from the Sydney city centre in NSW. It is the largest wetland of its type in the Sydney Basin region and represents vegetation types that are now rare in the area. It is an estuarine complex comprising a mixture of spits, bars, mudflats, dunes and beaches.</p> <p>The Ramsar site consists of a variety of habitats such as seagrass meadows, mangroves, saltmarshes, dune woodlands, Casuarina forest, small occurrences of littoral rainforest and sand dune grasslands.</p> <p>The vegetation within Towra Point Nature Reserve is regionally significant, with the reserve containing around 40% of the remaining mangrove communities and 60% of the remaining saltmarsh communities in Sydney. Furthermore, almost 300 plant species have been recorded within the Ramsar site including the threatened Magenta Cherry.</p> <p>Towra Point Nature Reserve is an important area for bird species, with approximately 200 species recorded in the area. This includes 34 species listed under international migratory bird conservation agreements. Large numbers of Eastern Curlew, Lesser Golden Plover, and Ruddy Turnstone have also been recorded within the Ramsar site. The state-listed threatened Little Tern and Pied Oystercatcher are known to breed within the Reserve.</p> <p>Middens, rock shelters, engravings, burial sites and other items of indigenous heritage have been found within Towra Point Nature Reserve. Captain James Cook anchored in Botany Bay in 1770 and Towra Point was explored, mapped and used as a source of freshwater. It was here where the ship's botanist, Sir Joseph Banks, took the first recognised botanical and zoological samples of Australian flora.</p> <p>The Ramsar site is part of a dedicated Nature Reserve, with activities restricted to nature-based recreation such as bird-watching and fishing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Towra Point Nature Reserve, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=23. Accessed 25 Jul 2017.</i></p>
<p>Queensland</p>	
<p>Great Sandy Strait (including Great Sandy Strait, Tin Can Bay and Tin Can Inlet)</p>	<p>The Great Sandy Strait Ramsar site is located in south-eastern Queensland and includes Great Sandy Strait, Tin Can Bay, Tin Can Bay Inlet, parts of Fraser Island and the mainland. It is a sand passage estuary between the mainland and the World Heritage-listed Fraser Island. Fraser Island has formed sufficiently close to the mainland to block the flow of a substantial river system, creating a double-ended estuary with a shifting (though relatively stable) pattern of mangroves, sand banks and mud islands</p> <p>Great Sandy Strait is a large area of tidal swamps consisting of intertidal sand and mud flats, extended seagrass beds, mangrove forests, salt flats and saltmarshes, and often contiguous with freshwater Paperbark wetlands and Coastal Wallum swamps. The mangrove communities within the Strait</p>

Description of the Environment

Wetland	Key Features
	<p>represent a transition between essentially temperate and tropical species. The rare patterned fens have also been recorded along Great Sandy Strait.</p> <p>The coastal wetlands of Great Sandy Strait are also of international significance for migratory birds, with 18 species listed under international migratory bird conservation agreements recorded within the Ramsar site. The Strait is also utilised by turtle species, Dugong and Humpback Whales. Threatened fish such as Oxleyan Pygmy Perch and Honey Blue-eye are also known to inhabit the area.</p> <p>Great Sandy Strait holds significant cultural heritage values for local indigenous groups. Evidence of occupation in the area dates back 5,500 years and middens are frequently found in the site. The Ramsar site is currently highly valued for commercial fishing, recreational fishing, boating and tourism related activities.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Great Sandy Strait (including Great Sandy Strait, Tin Can Bay and Tin Can Inlet), in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=51. Accessed 25 Jul 2017.</i></p>
<p>Moreton Bay</p>	<p>The Moreton Bay Ramsar site is located in and around Moreton Bay, north-east, east and south-east of the city of Brisbane, in the state of Queensland, Australia. It is located approximately mid-way along the east coast of Australia at a latitude of between 27 and 28 degrees south.</p> <p>The site is in a semi-enclosed basin, bounded on its eastern side by large sand islands and a deltaic coast on the western side, where large rivers discharge to the bay from a combined catchment of approximately 22,000 km². The bay is approximately 110 km long from north to south and 35 km at its widest east to west axis.</p> <p>The site meets all nine criteria for the designation of wetlands of international importance. It is notable for its large size, diversity of wetland habitats, connectivity between wetland types, as well as diverse flora and fauna that includes threatened species and ecological communities. It contains seagrass, sandy and muddy tidal flats and subtidal areas, saltmarsh, mangroves and coral communities, freshwater wetlands, as well as ocean beaches and dunes.</p> <p>The site includes one of the most extensive intertidal areas of seagrass, mangrove and saltmarsh communities on the eastern coast of Australia, and is valuable for supporting fisheries resources, waterbirds and marine megafauna of conservation significance.</p> <p>The site regularly supports more than 50,000 waterbirds, representing at least 43 species of shorebirds and at least 28 migratory shorebird species. The site is recognised as a network site under the East Asian-Australasian Flyway Partnership (site code EAAF013) and supports over 1% of the estimated flyway population of at least nine migratory shorebird species, including eastern curlew (<i>Numenius madagascariensis</i>) and curlew sandpiper (<i>Calidris ferruginea</i>), which are listed as critically endangered under national environmental legislation.</p> <p>The site further supports a range of internationally, nationally, state and locally significant species including the Oxleyan pygmy perch (<i>Nannoperca oxleyana</i>) fish, four species of acid frogs, the water mouse (<i>Xeromys myoides</i>), Illidge's ant-blue butterfly (<i>Acrodipsas illidgei</i>), and several freshwater invertebrates.</p> <p>In addition to its environmental values, the site provides important cultural, social, economic and recreational values</p> <p><u>Reference</u> <i>Department of Agriculture, Water and the Environment. 2021. Moreton Bay in Australian Wetlands Database. Department of Agriculture, Water and the Environment, Canberra. Available from: https://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=67 Accessed 14 May 2021.</i></p>
<p>External Territories</p>	
<p>Elizabeth and Middleton Reefs</p>	<p>Elizabeth and Middleton Reefs Marine National Nature Reserve is located in the northern Tasman Sea, in Australia's East Marine Region. It is 630 km east of Coffs Harbour, NSW, and 690 km east-south-east</p>

Description of the Environment

Wetland	Key Features
<p>Marine National Nature Reserve</p>	<p>of Brisbane, Queensland. Elizabeth and Middleton Reefs are remote coral reef atolls that occur atop isolated, oceanic sea mounts, 50 km apart from each other.</p> <p>They are the most southerly open ocean platform reefs in the world and their coral reef communities are influenced both by tropical and temperate ocean currents. As isolated oceanic wetlands with no permanent dry land, the Reef perimeters provide the only buffer to high-energy impacts of ocean swells and waves, and thus provide for remote sheltered wetland habitats within a vast region of oceanic waters of the western Pacific Ocean.</p> <p>Reef building corals and algae form the dominant components of habitat complexity and ecological features of the site. Elizabeth and Middleton Reefs support several coral species at or near their northern or southern limits of distribution, and species which can self-recruit to the same reef. Seagrass occurs only as scattered plants on the sheltered sandy lagoons at both reefs.</p> <p>The fish communities include seven undescribed fishes and a number of species with specialised habitats and relatively restricted geographic distributions. The Elizabeth and Middleton Reefs populations of the Galapagos Reef Shark form a single genetic stock, which is distinct from the only other Australian population, 173 km further south at Lord Howe Island. Threatened species known to utilise the site include the Green Turtle, Leatherback Turtle, and Wandering Albatross and listed migratory Humpback Whale.</p> <p>At least 30 ships have been recorded wrecked on the Reefs, dating back to the late 18th Century, making the area of considerable marine archaeological significance. Except for the remains of more recent wrecks, which are a conspicuous feature of the Ramsar site, the majority of wrecks have not been accurately located. The wreck <i>Fuku Maru</i> on Middleton Reef supports a small breeding colony of Sea Terns, which due to lack of suitable dry land, otherwise would not occur at the Ramsar site.</p> <p>Currently, Elizabeth and Middleton Reefs are mainly use for nature conservation and scientific research, with limited recreational diving and fishing also occurring.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Elizabeth and Middleton Reefs Marine National Nature Reserve, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=60#. Accessed 25 Jul 2017.</i></p>

Appendix 2 - Marine and Coastal Zone Wetlands of National Importance

The classification of a 'Marine and Coastal Zone wetlands' is extensive and includes those wetlands that while predominantly based inland have some form of connection with the coast and/or marine waters. The category for 'Marine and Coastal Zone wetlands' includes:

1. Marine waters - permanent shallow waters less than six metres deep at low tide; includes sea bays, straits.
2. Subtidal aquatic beds; includes kelp beds, seagrasses, tropical marine meadows.
3. Coral reefs.
4. Rocky marine shores; includes rocky offshore islands, sea cliffs.
5. Sand, shingle or pebble beaches; includes sand bars, spits, sandy islets.
6. Estuarine waters; permanent waters of estuaries and estuarine systems of deltas.
7. Intertidal mud, sand or salt flats.
8. Intertidal marshes; includes salt-marshes, salt meadows, saltings, raised salt marshes, tidal brackish and freshwater marshes.
9. Intertidal forested wetlands; includes mangrove swamps, nipa swamps, tidal freshwater swamp forests.
10. Brackish to saline lagoons and marshes with one or more relatively narrow connections with the sea.
11. Freshwater lagoons and marshes in the coastal zone.
12. Non-tidal freshwater forested wetlands.

The key features of the wetland sites, as described within the Australian Wetland Database, are provided in the below table.

Table B-1: Key Features of Nationally Important Wetlands

Wetland	Key Features
South Australia	
Piccaninnie Ponds	<p>Site description Large spring-fed limestone wetlands bounded by coastal dunes. The site comprises: First Pond, approximately 10 m deep; Turtle Pond, 6 m deep basin at the end of a wide channel; and a 90 m deep chasm which leads into a chamber known as the Cathedral.</p> <p>Physical features Landform: Water-filled limestone rift and large submerged cave surrounded by shallow swamps, found between stable coastal dunes to the south and low calcarenite dunes to the north. Geology: Tertiary marine limestone forming the Gambier Embayment of the Otway Basin partially covered by dune ridges and volcanic deposits. Soils: Highly organic alkaline peats.</p> <p>Ecological features Ecological role: The area contains a number of threatened plant, bird and fish species. Plant structural formations: Represents the only conserved site which supports a mixed tea-tree <i>Leptospermum lanigerum</i> and <i>Melaleuca squarrosa</i> closed shrub formation, and a reed swamp formation with <i>Phragmites vulgaris</i> and <i>Typha angustifolia</i>. This type of swamp vegetation formerly occupied extensive areas along the coastal region of the south east of the State, but most has been cleared for agriculture.</p> <p>Significance The ponds are a unique karst feature of the South East region and are world renowned for cave diving. The wetland is the largest rift in the Gambier Embayment. The site is the only and largest remnant of coastal peat fen reserved in South Australia, and one of a few of its type reserved in Australia.</p> <p>Social and Cultural values Research: The aquatic biota of Piccaninnie Ponds has been comprehensively studied by Thurgate (1992). Recreation: Popular site for cave diving and snorkelling.</p> <p>Reference <i>Department of the Environment and Energy. 2017. Piccaninnie Ponds - SA060, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=SA060. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>South East Coastal Salt Lakes</p>	<p>Site description A series of four separate lakes of various depth, situated in the interdune corridor between the present and relict coastal dunes. Lake Robe (399 ha), Lake Eliza (4,683 ha) and Lake St. Clair (2,566 ha) are shallow lakes with a fringe of vegetation. Lake George is a deep estuarine lake intermittently connected to the sea, with a surface area of 5916 ha and is surrounded by a fringe of vegetation. Small freshwater ephemeral wetlands exist around the lakes.</p> <p>Physical features Landform: The wetlands occur on the coastal flat between a low, well-vegetated coastal dune ridge to the west and a relict coastal dune ridge to the east. Geology: Unconsolidated calcareous sands from the Pleistocene uncomformably lay over Tertiary formed calcrete. Soils: Lake beds consist of black friable loams covered by mud, clay, sand or shellgrit; the dunes surrounding the lakes support deep calcareous sands and shallow red sandy loams.</p> <p>Ecological features Ecological role: A group of coastal wetlands that act as a refuge for waterbirds in summer or drought. The lakes and the fresh groundwater soaks provide a diverse selection of vegetation structures and wetland habitats for waterbirds. Lake George is a spawning area for two marine fishes, the Yellow-eye Mullet and Flounder. Plant structural formations: Tea-tree scrub, samphire flat, sedgelands and coastal closed scrub.</p> <p>Significance Lake George and Lake Eliza are two of the remaining wintering grounds in the south east of the State for the Orange-bellied Parrot, and Lake George is an important wintering ground for the Double-banded Plover.</p> <p>Social and Cultural values Cultural: The coastal lakes are rich in Aboriginal heritage with many occupation sites such as middens, rock shelters and open-air campsites at the lake margins.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. South East Coastal Salt Lakes - SA062, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=SA062. Accessed 25 Jul 2017.</i></p>
Victoria	
<p>Anderson Inlet</p>	<p>Site description Anderson Inlet is one of the largest estuaries on the Victorian coast.</p> <p>Physical features Geological setting: Quaternary sediment between Tertiary hills and Devonian ridge. A series of spits developed across a former embayment to create the inlet which has infilled with estuarine sediment. Large areas of mudflats are exposed at low tide.</p> <p>Ecological features The inlet is of high value for its fauna.</p> <p>Significance (No data)</p> <p>Social and Cultural values Recreation: Anderson Inlet is very popular for recreational line-fishing. Sailing, powerboating, waterskiing, bait collection and duck hunting are other popular water based activities here. Research: The Australian Wader Study Group traps, measures and bands migratory and nomadic wading birds in the inlet for biological studies.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Anderson Inlet - VIC062, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC062. Accessed 25 Jul 2017.</i></p>
<p>Corner Inlet</p>	<p>Site description Corner Inlet contains the most southerly tidal mudflat system of mainland Australia.</p> <p>Physical features Geological setting: Quaternary marine, coastal, aeolian, lacustrine and paludal sediment overlying Quaternary colluvial, alluvial, lacustrine and paludal sediments, upper Devonian granite, the lower Devonian Liptrap Formation and Cretaceous Strzelecki Group sediment.</p> <p>Ecological features Corner Inlet is a high value wetland for its high productivity, geomorphology and significant flora and fauna.</p> <p>Significance The site is of international zoological significance due to its geographical position and of national geomorphological significance as an example of barrier island formation. Both Snake Island and Clonmel Island are considered nationally important for their geomorphology. The coastal strip from the barrier ridges to Welshpool is considered regionally important for its geomorphology. Corner Inlet is the best example of a wetland enclosed by barrier islands in Victoria and it contains the most extensive intertidal flats in Victoria. Corner Inlet is a very important area as the intertidal flats provide large feeding grounds for many waterfowl and wader species. The inlet is an important feeding area for juvenile and adult waders in the non-breeding season and during migration. The mangrove and seagrass</p>

Description of the Environment

Wetland	Key Features
	<p>communities also provide critical habitat for juvenile fish. In addition, the seagrass beds provide extensive feeding grounds for fish populations including commercial fish species. The inlet islands are considered to be of national botanical significance. Reeves Beach and the coastline from Port Franklin to Reeves Beach are considered to be of state botanical significance.</p> <p>Social and Cultural values Industry: Commercial fishing. Recreation: Fishing, swimming, boating (including yachting and kayaking), bird watching, duck hunting and Hog Deer Axis porcinus hunting (on Sunday Island) are popular activities. Research: Corner Inlet has been used as a site for long term monitoring of the Chestnut Teal by the Arthur Rylah Institute. Birds Australia also uses this site for long term monitoring of waterfowl and waders. Snake Island is used annually as a field site to study floristic composition and fire ecology by Melbourne University. History: Two of the coastal port townships of Corner Inlet, Port Albert and Port Welshpool, have historically been important for shipping cattle to Gippsland from Tasmania. These ports also served as a means of opening up Gippsland for agriculture. Commercial fishing was not important in Corner Inlet until the late 1840s when the steamship services to Melbourne commenced. The numerous shipwreck sites in Corner Inlet and within the barrier Islands of Nooramunga also make this area culturally important. Aboriginal culture: There are 23 shell middens located in the area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Corner Inlet - VIC066, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC066. Accessed 25 Jul 2017.</i></p>
<p>Ewing's Marsh (Morass)</p>	<p>Site description Wetland Atlas number : 8522 160148.</p> <p>Physical features Geological setting: Ewing's Marsh formed in a long, narrow basin of Quaternary alluvium between an active barrier (extending for over 50 km between Red Bluff near Lake Tyers and Point Ricardo) and the Piedmont Downs landscape of the hinterland. The basin overlies Pleistocene-Holocene coastal and non-marine sediments and Pleistocene coastal and non-marine and Pliocene-Miocene deposit. Many dune blowouts and short parabolic dunes extend across the barrier and into Ewing's Marsh. The creeks entering the Marsh differ from others in East Gippsland in that they are completely enclosed by the barrier and have no tidal connection to estuaries at Lake Tyers or the lower Snowy River. The creek valleys have become almost completely filled with a dense reed, sedge and swamp scrub and only Hospital Creek maintains an open channel into Ewing Marsh. At the mouth of Simpson Creek, several lobate and cusped bodies extend into Ewing Marsh. The elongated shape of some of these suggest that they have been reworked as lagoon shore spits. These are important in understanding the evolution of the Gippsland coastline, particularly Holocene changes in sea level.</p> <p>Ecological features Ewing's Marsh has thick shrub, sedge, rush and grass-dominated vegetation merging into heathland and forest on its inland side, and into dune shrubland on the seaward border. Dense vegetation provides habitat for a number of secretive animal species but some open water exists as habitat for waterbirds.</p> <p>Significance Ewing's Marsh is an important coastal wetland ecosystem which provides an important habitat for fauna, particularly water birds and supports a diversity of fauna.</p> <p>Social and Cultural values Recreation: Duck and deer hunting, birdwatching, bushwalking (from beach).</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Ewing's Marsh (Morass) - VIC132, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC132. Accessed 25 Jul 2017.</i></p>
<p>Glenelg Estuary</p>	<p>Site description The Glenelg Estuary is a large estuarine system consisting of the main channel of the Glenelg River and a side lagoon called the Oxbow.</p> <p>Physical features Geological setting: Quaternary lacustrine, paludal, alluvial and coastal sediments on Quaternary aeolian sediments.</p> <p>Ecological features The Glenelg Estuary is a high value wetland for its ecological features.</p> <p>Significance This wetland is of special geomorphological interest, being the only estuarine lagoon system in Victoria developed within a framework of dune calcarenite ridges. The Glenelg estuary contains the only remaining relatively undisturbed salt marsh community in western Victoria. Spits at</p>

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Wetland	Key Features
	<p>river mouths such as those at Glenelg River provide valuable breeding sites for the Little Tern. This area is one of the few sites where Little Tern breed in Victoria.</p> <p>Social and Cultural values Recreation: The western end of Discovery Bay Coastal Park at the Glenelg Estuary is popular for fishing, boating, walking and other activities. The Major Mitchell Trail meets the coast here: the river mouth marks the end of Major Mitchell's expedition of 1836. The Great South West Walk traverses the estuary. Aboriginal culture: Several shell middens and surface scatters exists at Glenelg Estuary.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Glenelg Estuary - VIC028, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC028. Accessed 25 Jul 2017.</i></p>
<p>Jack Smith Lake State Game Reserve</p>	<p>Site description This Reserve includes Jack Smith and Lambs Lake (a smaller wetland of 85 ha) and small herbfields interspersed between thickets of Swamp Paperbark <i>Melaleuca ericifolia</i> and subject to regular wetting and drying cycles. The Reserve's 13 km-long south-eastern boundary abuts the Ninety Mile Beach Coastal Reserve.</p> <p>Physical features Jack Smith Lake lies on an emerged coastal plain of Quaternary marine, fluvial, lacustrine, paludal and aeolian sediments. The form of Jack Smith Lake suggests that it was once a bay that has now been isolated from the sea by the development of a sandy barrier.</p> <p>Ecological features This lake is of high value for its fauna and flora.</p> <p>Significance (No data)</p> <p>Social and Cultural values Recreation: Duck hunting is the major recreational use of the Reserve. Camping occurs throughout the year peaking during the opening weekend of duck season. Fishermen gaining access to Ninety Mile Beach are another major source of visitors to the Reserve. Aboriginal culture: Archaeological significance includes unique Aboriginal shell midden deposits of a type not found elsewhere in the South Gippsland region. In addition, the Red Hill area of Jack Smith Lake is reputed to be a burial site for Aborigines killed in a massacre by early European settlers, although this has never been confirmed.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Jack Smith Lake State Game Reserve - VIC069, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC069. Accessed 25 Jul 2017.</i></p>
<p>Lake Bunga</p>	<p>Site description Lake Bunga is a narrow freshwater lagoon and is the former entrance to the Gippsland Lakes.</p> <p>Physical features Geological setting: Quaternary lacustrine and paludal sediments overlying Quaternary marine sediments and Tertiary sediments of the Sale/Seaspray Group.</p> <p>Ecological features This wetland is of high value for its avifauna.</p> <p>Significance Lake Bunga is a high value wetland for its geological, geomorphological, botanical and ornithological features.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Bunga - VIC085, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC085. Accessed 25 Jul 2017.</i></p>
<p>Lake Connewarre State Wildlife Reserve</p>	<p>Site description The Lake Connewarre State Wildlife Reserve consists of an extensive estuarine and saltmarsh system drained by the Barwon River. It includes a large permanent freshwater lake, a deep freshwater marsh, several semi-permanent saline wetlands and an estuary.</p> <p>Physical features Geological setting: Quaternary alluvial sediments on Quaternary coastal and aeolian sediments, basalt flows of the Newer Volcanics and sediments of the Tertiary Moorabool Viaduct Formation.</p> <p>Ecological features The Lake Connewarre State Game Reserve consists of a wide variety of wetland habitats which support a large and diverse waterbird population and contain a significant area of natural vegetation in this part of the South East Coastal Plain.</p>

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Wetland	Key Features
	<p>Significance Lake Connearre State Game Reserve is a high value wetland for its ecological, recreational and scientific features. Lake Connearre State Game Reserve is the largest area of native vegetation remaining on the Bellarine Peninsula. Reedy Lake is the largest natural freshwater lake in central Victoria and has outstanding significance due to its large size, floristic richness and structural diversity. The lower two thirds of the estuary is essentially unmodified.</p> <p>Social and Cultural values Recreation: The Reserve is used for duck hunting and is a good fishing area for Jewfish which has a limited distribution. Windsurfing and boating are popular activities on the river, especially in the estuary. Education: The wetlands are used extensively for teaching purposes. Aboriginal culture: A large oyster midden exists on Campbell Point at Lake Connearre.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Long Swamp - VIC030, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC070. Accessed 25 Jul 2017.</i></p>
<p>Lake King Wetlands</p>	<p>Site description The Lake King Wetlands consist of two large coastal lagoons and associated channels with surrounding salt marshes and brackish to fresh marshes.</p> <p>Physical features Geological setting: Quaternary lacustrine and paludal sediments on Quaternary alluvial and marine sediments overlying Tertiary sediments of the Sale/Seaspray Group. Lake King contains several islands.</p> <p>Ecological features These wetlands are of high value for fauna and part of a major drought refuge.</p> <p>Significance The Lake King Wetlands are high value for ecological, recreational, scientific, cultural and landscape features. They are fine examples of a large coastal lagoon system. The Lake King Wetlands contain two sites of geological/ geomorphological significance: the Mitchell River silt jetties (international) which are on the Register of the National Estate and the Tambo River Delta (state). Mullacky Swamp, two kilometres east of Ocean Grange, is listed as a site of special botanical significance. The Mitchell River Delta silt jetties are one of the finest examples of a digitate delta in the world; these silt jetties almost separate Jones Bay from Lake King. The Tambo River Delta is a major example of the processes of delta growth.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake King Wetlands - VIC071, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC071. Accessed 25 Jul 2017.</i></p>
<p>Lake Tyers</p>	<p>Site description Lake Tyers is a branched inlet formed by marine submergence of incised valleys. It has a well developed tidal delta with marshy islets.</p> <p>Physical features Geological setting: Quaternary lacustrine and paludal sediments overlying Quaternary marine sediments and Tertiary sediments of the Sale/Seaspray Group.</p> <p>Ecological features This wetland is of high value for its fauna.</p> <p>Significance Lake Tyers is a high value wetland for its ecological, recreational, scientific, cultural and scenic features. Lake Tyers is of scenic value for its forested shores and unspoilt character.</p> <p>Social and Cultural values Recreation: Lake Tyers is popular for camping, fishing, sailing and power boating. Tourism: Large numbers of holiday makers arrive in summer and are exposed to the Little Tern Management Program and commercially chartered boat trips (private) with a naturalist aspect. Aboriginal culture: 18 sites of Aboriginal archaeological significance were recorded in and around Lake Tyers. The local Aboriginal community borders Lake Tyers.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Tyers - VIC086, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC086. Accessed 25 Jul 2017.</i></p>
<p>Lake Victoria Wetlands</p>	<p>Site description Lake Victoria is a large coastal lagoon with fringing saltmarsh. It is part of the Gippsland Lakes system.</p> <p>Physical features Geological setting: Quaternary lacustrine and paludal sediments on Quaternary coastal and aeolian sediments.</p>

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Wetland	Key Features
	<p>Ecological features These wetlands are of high value for their fauna.</p> <p>Significance Lake Victoria comprises wetlands highly valued for their ecological, recreational, tourist, scientific, educational, cultural and landscape features. Lake Victoria and Blond Bay support a highly productive fish community. This also makes the lakes very important for piscivorous birds such as pelicans, cormorants and terns. Blond Bay State Game Reserve encompasses one of the largest remaining area of natural vegetation on the shores of the Gippsland Lakes. Lake Victoria has thick Swamp Paperbark scrub/closed forest fringing most of the foreshore. The intermittent wetlands making up the Blond Bay system are not common or sufficiently protected in the region.</p> <p>Social and Cultural values Research: The lakes are scientifically valuable for the study of haloclines and geologically, as part of the Gippsland Lakes system. Recreation: Lake Victoria abuts The Lakes National Park which has a visitor centre and bird hides. Aboriginal culture: Numerous archaeological sites, including a burial site, scarred tree, shell middens, surface scatters and isolated artefacts, occur around Lake Victoria and Blond Bay.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Victoria Wetlands - VIC072, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC072. Accessed 25 Jul 2017.</i></p>
<p>Lake Wellington Wetlands</p>	<p>Site description (No data)</p> <p>Physical features Geological setting: Quaternary lacustrine, paludal and alluvial sediments over a broad plain of Quaternary lacustrine, paludal, coastal and aeolian sediments. Landform: The Lake Wellington area lies on a former coastline with a 'prior' barrier to the north and an 'inner' barrier on the seaward side. Morass areas occur where erosion of barrier sediments have reached the water table. Geomorphic features in these areas include foredunes, "modern floodplains along the lower section of the rivers above the swampy plains" and "flat to undulating terrain above the floodplains, and sand sheets, ridges and dunes".</p> <p>Ecological features These wetlands are of high value for their fauna and act as drought refuges.</p> <p>Significance Lake Wellington Wetlands are high value for their ecological, recreational, scenic and cultural features. The wetlands contain excellent examples of both deep freshwater marshes and permanent saline wetlands. Dowds Morass and Victoria Lagoon are the most significant examples of each type respectively. Sale Common is an important refuge from hunting for game ducks in the Gippsland Lakes area. Heart, Clydebank and Dowd Morasses are good examples of native weed-free riparian vegetation in East Gippsland that is considered to be of the highest botanical significance because of the high levels of disturbance that have already occurred in other wetlands. Dowd Morass exhibits a process of shoreline margin succession due to siltation which has been halted elsewhere in the Gippsland Lakes by rising salinity. There are many picturesque sites with paperbark Melaleuca/sedge swamp, grasslands and River Red Gum woodland at the mouth of the LaTrobe River. The large Red Gums between the banks of the Avon River and Clydebank Morass provide the only natural setting remaining along the lower Avon River. These Red Gums may be either River Red Gum or Forest Red Gum or a hybrid of each.</p> <p>Social and Cultural values Research: Dowd Morass has been the subject of long term surveys by the Department of Natural Resources and Environment. In the 1990/91 breeding season, a banding study of Great Egrets and Royal Spoonbills was initiated as part of Project Egret Watch which is coordinated by the Shortland Wetlands Centre, Newcastle. Education: Heart Morass is used to demonstrate principles of salinity to school and land-holder groups. Wetland education kits have been developed for use on the Sale Common by local schools with a grant from ESSO. Sale Common has provided a focus for community wetland conservation activities, with Field and Game Australia and NRE cooperating in planting trees and providing nestboxes. Field and Game Australia also provided funds and effort for several major projects including the water control structures in Dowd Morass. Facilities at Sale Common include a bird viewing hide, board walk, lookout, walking tracks and an information shelter. The Common attracts more than 20,000 visitors per year. Aboriginal culture: Three sites within the system have archaeological value. Small isolated Aboriginal scatters are present at several sites. The Heart Morass is also the site of an Aboriginal massacre. There are many scarred trees along wetland margins and nearby rivers. Recreation: Lake Wellington is important for boating, fishing and hunting.</p> <p><u>Reference</u></p>

Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Lake Wellington Wetlands - VIC073, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC073. Accessed 25 Jul 2017.</i></p>
<p>Long Swamp</p>	<p>Site description Long Swamp is an elongated freshwater wetland in the Discovery Bay barrier system. It is separated from the sea by an extensive dunefield.</p> <p>Physical features Geological setting: Quaternary lacustrine, paludal and some aeolian sediments.</p> <p>Ecological features Long Swamp is a high value wetland for its flora and fauna.</p> <p>Significance (No data)</p> <p>Social and Cultural values Recreation: Long Swamp has little recreational value due to difficulty of access but the swamp has scenic tourism value. Research: Surveys of Ground Parrots and flora have occurred. Aboriginal culture: Two shell middens and one surface scatter exists at Long Swamp.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Long Swamp - VIC030, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC030. Accessed 25 Jul 2017.</i></p>
<p>Lower Aire River Wetlands</p>	<p>Site description These wetlands consist of three shallow freshwater lakes, brackish to saline marshes and an estuary on the Aire River floodplain. This floodplain occurs at the confluence of the Ford and Calder Rivers with the Aire River. It is surrounded by the Otway Ranges and dune-capped barrier along the ocean shoreline.</p> <p>Physical features Geological setting: Quaternary alluvium on Quaternary colluvium and alluvium and sediments of the Tertiary Dilwyn Formation and Cretaceous Otway Group.</p> <p>Ecological features The Lower Aire River Wetlands have extensive beds of Common Reed and groves of Woolly Tea-tree which can support large numbers of waterbirds. These wetlands act as a drought refuge for wildlife.</p> <p>Significance Lake Hordern is considered to be of State significance for its geomorphology.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lower Aire River Wetlands - VIC091, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC091. Accessed 25 Jul 2017.</i></p>
<p>Lower Merri River Wetlands</p>	<p>Site description The Lower Merri River Wetlands consist of two connected wetlands developed in a swale between calcareous dune ridges and fed by the Merri River.</p> <p>Physical features Geological setting: The geology consists of Quaternary lacustrine and paludal sediments overlying colluvium and alluvium, and tuff of the Newer Volcanics.</p> <p>Ecological features These wetlands are of high value for their avifauna. There are large areas of Common Reed with Spiky Club-sedge, saltmarsh and mudflats.</p> <p>Significance The Lower Merri River Wetlands are of high value for their geomorphology and are a well preserved example of interdunal wetlands fed by a small drainage system.</p> <p>Social and Cultural values Recreation: The wetlands are used for hunting, walking and bird watching. The Mahogany Trail follows the edge of these wetlands. History: The Mahogany Ship is reputed to be buried under sand dunes adjacent to Saltwater Swamp. Aboriginal culture: Surface scatters exist at Kelly Swamp indicating a history of Aboriginal occupation.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lower Merri River Wetlands - VIC075, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC075. Accessed 25 Jul 2017.</i></p>
<p>Lower Snowy River Wetlands System</p>	<p>Site description The Lower Snowy River Wetlands consist of Lake Corringale, Lake Wat Wat, Lake Curlip, Cabbage Tree Lagoon and numerous other small wetlands on the floodplain of the Snowy and Brodribb Rivers. The area consists of extensive saltmarsh flats and reed beds, paperbark thicket, mud flats and seagrass beds and thus supports a diverse faunal assemblage.</p>

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Wetland	Key Features
	<p>Physical features Geological setting: Quaternary colluvial, alluvial, lacustrine, paludal and marine sediments on Tertiary sediments.</p> <p>Ecological features These wetlands are of high value for their avifauna and fish.</p> <p>Significance The Lower Snowy River Wetlands are high value for their ecological, recreational, scientific, educational and scenic values. The wetlands are an excellent example of a floodplain system consisting of a diverse range of habitats and contain extensive areas of Swamp Paperbark, reed beds, salt marsh and mudflats which have been cleared or badly degraded elsewhere throughout the Snowy River floodplain. Similar areas in East Gippsland (i.e. remainder of Snowy River floodplain, Cann River floodplain and Genoa River floodplain) have all been severely degraded through clearing, drainage channels and grazing. Lakes Corringale, Wat Wat and Curlip are of significant conservation value since they support an array of wildlife that may only exist where these remnant pockets of vegetation remain undisturbed.</p> <p>Social and Cultural values Recreation: The area is a very popular destination for recreation fishermen and boating enthusiasts, particularly during summer months and school holidays. Tourism: Recreation is very important to the economy of Marlo and Orbost. Research: The Lower Snowy River Wetlands continue to be subject to numerous scientific research projects and investigations. The gradual infilling of a large coastal embayment to produce the extensive floodplain of the Snowy and Brodribb rivers has allowed for detailed studies in coastal and estuarine morphologies, evolution of wetland vegetation, and wetland/estuary hydrology. Other studies related to the area include wetland classification, habitat type and water bird distribution and the effect of altering hydrologic regimes.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lower Snowy River Wetlands System - VIC087, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC087. Accessed 25 Jul 2017.</i></p>
<p>Mallacoota Inlet Wetlands</p>	<p>Site description Wetland Atlas numbers : 8822 436430 (Mallacoota Inlet), 8822 526420 (Lake Barracoota), 8822 468412, 8822 472415, 8822 494416.</p> <p>Physical features Mallacoota Inlet was formed by the submergence of the Genoa and Wallagaraugh River valleys and partial closure of the resulting marine embayment by a sandy barrier and accumulation of dunes. Geological setting: Tertiary sediments and some areas of Ordovician sediments (Mallacoota Beds) and the Kuark Metamorphics underlie most of the Inlet. Islands within the Inlet and the barrier system along the coast (forming Howe Flat and Lake Barracoota) consist of Quaternary coastal and aeolian deposits. The Inlet shoreline consists of low cliffs of sedimentary rock and small sandy beaches. Quaternary swamp and lagoonal deposits occur on Howe Flat and at Lake Barracoota.</p> <p>Ecological features The diversity of flora and fauna in the East Gippsland and adjacent Eden region is high as this area is on the convergence of the cool and warm temperate zones of eastern Australia. The Mallacoota Inlet Wetlands also provide a variety of wetland habitats ranging from estuarine to freshwater, deep inlet waters to sedgeland, and open and closed hydrological s.</p> <p>Significance Mallacoota Inlet and surrounds are listed on the Register of the National Estate. The Inlet and Howe Flat-Lake Barracoota are listed as of State significance, and Tidal Delta, Goodwin Sands and Allan Head within the Inlet are listed as of Regional significance for geology and geomorphology. North and south Mallacoota Inlet are listed as of State zoological significance. Parts of the Inlet are within the Croajingolong National Park Biosphere Reserve. Lake Barracoota supports important lowland wetland ecosystems and contains a relict marine fauna.</p> <p>Social and Cultural values Mallacoota and the surrounding district are very popular holiday destination. Recreation: Boating, fishing, bird-watching.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Mallacoota Inlet Wetlands - VIC133, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC133. Accessed 25 Jul 2017.</i></p>
<p>Mud Islands</p>	<p>Site description Mud Islands are a group of low, sandy islands located in the southern part of Port Phillip Bay. The islands are narrow, and arranged in a roughly circular configuration around a central tidal lagoon. On the southern, western and northern shores, extensive intertidal mudflats and sea-grass meadows are present.</p>

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Wetland	Key Features
	<p>Physical features Geological setting: Quaternary coastal and aeolian sediments.</p> <p>Ecological features The islands have very high value for fauna since they support large numbers of migratory wading birds and breeding seabirds.</p> <p>Significance Mud Islands has a high value for its ecological, recreational, scientific, educational and aesthetic features. It has a very high diversity of birds, 114 species, and is an important feeding and roosting site for many migratory birds. The wetland is an unusual offshore saltmarsh island complex providing breeding habitat for many birds. Mud Islands provides a wilderness experience for visitors.</p> <p>Social and Cultural values Recreation: Mud Islands receives many visitors although it is only accessible by boat. However, visiting the island is not encouraged by the Department of Natural Resources and Environment. Research: The avifauna of Mud Islands has been well documented historically and the vegetation has been surveyed in detail. Bird banding has been carried out on Mud Islands since 1914. Between 1979 and 1987, 11,300 Silver Gull chicks were banded of which 2% have been recovered. A dense population of the introduced <i>Carcinus maenas</i> occurs in the lagoon. The rapidly changing geomorphology makes Mud Islands an ideal place to study plant succession. Education/tourism: Mud Islands is used for excursions by Frankston TAFE and the Victorian Institute of Marine Sciences, which also run summer holiday activities for the general public.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Mud Islands - VIC077, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC077. Accessed 25 Jul 2017.</i></p>
<p>Point Cook & Laverton Saltworks</p>	<p>Site description The coastline of this area comprises rocky shoreline, sandy beaches and spits and large areas of intertidal mudflats and seagrass. Laverton Saltworks consists of shallow evaporation basins and saltmarsh. The Point Cook Coastal Park contains saltmarsh, dune vegetation, grassland, freshwater meadows, fresh to brackish marshes and a saline lake.</p> <p>Physical features Geological setting: Quaternary coastal, lacustrine, paludal and aeolian sediments overlying basalt flows of the Newer Volcanics.</p> <p>Ecological features The saltworks ponds and Point Cook Lake provide an important habitat for waders, particularly sandpipers, avocets and stilts, and other waterbirds.</p> <p>Significance The coastline from Point Cook to Skeleton Creek includes wetlands which are high value for their ecological, recreational, scientific, educational and cultural features. The Laverton Saltworks are a very valuable artificial wetland with a range of salinities providing habitat diversity. This salinity range is vital in maintaining the value of the habitat. The active recurving sand spits between the Skeleton Creek mouth and the Laverton Creek mouth are geomorphologically significant. Point Cook Coastal Park has been rated as a site of state botanical significance.</p> <p>Social and Cultural values Recreation: The Point Cook Coastal Park receives large numbers of visitors and provides recreational facilities. Research: The area has been the study site in a number of research projects such as the banding of Double-banded Plovers by the Australasian Wader Studies Group. It also has detailed historical bird survey data. History: The Point Cook Estate, Point Cook Homestead and the Stables are all listed on the Register of the National Estate, classified by the National Trust and are listed on the Register of the Historic Building Council.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Point Cook & Laverton Saltworks - VIC116, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC116. Accessed 25 Jul 2017.</i></p>
<p>Powlett River Mouth</p>	<p>Site description (No data)</p> <p>Physical features Geological setting: Quaternary alluvium on Cretaceous sediment of the Strzelecki Group.</p> <p>Ecological features The Powlett River Mouth provides valuable habitat for the endangered Orange-bellied Parrot.</p> <p>Significance (No data)</p> <p>Social and Cultural values Research: The Powlett River mouth is covered in McMahon et al. (1994) which covers saltmarsh habitats on the Victorian coast.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Powlett River Mouth - VIC078, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC078. Accessed 25 Jul 2017.</i></p>
<p>Princetown Wetlands</p>	<p>Site description These wetlands consist of swamps of varying salinity on the floodplains of the Gellibrand River and its tributary, the Serpentine (Latrobe) Creek. Wetlands types present are a deep freshwater marsh, semi- permanent saline marshes and a shallow freshwater marsh.</p> <p>Physical features The Princetown Wetlands occur in the contact area between the Port Campbell Plains, the folded Otway geology and Recent dune deposits. Geological setting: Quaternary alluvium on Tertiary Gellibrand Marl and Dilwyn Formation and Quaternary Bridgewater Formation.</p> <p>Ecological features The Princetown Wetlands have extensive beds of Common Reed Phragmites australis and meadows dominated by Beaded Glasswort which can support large numbers of waterbirds.</p> <p>Significance A series of relict spits adjacent to the Gellibrand Estuary and a number of levee banks at various sites have State significance for their geomorphology.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Princetown Wetlands - VIC093, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC093. Accessed 25 Jul 2017.</i></p>
<p>Shallow Inlet Marine & Coastal Park</p>	<p>Site description Shallow Inlet is a large tidal embayment with a single channel to the sea. The seaward side is enclosed by a sandy barrier complex of spits, bars and mobile dunes.</p> <p>Physical features Geological setting: Shallow Inlet consists of Quaternary coastal and aeolian sediments deposited in a basin eroded into lower Palaeozoic and Pliocene sediments and enclosed by Pleistocene and Holocene coastal barrier and dune deposits. Large areas of mudflats are exposed at low tide.</p> <p>Ecological features Shallow Inlet is of high value for its avifauna and flora.</p> <p>Significance 13 sites of State, regional and local geological and geomorphological significance has been documented for the Shallow Inlet Marine and Coastal Park.</p> <p>Social and Cultural values Education: Shallow Inlet is used occasionally by local schools for environmental education. Tertiary institutions have used the area as a field study site for post-graduate research, mainly in geology and geomorphology. Research: The formation of the entrance barrier of Shallow Inlet has been studied in Cummins (1989). Tourism: Shallow Inlet is a popular tourist destination offering attractive surroundings and a variety of recreational activities including fishing, sailboarding, swimming, camping and picnicking. It also provides a base for visits to other holiday locations such as Wilsons Promontory and Corner Inlet. Aboriginal culture: Detailed archaeological surveys have discovered rich sites between Shallow Inlet and Darby River. Aboriginal middens are found along the coast west of Shallow Inlet. History: Shallow Inlet and the surrounding area also have a well documented European history, including maritime history and associated shipwrecks.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Shallow Inlet Marine & Coastal Park - VIC080, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC080. Accessed 25 Jul 2017.</i></p>
<p>Swan Bay & Swan Island</p>	<p>Site description Swan Bay is a shallow marine embayment partly enclosed by spits and barrier islands such as Swan Island. It is generally less than two metres in depth, with 700–1,000 ha of mudflats exposed at low tide, and has extensive seagrass beds. The bay is fringed with saltmarsh including some extensive flats and there are some stands of remnant woodland, particularly on Edwards Point at the northern end and on the islands on the eastern boundary of the bay.</p> <p>Physical features Geological setting: Quaternary coastal and aeolian sediments overlying Quaternary alluvial and coastal sediments.</p> <p>Ecological features The bay is of high value for its avifauna and flora. It is very productive for birds, molluscs and fish. The saltmarsh and intertidal seagrass meadows are regionally significant. The avifauna is particularly diverse, with 190 bird species recorded.</p>

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Wetland	Key Features
	<p>Significance Swan Bay is a high value wetland for its ecological, recreational and educational features. Swan Bay is an unusual shallow embayment with a mixture of seagrass species which is relatively undisturbed and in good ecological condition.</p> <p>Social and Cultural values Research: Swan Bay has been well researched scientifically and is the subject of many reports. The type specimens of two isopods <i>Haliophasma cycneum</i> and <i>Paranthura boronia</i> held at the Museum of Victoria were collected in Swan Bay. The Marine Science Laboratory of the Department of Natural Resources and Environment at Queenscliff is in close proximity. History: Swan Island has value for historical military relics.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Swan Bay & Swan Island - VIC081, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC081. Accessed 25 Jul 2017.</i></p>
<p>Sydenham Inlet Wetlands</p>	<p>Site description Wetland Atlas numbers: 8622 756184 (Sydenham Inlet), 8622 744203, 8622 764199, 8622 765191, 8622 769185, 8622 784209.</p> <p>Physical features Sydenham Inlet, together with Tamboon Inlet, developed in an embayment between the headlands at Pearl Point and Tamboon South. Bemm River formed a shallow tidal lagoon between two late Pleistocene-Holocene barriers behind a dune and barrier system on Ninety Mile Beach. An exposure of Noorinbee Granodiorite, which forms a small waterfall and rapids, defines the tidal extent of the Inlet. The accumulation of swamp deposits and river sediments has reduced the area and depth of the Inlet and has isolated Mud Lake and Swan Lake from the main wetland. The active cusped delta of the Bemm River and several abandoned deltas occur on the north side of the Inlet. Geological setting: Sydenham Inlet and Mud Lake occur in a basin of Quaternary alluvium on Tertiary sand and Quaternary beach and dune deposits. Swan Lake was formed on Tertiary sand and Quaternary beach and dune deposits.</p> <p>Ecological features The Sydenham Inlet Wetlands include a variety of wetland types affected by fresh to saline water, provide a large area of estuarine habitat and support a high diversity of flora and fauna.</p> <p>Significance Sydenham Inlet is of State significance for its geology and geomorphology. The Inlet, Mud Lake, Swan Lake and the lower Bemm River are of high value for their flora and fauna. Riparian communities such as along the Bemm River near Sydenham Inlet are of high botanical significance. The diversity of fish species and the importance of the Inlet entrance barrier for roosting or nesting terns and shorebirds are particularly notable.</p> <p>Social and Cultural values Recreation: Fishing, boating, walking, birdwatching.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Sydenham Inlet Wetlands - VIC134, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC134. Accessed 25 Jul 2017.</i></p>
<p>Tamboon Inlet Wetlands</p>	<p>Site description Wetland Atlas numbers : 8722 863231 (Lake Furnell), 8722 872188 (Tamboon Inlet).</p> <p>Physical features Tamboon Inlet, together with Sydenham Inlet, developed in an embayment between the headlands at Pearl Point and Tamboon South. Cann River formed a shallow tidal lagoon between two late Pleistocene-Holocene barriers behind a dune and barrier system on Ninety Mile Beach and bordered by a band of plutonic rock to the east. The Inlet consists of the river channel within a delta, the north and south basins separated by a sand bar and spit, the eastern channel and the entrance barrier complex. Geological setting: Quaternary beach and dune deposits underlie most of Tamboon Inlet and Devonian Noorinbee Granodiorite occurs along the east side of the Inlet. Lake Furnell was formed on Quaternary beach and dune deposits and Tertiary sediments.</p> <p>Ecological features The Tamboon Inlet Wetlands have a variety of wetland types affected by fresh to saline water which support a diversity of flora and fauna. The Inlet provides a large area of estuarine habitat.</p> <p>Significance Tamboon Inlet, Lake Furnell and the lower Cann River are of high value for their flora and fauna, particularly the diversity of fish species. Tamboon Inlet is of State significance for its geology and geomorphology.</p> <p>Social and Cultural values Recreation: Fishing, boating, walking, birdwatching.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Tamboon Inlet Wetlands - VIC135, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC135. Accessed 25 Jul 2017.</i></p>
<p>Werribee-Avalon Area</p>	<p>Site description This wetland system contains a variety of habitats, including large areas of intertidal mudflat and seagrass beds, extensive areas of saltmarsh, small stands of White Mangrove <i>Avicennia marina</i>, reed beds, salt evaporation lagoons of the Avalon saltworks and the grass filtration paddocks and sewage treatment lagoons of the Werribee Treatment Complex.</p> <p>Physical features Natural wetlands include two inter-tidal lagoons (Limeburners Bay and The Spit), two estuaries (Little River and Werribee River), saltmarsh flats and several shallow freshwater marshes. Artificial wetlands comprise salt evaporation ponds (built from saltmarsh and embayments), sewage filtration paddocks and sewage treatment lagoons. Geological setting: Quaternary coastal, lacustrine and paludal sediments and basalt flows of the Newer Volcanics.</p> <p>Ecological features (No data)</p> <p>Significance The Port Phillip Bay Coastal Study identified Limeburners Bay as a site of geomorphological, floral and faunal interest, and The Spit and the Western Treatment Complex as sites of faunal interest. Limeburners Bay is listed as a site of special scientific interest for its vegetation and its geology and geomorphology. The Spit is also a site of geological and geomorphological scientific interest. These wetlands are of high value for ecological, recreational, tourism, scientific and educational features. They are highly productive and include diverse habitats supporting a wide range and large numbers of waders, ducks, passerines and raptors.</p> <p>Social and Cultural values Recreation: This wetland system has very high values for birdwatching. Although access is restricted it is within easy reach of Melbourne. The Werribee Treatment Complex is regarded as the best place in Victoria for waterbirds and is internationally-renowned. The coastline is heavily used for recreational fishing. Research: Waterbird counts at Werribee are used to monitor the populations of species listed on JAMBA and CAMBA. It is also a study site for many research projects. Orange-bellied Parrots have been extensively studied in the area. Education: The area is close to Melbourne and is used for teaching by universities.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Werribee-Avalon Area - VIC121, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC121. Accessed 25 Jul 2017.</i></p>
<p>Western Port</p>	<p>Site description Western Port is a large bay with extensive intertidal flats, mangroves, saltmarsh, seagrass beds, several small islands and two large islands.</p> <p>Physical features Geological setting: Quaternary marine, coastal, alluvial, colluvial, lacustrine and paludal sediments on basalt flows of the Older Volcanics, Tertiary sandstone and Cretaceous sediments.</p> <p>Ecological features Western Port is of high value for its avifauna and flora. The bays seagrass flats are nursery grounds for King George Whiting and other species of fish and many birds depend on these areas. Many sites in Western Port are of special significance as breeding, roosting or feeding sites for waterbirds, including migratory waders.</p> <p>Significance Western Port is a high value wetland for its ecological, recreational, tourist, scientific, educational, cultural and scenic features. It is a very good example of a saltmarsh-mangrove-seagrass wetland system.</p> <p>Social and Cultural values History: Western Port is the site of many historical expeditions and settlements. Churchill Island, which is the site of the first planting of European crops in Victoria and the earliest known substantial building in Victoria following the settlement of Lieut. James Grant in 1801, is listed on the Register of the National Estate. A number of sites of archaeological significance have been identified around the bay. Research: Many studies have been carried out in Western Port. The Western Port study of the 1970s was a world first for such a comprehensive study of an ecosystem. Two significant reports about waterbirds have been published: Loyn (1978) and Dann et al. (1994a, 1994b). The Australasian Wader Study Group use several sites around the bay to trap, measure and band migratory and nomadic wading birds for biological studies. Education: Western Port is used extensively</p>

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Wetland	Key Features
	<p>for teaching by schools and universities. The Victorian Institute of Marine Science has an education centre at Tooradin.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Western Port - VIC083, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC083. Accessed 25 Jul 2017.</i></p>
<p>Yambuk Wetlands</p>	<p>Site description The Yambuk Wetlands are a network of the estuary of the Eumeralla River and Shaw River (Lake Yambuk), associated freshwater meadows and semi-permanent saline wetlands.</p> <p>Physical features The wetlands adjacent to Lake Yambuk and the lower Eumeralla River are floodplain depressions separated from the river by low natural levee banks. All these wetlands have formed in the swale between successive barrier complexes. Geological setting: Quaternary lacustrine, paludal, coastal and alluvial sediments on Quaternary colluvium and alluvium and Tertiary sediments.</p> <p>Ecological features The Yambuk Wetlands are high value for their flora and fauna and they act as drought refuges. The vegetation consists of extensive reed beds and narrow bands of saltmarsh.</p> <p>Significance Lake Yambuk is an excellent example of an estuary with extensive overbank swamps.</p> <p>Social and Cultural values Recreation: Fishing, duck hunting, boating and walking at the river mouth are the main activities. Aboriginal culture: Shell middens, surface scatters and isolated hearths exist in and around Lake Yambuk.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Yambuk Wetlands - VIC084, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=VIC084. Accessed 25 Jul 2017.</i></p>
<p>Tasmania</p>	
<p>Blackmans Lagoon</p>	<p>Site description A coastal wetland, located partly within the Waterhouse Conservation Area (north-east of Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features A lagoon barred by the development of Holocene dunes over the last 6,000 years. It is situated at the contact between active Holocene dunes and older, possibly Pleistocene features. The soil is predominantly sand, which is light grey brown in colour with low organic content.</p> <p>Ecological features This wetland contains a <i>Lilaeopsis brownii</i> herbfield in which <i>Mimulus repens</i> and <i>Isolepis fluitans</i> co-dominate; the community varies in cover from closed to very open. The wetland also has a rich aquatic diversity.</p> <p>Significance The lagoon supports rare, poorly reserved, and scientifically valuable taxa. It is also of significance because of its physical shape and evolution which appear to differ from the other interdune lakes which have developed between transgressive dunes.</p> <p>Social and Cultural values The lagoon is valued as an area suitable for recreational activity.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Blackmans Lagoon - TAS001, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS001. Accessed 25 Jul 2017.</i></p>
<p>Boullanger Bay - Robbins Passage</p>	<p>Site description Boullanger Bay - Robbins Passage is an extensive area of tidal channels and intertidal mud and sand flats lying between the northwest coastline of Tasmania, and three off-shore islands (Perkins, Robbins and Penguin islands).</p> <p>Physical features The site is composed of both estuarine and marine areas, including tidal mud and sand flats, intertidal channels and tidal channels.</p> <p>Ecological features The large area of exposed mud and sand flats at this site provides a feeding ground for resident and migratory waders. Other seabirds are also abundant in the area, using headlands, sandy beaches, dunes and saltmarshes surrounding the area for roosting and nesting. The saltmarsh areas are important for invertebrates, mainly small crustaceans, crabs and snails.</p> <p>Significance Boullanger Bay - Robbins Passage attracts the largest numbers of migratory waders in Tasmania, and is also a very significant habitat for non-migratory species. It supports a number of bird species which are regarded as significant both nationally and internationally. Among the many birds using the area, there are 13 species which are listed on the following international treaties, the JAMBA</p>

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Wetland	Key Features
	<p>and the CAMBA. The area provides the most extensive feeding grounds on an important route for birds migrating across Bass Strait. It is likely that the Orange-bellied Parrot uses this area as a stop-over in its migration across Bass Strait.</p> <p>Social and Cultural values There is extensive anecdotal evidence of the long-term use of the area by Tasmanian Aboriginals for various purposes, including hunting and food-gathering. Although it is likely that Aboriginal values of National Estate significance exist at this site, these have not yet been identified or documented.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Boullanger Bay - Robbins Passage - TAS089, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS089. Accessed 25 Jul 2017.</i></p>
<p>Calverts Lagoon</p>	<p>Site description A small coastal, saline lagoon, in the south-east of Tasmania. Access is possible by 2-wheel drive.</p> <p>Physical features An excellent example of a Holocene dune barred lagoon with no surface outlet to the sea. Drainage is likely to occur as seepage through the dune system although evaporation is the dominant process. The soil is predominantly sand, which is white in colour and is inorganic and aerated.</p> <p>Ecological features Calverts lagoon supports a diverse aquatic flora.</p> <p>Significance The lagoon is a good example of a Holocene dune barred lagoon in this area. It supports species which are rare and vulnerable in Tasmania and nationally and birds which are listed under the JAMBA and the CAMBA.</p> <p>Social and Cultural values This lagoon is valued as part of a local recreational area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Calverts Lagoon - TAS055, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS055. Accessed 25 Jul 2017.</i></p>
<p>D'Arcy's Lagoon</p>	<p>Site description A coastal lagoon near the isthmus separating North and South Bruny Island (southeast Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features A wetland formed by damming behind coastal sands forming the northern end of the Bruny Island spit - a rare geomorphological phenomenon in Tasmania. The lagoon occurs within a deflation hollow with a distinct (0.5 m) lunette ridge overlaying Quaternary deposits. The soil is predominantly sand, which is grey in colour with medium organic content.</p> <p>Ecological features This site is an important habitat for a vulnerable species of copepod.</p> <p>Significance This lagoon is significant as it is the only known location in Tasmania of a copepod species. The lagoon also represents geomorphology which is rare in Tasmania.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. D'Arcy's Lagoon - TAS028, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS028. Accessed 25 Jul 2017.</i></p>
<p>Earlham Lagoon</p>	<p>Site description An estuarine coastal lagoon/marsh on the south-east coast of Tasmania. Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon lies within a coastal swale, overlying Quaternary deposits. The soil is predominantly silt, which is yellow brown in colour with reducing, organic mud.</p> <p>Ecological features The site is surrounded by grazing land and therefore the marsh flora has become mixed with exotic grasses.</p> <p>Significance The lagoon supports species which are poorly reserved in Tasmania. It is also used by Red-necked Stints which are listed as important species both under the JAMBA and the CAMBA.</p> <p>Social and Cultural values The lagoon is valued locally as a recreational area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Earlham Lagoon - TAS033, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</i></p>

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Wetland	Key Features
	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS033. Accessed 25 Jul 2017.</p>
<p>Fergusons Lagoon</p>	<p>Site description A transitory wetland on the north-east coast of Flinders Island in Bass Strait. Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon occurs within a coastal swale overlaying Quaternary siliceous sands. The soil is predominantly sand, which is brown in colour with reducing, organic mud.</p> <p>Ecological features The wetland supports a transient aquatic flora and an <i>Isolepis cernua</i> sedgeland. The shoreline is dominated by tussocks and tea tree.</p> <p>Significance This lagoon supports species and communities which are rare or vulnerable in Tasmania and also a species which is considered vulnerable at a national level. The site is important as it is visited by a group of migratory birds species listed on the JAMBA and/or the CAMBA.</p> <p>Social and Cultural values The site is an important area for recreational activities.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Fergusons Lagoon - TAS039, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS039. Accessed 25 Jul 2017.</i></p>
<p>Flyover Lagoon 1</p>	<p>Site description Flyover Lagoon is one of a number of shallow, saline coastal lagoons and marshes, which occur on the east coast of Cape Barren Island in the Furneaux group, Bass Strait. Collectively these lagoons are Ramsar listed as the "East-Coast Cape Barren Island Lagoons". This entry pertains to the northern section of Flyover Lagoon. Access to this area is by walking or off-road vehicles.</p> <p>Physical features Flyover Lagoon is a dune barred (dammed by Recent calcareous sand dunes) lagoon, which forms part of the Cape Barren dune system. The topsoil is grey sand, with some reducing organic mud.</p> <p>Ecological features The wetland is surrounded by heath and coastal scrub, and is largely free from invasion by exotic species. Both a <i>Lepilaena cylindrocarpa</i> and <i>Selliera radicans</i> community are present at the site. Many species of waterbirds use the area.</p> <p>Significance Flyover Lagoon supports a suite of species and communities which are rare, vulnerable and poorly reserved in Tasmania. The lagoon is part of the Cape Barren dune system, which is considered geologically significant, and is listed in the Tasmanian Geoconservation Database. It is also of cultural significance to the Tasmanian Aboriginal community.</p> <p>Social and Cultural values The area is valued as a site for various recreational activities. It is also of significance to the Aboriginal community.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Flyover Lagoon 1 - TAS040, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS040. Accessed 25 Jul 2017.</i></p>
<p>Flyover Lagoon 2</p>	<p>Site description Flyover Lagoon is one of a number of shallow, saline coastal lagoons and marshes, which occur on the east coast of Cape Barren Island in the Furneaux group, Bass Strait. Collectively these lagoons are Ramsar listed as the "East-Coast Cape Barren Island Lagoons". This entry pertains to the southern section of Flyover Lagoon. Access to this area is by walking or off-road vehicles.</p> <p>Physical features Flyover Lagoon is a dune barred (dammed by Recent calcareous sand dunes) lagoon, which forms part of the Cape Barren dune system. There are deep sandy soils throughout and some areas of plain formed on Quaternary siliceous marine sands and clays.</p> <p>Ecological features The wetland is surrounded by heath and coastal scrub, and is free from invasion by exotic species. This basin is important for its <i>Eleocharis pusilla</i> sedgeland community. Many species of waterbirds use the area.</p> <p>Significance Flyover Lagoon supports a suite of species and communities which are rare, vulnerable and poorly reserved in Tasmania. The lagoon is part of the Cape Barren dune system, which is considered geologically significant, and is listed in the Tasmanian Geoconservation Database. It is also of cultural significance to the Tasmanian Aboriginal community. This site is visited by White-bellied Sea Eagles which are listed as an important species under the CAMBA.</p> <p>Social and Cultural values The area is valued as an area for recreational activity and also holds cultural significance for the Tasmanian Aboriginal community.</p>

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Wetland	Key Features
	<p><u>Reference</u> Department of the Environment and Energy. 2017. Flyover Lagoon 2 - TAS041, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS041. Accessed 25 Jul 2017.</p>
<p>Freshwater Lagoon</p>	<p>Site description A coastal freshwater lagoon on the east coast of Tasmania, near Moulting Lagoon Game Reserve. Access is possible by 2-wheel drive.</p> <p>Physical features Freshwater lagoon is barred by a foredune overlaying Permian mudstone and sands. The soil is predominantly sand, which is grey in colour with low organic content.</p> <p>Ecological features A <i>Selliera radicans</i> herbfield occurs within this wetland. It varies greatly in cover and species composition, and has the following species recorded as co-dominants: <i>Centella cordifolia</i>, <i>Leptinella reptans</i>, <i>Pratia platycalyx</i>, <i>Sarcocornia quinqueflora</i>, <i>Samolus repens</i>, <i>Schoenus nitens</i>, <i>Villarsia reniformis</i>, <i>Wilsonia backhousei</i> and <i>Wilsonia rotundifolia</i>.</p> <p>Significance The lagoon supports species and communities which are rare and poorly reserved in Tasmania. This site is also visited by Caspian Terns which are listed as important birds under both the CAMBA and the JAMBA.</p> <p>Social and Cultural values The lagoon is valued for its aesthetic and recreational values.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Flyover Lagoon 2 - TAS041, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS041. Accessed 25 Jul 2017.</p>
<p>Hogans Lagoon</p>	<p>Site description A large seasonal marsh on the north-east coast of Flinders Island (in Bass Strait). Access is by 2-wheel drive.</p> <p>Physical features Hogans Lagoon is a dune-barred lagoon which has developed within a parallel dune system. It is one of only two large sites showing significant sand accumulation and coastal progradation in Tasmania. The topsoil is red-brown Quaternary, siliceous sand, and is relatively rich in nutrients.</p> <p>Ecological features The lagoon is surrounded by a <i>Baumea arthrophylla</i> marsh with fringing herbland.</p> <p>Significance This site is important as it supports species which are rare and poorly reserved in Tasmania, and also a species which is vulnerable at a national level. The lagoon is visited by a group of migratory birds which are listed under the JAMBA and/or the CAMBA. It is also of geoconservation value, as it is within a parallel dune system listed in the Tasmanian Geoconservation Database. Hogans Lagoon is also included on the Geoconservation Database because it has a lunette which illustrates the geomorphological relationships with the beach ridge system.</p> <p>Social and Cultural values The area is valued as a location suitable for various recreational activities.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Freshwater Lagoon - TAS034, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS034. Accessed 25 Jul 2017.</p>
<p>Jocks Lagoon</p>	<p>Site description Jocks Lagoon is a small freshwater lagoon partly in the St Helens Conservation Area (north-east coast of Tasmania). It is one of a chain of lagoons, swamps and wetlands. Access to the site is possible by 2-wheel drive.</p> <p>Physical features An area of Quaternary sands and clays separated from the sea by beach and sand dunes.</p> <p>Ecological features Jocks Lagoon is one of the very few wetlands in Tasmania containing the rare sedge, <i>Baumea articulata</i>. The lagoon has several beds of tall sedges and <i>Triglochis</i> sp. as emergent plants but also has some open water. <i>Lepidosperma longitudinale</i> open sedgeland and <i>Baumea articulata</i> dominate a small edge zone on the southwest side in a mixture with <i>Melaleuca squarrosa</i>. On higher ground these communities grade into coastal heath.</p> <p>Significance Jocks Lagoon supports rare and poorly reserved species and scientifically valuable species. It is also a locally important freshwater aquatic habitat in an otherwise dry area. Geomorphologically, it is a good representative example of such a lagoon at the regional scale.</p> <p>Social and Cultural values Potentially valuable for conservation education, recreational value.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Jocks Lagoon - TAS002, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS002. Accessed 25 Jul 2017.</i></p>
<p>Lavinia Nature Reserve (Lake Martha Lavinia, Sea Elephant Wildlife Sanctuary, Nook)</p>	<p>Site description Lavinia Nature Reserve (King Island, Tasmania) includes the Sea Elephant River Estuary and associated mudflats, areas of coastal swamp, lagoons and areas of drier marsh inland from the coast. Access to the reserve is by 4-wheel drive.</p> <p>Physical features The Sea Elephant River, the largest on King Island, drains into Bass Strait midway along the east coast. The shifting sands of the Sea Elephant River mouth have resulted in a substantial back-up of brackish water, creating the saltmarsh that extends up to 5 km upstream from the mouth. The coastal strip of the reserve is comprised of dunes and beaches of Quaternary calcareous sands. Further inland are Quaternary sand plains with mostly deep, organic, sandy soils. Outcrops of Precambrian granite occur west of Lake Martha Lavinia, on the coastline near Pennys Lagoon and at the junction of Sea Elephant River and Saltwater Creek. Two distinct episodes of dune formation have occurred in the area. Nook Swamps, running parallel to the coast, occupy a flat depression that separates the new system of parallel dunes from the older parabolic dunes further inland. The topsoil is yellow-brown sand with a high peat content. The Sea Elephant River has reducing, organic mud over dark grey-brown sand and silt.</p> <p>Ecological features Much of King Island once supported massive eucalypt forests, however, wildfires and large-scale clearing have meant that very few mature trees remain today, the island being dominated by pasture and rapidly diminishing scrub/heathland. The Lavinia Nature Reserve is one of the few largely unaltered areas of the island and contains much of the remaining native vegetation on King Island. The major wetlands in the reserve are the Sea Elephant River estuary area, Lake Martha Lavinia, Penny's Lagoon, and the Nook Swamps. There are also numerous smaller wetland areas, most of which are seasonally inundated. The freshwater areas of the Nook Swamps are dominated by swamp forest, the closed canopy of which exceeds 30m in places. The reserve contains about 200 ha of quality feeding habitat for nationally endangered Orange-bellied Parrots.</p> <p>Significance The wetland area supports species and communities which are threatened in both Tasmania and/or globally. The area provides a critical feeding site for the endangered Orange-bellied Parrot during its annual migration between south-eastern Australia and Tasmania. The species Short-tailed Shearwater, also found within the reserve, is listed under the JAMBA. Several migratory birds which are listed under the CAMBA visit this site. The reserve is one of the few largely unaltered areas of native vegetation remaining on the island and is therefore a very important refuge for both flora and fauna.</p> <p>Social and Cultural values The largely unspoiled nature of this reserve and its variety of interesting features, makes it an important area for scientific study, recreation and education. It is thought that there may be archaeological sites connected with colonial whaling and sealing operations in the area around Cowper's Point. Two sites of Aboriginal significance are located within the Lavinia Nature Reserve, one is located near Martha Lavinia and the other at Pennys Lagoon.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lavinia Nature Reserve (Lake Martha Lavinia, Sea Elephant Wildlife Sanctuary, Nook - TAS075, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS075. Accessed 25 Jul 2017.</i></p>
<p>Little Thirsty Lagoon</p>	<p>Site description Little Thirsty Lagoon is one of a number of shallow, saline coastal lagoons and marshes, which occur on the east coast of Cape Barren Island, in the Furneaux group, Bass Strait. Collectively these lagoons are listed on the Convention on Wetlands as the "East-Coast Cape Barren Island Lagoons". Access to this area is by walking or trail bikes.</p> <p>Physical features The topsoil is inorganic, aerated red-brown sand.</p> <p>Ecological features The lagoon supports a diverse aquatic flora community and is also utilised by many migratory birds.</p> <p>Significance Little Thirsty Lagoon supports a suite of species and communities which are rare and poorly reserved in Tasmania and also a species which is vulnerable at a national level. The lagoon is also an important site for a number of migratory birds listed under the CAMBA and/or the JAMBA.</p>

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Wetland	Key Features
	<p>Social and Cultural values The lagoon is of cultural significance to the Tasmanian Aboriginal community.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Little Thirsty Lagoon - TAS043, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS043. Accessed 25 Jul 2017.</i></p>
<p>Little Waterhouse Lake</p>	<p>Site description Little Waterhouse Lake is a coastal freshwater lagoon situated in the Waterhouse Conservation Area (north-east coast of Tasmania). It is an important habitat for a group of rare and poorly reserved species. Access is possible by 2-wheel drive.</p> <p>Physical features This site is a classic example of a lake formed in the depression between parabolic dunes of the Waterhouse transgressive dunefield, when seaward drainage was blocked by mobile coastal dunes. Quaternary sands and clays found in this area are strongly mottled with a layer of impermeable coffee rock at a depth of 1.5 m. Topsoil is grey, Quaternary calcareous, with a low peat content.</p> <p>Ecological features The lagoon has dense aquatic growth and a high species richness. To the east an open scrub covers most of the area with <i>Banksia marginata</i> and <i>Xanthorroea australis</i> dominating. West of the site marram grass (<i>Ammophila</i> sp.) occurs on the foredunes with <i>Acacia sophorae</i>, <i>Banksia marginata</i> and <i>Acacia verticillata</i>.</p> <p>Significance Little Waterhouse is a good example of a coastal freshwater lagoon in the Ben Lomond biogeographic area. It has a high species richness, and supports species and communities which are rare and poorly reserved in Tasmania, therefore forming an integral part of the coastal community.</p> <p>Social and Cultural values The area is important for the conservation of a representative coastal community and is also valued as a site for various recreational activities such as angling.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Little Waterhouse Lake - TAS003, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS003. Accessed 25 Jul 2017.</i></p>
<p>Logan Lagoon</p>	<p>Site description Logan Lagoon is one of three large estuarine lagoons which make up a coastal lagoon system along the south-east coast of Flinders Island, Bass Strait. It is enclosed within the Logan Lagoon Conservation area. Access to the lagoon is by 4-wheel drive only</p> <p>Physical features The lagoon is contained entirely within Holocene alluvial deposits which, when mobilised by longshore drift, block freshwater drainage to the sea.</p> <p>Ecological features The area is in a relatively natural condition except for some cleared and drained agricultural land on the western shore. The lagoon is fringed with <i>Juncus</i> reed beds whilst the surrounding land supports a savannah grassland with scattered <i>Eucalyptus</i>, <i>Allocasuarina</i> and <i>Banksia</i> trees. Swans and other waterfowl breed in the <i>Juncus</i> tussocks during winter. Being a shallow evaporative basin the lagoon is rich in nutrients and provides abundant food for water birds. When the lagoon has been dry, nearby Cameron Inlet has been recorded as supporting the bird populations normally occupying Logan Lagoon.</p> <p>Significance Logan Lagoon supports large numbers of migratory waterbirds and a number of species which are rare or vulnerable in Tasmania. The site is used by three species which are listed under both the CAMBA and the JAMBA (<i>Calidris ruficollis</i>, <i>Numenius madagascariensis</i> and <i>Tringa nebularia</i>). Logan Lagoon is listed as an important site for the Double-banded Plover under The East Asian - Australasian Shorebird Site Network which links wetlands that are internationally important for shorebirds. It is an important hydrological feature in the area. It is also listed on the Tasmanian Geoconservation Database because, with other lagoons and dunes in the area, it provides an excellent example of the development of Holocene shorelines.</p> <p>Social and Cultural values The sanctuary is important for conservation education, scientific research, recreation and tourism.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Logan Lagoon - TAS044, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</i></p>

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	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refodelist=TAS044. Accessed 25 Jul 2017.</p>
<p>Maria Island Marine Reserve</p>	<p>Site description The Maria Island Marine Reserve is the seaward extension of the Maria Island National Park, off the east coast of Tasmania. The reserve runs from around the shoreline out to the 20 m depth contour, about one kilometre offshore.</p> <p>Physical features Fossil Bay, on the island's west coast, is characteristically limestone, containing numerous large caverns, whereas rounded granite blocks with moderate cave development occur along most of the eastern coast of the island. Dolerite and folded, argillite reefs are found between these two areas. The east coast reefs drop quickly to considerable depths (40+ m) and experience maximal wave exposure. The sheltered reefs of Shoal Bay are very shallow and have a broken topography of small dolerite boulders. The sandstone reefs near Howells Point are usually submerged under sand in shallow water, but where they extend to greater depths, long gutters and ledges are found.</p> <p>Ecological features There are extensive seagrass beds and fish nurseries in Mercury Passage (between Maria Island and mainland Tasmania) and sandstone reefs at Howells Point. Forests of giant kelp (15-20 m), rocky reefs and large underwater caverns are found in Fossil Bay. The marine communities around Maria Island occur on a variety of substrates and have a rich diversity of flora and fauna.</p> <p>Significance Maria Island Marine Reserve protects a representative range of the marine communities found along Tasmania's east coast. It is one of only a few formal marine reserves in Tasmania. The marine area is the most significant representation of the Maugean biogeographic province reserved in Tasmania. It provides an important breeding refuge for species which are commercially fished. The Fossil Cliffs, part of the Marine Reserve, is a site of international geoconservation significance for its well preserved marine fossils. The site is also used by a number of bird species which are listed under the JAMBA and the CAMBA.</p> <p>Social and Cultural values The Marine Reserve has significant aesthetic and recreational values, including large underwater caverns, sandstone reefs and seagrass beds of interest to the snorkeler or diver.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Maria Island Marine Reserve - TAS036, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refodelist=TAS036. Accessed 25 Jul 2017.</i></p>
<p>Moulting Lagoon</p>	<p>Site description A large estuary at the mouths of the Swan and Apsley Rivers, on the East Coast of Tasmania, adjacent to, and continuous with, another significant wetland (Apsley Marshes). The lagoon, several sections of coastal reserve surrounding it, and an additional area of dry land one kilometre north comprise Moulting Lagoon Game Reserve. Access is possible with a 2-wheel drive vehicle.</p> <p>Physical features This lagoon formed with the partial closure of the mouths of the Swan and Apsley Rivers, due to the creation of a Holocene alluvial bar approximately 10,000 years ago. The underlying bedrock is predominantly Jurassic dolerite. The restriction of flow has resulted in the flooding of the surrounding low-lying land and the formation of extensive mudflats where silt carried down by the rivers has been deposited.</p> <p>Ecological features The lagoon contains areas of both shallow and deep water and is surrounded by periodically exposed mudflats and saltmarsh. The western shore has largely been cleared and is used for livestock grazing while the eastern shore is relatively undisturbed and covered with native vegetation. The plant communities around Moulting Lagoon reflect the wide diversity of terrain and consequent soil drainage patterns. The immediate edge of the lagoon supports an almost continuous belt of <i>Sarcocornia quinqueflora</i>. Behind that is a continuous fringe of <i>Juncus kraussii</i> and beyond in wet areas is <i>Melaleuca ericifolia</i>, <i>Acacia dealbata</i>, or small stands of <i>Callitris rhomboidea</i> with scattered <i>Allocasuarina</i>, <i>Banksia marginata</i> and <i>Acacia dealbata</i> on the few rocky outcrops. The vegetation in the lower areas (<i>Sarcocornia quinqueflora</i>, <i>Juncus kraussii</i>) provides important nesting, roosting and feeding habitat for the numerous resident waterfowl. Seasonal fluctuations in numbers of birds occur with changes in rainfall. The estuary is also a nursery area for many fish species and at least fifty-nine species have been recorded in or near the estuary.</p> <p>Significance Moulting Lagoon and the adjacent Apsley Marshes are one of the largest and most significant wetland areas in Tasmania. Moulting Lagoon supports a number of species and communities which are rare or vulnerable. This lagoon is a significant site for several species listed under both the</p>

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	<p>AMBA) and the JAMBA. The area provides an important resting and breeding ground for many species of migratory birds and fish, and an important drought refuge. Having a substantial catchment, it plays a vital hydrological role in the region. The lagoon is culturally significant to both Aboriginal and European people.</p> <p>Social and Cultural values The lagoon is a highly valued recreation area. The reserve has commercial value to the local tourism industry and aquaculture operators. It has been used for fishing and hunting of waterfowl since European settlement, and for the harvest of waterfowl eggs by Aboriginal groups living around the lagoon for an unknown length of time prior to this.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Moulting Lagoon - TAS037, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS037. Accessed 25 Jul 2017.</i></p>
<p>Pearshape Lagoon 1</p>	<p>Site description One of a group of coastal lagoons on the southwest coast of King Island (Bass Strait). Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon has an inflowing channel. Pearshape lagoon occurs within a coastal swale overlaying Quaternary calcareous sands. The soil is predominantly sand, which is white in colour with medium organic content.</p> <p>Ecological features The wetland supports communities of mixed sedges and grasses, with flooded tea tree scrub in some areas.</p> <p>Significance This wetland is a good representative wetland for the region and is visited by a diverse range of waterbirds.</p> <p>Social and Cultural values This area is valued by locals as it is a suitable area for recreational shooting.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pearshape Lagoon 1 - TAS076, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS076. Accessed 25 Jul 2017.</i></p>
<p>Pearshape Lagoon 2</p>	<p>Site description One of a group of coastal lagoons on the southwest coast of King Island (Bass Strait). Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon has an inflowing channel. The lagoon occurs within a coastal swale overlaying Quaternary calcareous sands. The soil is predominantly sand, which is white in colour, inorganic and aerated.</p> <p>Ecological features The wetland is occupied by communities of mixed sedges and grasses, with flooded tea tree scrub in some areas.</p> <p>Significance This wetland is a good representative wetland for the region, and is visited by a diverse range of waterbirds.</p> <p>Social and Cultural values This area is valued by locals as it is a suitable area for recreational shooting.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pearshape Lagoon 2 - TAS077, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS077. Accessed 25 Jul 2017.</i></p>
<p>Pearshape Lagoon 3</p>	<p>Site description One of a group of coastal lagoons on the southwest coast of King Island (Bass Strait). Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon occurs within a coastal swale overlaying Quaternary calcareous sands. The soil is predominantly sand, which is white in colour, inorganic and aerated.</p> <p>Ecological features This wetland is in a relatively natural condition, with sections of native bush vegetation remaining around the perimeter and fencing to exclude cattle.</p> <p>Significance This wetland is a good representative wetland for the region. The lagoon is significant as it supports species and communities which are rare and/or poorly reserved in Tasmania.</p> <p>Social and Cultural values This area is valued by locals as it is a suitable area for recreational shooting.</p>

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Wetland	Key Features
	<p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pearshape Lagoon 3 - TAS078, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS078. Accessed 25 Jul 2017.</i></p>
<p>Pearshape Lagoon 4</p>	<p>Site description One of a group of coastal lagoons in the southwest of King Island (Bass Strait). Access is possible by 2-wheel drive.</p> <p>Physical features The lagoon occurs within a coastal swale overlaying Quaternary calcareous sands. The soil is predominantly sand, which is yellow brown in colour with medium organic content.</p> <p>Ecological features The wetland supports communities of mixed sedges and grasses.</p> <p>Significance This wetland is a good representative wetland for the region, and it also supports a community which is poorly reserved in Tasmania.</p> <p>Social and Cultural values This area is valued by locals as it is a suitable area for recreational shooting.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pearshape Lagoon 4 - TAS079, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS079. Accessed 25 Jul 2017.</i></p>
<p>Pitt Water and Orielton Lagoon</p>	<p>Site description Pitt Water/ Orielton Lagoon comprises an estuarine system with a large area of saltmarsh. The estuary system offers a diversity of habitats and is subsequently a species-rich environment. Access to the lagoon is possible with 2-wheel drive.</p> <p>Physical features Pitt Water is an almost land-locked body of tidal salt water with a narrow entrance to Fredrick Henry Bay. The area includes estuaries of four watercourses: Coal River and Sorell Rivulet into Pitt Water, Orielton Rivulet into Orielton Lagoon and Iron Creek into Iron Creek Bay. The whole area is protected from the open sea by a large sand bar (Seven Mile Beach). The site has large areas of tidal mud and sand flats and a restricted tide flow through the mouth leaves extensive areas exposed as suitable feeding areas for wading birds. The geology of the area is complex, being dominated by Holocene river alluvium, silt, fine sand, dune and windblown sand with pockets of Triassic sandstone and shale. Orielton Lagoon is separated from Pitt Water by a causeway originally constructed in 1868 and modified in 1906 and 1953. This structure constricted broad tidal flow and created a shallow (1.25 m deep) lagoon about 265 ha in area. The culverts under the causeway have recently been modified to allow freer water flow between Orielton Lagoon and Pitt Water.</p> <p>Ecological features Most of the site is open water fringed by saltmarsh communities and rocky shores. Extensive mudflats and saltmarsh areas are important habitat for wading birds and waterfowl. There are a number of saltmarsh communities which are significant in their own right; particularly in the north-west (north of Lands End) and surrounding Barilla Bay. The saltmarsh at the northern end of the lagoon, is dominated by <i>Sclerostegia arbuscula</i> and <i>Sarcocornia quinqueflora</i>. Altered salinity combined with nutrient input from adjacent land uses led to eutrophication, and a series of algal blooms of the species <i>Nodularia spumigena</i> in the lagoon in 1993.</p> <p>Significance The Pitt Water estuary often contains large populations of waterbirds, and is considered to be an important refuge in times of drought. It is the most southern major summer feeding ground for waterbirds in Australia. It is an important area for migratory waders that fly to the site from as far away as the arctic tundra. Twenty six bird species that occur in the estuary are listed on the JAMBA, and 27 bird species are listed on the CAMBA. The wetland flora contains an array of species which are considered to be rare and at risk in Tasmania. Orielton Lagoon is listed as an important site for the Double-banded Plover under The East Asian - Australasian Shorebird Site Network which links wetlands that are internationally important for shorebirds. The rocky shores of Pitt Water are also critical habitat for the endemic starfish, <i>Patriella vivipara</i>, which has a very restricted geographic range. The southern part of the site is a protected shark nursery area.</p> <p>Social and Cultural values Community groups are involved in the rehabilitation of Orielton Lagoon. The Pitt Water area is valued by locals as a recreational fishing area. The area is also commercially valued as an important area for shell fish aquaculture production. At the time of European arrival, Pitt Water was part of the territory occupied by the Oyster Bay Tribe. Twenty-one sites within close proximity to the site have been registered on the Tasmanian Aboriginal site index. Although few surveys</p>

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Wetland	Key Features
	<p>have specifically focused on aboriginal sites in the area, one reasonably large midden has been located in the site and it is highly likely that more exist.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pitt Water and Orielton Lagoon - TAS067, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS067. Accessed 25 Jul 2017.</i></p>
<p>Rocky Cape Marine Area</p>	<p>Site description A marine area off the coast of Rocky Cape National Park, on the northwest coast of Tasmania.</p> <p>Physical features The rugged coastline at Rocky Cape National Park maintains its jagged nature underwater. Offshore from the headlands are rocky reefs that extend to depths greater than 20 m. The folded quartzite extends as a series of parallel ridges containing long, overhanging caves which follow the strike of the rock. The boulder beaches give way to sea grass beds in very shallow water. Wave exposure around the coast is moderate, although water clarity during calm weather can reach up to 20 m.</p> <p>Ecological features The extensive caves and high structural relief, together with the range of wave exposures found in the area, result in particularly high biotic diversity. The lower eulittoral zone contains bands of the seaweeds, <i>Hormosira banksii</i> and <i>Cystophora torulosa</i>. Below these species occurs a zone of <i>Cystophora moniliformis</i> which merges with <i>Caulerpa brownii</i> and a suite of other seaweeds. Numerous other species are found in the area. As a result of the relatively low wave energy and considerable cave development at Rocky Cape, a large number of fragile, erect animals grow on rock faces, even in shallow water. The Rocky Cape fish fauna contains many warm temperate species as well as numerous cool temperate species including cave dwelling species. The abundance of the slow-moving, edible Boarfish, <i>Pentaceroopsis recurvirostris</i>, indicates that the area has not been spearfished extensively.</p> <p>Significance The Rocky Cape Marine Area is a representative wetland type. It is an important site due to its species-diverse marine communities and pollution-free waters. It also supports a species which is thought to be rare in Tasmanian waters.</p> <p>Social and Cultural values The area is used by the community for recreational activities such as scuba diving, snorkelling, fishing and boating.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Rocky Cape Marine Area - TAS080, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS080. Accessed 25 Jul 2017.</i></p>
<p>Sellars Lagoon</p>	<p>Site description One of a group of wetlands on the east coast of Flinders Island (Bass Strait). Access is possible by 4-wheel drive.</p> <p>Physical features The lagoon occurs within a deflation hollow or local depression overlaying Quaternary deposits. The soil is predominantly sand, which is dark grey brown in colour, inorganic and aerated.</p> <p>Ecological features The lagoon is surrounded by a <i>Wilsonia backhousei</i> herbfield.</p> <p>Significance Sellars lagoon supports communities which are poorly reserved in Tasmania, and also provides an important habitat for a range of migratory waterbirds. The lagoon is an important site for a number of migratory birds listed under the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values The site is valued as an area suitable for recreational activities such as recreational shooting.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Sellars Lagoon - TAS045, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS045. Accessed 25 Jul 2017.</i></p>
<p>South East Cape Lakes</p>	<p>Site description Coastal perched dune lakes, on the remote southeast Cape of Tasmania.</p> <p>Physical features The lakes and associated marshes are situated in several swales of a Quaternary dune system. This is underlain by Jurassic dolerite and near horizontal Permian sediments.</p> <p>Ecological features (No data)</p>

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Wetland	Key Features
	<p>Significance These perched dune lakes form a unique wetland type. The lakes are very significant as they are the only interdune lakes known to have formed behind a cliff top dune complex in Tasmania.</p> <p>Social and Cultural values The location is important for its aesthetic, conservation and recreational values.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. South East Cape Lakes - TAS030, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS030. Accessed 25 Jul 2017.</i></p>
<p>Syndicate Lagoon</p>	<p>Site description Syndicate Lagoon is part of a chain of lagoons and marshes occurring down the eastern coast of Flinders Island (Bass Strait). Access is possible by 4-wheel drive.</p> <p>Physical features The lagoon occurs on Quaternary calcareous sands with some reducing organic muds.</p> <p>Ecological features The area is relatively undisturbed and there are representative examples of coastal vegetation around the lagoon. Swans (<i>Cygnus atratus</i>) and other waterfowl breed in winter in the fringe of <i>Juncus</i> tussocks around Syndicate Lagoon. As the water recedes in summer, wading birds feed on the exposed sand and mudflats. The lagoon is rich in nutrients and provides abundant food for waterbirds. The wetland complex is a refuge for waterfowl during the shooting season, and a resting and feeding area for migratory birds.</p> <p>Significance Syndicate Lagoon supports communities which are poorly reserved in Tasmania, and provides an important habitat for a range of migratory waterbirds. The lagoon is visited by a number of migratory bird species listed under the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Syndicate Lagoon - TAS047, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS047. Accessed 25 Jul 2017.</i></p>
<p>The Chimneys (Lower Ringarooma River floodplain)</p>	<p>Site description The wetland area is situated on the sandy flood plain of the Lower Ringarooma River (northern Tasmania) and is surrounded by woodland used for rough grazing. Access to the site is by 4-wheel drive.</p> <p>Physical features The Chimneys may represent the remnants of a once more extensive lake system. The area consists of flat plains of Quaternary clays, sands and gravels. Silty clay soil overlays a deep grey sand, with silt content decreasing with depth. The silt is derived from tin mining activity in the river catchment.</p> <p>Ecological features The area is dominated by scrub and tussock grassland vegetation, and includes substantial areas of freshwater marsh habitat in the floodplain. There are also lagoons and dunes which support a rich variety of invertebrate fauna.</p> <p>Significance This site has been listed under the Convention on Wetlands of International Importance. The area supports a number of species which are rare or vulnerable, and are poorly reserved in Tasmania. The area has a rich diversity of invertebrate fauna. The Chimneys are also an important feeding and nesting place for many species of waterbird.</p> <p>Its geoscientific significance relates to its age, as it could be older than other lakes in the area (having a possible Pleistocene age being situated well within known Pleistocene dunefields). If so, it is of considerable interest from a palynological and palaeobotanical perspective. The Chimneys may have important subfossil potential such as megafaunal remains.</p> <p>Social and Cultural values The area was used by Aboriginal people, and has a long history of European occupation and mining exploitation. Limited use is made of the area for duck shooting and cattle grazing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. The Chimneys (Lower Ringarooma River floodplain) - TAS005, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS005. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>Tregaron Lagoons 1</p>	<p>Site description A coastal lagoon, partly in the private Cape Portland Wildlife Sanctuary (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features Holocene dune barred lagoon situated in a restricted transgressive dunefield in relation to other parts of the region. The soil is predominantly sand (overlying Jurassic dolerite and Quaternary deposits), which is grey in colour with medium peat content.</p> <p>Ecological features <i>Crassula helmsii</i> herbfield is found in this wetland, where the dominant species forms a low, closed sward with the co-dominants <i>Myriophyllum propinquum</i> and <i>Mimulus repens</i>.</p> <p>Significance The lagoon supports species and communities which are rare and poorly reserved in Tasmania and a species which is listed as nationally vulnerable. It is important for comparative geomorphological studies for its value in the understanding of Holocene coastline development. This site supports a group of species which are listed as important under both the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Tregaron Lagoons 1 - TAS006, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS006. Accessed 25 Jul 2017.</i></p>
<p>Tregaron Lagoons 2</p>	<p>Site description A coastal lagoon, part of which is reserved in the private Cape Portland Wildlife Sanctuary (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features Holocene dune barred lagoons situated in a restricted transgressive dunefield in relation to other parts of the region. The soil is predominantly sand (overlying Jurassic dolerite and Quaternary deposits), which is grey in colour with medium peat content.</p> <p>Ecological features The lagoon is visited by a high diversity of waterbirds. The wetland contains a <i>Mimulus repens</i> herbfield, whilst the dominant emergent species include <i>Juncus</i> sp., <i>Triglochin</i> spp. and <i>Phragmites</i> sp..</p> <p>Significance The lagoon supports species and communities which are rare and poorly reserved in Tasmania and a species which is listed as nationally vulnerable. It is important for comparative geomorphological studies for its value in the understanding of Holocene coastline development. The site is visited by a number of important migratory species which are listed under the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Tregaron Lagoons 2 - TAS007, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS007. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS008</p>	<p>Site description The wetland occurs within a coastal swale overlaying Quaternary deposits. Access is possible by 2-wheel drive.</p> <p>Physical features The soil is predominantly sand, which is grey in colour with medium organic content.</p> <p>Ecological features The wetland supports a salt marsh community and a diverse assemblage of fish.</p> <p>Significance The wetland supports species which are both rare and poorly reserved in Tasmania. It is also part of the Poole Peatland site listed on the Tasmanian Geoconservation Database.</p> <p>Social and Cultural values Valued as an area for recreational activities.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS008, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS008. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS009</p>	<p>Site description A coastal lagoon, part of which is reserved in the private Cape Portland Wildlife Sanctuary (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features The wetland occurs within a deflation hollow or local depression overlaying Jurassic dolerite. This wetland appears to have evolved in a different way to the rest of the wetlands in the region</p>

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Wetland	Key Features
	<p>most of which owe their origin to a prograding coastline. This site is an old infilled gulch. The soil is predominantly sand, which is red brown in colour with reducing, organic mud.</p> <p>Ecological features <i>Sarcocornia quinqueflora</i> herbfield occurs in this wetland. The community is very variable in its cover characteristics and varies in its co-dominance with <i>Mimulus repens</i>, <i>Schoenus nitens</i> and <i>Triglochin striata</i>.</p> <p>Significance The lagoon supports species which are rare and poorly reserved in Tasmania. As it is an unusual landform for this area, it is significant as it adds to the diversity of landforms present in Tasmania.</p> <p>Social and Cultural values Valued as a recreational area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS009, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS009. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS010</p>	<p>Site description A coastal lagoon, part of which lies within the private Cape Portland Wildlife Sanctuary (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features The wetland occurs within a coastal swale overlaying Jurassic dolerite and Quaternary deposits. The soil is predominantly sand, which is grey in colour with medium organic content.</p> <p>Ecological features This wetland supports a <i>Wilsonia rotundifolia</i> herbfield.</p> <p>Significance The wetland supports species and communities which are rare and poorly reserved in Tasmania. It forms part of a band of wetlands in the area.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS010, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS010. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS011</p>	<p>Site description A coastal lagoon, part of which is in the private Cape Portland Wildlife Sanctuary (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features The wetland occurs within a coastal swale overlaying Quaternary deposits. The soil is predominantly sand, which is grey in colour with medium organic content.</p> <p>Ecological features <i>Wilsonia rotundifolia</i> herbfield, which occurs in this wetland, is usually a very open community. Co-dominant species include <i>Lilaeopsis brownii</i>, <i>Puccinellia stricta</i>, <i>Ruppia maritima</i>, <i>Sarcocornia quinqueflora</i>, <i>Schoenus nitens</i>, <i>Selliera radicans</i> and <i>Spergularia media</i>.</p> <p>Significance The wetland supports species and communities which are rare and poorly reserved in Tasmania. It forms part of a band of wetlands in the area.</p> <p>Social and Cultural values Valued as an area suitable for activities such as shooting.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS011, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS011. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS012</p>	<p>Site description A coastal lagoon, part of which is in the Musselroe Bay Conservation Area (north-east Tasmania). Access is possible by 2-wheel drive.</p> <p>Physical features The wetland occurs within a coastal swale overlaying Quaternary deposits. The soil is predominantly sand, with high organic content.</p> <p>Ecological features The site supports a saltmarsh community.</p> <p>Significance The wetland supports species which are rare and poorly reserved in Tasmania. It has evolved as part of a bay mouth spit complex which is significant as it is both undisturbed and poorly reserved in the State.</p> <p>Social and Cultural values Valued as an area for recreational activities such as boating and fishing.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS012, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS012. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS013</p>	<p>Site description A coastal lagoon in the Waterhouse Conservation Area (north-east Tasmania). Access is possible by walking only.</p> <p>Physical features The wetland occurs within a coastal swale overlaying Quaternary deposits. The soil is predominantly sand, which is grey in colour with high organic content.</p> <p>Ecological features A <i>Selliera radicans</i> herbfield occurs within this wetland. It varies greatly in cover and species composition, and has the following species recorded as co-dominants: <i>Centella cordifolia</i>, <i>Cotula repens</i>, <i>Pratia platycalyx</i>, <i>Sarcocornia quinqueflora</i>, <i>Samolus repens</i>, <i>Schoenus nitens</i>, <i>Villarsia reniformis</i>, <i>Wilsonia backhousei</i> and <i>Wilsonia rotundifolia</i>.</p> <p>Significance The wetland supports taxa and communities which are rare and poorly reserved in Tasmania. It forms part of a band of wetlands in the area.</p> <p>Social and Cultural values Many recreational activities are carried out both on the lagoon and in the surrounding area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS013, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS013. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS014</p>	<p>Site description A coastal lagoon in the Waterhouse Conservation Area (north-east Tasmania). Access is possible by 4-wheel drive.</p> <p>Physical features The wetland occurs within a coastal swale overlaying Quaternary deposits. The soil is predominantly sand, which is white in colour with low organic content.</p> <p>Ecological features The dominant plant community is <i>Scoenoplectus pungens</i> sedgeland.</p> <p>Significance The wetland supports taxa and a community which are rare and/or poorly reserved in Tasmania.</p> <p>Social and Cultural values Many recreational activities are carried out both on the lagoon and in the surrounding area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS014, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS014. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS038</p>	<p>Site description A small wetland on the east coast of Tasmania, near Moulting Lagoon. Access is possible by 4-wheel drive.</p> <p>Physical features The wetland has an outflowing channel. It occurs within a deflation hollow with distinct (0.5 m plus) lunette ridges overlaying granite and sands. The soil is predominantly sand, which is grey in colour with high organic content.</p> <p>Ecological features <i>Centella cordifolia</i> herbfield occurs in this wetland, in a low, open sward, with the co-dominates <i>Hydrocotyle muscosa</i>, <i>Isolepis fluitans</i>, <i>Agrostis avenacea</i> and <i>Goodenia humilis</i>.</p> <p>Significance This wetland supports plant communities which are rare in Tasmania. It is also part of the Poole Peatland site, which is considered to be of geoconservation significance, and is listed in the Tasmanian Geoconservation Database.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS038, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS038. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS051</p>	<p>Site description This lagoon is one of a number of shallow, saline coastal lagoons and marshes, which occur on the east coast of Cape Barren Island, in the Furneaux group, Bass Strait. Collectively these</p>

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Wetland	Key Features
	<p>lagoons are listed on the Convention on Wetlands as the "East-Coast Cape Barren Island Lagoons". Access to this area is by walking or off-road vehicle.</p> <p>Physical features There are deep sandy soils throughout and some areas of plain formed on granite and Quaternary siliceous marine sands and clays. This particular small, brackish wetland is perched in the coastal sand dune system. The topsoil is inorganic, aerated dark grey-brown sand.</p> <p>Ecological features This site is sparsely vegetated, but free from invasion of exotic species.</p> <p>Significance The lagoon supports species which are considered rare and poorly reserved in Tasmania and nationally, and provides an important habitat for a range of migratory waterbirds, some of which are listed under the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values The area surrounding the wetland is valued as a site for recreational activities.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS051, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS051. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS052</p>	<p>Site description This lagoon is one of a number of shallow, saline coastal lagoons and marshes, which occur on the east coast of Cape Barren Island, which is in the Furneaux group in Bass Strait. Collectively these lagoons are listed on the Convention on Wetlands as the "East-Coast Cape Barren Island Lagoons". Access is possible by walking or off-road vehicles.</p> <p>Physical features The wetland is barred by a foredune overlaying granite and sands. The soil is predominantly sand, which is grey in colour with low organic content.</p> <p>Ecological features This site is important for large numbers of migratory waterbirds. The vegetation community surrounding the margins of the lagoon is an open herbfield.</p> <p>Significance The lagoon supports species and communities which are considered rare and poorly reserved in Tasmania, and a species which is vulnerable on a national level. It is also used by species which are listed under the CAMBA and/or the JAMBA.</p> <p>Social and Cultural values The area including and surrounding this wetland has important recreational values.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS052, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS052. Accessed 25 Jul 2017.</i></p>
<p>Unnamed Wetland TAS081</p>	<p>Site description A coastal wetland in the far northwest of Tasmania. Access is possible by 2- wheel drive.</p> <p>Physical features The wetland occurs within a coastal swale overlaying metamorphosed fine grained rocks. The soil is predominantly sand, which is grey in colour with medium organic content.</p> <p>Ecological features A <i>Hydrocotyle muscosa</i> herbfield occurs within this wetland, where the dominant species form low, mostly closed swards and is commonly associated with <i>Crassula helmsii</i>, <i>Eleocharis acuta</i>, <i>Lilaeopsis brownii</i> and <i>Selliera radicans</i>. <i>Villarsia reniformis</i> aquatic community, also found in this wetland, forms a dense cover, with the co- dominant species <i>Myriophyllum propinquum</i>, <i>Isolepis fluitans</i> and <i>Triglochin procera</i>.</p> <p>Significance This site is an important representative wetland for the region. It is of further importance as it supports communities which are poorly reserved in Tasmania.</p> <p>Social and Cultural values The area is valued as an important site for recreational activities such as fishing.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Unnamed Wetland - TAS081, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=TAS081. Accessed 25 Jul 2017.</i></p>
<p>New South Wales</p>	

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Wetland	Key Features
<p>Avoca Lagoon</p>	<p>Site description A shallow, brackish lagoon with extensive <i>Phragmites australis</i> rushlands. Large <i>Juncus kraussii</i> reedlands occur in the northern arm. Swamp forests of <i>Melaleuca quinquenervia</i> and <i>Casuarina glauca</i> surround most of the northern and western arms and are also found on the island. There are dense growths of aquatic grasses and algae, especially in the northern arm. The bottom is mainly silt but is sandier near the entrance.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance In Fair Condition. There is a high nutrient input from septic tanks, urban runoff and fertilisers used in the rural part of the catchment. The narrow opening of the southern arm of the lake restricts water movement. This section of the lake is showing increased rates of eutrophication. The lagoon is being dredged for sand, thus increasing turbidity and disturbance of aquatic habitats. Frequent artificial opening has unknown effects.</p> <p>Social and Cultural values The lake is an important tourist attraction and recreation area. It is a good nesting and feeding area for ducks, moorhens and other waterbirds.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Avoca Lagoon - NSW181, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW181. Accessed 25 Jul 2017.</i></p>
<p>Beecroft Peninsula</p>	<p>Site description The Commonwealth component of the Beecroft Peninsula consists of the area known as the Beecroft Weapons Range and covers almost all of the Peninsula except a strip of land in the northern end that contains the township of Currarong and Abrahams Bosom Reserve, and an area to the west of the Beecroft Weapons Range that is NSW NPWS land. The vegetation is diverse (573 species) and of high conservation value (8 ROTAP species recorded).</p> <p>Physical features The Beecroft Peninsula forms the northern headland of Jarvis Bay and is a remnant of a Permian coastal plateau that slopes north and east from high ocean cliffs to the gentler shore of the Bay. The area supports a high diversity of vegetation types within a small area including mangroves, saltmarsh and freshwater swamps, heathland, eucalypt forest and sub-tropical and littoral rainforest. On the northern boundary of the range (outside of the Commonwealth area) is Lake Wollumboola, which is the largest shallow saline lagoon on the south coast of NSW. The Lake is seldom open to the sea. Wowly Gully, in the north-west corner of the Peninsula, consists of a series of interconnected pools and is fringed by sandflats and swamps. The gully is frequently open to Jarvis Bay at which time it becomes a tidal channel.</p> <p>Ecological features The peninsula supports a variety of wetland units with varying vegetation types, including: <i>Casuarina glauca</i> swamps with a shrub and sedge understorey; Low lying swamps supporting <i>Phragmites australis</i>, <i>Melaleuca ericifolia</i>, <i>Baumea teretifolia</i>, <i>Baumea articulata</i> and <i>Leptospermum juniperinum</i>; stream swamps occur in the catchment of Duck creek with dominant species including <i>Gahnia clarkei</i> and <i>Gleichenia microphylla</i>; swampy thicket occurs on low lying land between heathland and low lying swamp with common species being; <i>Allocasuarina littoralis</i>, <i>Epacris microphylla</i>, and <i>Melaleuca thymifolia</i>; and mangroves <i>Avicennia marina</i> found on tidal mudflats. Other habitat types include coastal scrub, wet and dry heath, small and large crowned eucalypt forests, Terpetine and rainforest. The lower saltmarsh of Lake Wollumboola is a mosaic of two communities, one dominated by the uncommon <i>Wilsonia backhousei</i> and the other is dominated by <i>Sarcocornia quinqueflora</i>. Grey mangrove <i>Avicennia marina</i> occurs in patches at Chinamans Beach but fringes Cararma inlet behind which are areas of saltmarsh. The most striking feature is the presence of the <i>Chenopod Sclerostegia arbuscula</i> which is only known from a few sites in NSW.</p> <p>Significance The area supports a high diversity of vegetation types within a small area and a variety of wetland types. A number of threatened flora and fauna species are present.</p> <p>Social and Cultural values The Point Perpendicular lighthouse includes residences and ancillary structures representing early construction methods using pre-cast concrete block masonry employing sandstone aggregate from the site. There are a large number of aboriginal sites recorded on the peninsula including art sites, middens, scarred trees and campsites.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Beecroft Peninsula - NSW176, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</i></p>

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Wetland	Key Features
	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW176. Accessed 25 Jul 2017.</p>
<p>Bondi Lake</p>	<p>Site description (No data)</p> <p>Physical features Bondi Lake is an example of a Simple Embayment Lake. Embayment lakes are formed in the same formative process as in drowned valley lakes, except that in this case a bay is cut off. Such lakes were formed in the Holocene marine transgression. The lake lies in a broad depression behind the frontal dune.</p> <p>Ecological features Bondi lake is a freshwater lake located in an area whereby the surrounding waterbodies exhibit varying degrees of salinity. The lake supports a range of freshwater flora and fauna species, little documentation exists.</p> <p>Significance (No data)</p> <p>Social and Cultural values Former school house located at the northern end of Bondi Lake</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Bondi Lake - NSW116, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW116. Accessed 25 Jul 2017.</i></p>
<p>Brisbane Water Estuary</p>	<p>Site description (No data)</p> <p>Physical features The estuary of Brisbane Water is a relatively small (27 km²) broad, shallow estuary connected to Broken Bay through a narrow channel. The estuary is entirely within the City of Gosford.</p> <p>Ecological features Two species of mangroves occur, Grey Mangrove (<i>Avicennia marina</i>) and River Mangrove (<i>Aegiceras corniculatum</i>) and cover an area of 163 ha; Saltmarsh covers an area of 95 ha, mostly in the Cockle Bay Nature Reserve and Rileys Island Nature Reserve. Intertidal seagrass beds are extensive and are shown on the attached map. Brisbane Water is important feeding area for migratory waders and for waterbirds generally. Swans arrive in spring and summer in the estuary to feed on the extensive seagrass beds. The area is also important as a nursery and spawning ground for fish and crustaceans.</p> <p>Significance (No data)</p> <p>Social and Cultural values Around 100,000 people live around Brisbane Water, there is an important commercial fishery and oyster farming industry based in the estuary and the area is well known as an amateur fishing area. Marinas operate around the estuary and there are many sailing and motorboat clubs operating on the lakes and in the estuary.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Brisbane Water Estuary - NSW132, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW132. Accessed 25 Jul 2017.</i></p>
<p>Bundjalung National Park</p>	<p>Site description (No data)</p> <p>Physical features The geology of Bundjalung National Park consists primarily of areas of Quaternary sediments including alluvium, gravel, sand, silt, clay and areas of beach and dune sand. The geology of the remaining area consists of Triassic - Jurassic sediments of the Bendamba Group including sandstone, shale, and conglomerate). Soils of Bundjalung National Park include siliceous sands, sand podzols, humus podzols, acid peats, and Quaternary estuarine deposits. These soils are sandy, poorly structured and infertile. Examples of the dune and swale complex which was formed during the Pleistocene are contained in Bundjalung National Park.</p> <p>Ecological features Bundjalung National Park consists of a dunal wetland system, consisting of a mosaic of wet heath, sedgeland, dry heath, forested swamp and sclerophyll forest south of Evans Head. In the southern area of the National Park swamp sclerophyll forests grade to saltmarsh and mangroves in intertidal areas. The central area comprises predominantly of wet heathland and sedgeland communities.</p> <p>Significance This large complex of dunal wetlands is in a relatively natural condition, and is considered to be a representative example of coastal dunal wetlands.</p> <p>Social and Cultural values Evidence of Aboriginal occupation of the area covered by Bundjalung National Park includes middens, campsites, mythological sites, a fish trap made of rock at Woody Head, stone tool workshops and bora ceremonial grounds. Goanna Headland which lies adjacent to</p>

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Wetland	Key Features
	<p>Bundjalung National Park has particular mythological significance to the local Aboriginal community. There is a Native Title claim over the park and it is likely that some form of joint management will occur in the future. Bundjalung has been used for military purposes since World War II. Disused bunkers associated with target practice ranges are located in the central area of Bundjalung National Park. In the past the coastal areas of the National Park have been used for fishing, recreation, bee keeping and limited cattle grazing. A miners cottage, erected in 1923 still stands near Woody Head. Possible opportunities for scientific studies and educational purposes.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Bundjalung National Park - NSW026, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW026. Accessed 25 Jul 2017.</i></p>
<p>Clarence River Estuary</p>	<p>Site description (No data)</p> <p>Physical features The geology of the area consists of Quaternary sediments including alluvium, gravel, sand silt, clay overlying the Cretaceous-Jurassic Kangaroo Creek Sandstone.</p> <p>Ecological features Estuary of largest coastal river in NSW (based on discharge and catchment area, and associated mangrove, seagrass and saltmarsh areas. Four species of mangrove occur within the Clarence Estuary including the River Mangrove (<i>Aegiceras corniculatum</i>), Grey Mangrove (<i>Avicennia marina</i> var. <i>australasica</i>), Black Mangrove (<i>Bruguiera gymnorrhiza</i>) and the Milky Mangrove (<i>Excoecaria agallocha</i>). Dominant species in saltmarsh include Samphire (<i>Sarcocornia quinqueflora</i>) and Salt Couch (<i>Sporobolus virginicus</i>). Rainforest trees, shrubs and vines are also a prominent feature of the estuary.</p> <p>Significance A number of wetlands within the Clarence Estuary are SEPP 14 wetlands; these include Freeburn, Thorny, Micalo, Dart, Hickey and Rabbit Islands.</p> <p>Social and Cultural values The Clarence Estuary was utilised by Aborigines for fishing and evidence of this includes oyster shell middens that have been recorded on Micalo Island. In the early 1800's Richard Craig pioneered the harvesting of extensive Red Cedar stands of the Clarence. Cropping began with sugar cane farms in 1864 on the Clarence River floodplain.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Clarence River Estuary - NSW027, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW027. Accessed 25 Jul 2017.</i></p>
<p>Clybucca Creek Estuary</p>	<p>Site description (No data)</p> <p>Physical features The geology of the Clybucca Creek Estuary comprises of Quaternary sediments including alluvial, paludal and estuarine deposits, mainly sands silts and gravel.</p> <p>Ecological features Wetlands consisting of 520 ha of mangroves, 191 ha of seagrasses, and 365 ha of saltmarsh. Mangrove species within the estuary include Grey Mangrove (<i>Avicennia marina</i>), River Mangrove (<i>Aegiceras corniculatum</i>), Milky Mangrove (<i>Excoecaria agallocha</i>). The saltmarsh community include species such as Couch (<i>Sporobolus virginicus</i>), Sedge (<i>Cyperus polystachyos</i>), Sea Rush (<i>Juncus kraussii</i>), the Sedge <i>Fimbristylis ferruginea</i>, Seaberry Saltbush (<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>) and, Ruby Saltbush (<i>Enchylaena tomentosa</i>). Freshwater swamp forest also occurs along the estuary and includes species such as Paperbark (<i>Melaleuca quinquenervia</i>), Willow Bottlebrush (<i>Callistemon salignus</i>) and Swamp Oak (<i>Casuarina glauca</i>). Fauna species recorded within the estuary include the Australian White Ibis (<i>Threskiornis molucca</i>), Straw-necked Ibis (<i>Threskiornis spinicollis</i>), Pied Oystercatcher (<i>Haematopus longirostris</i>), Pelican (<i>Pelecanus conspicillatus</i>), Whimbrel (<i>Numenius phaeopus</i>), White-bellied Sea-eagle (<i>Haliaeetus leucogaster</i>), Pied Cormorant (<i>Phalacrocorax varius</i>), Little Pied Cormorant (<i>Phalacrocorax melanoleucos</i>), Welcome Swallow (<i>Hirundo neoxena</i>), Azure Kingfisher (<i>Alcedo azurea</i>), Willie Wagtail (<i>Rhipidura leucophrys</i>), Jacky winter (<i>Microeca fascinans</i>), Red-bellied Black Snake (<i>Pseudechis porphyriacus</i>), and the Echidna (<i>Tachyglossus aculeatus</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Evidence of Aboriginal occupation of the wetland includes midden sites at Stuarts Point and Shark Island. The Macleay middens are unique as a surviving complex and are probably the largest deposits of their sort still intact. Other Aboriginal sites which occur within the estuary include burial sites, ceremonial grounds and carved trees.</p>

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Wetland	Key Features
	<p><u>Reference</u> Department of the Environment and Energy. 2017. Clybucca Creek Estuary - NSW028, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW028. Accessed 25 Jul 2017.</p>
<p>Clyde River Estuary</p>	<p>Site description (No data)</p> <p>Physical features The geology of the Clyde River estuary consists primarily of Ordovician sediments including siltstone, claystone, sandstone, quartzite and chert. with some areas around the mouth of the estuary consisting of Quaternary sediments including alluvium gravel, swamp deposits and sand dunes.</p> <p>Ecological features A relatively south coast estuary, which supports areas of mangrove including River Mangrove (<i>Aegiceras corniculatum</i>) and Grey Mangrove (<i>Avicennia marina</i>) (3200 ha), seagrass (70 ha) and saltmarsh (100 ha). Other common flora species include Common Reed (<i>Phragmites australis</i>), Sea Rush (<i>Juncus krausii</i>), Sheoaks (<i>Casuarina</i> spp.), <i>Eucalyptus</i> spp., Long-leaved Wallaby Grass (<i>Danthonia longifolia</i>). Relatively rich zooplankton fauna are found in the estuary. Many native fish are found in the estuary including Australian Smelt (<i>Retropinna semoni</i>), Australian Bass (<i>Macquaria novemaculeata</i>), and the Australian Grayling (<i>Prototroctes maraena</i>). Fauna species which occur in the area include the Common Eastern Froglet (<i>Crinia signifera</i>), Brown Striped Frog (<i>Limnodynastes peronii</i>), Brown Tree Frog (<i>Litoria ewingii</i>), Lace Monitor (<i>Varanus varius</i>), Grass Skink (<i>Lampropholis delicata</i>), Red-bellied Black-snake (<i>Pseudechis porphyriacus</i>), Striated Heron (<i>Butorides striatus</i>), Buff-banded Rail (<i>Gallirallus philippensis</i>), Purple Swamphen (<i>Porphyrio porphyrio</i>), Masked Lapwing (<i>Vanellus miles</i>), Brown Cuckoo-Dove (<i>Macropygia amboinensis</i>), Gang-gang Cockatoo (<i>Callocephalon fimbriatum</i>), Musk Lorikeet (<i>Glossopsitta concinna</i>), Little Lorikeet (<i>Glossopsitta pusilla</i>), Crimson Rosella (<i>Platycercus elegans</i>), Australian Owllet-nightjar (<i>Aegotheles cristatus</i>), Laughing Kookaburra (<i>Dacelo novaeguineae</i>), Sacred Kingfisher (<i>Todiramphus sanctus</i>), Striated Thornbill (<i>Acanthiza lineata</i>), Brown Thornbill (<i>Acanthiza pusilla</i>), White-throated Gerygone (<i>Gerygone olivacea</i>), Spotted Pardalote (<i>Pardalotus punctatus</i>), White-browed Scrubwren (<i>Sericornis frontalis</i>), Eastern Spinebill (<i>Acanthorhynchus tenuirostris</i>), Yellow-faced Honeyeater (<i>Lichenostomus chrysops</i>), Lewin's Honeyeater (<i>Meliphaga lewinii</i>), White-naped Honeyeater (<i>Melithreptus lunatus</i>), Scarlet Honeyeater (<i>Myzomela sanguinolenta</i>), Eastern Yellow Robin (<i>Eopsaltria australis</i>), Eastern Whipbird (<i>Psophodes olivaceus</i>), Grey Shrike-thrush (<i>Colluricincla harmonica</i>), Crested Shrike-tit (<i>Falcunculus frontatus</i>), Rufous Whistler (<i>Pachycephala rufiventris</i>), Spangled Drongo (<i>Dicrurus bracteatus</i>), Leaden Flycatcher (<i>Myiagra rubecula</i>), Grey Fantail (<i>Rhipidura fuliginosa</i>), Rufous Fantail (<i>Rhipidura rufifrons</i>), Double-barred Finch (<i>Taeniophygia bichenovii</i>), Brown Antechinus (<i>Antechinus stuartii</i>), Feathertail Glider (<i>Acrobates pygmaeus</i>), Greater Glider (<i>Petauroides volans</i>), Sugar Glider (<i>Petaurus breviceps</i>), Swamp Wallaby (<i>Wallabia bicolor</i>), Gould's Long-eared Bat (<i>Nyctophilus gouldi</i>), Little Forest Eptesicus (<i>Vespadelus vulturnus</i>), Bush Rat (<i>Rattus fuscipes</i>), and Leopard Seal (<i>Hydrurga leptonyx</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values The area was populated by the Yuin group of Aboriginal tribes who probably set up permanent camps near the river. Several middens have been recorded near the mouth of the estuary. The coastal areas provided plentiful food and were favoured by the Aboriginal people. Europeans have utilised the area for forestry purposes since around the 1820s.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Clyde River Estuary - NSW059, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW059. Accessed 25 Jul 2017.</p>
<p>Cockrone Lagoon</p>	<p>Site description A shallow brackish lagoon with extensive <i>Phragmites australis</i> reedlands near the head waters. The Lake is fringed by <i>Baumea juncea</i>, <i>Juncus krausii</i> and <i>Melaleuca ericifolia</i> scrub. <i>Melaleuca quinquenervia</i>, <i>M. styphelioides</i> and <i>Casuarina glauca</i> occur around most of the lagoon, and thickets of <i>Melaleuca biconvera</i> extend up Cockrone Creek. The water is usually clear with <i>Ruppia</i> sp. and several species of green algae.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p>

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Wetland	Key Features
	<p>Significance The condition is very good. This is the best preserved of the coastal lagoons but there is some nutrient runoff and septic pollution. The foredune was affected by developments, and was blowing into the mouth of the lagoon. Dune restoration is now beginning to take effect.</p> <p>Social and Cultural values The lake is an important tourist attraction and recreation area. It is also a feeding and nesting area for many species of water birds.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Cockrone Lagoon - NSW182, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW182. Accessed 25 Jul 2017.</i></p>
<p>Coila Creek Delta</p>	<p>Site description (No data)</p> <p>Physical features The delta has formed at the mouth of Coila Creek that drains to Coila Lake, a large south coast ICOLL of about 700 ha. A variety of sediments form the delta including shell-filled sands on the points of the delta, soft sandy clays on the saltmarsh, black cracking clays in pans, and black fine soft muds in the lake adjoining the delta.</p> <p>Ecological features Mico-relief of a few decimetres gives rise to various habitats. Low areas are dominated by a Samphire (<i>Sarcocornia quinqueflora</i>), <i>Wilsonia rotundifolia</i> saltmarsh in good condition, higher areas by rushland of Sea Rush (<i>Juncus krausii</i>) and various saltmarsh forbs including <i>Selliera radicans</i> and Creeping Monkey-flower (<i>Mimulus repens</i>), and the longest accumulated sediments flanking Coila Creek dominated by a Swamp Oak (<i>Casuarina glauca</i>) forest. The dried black cracking claypans support no visible plant life. The strandline on the northern shore comprises various sedge species and a mix of unusual forbs. The aquatic habitats are rich in aquatic plants. Algae, Sea Grass (<i>Zostera</i> sp.), Sea Tassel (<i>Ruppia</i> sp.) and Sea Wrack (<i>Halophila</i> sp.) all occur with healthy populations of <i>Halophila</i> adjoining the saltmarsh.</p> <p>Significance (No data)</p> <p>Social and Cultural values Bait search area for fishers. Aboriginal significance is unknown but likely.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Coila Creek Delta - NSW117, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW117. Accessed 25 Jul 2017.</i></p>
<p>Coomaditchy Lagoon</p>	<p>Site description (No data)</p> <p>Physical features Coomaditchy Lagoon is a small coastal dunal lake, found between dunes covering the original entrance to Lake Illawarra. The climate around Coomaditchy Lagoon is described as temperate marine. Geology of the area consists of Quaternary windblown medium to fine grained marine quartz sand. The landscape is gently undulating to rolling coastal dune fields. The area adjacent to the lagoon has been mined for sand. The removed sand has since been replaced by coal wash.</p> <p>Ecological features Coomaditchy Lagoon is home to a great variety of birds, reptiles, frogs and fish. The lagoon contains a reed swamp and sedge swamp on the southern and western shores. These swamps are used as breeding sites for many waterbirds.</p> <p>Significance (No data)</p> <p>Social and Cultural values The lagoon and surrounding area is of cultural value to the local Aboriginal people. This area is the location of the Aboriginal camps, following the relocation of people from Hill 60 during World War II.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Coomaditchy Lagoon - NSW135, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW135. Accessed 25 Jul 2017.</i></p>
<p>Coomonderry Swamp</p>	<p>Site description (No data)</p> <p>Physical features Coomonderry Swamp was formed by natural infilling behind the sand barrier north of Mount Coolangatta. The wetland has soils composed of friable organic peat overlying acid peats of depths greater than one metre. Below the peat, various sandy subsoils overlie Quaternary marine sands.</p>

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Wetland	Key Features
	<p>Ecological features The swamp is dominated by sedges and aquatic herbs. In particular the eastern margin of the swamp supports a most outstanding example of freshwater wetland - woodland - sand dune transition. At the swamp edge extensive reed beds and sedgelands merge into thickets of Swamp Oak (<i>Casuarina glauca</i>), Prickly Tea Tree (<i>Leptospermum juniperinum</i>), Swamp Paperbark (<i>Melaleuca ericifolia</i>) and Snow in summer (<i>Melaleuca linariifolia</i>). Adjacent to these shrub and small tree species there are extensive stands of Swamp Mahogany (<i>Eucalyptus robusta</i>) with an understorey of native grasses and sedges. Wet meadow communities on the western and southern margins are highly dynamic and support a diversity of short-lived wetlands species. Adjacent areas of Southern Mahogany (<i>Eucalyptus botryoides</i>), and Blackbutt (<i>Eucalyptus pilularis</i>) open forest as well as littoral rainforest also occur. Sedge and reed beds cover most of the swamp and are dominated by Jointed Twig-rush (<i>Baumea articulata</i>), Baumea arthropylla, Tall Spike-rush (<i>Eleocharis sphacelata</i>), Common Reed (<i>Phragmites australis</i>) and Broad-leaf Cumbungi (<i>Typha orientalis</i>). Open water areas are dominated by submerged plant communities of Water Millfoil (<i>Myriophyllum</i> sp.), Nardoo (<i>Marsilea</i> sp.), and Blunt Pondweed (<i>Potamogeton ochreatus</i>).</p> <p>Significance Good example of coastal wetland on south coast, in relatively undisturbed condition. Coomonderry Swamp is the largest freshwater coastal wetland in the southern region of NSW. It is an outstanding example of a large freshwater swamp developed inland of a parallel Quaternary dune system.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Coomonderry Swamp - NSW076, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW076. Accessed 25 Jul 2017.</i></p>
<p>Cormorant Beach</p>	<p>Site description Almost completely surrounded by houses with inadequate buffer. Subject to urban runoff. Degraded margin.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance A rare wetland type heavily impacted on the margins but retaining some very important unspoilt components. It contains rare freshwater communities, some uncommon species and important faunal habitat. All four plant communities that occur in the wetland are considered to be significant, with the dunal freshwater wetland providing frog and bird habitat within the urban area. While Paperbark Shrubland and Swamp Oak forest are structurally similar to estuarine counterparts, at this site they occur in deeper standing water and herbaceous understorey plants are different.</p> <p>Social and Cultural values Surrounded by urban development.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Cormorant Beach - NSW172, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW172. Accessed 25 Jul 2017.</i></p>
<p>Crowdy Bay National Park</p>	<p>Site description (No data)</p> <p>Physical features The geology of Crowdy Bay National Park consists primarily of Quaternary sediments including sand, silt, mud, gravel, quartose sand and silt. An area of Tertiary rhyolite also occurs at Diamond Head which was formed as the result of an intrusion caused by volcanic activity along the east coast of Australia. Bedrock outcrops occur throughout the park and consist of Triassic shales, tuff, tuffaceous sandstone, sandstone and conglomerate. The soils of Crowdy Bay National Park consists predominantly of unconsolidated and podsolised poor nutrient sandy soils of Holocene and Pleistocene origin including siliceous sands, sand podzols and humus podzols, acid peats, solonchaks and brown podzolics. Bedrock soils include lithosols, red and yellow earths, gleyed podzolics, soloths and dark grey-brown clay loams.</p> <p>Ecological features Dunal wetland system, consisting of a mosaic of wet heath, sedgeland, dry heath, forested swamp and sclerophyll forest north of Harrington. Vegetation communities within the park include Tuckeroo (<i>Cupaniopsis anacardioides</i>) and Brush Box (<i>Lophostemon confertus</i>) littoral rainforests, Grey Mangrove (<i>Avicennia marina</i>) mangrove forests and woodlands, Flooded Gum (<i>Eucalyptus grandis</i>) and Blackbutt (<i>Eucalyptus pilularis</i>) wet sclerophyll forests, Tallowwood</p>

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Wetland	Key Features
	<p>(<i>Eucalyptus microcorys</i>), Black Sheoak (<i>Allocasuarina littoralis</i>), and Banksia (<i>Banksia aemula</i>) dry sclerophyll forests and woodlands, graminoid clay heathland, wet heathland, Samphire (<i>Sarcocornia quinqueflora</i>), Sand Couch (<i>Sporobolus virginicus</i>) chenopod shrubland, Hairy Spinifex (<i>Spinifex sericeus</i>) tussock grassland, Kangaroo Grass (<i>Themeda triandra</i>) sod grassland, various sedgeland, Sea Rush (<i>Juncus kraussii</i>) rushland, Swamp Water Fern (<i>Blechnum indicum</i>) fernland, and saltmarsh communities.</p> <p>Significance Crowdy Bay National Park is a large complex of dunal wetlands which remain in a relatively natural condition, and are thus considered to be a good example of this wetland type.</p> <p>Social and Cultural values Until the late nineteenth century the Ngamba and Birripai tribes of Aborigines occupied the area. In the summer the Birripai people lived in the lowlands of their territory near the river and the sea so that they could utilise the seasonally abundant fish and shellfish and native fruits. Aboriginal sites within the park include shell middens (approximately 6,000 years old), axe heads, stone tools and hooks. On the homeward leg of his 1818 expedition over the New England Tablelands into the Hastings Valley, John Oxley traversed the park area. Mineral sand mining occurred in various areas within the park between 1959 and 1982. Several residences within the park are the result of early European occupation of the area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Crowdy Bay National Park - NSW029, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW029. Accessed 25 Jul 2017.</i></p>
<p>Cudgen Nature Reserve</p>	<p>Site description (No data)</p> <p>Physical features Three major landforms dominate the Cudgen catchment including: Coastal sands located east of Cudgen Lake; Cudgen lagoonal lands (surrounding Cudgen Lake and including the south east of Round Mountain; and sediments of the Neranleigh-Fernvale Group which dominate the Round Mountain hills and upper catchment. Cudgen Lake is a barrier dune lake system. Sandy yellow podsols occur between the outer barrier dunes and Cudgen Lake. The Clothiers Creek and Reserve Creek floodplain soils are dark loams overlying clays.</p> <p>Ecological features Cudgen Nature Reserve supports 15 distinct vegetation associations, viz. littoral rainforest, lowland subtropical rainforest on Round Mountain, lowland subtropical rainforest on swamp forest margins, Swamp Paperbark (<i>Melaleuca quinquenervia</i>) swamp forest, Swamp Mahogany (<i>Eucalyptus robusta</i>) forest, Blackbutt (<i>Eucalyptus pilularis</i>) forest, Grey Gum (<i>Eucalyptus propinqua</i>) - Blackbutt (<i>Eucalyptus pilularis</i>) tall open forest, Red Gum (<i>Eucalyptus tereticornis</i>) - Pink Bloodwood (<i>Corymbia intermedia</i>) - Swamp Turpentine (<i>Lophostemon suaveolens</i>) forest, Scribbly Gum (<i>Eucalyptus signata</i>) - Wallum Banksia (<i>Banksia aemula</i>) forest, Wallum Banksia (<i>Banksia aemula</i>) heath, Wet heath, <i>Baumea rubiginosa</i> Closed Sedgeland, Water Ribbons (<i>Triglochin procera</i>) Sedgeland, <i>Schoenoplectus littoralis</i> Sedgeland, Grey Mangrove (<i>Avicennia marina</i>) Mangrove Wetland. Other vegetation communities of special significance include Swamp Banksia (<i>Banksia robur</i>) wet heathlands, Riberry (<i>Syzygium luehmanni</i>) - Broad-leaved Lilly Pilly (<i>Acmena hemilampra</i>) littoral rainforests and Swamp Banksia (<i>Banksia robur</i>) - Leptospermum liversidgei - Xanthorrhoea fulva wet heathland community. The perimeter of Cudgen Lake contain dense stands of Common Reed (<i>Phragmites australis</i>) and Lepironia articulata scattered with Cladium procerum. The shallow lake waters support a dense emergent growth of reeds <i>Schoenoplectus littoralis</i> and Cumbungi (<i>Typha</i> sp.) on the northern side of the lake. Other aquatic species include <i>Baumea rubiginosa</i> sedgeland and <i>Triglochin procera</i>, while intertidal and subtidal species are dominated by mangroves e.g. Grey Mangrove (<i>Avicennia marina</i>), <i>Bruguiera gymnorhiza</i> and seagrasses e.g. Eel Grass (<i>Zostera capricorni</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values The Aboriginal people of the Cudgen area were known as the Coodjimbingurra. A number of Aboriginal sites have been identified in the local area including a stone quarry on the banks of Cudgen Lake.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Cudgen Nature Reserve - NSW108, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW108. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>Cullendulla Creek and Embayment</p>	<p>Site description (No data)</p> <p>Physical features Most of the area is composed of widely spaced beach ridges overlying a shallow sheet of nearshore or low tidal shelly sands. The areas between the ridges have been infilled with mud and organic debris.</p> <p>Ecological features A mangrove forest comprising River Mangrove (<i>Aegiceras corniculatum</i>) and Grey Mangrove (<i>Avicennia marina</i>) covers most of the tidally influenced portion of the basin and the creek margins. Mudflats are bare apart from scattered depressions in which patches of seagrasses occur. A bare zone also separates the mangrove swamp from upland Eucalypt forest. This zone consists of a hard mud pavement with intermittent coverings of blue-green algae and occasional individuals of Beaded Glasswort (<i>Sarcocornia quinqueflora</i>). Swamp She Oak (<i>Casuarina glauca</i>) grows on the beach ridges. Fauna species include Black Swan (<i>Cygnus atratus</i>), Little Pied Cormorant (<i>Phalacrocorax melanoleucos</i>), Pygmy Right Whale (<i>Caperea marginata</i>) nearby.</p> <p>Significance The beach chenier system (a chenier is a long, low narrow beach ridge roughly parallel to a retreating shoreline seaward of marsh and mud-flat deposits) is uncommon in NSW. These well developed cheniers provide a record of shoreline trends over the Holocene (10,000 BP to present). The embayment provides a good example of low energy deposition of beach ridge and mud flat deposits within an enclosed bay.</p> <p>Social and Cultural values The site is also an important sedimentological research site. The area was populated by the Yuin group of Aboriginal tribes who probably set up permanent camps near the river. Several middens have been recorded near the mouth of the estuary. The coastal areas provided plentiful food and were favoured by the Aboriginal people. Cullendulla Creek was particularly a source of fin fish and shellfish such as the Sydney Rock Oyster (<i>Scostrea commercialis</i>) and Bimbilla (<i>Anadara trapezia</i>). The beach ridges in the chenier system contain extensive middens of Bimbilla. Present use of the area as a source of seafood by the Aboriginal community indicates a long tradition of use and economy of the Cullendulla area. Evidence of the early logging trade is apparent in an old loading wharf in the upper reaches of the Creek. Logs from Benandarah State Forest were off-loaded in upper reaches of creek to barge or creek waters.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Cullendulla Creek and Embayment - NSW060, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW060. Accessed 25 Jul 2017.</p>
<p>Durras Lake - NSW118</p>	<p>Site description (No data)</p> <p>Physical features 80% lake foreshore densely forested, 20% low lying areas covered in sedge/saltmarsh which is periodically inundated. Lake separated from ocean by sand barrier dunes. Freshwater inflow from forested catchment. Lake shallow with depth between 1-2 m. Broadwater slightly deeper.</p> <p>Ecological features Excellent habitat for prawns, crustaceans and fish. Extensive seagrass beds, (<i>Zostera capricorni</i>), Swamp Oak (<i>Casuarina glauca</i>) forest adjoining sedge areas including Sea Rush (<i>Juncus krausii</i>) and Bare Twig-rush (<i>Baumea juncea</i>) with Spotted Gum (<i>Eucalyptus maculata</i>) forest surrounding most of the lake. Wetland 215b is an extensive sedgeland of Bare Twig-rush (<i>Baumea juncea</i>).</p> <p>Significance Main significance is the intact catchment and natural state of the lake.</p> <p>Social and Cultural values Area has Aboriginal significance, was one of the first sightings of Aboriginal people by Captain Cook. Numerous Aboriginal sites surround the lake. Close to south Durras lake was used in early timber industry. The area is within the Benandarah National Estate Area, recognised for its multiple-use forests.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Durras Lake - NSW118, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW118. Accessed 25 Jul 2017.</p>
<p>Eve St. Marsh, Arncliffe</p>	<p>Site description (No data)</p>

Description of the Environment

Wetland	Key Features
	<p>Physical features Eve Street Marsh is situated on a low lying coastal floodplain, within a broad and shallow valley floor, between gently slopes and low ridges. Soils of the area consists of Quaternary alluvium, and unconsolidated sediments.</p> <p>Ecological features This wetland is a remnant of a once extensive brackish marsh extending eastwards from Arncliffe. The site has been rehabilitated from its previously degraded state. Changes include major earthworks to establish appropriate gradients for tidal inundation, a mangrove lined channel connecting the wetland with the Cooks River and an enlarged tidal pond area in which water level is controlled by a weir. The main area of wetland consists of islands covered with saltmarsh in an area of tidal mudflats fringed by Common Reed (<i>Phragmites australis</i>), Club Rush (<i>Bolboschoenus caudwellii</i>) and Marsh Club-rush (<i>Bolboschoenus fluviatilis</i>). The saltmarsh is relatively diverse ranging from Sea Rush (<i>Juncus kraussii</i>) and Seablite (<i>Suaeda australis</i>) at the higher elevations through Samphire (<i>Sarcocornia quinqueflora</i>) to Creeping Monkey-flower (<i>Mimulus repens</i>) at the lower level.</p> <p>Significance The wetland has significance as one of the first Australian examples of a rehabilitated tidal marsh that provides habitat for uncommon saltmarsh communities and for migratory wading birds and resident birds.</p> <p>Social and Cultural values Eve Street Marsh is an important resource area for education and study of natural sciences.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Eve St. Marsh, Arncliffe - NSW077, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW077. Accessed 25 Jul 2017.</i></p>
<p>Five Islands Nature Reserve</p>	<p>Site description (No data)</p> <p>Physical features The Five Islands are rocky offshore islands consisting of Big Island, Rocky Islet and Martin Islet. The climate of the area surrounding Five Islands Nature Reserve is described as temperate marine. The geology of the area is predominantly dolerite of the upper Permian age.</p> <p>Ecological features The Five Islands are a significant area for seabird breeding, also offering shelter to many migratory birds. The islands support many shrub and grass communities. However, the dominant species presently found on the islands includes the exotic Kikuyu Grass (<i>Pennisetum clandestinum</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values The Five Islands Nature Reserve is a site of significance to the local Aboriginal people. The Five Islands were regularly visited by local people as a place for fishing, evidence of this being the many shell middens found around the edges of Big Island.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Five Islands Nature Reserve - NSW137, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW137. Accessed 25 Jul 2017.</i></p>
<p>Jervis Bay</p>	<p>Site description The Jervis Bay Territory and surrounding Jervis Bay Area contains diverse wetland areas including tidal, intertidal and estuarine wetlands, freshwater lagoons, swamp, saltmarsh, sedgeland, rocky marine shores and non-tidal freshwater forested wetlands. The area represents a site in the transition zone between warm temperate and the cool temperate biogeographic provinces and supports rich faunal and floral units. The estuarine inlet supports large areas of seagrass (900 ha) and smaller areas of mangrove (125 ha) and saltmarsh (230 ha). Important wetland sites in the Jervis Bay Territory include Lake Windermere, Lake McKenzie, Flat Rock Creek, Captains Lagoon, Bowen Island, Murrays Beach and Ryans Swamp. Wetland sites in the Jervis Bay Area are associated with six major creeks entering Jervis Bay but primarily include Currambene Creek, Moona Moona Creek, Wowly Gully and Carama Inlet. The wetland sites provide valuable habitat for waterfowl, indigenous fresh water fauna, and threatened and biogeographically important species.</p> <p>Physical features The geology of Jervis Bay includes three broad units; the two Snapper Point sandstone headlands which enclose the Bay, and the softer, generally low-lying Wandrawandrian siltstone comprising the catchment area to the west of the Bay.</p> <p>Ecological features The vegetation type is characterised by swamp communities (2.2%), wet heath (1.5%), mangroves (0.6%) and salt marsh (0.5%). The dominant mangrove species is River Mangrove (<i>Avicennia marina</i>) occurring with much smaller stands of Grey Mangrove (<i>Aegiceras corniculatum</i>).</p>

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Wetland	Key Features
	<p>Saltmarsh found on cliff tops on Bowen Island is unusual. The marsh is dominated by the saltmarsh grass (<i>Sporobolus virginicus</i>) and soil moisture is maintained by sea spray. Estuarine areas are characterised by salt marsh and to a lesser extent, mangroves.</p> <p>Significance The site has highly diverse communities, with 723 species identified. Due to relatively large areas of seagrasses, mangrove, and saltmarsh, it is considered to be a good example of estuarine wetland on the south coast. The bay provides potential habitat for migratory waders. As with all estuarine wetlands, the bay provides important nursery habitats for commercial fish species.</p> <p>Social and Cultural values The uniqueness of the area and its waters provide a popular destination for tourists and recreationalists. The natural qualities of the area and relatively pristine condition give the area a high conservation value. The site contains evidence of Aboriginal history in the form of middens and camps, and shipwrecks located in the waters of the bay contribute to maritime history.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Jervis Bay - NSW078, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW078. Accessed 25 Jul 2017.</i></p>
<p>Jervis Bay Sea Cliffs</p>	<p>Site description (No data)</p> <p>Physical features Among the tallest sea cliffs on the NSW coastline. Extend for about 14 km on the Beecroft Peninsula and 11 km on the Bherwerre Peninsula. Incised inlets such as Eves Ravine and Devils Inlet. Rocky offshore islets Drum and Drum Sticks. High sandstone cliffs, marine caves, overhangs, tunnels and crevices.</p> <p>Ecological features Significant plant and animal communities are expected. These include fernlands and herbfields on seepages, soaks and behind waterfalls. Interstitial invertebrate communities expected on geological formations and unusual animal communities adapted to high salt and humidity environments. Significant marine habitats at the base of the cliffs.</p> <p>Significance (No data)</p> <p>Social and Cultural values Of interest for heritage value; recreation; defence.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Jervis Bay Sea Cliffs - NSW139, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW139. Accessed 25 Jul 2017.</i></p>
<p>Killalea Lagoon</p>	<p>Site description (No data)</p> <p>Physical features The geology of the Lagoon is comprised mainly of Quaternary sediments.</p> <p>Ecological features Plant species present include Austral Stonecrop (<i>Crassula sieberiana</i>), Blown Grass (<i>Agrostis avenacea</i>), Branching Rush (<i>Juncus prismatocarpus</i>), Caldwell's Club-rush (<i>Bolboschoenus caldwellii</i>), Coast Couch (<i>Zoysia macrantha</i>), Coastal Wattle (<i>Acacia sophorae</i>), Common Reed (<i>Phragmites australis</i>), Common Spike-rush (<i>Eleocharis acuta</i>), Couch Grass (<i>Cynodon dactylon</i>), Crassula (<i>Crassula peduncularis</i>), Creeping Monkey-flower (<i>Mimulus repens</i>), Duck Weed (<i>Spirodela punctata</i>), False Quilwort (<i>Lilaeopsis polyantha</i>), Flat Spurge (<i>Chamaesyce psammogeton</i>), Floating Club-rush (<i>Isolepis fluitans</i>), Goosefoot (<i>Chenopodium glaucum</i>), Guinea-flower (<i>Hibbertia scandens</i>), Inverted Sedge (<i>Carex inversa</i>), Jersey Cudweed (<i>Pseudognaphalium luteoalbum</i>), Kangaroo Grass (<i>Themeda triandra</i>), Knobby Club-rush (<i>Isolepis nodosa</i>), Lesser Joyweed (<i>Alternanthera denticulata</i>), Many-spiked Sedge (<i>Cyperus polystachyos</i>), Monier's Bacopa (<i>Bacopa monniera</i>), Nodding Club-rush (<i>Isolepis cernuus</i>), Ribbonweed (<i>Vallisneria gigantea</i>), River Buttercup (<i>Ranunculus inundatus</i>), River Club-rush (<i>Schoenoplectus validus</i>), Saltwater Couch (<i>Paspalum distichum</i>), Slender Knotweed (<i>Persicaria decipiens</i>), Spinifex (<i>Spinifex sericeus</i>), Streaked Arrowgrass (<i>Triglochin striatum</i>), Swamp Oak (<i>Casuarina glauca</i>), Tall Spike-rush (<i>Eleocharis sphacelata</i>), Velata Sedge (<i>Fimbristylus velata</i>), Water Primrose (<i>Ludwigia peploides</i>), and Water Ribbons (<i>Triglochin procerum</i>). Isolated clumps of Jointed Twig-rush (<i>Baumea articulata</i>) and Cumbungi (<i>Typha orientalis</i>) occur within the lagoon. Records exist of up to 300 Black Swans on the lagoon including many young cygnets. Other waterbird species present included Pied Cormorant (<i>Phalacrocorax varius</i>), Little Black Cormorant (<i>Phalacrocorax sulcirostris</i>), Pelicans and Black Duck (<i>Anas superciliosa</i>).</p> <p>Significance Considered to be a good example of a freshwater coastal lagoon.</p> <p>Social and Cultural values (No data)</p>

Description of the Environment

Wetland	Key Features
	<p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Killalea Lagoon - NSW079, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW079. Accessed 25 Jul 2017.</i></p>
<p>Kooragang Nature Reserve</p>	<p>Site description (No data)</p> <p>Physical features Kooragang Nature Reserve comprises two areas: Kooragang Island and Fullerton Cove. Kooragang Island originally consisted of several smaller islands or bars. Several attempts to control deposition and siltation of the Newcastle port area resulted in the agglomeration of these islands into a smaller number of larger units by the artificial filling of channels and the construction of training walls. Fullerton Cove is a large shallow embayment north of Kooragang Island. It has a maximum depth of two to three metres at its centre and at low tide large areas of mudflats are exposed. The lower Hunter River is a barrier estuary formed by the deposition of sediments in swamps and flats lying between the inner and outer coastal barrier sands. The sediments on Kooragang Island and adjacent estuarine areas comprise black silty and highly saturated soft clays to a depth of about 2 metres which are underlain by a light grey and silty sand. Depending on their elevation above sea level, drainage pattern and susceptibility to freshwater flooding, these sediments may be more or less saline. Salinities may vary from as high as 70‰ in evaporative salt marsh areas to as low as 8‰ behind levees where the soil is generally more fertile and regularly flooded by fresh water. Most soils of Kooragang Island are only slightly acidic, although small areas of sandy clays supporting brackish swamps can reach significantly low pH and create the potential for acid sulphates to occur, should they be permanently dried out or drained.</p> <p>Ecological features Extensive areas of mangrove (approximately 15 km²), saltmarsh (approximately 5 km²) and mudflats, occurring within the Hunter River estuary. Past filling has destroyed up to 10 km² of estuarine wetlands, but remaining wetlands remain in a healthy condition. Kooragang Nature Reserve contains numerous wetland types. The area is ecologically diverse and represents a significant genetic pool for wetland species in the region. Habitat types contained within Kooragang Nature Reserve include Mangrove forests dominated by Grey Mangrove with some River Mangrove; Saltmarsh dominated by <i>Samphire Sarcocornia</i> sp. and Saltwater Couch (the community of saltmarsh in the area to the west of Fullerton Cove was once the largest in the region). Saline and freshwater pastures are dominated by couch and other agricultural grasses, sedges and introduced weeds; Swamp forests consisting of Swamp Oak and Paperbarks. that are now limited (these forests once formed an intermediate stage in the succession of habitats from mangroves to forests in brackish water above the saline regime). Rainforest communities exist in remnants on Kooragang Island (isolated individual trees, for example figs <i>Ficus</i> spp. and Cabbage Tree Palms, still occur). A small area of seagrass <i>Ruppia spiralis</i> is located in a large tide pool adjacent to the railway line south of the Reserve; and Brackish swamps and standing open water containing sedges <i>Scirpus</i> spp. and other aquatic species. Other important habitats that exist include standing open water, mudflats, sandy beaches and rock training walls. The Nature Reserve is listed as a wetland of international importance under the Ramsar Convention because of its value as migratory wader habitat.</p> <p>Significance Considered to be a representative example of its type.</p> <p>Social and Cultural values Kooragang Nature Reserve and the surrounding areas have become known as one of the most important bird study areas in NSW. The Reserve is used for both research and recreational birdwatching. Limited recreational fishing is also undertaken within the Reserve. The Worimi and Awabakal Aboriginal tribes were the earliest inhabitants of the lower Hunter estuary. There are numerous middens and campsites scattered throughout the lower Hunter but they occur particularly along the river banks and within the dunes along Stockton Bight. The nearest Aboriginal sites outside the reserve come from the dunes and coastal forests between Fullerton Cove and Stockton Bight where many and varied sites are known to occur. There are a few European historic sites within Kooragang Nature Reserve. These include concrete footings of an old dairy on Sandy Island, a timber bridge, a mature Moreton Bay Fig associated with early farming and a half submerged timber drogher. The most significant structure on the island is the school teachers residence; however this lies outside the reserve.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Kooragang Nature Reserve - NSW080, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</i></p>

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Wetland	Key Features
	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW080. Accessed 25 Jul 2017.</p>
<p>Lagoon Head</p>	<p>Site description A small undisturbed hind-dunal wetland and draining creek on crown land, SEPP No. 14 168.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance A rare wetland type with a diversity of communities and plants, some significant. This small wetland contains a high diversity of plant communities of which Freshwater Herbland, Spike-rush Sedgeland, Freshwater Baumea Sedgeland and Melaleuca-Baumea Shrubland are poorly represented along the NSW south coast.</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Lagoon Head - NSW173, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW173. Accessed 25 Jul 2017.</p>
<p>Lake Hiawatha and Minnie Water</p>	<p>Site description (No data)</p> <p>Physical features The geology of Lake Hiawatha and Minnie Water is primarily undifferentiated Palaeozoic greywacke, slate, sandstone, quartzite and chert with minor areas to the north and south of the lake consisting of Quaternary alluvium including alluvium, gravel, sand, silt and clay with dunes to the east of the lakes. The Palaeozoic geology supports soils such as red and yellow podzolics, and yellow and grey earths.</p> <p>Ecological features The sedge <i>Lepironia articulata</i> is the major emergent shoreline plant of both lakes. The bed of Minnie Water is covered by a dense mat of aquatic plants such as Musk Grass (<i>Chara fibrosa</i>) and Golden Bladderwort (<i>Utricularia aurea</i>). The Great Crested Grebe (<i>Podiceps cristatus</i>) and the Hoary-headed Grebe (<i>Poliiocephalus poliocephalus</i>) occur on Lake Hiawatha and the Little Grassbird (<i>Megalurus gramineus</i>) if found in the reed beds at the waters edge. A variety of water beetles are common in both lakes. They are notable for their characteristic fauna such as the zooplankton including <i>Calamoecia tasmanica</i>, <i>Mesocyclops leuckarti</i> and <i>Bosmina meridionalis</i>. Twelve species of fish have been recorded within the lakes, the dominant ones being the Fire-tail Gudgeon (<i>Hypseleutris galii</i>) and the introduced Mosquito Fish (<i>Gambusia holbrooki</i>).</p> <p>Significance These wetlands are the largest dune contact lakes in this biogeographic region. Extensive research in the area suggested these sites were of regional significance with respect to freshwater invertebrates.</p> <p>Social and Cultural values Aboriginal sites within the park include pippie shell middens along the dune systems (possibly those near the lakes), mythological sites, campsites and stone tool workshops and quarries. The pippie shell middens are evidence of transitory day camps and together with campsites these demonstrate the marine-centred activity of the local Aborigines over the past 1,000 years. The lakes have significant value for scientific research for studying biological and physiochemical interactions.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Lake Hiawatha and Minnie Water - NSW031, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW031. Accessed 25 Jul 2017.</p>
<p>Lake Illawarra</p>	<p>Site description (No data)</p> <p>Physical features Lake Illawarra is an early-intermediate barrier estuary with its entrance to the ocean being a weakly active fluvial delta system. The entrance channel is constantly changing by shifting aeolian sands and a high energy beachfront.</p> <p>Ecological features The shallow waters and saline conditions allow seagrasses such as <i>Zostera</i> sp. and <i>Ruppia</i> sp. to thrive. These seagrasses provide food for waterfowl. A total of 24 species of waterbirds was recorded on Lake Illawarra, including 97 Grey Teal (<i>Anas gibberifrons</i>), 74 Chestnut Teal (<i>Anas castanea</i>), 42 Black Swan (<i>Cygnus atratus</i>), and 40 Australasian Little Grebe (<i>Podiceps novaehollandiae</i>). Estuarine vegetation of Lake Illawarra was mapped and included saltmarsh communities and extensive seagrass beds. Four major structural units or complexes and 15</p>

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Wetland	Key Features
	<p>communities for the foreshore vegetation of Lake Illawarra, with a total of 126 species recorded. The peripheral and foreshore vegetation includes the saltmarsh of Samphire (<i>Sarcocornia quinqueflora</i>), Shore Rush (<i>Juncus kraussii</i>), Common Reed (<i>Phragmites australis</i>), Swamp Oak (<i>Casuarina glauca</i>), and Creeping Saltbush (<i>Atriplex australasica</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Aboriginal sites of archaeological significance occur near the lake including a burial ground, quarry and open midden.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Illawarra - NSW081, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW081. Accessed 25 Jul 2017.</i></p>
<p>Lake Termeil Wetland Complex</p>	<p>Site description Termeil Lake is a large relatively undisturbed coastal lagoon with a catchment area of about 1400 ha.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance The complex of wetlands at Lake Termeil make this area significant and has been described as near pristine. The wetland supports a number of regionally rare plant species and uncommon wetland vegetation communities. The wetland is a rare example of freshwater vegetation communities. In addition the wetland supports a range of water birds and two threatened bat species and has been protected from anthropogenic disturbance.</p> <p>Social and Cultural values Does not appear to have a high level of recreational use. A number of aboriginal sites have been recorded around the lake.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Termeil Wetland Complex - NSW174, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW174. Accessed 25 Jul 2017.</i></p>
<p>Limeburners Creek Nature Reserve</p>	<p>Site description (No data)</p> <p>Physical features The geology of Limeburners Creek Nature Reserve is varied i.e. the headlands consist of Carboniferous sediments including sandstone, siltstone, tuff, shale and limestone and the western areas of the reserve consist of Quaternary sand dunes. Soils are sandy and are derived from clays, sands, silt mud and gravel.</p> <p>Ecological features Dunal wetland system, consisting of a mosaic of wet heath, sedgeland, dry heath, forested swamp and sclerophyll forest. The majority of the reserve contains Broad-leaved Tea Tree (<i>Melaleuca quinquenervia</i>) and Swamp Oak (<i>Casuarina glauca</i>) swamp sclerophyll forest and woodland, Heath Banksia (<i>Banksia ericifolia</i>) swamp shrubland, Grass Tree (<i>Xanthorrhoea fulva</i>), Tea Tree (<i>Leptospermum</i> sp.) and Banksia (<i>Banksia oblongifolia</i>) wet heath and sedgelands. Small pockets of littoral rainforest, mangroves, dune heathlands, and saltmarsh communities are also represented within the nature reserve.</p> <p>Significance Limeburners Creek Nature Reserve is a large complex of dunal wetlands remaining in a relatively natural condition, and is therefore considered to be a good example of coastal dunal wetlands.</p> <p>Social and Cultural values Aboriginal occupation of the area dates back to 5-6,000 years. A particularly high concentration of Aboriginal sites have been recorded within the Nature Reserve including burial sites, shell middens, campsites, axe-grinding grooves, and stone quarries. One of the three Aboriginal fish traps recorded along the north coast of NSW is located within the Nature Reserve. There is also evidence of European settlement in the area, for example, there is evidence of the gathering of shells which were burnt to produce lime for the penal colony at Port Macquarie. The Nature Reserve provides opportunities for scientific research of coastal processes, wetland systems and vegetation succession.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Limeburners Creek Nature Reserve - NSW032, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW032. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>Merimbula Lake</p>	<p>Site description (No data)</p> <p>Physical features The geology of Merimbula Lake consists of Tertiary sediments including gravel, sand, sandstone, clay and lignite on the southern shores and Upper Devonian sediments of the Merimbula Formation including conglomerate, red and brown shale, sandstone, quartzite, and arkose.</p> <p>Ecological features Supports relatively large area of seagrasses (2300 ha) and smaller areas of mangrove (40 ha) and saltmarsh (60 ha). Flora species which occur in the area include Dune Thistle (<i>Actites megalocarpa</i>), Knobby Club-rush (<i>Isolepis nodosa</i>), Rush <i>Lepidosperma gladiatum</i>, Coastal Bearded Heath (<i>Leucopogon parviflorus</i>), Coastal Wattle (<i>Acacia sophorae</i>), Spiny-headed Mat-rush (<i>Lomandra longifolia</i>), Wood Sorrel (<i>Oxalis chnoodes</i>), Beach Fescue (<i>Austrofestuca littoralis</i>), Hairy Spinifex (<i>Spinifex sericeus</i>), Prickly Couch (<i>Zoysia macrantha</i>), and the herb <i>Acaena novae-zelandiae</i>. Fauna species include the Hawksbill Turtle (<i>Eretmochelys imbricata</i>), Leopard Seal (<i>Hydrurga leptonyx</i>), Dugong (<i>Dugong dugon</i>), Little Penguin (<i>Eudyptula minor</i>), Little Pied Cormorant (<i>Phalacrocorax melanoleucos</i>), Little Black Cormorant (<i>Phalacrocorax sulcirostris</i>), Australian Pelican (<i>Pelecanus conspicillatus</i>), and Australian White Ibis (<i>Threskiornis molucca</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Two large Aboriginal shell middens have been located at the site.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Merimbula Lake - NSW061, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW061. Accessed 25 Jul 2017.</p>
<p>Meroo Lake Wetland Complex</p>	<p>Site description Meroo Lake is an extensive coastal lagoon with a catchment area of approximately 1950 ha. It comprises one large and one small estuarine wetland that are linked to the lake.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance Saltwater sedgeland is probably the largest stand of the river clubrush near its southern limit. This very large wetland contains some mosaic communities with mixes of dominant species not often seen elsewhere. In a study of the fauna of the wetlands of the lower Shoalhaven City, Lake Meroo stood out in terms of the diversity and abundance of mammals and frogs. The Lake supports the only population of Nationally Endangered Green and Golden Bell Frog found in the coastal lakes, and it is considered to be the third largest population in the Shoalhaven Region. The lake also provides habitat for three other threatened animal species.</p> <p>Social and Cultural values Does not appear to have a high level of recreational use. A number of aboriginal sites have been recorded around the lake.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Meroo Lake Wetland Complex - NSW175, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW175. Accessed 25 Jul 2017.</p>
<p>Minnamurra River Estuary - NSW084</p>	<p>Site description (No data)</p> <p>Physical features (No data)</p> <p>Ecological features The riverine vegetation is dominated by thick stands of Grey Mangrove (<i>Avicennia marina</i>) and River Mangrove (<i>Aegiceras corniculatum</i>) with areas of saltmarsh, Casuarina forest and rushes in brackish areas subject to flooding or tidal movements. Rocklow Creek (SEPP 14 wetland 374) supports mangrove forest along the immediate banks of the creek. Adjacent to the creek is a brackish wetland dominated by Salt Rush (<i>Juncus kraussii</i>) and Samphire (<i>Sarcocornia quinqueflora</i>). Swamp She-oak (<i>Casuarina glauca</i>) and Common Reed (<i>Phragmites australis</i>) are found around the margins of the wetland. SEPP 14 wetland 373 consists of a crown reserve on the southern side of the river downstream of the road bridge. The reserve consists of mangrove and saltmarsh communities with considerable amounts of regenerating mangroves present. Saltmarsh species present include Samphire (<i>Sarcocornia quinqueflora</i>), Salt Couch (<i>Sporobolus virginicus</i>) and pigface. The mangroves appear to be regenerating after disturbance. SEPP 14 wetland 372 is at the upper reaches of the estuary and consists of a mixture of Swamp She-oak forest and saltmarsh which occurs on the floodplain of the river. This floodplain area is crossed by a number of saline-brackish creeks which support thin fringes of mangroves along their banks. Species present in the Swamp She-oak forest community include Swamp</p>

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Wetland	Key Features
	<p>She-oak (<i>Casuarina glauca</i>), Northern Boobialla (<i>Myoporum acuminatum</i>), Salt Rush (<i>Juncus kraussii</i>), Club Rush (<i>Isolepis nodosa</i>), Seablite (<i>Suaeda australis</i>), Salt Couch (<i>Sporobolus virginicus</i>), and Samphire (<i>Sarcocornia quinqueflora</i>). In the saltmarsh areas records exist of Salt Rush (<i>Juncus kraussii</i>), Streaked Arrowgrass (<i>Triglochin striata</i>), Creeping Brookweed (<i>Samolus repens</i>), Salt Couch (<i>Sporobolus virginicus</i>), Samphire (<i>Sarcocornia quinqueflora</i>), and Seablite (<i>Suaeda australis</i>). SEPP 14 coastal wetland 372 is located on private property which is subject to grazing. A new residential development has been constructed around the south-eastern side of the wetland.</p> <p>Significance (No data)</p> <p>Social and Cultural values The Minnamurra Estuary is also an important area for commercial oyster farming.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Minnamurra River Estuary - NSW084, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW084. Accessed 25 Jul 2017.</i></p>
<p>Moruya River Estuary Saltmarshes</p>	<p>Site description (No data)</p> <p>Physical features The saltmarsh is part of a mature estuarine system with a relatively extensive floodplain. The marsh is geographically defined by SEPP 14 coastal wetlands No. 177 and 178 and possibly SEPP 14 coastal wetlands in Malabar Lagoon.</p> <p>Ecological features A large Samphire (<i>Sarcocornia quinqueflora</i>) dominated herbfield, sparse Mangrove shrubland lining the channel banks, <i>Juncus</i> rushlands and Swamp Oak (<i>Casuarina glauca</i>) forest on the landward side of the marsh occurs at SEPP 14 coastal wetland No. 177.</p> <p>Significance Moruya River estuary contains a number of extensive, modified salt and brackish marshes. All are of conservation significance and due to their variability, of considerable floristic interest.</p> <p>Social and Cultural values Grazing area.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Moruya River Estuary Saltmarshes - NSW119, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW119. Accessed 25 Jul 2017.</i></p>
<p>Myall Lakes</p>	<p>Site description (No data)</p> <p>Physical features On the mainland the dominant geological structure is the Myall Syncline within which the main rock types are Carboniferous sandstones, siltstones and mudstones, with some igneous intrusions of the Alum Mountain volcanics varying in composition from rhyolite to basalt. A belt of limestone outcrops on the eastern side of the Myall Lake. Broughton Island and Little Broughton Island have rock types associated with the Carboniferous Nerong Volcanics that are made up of toscanite, dacite, andesite, ignimbrite, agglomerate, conglomerate, sandstone and siltstone. The lakes are drowned river basins and the remnants of former hind dune drainage systems. The configuration of the lakes is largely determined by the irregular bedrock topography of the western shoreline. The eastern shores are mainly formed by the two distinct beach ridge systems of an inner and outer barrier. The coastal dune systems were laid down between 60,000 and 2,000 years ago. The inner barrier system is composed of highly podzolized sands overlying a sandrock hardpan. The sands of the outer barrier are only moderately podzolized. An intervening swamp or lagoon usually separates these two larger systems. Acid peat soils occur in these areas.</p> <p>Ecological features The low lying sands around the lagoons support a mosaic of wet heath, sedgeland, dry heath, forested swamp and sclerophyll forest. The dominant species in woodland communities in sheltered sites include Smooth-barked Apple (<i>Angophora costata</i>) and Banksia species. On deep stable sands, a forest of Blackbutt (<i>Eucalyptus pilularis</i>) often with Red Bloodwood (<i>Eucalyptus gummiifera</i>) develops. A protected fringe forest of Swamp Mahogany (<i>Eucalyptus robusta</i>) occurs with an understorey including Paperbark (<i>Melaleuca sieberi</i>) and Saw-sedge (<i>Gahnia clarkei</i>). A small area of seagrasses (approximately 8 ha) occur within the lakes. The open water in the lake is fringed by a reed swamp, except where sand reaches the water's edge. The bottom of Boolambayte and Broadwater Lakes is covered with submerged vegetation including Prickly Water Nymph (<i>Najas marina</i>) (which extends towards the shore to depths of about 0.5 m), Floating Pondweed (<i>Potamogeton tricarinatus</i>), Ribbonweed (<i>Vallisneria gigantea</i>), and Sea Tassel (<i>Ruppia maritima</i>). Reeds extend from the waters</p>

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Wetland	Key Features
	<p>edge up to a depth of 1.5 m. From the edge of the reed swamp to the junction with the stable sand or silt flats extends a characteristic Swamp Oak (<i>Casuarina glauca</i>), and Paperbark (<i>Melaleuca quinquenervia</i>) swamp forest with a dense undergrowth of sedges. An extensive heath, 6–8 km long and as much as 1 km wide, lies between the coastal dunes and the tuff hills south-east of Myall Lakes. In the wetter areas the heath gives way to peat-swamps. These areas are dominated by Tea Tree (<i>Leptospermum liversidgei</i>). The vegetation of the tuff hills differs markedly from the settled dunes and sand flats and consists of a mixed Eucalyptus forest and a sub-tropical rain-forest.</p> <p>Significance Largely because of their undeveloped condition, the Myall Lakes represent a large example of the coastal lagoons that occur along the central and lower north coasts of NSW.</p> <p>Social and Cultural values The park contains numerous Aboriginal middens, which are the major archaeological features of Aboriginal heritage. Some of these middens also contain Aboriginal burials. The Myall Lakes wetlands have high social and cultural value. The park also contains evidence of early European occupation including graves and early sawmill sites, the fishing village of Tamboy, old farm houses at Kataway Bay and Sunnyside, and the remains of droughers. There is a diverse range of recreational activities undertaken throughout the area that includes sailing, swimming, commercial and recreational fishing, camping, power boating, canoeing, four-wheel driving and bird watching. The University of New South Wales has established a Research Station in the park for the conduct of ecological studies.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Myall Lakes - NSW033, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW033. Accessed 25 Jul 2017.</i></p>
<p>Nadgee Lake and tributary wetlands</p>	<p>Site description (No data)</p> <p>Physical features Nadgee Lake is an intermittently open/closed coastal lake. It has never been mechanically opened. It has a relatively large catchment of 15.5 km² and a surface water area of about 1 km². It has a broad unvegetated sand berm at the normal breakout entrance. The depth of the lake is unknown but likely to be less than 5 m.</p> <p>Ecological features The area is habitat for a range of wildlife including threatened species. The lake supports interesting waterbird assemblages including Musk Duck and Black Swan and may be an important drought refuge for waterbirds. Emergent rushes protect the western foreshore and merge into the adjoining swamp communities. Estuarine aquatic vegetation includes sea grass beds of <i>Ruppia</i> sp. Up to 1,000 Black Swans gather at Nadgee Lake between September and January to moult. During this time the birds are flightless and dependent on the lake to supply all their needs including food and shelter until the moult is finished. During winter as few as two swans have been recorded.</p> <p>Significance (No data)</p> <p>Social and Cultural values It is the only coastal lagoon of its type within a wilderness area in NSW and is the most undisturbed coastal lake in NSW. There is evidence of Aboriginal occupation of the area. Due to its pristine nature, the lake is an excellent reference site for scientific research regarding coastal lagoon ecology.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Nadgee Lake and tributary wetlands - NSW187, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW187. Accessed 25 Jul 2017.</i></p>
<p>Nargal Lake</p>	<p>Site description (No data)</p> <p>Physical features Nargal Lake is one of few dune-swale freshwater lakes in the bioregion the other main one being Bondi Lake. The total catchment is about 60 ha. A relatively narrow frontal dune about 50 m basal width and about 10 m total height separates the lake from the ocean. This is much narrower and lower than the Bondi Lake foredune.</p> <p>Ecological features The eastern shoreline and fringe contains small areas of Swamp Oak (<i>Casuarina glauca</i>) forest. Sedgeland of Spike-rush (<i>Eleocharis</i> sp.) occur in the south-western and northern sectors of the lake providing shelter for waterbirds and waterfowl, eg. Musk Duck (<i>Biziura lobata</i>), and breeding grounds for Black Swan (<i>Cygnus atratus</i>). Possible drought refuge for waterfowl. A strandline herbfield of Selliera radicans and other species occurs on the eastern shoreline.</p>

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Wetland	Key Features
	<p>Significance (No data)</p> <p>Social and Cultural values Of significance to Aboriginal people</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Nargal Lake - NSW120, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW120. Accessed 25 Jul 2017.</i></p>
Nelson Lagoon	<p>Site description (No data)</p> <p>Physical features Intermittently closed and open barrier lagoon with several small indented bays and with 20 km² catchment. Aerial photo interpretation suggest that this lagoon has undergone a high degree of in-filling. A delta has formed at mouth of Nelson Creek.</p> <p>Ecological features Areas of saltmarsh of conservation significance.</p> <p>Significance (No data)</p> <p>Social and Cultural values Natural recreation, swimming and fishing</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Nelson Lagoon - NSW121, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW121. Accessed 25 Jul 2017.</i></p>
Pambula Estuarine Wetlands	<p>Site description (No data)</p> <p>Physical features Estuarine system with a backwater extending as a closed tributary to the Yowaka River. They are located upstream of Pambula lake at the fluvo-estuarine interface on the southern edge of the Pambula River floodplain. The wetlands are located across a number of different land tenures including freehold, reserved and unreserved crown lands, and a small flora and fauna reserve.</p> <p>Ecological features The area is habitat for a number of fauna including threatened species. Areas of exposed sandflats and Mangroves (<i>Avicennia marina</i>), saltmarsh and brackish/freshwater assemblages.</p> <p>Significance (No data)</p> <p>Social and Cultural values The area is a landmark to the local community. It is a developing icon for the community with strong recognition developing for its environmental and historical values. The community and Bega Valley shire council are working together to define a balance for the area between protection and potential recreational use. The area has significant historical values linked to use of part of the area as a race course.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pambula Estuarine Wetlands - NSW122, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW122. Accessed 25 Jul 2017.</i></p>
Port Stephens Estuary	<p>Site description (No data)</p> <p>Physical features The geology of the Port Stephens estuary comprises primarily of Quaternary alluvium (gravel, sand, silt, clay, 'Waterloo Rock', marine and freshwater deposits) and Carboniferous Nerong Volcanics (Toscanite, dacite, andesite, ignimbrite, agglomerate, conglomerate, sandstone and siltstone). Smaller areas on the west of the estuary are comprised of Carboniferous undifferentiated volcanics and Permian sediments of the Dalwood Group (sandstone, siltstone, mudstone, shale, conglomerate, tuff, and basalt). The soils of the area are generally acidic. The soils of the beach fore dune are leached, well drained and sandy whereas the soils of the hind dunes are grey, well drained with a humic zone. Poorly drained peat and silty soils over sand occur in the swamp heaths and forests. The soils of the tidal zone comprise of silts and muds compacted with shell fragments.</p> <p>Ecological features Extensive estuarine system consisting of an area of 2,776 ha of mangroves, 1000 ha of seagrass, and 1433 ha of saltmarshes. This comprises approximately 21% of mangrove forests, 13% of saltmarsh, and 5% of seagrasses in NSW. Other aquatic plant communities present within the estuary include Seawracks <i>Halophila</i> spp. The flora of the beach fore dunes consists of species such as Many-flowered Mat-rush <i>Lomandra multiflora</i>, Prickly Couch <i>Zoysia macrantha</i>, Bearded Heath <i>Leucopogon lanceolatus</i>, Guinea Flower <i>Hibbertia scandens</i>, Coast Tea Tree <i>Leptospermum laevigatum</i>, Paperbark <i>Melaleuca armillaris</i>, Coast Banksia <i>Banksia integrifolia</i>, Old</p>

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Wetland	Key Features
	<p>Man Banksia <i>Banksia serrata</i>, and Black Sheoak <i>Allocasuarina littoralis</i>. In the hind dunes dense vegetation includes Smooth-barked Apple <i>Angophora costata</i>, Old Man Banksia <i>Banksia serrata</i>, <i>Monotoca elliptica</i> and Blackbutt <i>Eucalyptus pilularis</i> with an understorey of Blady Grass <i>Imperata cylindrica</i>, Bracken Fern <i>Pteridium esculentum</i> and Wattle <i>Acacia</i> sp. The vegetation of the inner barrier dunes support scrubland vegetation including Old Man Banksia <i>Banksia serrata</i>, Tea Trees <i>Leptospermum trinervium</i>, <i>L. polygalifolium</i>, Rice Flower <i>Pimelia linifolia</i>, Grass Tree <i>Xanthorrhoea australis</i>, Prickly Moses <i>Acacia ulicifolia</i>, Sydney Golden Wattle <i>Acacia longifolia</i>, Broad-leaved Scribbly Gum <i>Eucalyptus haemastoma</i>, and Parramatta Red Gum <i>Eucalyptus parramattensis</i>. Swamp heath and swamp forest occurs near Salamander Bay and includes dominant species such as Banksias <i>Banksia robur</i>, <i>B. oblongifolia</i>, Hakea <i>Hakea teretifolia</i>, Paperbarks <i>Melaleuca nodosa</i>, <i>M. quinquenervia</i>, Swamp Mahogany <i>Eucalyptus robusta</i>, Broad-leaved Scribbly Gum <i>Eucalyptus haemastoma</i>, Native Broom <i>Viminaria juncea</i>, Prickly-leaved Tea Tree <i>Melaleuca styphelioides</i>, and Christmas Bells <i>Blandfordia grandiflora</i>. Mangrove species growing in the tidal zone are the River Mangrove <i>Aegiceras corniculatum</i>, Grey Mangrove <i>Avicennia marina</i>. Other species growing in this zone include Swamp Oak <i>Casuarina glauca</i>, Sea Rush <i>Juncus kraussii</i>, Tuckeroo <i>Cupaniopsis anacardioides</i>, Brush Muttonwood <i>Rapanea howittiana</i>, Creeping Brookwood <i>Samolus repens</i>, Samphire <i>Sarcocornia quinqueflora</i>, the herb <i>Suaeda australis</i>, Ruby Saltbush <i>Enchylaena tomentosa</i>, <i>Isolepis nodosa</i>, and Prickly Couch <i>Zoysia macrantha</i>. Freshwater swamps occur between the outer barrier dunes and terrestrial dunes and includes species such as Water Ribbons <i>Triglochin procerum</i>, Tall Spike-rush <i>Eleocharis sphacelata</i>, Tea Tree <i>Leptospermum liversidgei</i>, Christmas Bells <i>Blandfordia grandiflora</i>, Vanilla Plant <i>Sowerbaea juncea</i>, Milkmaids <i>Burchardia umbellata</i>, and Selaginella <i>Selaginella uliginosa</i>. Mammal species which have been recorded within the area include the Yellow-footed Antechinus <i>Antechinus flavipes</i>, Brown Antechinus <i>Antechinus stuartii</i>, New Holland Mouse <i>Pseudomys novaehollandiae</i>, Common Brushtail Possum <i>Trichosurus vulpecula</i>, Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i>, Gould's Long-eared Bat <i>Nyctophilus gouldi</i>, and the Northern Brown Bandicoot <i>Isodon macrourus</i>. Other species recorded within the area include the Eastern Banjo Frog <i>Limnodynastes dumerilii</i>.</p> <p>Significance The Port Stephens Estuary is considered to be a good example of estuarine wetland due to large areas of mangroves and saltmarsh in a healthy condition.</p> <p>Social and Cultural values The Port Stephens area was traditionally occupied by the Worimi people. Evidence of Aboriginal occupation of the area is not well documented, however, some middens and stone artefacts have been recorded within Tomaree National Park. James Cook named Port Stephens after he sailed past in 1770. In 1791, the Salamander was the first ship to enter the harbour while carrying out an informal investigation. Governor Macquarie arrived in Port Stephens in the Lady Nelson in 1811. John Oxley arrived in 1818 on returning from his trek seeking the source of the Macquarie River. Prior to permanent European settlement of the area, groups of Chinese fishermen were reputed to have lived along the shores of Port Macquarie.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Port Stephens Estuary - NSW034, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW034. Accessed 25 Jul 2017.</i></p>
<p>Shoalhaven / Crookhaven Estuary</p>	<p>Site description (No data)</p> <p>Physical features Geographical area of listing includes Comerong Island, an extensive sand island in the Shoalhaven River estuary. The eastern side of Comerong Island consists of a marine sand barrier on which parallel dunes have formed. The northern part of this sand barrier is a sandspit across the Shoalhaven River entrance and is subject to flooding. The remainder of Comerong Island and the other islands within the estuary have built up on river silt behind the sand barrier. The islands are joined by mudflats at low tide. Additional habitats of sandspits (at Shoalhaven Heads) and sediments of various assortments occur as a result of riverine and marine deposition.</p> <p>Ecological features Supports relatively large area of mangrove (350 ha) and saltmarsh (150 ha), with smaller area of seagrasses (100 ha) and small patches of swamp oak forest. Common species include River Mangrove (<i>Avicennia marina</i>), Sea Rush (<i>Juncus kraussii</i>), Bracken Fern (<i>Pteridium esculentum</i>), <i>Juncus polyanthemus</i>, Common Reed (<i>Phragmites australis</i>), Swamp Oak (<i>Casuarina glauca</i>), Samphire (<i>Sarcocornia quinqueflora</i>), <i>Sporobolus virginicus</i>, Seablite (<i>Suaeda australis</i>), Goosefoot (<i>Chenopodium glaucum</i>), and New Zealand Spinach (<i>Tetragonia tetragonioides</i>). An area of littoral</p>

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Wetland	Key Features
	<p>rainforest occurs on the south western side of the dunes on Comerong Island. Common species include Corkwood (<i>Guioa semiglauca</i>), Red Olive Plum (<i>Cassine australis</i>), Brown Beech (<i>Cryptocarya glaucescens</i>), Cabbage Tree Palm (<i>Livistona australis</i>), and Turnip Wood (<i>Rapanea howittiana</i>).</p> <p>Significance Due to relatively large areas of mangrove, saltmarsh and seagrasses, considered to be representative example of estuarine wetland on the south coast.</p> <p>Social and Cultural values One Aboriginal midden of significance has been recorded within the estuary and several other sites within the area are of significance to the Aboriginal community such as other open middens and axe grinding grooves. Also of scientific importance in the areas of wader conservation and research.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Shoalhaven / Crookhaven Estuary - NSW088, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW088. Accessed 25 Jul 2017.</i></p>
<p>Solitary Islands Marine Park</p>	<p>Site description (No data)</p> <p>Physical features The Marine Park lies in the region where the warm tropical waters of the East Australian Current meet cool coastal waters of temperate origin creating a biogeographic overlap zone of unusually high diversity. The Solitary Islands are remnants of a north-south outcrop of marine rocks of Carboniferous age. The inner shelf, beaches and dunes consist of silica sands.</p> <p>Ecological features Habitats include open waters, continental shelf floor, coral reefs, rocky reefs and headlands, sandy beaches, estuaries, tidal mud flats, seagrass, mangroves, saltmarsh, low scrub lands, grass leans, shallow soils and bare rock.</p> <p>Significance (No data)</p> <p>Social and Cultural values The marine park is a focus for tourism activities, particularly whale watching, boating, snorkelling, scuba diving and recreational fishing. It is also of key importance to education and scientific research in a variety of universities and museums and The University Of Armidale operates a research station at Arrawarra Headland.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Solitary Islands Marine Park - NSW109, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW109. Accessed 25 Jul 2017.</i></p>
<p>St. Georges Basin</p>	<p>Site description (No data)</p> <p>Physical features The geology of the northern shores of the St Georges Basin consists primarily of Permian sediments of the Wandrawandian Siltstone which includes siltstone, and silty sandstone. The eastern and western shores consists of Permian sediments of the Conjola formation including conglomerate, sandstone and silty sandstone, while the southern shore consists primarily of Quaternary sediments including alluvium gravel, swamp deposits and sand dunes.</p> <p>Ecological features Supports relatively large area of seagrasses (850 ha) and smaller areas of mangrove (25 ha) and saltmarsh (4 ha). Swamp Oak (<i>Casuarina glauca</i>) woodland fringes much of the basin with smaller areas of Swamp Paperbark (<i>Melaleuca ericifolia</i>) shrubland and Common Reed (<i>Phragmites australis</i>) reedland. The catchments on the southern and western sides of the basin are covered largely in native vegetation.</p> <p>Significance (No data)</p> <p>Social and Cultural values (No data)</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. St. Georges Basin - NSW090, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW090. Accessed 25 Jul 2017.</i></p>
<p>Swan Lagoon</p>	<p>Site description (No data)</p> <p>Physical features The lagoon is characteristic of many south coastal lagoons separated from the sea by beach dunes.</p> <p>Ecological features A small lagoon with reed swamp catchment. The lagoon itself is surrounded by Grey Swamp She-oak (<i>Casuarina glauca</i>) which is considered to be 20 plus year old regeneration.</p>

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Wetland	Key Features
	<p>Early reports from the area indicate a more open woodland probably of forest red gum (<i>Eucalyptus tereticornis</i>). <i>Juncus</i> sp. and Common Reed (<i>Phragmites australis</i>) fringe the water edge.</p> <p>Significance (No data)</p> <p>Social and Cultural values The significance is cultural both traditional and contemporary. The lagoon (in part) lies within the Murramarang Aboriginal Area and forms part of a complex of sites within a culturally significant landscape. The area is one of only three archaeological sites of Pleistocene age on the south coast. The area has high Aboriginal significance. Part of significance relates to the lagoon being home to the mythological serpent, a creature common in Aboriginal culture. The mythology of the lagoon makes connections as far as the far south coast and the Snowy mountains. The lagoon and swamp provide a range from freshwater to brackish conditions, with associated vegetation. This wetland complex would have provided several alternative sources of animal and plant food for Aboriginal people who were also exploiting marine resources around Murramarang Point. The area including the lagoon continues to be of significance for contemporary Aboriginal people of the south coast who regard the area as been indicative of their culture, signifying intertribal relationships through its use as a meeting place.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Swan Lagoon - NSW140, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW140. Accessed 25 Jul 2017.</p>
<p>Swan Pool / Belmore Swamp</p>	<p>Site description (No data)</p> <p>Physical features The geology of the area consists of Quaternary sediments including sand, silt, mud and gravel.</p> <p>Ecological features Very extensive fresh meadows, seasonal fresh swamps, and reed swamps, characterised by a zonation from fresh meadow to seasonal fresh swamp and reed swamp with increasing depth and permanence of inundation. Common species include Marsh Clubrush (<i>Bolboschoenus fluviatilis</i>), Common Reed (<i>Phragmites australis</i>), Spike-rushes (<i>Eleocharis equisetina</i> and <i>Eleocharis dietrichiana</i>), Water Couch (<i>Paspalum distichum</i>), and Water Pepper (<i>Persicaria hydropiper</i>). Swamp forests of Broad-leaved Paperbark (<i>Melaleuca quinquenervia</i>), Snow-in-summer (<i>Melaleuca linariifolia</i>) and Swamp Oak (<i>Casuarina glauca</i>) fringe the wetlands.</p> <p>Significance A good example of a large area of coastal floodplain swamp.</p> <p>Social and Cultural values The Macleay coastal area is part of the area of the Thunghutti (Dhunghutti) group of Aboriginal people. Aboriginal sites recorded within the local area include bora rings, shell middens, campsites, and burial sites. Sites specifically recorded within Belmore Swamp include shell middens and burial grounds. Cedar cutters were the first Europeans to explore the rainforests of the north coast rivers during the 1820s. Farmers cleared the rainforests of the alluvial plains for agriculture and Kempsey was then established in 1836.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Swan Pool / Belmore Swamp - NSW035, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW035. Accessed 25 Jul 2017.</p>
<p>Tabourie Lake</p>	<p>Site description Extensive estuarine lake comprising 5 SEPP 14 wetlands.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance Saltmarsh is a community type declining in area in NSW, which may provide important nursery habitat for fish. Nearly all of the region's saltmarsh occurs in two small bays at Lake Tabourie, and in Tabourie Creek. It supports a number of rare plant species and two threatened animal species.</p> <p>Social and Cultural values A number of aboriginal sites have been recorded around the lake; recreational use.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Tabourie Lake - NSW171, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW171. Accessed 25 Jul 2017.</p>

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Wetland	Key Features
<p>Terrigal Lagoon</p>	<p>Site description A shallow, brackish lagoon with <i>Phragmites australis</i> reedlands at the extremities of the western arm. A wide border of <i>Juncus kraussii</i> is found there on the landward edge and <i>Casuarina glauca</i> is spreading into the reedlands. Spoonbills and Black ducks were observed on this arm of the lagoon. The northern arm has been significantly altered by development on the shores and filling of the wetlands. The bottom is very silty and the water becomes very turbid when mixed by wind waves. There are no obvious algal areas or seagrasses.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance Condition is poor. Septic pollution is being reduced as the sewer is connected but urban run-off, fertilisers and the like, continue to add nutrients. Landfill, erosion in the catchment and frequent opening, all result in accelerated sedimentation. Some of the wetlands are recommended for conservation in SEPP No. 14 numbers 908 and 910.</p> <p>Social and Cultural values The lagoon is an important tourist attraction and recreation area. Water birds and animals still use the western arm of the lagoon where the shore vegetation is less disturbed.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Terrigal Lagoon - NSW180, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW180. Accessed 25 Jul 2017.</i></p>
<p>Towra Point Estuarine Wetlands</p>	<p>Site description (No data)</p> <p>Physical features Towra Point is located on the northern side of Kurnell Peninsula which forms the southern shore of Botany Bay. It is an estuarine complex bounded by Woollooware, Quibray and Weeney Bays. Towra Point and Taren Point are low lying promontories of Holocene sandy sediments. The muddy sand flats at the eastern end of Towra Point and at the western end of Towra Spit are being damaged by coastal erosion. Towra Spit is actively extending in a southwesterly direction and the beaches on the eastern and western faces of Towra Point are eroding and contributing sand to the growth of the spit. Recent erosion has been partly attributed to dredging and port works within Botany Bay. In 1991, erosion caused the western portion of Towra Spit to separate from the mainland and to form a highly mobile island west of the spit. However, during 1997 the island rejoined the mainland at the eastern end after a large local storm.</p> <p>Ecological features The terrestrial parts of the land are fringed by extensive tidal wetlands, including approximately 600 ha of seagrasses including Strapweed (<i>Posidonia australis</i>), Eelgrass (<i>Zostera capricorni</i>), and the Paddleweeds <i>Halophila ovalis</i> and <i>Halophila decipiens</i>; 400 ha of mangroves including the Grey Mangrove (<i>Avicennia marina</i>) and River Mangrove (<i>Aegiceras corniculatum</i>); and 161 ha of saltmarshes, representing one of the few large remnant systems near Sydney. Towra Point is an important bird feeding, roosting and nesting site for migratory waders and waterfowl. Towra Point Nature Reserve is listed under the Ramsar Convention because of its value as migratory wader habitat. The terrestrial plant communities comprise a number of recognised associations such as Swamp Sheoak (<i>Casuarina glauca</i>) forest, littoral rainforest, littoral strandline and a complex mosaic of dune sclerophyll scrub/forest.</p> <p>Significance Large areas of mangroves and saltmarsh in a healthy condition provide a representative example of estuarine wetlands. The site contains 50% of mangrove communities remaining in the Sydney region. It is an important habitat for many species of migratory waders, and is considered an important area for wading birds in NSW, and is especially significant for wading and wetland birds in the Sydney region. As with other areas of estuarine wetlands, also an important habitat for many commercial fish species. Because of the presence of migratory waders, the area is often used for wader research, including banding. Located close to Kurnell Field Studies Centre, and is used for environmental education.</p> <p>Social and Cultural values Because of the presence of migratory waders, the area is often used for wader research, including banding. Located close to Kurnell Field Studies Centre, and is used for environmental education. The Towra Point area offers a readily accessible variety of wetland plants and animals in close proximity to Sydney for research and teaching. The Reserve has some historic structures and three known Aboriginal sites. The shorebird community occurring on the relict tidal delta sands at Taren Point has been listed as an endangered ecological community under the NSW Threatened Species Conservation Act, 1996.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p>Department of the Environment and Energy. 2017. Towra Point Estuarine Wetlands - NSW092, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW092. Accessed 25 Jul 2017.</p>
<p>Tuggerah Lake</p>	<p>Site description (No data) Physical features (No data) Ecological features Three main features of the wetlands are Teatree Swamps dominated by Broad-leaved Paperbarks <i>Melaleuca quinquenervia</i>; Casuarina swamps containing major forests of Swamp Oak <i>Casuarina glauca</i>; and Shallow Estuarine Waters, the main aquatic vegetation being the seagrasses <i>Zostera capricorni</i>, <i>Halophila ovalis</i> and Sea Wrack <i>Ruppia megacarpa</i>. The areas of saltmarsh surround the lake. Saltmarsh of Rushes <i>Juncus</i> sp., Samphire <i>Sarcocornia quinqueflora</i> and Saltwater Couch <i>Paspalum vaginatum</i> occur around the lakes in addition to the fringing paperbarks and swamp oaks. Seagrass beds are very extensive and drop their leaves twice a year so that large areas of wrack occur around the lake. At times extensive beds of algae occur which die and mix with the wrack of the seaweed. Significance (No data) Social and Cultural values About 50,000 people live around Tuggerah Lakes in the suburbs of The Entrance, Long Jetty, Killarney Vale, Berkeley Vale, Chittaway, North and South Tacoma, Wyongah, Gorokan, Toukley and Norahville. Fourteen professional fishermen operate all year round; the area is important for recreational fishing, sailing and water skiing and The Entrance is a major holiday resort, c.25 caravan parks front onto the lake. Coal mining will shortly take place under the lake. <u>Reference</u> Department of the Environment and Energy. 2017. Tuggerah Lake - NSW141, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW141. Accessed 25 Jul 2017.</p>
<p>Tuross River Estuary</p>	<p>Site description (No data) Physical features A complex delta estuary at intermediate stage of infilling with many low islands and islets (>20), draining a major SEC bioregion river system and enters the sea adjoining a relatively long beach barrier. Ecological features A diverse area of land and waters with high shoreline length due to the delta system. Islands contain a variety of plant and animal communities including mangroves, saltmarsh, Casuarina swamp forest, mapped littoral rainforest (SEPP 26), sand and mud flats. Significance (No data) Social and Cultural values Oyster farming, recreational boating and fishing, productive (cattle, dairy) grazing land on & adjoining delta. Aboriginal middens and sites of Aboriginal sacred significance are known in the area. <u>Reference</u> Department of the Environment and Energy. 2017. Tuross River Estuary - NSW123, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW123. Accessed 25 Jul 2017.</p>
<p>Twofold Bay</p>	<p>Site description (No data) Physical features The area of the Bay shoreline and seabed up to 6 m depth. Includes the rocky and sandy shorelines of Twofold Bay, the Towamba River and Nullica River estuaries, Curalo Lagoon and the seabed of four separate embayments including Calle Calle Bay in the north, Quarantine Bay and Nullica Bay in the west and East Boyd Bay in the south. Excludes wharf area and harbour facilities at Snug Cove; and breakwall and boat ramp near Quarantine Bay. Ecological features The area is habitat for a number of marine mammals and birds including threatened species. Areas of exposed sandflats in the Towamba River estuary are potential habitat for waders. Flora species present within the bay include Pigface (<i>Carpobrotus glaucescens</i>), New Zealand Spinach (<i>Tetragonia tetragonioides</i>), Fireweed Groundsel (<i>Senecio linearifolius</i>), Coastal Saltbush (<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>), Calystegia soldanella, Sedge (<i>Carex pumila</i>), Knobby Club-rush (<i>Isolepis nodosa</i>), Bracken Fern (<i>Pteridium esculentum</i>), Coast Beard-heath (<i>Leucopogon parviflorus</i>), Coastal Wattle (<i>Acacia sophorae</i>), Geranium (<i>Geranium homeanum</i>), Native Storksbill</p>

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Wetland	Key Features
	<p>(<i>Pelargonium australe</i>), Spiny-headed Mat-rush (<i>Lomandra longifolia</i>), Paperbark (<i>Melaleuca armillaris</i>), Wood Sorrel (<i>Oxalis chnoodes</i>), Coast Blowngrass (<i>Agrostis billardieri</i>), Long-hair Plume Grass (<i>Dichelachne crinita</i>), Blady Grass (<i>Imperata cylindrica</i>), Hairy Spinifex (<i>Spinifex sericeus</i>), Speargrass (<i>Stipa flavescens</i>), Prickly Couch (<i>Zoysia macrantha</i>), Climbing Lignum (<i>Muehlenbeckia adpressa</i>), Coast Banksia (<i>Banksia integrifolia</i>), Small-leaved Clematis (<i>Clematis microphylla</i> var. <i>leptophylla</i>), and Bidgee Widgee (<i>Acaena novae-zelandiae</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Twofold Bay has a legendary maritime history of whaling and fishing. It is a safe harbour for shipping. The Bay is a focus for marine ecotourism such as whale watching and produces oysters, mussels, abalone and other fin-fish. It is the largest and deepest embayment in the South-East Corner bioregion.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Twofold Bay - NSW124, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW124. Accessed 25 Jul 2017.</i></p>
<p>Ukerebagh Nature Reserve</p>	<p>Site description (No data)</p> <p>Physical features Ukerebagh Nature Reserve consists of Ukerebagh Island and a mainland portion within and adjacent to the Tweed River estuary. It occurs on the Tweed floodplain which is formed from Quaternary alluvial and ocean beach deposits of gravel, sand, silt, clay and peat.</p> <p>Ecological features Vegetation communities found within Ukerebagh Nature Reserve include littoral rainforest, swamp forest, mangrove forest, open forest and saltmarsh associations. Seagrass is common in Ukerebagh Passage and together with Ukerebagh Nature Reserve forms one of the larger saline wetland systems in the Tweed estuary.</p> <p>Significance (No data)</p> <p>Social and Cultural values Association from pre-European times to the present day is evident in identified values of both traditional and contemporary historical significance. Several Aboriginal sites and 28 species of bush foods and medicinal plants traditionally utilised by local Aboriginal people have been recorded within Ukerebagh Nature Reserve. Many Aboriginal families lived on Ukerebagh Island during the 1920s and 1930s. Ukerebagh Nature Reserve is instrumental in the maintenance of the cultural identity of local Aboriginal people.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Ukerebagh Nature Reserve - NSW111, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW111. Accessed 25 Jul 2017.</i></p>
<p>Waldrons Swamp</p>	<p>Site description (No data)</p> <p>Physical features Draining forested creeks from Pollwombra Mountain, Waldrons Swamp superimposes amorously upon the northern part of the Broulee (Bengello) relict dunefield that extends to the Moruya River. The dunal features are very significant geomorphologically and of great scientific interest. The main body of the swamp is 2 km inland (at the ancient beachline) with a narrow outflow channel of some 1.5 km length meandering and cutting through the dunefield to connect very intermittently to the ocean at Bengello Beach between Broulee and Moruya Heads.</p> <p>Ecological features A variable mosaic of closed Swamp Paperbark (<i>Melaleuca ericifolia</i>) shrublands, Gahnia, Carex and Cladium sedgeland, rushlands and periodically open water providing breeding, refuge, roost and forage habitat for protected and threatened terrestrial species.</p> <p>Significance (No data)</p> <p>Social and Cultural values Locally important for grazing, eel fishing, water conservation and environmental protection. The relict dunal system adjacent to and south of the swamp is a great scientific interest.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Waldrons Swamp - NSW125, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW125. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>Wallaga Lake</p>	<p>Site description (No data)</p> <p>Physical features A permanently open estuary with considerable area (100 ha.) of sandflat exposed at low tide near the entrance. The lake backs up into convoluted shallow reaches of inflowing tributaries flanked by Eucalyptus open forest including Red Gum (<i>Eucalyptus tereticornis</i>), Southern Mahogany (<i>Eucalyptus botryoides</i>), Black Apple (<i>Planchonella australis</i>), Water Gum (<i>Tristania laurina</i>), Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Sweet Pittosporum (<i>Pittosporum undulatum</i>), Rough Tree Fern (<i>Cyathea australis</i>), and Late Black Wattle (<i>Acacia mearnsii</i>). Swamp Paperbark (<i>Melaleuca ericifolia</i>) occurs along much of the shoreline of the lake. Forested islands occur within the lake. The lake is drained by a relatively large catchment of mostly forested and some rural lands.</p> <p>Ecological features Upper reaches of tributaries contain saltmarsh habitats. The lake is mostly fringed by a Swamp Oak (<i>Casuarina glauca</i>) stand. Extensive eelgrasses indicate potential fish nursery habitat. Occasional mangrove specimens only. Waterbird and seabird habitat for resting and forage provided by sandflats.</p> <p>Significance (No data)</p> <p>Social and Cultural values Islands within the lake and the lake itself are of strong spiritual significance to local Aboriginal people. Dreamtime songlines link tribal kings such as King Merriman to the Lake. Approximately 60 middens have been recorded on the shore of Wallaga Lake. Spectacular scenic vistas from coastal vantage points near lake entrance; the presence of Gulaga (Mt. Dromedary) to the north-west and the seascape to the east and north-east (including Montague Island) combine to evoke a classic south coast scenscape of 'estuary-mountain-ocean'.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Wallaga Lake - NSW126, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW126. Accessed 25 Jul 2017.</p>
<p>Wallagoot Lagoon (Wallagoot Lake)</p>	<p>Site description (No data)</p> <p>Physical features Wallagoot Lagoon is an example of a Simple Embayment Lake. Embayment lakes are formed in the same formative process as in drowned valley lakes, except that in this case a bay is cut off. Such lakes were formed in the Holocene marine transgression. Extensive sand spits and sandy islets occur at the eastern end of the Lagoon, total area of these features dependent on water level.</p> <p>Ecological features The Lagoon has extensive areas of seagrass beds (area unknown), and a variety of rushes and sedges occur and include Saltmarsh (<i>Sarcocornia quinqueflora</i>), Streaked Arrow-grass (<i>Triglochin striata</i>), Saw-sedge (<i>Gahnia</i> sp.), Common Reed (<i>Phragmites australis</i>) and Sedges (<i>Juncus</i> spp.) A total of 480 faunal records have been recorded in the Wallagoot Lagoon area to date.</p> <p>Significance (No data)</p> <p>Social and Cultural values Tourism, recreation, education, commercial and recreational fishing. Extensive evidence of Aboriginal occupation (recorded sites) surrounding the lagoon.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Wallagoot Lagoon (Wallagoot Lake) - NSW127, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW127. Accessed 25 Jul 2017.</p>
<p>Wallis Lake and adjacent estuarine islands</p>	<p>Site description (No data)</p> <p>Physical features The geology of Wallis Lake consists predominantly of Quaternary sediments of gravel, sand, silt, clay and marine and freshwater deposits. The geology of the western and southern area of the lake consists of Carboniferous sediments of the Wootton Beds and includes sandstone, siltstone, claystone, shale, and limestone. The lake is largely underlain by Pleistocene barrier, dune and back barrier deposits and underlying these estuarine sediments.</p> <p>Ecological features Coastal lagoon with extensive seagrass beds [including Eelgrasses (<i>Zostera capricorni</i>) and the Seagrass <i>Posidonia australis</i>] (3,079 ha), areas of saltmarsh (405 ha), mangroves (79 ha) [including Grey Mangrove (<i>Avicennia marina</i>), and River Mangrove (<i>Aegiceras corniculatum</i>)], <i>Ruppia</i> sp. and algal (<i>Hormisira banksii</i>) beds. The extensive seagrass beds in this estuary comprise approximately 20% of total seagrasses in NSW. Saltmarsh communities are dominated by <i>Sarcocornia quinqueflora</i>. The saltmarsh communities grade into swamp woodland with dominant species including Swamp Oak (<i>Casuarina glauca</i>) and Paperbark (<i>Melaleuca quinquenervia</i>). Sea Rushes (<i>Juncus</i></p>

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Wetland	Key Features
	<p><i>kraussii</i>) dominate the area behind the saltmarsh with patches of sedge (<i>Baumea juncea</i>), rush (<i>Schoenoplectus</i> sp.) and Common Reed (<i>Phragmites australis</i>). Yahoo Island also supports a low closed forest (rainforest) community and an extensive tract of open Cabbage Palm (<i>Livistona australis</i>) community. Wallis Island includes communities of Paperbarks and Cabbage Palms and Swamp Mahogany (<i>Eucalyptus robusta</i>), Spotted Gum (<i>Eucalyptus maculata</i>), Grey Ironbark (<i>Eucalyptus paniculata</i>) and Forest Red Gum (<i>Eucalyptus tereticornis</i>) forests.</p> <p>Significance (No data)</p> <p>Social and Cultural values Aboriginal middens have been recorded within Yahoo Island Nature Reserve.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Wallis Lake and adjacent estuarine islands - NSW038, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW038. Accessed 25 Jul 2017.</p>
<p>Wamberal Lagoon</p>	<p>Site description A shallow, brackish lagoon that is normally closed by a sandbar. Extensive flooded <i>Baumea juncea</i>, <i>Juncus kraussii</i> and <i>Phragmites australis</i> reedlands at the northern end support large frog populations. Parts of the dense <i>Melaleuca ericifolia</i> and <i>Melaleuca nodosa</i> scrub near Forresters Ck are normally inundated. The foredune is relatively well preserved and shows a vegetation succession from <i>Spinifex hirsutus</i> near the ocean to <i>Banksia integrifolia</i> and <i>Melaleuca quinquenervia</i> forest. <i>Eleocharis</i> species and <i>Phragmites</i> sp. occur on the lagoon shore.</p> <p>Physical features (No data)</p> <p>Ecological features (No data)</p> <p>Significance It is in good condition. Some of the catchment is still protected by dense vegetation. The dense vegetation acts as a nutrient sink and sediment trap. Septic pollution, urban runoff, rubbish dumping and sedimentation are major problems for the continued well being on the lagoon. The effects of frequent artificial opening are unknown. Some of the wetlands are recommended for conservation in SEPP No. 14 site numbers 907 and 909. The lagoon and foredune are in the Wamberal Lagoon Nature Reserve, and parts of the catchment have conservation zonings.</p> <p>Social and Cultural values The area is an important wildlife habitat, especially as so few coastal lagoons remain in good condition. It has great educational value and guided tours are given to schools and other groups. The area is also used for recreation and is a valuable tourist attraction.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Wamberal Lagoon - NSW179, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW179. Accessed 25 Jul 2017.</p>
<p>Wollumboola Lake</p>	<p>Site description (No data)</p> <p>Physical features Soils consists primarily of grey sandy loam underlain by heavy red clay derived from the Permian Wandrawandian siltstone common to the area.</p> <p>Ecological features The lake supports surrounding wetland areas of Casuarina forest, teatree scrub, saltmarsh and sedgelands. The bed of the lake supports seagrasses. Reports that wetland 365 consists of a narrow herbfield on the shores of the lake dominated by coastal saline tolerant species. Behind this is an area of rushes and sedges consisting of a mix of Common Reed (<i>Phragmites australis</i>), Salt Rush (<i>Juncus kraussii</i>) and the Sedge, <i>Baumea juncea</i>. It is only one of three sites containing <i>Wilsonia rotundifolia</i> in coastal NSW. Wetland 364 consists of a small bay in the northwest corner of the lake which support extensive sandflats and saltmarsh communities. The dominant species in the saltmarsh is Samphire (<i>Sarcocornia quinqueflora</i>). Shoreward from the saltmarsh is an area of mixed sedgeland consisting of sedge species and salt rush (<i>Juncus kraussii</i>). The bay is surrounded by a dense closed forest of Paperbark (<i>Melaleuca</i> sp.) and Swamp She-oak (<i>Casuarina glauca</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Around 200 Aboriginal sites have been recorded in the area including symbolic / sacred sites, art sites, habitation sites and axe grinding grooves.</p> <p><u>Reference</u> Department of the Environment and Energy. 2017. Wollumboola Lake - NSW094, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</p>

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	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW094. Accessed 25 Jul 2017.</p>
<p>Wooloweyah Lagoon</p>	<p>Site description (No data)</p> <p>Physical features The geology of Wooloweyah Lagoon is comprised predominantly of Quaternary sediments including alluvium, gravel, sand, silt, clay, beach sand and dune sand overlying Triassic-Jurassic sandstone, shale, and conglomerate.</p> <p>Ecological features Estuarine lagoon, and associated seagrass, mangrove and saltmarsh areas. Dominant plant species include the aquatic herb <i>Bacopa monniera</i>, Swamp Oak (<i>Casuarina glauca</i>), Spike-rush (<i>Eleocharis equisetina</i>), Rushes (<i>Juncus</i> spp.), Paperbark (<i>Melaleuca quinquenervia</i>), Water Couch (<i>Paspalum distichum</i>), Common Reed (<i>Phragmites australis</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values The Clarence Estuary was utilised by Aborigines for fishing and evidence of this includes oyster shell middens that have been recorded on Micalo Island. In the early 1800s Richard Craig pioneered the harvesting of extensive Red Cedar stands of the Clarence (Clancy, 1992). Cropping began with sugar cane farms in 1864 on the Clarence River floodplain.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Wooloweyah Lagoon - NSW039, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=NSW039. Accessed 25 Jul 2017.</p>
<p>Queensland</p>	
<p>Bribie Island</p>	<p>Site description Bribie is a low sand island, with an elevation less than 10 m. The island has formed the narrow Pumicestone Passage to the west. The wetlands occur as creeks, lagoons, swamps and tidal flats. The majority of the island's interior is flat with closed depressions. Creeklines are short or interrupted. Large swamps (hundreds to thousands of hectares in size) occur in the sand plain and supra-tidal zone. The most extensive geology is a formation of Holocene tidal flats and meadows of sand and mud found in central and western parts of the island along with Pleistocene estuarine deposits. Pleistocene sand ridges, and Holocene beach ridges occur along southern and eastern beaches. Soils are podzols (bleached sands) on the eastern dunes and gleyed podzolic soils with a higher clay content in the west. This is broken by more than 200 ha of peat swamp. Groundwater podzols are found in some of the wet areas. Recent soil samples have found the presence of acid sulfate soil deposits in south-western parts of the island.</p> <p>Physical features (No data)</p> <p>Ecological features The freshwater wetlands are primarily composed from six community types. Swamp paperbark (<i>Melaleuca quinquenervia</i>), swamp box (<i>Lophostemon suaveolens</i>), <i>Eucalyptus tereticornis</i>, flooded gum (<i>Eucalyptus grandis</i>), scribbly gum (<i>E. racemosa</i>), swamp mahogany (<i>E. robusta</i>), pink bloodwood (<i>Corymbia intermedia</i>), cabbage tree palm (<i>Livistona australis</i>) open forest on beach ridges and old estuarine deposits, open forest or woodland dominated by <i>M. quinquenervia</i> with <i>E. robusta</i> and no understorey except swamp water fern (<i>Blechnum indicum</i>), <i>Baumea</i>, <i>Restio</i> and <i>Villarsia</i> spp. ground cover. Heathland or sedgeland with <i>Hakea actites</i>, broad-leaved banksia (<i>Banksia robur</i>), <i>Leptospermum</i> spp. and swamp grasstree (<i>Xanthorrhoea fulva</i>), <i>Ghania</i>, <i>Epacris</i> and <i>Restio</i> species, with emergents such as <i>E. robusta</i>, brush box (<i>Lophostemon confertus</i>), <i>L. suaveolens</i>. Wallum banksia (<i>Banksia aemula</i>) low open forest and woodland with black sheoak (<i>Allocasuarina littoralis</i>) and open heath. <i>M. quinquenervia</i>, and heathland or sedgeland on beach ridges. Open heath with <i>Caustis recurata</i>, <i>Xanthorrhoea fulva</i>, <i>Coleocarya gracilis</i>, <i>Sowerbea juncea</i> and <i>Leptospermum</i>, <i>Banksia</i> and <i>Bauera</i> species on beach ridge systems. Eight hundred and fifty hectares of intertidal and low coastal shrubland and forests occur in the south, west and north. These areas have communities with grey mangrove (<i>Avicennia marina</i>), river mangrove (<i>Aegiceras corniculatum</i>), yellow mangrove (<i>Ceriops tagal</i>), spotted mangrove (<i>Rhizophora stylosa</i>), large-fruited orange mangrove (<i>Bruguiera gymnorhiza</i>), milky mangrove (<i>Excoecaria agallocha</i>) and black mangrove (<i>Lumnitzera racemosa</i>), swamp she-oak (<i>Casuarina glauca</i>), Salicornia quinqueflora, Triglochin striata and sand couch (<i>Sporobolus virginicus</i>).</p> <p>Significance At least 850 ha of gazetted intertidal and estuarine shrubland and forests occur in the south, west and northern shorelines of the island. On the island, most wetland and vegetation mosaics are hundreds to thousands of hectares. These communities are considered highly significant</p>

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Wetland	Key Features
	<p>representatives of their type in south-east Queensland because of their size and naturalness. A survey of intertidal vegetation by the Queensland Herbarium has delineated 26 communities that intersect the Bribie wetland. These include 21 communities of State significance, three communities with regional significance, and two communities with local or major significance. Significant areas of sub-tidal sea grass occur in Pumicestone Passage. These areas are protected by a wetland reserve and fish habitat area in an area of more than 7000ha on the western side of the island. The shorelines and tidal wetlands of the island are listed in the Moreton Bay Ramsar area. The area provides refuge for threatened wildlife and is species rich.</p> <p>Social and Cultural values Bribie Island has two listings in the Register of the National Estate: Pumicestone Passage and Bribie Island, and for the World War II fortifications in the northern ocean-side of the island. The area is recognised for its value to migratory waders, and local naturalist groups visit the island for annual bird surveys. The island has been used by Brisbane universities for research into oceanography, coastal geomorphology, and for coastal health studies. QPWS provides educational facilities. The Department of Primary Industries Fisheries Branch has an aquaculture research facility on the south-eastern part of the island. The beaches attract tourists from the greater Brisbane area and picnic facilities and parks are provided for this purpose. The intersecting Pumicestone Passage is very high natural and scenic amenity, and the natural quality of its habitats attract naturalists and fishermen. The value to commercial fisheries is very high due to the spawning, recruitment, refugia and feeding values for aquatic fauna in the passage. No commercial fishing is allowed within the passage. More than 50 cultural heritage sites have been identified on the island. Numerous middens, artefact scatters, scarred and carved trees have been identified. Highly significant evidence from campsites and villages indicates that Indigenous peoples have lived on the island for more than 2,000 years. European settler heritage (additional to the war fortifications) includes historic wooden lighthouses (built in 1896) and a fish cannery site built in the early 1900s.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Bribie Island. - QLD189, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD189. Accessed 25 Jul 2017.</i></p>
<p>Burrum Coast</p>	<p>Site description The site comprises the coastline and estuaries between, and including, Beelbi and Theodolite creeks. It is made up of extensive intertidal flats associated with the mouth of the Burrum River and adjacent coastline; mangrove and saltflat systems along estuaries and coastline; freshwater wetlands dominated by wallum heaths, and lesser areas of sedgeland and swamp forests.</p> <p>Physical features Landforms: shallow, protected marine waters; broad intertidal sand flats and tidal deltas; fringing mangrove/saltflat; beaches backed by frontal dunes; and beach ridges with swampy swales. Geology: dominated by relatively recent (Holocene) deposits - sandy beach ridges, muddy estuarine sediments and sandy tidal deltas; much larger areas of Pleistocene sandy beach ridge deposits occur behind the more recent ones; undifferentiated Quaternary freshwater swamp deposits of mud and peat occur in the lower parts of the beach ridge systems. Soils: calcareous sands on the beaches, siliceous sands in the Holocene beach ridges, siliceous podosols in the Pleistocene beach ridges, sands/loams/muds in mangrove and saltmarsh, and acid peats and peaty sands in the low lying swampy areas between the beach ridges.</p> <p>Ecological features Major habitat types include seagrass beds, mangrove low closed forest to open shrubland, saltmarsh, bare claypan, and extensive bare sandflats (exposed at low tide); sedgelands, open forest/woodland and closed heath occur in swampy areas of the beach ridge systems; fringing woodlands and open forests, dominated variously by <i>Casuarina</i>, <i>Melaleuca</i> and <i>Eucalyptus</i> spp., occur adjacent to the beaches and wetland communities. The mangrove communities vary in structure and composition - low closed forest of grey mangrove (<i>Avicennia marina</i>) and/or club mangrove (<i>Aegialitis annulata</i>) shrubs fringes the larger estuaries; large-fruited orange mangrove (<i>Bruguiera gymnorhiza</i>) and/or yellow mangrove (<i>Ceriops tagal</i>) and/or river mangrove (<i>Aegiceras corniculatum</i>) and/or spotted mangrove (<i>Rhizophora stylosa</i>) low forest to open shrubland fringes smaller estuaries; less frequently inundated areas support yellow mangrove and/or river mangrove open shrubland; while milky mangrove (<i>Excoecaria agallocha</i>), myrtle mangrove (<i>Osbornia octodonta</i>) and cotton tree (<i>Hibiscus tiliaceus</i>) are confined to the landward fringes of the mangrove forest and shrubland. Saltmarsh areas behind the mangroves are variously dominated by sand couch (<i>Sporobolus virginicus</i>) grassland and samphire herbland (e.g. samphire (<i>Halosarcia indica</i>), seablite (<i>Suaeda australis</i>) and <i>Tetragonia tetragonoides</i>).</p>

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Wetland	Key Features
	<p>These areas may also be fringed by woodlands of <i>Melaleuca</i> spp. and swamp she-oak (<i>Casuarina glauca</i>). The swampy areas on peaty soils comprise three community types - open forest/woodland dominated by <i>Melaleuca</i> spp. but including cabbage tree palm (<i>Livistona australis</i>), <i>Tristania suaveolens</i> and <i>Eucalyptus tereticornis</i>; closed heath with species including <i>Boronia falcifolis</i>, wallum bottlebrush (<i>Callistemon pachyphyllus</i>), wallum tea-tree (<i>Leptospermum semibaccatum</i>), <i>Restio fastigiatus</i> and common heath (<i>Epacris obtusifolia</i>); and sedgeland, common species including <i>Schoenoplectus litoralis</i>, sea rush (<i>Juncus kraussii</i>) and sword grass (<i>Gahnia sieberiana</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Several high value Aboriginal cultural sites occur, mainly along the Burrum and Gregory rivers and behind the beach at Woodgate. Important and increasingly popular for tourism and recreation, particularly for fishing and boating. Valuable area for research into both natural and cultural features of the Hervey Bay coastline.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Burrum Coast - QLD126, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD126. Accessed 25 Jul 2017.</i></p>
<p>Bustard Bay Wetlands</p>	<p>Site description The site includes the embayment and estuaries between Rodds Peninsula and Round Hill. It is comprised of three interconnected, mangrove dominated, estuarine wetlands on and around Middle Island (Pancake, Middle and Jenny Lind creeks), plus two similar small estuaries at the southern end of Bustard Bay (Eurimbula and Round Hill creeks); an extensive non tidal, seasonal, freshwater wetland exists between the two southern estuaries, in Eurimbula National Park.</p> <p>Physical features The coastline of Bustard Bay consists largely of Holocene beach ridge deposits (including a large exposed sandmass on Middle Island); Holocene estuarine deposits dominate the western side of Middle Island and the major estuaries; on the north of Middle Island, Bustard Head and Clews Point are formed on unnamed granites of Triassic origin. A small area of the same granite occurs on the west side of Middle Island, near the centre of the Pancake Estuary; the estuarine deposits are bounded variously by Quaternary alluvium and Agnes Water volcanics (Triassic), an outcrop of which also forms Round Hill Head. There is considerable variation in the sediment of the estuaries - Round Hill Creek is predominantly sandy with a small fraction of fine mud, Eurimbula and Middle creeks are largely fine mud with small amount of sand at their mouths, Jenny Lind and Pancake creeks are sandy.</p> <p>Ecological features The dominant plant community in the site is mangrove forest and shrubland, with relatively small areas of saltflats behind; mangroves exhibit distinct banding from seaward to land :</p> <ul style="list-style-type: none"> - Avicennia and/or Aegialitis fringe on seaward margin; - Rhizophora and/or Avicennia and/or Ceriops zone (main zone); - Ceriops and/or Avicennia and/or Rhizophora zone; - coastal saltflat (sand couch (<i>Sporobolus virginicus</i>) and/or chenopods); - Ceriops fringe (between saltflat and terrestrial vegetation); <p>several intertidal seagrass beds are situated in Pancake Inlet and in the small bay formed between Bustard Head and Clews Point. Of significance is the somewhat unusual occurrence of a fringing coral reef in an estuary (Pancake); the site supports a variety of marine fauna (e.g. 25 crab species and 29 mollusc species in Eurimbula and Round Hill creeks), as well as numerous shore, sea and land birds.</p> <p>Significance The Round Hill Head area is one of only three places where James Cook went ashore on his journey up the east coast of Australia in 1770. The site provides popular anchorages for recreational boats travelling up and down the coast, as well as unique natural features (landscape, flora and fauna, estuarine coral reef) in a relatively undisturbed condition.</p> <p>Social and Cultural values James Cook came ashore at Round Hill Head during his voyage up the east coast of Australia in 1770, and the Bustard Head Lighthouse was the second to be built in Queensland in 1868. Bustard Head also has a cemetery associated with early exploration of the area. Aboriginal shell middens occur throughout the area and there is considerable intrinsic value to fisheries as habitat and crab fishery. Bustard Bay supports a trawl fishery, while the estuaries support crab fisheries. Middle Island supports a small grazing enterprise, and several shipwrecks are located in Bustard Bay. Scientific interest and research values: Especially in the coral reef. The area is becoming increasingly popular as a tourist destination, especially as an access point to the Great Barrier Reef.</p> <p><u>Reference</u></p>

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Wetland	Key Features
	<p><i>Department of the Environment and Energy. 2017. Bustard Bay Wetlands - QLD127, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD127. Accessed 25 Jul 2017.</i></p>
<p>Colosseum Inlet - Rodds Bay</p>	<p>Site description The site is comprised of the area of the Curtis Coast between Wild Cattle Island and Rodds Peninsula. It contains three large estuaries/embayments with extensive mangroves and lesser areas of coastal saltflat and seagrass beds, supporting fauna of state and national significance.</p> <p>Physical features Geology/geomorphology: marine lowlands surrounded by flat to undulating terrain; geology is predominantly Quaternary estuarine (Holocene) and alluvial (Pleistocene) deposits fringed by Agnes Water granites (Triassic) and Miriam Vale granodiorites (Permian); Hummock Hill Island has an area of the latter granites surrounded by estuarine deposits and Quaternary beach ridge deposits on the north and south ends; a small area of Quaternary tidal delta sands occurs at the mouth of Colosseum Inlet. Soils: the lowlands are mainly saline clays (Olsen et al., 1980).</p> <p>Ecological features Extensive mangrove forests and shrublands; restricted seagrass beds; coastal saltflats (claypan and saltmarsh) and a small coral reef. Mangroves exhibit distinct banding from seaward to land :</p> <ul style="list-style-type: none"> - Avicennia fringe on seaward margin - Rhizophora zone (main zone) - Ceriops zone - Coastal saltflat - Ceriops fringe (between saltflat and terrestrial vegetation). <p>Seagrasses are generally intertidal due to the natural turbidity of the waters - most abundant species are <i>Zostera capricornia</i>, <i>Halophila ovalis</i> and <i>Halodule uninervis</i>. Coastal saltflats range from bare claypan, through low/dwarf open halophytic shrubland (e.g. <i>Sarcocornia</i> spp. and <i>Suaeda</i> spp.), to open and closed grasslands dominated by sand couch (<i>Sporobolus virginicus</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Several sites of archaeological importance occur in Colosseum Inlet and around Rodds Bay. These waterways are popular for boating, providing an extensive sheltered passage along the coast, as well as mooring sites inside Colosseum Inlet and Rodds Harbour. It is an important recreational fishing/crabbing area, and also an important source of commercial fisheries species. Hummock Hill Island supports a small grazing operation. Tourism is gaining momentum with several resort proposals in this area. There are also mineral reserves under exploration.</p> <p><u>Reference</u></p> <p><i>Department of the Environment and Energy. 2017. Colosseum Inlet - Rodds Bay - QLD129, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD129. Accessed 25 Jul 2017.</i></p>
<p>Deepwater Creek</p>	<p>Site description (No data)</p> <p>Physical features The Deepwater landscape is characterised by a gently sloping alluvial plain that is closed by a coastal dunefield in the north and east. The catchment includes extensive Quaternary alluvium and Tertiary sandstone formations. The sandstones occur in elevated western areas and alluvium occurs in the north, east and south-eastern plains. Outcrops of the Triassic volcanics are found in the north and east. A small highland area in the south west of the catchment is Triassic granite. Minor formations of Jurassic and Triassic sandstone and mudstone occur in southern areas. Dune formations contain Holocene sands, and the estuary contains Holocene deposits. Gradational yellow massive earths (Gn2.3) predominate in elevated and western sections of the catchment. Soloths (Dy 3.41) have formed in the low eastern areas and deeply leached siliceous sands (Uc 1.21) have formed on the coastal dunes. Most discharge is produced from northern watersheds and shallow sandy aquifers. Other significant creeks include Reedy, Fullers, Bullock, Five mile, Pearson, Blackwater and Pig creeks. The drainage network is organised, convergent and unidirectional. Waterholes are found in the main channel and swamp formations occur near the coastal dunes. The climate is 'temperate humid' but a close proximity to the sub-tropics in the north is associated with thunderstorms and high rainfall intensity.</p> <p>Ecological features The inland alluvial and palustrine environments and ecosystems (together with the Eurimbula and Bustard Bay area) provide the largest and least disturbed northern representatives of their type. The estuary is flanked by more than 100 ha of littoral forest, grass meadow and reed beds.</p>

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Wetland	Key Features
	<p>Closed Ceriops mangrove forests dominate with <i>Avicennia</i> forest and <i>Sporobolous</i> grassland. <i>Aegiceras</i> and <i>Rhizophera</i> forests occur in smaller communities. Sporobolous meadows are associated with <i>Juncus</i>, <i>Casuarina</i> and <i>Melaleuca</i> communities. Coastal rocky headlands support <i>Themeda triandra</i> and heath communities while adjacent foredunes support <i>Themeda</i>, <i>Allocasuarina</i>, <i>Banksia</i> and <i>Accacia</i> species. Further inland, the Quaternary sand plain and dune swales support microphyll and notophyll rainforest and open forest including <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Melaleuca</i>, <i>Callitris</i> and <i>Livistonia</i> species. The swamps and ponded areas inland of the dunes support fringing sedge <i>Leperonia articulata</i>, meadows with <i>Blechnum indicum</i> and areas of <i>Urtricularia</i>, <i>Lepidosperma</i>, and <i>Philydrum</i> species. These areas merge with the prevalent alluvial ecosystems of wet heaths with <i>Melaleuca</i>, <i>Banksia</i>, <i>Hakea</i>, <i>Leptospermum</i> and <i>Baekia species</i> (typical wallum), open riparian forests of <i>Melaleuca quinquenervia</i>, <i>Eucalyptus robusta</i>, <i>E. tereticornis</i>, <i>E. racemosa</i>, <i>Corymbia intermedia</i> and <i>Lophostemon suaveolens</i>. On slopes of seasonally waterlogged Tertiary sediment or volcanic rock, open forests and grassy woodlands with <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Melaleuca</i> and <i>Banksia</i> species are prevalent.</p> <p>Significance The Deepwater catchment and lowlands provide a large and relatively intact wetland system at the northern limit of the coastal lowland 'wallum' ecosystem of south-east Queensland. The area is one of the least disturbed mainland representatives for coastal acid freshwater wetlands in Queensland. The area is part of the Macpherson-Macleay zone of biogeographical transition, an area with enhanced species diversity. The sandy beaches support the second largest aggregation of mainland breeding sea turtles in Queensland, and provide the only mainland nesting site used repeatedly by the nationally endangered leatherback turtle.</p> <p>Social and Cultural values This is an important area for nature based recreation (camping, boating and fishing), and it provides a destination for regional communities. Shell middens are found on the foredunes. The Gooreng Gooreng Aboriginal people have a tradition with the land. Captain Cook visited the area in 1770, which may have been his first landing place in Queensland. Captain Cook's landing just to the north of the mapped area (Town of 1770) attracts tourists to the Deepwater beaches and headlands. The 1770 area has high social value in south-east Queensland. The mineral-rich Deepwater Beach ridge dunes are of high economic and natural value. The dune field is listed in the Register of the National Estate.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Deepwater Creek - QLD182, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD182. Accessed 25 Jul 2017.</i></p>
<p>Fraser Island</p>	<p>Site description Fraser Island is the largest sand island in the world. It has huge reserves of fresh groundwater and characteristic window and barrage dune lakes. The topography of the island is characterised by rough dunes reaching an elevation of more than 220 m. Steep cliffs are common on the east coast and extensive flats are common on the west. The catchment is that of the permeable Fraser Island sandmass and there is relatively little direct runoff.</p> <p>Physical features Landform: intertidal flat, beach, floodout, supratidal flat, drainage depression, stream channel, stream bed, tidal creek, estuary, swamp, swale and lake; uplands are rough dunes with high relief. General geology: Fraser Island is dominated by a series of overlapping parabolic dunes which have been deposited as a result of inland migration of sands from coastal blowouts. These Quaternary and older siliceous sands overlie Cretaceous sediments of the Maryborough and Burrum sediments. Igneous intrusives at Indian Head and Waddy Point are the only true rocks on the island. The sand dunes were derived from the erosion of sandstones from coastal river valleys in northern NSW and southern Queensland. These late Pleistocene deposits were transported up the coast to their present position with successive rises and falls in sea level due to eustatic oscillations. The Pleistocene units are characterised by pure white sand while the Holocene dunes of pale yellow-brown sand overlap and, in some cases, form a veneer over the Pleistocene units. Soils: the soils are mostly quartzipsamments. They are deep sands with an A horizon of variable development and some deeper organic staining. Giant podosols occur with thick, richly coloured B horizons. There are also some groundwater podosols and peats.</p> <p>Ecological features The following wetland and related environments occur on the island: (i) permanent creeks fed by springs draining the major sand aquifers, on the east and west of the island. Rainforest communities are found along Eli and Wanggoolba creeks and comprise notophyll vine forests, notophyll</p>

Description of the Environment

Wetland	Key Features
	<p>palm forests and microphyll vine forests. Six species of rare or vulnerable plants have been recorded from the rainforests. Isolated dense palm forests of piccabeen palm (<i>Archontophoenix cunninghamiana</i>) are found in sheltered areas along the streams. Little information is available on aquatic macrophytes within the creeks. Some waterways support different morphs of the Fraser Island sunfish (<i>Rhadinocentrus ornatus</i>); (ii) dry sclerophyll forests or paperbark woodland (swamp paperbark (<i>Melaleuca quinquenervia</i>)) grading into paperbark swamp at the margins of the lakes. Forests are structurally variable and can include forest red gum (<i>Eucalyptus tereticornis</i>), red bloodwood (<i>Corymbia</i> spp.) and swamp box (<i>Lophostemon suaveolens</i>) as well as swamp mahogany (<i>Eucalyptus robusta</i>) and weeping cabbage palm (<i>Livistona decipiens</i>) in moister sites; (iii) open shrublands and low woodlands dominated by the wallum banksia (<i>Banksia aemula</i>). Other associated flora includes black sheoak (<i>Leptospermum trinervium</i>), monotoca white banksia and mallee forms of brush box. A notable species is Wide Bay boronia (<i>Boronia rivularis</i>) which occurs near lakes to the north end of the island, and which is recorded as a rare species with a restricted habitat. The acidic waters within this "wallum" environment are inhabited by a specialist frog fauna which has evolved in response to apparent constraints imposed on most other frogs by the acid waters. These "acid" frogs are represented by wallum rocketfrog (<i>Litoria freycineti</i>), Cooloola sedgefrog (<i>L. cooloolensis</i>), wallum sedgefrog (<i>L. olongburensis</i>) and wallum froglet (<i>Crinia tinnula</i>). The Fraser Island sunfish (<i>Rhadinocentrus ornatus</i>) is confined to wallum waters; (iv) freshwater perched water table window lakes and barrage dune lakes with marginal bands of sedges, dominated by <i>Lepironia articulata</i>. The sedge <i>Schoenus scabripes</i> is notable as a rare species restricted to highly specific habitats. Exposed areas of moist sand on lake margins area colonised by sundews (<i>Drosera spatulata</i>), dwarf yellow-eye (<i>Xyris juncea</i>) and fairy aprons (<i>Utricularia dichotoma</i>). A short-necked tortoise <i>Emydura</i> sp. is confined to island lakes and may be subspecifically different to current forms. The lakes are filled with either clear "white" or discoloured "black" water. Most lakes are oligotrophic and have depauperate fauna and flora. The lake catchments are closed and the organisms that inhabit them are isolated with the potential to diverge morphologically and genetically. Water birds occur in low numbers. Lake Wabby has a diverse fish fauna of 11 species, including the rare honey blue-eye (<i>Pseudomugil mellis</i>). The ancient chironomid midge <i>Anaphrotenia lacustris</i> is endemic to Lake Boernigin; (v) saline soil communities including mangroves, salt marshes and salt flats occur in the intertidal zones. The mangrove communities are dominant in terms of area and comprise 12 species. The dominant species of mangroves are grey mangrove (<i>Avicennia marina</i>), river mangrove (<i>Aegiceras corniculatum</i>), yellow mangrove (<i>Ceriops tagal</i>) and spotted mangrove (<i>Rhizophora stylosa</i>). Some of the mangrove species are at the southern limit of their distributions and some are of disjunct occurrence. Salt marshes and supratidal flats are dominated by samphires such as <i>Arthrocnemum</i> spp., <i>Suaeda</i> spp. and beadweed (<i>Salicornia quinqueflora</i>). sand couch (<i>Sporobolus virginicus</i>) is common; (vi) intertidal habitats including surf, sheltered beach and estuaries also occur.</p> <p>Significance The Fraser Island wetlands are significant because of their distinctness and because they are the best Australian example of a complex of wetlands characteristic of the South Eastern Queensland bioregion. Fraser Island possess the most numerous, most diverse, largest and highest perched lakes in the world. The lakes are notable for their palynology, climatology, ecology and, particularly, their hydrology. The hydrology and physicochemical properties of the groundwater are of notable scientific significance due to the relatively long residence time of water in the sandmass (70-100 years) and the characteristics of waters passing through the soil profiles. This island is also significant as a habitat for a diverse range of endemic, rare, and threatened fauna and flora. Fraser Island is also a World Heritage site.</p> <p>Social and Cultural values Fraser Island has a very long history of Aboriginal occupation. Only a small proportion of Aboriginal sites have been identified to non Aboriginal people. Details of cultural landscapes with symbolic, ceremonial, and/or mythological significance to Aboriginal people are therefore not widely known. In addition to the above a large number of prehistoric sites have been identified. Fraser Island is also significant because of the number of sites relating to European occupation e.g. Bool Creek as the site of the first European landing, by Flinders from the Investigator. Currently Fraser Island is one of the most important tourism and recreational destinations in southeast Queensland.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Fraser Island - QLD131, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from:</i></p>

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Wetland	Key Features
	<p>http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD131. Accessed 25 Jul 2017.</p>
<p>Great Barrier Reef Marine Park</p>	<p>Site description (No data)</p> <p>Physical features The Great Barrier Reef is not a continuous barrier but a broken maze of coral reefs, some with coral islands (or cays). The reef comprises some 2,500 reefs which range in size from less than one hectare to more than 10,000 ha, and in shape from flat platform reefs to elongate ribbon reefs. There are 71 cays on the reef. The reefs are composed of the accumulated remains of animal calcium carbonate skeletal material and plant material, supporting a veneer of living plants and animals. The reef can be divided into three distinct sectors. The northern sector (north of latitude 16°S) contains many patch reefs with cays. Of particular interest are the low wooded islands which are coral cays carrying mangrove communities. The central sector (from 16°S to 21°S) is characterised by scattered platform reefs which are separated from fringing reefs of the mainland coast and coastal islands by a channel 15 km wide in the north and 50 km wide in the south. The southern sector (from 21°S to 24°S) is characterised in the north by a tightly packed maze of wall-like reefs separated by channels which carry strong tidal currents. To the south the reefs are tightly packed patch reefs with large patch reefs at the very southern end having well developed vegetated coral cays.</p> <p>Ecological features The Great Barrier Reef Marine Park contains a variety of habitats in a number of ecosystems. The area is recognised for its seagrass beds, estuarine wetlands, mangrove woodlands, island cays and coral atolls. The reef formations owe themselves to the ability of corals to produce substantial skeletons of calcium carbonate. Many of the corals have a variety of growth forms (branching corals, massive brain corals, plate-like corals, encrusting corals and mushroom corals) which relate not only to the genetic makeup of the corals but also, in part, to the hydrological regime and exposure of the location in which they develop.</p> <p>Significance (No data)</p> <p>Social and Cultural values The great diversity of life forms, especially in the endemic species, makes it an area of enormous scientific importance. It is an area that is recognised as being of great natural beauty and wonder and as such is one of Australia’s most recognisable natural features. The area is extensively used for tourism and recreation. The area contains many archaeological sites of Aboriginal and Torres Strait Islander origin. There are over 30 historic shipwrecks in the area, and on the islands there are ruins and operating lighthouses.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Great Barrier Reef Marine Park - QLD100, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD100. Accessed 25 Jul 2017.</i></p>
<p>Great Sandy Strait</p>	<p>Site description A very large and complex wetland system, consisting of intertidal sand and mud flats, extensive seagrass beds, mangrove forests, salt flats and saltmarshes. A number of individual wetlands have been described for the Great Sandy Strait. These wetlands cover some 46,000 ha. Kauri Creek, Tin Can Bay and Tin Can Inlet are significant wetlands (10,000 ha) at the southern end of the Great Sandy Strait.</p> <p>Physical features Soils are mostly modern fluvial (Mary River) sediments - fine to medium grained felspathic sands, with a 3-6% mud content. Most of the area lies on or close to the 1200 mm isohyet.</p> <p>Ecological features Major habitat types include mangrove forests, intertidal and subtidal seagrass beds, saltmarshes, unvegetated mud, sand and salt flats, and estuarine and channel waters of varying depth and width. As well as the extensive seagrass beds and ten species of mangrove occurring in the wetland, large and important communities of migratory waders, mangrove invertebrates and fish are present throughout the wetland. The wetland is also home to dugong (<i>Dugong dugon</i>) and marine turtles.</p> <p>Significance The Great Sandy Strait is one of few passage landscapes in Australia where an offshore barrier island has formed sufficiently close to the mainland to block the outflow of a substantial river system, creating a double-ended estuary with a shifting pattern of mangroves, sand banks and mud islands.</p> <p>Social and Cultural values Aboriginal and non Aboriginal historical significance is attached to much of the Great Sandy Region; evidence of Aboriginal presence in the region dates back 5,500 years. The Great Sandy Strait is highly valued by commercial and recreational fishermen and boating enthusiasts.</p>

Description of the Environment

Wetland	Key Features
	<p>The unique natural features of the area provide almost unequalled opportunities for research into the species, communities and processes at work in this large wetland system.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Great Sandy Strait - QLD132, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD132. Accessed 25 Jul 2017.</i></p>
<p>Lake Coombabah</p>	<p>Site description Lake Coombabah is a tidal lake at the mouth of Coombabah Creek. The lake and swamps have formed in the tidal delta and coastal plain of southern Moreton Bay.</p> <p>Physical features The majority of the wetland has formed on marine plain and alluvium. The upper alluvial and colluvial slopes occur on sub-coastal hills and rises. Tidal reaches and Melaleuca swamps in low lying and supra-tidal areas occur on Holocene muds and sands. Small beach ridge dunes to the east formed during the Holocene. The coastal flats are surrounded by Quaternary alluvial flats. The sub-coastal hills have developed from Devonian-Carboniferous geology of mudstone, shale and conglomerate. The beach ridge dunes have formed deep siliceous sands. Dune swales and swamps contain acid peat soils that are frequently waterlogged (eg. humic podzols). Some supratidal freshwater swamp zones have developed peat profiles. Humic gley soils typically occur in old tidal channels and depressions, and they have permanently wet subsoils. More saline soils include solonchaks. Gleyed podzolics occur upslope of the tidal soils. Yellow podzolics are prevalent on alluvium and colluvium. Erodible sandy duplex soils with impermeable subsoil occur on elevated slopes, whilst seasonally waterlogged podzolics (some support perched water tables) occur on lower slopes. More than half of the lowland alluvial and coastal plain area is affected by acid sulfate soil deposits.</p> <p>Ecological features The upper watershed forms a mosaic of tall forests and woodlands with <i>Corymbia citriodora</i>, <i>Eucalyptus siderophloia</i>, <i>E. major</i>, <i>E. seeana</i> and <i>E. racemosa</i> with <i>Angophora</i>, and <i>Lophostemon</i> species. The lowland communities include Mangroves with <i>Avicennia marina</i> and <i>Casuarina glauca</i>, saltmarsh communities with <i>Sporobolus virginicus</i>, <i>Suaeda</i> and <i>Salicornia</i> species, <i>Casuarina glauca</i> forests with <i>Melaleuca quinquenervia</i>, forests with <i>M. quinquenervia</i>, <i>Eucalyptus robusta</i>, and <i>Blechnum indicum</i> with heath representatives such as <i>Restio</i> species, wet heath with <i>Restio pallens</i>, <i>R. tetraphyllus</i>, <i>Leptocarpus tenax</i>, <i>Epacris obtusifolia</i>, <i>Leptospermum juniperinum</i> and <i>Melaleuca nodosa</i>, tall heaths with <i>Banksia aemula</i>, <i>Leptospermum trinervium</i>, <i>Acrotriche aggregata</i> and <i>Leucopogon lanceolatus</i>, low heaths with <i>Bauera capitata</i>, <i>Hibbertia salicifolia</i>, <i>Epacris pulchella</i>, <i>Leucopogon</i> species, and <i>Boronia</i> species, lowland forests and woodlands with <i>Corymbia tessellaris</i>, <i>E. intermedia</i>, <i>Lophostemon confertus</i>, and <i>M. quinquenervia</i>, woodlands with <i>E. pilularis</i>, <i>E. crebra</i>, <i>E. tereticornis</i>, <i>E. intermedia</i>, <i>Lophostemon confertus</i>, <i>Acacia</i> species and <i>Callitris columellaris</i>, and open woodlands and grasslands with <i>E. pilularis</i>, <i>E. tereticornis</i>, <i>Xanthorrhoea</i> species, <i>Haemodorum tenuifolium</i>, <i>Tricoryne elatior</i>, <i>Xyris complanata</i>, and <i>Dianella caerulea</i>.</p> <p>Significance The Coombabah wetlands are significant because they are the most southerly lake and coastal swampland representatives in the bioregion, and because the area provides significant wildlife value and refuge habitat. Remnant vegetation mosaics are 10s to 100s of hectares in size. Remnant connectivity is poor and mosaics occur primarily as isolated fragments. Remnants have low to modest integrity, primarily due to numerous edge effects, illegal waste disposal and weed growth, clearing and fire. Weeds in the lowland areas include groundsel (<i>Baccharis halimifolia</i>), ragweed (<i>Ambrosia</i> species), introduced pine wildings and various pasture and annual species. Saline or brackish lowland wetlands are included in the Moreton Bay Ramsar area. Coombabah Lake and confluent tidal creeks intersect 41 mosaics of significant intertidal vegetation and tidal beds. The mosaics incorporate an area of about 500 ha. The Queensland Herbarium surveyed the tidal and near-tidal coastal vegetation and found 22 significant mosaics. Eleven mosaics have State significance and 11 have regional significance. Two Gazetted fish habitat areas extend through the tidal lake. The habitat areas include about 560 ha of the tidal wetland. The majority of the tidal lake and surrounding swamp area is used by waders for feeding and roosting.</p> <p>Social and Cultural values The Lake Coombabah area includes Ramsar and fish habitat areas because of its high value to bird and fish life. This wildlife activity attracts naturalist groups and bird watchers who survey the movement of migratory waders. The area is also popular with boat users. The Gold Coast City Council and QPWS supports the use of the area for natural history education, and local schools use the facilities for their studies. This is the last remaining representative of its type and size in the mainland area of the Gold Coast. The wetland area has high heritage value to the Kombumerri</p>

Description of the Environment

Wetland	Key Features
	<p>people. The area contains sites and relics such as shell middens and artifacts that indicate the use of natural resources by indigenous people for more than 5,000 years. These people harvested fish, crayfish, shellfish and dugong, as well as macropods, invertebrates and reptiles. The lowlands also provided vegetables and fruit, yams, nuts, berries, seeds etc. The area was used as a meeting and feasting place, and a place for ceremonies. The area also holds evidence of the development of the area by white settlers. The white settlers grazed cattle, cut and milled the timber, and fished the fisheries. From the 1950s to the present, the area has been marketed as a recreational, tourist and urban destination.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Coombabah - QLD194, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD194. Accessed 25 Jul 2017.</i></p>
<p>Lake Weyba</p>	<p>Site description The site comprises the area which covers that part of Noosa National Park south of the original headland park and the adjacent Lake Weyba.</p> <p>Physical features General geology: two geological units are represented. The majority of the area is of Pleistocene origins as old tidal delta sand deposits. The landform is level sand plain with humus podosols and peaty podosols on poorly drained plains and depressions. These low lying areas are seasonally waterlogged and the water table can be permanently close to the surface. Depression areas are permanently waterlogged. The western part of the block is on Myrtle Creek sandstones of Triassic/Jurassic origins. The landform here is gently undulating rises of coarse grained quartzose sandstones. Soils are yellow podosols or yellow earths, low in nutrients and with little or no structure.</p> <p>Ecological features (No data)</p> <p>Significance (No data)</p> <p>Social and Cultural values Increasingly used for recreation.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lake Weyba - QLD133, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD133. Accessed 25 Jul 2017.</i></p>
<p>Lower Mooloolah River</p>	<p>Site description The Mooloolah River runs through a long reach of sandy coastal plain to become a delta with small islands, bars and meander channels.</p> <p>Physical features The Mooloolah River is pinned to the north by a beach ridge plain, alluvium, rocky headland, and urban infrastructure such as canals. The landscape is very gently to gently inclined with occasional very low rises. Most of the lower Mooloolah River is derived from Quaternary alluvium deposits. Some low rises and ridgelines are formed on sandstone, siltstone, shale, and ferruginous material formed during the Triassic-Jurassic period. The majority of coastal sands and silts in the lowest areas have formed from deposits of Holocene tidal sandy mud or peat-mud. Humic gley soils occur on Quaternary alluvium, while bleached sandy soils with pans (humic podzols, ground water podzols) are found in northern areas. The soils are generally nutrient poor and poorly drained. Hummock microrelief is found in areas of frequent waterlogging. Acid sulfate soil deposits with Jarosite occurs in the majority of low-lying areas.</p> <p>Ecological features Eight vegetation associations occur in the lower floodplain. These are <i>Eucalyptus tereticornis</i>, swamp paperbark (<i>Melaleuca quinquenervia</i>), scribbly gum (<i>E. racemosa</i>), and pink bloodwood (<i>Corymbia intermedia</i>) open forest on old estuarine deposits, <i>M. quinquenervia</i>, swamp box (<i>Lophostemon suaveolens</i>), <i>E. tereticornis</i>, flooded gum (<i>E. grandis</i>), <i>E. racemosa</i>, swamp mahogany (<i>E. robusta</i>), <i>C. intermedia</i>, cabbage tree palm (<i>Livistona australis</i>) and piccabeen palm (<i>Archontophoenix cunninghamiana</i>) open forest on old estuarine deposits, <i>E. robusta</i>, <i>L. suaveolens</i> with <i>M. quinquenervia</i> open forest on old estuarine deposits, <i>E. robusta</i>, <i>E. racemosa</i>, red bloodwood (<i>C. gummifera</i>), <i>M. quinquenervia</i> open woodland, <i>L. suaveolens</i> on old estuarine deposits, <i>E. racemosa</i>, red mahogany (<i>E. resinifera</i>), <i>C. gummifera</i> woodland on old estuarine deposits, swamp stringybark (<i>E. conglomerata</i>), Queensland white stringybark (<i>E. tindaliae</i>), <i>E. robusta</i>, <i>C. gummifera</i> and <i>Syncarpia glomulifera</i> in woodland or open forest on old estuarine deposits, closed heathland and sedgeland commonly with <i>Hakea actites</i>, broad-leaved banksia (<i>Banksia robur</i>), <i>Leptospermum</i> spp. and swamp grasstree (<i>Xanthorrhoea fulva</i>) on old estuarine deposits with emergents such as <i>E. robusta</i>, <i>E. racemosa</i>, <i>E. conglomerata</i>, <i>M. quinquenervia</i>, and black sheoak (<i>Allocasuarina littoralis</i>),</p>

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	<p>and open to closed heathland/sedgeland with <i>M. quinquenervia</i> on old estuarine deposits. Aquatic emergents include <i>Phragmites</i>, <i>Lepironia</i>, <i>Ghania</i> and <i>Baumea</i> species. Estuarine species include river mangrove (<i>Aegiceras corniculatum</i>), grey mangrove (<i>Avicennia marina</i>), spotted mangrove (<i>Rhizophora stylosa</i>), large-fruited orange mangrove (<i>Bruguiera gymnorhiza</i>).</p> <p>Significance The Mooloolah River wetlands are significant because of they are a good representative of a number of wetland types and coastal environments, and because of the diversity of habitats, wildlife and provision of wildlife refuge.</p> <p>Social and Cultural values Two sites are listed in the Register of the National Estate; these are the Mooloolah River National Park and the Currimundi Lake Environmental Park. These areas are recognised and celebrated by local naturalist and conservation groups for their annual flower displays. The Mooloolah River and much of the mapped area is culturally significant to Indigenous peoples. Oyster middens have been found on the river banks and bora rings have been found in the area. Swards of <i>Blechnum indicum</i> within the <i>Melaleuca</i> forests provided a food source for Indigenous people. Evidence of Indigenous artefacts and tools is found in scatters in eastern coastal areas of the Mooloolah floodplain along with scarred trees.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Lower Mooloolah River - QLD187, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD187. Accessed 25 Jul 2017.</i></p>
<p>Moreton Bay Aggregation</p>	<p>Site description The Moreton Bay Aggregation site is a basin forming one of the largest semi enclosed estuarine bays in Australia, and is bounded by two of the largest sand dune islands in the world. The mainland catchment is that of a large number of streams draining eastwards into Moreton Bay and Pumicestone Passage, principally the Coomera, Logan, Brisbane, Pine and Caboolture rivers. Bribie, Moreton, North and South Stradbroke sand islands have local catchments and trap considerable reserves of groundwater in the permeable sand masses. There is relatively little direct runoff from these.</p> <p>Physical features Landform: reef, tidal flat, intertidal flat, supratidal flat, beach, tidal creek, estuary, drainage depression, stream channel, swamp and lake; uplands are mostly flats and dunes with high relief. General geology: the dune island barriers, barrier islands, strand plains, coastal plains, tidal deltas and back barrier lagoons of the bay are all depositional features and consist mainly of Quaternary sediments. These sediments were derived by stream erosion of Mesozoic and Permian sedimentary rocks and granites of the eastern Australian highlands. Strong longshore currents transported these predominantly quartz grains north throughout the Quaternary Period where they were trapped between the older rocky outcrops of the bay. Between these outcrops the average depth of the bedrock is 45 m. The rocky outcrops, coastal headlands and underlying bedrock of the islands and the bay itself are formed of Tertiary basalts and freshwater shales, Mesozoic sandstone and Palaeozoic metamorphic rocks with some laterite soil development at the surface. The bay is enclosed by the sand islands of South Stradbroke, North Stradbroke, Moreton and Bribie. Except for South Stradbroke, these islands are sand dune-island barriers. They were formed by wave and wind action during several cycles of sea level changes and date back 215,000 years. Unlike the dune-island barriers, South Stradbroke Island is a Holocene feature described as a true barrier island. Oceanic entrances into the bay incorporate a delta generated by tidal currents and consist of a network of sand shoals and channels on both sides of the inlet. Soils: undescribed saline soils and sediments on the tidal flats. Sandy soils and sediments in the eastern bay. A range of soils on the islands.</p> <p>Ecological features Moreton Bay is situated in an area transitional between tropical and temperate zones, and a number of species and associations are at the southern limit of their range. Diurnal circulation of oceanic water through the various entrances maintains high salinity throughout the bay. Moreton Bay consists of a deeper eastern section subject to strong north- south tidal circulation, and a shallower western section with much weaker east-west mixing. Consequently, fine particles settle in the less turbulent western areas of the bay, while the eastern bay is characterised by sandy sediments associated with higher tidal velocities. The following wetland and related habitats occur in the site: (i) marine and wetland environs of Moreton Bay: small areas of rocky shore and a total of approximately 23,000 ha of tidal flats with substrates of mud, sand or coral are exposed at low tide. These flats provide a variety of habitats and are of particular relevance to the migratory species of birds that are covered by JAMBA and CAMBA. Within the bay, mangroves colonise the muddy intertidal zone associated with the estuaries and sheltered embayments around the islands and mainland. Moreton Bay, including</p>

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	<p>Pumicestone Passage, contains approximately 13,720 ha of mangroves. Seven species of mangroves have been recorded. Within Moreton Bay densely vegetated seagrass meadows cover approximately 4,261 ha and a further 2,596 ha is covered by sparser patches. Of the total approximately 6,857 ha, 67% is in the Kooringal, Dunwich and Amity Banks area. The salt pans and saltmarshes generally are located adjacent to mangroves. Moreton Bay has approximately 6,328 ha of salt flats including unvegetated marine clay pans, dense mats of sand couch (<i>Sporobolus virginicus</i>), and samphire communities containing species of <i>Sarcocornia</i>, <i>Halosarcia</i> and <i>Suaeda</i>. In addition, <i>Juncus maritimus</i> is present in areas of low salinity; (ii) fringing coral reefs have formed around islands in the centre of the bay; (iii) dune-island barriers: North Stradbroke, Moreton and Bribie islands have the same genesis and have similar topography. Narrow coastal plains and long straight beaches border the high sand dunes of the interior. The western margins are mostly low energy environments characterised by tidal flats and mangrove swamps. The southern half of Bribie Island consists of lines of stranded beach ridges mainly of Pleistocene origin. The uniform sand, high infiltration rate and low runoff rate provide ideal conditions for a substantial store of ground water. Perched water tables form above the regional water table where buried organic soils or peats of old lagoons impede the vertical infiltration of water to the regional water table. Both perched lakes and window table lakes occur on the sand islands of the bay, although the former are much more common. Perched dune lakes form in depressions in a perched water table and may occur 100 m above sea level. The perched dune lakes have a distinctive water chemistry which strongly influences their biological communities. Species such as the 'acid' frogs have evolved adaptations to conditions of low pH and are restricted to a narrow coastal strip of 'wallum'. The biological communities of acid dune lakes are distinctive. Dense swards of sedges grow in the littoral zone. The dominant species is typically <i>Lepironia articulata</i>. Phytoplankton biomass is low and desmids dominate. Characteristic of dune lakes, the zooplankton consist almost entirely of the calanoid copepod <i>Calamoceia tasmanica</i>; (iv) swamps: acid peats consisting of decomposing vegetation have accumulated to depths of more than 1 m in the freshwater swamps. Sedges, Restiads and ferns, sword grass (<i>Gahnia sieberiana</i>) and <i>Blechnum</i>, and the twining climber snake fern (<i>Lygodium microphyllum</i>) dominate the majority of the island swamps; (v) frontal dune communities: the dominant species consist of <i>Spinifex sericeus</i> in association with the creepers <i>Ipomoea pes-caprae</i>, <i>Oenothera drummondii</i>, <i>Senecio lautus</i>, sea rocket (<i>Cakile edentula</i>), coastal jack bean (<i>Canavalia rosea</i>), pigface (<i>Carpobrotus glaucescens</i>) and climbing guinea flower (<i>Hibbertia scandens</i>).</p> <p>Significance The Moreton Bay Aggregation wetlands are nationally significant as one of the largest estuarine bays in Australia, enclosed by barrier islands of vegetated dunes, which together with the permanent lakes of the sand island components provide a diverse and rich suite of wetland habitats. The wetlands are particularly significant as habitat for migratory waders and dugongs (<i>Dugong dugon</i>). More than 50,000 wintering and staging waders depend on Moreton Bay during the non breeding season. The Bay is internationally significant for wintering Eastern Curlew (<i>Numenius madagascarensis</i>) (3,000-5,000 birds) and Grey-tailed Tattler (<i>Tringa breviceps</i>) (>10,000 birds).</p> <p>Social and Cultural values Moreton Island contains some of the best remaining evidence of Aboriginal adaptation to a marine based society. Sites of Aboriginal significance are on many islands in the bay and consist of middens, fish traps, artefact scatters, quarries and sacred trees. The shoreline was the first to be settled by Europeans in the Brisbane region. There has been a long history of scientific research and use by various schools, universities and government agencies. Queensland University, CSIRO, and the Queensland Department of Primary Industries have research stations in the Moreton Bay area. St. Helena Island was the first national park in Queensland to be reserved solely because of its historical significance, and is the only national park in Queensland containing substantial historic ruins. An estimated 300,000 recreational fishermen spend 1.5 million man days per year in the Bay. Approximately 2,000 people visit Brisbane annually to watch waders in Moreton Bay. The values of fish and related products from the Moreton Bay area is more than \$40 million annually to commercial operators, with a retail value of \$80 million.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Moreton Bay Aggregation - QLD134, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD134. Accessed 25 Jul 2017.</i></p>

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Wetland	Key Features
<p>Noosa River Wetlands</p>	<p>Site description Spectacular and extensive system of freshwater, brackish and saline lakes, marshes, heathlands and estuarine wetlands associated with the Noosa River; it has unique landforms, vegetation and fauna.</p> <p>Physical features The Noosa River flows across a low lying, low gradient coastal plain, between the Cooloola sandmass on the coast and a series of sandstone hills (Benham Range) a short distance to the west; this plain extends to the coast, east of Lakes Cootharaba and Cooroibah. The entire plain is generally sandy (Quaternary beach, estuarine and lacustrine deposits). Lakes Cootharaba and Cooroibah are open ended; Como, Weyba and Doonella are culs-de-sac; and Cooloola is isolated. Lakes Cooloola and Como are delta lakes, formed by deposition of sediment from the Noosa River where it enters Lake Cootharaba (which was formerly much more extensive). South of Lake Cooroibah, the river becomes more typically estuarine, with numerous low sand/mud islands, adjacent saline flats, and tidal delta and bars near the river mouth. Lake Weyba is located south of the Noosa estuary and, while not strictly a part of the Noosa River Lakes system, is tidally connected to the estuary.</p> <p>Ecological features Major habitat types include permanent open water bodies, estuarine waters, intertidal sand/mud flats, mangrove forest/shrubland, saltmarsh, open forest, woodland, sedgeland and heathland. Mangroves, intertidal flats and saltmarsh are the dominant communities in the Noosa River estuary, including islands and adjacent lakes. Fringing communities of mangrove forest/shrubland and/or swamp she-oak (<i>Casuarina glauca</i>) forest occur along the river and lake edges, to the limit of tidal influence. Mixed high to tall open forest/woodland communities occur along creek/river banks throughout the site (pink bloodwood (<i>Corymbia intermedia</i>), broad-leaved white mahogany (<i>Eucalyptus umbra</i>), <i>E. tereticornis</i>, black sheoak (<i>Allocasuarina littoralis</i>), coastal cypress (<i>Callitris columellaris</i>), swamp paperbark (<i>Melaleuca quinquenervia</i>) and swamp box (<i>Lophostemon suaveolens</i>). Seasonally and permanently waterlogged areas generally support tall woodlands dominated by swamp paperbark, with <i>Eucalyptus</i> spp., swamp box and swamp she-oak, and with or without shrub and ground layers of heath, grasses, sedges and restiads. Permanently saturated areas (e.g. freshwater lake margins) also support sedgelands. Common species including <i>Lepironia articulata</i>, soft twigrush (<i>Baumea rubiginosa</i>), <i>Baloskion pallens</i>, pithy sword sedge (<i>Lepidosperma longitudinale</i>) and sword grass (<i>Gahnia sieberiana</i>). Areas of low closed heathland occur on sand lenses within the drainage lines.</p> <p>Significance The Noosa River lakes and adjacent wetlands are one of few such wetland complexes on the Australian east coast;</p> <p>Social and Cultural values This site is a highly valued area for tourism and recreation; education is also a significant use (e.g. many school groups use facilities at Lake Cootharaba for geography and science field trips); rapidly increasing urban and tourism development due to the natural values of the area; invaluable area for research into unique flora, fauna and landscape processes; and highly significant to Aboriginal people with numerous archaeological sites.</p> <p><u>Reference</u></p> <p>Department of the Environment and Energy. 2017. Noosa River Wetlands - QLD135, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD135. Accessed 25 Jul 2017.</p>
<p>North Stradbroke Island</p>	<p>Site description North Stradbroke Island is a sand island anchored by sedimentary and volcanic rocky headlands developed in the Mesozoic and Palaeozoic period</p> <p>Physical features The island has been built by periodic ocean rise during the Quaternary. These transgressions move sand to the island and initiate dune formation. Most dune building occurred in the Pleistocene, with different periods of formation producing mosaics of dunes of different sizes and shapes. Dune patterns, elevation, and the distribution of peat and estuarine clay control wetland formation. The western marine flats form a tidal delta for southern Moreton Bay. In the Holocene, beach ridge formations have developed a large freshwater lagoon at the foothills of the eastern parabolic dunes. The lagoon (18 Mile Lagoon) includes approximately 3,000 ha of swamp and creekline. Acid peats and humic podzols (with organic pans) have developed in this type of environment. The wetlands are surrounded by fast draining siliceous sands. Marine flats have developed gleyed duplex soils.</p> <p>Ecological features Evapotranspiration accounts for 750–1,000 mm of water loss each year. Runoff quantities are less than 500 mm per annum, because soil-water and groundwater recharge captures most surface water. Recharge occurs through direct infiltration to an 'unconfined' aquifer. Surface water is retained in perched or groundwater swamps and lakes. Stream flow is mostly lateral discharge from the island's sand aquifers. The mapped area that is near-permanently waterlogged or inundated</p>

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Wetland	Key Features
	<p>exceeds 5,300 ha including tidal flats and estuaries. During seasonally wet periods, the wetland area expands to at least 6,300 ha. Water depth in swamps is usually less than 1.5 m, but depths greater than 6 m occur in lakes (eg. Blue and Brown Lake). Water quality is very good. Water is often tannin stained but turbidity is low, nitrogen levels are low, salinity is low and chlorophyll-a levels are low. Water pH is generally between 4 and 5. The primary function of the wetlands is for recharge, flood detention, discharge (lateral seepage holds saline water from groundwater), and supply of clean water to lagoons, swamps and lakes.</p> <p>Significance North Stradbroke Island wetlands are significant because they provide some of the best and largest representatives of southern sandy island wetlands, they include a diversity of wildlife in natural conditions, and provide refuge habitat to wildlife including migratory species. The wetlands provide substantial cultural and historical value to indigenous people, for European settlers and because of the significant role they have provided for research and education. Remnant ecosystems are large and well connected. Mosaics of remnants vary from 10s to 1000s of hectares in extent and have a high level of integrity. The Queensland Herbarium has identified 23 low-lying coastal wetland habitats in the mapped area. All of the mosaics are considered to have State significance. Some of the southern and north western open tidal and estuarine areas are included in designated fish habitat area. These areas contain more than 200 ha of designated fish habitat area within the mapped wetland. Migratory waders use numerous small bays and flats for feeding and roosting (about 120 ha in the mapped wetland area), and these sites connect with extensive Moreton Bay general wader habitat. The majority of fresh and saline wetlands are included in the Moreton Bay Ramsar area. Contemporary disturbance to remnant patches includes fire and weeds (<i>Lantana camara</i> and <i>Baccharis halimifolia</i>), clearing and water use for sand mining.</p> <p>Social and Cultural values A number of historical and indigenous sites are listed by the Register of the National Estate. These include natural values of the central and southern sections of the island, Blue Lake National Park, the Dunwich Cemetery, Southern and Eastern Moreton Bay, and places of indigenous value at Point Lookout and Dunwich. The sea caves and cliffs of the island have regional geohistorical value. The area is visited by birdwatchers and naturalist groups, to survey birds, especially migratory waders, and to observe dugong and whales. Universities from Brisbane have an established history and tradition of zoological, ecological, coastal geomorphology and oceanographic research from the island. The island's estuaries and harbours provide frequently used recreational boating and fishing facilities and resources. The North Stradbroke Island wetlands were a critical part of the traditional indigenous hunter-gather economy. The significance of wetlands to the traditional Aboriginal lifestyle of the North Stradbroke Island people is substantial. The <i>Blechnum indicum</i> fern was the predominant vegetable staple food, while swamp yam species such as <i>Ipomea</i> and <i>Typha</i> species, and wild fruits and berries appear to have also played a food role. The swamps, swamp margins and their ecotones harboured the majority of plant species used in, and essential to, the traditional economy. These include blueberry ash (fish poison); foods such as midgim and pig face; paperbark for housing, shelter, packaging and fish storage; cottonbush and native hibiscus for cordage, twine and hunting and fishing nets; bark and trees for canoes and housing; timber and wood for spears, boomerangs and tools; and reeds and boronia for basketry. The Eighteen Mile Swamp provided no constraints to movement of resources and the western margin was also used for traditional rights of passage initiation ceremony associated with a large bora ring associated located on the southern end of the island near Swan Bay. The west coast sites contain little evidence of the cross-island transport of food and other resources. Traditional occupation to the south of Dunwich appears to have been more low-key with family-sized occupation sites, often targeting premium local resources such as hairy mussel, oyster and quampie. European historic values include the use of Dunwich and Amity Point (areas with close access to Flinders and Myora swamps and springs) for early penal settlements until 1839. An initial survey of the island and contact with Aboriginals occurred in 1803 with an expedition led by Matthew Flinders. At that stage more than 300 indigenous people inhabited the island in permanent camps. Amity Point in the 1820s was used as a harbour and transfer point for goods dispatched to Brisbane. This activity was soon shifted to Dunwich. A Catholic mission for Aborigines was established at Dunwich in 1843. From 1850 to 1947 Dunwich played a Quarantine and 'Benevolent Asylum' role. Six large shipwrecks have occurred around the island. The historic cement and timber Point Lookout Light House was built in 1932 to reduce the number of shipping accidents. The island has an established history in the fishery industry, particularly from the 1940s. The most recent profitable and heavy industry to commence on the island is mineral sand mining (for ilmenite, rutile and zircon), which began in 1950. Much of the island's</p>

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Wetland	Key Features
	<p>infrastructure was built with the initiation of mining activities. The area is now better known for its tourism and urban lifestyle.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. North Stradbroke Island - QLD191, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD191. Accessed 25 Jul 2017.</i></p>
<p>Northeast Curtis Island</p>	<p>Site description The site is the northeastern side of Curtis Island, between Cape Keppel and Cape Capricorn, incorporating the extensive marine plain south of Yellow Patch inlet, and also Rundle Island. It is a shallow embayment some 20 km long, with small rocky headlands at each end; bay and estuary fringed largely by mangroves, behind which there is a 4,000 ha marine plain, which is tending to the southern limit of such habitat.</p> <p>Physical features Shallow embayment and small estuaries; offshore islands and sand bars; small rocky headlands; coastal lowlands; parabolic dune system and exposed sandmass. Geology dominated by estuarine deposits of the Holocene epoch; tidal delta sands of the same age at the mouth of Yellow Patch Inlet and in the sandbar offshore from it; Holocene high dune system occur along the southeastern boundary of the site (coastline running up to Cape Capricorn); Capes Capricorn and Keppel are formed on the Shoalwater and Wandilla formations respectively (Devonian); minor areas of Eocene colluvium occurs between the estuarine deposits and the Ramsay Range (Wandilla Formation).</p> <p>Ecological features Mangrove forest and shrubland forms an extensive fringing community along the estuaries and protected coastline of the bay; distinct banding occurs from seaward to land - Avicennia fringe on the seaward margin through a Rhizophora zone (main zone) a Ceriops zone on coastal saltflat to Ceriops fringe (between a saltflat and terrestrial vegetation). The most prominent feature of this wetland site is the vast (4,000 ha) marine plain, which represents the southern limit of this habitat type; the marine plain supports swampy or mixed grassland, dominated by green couch (<i>Cynodon dactylon</i>), <i>Paspalum</i> sp. and <i>Digitaria</i> sp., often in pure swards. The area supports a variety of flora and fauna, both terrestrial and marine, some of which are threatened species.</p> <p>Significance The extent of the marine plain, at the southern limit of the habitat type, the presence of threatened fauna, migratory waders, notable landscape features and the overall near natural condition of the area in general combine to make this site a highly significant wetland at the regional, state and national levels.</p> <p>Social and Cultural values A number of Aboriginal shell middens occur in the area. There is an historic lighthouse at Cape Capricorn which is listed on the Queensland Heritage Register. The site comprises an important grazing resource for leaseholders, and has significant tourism/recreation values (e.g. estuarine boating and fishing, sight seeing). There is a popular and spectacular mooring site in Yellow Patch Inlet, and Yellow Patch sand blow is a significant landscape feature.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Northeast Curtis Island - QLD017, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD017. Accessed 25 Jul 2017.</i></p>
<p>Pine River and Hays Inlet</p>	<p>Site description (No data)</p> <p>Physical features The Lower Pine River and Hays Inlet area is an estuarine delta at the northern limit of Brisbane City. Pine River, Fresh Water and Hays creeks discharge into the delta. Hays Creek forms Hays Inlet, a shallow linear inlet with extensive tidal flats. The genesis of the inlet and lower Pine River has defined the delta. The inlet is bounded by Tertiary ferricrete with outcrops of Tertiary basalt on Redcliffe Peninsula in the east, and Triassic-Jurassic sandstones and shales in Mango Hill to the west. The majority of the delta and inlet is formed from Holocene and Pleistocene sand and mud. Northern and western areas on sandstone, colluvium and palaeosol have formed clayey humic gley soils with poor drainage and ironstone nodules. Eastern parts of the delta include krasnozems soils. The majority of supratidal flats and meadows have gleyed podzolic or soloth duplex soils with poor drainage and frequent waterlogging. Soils in southern and south-western reaches include humic gleys formed in depressions and old tidal channels with high water tables. Acid sulfate soil deposits are known or expected to occur in almost all wetland areas.</p> <p>Ecological features Vegetation in the wetland is dominated by mangrove shrublands and forests, saltmarshes and claypans, mixed Eucalyptus forest, Melaleuca forest, Casuarina open forest and sedge</p>

Description of the Environment

Wetland	Key Features
	<p>swamps on old pasture. Mangrove communities include grey mangrove (<i>Avicennia marina</i>) closed forests and shrublands, with river mangrove (<i>Aegiceras corniculatum</i>), large-fruited orange mangrove (<i>Bruguiera gymnorhiza</i>), yellow mangrove (<i>Ceriops tagal</i>), spotted mangrove (<i>Rhizophora stylosa</i>), milky mangrove (<i>Exoecaria agallocha</i>) and black mangrove (<i>Lumnitzera racemosa</i>). Low open <i>Ceriops</i> shrubland are a common feature in the high tidal zone. Intertidal saltmarshes include sand couch (<i>Sporobolus virginicus</i>) grassland, samphire communities, claypans and algal mats. Mixed Eucalyptus forests and woodland include <i>E. tereticornis</i>, Moreton Bay ash (<i>E. tessellaris</i>), grey ironbark (<i>E. drepanophylla</i>), swamp she-oak (<i>Casuarina glauca</i>), white bottlebrush (<i>Callistemon salignus</i>), swamp paperbark (<i>M. quinquenervia</i>), <i>Cupaniopsis anarcardioides</i>, <i>Ficus platypoda</i>, <i>Brachychiton populneus</i>, broad-leaved leopard tree (<i>Flindersia collina</i>) and cotton tree (<i>Hibiscus tiliaceus</i>). Forests of <i>M. quinquenervia</i> occur as small remnants in the south but more extensive forests occur around Hays Inlet. <i>Casuarina glauca</i> with <i>S. virginicus</i> occur on estuarine verges. Sedge swamps include broad-leaved cumbungi (<i>Typha orientalis</i>), common reed (<i>Phragmites australis</i>), <i>Eleocharis species</i>, <i>Lepironia articulata</i>, and frogmouth (<i>Philydrum lanuginosum</i>). Minor scrub remnants occur with epiphytes (<i>Asplenium australasicum</i>), glossy acronychia (<i>Acronychia laevis</i>), and crow's ash (<i>Flindersia australis</i>).</p> <p>Significance The Pine River and Hays Inlet wetland is significant because of its value to wildlife, especially migratory waders, and because of the facilities provided for wildlife education and research. The Queensland Herbarium has classified the extensive tidal wetlands and low-lying freshwater wetland vegetation into 46 vegetation mosaics of tens of hectares. Twenty-three mosaics have been identified with State significance, seven mosaics have regional significance and 16 mosaics have local significance. A large area of the tidal zone, about 1,350 ha, is conserved for fish habitat, because of its value to fish and crustacean spawning and feeding. The area is critical to migratory waders. Seven areas of approximately 110 ha, as well as habitat mapped with the greater Moreton Bay area, provide essential wader roosting and feeding areas. The majority of the mapped wetland is included in the Moreton Bay Ramsar area because of its wader and fisheries significance. Significant weeds occur in the wetland, including <i>Cyperus papyrus</i>, <i>Eichhornia crassipes</i>, <i>Protasparagus species</i>, <i>Chloris gayana</i>, <i>Baccharis halimifolia</i>, and <i>Lantana camara</i>. These threats combined with pollution, littering and fire reduce the integrity and value of many habitats.</p> <p>Social and Cultural values The area is recognized regionally and nationally for its value to migratory waders. Thousands of visitors visit the wetland reserves (e.g. the Tinchi Tamba environmental park) to survey and observe the birds. Bird observer groups monitor the site annually and periodically to survey bird numbers. Bird hides and educational materials are provided in the Tinchi Tamba reserve. The area is recognized as a significant fishery, attracting tourists, boat and fishing enthusiasts from the Brisbane area. Indigenous values include middens, scarred trees and the use of the area for a burial area. Evidence of historic corduroy tracks and soldier settlements have been identified. One of these soldier settlement blocks was one of only two given to returned indigenous WW1 soldiers. The formal use of the area for recreation dates back to 1929 when a caretaker's cottage and kiosk was built. Public parks and picnic areas are regularly used. Swimming, photography and nature appreciation are activities encouraged within the reserves and conservation areas. The Tinchi Tamba reserve is used by local school and TAFE colleges for educational purposes.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pine River and Hays Inlet - QLD190, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD190. Accessed 25 Jul 2017.</i></p>
<p>Port Curtis</p>	<p>Site description The site includes all tidal areas in the vicinity of Gladstone, from a line between Laird Point and Friend Point (southern end of The Narrows), to a line between Gatcombe Head and Canoe Point, including the seaward side of Facing Island and Sable Chief Rocks, and southern Curtis Island west of a line between North Point and Connor Bluff.</p> <p>Physical features Partially enclosed embayment and shallow estuaries, including small, continental rocky islands, intertidal flats and estuarine islands. The geology consists of two main groups - Holocene estuarine deposits (lowlands), and Wandilla and Shoalwater Formations; both Devonian (islands and coastal hills), plus relatively smaller areas of Holocene tidal delta sands and beach ridges near the mouth of the Boyne River, and Pleistocene alluvium, associated with the Boyne and Calliope rivers.</p> <p>Ecological features There are extensive mangrove forests and shrublands (3,300 ha), seagrass beds (2,430 ha) and saltflats (2,800 ha). Mangroves exhibit distinct banding from seaward to land - <i>Avicennia</i></p>

Description of the Environment

Wetland	Key Features
	<p>fringe on seaward margin through a Rhizophora zone (main zone) a Ceriops zone on coastal saltflat to a Ceriops fringe (between saltflat and terrestrial vegetation). Seagrasses are generally intertidal due to the natural turbidity of the waters - most abundant species is <i>Zostera capricornia</i>, with <i>Halophila ovalis</i> and <i>Halodule uninervis</i> also common. Coastal saltflats are mostly bare claypan, with lesser areas ranging from low/dwarf open halophytic shrubland (e.g. <i>Sarcocornia</i> sp. and <i>Suaeda</i> spp.), to open and closed grasslands dominated by sand couch (<i>Sporobolus virginicus</i>).</p> <p>Significance (No data)</p> <p>Social and Cultural values Several sites of high archaeological significance occur on Facing Island, and a number of shipwrecks are also found along the coast. Gladstone Harbour is the major port of central Queensland - 20% of Queensland's and 5% of Australia's export revenue is earned through this port. The area provides an important access to the Great Barrier Reef and has a developing tourism industry; the harbour facilities and other infrastructure in Gladstone continue to provide initiative for major ongoing industrial development.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Port Curtis - QLD019, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD019. Accessed 25 Jul 2017.</i></p>
<p>Pumicestone Passage</p>	<p>Site description Several creek systems drain into Pumicestone Passage at the northern extent of Moreton Bay. The direct access of these creeks to the sea is blocked by the barrier island, Bribie Island. This gives rise to a narrow, shallow passage which has limited water exchange with the ocean. The build up of silt carried down by these creeks has formed vast tidal flats, providing feeding areas for waders. Seagrass meadows occur throughout the site. The adjacent national park on Bribie Island is fringed by mangroves backed by melaleuca swamps.</p> <p>Physical features General geology: the regional geology of the catchment area of Pumicestone Passage consists of a variety of volcanic and sedimentary rocks and associated unconsolidated sediments. The western boundary of the catchment is defined by the coastal ranges, consisting of sandstone, siltstone, shale, conglomerate, ironstone and coal of the Landsborough Sandstone. Along the coastal plain, the Landsborough Sandstone is the main sedimentary formation while Quaternary alluvium and coastal deposits are associated with streams issuing into Pumicestone Passage and along the western shores of that feature. Acid volcanic plugs, forming the Glasshouse Mountains, intrude into the sandstone unit. Bribie Island, which forms the eastern side of Pumicestone Passage, is built of Holocene dunes, tidal deltas, flats overlying Pleistocene sand ridges and estuarine deposits. It has no comparable major aeolian landforms such as those exhibited by the other barrier islands (Moreton, North Stradbroke and South Stradbroke) which form the eastern edge of Moreton Bay.</p> <p>Ecological features Four wetland habitats occur within the site, or adjacent to it: (i) shallow estuarine water systems including seagrass beds; (ii) lower intertidal mudflats; (iii) mangrove communities; and (iv) supratidal flats.</p> <p>Significance (No data):</p> <p>Social and Cultural values The site is important as a recreational area (e.g. swimming, fishing).</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Pumicestone Passage - QLD136, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD136. Accessed 25 Jul 2017.</i></p>
<p>The Narrows</p>	<p>Site description The site is the passage between Curtis Island and the mainland, including the tidal wetlands on northwestern Curtis Island, and Graham Creek east of Deception Creek.</p> <p>Physical features Passage landform between mainland and continental island; supra and intertidal flats and estuary landforms; predominantly recent and Quaternary alluvial and marine deposits of silt, clay and sand. Significant oil shale deposits are found below the more recent sediments.</p> <p>Ecological features Habitat types include: (i) saline coastal flats; (ii) mangrove forests; (iii) intertidal sand and mud flats; (iv) seagrass beds and (v) open marine and estuarine waters.</p> <p>Significance The Narrows is a unusual landform feature, being one of only four tidal passages in Australia.</p>

Description of the Environment

Wetland	Key Features
	<p>Social and Cultural values Several registered sites of Aboriginal significance occur along The Narrows; a major commercial and recreational fishing and crabbing area; important waterway (at high tide) for boats moving up and down the coast.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. The Narrows - QLD021, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD021. Accessed 25 Jul 2017.</i></p>
<p>Upper Pumicestone Coastal Plain</p>	<p>Site description The upper Pumicestone coastal and subcoastal plain includes the sub catchments of Bells, Lamerough, Halls, Bluegum, Mellum, Coochin, Coonorwin and Hussey creeks.</p> <p>Physical features The creeks are interrupted by depressions and swamps with hummock microrelief. Most water is shed from very low ridges of sandstone and lateritic residue. The creeks drain through tidal deltas to Pumicestone Passage. The creeks have low flow capacities and floodplain development is minimal. The geology is dominated by shale and sandstone from the Triassic-Jurassic period. The lowest plains are derived from tidal sands and muds. Soils include lateritic podzols, gleyed podzolics, humic gleys and groundwater podzols. The groundwater podzols are humus rich and have an organic pan. The podzolic gleyed soils are silt and clay rich, and are found in depressions subject to frequent inundation and anoxia. The humic gleys also occur in frequently inundated areas but are sandier and include perched water tables. Large areas with peat and peaty sands occur. The wetlands include hundreds of hectares of acid sulfate deposits.</p> <p>Ecological features Feature wetland communities include Melaleuca forested wetlands with swamp water fern (<i>Blechnum indicum</i>) and broad-leaved banksia (<i>Banksia robur</i>), fringing riparian swamp paperbark (<i>M. quinquenervia</i>) and black sheoak (<i>Allocasuarina littoralis</i>) with <i>Hypolepis</i>, <i>Lepironia</i>, <i>Lygodium</i>, <i>Rhynchospora</i> and <i>Cyperus</i> species, <i>M. quinquenervia</i> wet heaths with <i>Banksia</i>, <i>Leptospermum</i>, <i>Callistemon</i> and <i>Ghania</i> species, sedgeland with <i>Lepironia articulata</i>, <i>Cyperus</i>, <i>Ghania</i>, <i>Baumea</i>, <i>Schoenus</i>, <i>Leersia</i> and <i>Philydrum</i> species, gallery myrtaceous forests in the supratidal zone (scribbly gum (<i>Eucalyptus racemosa</i>) and <i>M. quinquenervia</i>), notophyll vine forest, open and closed proteaceous wet heath with swamp stringybark (<i>E. conglomerata</i>), Bancroft's red gum (<i>Eucalyptus bancroftii</i>), swamp box (<i>Lophostemon suaveolens</i>), <i>Syncarpia glomulifera</i>, tinywattle (<i>Acacia attenuata</i>), broad-leaved tea-tree (<i>M. leucadendra</i>), <i>Epacris</i>, <i>Lomandra</i>, <i>Baeckia</i> and <i>Banksia</i> species, scribbly gum (<i>E. racemosa</i>) and blackbutt (<i>E. pilularis</i>) forest, intertidal meadows and pans with sand couch (<i>Sporobolus virginicus</i>) and swamp she-oak (<i>Casuarina glauca</i>), and mangrove shrublands and forests with <i>Avicennia</i>, <i>Aegiceras</i>, <i>Ceriops</i>, <i>Rhizophora</i>, and <i>Bruguiera</i> species.</p> <p>Significance The Upper Pumicestone Coastal Plain wetlands are significant because they contain some of the last remnants of wallum and intertidal wetland from the once extensive wetlands of the northern Caboolture plain. These remnants are good representatives because they have been conserved from development and for research. The area hosts a very large number of wildlife species, including migratory species, and provides refuge habitat for wildlife. The area has high cultural significance to Indigenous peoples and for research and education purposes.</p> <p>Social and Cultural values Several features in the area are listed in the Register of the National Estate. These include Pumicestone Passage and places of Indigenous value (e.g. bora and kippa rings, and fish traps occur in the area). The Pumicestone plain contains numerous sites of artefact scatters, scarred trees, middens and camps. The wetlands in this area provided an abundance of food (e.g. fish, crayfish, shellfish and vegetable matter) for Indigenous peoples. The area has an historic timber harvesting record, and a collection of Jinker logs and stumps cut using springboards are located in the area. The mapped area includes four scientific areas with a combined area of 800 ha. These areas were conserved from logging and wildfires to provide ecological reference sites to illustrate coastal wallum conditions prior to logging, and to enable the evaluation of soil types and the evolution of habitats. Habitat evolution research included analysis of fire frequency effects on wallum community diversity and viability. Local conservation and naturalist groups and QPWS survey these areas periodically and encourage community involvement. Universities also contribute to research. These areas are managed with risk management plans. The scientific areas have been established for 26 to 75 years, and their biological and ecological characteristics and dynamics have been extensively researched during that period of time. Large numbers of naturalists visit Pumicestone Passage for bird surveys because the area hosts large numbers of migratory waders. The passage is popular for boating</p>

Description of the Environment

Projects & Operations | EP

Wetland	Key Features
	<p>activities, particularly recreational fishermen, and attracts tourists from across the region for this purpose.</p> <p><u>Reference</u> <i>Department of the Environment and Energy. 2017. Upper Pumicestone Coastal Plain - QLD188, in Australian Wetlands Database. Department of the Environment and Energy, Canberra. Available from: http://www.environment.gov.au/cgi-bin/wetlands/report.pl?smode=DOIW;doiw_refcodelist=QLD188. Accessed 25 Jul 2017.</i></p>

Appendix 3 - EPBC Protected Matters Search Reports

Environment Sectors:

- Otway
- Bass Strait
- Gippsland
- Sorell
- SE Tasmania
- Central NSW
- SE Queensland
- Lord Howe
- Norfolk Island



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: 22-Aug-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	80
Listed Migratory Species:	54

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:	82
Whales and Other Cetaceans:	30
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:	1
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	17
Key Ecological Features (Marine):	1
Biologically Important Areas:	15
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[\[Resource Information \]](#)

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

Feature Name

Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name

[Littoral Rainforest and Coastal Vine Thickets of Eastern Australia](#)

Threatened Category

Critically Endangered

Presence Text

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

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

BIRD

[Anthochaera phrygia](#)

Regent Honeyeater [82338]

Threatened Category

Critically Endangered

Presence Text

Species or species habitat likely to occur within area

[Botaurus poiciloptilus](#)

Australasian Bittern [1001]

Endangered

Species or species habitat likely to occur within area

[Calidris canutus](#)

Red Knot, Knot [855]

Endangered

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 may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely 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 likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	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
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding 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

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
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
FISH		
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may 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
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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 may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
PLANT		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding 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	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat may occur within area
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat 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

Scientific Name	Threatened Category	Presence Text
Centrophorus uyato listed as Centrophorus zeehaani Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	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 bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	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

Scientific Name	Threatened Category	Presence Text
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding 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	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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 likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

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 Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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

Scientific Name	Threatened Category	Presence Text
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]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat 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
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely 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
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	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
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

Scientific Name	Threatened Category	Presence Text
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may 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 may occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
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

Scientific Name	Threatened Category	Presence Text
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
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area

Mammal

Scientific Name	Threatened Category	Presence Text
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[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

Breeding 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

Breeding likely to occur within area

[Eretmochelys imbricata](#)

Hawksbill Turtle [1766]

Vulnerable

Species or species habitat likely to occur within area

Whales and Other Cetaceans

[[Resource Information](#)]

Current Scientific Name

Status

Type of Presence

Mammal

[Balaenoptera acutorostrata](#)

Minke Whale [33]

Species or species habitat may occur within area

[Balaenoptera bonaerensis](#)

Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]

Species or species habitat likely to occur within area

[Balaenoptera borealis](#)

Sei Whale [34]

Vulnerable

Foraging, feeding or related behaviour likely to occur within area

[Balaenoptera 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 likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
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

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

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State
Ewing Morass W.R	Natural Features Reserve	VIC

Regional Forest Agreements [\[Resource Information \]](#)

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

RFA Name [\[Resource Information \]](#)

RFA Name	State
East Gippsland RFA	Victoria

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State
Ewing's Marsh (Morass)	VIC

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
2D seismic Survey in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	Not Controlled Action	Completed
Basker-Manta-Gummy Oil Field Development	2007/3402	Not Controlled Action	Completed
Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
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
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
Longtom Gas Pipeline Development, VIC/P54	2006/3072	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
Not controlled action (particular manner)			
2D seismic survey in the Sole gas field and adjacent acreage in the Gippsland Basin (VIC RL/3 & VIC/	2002/871	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey Program in Bass Strait	2008/4040	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins 3D Seismic Survey VIC/P55	2007/3780	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed

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

Scientific Name	Behaviour	Presence
Seabirds		
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur

Scientific Name	Behaviour	Presence
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[Carcharodon carcharias](#)

White Shark [64470]

Distribution
(low density)

Likely to occur

[Carcharodon carcharias](#)

White Shark [64470]

Known
distribution

Known to occur

Whales

[Balaenoptera musculus brevicauda](#)

Pygmy Blue Whale [81317]

Distribution

Known to occur

[Balaenoptera musculus brevicauda](#)

Pygmy Blue Whale [81317]

Foraging

Likely to be
present

Bioregional Assessments

SubRegion

Gippsland

BioRegion

Gippsland Basin

Website

[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: 16-Jun-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	3
Listed Threatened Ecological Communities:	17
Listed Threatened Species:	145
Listed Migratory Species:	82

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:	42
Commonwealth Heritage Places:	12
Listed Marine Species:	128
Whales and Other Cetaceans:	39
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	2
Australian Marine Parks:	7
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:	92
Regional Forest Agreements:	5
Nationally Important Wetlands:	40
EPBC Act Referrals:	109
Key Ecological Features (Marine):	6
Biologically Important Areas:	49
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

[Gippsland lakes](#)

Proximity

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

EEZ and Territorial Sea

Extended Continental Shelf

Extended Continental Shelf

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

[Araluen Scarp Grassy Forest](#)

Threatened Category

Endangered

Presence Text

Community may occur within area

[Brogo Vine Forest of the South East Corner Bioregion](#)

Endangered

Community likely to occur within area

[Coastal Swamp Oak \(Casuarina glauca\) Forest of New South Wales and South East Queensland ecological community](#)

Endangered

Community likely to occur within area

[Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland](#)

Endangered

Community likely to occur within area

[Giant Kelp Marine Forests of South East Australia](#)

Endangered

Community may occur within area

[Gippsland Red Gum \(Eucalyptus tereticornis subsp. mediana\) Grassy Woodland and Associated Native Grassland](#)

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
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 may 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
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
null		
Mordacia praecox		
Non-parasitic Lamprey, Precocious Lamprey [81530]	Endangered	Species or species habitat likely to occur within area
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area
Aquila audax fleayi Tasmanian Wedge-tailed Eagle, Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Breeding likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
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 may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat 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 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	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
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
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

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche 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
CRUSTACEAN		
Engaeus martigener Furneaux Burrowing Crayfish [67220]	Endangered	Species or species habitat may occur within area
FISH		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	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
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Litoria watsoni Watson's Tree Frog [91509]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	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
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	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
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

Scientific Name	Threatened Category	Presence Text
<u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u>		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
<u>Potorous longipes</u>		
Long-footed Potoroo [217]	Endangered	Species or species habitat known to occur within area
<u>Potorous tridactylus trisulcatus</u>		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat known to occur within area
<u>Pseudomys fumeus</u>		
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat likely to occur within area
<u>Pseudomys novaehollandiae</u>		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
<u>Pteropus poliocephalus</u>		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
OTHER		
<u>Dendronephthya australis</u>		
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat known to occur within area
PLANT		
<u>Acacia caerulescens</u>		
Limestone Blue Wattle, Buchan Blue, Buchan Blue Wattle [21883]	Vulnerable	Species or species habitat known to occur within area
<u>Acacia constablei</u>		
Narrabarba Wattle [10798]	Critically Endangered	Species or species habitat known to occur within area
<u>Acacia georgensis</u>		
Bega Wattle [9848]	Vulnerable	Species or species habitat known to occur within area
<u>Amphibromus fluitans</u>		
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat may 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 may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area
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
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

Scientific Name	Threatened Category	Presence Text
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat likely to occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely 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
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
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
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

Scientific Name	Threatened Category	Presence Text
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 frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	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
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 likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text
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 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 epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat known to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat 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
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
Zieria tuberculata Warty Zieria [56736]	Vulnerable	Species or species habitat known to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	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	Species or species habitat 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

Scientific Name	Threatened Category	Presence Text
Centrophorus uyato listed as Centrophorus zeehaani Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
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]		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

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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 known to occur within area

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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
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 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
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
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	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]		Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
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
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
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat 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
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat 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
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat 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
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Australian National University

Commonwealth Land - Australian National University [12023]	NSW
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Commonwealth Land - Australian National University [12022]	NSW
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Commonwealth Land - Australian National University [12024]	NSW
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Commonwealth Land - Australian National University [12021]	NSW
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Commonwealth Land - Australian National University [12019]	NSW
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Commonwealth Land - Australian National University [15737]	NSW
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Commonwealth Trading Bank of Australia

Commonwealth Land - Commonwealth Trading Bank of Australia [12020]	NSW
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Communications, Information Technology and the Arts - Australian Postal Corporation

Commonwealth Land - Australian Postal Commission [12052]	NSW
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Communications, Information Technology and the Arts - Telstra Corporation Limited

Commonwealth Land - Australian Telecommunications Commission [12053]	NSW
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Commonwealth Land - Australian Telecommunications Commission [12050]	NSW
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Commonwealth Land - Australian Telecommunications Commission [15461]	NSW
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Commonwealth Land - Australian Telecommunications Commission [15430]	NSW
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Commonwealth Land - Australian Telecommunications Commission [15611]	NSW
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Commonwealth Land - Australian Telecommunications Commission [16089]	NSW
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Commonwealth Land - Australian Telecommunications Commission [12038]	NSW
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Commonwealth Land - Australian Telecommunications Commission [12014]	NSW
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Commonwealth Land - Australian Telecommunications Commission [12265]	NSW
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Commonwealth Land Name	State
Commonwealth Land - Australian Telecommunications Commission [12025]	NSW
Commonwealth Land - Telstra Corporation Limited [12051]	NSW
Commonwealth Land - Telstra Corporation Limited [15888]	NSW
Defence	
Defence - BEECROFT RAPIER RANGE [10049]	NSW
Defence - BEECROFT RAPIER RANGE [10048]	NSW
Defence - BEECROFT RAPIER RANGE [10051]	NSW
Defence - BEECROFT RAPIER RANGE [10050]	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 [91002]	JBT
Commonwealth Land - Booderee National Park [91003]	JBT
Commonwealth Land - Booderee National Park [91001]	JBT
Commonwealth Land - Booderee National Park [91004]	JBT
Commonwealth Land - Booderee National Park [91005]	JBT
Unknown	
Commonwealth Land - [12042]	NSW
Commonwealth Land - [12041]	NSW
Commonwealth Land - [21489]	VIC
Commonwealth Land - [21496]	VIC
Commonwealth Land - [21497]	VIC
Commonwealth Land - [21498]	VIC
Commonwealth Land - [21491]	VIC
Commonwealth Land - [21490]	VIC
Commonwealth Land - [12045]	NSW
Commonwealth Land - [12046]	NSW

Commonwealth Land Name	State
Commonwealth Land - [12047]	NSW

Commonwealth Heritage Places [\[Resource Information \]](#)

Name	State	Status
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Historic

Cape St George Lighthouse Ruins & Curtilage	ACT	Listed place
Christians Minde Settlement	ACT	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

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
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Listed Marine Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
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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

Scientific Name	Threatened Category	Presence Text
Ardena carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardena grisea as Puffinus griseus Sooty Shearwater [82651]		Breeding known to occur within area
Ardena pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Ardena tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
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 ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
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
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		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]		Foraging, feeding or related behaviour 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

Scientific Name	Threatened Category	Presence Text
Hydroprogne caspia Caspian Tern [808]		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
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat may occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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 may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
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

Scientific Name	Threatened Category	Presence Text
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Breeding likely to occur within 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 skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat 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
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
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
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
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
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
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout 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	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	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	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

Current Scientific Name	Status	Type of Presence
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
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 Ginkgo-toothed Beaked Whale, Ginkgo-toothed Whale, Ginkgo 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
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
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

Current Scientific Name	Status	Type of Presence
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	Botanic Gardens (Commonwealth)
Booderee	JBT	National Park (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)
Jervis	Special Purpose Zone (Trawl) (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Baawang	Reference Area	VIC
Badger Island	Indigenous Protected Area	TAS
Bancroft Bay - Kalimna G.L.R.	Natural Features Reserve	VIC
Bass Pyramid	Nature Reserve	TAS
Batemans	Marine Park	NSW
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
Beware Reef	Marine Sanctuary	VIC
Biamanga	National Park	NSW
Blond Bay W.R.	Natural Features Reserve	VIC
Blyth Point	Conservation Area	TAS
Bournda	National Park	NSW
Brodribb River F.F.R	Nature Conservation Reserve	VIC
Broulee Island	Nature Reserve	NSW
Brush Island	Nature Reserve	NSW
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

Protected Area Name	Reserve Type	State
Cape Howe	Marine National Park	VIC
Chappell Islands	Nature Reserve	TAS
Clyde River	National Park	NSW
Conjola	National Park	NSW
Craggy Island	Conservation Area	TAS
Croajingolong	National Park	VIC
Cullendulla Creek	Nature Reserve	NSW
Devils Tower	Nature Reserve	TAS
Double Creek	Natural Catchment Area	VIC
Eagles Claw	Nature Reserve	NSW
East Gippsland Coastal streams	Natural Catchment Area	VIC
Egg Beach	Conservation 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
Fraser Island G.L.R.	Natural Features Reserve	VIC
Gippsland Lakes Coastal Park	Conservation Park	VIC
Goose Island	Conservation Area	TAS
Hogan Group	Conservation Area	TAS
Illawong	Nature Reserve	NSW
Jacksons Cove	Conservation Area	TAS
Jervis Bay	National Park	NSW

Protected Area Name	Reserve Type	State
Jervis Bay	Marine Park	NSW
Kent Group	National Park	TAS
Killiecrankie	Nature Recreation Area	TAS
Lake Corringale W.R	Natural Features Reserve	VIC
Lake Curlip W.R.	Natural Features Reserve	VIC
Lake Tyers S.P.	State Park	VIC
Little Island	Conservation Area	TAS
Low Point	Conservation Area	TAS
Mallacoota B.R.	Natural Features Reserve	VIC
Meroo	National Park	NSW
Metung B.R.	Natural Features Reserve	VIC
Mimosa Rocks	National Park	NSW
Montague Island	Nature Reserve	NSW
Mortimers Paddock B.R.	Natural Features Reserve	VIC
Mount Tanner	Nature Recreation Area	TAS
Mumbulla	Flora Reserve	NSW
Murrah	Flora Reserve	NSW
Murramarang	National Park	NSW
Nadgee	Nature Reserve	NSW
Narrawallee Creek	Nature Reserve	NSW
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

Protected Area Name	Reserve Type	State
Palana Beach	Nature Recreation Area	TAS
Pasco Group	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
Raymond Island G.L.R.	Natural Features Reserve	VIC
Rigby Island G.L.R.	Natural Features Reserve	VIC
Roydon Island	Conservation Area	TAS
Sandpatch	Wilderness Zone	VIC
Seal Creek	Reference Area	VIC
Seal Islands W.R.	Nature Conservation Reserve	VIC
Sentinel Island	Conservation Area	TAS
Sister Islands	Conservation Area	TAS
Snowy River	Heritage River	VIC
Steel Bay - Newland Backwater G.L.R.	Natural Features Reserve	VIC
Tanja	Flora Reserve	NSW
The Dock	Conservation Covenant	TAS
The Lakes	National Park	VIC
Tollgate Islands	Nature Reserve	NSW
William Hunter F.R	Nature Conservation Reserve	VIC
Wingaroo	Nature Reserve	TAS
Wright Rock	Nature Reserve	TAS

Regional Forest Agreements

[[Resource Information](#)]

Note that all areas with completed RFAs have been included.

RFA Name	State
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RFA Name	State
East Gippsland RFA	Victoria
Eden RFA	New South Wales
Gippsland RFA	Victoria
Southern RFA	New South Wales
Tasmania RFA	Tasmania

Nationally Important Wetlands	[Resource Information]
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Wetland Name	State
Beecroft Peninsula	NSW
Benedore River	VIC
Bondi Lake	NSW
Clyde River Estuary	NSW
Coila Creek Delta	NSW
Cormorant Beach	NSW
Cullendulla Creek and Embayment	NSW
Durras Lake	NSW
Ewing's Marsh (Morass)	VIC
Jervis Bay	NSW
Jervis Bay Sea Cliffs	NSW
Lagoon Head	NSW
Lake Bunga	VIC
Lake King Wetlands	VIC
Lake Tyers	VIC
Lake Victoria Wetlands	VIC
Lower Snowy River Wetlands System	VIC
Mallacoota Inlet Wetlands	VIC
Merimbula Lake	NSW
Meroo Lake Wetland Complex	NSW

Wetland Name	State
Moruya River Estuary Saltmarshes	NSW
Nadgee Lake and tributary wetlands	NSW
Nargal Lake	NSW
Nelson Lagoon	NSW
Pambula Estuarine Wetlands	NSW
Snowy River	VIC
St Georges Basin	NSW
Swan Lagoon	NSW
Sydenham Inlet Wetlands	VIC
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
Twofold Bay	NSW
Waldrons Swamp	NSW
Wallaga Lake	NSW
Wallagoot Lagoon (Wallagoot Lake)	NSW

EPBC Act Referrals [[Resource Information](#)]

Title of referral	Reference	Referral Outcome	Assessment Status
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
Controlled action			
Gippsland Lakes Mosquito Control Aerial /Hovercraft Spraying	2001/491	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
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
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
55m lattice tower & infrastructure	2003/1159	Not Controlled Action	Completed
Acquisition 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
Australia-USA Southern Cross NEXT fibre optic cable installation	2019/8405	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
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
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
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
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Installation of Sydney-Guam Submarine Cable	2007/3848	Not Controlled Action	Completed
Japan-Guam-Australia Sunshine Coast Branch Marine Cable Route Survey (JGA) QLD	2018/8373	Not Controlled Action	Completed
Longtom-3 Gas Appraisal Well, VIC/P54	2005/2494	Not Controlled Action	Completed
Longtom Gas Pipeline Development, VIC/P54	2006/3072	Not Controlled Action	Completed
Marlin-Snapper Gas Pipeline Project	2006/3197	Not Controlled Action	Completed
Melville 1 Oil Exploration Well	2001/167	Not Controlled Action	Completed
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
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
Sole-2 appraisal gas well, VIC/RL3	2002/636	Not Controlled Action	Completed
Sole gas field development	2003/937	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
wastewater collection systems and pumping stations	2001/511	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Wreck Bay Housing Development	2001/299	Not Controlled Action	Completed
Not controlled action (particular manner)			
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
Bream 3D seismic survey	2006/2556	Not Controlled Action (Particular Manner)	Post-Approval
Church and School Development	2006/3185	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Construction and operation of a subsea telecommunications cable, between Sydney and New Zealand	2015/7480	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
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
Hawaiki Fibre-Optic Submarine Cable installation	2016/7765	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Inspection of project vessels for presence of invasive marine pests in Commonwealth waters off Victo	2012/6362	Not Controlled Action (Particular Manner)	Post-Approval
International fibre optic submarine cable installation, between Sydney and Honiara, Solomon Islands	2015/7502	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Japan-Guam-Australia (JGA) Fibre Optic Cable project	2016/7795	Not Controlled Action (Particular Manner)	Post-Approval
Lakes Entrance Sand Management Program Trial Dredging	2007/3852	Not Controlled Action (Particular Manner)	Post-Approval
Lakes Entrance Sand Management Program Trial Dredging	2007/3694	Not Controlled Action (Particular Manner)	Completed
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
Seismic survey, Gippsland Basin	2001/525	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Southern Cross Australia-New Zealand-America marine acoustic survey of the seabed	2017/7863	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
Tasman Global Access submarine cable marine route survey, Narrabeen, NSW	2015/7442	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			
Beardie-1 Field wildcat oil well	2001/469	Referral Decision	Completed
Beecroft Weapons Range Visitors Centre	2004/1322	Referral Decision	Completed
Breeding program for Grey Nurse Sharks	2007/3245	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

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Longtom-5 Offshore Production Drilling (Vic/L29)	2012/6413	Referral Decision	Completed
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed
Upgrade of Corringale 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
Tasman Front and eddy field	Temperate east
Upwelling East of Eden	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Dolphins		
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur
Seabirds		
Ardeanna carneipes		
Flesh-footed Shearwater [82404]	Foraging	Known to occur
Ardeanna grisea		
Sooty Shearwater [82651]	Breeding	Known to occur
Ardeanna grisea		
Sooty Shearwater [82651]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known 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
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
Oceanites oceanites Wilson's Storm Petrel [1034]	Migration	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
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]	Foraging	Known to occur
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur
Pterodroma macroptera Great-winged Petrel [1035]	Foraging	Likely 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 melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Likely to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Thalasseus bergii Crested Tern [83000]	Breeding	Known to occur
Thalasseus bergii Crested Tern [83000]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Sharks		
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur
Carcharias taurus Grey Nurse Shark [64469]	Migration	Known to occur
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Eubalaena australis Southern Right Whale [40]	Connecting habitat	Known to occur
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur
Eubalaena australis Southern Right Whale [40]	Migration and resting on migration	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
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Bioregional Assessments

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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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: 06-Sep-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	90
Listed Migratory Species:	58

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:	86
Whales and Other Cetaceans:	30
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:	13
Regional Forest Agreements:	1
Nationally Important Wetlands:	3
EPBC Act Referrals:	38
Key Ecological Features (Marine):	2
Biologically Important Areas:	15
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity
Gippsland lakes	Within 10km of Ramsar site

Commonwealth Marine Area [\[Resource Information \]](#)

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

Feature Name

Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

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
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Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
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Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
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River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
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Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
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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		
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Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
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Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
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
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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

Scientific Name	Threatened Category	Presence Text
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat 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 likely 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

Scientific Name	Threatened Category	Presence Text
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
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

Scientific Name	Threatened Category	Presence Text
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
FISH		
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
SeriOLElla brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Litoria watsoni Watson's Tree Frog [91509]	Endangered	Species or species habitat likely to occur within area
MAMMAL		

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
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
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
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 may occur within area

Scientific Name	Threatened Category	Presence Text
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
PLANT		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	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
Calochilus pulchellus Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat may occur within area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat likely to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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
SHARK		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat 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

Scientific Name	Threatened Category	Presence Text
Centrophorus uyato listed as Centrophorus zeehaani Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding known to 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 bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	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

Scientific Name	Threatened Category	Presence Text
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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 likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area

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 Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardena carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardena grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may 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]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
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
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		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
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
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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 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]		Foraging, feeding or related behaviour likely to occur within area overfly marine 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
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within 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 likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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
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
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

Scientific Name	Threatened Category	Presence Text
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
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

Scientific Name	Threatened Category	Presence Text
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
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area

Mammal

Scientific Name	Threatened Category	Presence Text
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[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

Breeding likely to occur within area

[Chelonia mydas](#)

Green Turtle [1765]

Vulnerable

Species or species habitat known to occur within area

[Dermochelys coriacea](#)

Leatherback Turtle, Leathery Turtle, Luth [1768]

Endangered

Breeding likely to occur within area

[Eretmochelys imbricata](#)

Hawksbill Turtle [1766]

Vulnerable

Species or species habitat likely to occur within area

Whales and Other Cetaceans

[[Resource Information](#)]

Current Scientific Name

Status

Type of Presence

Mammal

[Balaenoptera acutorostrata](#)

Minke Whale [33]

Species or species habitat may occur within area

[Balaenoptera bonaerensis](#)

Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]

Species or species habitat likely to occur within area

[Balaenoptera borealis](#)

Sei Whale [34]

Vulnerable

Foraging, feeding or related behaviour likely to occur within area

[Balaenoptera 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 likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
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

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

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Beware Reef	Marine Sanctuary	VIC
Brodribb F.R.	Nature Conservation Reserve	VIC
Brodribb River F.F.R	Nature Conservation Reserve	VIC
Cabbage Tree Creek F.R	Nature Conservation Reserve	VIC
Cape Conran Coastal Park	Conservation Park	VIC
Ewing Morass W.R	Natural Features Reserve	VIC
First and Second Islands F.R.	Nature Conservation Reserve	VIC
Lake Corringale W.R	Natural Features Reserve	VIC
Lake Curlip W.R.	Natural Features Reserve	VIC
Snowy River	Heritage River	VIC
William Hunter F.R	Nature Conservation Reserve	VIC

Protected Area Name	Reserve Type	State
Wombat Creek N.C.R.	Natural Features Reserve	VIC
Wood Point F.R	Nature Conservation Reserve	VIC

Regional Forest Agreements [\[Resource Information \]](#)

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

RFA Name	State
East Gippsland RFA	Victoria

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State
Ewing's Marsh (Morass)	VIC
Lower Snowy River Wetlands System	VIC
Snowy River	VIC

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
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
Biodiversity Impacts Audit	2011/6191	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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
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 Gippsland Pipeline compressor station, Newmerella, Vic	2014/7390	Not Controlled Action	Completed
East Pilchard exploration well	2001/137	Not Controlled Action	Completed
Gippsland Basin Seismic Programme	2004/1866	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
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
Northright-1 Exploration Well	2001/209	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
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D 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 Program in Bass Strait	2008/4040	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
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
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins 3D Seismic Survey VIC/P55	2007/3780	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
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed
Upgrade of Corringale 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	
Upwelling East of Eden	South-east	
Biologically Important Areas		
Scientific Name	Behaviour	Presence
Seabirds		
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur
Sharks		
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present

Bioregional Assessments		
SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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EPBC Act Protected Matters Report

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

Report created: 28-Aug-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	82
Listed Migratory Species:	58

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:	86
Whales and Other Cetaceans:	30
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:	2
Regional Forest Agreements:	1
Nationally Important Wetlands:	3
EPBC Act Referrals:	35
Key Ecological Features (Marine):	1
Biologically Important Areas:	15
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[\[Resource Information \]](#)

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

Feature Name

Commonwealth Marine Areas (EPBC Act)

Commonwealth Marine Areas (EPBC Act)

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name

[Littoral Rainforest and Coastal Vine Thickets of Eastern Australia](#)

Threatened Category

Critically Endangered

Presence Text

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

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

[BIRD](#)
[Anthochaera phrygia](#)

Threatened Category

Critically Endangered

Presence Text

Species or species habitat likely to occur within area

[Botaurus poiciloptilus](#)

Australasian Bittern [1001]

Endangered

Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
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
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

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
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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 may occur within area

Scientific Name	Threatened Category	Presence Text
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 known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat 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 likely 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	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area

FROG

Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area

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

Scientific Name	Threatened Category	Presence Text
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus trisulcatus Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
PLANT		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat may occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
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[Lissolepis coventryi](#)

Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat likely to occur within area
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SHARK

[Carcharodon carcharias](#)

White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
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[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
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[Centrophorus uyato listed as Centrophorus zeehaani](#)

Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
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[Galeorhinus galeus](#)

School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
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[Rhincodon typus](#)

Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
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Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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[Ardenna carneipes](#)

Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
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[Ardenna grisea](#)

Sooty Shearwater [82651]		Species or species habitat may occur within area
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[Diomedea antipodensis](#)

Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
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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
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
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding known to 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

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
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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 likely to occur within area

Scientific Name	Threatened Category	Presence Text
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardena carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardena grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may 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]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	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 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
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		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
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to 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 may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to 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
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

Scientific Name	Threatened Category	Presence Text
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus 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

Scientific Name	Threatened Category	Presence Text
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
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

Scientific Name	Threatened Category	Presence Text
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 Longsnout 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	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area

Whales and Other Cetaceans

[Resource Information]

Current Scientific Name	Status	Type of Presence
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Mammal

Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
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Current Scientific Name	Status	Type of Presence
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	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

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

Current Scientific Name	Status	Type of Presence
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
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

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State
Ewing Morass W.R	Natural Features Reserve	VIC
Snowy River	Heritage River	VIC

Regional Forest Agreements [\[Resource Information \]](#)

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

RFA Name	State
East Gippsland RFA	Victoria

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State
Ewing's Marsh (Morass)	VIC
Lower Snowy River Wetlands System	VIC
Snowy River	VIC

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
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
Biodiversity Impacts Audit	2011/6191	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
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
Gippsland Basin Seismic Programme	2004/1866	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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
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
Sole-2 appraisal gas well, VIC/RL3	2002/636	Not Controlled Action	Completed
Sole gas field development	2003/937	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D 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 Program in Bass Strait	2008/4040	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Inspection of project vessels for presence of invasive marine pests in Commonwealth waters off Victo	2012/6362	Not Controlled Action (Particular Manner)	Post-Approval
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular Manner)	Post-Approval
Southern Margins 3D Seismic Survey VIC/P55	2007/3780	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
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	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

Scientific Name	Behaviour	Presence
Seabirds		
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis Antipodean Albatross [82269]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur

Sharks

Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur

Whales

Balaenoptera musculus breviceuda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus breviceuda Pygmy Blue Whale [81317]	Foraging	Likely to be present

Bioregional Assessments

SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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EPBC Act Protected Matters Report

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

Report created: 16-Jun-2023

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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:	44
Listed Migratory Species:	44

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:	62
Whales and Other Cetaceans:	29
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:	40
Key Ecological Features (Marine):	1
Biologically Important Areas:	17
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

EEZ and Territorial Sea

Listed Threatened Species

[\[Resource Information \]](#)

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

Scientific Name

Threatened Category

Presence Text

BIRD

[Calidris canutus](#)

Red Knot, Knot [855]

Endangered

Species or species habitat may occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat may occur within area

[Diomedea antipodensis](#)

Antipodean Albatross [64458]

Vulnerable

Foraging, feeding or related behaviour likely to occur within area

[Diomedea antipodensis gibsoni](#)

Gibson's Albatross [82270]

Vulnerable

Foraging, feeding or related behaviour likely to occur within area

[Diomedea epomophora](#)

Southern Royal Albatross [89221]

Vulnerable

Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
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
FISH		
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Serirolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	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		

Scientific Name	Threatened Category	Presence Text
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
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area

SHARK

Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat 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 listed as Centrophorus zeehaani Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Ardeanna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche 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
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

Scientific Name	Threatened Category	Presence Text
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
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
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]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]	
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
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

Scientific Name	Threatened Category	Presence Text
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Stercorarius skua as Catharacta skua Great Skua [823]		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 bulleri platei as Thalassarche sp. nov. 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

Scientific Name	Threatened Category	Presence Text
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
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Leptoichthys fistularius Brush-tail 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
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

Scientific Name	Threatened Category	Presence Text
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout 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

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera 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
Berardius arnuxii Arnoux's Beaked Whale [70]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
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
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area

Current Scientific Name	Status	Type of Presence
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon hectori Hector's Beaked Whale [76]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

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
Basker-Manta-Gummy Oil Development	2011/6052	Not Controlled Action	Completed
Basker-Manta Oil Field Development	2005/2026	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
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
Gippsland Basin Seismic Programme	2004/1866	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
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
Offshore Petroleum Exploration	2001/289	Not Controlled Action	Completed
Offshore Seismic Survey	2001/498	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
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D 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
Apache 3D seismic exploration survey	2006/3146	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Inspection of project vessels for presence of invasive marine pests in Commonwealth waters off Victo	2012/6362	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
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
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
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular Manner)	Post-Approval
Seismic survey, Gippsland Basin	2001/525	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
Tuskfish 3D Seismic Survey, Bass Strait	2002/864	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
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	Referral Decision	Completed

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

Scientific Name	Behaviour	Presence
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Seabirds

[Ardena tenuirostris](#)

Short-tailed Shearwater [82652]

Foraging

Known to occur

[Diomedea exulans \(sensu lato\)](#)

Wandering Albatross [1073]

Foraging

Known to occur

[Diomedea exulans antipodensis](#)

Antipodean Albatross [82269]

Foraging

Known to occur

[Pelagodroma marina](#)

White-faced Storm-petrel [1016]

Foraging

Known to occur

[Pelecanoides urinatrix](#)

Common Diving-petrel [1018]

Foraging

Known to occur

[Thalassarche bulleri](#)

Bullers Albatross [64460]

Foraging

Known to occur

[Thalassarche cauta cauta](#)

Shy Albatross [82345]

Foraging likely

Likely to occur

[Thalassarche chlororhynchos bassi](#)

Indian Yellow-nosed Albatross [85249]

Foraging

Known to occur

[Thalassarche melanophris](#)

Black-browed Albatross [66472]

Foraging

Known to occur

[Thalassarche melanophris impavida](#)

Campbell Albatross [82449]

Foraging

Known to occur

Sharks

[Carcharodon carcharias](#)

White Shark [64470]

Distribution

Likely to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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EPBC Act Protected Matters Report

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

Report created: 15-Feb-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	75
Listed Migratory Species:	61

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

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 <http://www.environment.gov.au/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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	91
Whales and Other Cetaceans:	14
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:	5
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	1
Biologically Important Areas:	13
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Giant Kelp Marine Forests of South East Australia	Endangered	Community may occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	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

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	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
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

Scientific Name	Threatened Category	Presence Text
Grantiella picta Painted Honeyeater [470]	Vulnerable	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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely 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
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to 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	Species or species habitat may 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 likely to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
FISH		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Serirolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
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
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 (southeastern) [68050]	Endangered	Species or species habitat known to occur within area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Potorous longipes Long-footed Potoroo [217]	Endangered	Species or species habitat likely to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Pomaderris parrisiae Parris' Pomaderris [22119]	Vulnerable	Species or species habitat may occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	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

REPTILE

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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

SHARK

Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardena carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardena grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Ardena tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	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
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to 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	Species or species habitat may 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 likely to occur within area
Migratory Marine Species		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
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
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known 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]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely 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
Unknown	
Commonwealth Land - [21496]	VIC

Listed Marine Species

[\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus		
Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Ardenna tenuirostris as Puffinus tenuirostris		
Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius ruficapillus Red-capped Plover [881]		Foraging, feeding or related behaviour known to occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		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 overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		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	Species or species habitat may 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
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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]		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]		Foraging, feeding or related behaviour likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour 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 likely to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
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 eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to 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	Species or species habitat may 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 likely to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Dotterel, Hooded Plover [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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
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

Scientific Name	Threatened Category	Presence Text
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Reptile		

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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

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
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

Current Scientific Name	Status	Type of Presence
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
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Cape Conran Coastal Park	Conservation Park	VIC
Cape Howe	Wilderness Zone	VIC
Cape Howe	Marine National Park	VIC

Protected Area Name	Reserve Type	State
Croajingolong	National Park	VIC
Point Hicks	Marine National Park	VIC

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

RFA Name	State
East Gippsland RFA	Victoria

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State
Mallacoota Inlet Wetlands	VIC

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed
Construction of an ocean access boat ramp at Bastion Point	2004/1407	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
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

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

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

Scientific Name	Behaviour	Presence
Eudyptula minor Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Breeding	Known to occur
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur

Sharks

Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur

Whales

Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur
Eubalaena australis Southern Right Whale [40]	Migration and resting on migration	Known to occur

Bioregional Assessments

SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

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EPBC Act Protected Matters Report

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

Report created: 16-Jun-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	100
Listed Migratory Species:	71

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:	3
Commonwealth Heritage Places:	1
Listed Marine Species:	106
Whales and Other Cetaceans:	33
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	3
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	18
Regional Forest Agreements:	2
Nationally Important Wetlands:	7
EPBC Act Referrals:	58
Key Ecological Features (Marine):	3
Biologically Important Areas:	39
Bioregional Assessments:	1
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

EEZ and Territorial Sea

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

[Brogo Vine Forest of the South East Corner Bioregion](#)

Threatened Category

Endangered

Presence Text

Community may occur within area

[Giant Kelp Marine Forests of South East Australia](#)

Endangered

Community may 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

[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

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

BIRD

[Anthochaera phrygia](#)

Regent Honeyeater [82338]

Threatened Category

Critically Endangered

Presence Text

Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may 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

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	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
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

Scientific Name	Threatened Category	Presence Text
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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 may 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 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
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
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 likely 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
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

Scientific Name	Threatened Category	Presence Text
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

FISH

Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Hoplostethus atlanticus Orange Roughy, Deep-sea Perch, Red Roughy [68455]	Conservation Dependent	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
Rexea solandri (eastern Australian population) Eastern Gemfish [76339]	Conservation Dependent	Species or species habitat likely to occur within area
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area

FROG

Scientific Name	Threatened Category	Presence Text
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Litoria watsoni Watson's Tree Frog [91509]	Endangered	Species or species habitat known to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area
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
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
Isodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known 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 likely 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 may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
Acacia constablei Narrabarba Wattle [10798]	Critically Endangered	Species or species habitat known to occur within area
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calochilus pulchellus Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat may occur within area
Correa lawrenceana var. genoensis Genoa River Correa [66626]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat may occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Pomaderris parrisiae Parris' Pomaderris [22119]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat known to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text
Westringia davidii [19079]	Vulnerable	Species or species habitat may occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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
Lissolepis coventryi Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely 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

Scientific Name	Threatened Category	Presence Text
Centrophorus uyato listed as Centrophorus zeehaani Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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 may 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
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

Scientific Name	Threatened Category	Presence Text
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	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

Scientific Name	Threatened Category	Presence Text
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely 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
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
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 likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area

Migratory Wetlands Species

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
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
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely 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
Unknown	
Commonwealth Land - [21497]	VIC
Commonwealth Land - [21498]	VIC
Commonwealth Land - [21496]	VIC

Commonwealth Heritage Places [\[Resource Information \]](#)

Name	State	Status
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Name	State	Status
Historic		
Gabo Island Lighthouse	VIC	Listed place

Listed Marine Species	[Resource Information]
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Scientific Name	Threatened Category	Presence Text
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Bird

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

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
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		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
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

Scientific Name	Threatened Category	Presence Text
Lathamus discolor Swift Parrot [744]	Critically Endangered	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
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
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 may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
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
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within 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

Scientific Name	Threatened Category	Presence Text
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
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

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
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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area

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 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

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

Scientific Name	Threatened Category	Presence Text
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 Longsnout 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]		Breeding known to occur within area
Reptile		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Whales and Other Cetaceans [Resource Information]		
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
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

Current Scientific Name	Status	Type of Presence
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		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

Current Scientific Name	Status	Type of Presence
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Ginkgo-toothed Beaked Whale, Ginkgo-toothed Whale, Ginkgo 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
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

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

Australian Marine Parks [\[Resource Information \]](#)

Park Name	Zone & IUCN Categories
Flinders	Marine National Park Zone (IUCN II)
Beagle	Multiple Use Zone (IUCN VI)
East Gippsland	Multiple Use Zone (IUCN VI)

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State
Baawang	Reference Area	VIC
Barga	Reference Area	VIC
Bemm, Goolengook, Arte and Errinundra Rivers	Heritage River	VIC
Ben Boyd	National Park	NSW
Benedore River	Reference Area	VIC
Beware Reef	Marine Sanctuary	VIC
Cape Conran Coastal Park	Conservation Park	VIC
Cape Howe	Wilderness Zone	VIC
Cape Howe	Marine National Park	VIC
Croajingolong	National Park	VIC
East Gippsland Coastal streams	Natural Catchment Area	VIC
Mallacoota B.R.	Natural Features Reserve	VIC
Mortimers Paddock B.R.	Natural Features Reserve	VIC

Protected Area Name	Reserve Type	State
Nadgee	Nature Reserve	NSW
Point Hicks	Marine National Park	VIC
Rame Head	Remote and Natural Area - Schedule 6, National Parks Act	VIC
Sandpatch	Wilderness Zone	VIC
Seal Creek	Reference Area	VIC

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

RFA Name	State
East Gippsland RFA	Victoria
Eden RFA	New South Wales

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State
Bemm, Goolengook, Arte and Errinundra Rivers	VIC
Benedore River	VIC
Mallacoota Inlet Wetlands	VIC
Nadgee Lake and tributary wetlands	NSW
Sydenham Inlet Wetlands	VIC
Tamboon Inlet Wetlands	VIC
Thurra River	VIC

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
2D seismic Survey in VIC/P55, VIC/RL2 and VIC/P41	2004/1876	Not Controlled Action	Completed
Basker-Manta-Gummy Oil Development	2011/6052	Not Controlled Action	Completed
Basker-Manta Oil Field Development	2005/2026	Not Controlled Action	Completed
Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed
Construction of an ocean access boat ramp at Bastion Point	2004/1407	Not Controlled Action	Completed
Development of Kipper gas field within Vic/L3, Vic/L4 Vic/RL2	2005/2484	Not Controlled Action	Completed
Development of Turrum Oil Field and associated infrastructure	2003/1204	Not Controlled Action	Completed
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
Gippsland Basin Seismic Programme	2004/1866	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
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
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
Sole-2 appraisal gas well, VIC/RL3	2002/636	Not Controlled Action	Completed
Sole gas field development	2003/937	Not Controlled Action	Completed
Turrum Phase 2 Development Project	2008/4191	Not Controlled Action	Completed
West Triton Drilling Program - Gippsland Basin	2007/3915	Not Controlled Action	Completed
Not controlled action (particular manner)			
2D 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

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
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
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
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
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
Seismic Exploration in Permit VIC/P41	2001/267	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Seismic Survey	2001/206	Not Controlled Action (Particular Manner)	Post-Approval
Seismic survey, Gippsland Basin	2001/525	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
Tuskfish 3D Seismic Survey, Bass Strait	2002/864	Not Controlled Action (Particular Manner)	Post-Approval

Referral decision

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
Shark 3D Seismic Survey	2007/3294	Referral Decision	Completed
Stanton 3D Marine Seismic Survey	2013/6764	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
Upwelling East of Eden	South-east

Biologically Important Areas

Scientific Name	Behaviour	Presence
Dolphins		
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur
Seabirds		
Ardena carneipes		
Flesh-footed Shearwater [82404]	Foraging	Known to occur
Ardena grisea		
Sooty Shearwater [82651]	Foraging	Likely to occur
Ardena pacifica		
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardena tenuirostris		
Short-tailed Shearwater [82652]	Foraging	Likely to occur
Ardena tenuirostris		
Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Foraging	Likely to occur
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Foraging	Known to occur
Diomedea exulans antipodensis		
Antipodean Albatross [82269]	Foraging	Known to occur
Eudyptula minor		
Little Penguin [1085]	Breeding	Known to occur
Eudyptula minor		
Little Penguin [1085]	Foraging	Known to occur
Macronectes giganteus		
Southern Giant Petrel [1060]	Foraging	Known to occur
Macronectes halli		
Northern Giant Petrel [1061]	Foraging	Known to occur
Oceanites oceanites		
Wilson's Storm Petrel [1034]	Migration	Known to occur

Scientific Name	Behaviour	Presence
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]	Foraging	Known to occur
Procellaria parkinsoni Black Petrel [1048]	Foraging	Likely to occur
Pterodroma macroptera Great-winged Petrel [1035]	Foraging	Likely 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 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]	Migration	Known to occur

Scientific Name	Behaviour	Presence
Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution	Likely to occur
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur
Eubalaena australis Southern Right Whale [40]	Migration and resting on migration	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur

Bioregional Assessments

SubRegion	BioRegion	Website
Gippsland	Gippsland Basin	BA website

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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Summary of Stakeholders' Feedback and Cooper Energy Assessment of Objections and Claims

A series of resources were developed and distributed to support initial consultation post July 2022. This information and contact method was classified using the codes identified in Table 1. These are denoted within Tables 2,3 and 4. Copies of these resources are included within the sensitive information document.

Table 1: Correspondence Code

Code	Description
*	Relevant person received the Cooper Energy Activities sheet 2023
CCL	Relevant person received the 2023 Coastal Communities Letter
FNSL	Relevant person received the 2023 First Nation and Local Shires Letter
W	Relevant person contact was attempted via website contact form

Table 2: Pre-July 2022

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Australian Antarctic Division (AAD)	GA-AAD	Historical consultation summary.	<ul style="list-style-type: none"> COE submission of marine mammal sightings forms following offshore activities Clarification whether to use cetacean sightings application or sightings spreadsheet for offshore activities. AAD confirmed use spreadsheet. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		<p>COE contacted AAD to enquire about the presence of blue whales on the Marine Mammal Search map. As there were limited number of blue whales present in the Otway and Gippsland regions, compared to studies conducted by the Blue Whale Study.</p> <p>COE emailed AAD seeking advice regarding how COE can manage potential impacts from noise (primarily from vessels) during facility/ infrastructure decommissioning, particularly to these more sensitive species. COE asked for information about how vessel noise is managed in the Antarctic.</p>	<p>AAD responded that the database does not contain all of the States data hence some of the issues COE have noticed. AAD provided links to various other sites to obtain blue whale data.</p> <p>AAD provided additional information on recent examples (and ideas) of control measures including those used by the British Antarctic Survey to manage the impact of subsea noise in Antarctic waters from construction projects (rock breaking using explosives for wharf construction):</p> <ul style="list-style-type: none"> MMO monitoring pre-start and shut-down process Passive Acoustic Monitoring <p>The AAD also described relevant design features of the latest Australian Icebreaker (RSV NUYUNA):</p> <ul style="list-style-type: none"> ship design including DNV Silent R Notation for science acoustic work avoidance of areas where large aggregations of cetaceans are well known or predictable. <p>The AAD also noted whether bubble curtains might be worth considering.</p>	<p>No claims or objections raised with the proposed activity.</p> <p>COE assessed examples and ideas provided by AAD within the ALARP assessment for the management of noise impacts.</p> <p>Adopted measures have been integrated into EP performance standards.</p>	<p>COE assessed the additional blue whale data sources provided by AAD and integrated into the EP.</p> <p>No claim or objection has been raised. COE will continue to consult with AAD in line with ongoing engagements described in the EP.</p>	<p>GA-AAD-20210804-Email</p> <p>GA-AAD-20211005-Email</p>
		COE provided AAD with sightings information from Q1 2022 offshore GVI	AAD thanked COE for sightings information	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	GA-AAD-20220524-email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
					engagements described in the EP.	
Australian Border Force	GA-ABC	Historical consultation summary.	<ul style="list-style-type: none"> Informed of 2017 BMG EP 5-yearly revision. No response Flyer/email updates on BMG well abandonments planned for 2018. Confirmed they would forward on any and all information on to relevant parties within Maritime Border Command. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided COE Activity Update Statement 2021 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	A-ABC-20201120-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received. Email address no longer active. No alternate provided.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-ABC-20220331-email
Australian Fisheries Management Authority (AFMA)	GA-AFMA	<p>COE provided COE Activity Update Statement 2021 factsheet and key points in relation to revised BMG EP. Specific highlight included project activities overlap with fisheries areas and PSZ.</p> <p>COE provided a list of all Commonwealth-and Victorian-managed fisheries with spatial boundaries that overlap with the BMG area, and whether fishing operations occur in the area.</p>	<p>AFMA are unable to comment on individual proposals. However, they comment on the importance of consulting with all fishers with entitlements to fish within the proposed area. This can be done through the relevant fishing industry associations or directly with fishers who hold entitlements in the area.</p> <p>AFMA provided links to relevant information to identify relevant fishers and noted COE can request individual fisher contact details through licensing@afma.gov.au and that there is a cost associated with this service.</p>	COE have updated their stakeholder mail list with the contact details AFMA provided. COE continues to identify and consult with relevant fishers via established contacts within fishing industry associations.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AFMA-20201125-email

Gippsland Offshore Operations Environment Plan

Gippsland | Offshore Operations | EP

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AFMA-20220331-email
Australian Hydrographic Service (AHS)	GA-AHS	Historical consultation summary.	<ul style="list-style-type: none"> general and specific activity updates confirming and cancelling Notice to Mariners for various offshore campaigns. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE was seeking data on "hook up" marine incidents in Australia over the past 10-20 years involving fishing vessels snagging on seabed obstructions.	AHS confirmed the statistics have only domestic commercial vessel (DCV) data going back until July 1, 2018. AHS mentioned that data might be insufficient for what COE was aiming for.	No objections or claims raised with the proposed activity.	No mentions of vessel hook up were found through the 2018-2020 monthly incident summaries provided for AHS. No further action required.	GA-AHS-20201123-email
		COE communications in relation to GIV in the Gippsland (March 2022)	<p>Cooper Energy provided 1 month notice of GVI. AHS called and emailed 01 March 2022 to confirm timing for NTM.</p> <p>Cooper Energy returned comms, confirming date of offshore GVI.</p> <p>AHS issued NTM for the GVI: '216(T)/2022 AUSTRALIA - VICTORIA - Cape Conran - Subsea operations southwards. Cooper Energy</p>	No objections or claims raised with the proposed activity.	COE maintained a log of Marine notifications of the duration of the survey ensuring all necessary notification were completed. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AHS-20220301-email GA-AMSA-AHS-20220207-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	Receipt acknowledged.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	GA-AHS-20220404-email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
					engagements described in the EP.	
Australian Maritime Safety Authority (AMSA)	GA-AMSA	Historical consultation summary	<ul style="list-style-type: none"> informed of 2017 BMG EP 5-yearly revision. Advice on marine traffic and notification requirements flyer updates for BMG well abandonments planned for 2018 followed by standard pre-start notifications (and subsequent cancellation of those notifications) Subsequent consultation regarding other offshore projects through 2019 and 2020 including inspections at BMG in Q1 2020. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project	AMSA confirmed they received the email.	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AMSA-SR-20201120-email
	GA-AMSA-SR	COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project	No response received.	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AMSA-SR-20201120-email
		COE communications in relation to GIV in the Gippsland (March 2022)	AMSA thanked COE for the update and provided updated email address for future use.	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AMSA-20220318-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	AMSA thanked COE for the update and indicated AMSA were looking forward to receiving further information regarding BMG decommissioning in the future. AMSA also indicated BMG as being within the ATBA (this is not the case – BMG sits outside of the ATBA).	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AMSA-20220406-email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)	
			<p>COE checked with AMSA as to whether they wanted to discuss any aspects of BMG decommissioning in more detail at this point.</p> <p>AMSA responded to confirm nothing further required from AMSA with regards the BMG decommissioning at this point in time. Many thanks for offering to discuss anything. We will contact you if there's anything specific.</p>				
Department of Agriculture, Water and the Environment (DAWE) – Biosecurity (now DAFF)	GA-DAWE-B	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018. Auto Response only subsequent consultation for 2019 Otway offshore drilling campaign which is considered relevant to BMG decommissioning: advice provided by DAWE on topsides biosecurity, MARS, and waste transfers COE agreed to continue dialogue regarding vessel activities, particularly when utilising international vessels. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)	
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project	No response received.	No objections or claims raised with the proposed activity.	COE sent follow up email with additional consultation attachments relevant to BMG closure project prepared in line with the Departments consultation guidance for petroleum industry EPs. COE offered to discuss further.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE - B-20201120-email GA-DAWE - B-20210225-email
		COE sent follow up email with three additional consultation attachments relevant to BMG closure project prepared in line with the Departments consultation guidance for petroleum industry EPs. COE offered to discuss further.	DAWE confirmed receipt of information.	No objections or claims raised with the proposed activity.	COE shared DAWE contact details with the vessel contractor, Helix Energy, who are planning to bring semisubmersible vessel the Q7000 into country in 2022.	COE considers that the stakeholder's interests have	GA-DAWE -B-20210226-email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
					been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	DAWE replied, noting a lot going on and being planned. Contact in DAWE had switched roles but forwarded COEs email on, and requested future information go to seaportsprogram@agriculture.gov.au	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE-B-20220401-email.
DAWE – Fisheries (now DAFF)	GA-DAWEF	COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project. Specific highlight included project activities overlap with fisheries areas and PSZ. Provided a list of all Commonwealth- and Victorian- managed fisheries with spatial boundaries that overlap with the BMG area, and whether fishing operations occur in the area.	No response received	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWEF-20201120-Email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE-F-20220331-email
Department of Jobs, Precincts and	GA-DJPR-ERR	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018 followed by standard pre-start notifications (and subsequent cancellation of those notifications) 			2018 BMG Well Abandonment EP BMG-EN-

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Regions (DJPR) – Earth Resources Regulation (ERR)			<ul style="list-style-type: none"> subsequent consultation regarding other offshore projects through 2019 and 2020 including inspections at BMG in Q1 2020. 			EMP-0002 (activity deferred)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	Thanked Cooper Energy for the information. Some queries related to other EPs, noty relevant to this EP.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DJPR-20220405 GA-DJPR-20220406
Department of Transport (DoT)	GA-DJPR-EMB Now DoT	Historical consultation summary	<ul style="list-style-type: none"> project updates and OPEP review for BMG 2018 well abandonment scope BMG well abandonment campaign updates through 2018 including activity delay notification consultation for revision of Victoria Offshore OPEP for exploration drilling in the Otway (2019), including relevant advice on state response resources and OPEP review requirements. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project. Confirmed appropriate time frame for Victorian Government to review OPEP in late January 2021. Further discussions were related to BMG phase 1 OPEP and not relevant to this EP	Communications linked to GA-DJPR-ERR-20201120 -email.	No objections or claims raised with the proposed activity.	COE replied and sent a follow-up email to arrange government review of BMG OPEPs early next year. No response received to date.	GA-DOT-20201127 - email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	DoT thanked COE for the activity update and requested an additional DoT team member be added to the distribution list.	No claims or objections raised with the proposed activity.	COE has added DoT team member to distribution list and considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DOT-20220405

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
DAWE – Heritage (Now DAFF)	GA-DAWE-H	COE provided Cooper Energy Activity Update Statement 2021 factsheet along with map and details of ‘Result’ Shipwreck location for confirmation given not previously identified within BMG infrastructure.	DAWE- Heritage confirmed the exact location of wreck Result (ID 6550) remains unknown at this time. Stated that remains of this wreck is protected regardless and should discovery of a wreck or any other protected UCH site during COE activity must be notified in accordance with <i>Underwater Cultural Heritage Act 2018</i> and attached relevant fact sheet "Underwater Cultural Heritage Guidance for Offshore Developments" and Result (id 6550) wreck data on file.	No objections or claims raised with the proposed activity.	COE will notify DAWE in the event of shipwreck discovery in line with requirements of the <i>Underwater Cultural Heritage Act 2018</i> . COE considers that the stakeholder’s interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE-H-20210111-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE-H-20220331-email
DAWE - Sea Dumping Section (Now DAFF)		COE provided COE Activity Update Statement 2022 factsheet	Response received, but only relevant to BMG EP, not this EP	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DAWE-SD-20220406-email
Department of Foreign Affairs and Trade (DFAT)	GA-VDFAT	COE provided their Activity Update Statement 2021 factsheet and their key points in relation to revised BMG EP.	No response received.	No objections or claims raised with the proposed activity.	N/A Consultation continued	GA-VDFAT-20201120-email
		Informed DFAT of potential for worst case spill scenario in Phase 1 to enter international EEZ.	No response received	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	GA-VDFAT-20210211-Email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
					engagements described in the EP.	
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DFAT-20220331-email
Department of Defence (DoD)	GA-DoD	Historical consultation summary	<ul style="list-style-type: none"> General activity updates and notices provided in 2017 and 2018. DoD confirmed review of material and had no objections. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG closure project.	No response received.	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoD-20201120-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoD-20220331-email
Director of National Parks (DNP) - Parks Australia	GA-DNP	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018 Subsequent consultation for 2019 Otway drilling campaign which is considered relevant to BMG decommissioning. Key points: a) Oil pollution response is allowable in Multiple Use and Special Purpose Zones (IUCN Category VI) when undertaken in accordance with an accepted EP. b) DNP should be made aware of oil/gas pollution incidences that occur within a marine park or are likely to impact on a marine park. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation to COE activities including potential for worst case spill scenario to enter MPA.	No response received.	No objections or claims raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DNP-20201120 - email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity including potential for worst case spill scenario to enter MPA.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DNP-20220331 - email
Victorian Fishery Authority (VFA)	GA-VFA	COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DEWLP-DoT-DJPR-RDV-Parks Victoria-VFA-TMSV-20220405 - email
DJPR-Biosecurity & Agriculture Services (BAS)	GA-DJPR-BAS	Historical consultation summary	<ul style="list-style-type: none"> Flyers and emails have been provided in relation to the development of the COE IMS Management Plan. COE agreed to continue dialogue regarding vessel activities off of the Victorian coast. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DJPR-20220405
Transport Safety Victoria (now Maritime Safety Victoria)	GA-TSVMS	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018 followed by standard pre-start notifications (and subsequent cancellation of those notifications) Subsequent consultation regarding other offshore projects through 2019 and 2020 including inspections at BMG in Q1 2020. Note BMG Decommissioning pre-start and cessation notifications will be carried out. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	<p>Acknowledged and provided advice regarding NTM for Vic waters.</p> <p>COE confirmed they would contact TSV/MS for NTM before activities in Vic waters. There are no such activities in the near future.</p>	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	<p>GA-DEWLP-DoT-DJPR-RDV-Parks Victoria-VFA-TMSV-20220405-email</p> <p>GA-TMSV-20220406-email</p>
Department of Environment, Land, Water and Planning (DELWP) -	GA-DELWP-NPMP	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018. BMG well abandonment campaign updates through 2018 including activity delay notification. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Marine National Parks and Marine Parks		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity including planned activity and emergency response.	Auto Response Received. General Information on permitting and enquiry response times.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DEWLP-DoT-DJPR-RDV-Parks Victoria-VFA-TMSV-20220405-email GA-DELWP-20220405-email
Transport for NSW (NSW Maritime)	GA-NSWRMS	Historical consultation summary	<ul style="list-style-type: none"> COE sent an email with an overview of BMG activity, spill scenario, and provided OPEP for review. Spill map and Campaign Brochure also were supplied. RMS would like to receive copy of the OPEP RMS recommendation to confirm Control Agency roles and responsibilities in Commonwealth Waters as there are some complexities (i.e., AMSA role). Provided contact for NSW Port Authority RMS would undertake necessary consultation and advice with EPA and Port Authority COE recognise RMS feedback as a response agency and requirements to review OPEP and TRPs COE updated OPEP to reflect RMS comments/feedback (refer to BMG Well Abandonment EP for further details). 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity including planned activity and emergency response.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-NSWRMS-20220405-email
Parks Victoria	GA-PV	Historical consultation summary	<ul style="list-style-type: none"> General activity updates 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DEWLP-DoT-DJPR-RDV-Parks Victoria-VFA-TMSV-20220405-email GA-PV-20220406-email
Abalone Council Australia	CF-ACA	Historical consultation summary	Flyer/email updates on BMG well abandonments planned for 2018. No response.			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		Confirm correspondence contact. COE provided their Activity Update Statement 2021 factsheet and their key points in relation BMG project. Provided list of all Commonwealth- and Victorian- managed fisheries with spatial boundaries that overlap with the BMG infrastructure.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ACA-20201120 - email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ACA-20220405-email
Australian Southern	CF-ASBTIA-PL	Historical consultation summary	<ul style="list-style-type: none"> COE provided updates for BMG well abandonments planned for 2018 followed by standard pre-start notifications (and subsequent cancellation of those notifications). 			2018 BMG Well Abandonment

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Bluefin Tuna Industry Association (Port Lincoln)			<ul style="list-style-type: none"> Stakeholder confirmed that activities were unlikely to impact fish migration or fishing and ranching operations, that mainly occur in central and eastern GAB. They confirmed that they would like to stay on the list in case fishing activities changed. 			EP BMG-EN-EMP-0002 (activity deferred)
		COE provided their Activity Update Statement 2021 factsheet and their key points in relation to revised BMG activities.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ASBTIA-20221208-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ASBTIA-20220405-email
Commonwealth Fisheries Association	CF-CFA	Historical consultation summary	<ul style="list-style-type: none"> COE informed of 2017 BMG EP 5-yearly revision. No response received. COE sent email updates on BMG well abandonments planned for 2018. COE also provided what Commonwealth Fisheries had been identified and how COE consulted them. No response received. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)
		COE provided their Activity Update Statement 2021 factsheet and key points in relation to BMG activity. Specific highlight included project activities overlap with fisheries areas and PSZ. Provided a list of all Commonwealth- and Victorian- managed fisheries with spatial boundaries that overlap with the BMG area,	No direct response received to date. However, engagement has also taken place with companion license holders and associations to maximise potential feedback on activity. For example, feedback has also been sought from Tuna Australia (reference CF-TA-20201120-email) and SETFIA.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-CFA-20201120-email

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		and whether fishing operations occur in the area.				
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-CFA-20220405-email
South East Trawl Fishing Association (SETFIA)	CF-SETFIA	Historical Consultation Summary	<ul style="list-style-type: none"> • Consultation records from previous operators at BMG show SETFIA have been part of discussions on the BMG development and PSZ during BMG production and cessation phases. Consultation with LEFCOL and SETFIA in 2010 ultimately led to the trenching of the B6 flowline and umbilical in 2012 and reductions in the PSZ extent at BMG. • Consultation records indicate LEFCOL and SETFIA represent the majority of fishing vessels impacted by the BMG development. • COE informed of 2017 BMG EP 5-yearly revision. • COE sent email updates on BMG well abandonments planned for 2018. No outstanding issues. • Regular contact and feedback on activities in the Gippsland region is held. • Discussions in 2020 around decommissioning options. Engaged to undertake fishing study for BMG area in 2020. 			2018 BMG Well Abandonment EP BMG-EN-EMP-0002 (activity deferred)

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		<p>COE updated comments and re-worked the PSZ video and fact sheet. Asked for feedback. Provided link to list of PSZ on the NOPSEMA website and link to BMG PSZ.</p> <p>COE consider the information available on the NOPSEMA website it's difficult to use for non-industry people. It might be a good idea to create a google map with pins for facilities with PSZs.</p> <p>COE agreed that involvement of Esso and APPEA would be a good idea. Queried whether video/fact sheet should be run past other fishing bodies.</p>	<p>SETFIA provided feedback and queries including:</p> <ul style="list-style-type: none"> • crew and vessel (not vessel and crew) • what infrastructure are we looking at (fishers will want to know) • would consider co-branding with SETFIA? • can we put a map of the SE in that shows PSZs? 	No claims or objections raised with the proposed activity.	<p>COE noted that FishSafe and AMSA need to be contacted to check if it is ok to use their animations. COE asked SETFIA if they would like to be included in the correspondence.</p> <p>Consultation ongoing</p>	CF-SETFIA-20200821-Emails
		N/A	Requested to be cc'd into email to FishSafe and AMSA. Noted they might be able to find some footage from a real trawler to include in the video.	No claims or objections raised with the proposed activity.	COE agreed about the footage. Consultation ongoing	
		Provided SETFIA with updated PSZ video noting changes content.	Had trouble viewing video. Suggested adding some words in Philipino.	No claims or objections raised with the proposed activity.	Consultation ongoing	
		<p>Provided SETFIA with smaller size video and interactive google map with PSZs and requested feedback.</p> <p>Also noted that another video with Pilipino script could be made with a translator.</p>	No response received.	No claims or objections raised with the proposed activity.	Consultation ongoing	

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		<p>COE provided SETFIA with PSZ videos, info sheets and PSZ map.</p> <p>Asked if SETFIA could provide a link when hosted on website / Facebook page.</p> <p>Noted changes to videos since last checked.</p>	<p>SETFIA posted PSZ education video and PSZ map on SETFIA Facebook page.</p> <p>PSZ Awareness video: https://www.facebook.com/southeasttrawl/videos/434966874187770/</p> <p>PSZ Locator Map</p>	No claims or objections raised with the proposed activity.	Consultation ongoing	<p>CF-SETFIA-20200917-Email</p> <p>CF-SETFIA-20200917-Offshore Zones</p>
		COE provided notice of offshore GVI including advance notice, prestart and end-notifications	<p>SETFIA acknowledged and posted detailed notice on SETFIA social media page. Some satirical comments regarding the survey vessel.</p> <p>SETFIA texted eastern fleet with start and end notifications.</p> <p>No queries or complaints received</p>	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SETFIA-20220318-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	<p>Acknowledged by SETFIA and posted on SETFIA social media page.</p> <p>No further responses regarding the update.</p>	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SETFIA-20220407-email
Southern Rock Lobster Ltd	CF-SRL	Historical consultation summary	Stakeholder has been sent information regarding Sole and BMG activities during 2017 and 2018 with no response.			Archive
		Confirm correspondence contact. COE provided their Activity Update Statement 2021 factsheet and key points in relation to BMG activity. Specific highlight included vessel transits and interactions with fisheries and PSZ.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SRL-20201120-email
		COE provided COE Activity Update Statement 2022	No response received.	No claims or objections raised	COE considers that the stakeholder's interests have been adequately addressed;	CF-SRL-20220405-email

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Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		factsheet and key points in relation to BMG activity.		with the proposed activity.	consultation will continue in line with ongoing engagements described in the EP.	
Southern Squid Jig Fishery	CF-SSJF	Historical consultation summary	Consultation commenced in 2019 for COE Otway exploration activities. General discussion between fishery contact (DW) and COE in relation to both parties' activities. Geographical overlap between activities is possible, although fishery only has a small number of operators, and they do not have any specific fishing ground; they transient - following the squid. Skippers are not expected to be interested given the nature of planned activities (e.g., no seismic), agreed to continue providing updates on COE activities.			Archive
		COE provided their Activity Update Statement 2021 factsheet and key points in relation BMG closure project.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SSJF-20201120 - email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SSJF-20220405- email
Sustainable Shark Fishing Inc	CF-SSFI	Historical consultation summary	<ul style="list-style-type: none"> COE informed of 2017 BMG EP 5-yearly revision. No response received. stakeholder has been sent information regarding Sole and BMG activities during 2017 and 2018. No response received. COE sent emails with updates on BMG well abandonments planned for 2018. No response. 			Archive
		Confirm correspondence contact. COE provided their Activity Update Statement 2021 factsheet and key points in relation to BMG activity. Specific highlight included vessel transits and interactions with fisheries and PSZ.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SSFI-20201120- email

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		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SSFI-20220405-email
Tuna Australia	CF-TA	COE submitted a message via Tuna Australia website on 20/11/2020 to identify if Tuna Australia are interested in receiving updates on COE Activities given Tuna Fishery overlap with activities. COE contact details were provided for further activity updates.	Tuna Australia asked to be kept updated on project activities and provided their contact details.	Tuna Australia have been included within COEs Stakeholder Engagement Mail list. COE will keep up to date Tuna Australia on the project activities. No claims or objections raised with the proposed activity.	COE provided their Activity Update Statement 2021 factsheet. Queried whether there was any particular aspect of the project stakeholders were most interested in and confirmed whether there are any fishery boats operating in and around Otway and Gippsland area. No response received. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-TA-20201120-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-TA-20220405-email
Victorian Rock Lobster Association (VRLA)	CF-VRLA	Historical consultation summary	<ul style="list-style-type: none"> COE provided general activity updates overlap between Portland fishing grounds and vessel transit routes in/out of Portland has been raised and managed between COE and VRLA COE have consulted with VRLA members on vessel transit routes in/out of Portland to avoid interaction 			Archive

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
		COE provided their Activity Update Statement 2021 factsheet and key points in relation BMG closure project	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VRLA-20210122-email CF-VRLA-20210122-email attachment
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VRLA-20220405-email
Seafood Industry Victoria (SIV)	CF-SIV	Historical consultation summary	<ul style="list-style-type: none"> COE informed of 2017 BMG EP 5-yearly revision COE provided email updates on BMG well abandonments planned for 2018 meetings in 2017 and 2018 confirming member representation, consultation approach and identification of concerns in relation to COE activities in the Otway and Gippsland were held annual COE activity flyers included in Profish Magazine distributed to SIV members one of SIVs concerns historically has been exclusion zones that reduced a fisher's useable area consultation records indicate LEFCOL and SETFIA represent the majority of fishing vessels impacted by the BMG development. <p>Note – LEFCOL are represented by SIV, though COE have typically engaged LEFCOL directly.</p>			Archive
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	SIV confirmed receipt and uploaded Cooper Energy's information and link to flyer to their website 'offshore industry' page.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SIV20220406-email
Victorian Recreational	RI-VRFA	Historical consultation summary	<ul style="list-style-type: none"> COE informed of 2017 BMG EP 5-yearly revision. No response received. stakeholder has been sent information regarding Sole and BMG activities during 2017 and 2018. No response received. 			Archive

Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Fishers Association		COE provided their Activity Update Statement 2021 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-VRFA-20201120-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-VRFA-20220408-email
Victorian Scallop Fishermen's Association	CF-VSFA	Historical consultation summary	Stakeholder has been sent information regarding Sole and BMG activities during 2017 and 2018 with no response.			Archive
		Confirm correspondence contact. COE provided their Activity Update Statement 2021 factsheet and key points in relation to BMG activity. Specific highlight included vessel transits and interactions with fisheries and PSZ.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VSFA-20201120-email
		COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	Response pending. COE will continue to monitor for Stakeholder feedback.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VSFA-20220619

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Stakeholder	Stakeholder ID	Information provided	Summary of Stakeholder Response	Cooper Energy (COE) Assessment of Objection/ Claim	COE Response	Record ID (Stakeholder-Date-Item)
Australian Communications and Media Authority (ACMA)	GA-ACMA	COE provided COE Activity Update Statement 2022 factsheet and key points in relation to BMG activity.	No response received.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-ACMA-20220331-email GA-ACMA-20220331-email-2

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Table 3: Relevant Persons Consultation logged post July 2022 (Note some comments belong to BMG Closure EPs, but shown for completeness of discussion threads and stakeholder awareness)

Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
AMP Licence Holders						
The Trustee for The Minderoo Foundation Trust	CN-TMFT	Letter sent 16.02.23 with activity sheet	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	*CCL
Commonwealth Scientific and Industrial Research Organisation	GA-CSIRO	letter sent 16.02.23 with activity sheet Email sent 04.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-CSIRO-20230504-Email *CCL
AARNet Pty Ltd	OI-AARNPL	Email with links to new website sent 30.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-AARNPL-20230530-Email
Stakeholder ID: OI-JGP	OI-JGP	Email with links to new website sent 30.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	OI-JGP-20230530-Email

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
					engagements described in the EP.	
Southern Cross Cables Limited (SCCL)	OI-SCCL	Email with links to new website sent 30.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-SCCL-20230530-Email
Stakeholder ID: OI-SCMY	OI-SCMY	Email with links to new website sent 30.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-SCMY-20230601-Email
Stakeholder ID: OI-SP	OI-SP	Letter sent out by email with activity sheet 03.03.23 Email sent 16.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-SP-20230303-Email OI-SP-20230516-Email *CCL
Subpartners Pty Ltd	OI-SPL	Email with links to new website sent 30.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-SPL-20230530-Email

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Major Projects Foundation Ltd	RC-MPF	letter sent 16.02.23 with activity sheet Email sent 16.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RC-MPF-20230516-Email *CCL
Business						
Orbost Chamber of Commerce	B-OCC	Email sent 11.05.23 with new website link. COE also used the opportunity to ask about OCC activities, which role they play and discuss the Orbost Gas Plant 24.05.2023: Meeting COE: provided overview of environment plans Email sent 04.06.23 with record of meeting.	22.05.23: suggests location available to meet 24.05.2023 Meeting no issues raised and noted opportunities related to cool burning, soil carbon and replanting. 14.06.23: Making arrangement to look into waste opportunities and asked who is the best contact to interview for major biomass sources, their waste and energy needs	No objections or claims. Request for COE to look at more opportunities in the area where it derives much of its income is reasonable and will be considered.	Request to look at other opportunities in the area was noted. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	B-OCC-20230511-Email B-OCC-20230522-Email B-OCC-20230604-Email B-OCC-20230614-Email
RPS Group	OI-RPS	COE confirm BMG decommissioning is planned over two phases in 2023 and 2024-26 and sent Activity Statement of 2022 that included Gippsland Ops	RPS request confirmation of Gippsland activities to consider the cumulative impacts a wind farm off the Gippsland coast. Email received in 08.06.2022	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-RPS-20220608-Email

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Yarram and District Traders Association	B-YDTA	Email sent 11.05.23 with new website link	No response received	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-YDTA-20230511-Email
Commonwealth Government Departments						
Australian Antarctic Division - Marine Mammal Centre	GA-AAD	Email sent on 21.03.2022 about sightings from a short subsea inspection campaign in March 2022 Email sent with 2023 activity sheet 24.02.23 Email sent 28.07.23 with attached sightings from a recent campaign offshore Gippsland.	Appreciated the info	No objections or claims COE remain aware of the requirement to report sightings data	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AAD-20220321- Email GA-AAD-20230224-Email COE-All-Activities-2023-Update GA-AAD-20230728- *
Australian Communications and Media Authority (ACMA)	GA-ACMA	Email sent with Cooper Energy Activity Update 10.03.2023 Email sent 12.05.23 with new website link 26.05.2023 Thanked ACMA and noted no overlap between cables and activities	10.3.2023 Auto reply 17.03.23: provided info about ACMA and request COE contact submarine cables owner 15.05.23: Do not have further info	No objections or claims	Noted no overlap between cables and activities. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-ACMA-20230310-Email-2 GA-ACMA-20230310-Email GA-ACMA-20230317-Email GA-ACMA-20230512-Email GA-ACMA-20230515-Email GA-ACMA-20230526-Email GA-ACMA-20230526-Email-2

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Australian Fisheries Management Authority (AFMA)	GA-AFMA	Email sent with 2023 activity sheet 28.02.23 Email sent 21.04.23 with the new website link	Response 28.02.2023: Acknowledge the information and highlighted the importance to continue consulting the fisheries	No objections or claims Request to consult with relevant fisheries is reasonable and will be actioned	Confirmed COE will continue to consult with relevant fishers. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-AFMA-20230228-Email GA-AFMA-20230228-Email-2 GA-AFMA-20230421-Email *CCL
Australian Hydrographic Service (AHS) Australian Hydrographic Office (AHO)	GA-AHS	Email sent with 2023 activity sheet 28.02.23.	28.02.23: email acknowledgement	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-AHS 20230228-Email GA-AHS 20230228-Email-1 *
Australian Maritime Safety Authority (AMSA)	GA-AMSA	Email sent with 2023 activity sheet 28.02.23 Email sent 23.05.23 with new website link 04.07.23: COE thanked AMSA for their response and confirmed to comply with all requests noted in their email	08.06.2022 Responder said previous email address is no longer checked and suggested for all future correspondence NavSafety@amsa.gov.au 03.07.23: thanked for the update, requested to notify AMSA's Joint Rescue Coordination Centre (JRCC) for promulgation of radio-navigation warnings. Reminded that all vessels should exhibit appropriate lights and shapes to	No objections or claims Requests for notifications and compliance with safety requirements reasonable and will be actioned	04.07.2023 Confirmed will comply with requests made by AMSA in their email of 3 July 2023. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	20230228-Email GA-AMSA-20230523-Email GA-AMSA-20230608 GA-AMSA-20230703-Email GA-AMSA-20230704-Email *

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			reflect the nature of operations. Cooper Energy should evaluate and implement adequate anti-collision measures and provided a list of collision risk mitigation measures			
Department of Agriculture, Fisheries and Forestry (DAFF)- Aircraft, vessels and military & Biosecurity	GA-DAWE	Email sent with 2023 activity sheet 24.02.23	No response with respect to this EP	No objections or claims - see GA-DAWE_SC for continuation of discussions	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-DAWE-20230224-Email *
DAFF - Fisheries	GA-DAWE_FISH	Email sent with 2023 activity sheet 28.02.23	No response	No response- The Australian Fisheries Management Authority (AFMA) is responsible for the day-to-day management and compliance of Commonwealth fisheries.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-DAWE_FISH-20230228-Email *

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Department of Climate Change, Energy, the Environment and Water (DCCEEW) - Wetlands Section	GA-DCCEEW	Letter sent out with activity sheet 10.03.23 via email 08.07.2023 re-sent email with activities update	24.02.2023 email bounce back No bounce back on follow up email No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DCCEEW-20230310-Email GA-DCCEEW-20230708-Email *CCL
DCCEEW - Underwater cultural heritage	GA-DCCEEW_UCH	Email sent with 2023 activity sheet 24.02.23 Email sent 05.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-DCCEEW_UCH-20230224-Email GA-DCCEEW_UCH-20230605-Email *
Department of Foreign Affairs and Trade (DFAT)	GA-DFAT	COE provide Cooper Energy Activity Update for 2022 Email sent with 2023 activity sheet 28.02.23 Email sent 21.04.23 with the new website link 11.05.23: COE thanked DFAT	Response on 28.02.23 advising to use sea.law@dfat.gov.au 11.05.2023 Noted no further consultation with DFAT required	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-DFAT-20230228-Email GA-DFAT-20220331-Email-3 GA-DFAT-20230421-Email GA-DFAT-20230511-Email GA-DFAT-20230511-Email-2 *
National Native Title Tribunal (NNTT)	OI-NNTT		Auto response received on 03.03.2023 No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-NNTT-20230303-Email-1 OI-NNTT-20230303-Email-2 *

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Department of Defence (DOD)	GA-DoD	Email sent with activity sheet 28.02.23 08.07.2023 New email sent to offshore.petroleum@defence.gov.au and to XXX.XXX@defence.gov.au, noting earlier bounce back 08.07.2023 Re-sent and no bounce back	Delivery failure on 28.02.2023 08.07.2023 Email re-sent, no bounce back. No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update GA-DOD-20230228-Email GA-DoD-20230708-Email GA-DoD-20230708-Email-2 *
Director of National Parks (DNP) / Parks Australia	GA-DoNP	First Email of 2022 sent 31.03.2022 Attached the 2022 Cooper Energy Activities 28.07.2022 Confirmed no EP under development inside or immediately adjacent to any AMPs Email sent with 2023 activity sheet 28.02.23 The attached Information for DNP shows the AMPs which have the potential to be impacted in the unlikely event of a spill of hydrocarbons.	No response to 2023 mailout, but previous advice was no response required given location of activities.	No objections or claims Reasonable request made for clarity on whether consultation is being requested	Confirmed understanding of consultation requirements. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoNP-20220331-Email-1 GA-DoNP-20220617-Email GA-DoNP-20220725-Email GA-DoNP-20220725-Email-2 GA-DoNP-20220727-Email GA-DoNP-20220727-Email-2 COE-All-Activities-2023-Update GA-DoNP-20230228-Email GA-DoNP-20230228-Attachment *
ENGOS						
Australian Conservation Foundation	EG-ACF	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	EG-ACF-20230530-Email

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					engagements described in the EP.	
Australian Marine Conservation Society	EG-AMCS	Letter sent out with activity sheet 24.02.23 Email sent 21.04.23 confirming receipt of contact name and sharing activities website. 23.05.23: COE shared link to new activities website; sent to generic email address as no response previously from nominated contact	Email received 08.03.2023 pointing out focal point 20.04.23: auto response No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-AMCS-20230309-Email EG-AMCS-20230421-Email-1 EG-AMCS-20230421-Email-2 EG-AMCS-20230523-Email *CCL
Friends of the Earth - Melbourne	EG-FEM	Email sent 30.05.23 with new website link 08.06.23: COE asked if the company was based in Melbourne and requested best time to meet on Friday 16. 09.06.23: COE suggested best timeframe to meet 0.06.23: trying to schedule best day to meet 11.06.23: COE asked FEM if they spoke to XXXX and requesting the best location to meet 13.06.23: Confirmed time and location for meeting	07.06.23 Confirmed interest in being consulted. 09.06.23: will confirm best time with colleague 09.06.23: Confirmed base in Melbourne and will contact with possible times to meet 13.06.23: Responded with best location to meet 15.06.23. Accepted the invite for Thu 15 Jun 2023 2-3pm 20.07.23 Meeting in Melbourne: Initial acknowledgement that each party had a different view on the potential speed	No claims or objections raised with the proposed activity, although general position on the need for a faster transition away from gas usage noted. Request to meet decommissioning expert reasonable and will be actioned based on mutual availability (relate to different EP)	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP. Responses to queries provided during meeting and via post meeting record of meeting.	EG-FEM-20230530-Email EG-FEM-20230607-Email EG-FEM-20230608-Email EG-FEM-20230609-Email EG-FEM-20230609-Email-2 EG-FEM-20230609-Email-3 EG-FEM-20230609-Email-4 EG-FEM-20230611-Email EG-FEM-20230613-Email EG-FEM-20230613-Email-2 EG-FEM-20230720-Meeting EG-FEM-20230808-Email EG-FEM-20230809-Email

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		<p>15.06.23 Understood not available due to personal reasons, and COE will contact again for future meeting</p> <p>20.07.23 Meeting in Melbourne: Initial acknowledgement that each party had a different view on the potential speed of transition away from gas usage;</p> <p>COE provided an overview of the 4 environment plans currently being consulted on, using the activities website as presentation material.</p>	<p>of transition away from gas usage;</p> <p>1) Interested in Fugitive emissions and how reported. (COE advised emissions (including fugitives) are accounted for within reports to government and annual sustainability report which is publicly available.</p> <p>2) How is Carbon Neutrality attained. (COE advised Scope 1, 2 and controllable scope 3 emissions are offset via offsets available under the climate active scheme.)</p> <p>3) Is COE concerned about validity or robustness of the offsets? (COE undertakes due diligence on offsets, and seeks offsets which have dual benefit e.g. carbon offset with biodiversity benefits.)</p> <p>4) Will review sustainability report later and may have more queries.</p> <p>5) Regarding decommissioning, how many</p>	<p>Queries during meeting reasonable and responded to.</p>		

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			<p>people on the decommissioning vessel? (COE: approximately 130. The main decommissioning vessel will also be supported by two other vessels with approx. 30-60 personnel.)</p> <p>6)What types of marine monitoring during decom? (COE: Emissions and discharges will be monitored during the decommissioning campaign. CE will also undertake seabed sampling to check for any potential legacy contamination at the field.)</p> <p>7) Can the sampling results be provided to FoEM to avoid lengthy FoI process with the regulator. (COE: Typically reporting is provided to the regulator and not always publicly available; will look into it and advise. Post meeting note: COE declined to publish)</p> <p>8) Best to leave deeper discussions on decommissioning for follow up with Jeff Waters who is FoEM's decommissioning expert</p>			

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			<p>9) Interested in CE's longer term plans for drilling. (COE: In planning phase, future drilling subject to further approvals and additional consultation in due course. Noted there are work plans agreed with the government for additional drilling within the Title Areas awarded to CE.)</p> <p>10) Interested in CE's plans for seismic data acquisition and the use of marine vibrators instead of current compressed air sources. (COE doesn't have current plans for seismic and does not have a position on marine vibrators. While CE has no current plans to acquire seismic data, it could be a future buyer of data if available.)</p> <p>09.08.23: Thanked COE for the meeting report and requested to be kept informed of any adjustments to future plans</p>			
Greenpeace	EG-G	Email sent 30.05.23 with new website link	30.05.23: Email auto response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	EG-G-20230530-Email EG-G-20230530-Email-2

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					engagements described in the EP.	
International Fund for Animal Welfare	EG-IFAW	Letter sent out with activity sheet 24.02.23 Email sent 01.0.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-IFAW-20230601-Email *CCL
Sea Shepherd Australia	EG-SSA	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-SSA-20230530-Email
Wilderness Society	EG-WSM	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-WSM-20230530-Email
World Wildlife Fund	EG-WWF	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	EG-WWF-20230530-Email

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					engagements described in the EP.	
Australian Coastal Society – Victorian Chapter	EG-ACS	Letter sent out with activity sheet 24.02.23 Email sent 16.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-ACS-20230516-Email *CCL
Environment Victoria	EG-EV	Email sent 29.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-EV-20230530-Email
Living Ocean	EG-LO	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-LO-20230530-Email
Marine Mammal Foundation	EG-MMF	Letter sent out with activity sheet 24.02.23 Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-MMF-20230530-Email *CCL

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Ocean Watch	EG-OW	Letter sent out with activity sheet 24.02.23 Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-OW-20230530-Email *CCL
Surfrider Foundation Australia	EG-SFA	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-SFA-20230530-Email
The Nature Conservation Council of NSW	EG-NCCNSW	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-NCCNSW-20230530-Email
Rising Tide Australia	EG-RTA	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-RTA-20230530-Email
Surfers for Climate	EG-SC	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in	EG-SC-20230530-Email

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					line with ongoing engagements described in the EP.	
Whale and Dolphin Conservation Australia	EG-WDCA	Email sent 30.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	EG-WDCA-20230530-Email
First Nations Communities						
Batemans Bay LALC	FN-BBLALC	Letter sent out with activity sheet 17.03.23 Letter sent out with activity sheet 19.04.23 Email with weblink sent 30.4.2023 10.05.2023 Called but in meeting so couldn't speak, 12.05.2023 Called again but no answer 18.05.23: replied email with dates available to arrange a Teams meeting 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial	Letter returned to sender	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-BBLALC-20230430-Email FN-BBLALC-20230518-Email FN-BBLALC-20230518-Email-2 FN-BBLALC-20230521-Email *FNNSLW

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		contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts				
Bega Local Aboriginal Land Council	FN-BELALC	Letter sent out with activity sheet 24.02.23 30.04.2023 email with new website link sent 02.05.2023 Noted will contact Eden LALC 12.05.2023 Follow up email looking at meeting 12.05.2023 COE emailed project coordinator 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	01.05.23: Noted availability 01.05.23: BELALC will be out of the office on alternative dates and believed that it would be better to engage with Eden LALC 12.05.2023 CEO connected COE with Project Coordinator No further response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-BELALC-20230430-Email FN-BELALC-20230501-Email FN-BELALC-20230502-Email FN-BELALC-20230512-Email FN-BELALC-20230512-Email-2 FN-BELALC-20230512-Email-3 *FNLSLW
Bidwell First Nations Clans Aboriginal Corporation	FN-BFNCAC	Letter sent out via email with activity sheet 08.03.23 Note: Will continue efforts to engage; RAP application was unsuccessful. No clear	Email bounce back auto-response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	FN-BFNCAC-20230308-Email FN-BFNCAC-20230308-Email-2 *FNLSL

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		contacts for key people. DTP may be able to assist in providing contacts.			engagements described in the EP.	
Bodalla LALC	FN-BODALALC	Letter sent out with activity sheet 17.03.23 30.04.23: Email sent including link to new website. 04.05.2023 Called and left message and sent text 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-BODALALC-20230430-Email *FNLSL
Cobowra LALC	FN-COLALC	Letter sent out with activity sheet 17.03.23 Email sent 30.04.23 with new website link. 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-COLALC-20230430-Email *FNLSL

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		ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts		South Coast CEOs as additional contacts		
Eden Local Aboriginal Land Council	FN-ELALC	Letter sent 16.02.23 with activity sheet Email requesting a meeting by the end of April 2023 Email sent 30.04.2023 inviting to visit COE consultation website 04.05.23: Thanked the call and tried to schedule a meeting 06.06.23: Thanked for sharing their stories and knowledge	05.05.23: confirmed meeting with the Chair 19.05.2023 Chair shared stories on connections to killer whales and porpoises, concerns raised around extractive industries in general, impacts of activities on whale migrations, and would want involvement of Eden LALC in response should any spill impact their Country.	Noted concerns around extractive industries Described how mitigations were in place to limit impact on whale migration to acceptable levels Committed to including Eden LALC contacts in Emergency Response consultation list	19.05.2023 During meeting: Noted concerns around extractive industries, Described how mitigations were in place to limit impact on whale migration to acceptable levels Committed to including Eden LALC contacts in Emergency Response consultation list. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-ELALC-20230430-Email FN-ELALC-20230504-Email FN-ELALC-20230505-Email FN-ELALC-20230606-Email *FNSL
Federation of Victorian Traditional Owner Corporations	FN-FVTOC	Letter sent 16.02.23 with activity sheet		No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	*FNSL

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Illawarra LALC	FN-ILALC	Letter sent out with activity sheet 17.03.23 Email sent 30.04.23 with new website link 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	10.05.2023 Spoke briefly, busy following week but will advise when available to meet	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-ILALC-230430-Email *FNSL
Jerrinja LALC	FN-JLALC	Letter sent out with activity sheet 17.03.23 Email sent 30.04.23 with new website link 10.05.2023 called and left message and sent text 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-JLALC-230430-Email *FNSL

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Krowathunkoolong Keeping Place	FN-KKP	Letter sent out with activity sheet 24.02.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	*FNLSW
Lake Tyers Aboriginal Trust	FN-LTAT	Letter sent out with activity sheet 24.02.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	*FNLSW
Merrimans Local Aboriginal Land Council	FN-MELALC	Letter sent out with activity sheet 24.02.23 Email sent 30.04.23 with new website link 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-MELALC-20230430-Email *FNLSL

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Mogo LALC	FN-MOGOLALC	<p>Letter sent out with activity sheet 17.03.23</p> <p>Email sent 30.04.23 with new website link</p> <p>Email sent 06.06.23 providing a record of meeting held 17.05.23. Concerns raised regarding general hydrocarbon extraction impacts to mother earth and climate change. Action taken for Mogo LALC to provide quote for cultural overview of nearby coastal Aboriginal site.</p> <p>28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts</p>	<p>Meeting: Concerns raised</p> <ul style="list-style-type: none"> - drilling into magma - reducing emissions - clean alternatives to gas <p>17.05.23: Thanked COE for the visit and is welcome to join the NAIDOC to assist in informing the community</p>	<p>Concerns included:</p> <ul style="list-style-type: none"> - Drilling into magma. - Reducing carbon emissions related to offshore activities and gas in the Gippsland. - Looking at clean alternatives to gas <p>COE has assessed these and as these do not relate to the scope of the BMG Phase 2 EP activities, it was considered that no claims or objections were raised with the proposed activity.</p> <p>Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response</p>	<p>Advised:</p> <ul style="list-style-type: none"> • Regarding risk of drilling into magma, noted that Cooper Energy are not proposing to drill new wells under these environment plans -• On the issue of reducing carbon emissions, Cooper Energy offsets its Scope 1 and 2 emissions, and has a system designed for its customers to offset their emissions when the gas is used should they choose to do so (Scope 3) • In terms of future clean alternatives to gas, it was noted that there are significant investments being made into green hydrogen, but that it was likely some time before this would be commercial. <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>FN-MOGOLALC-20230430-Email</p> <p>FN-MOGOLALC-20230517-Email</p> <p>FN-MOGOLALC-20230606-Email</p> <p>*FNSLW</p>

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
				consultation list, with individual South Coast CEOs as additional contacts.		
NTSCORP Limited	FN-N	Email and 2023 activity sheet sent 03.03.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-N-20230303-Email *
Nowra LALC	FN-NOLALC	Email sent 12.05.23 with new website link 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-NOLALC-20230512-Email

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NSW Aboriginal Land Council	FN-NSWALC	<p>Letter sent out with activity sheet 15.03.23</p> <p>Called to arrange meeting</p> <p>Email sent 09.05.23 with new website link</p> <p>16.05.2023 Meeting with South Coast Zone management. Noted individual LALCs were independent and could be useful to present to all of them during a regional forum.</p> <p>Email sent 27.06.23 with ppt for the forum presentation</p> <p>28.06.2023 Presented to South Coast Zone regional forum, overview of projects, potential impacts and risks.</p> <p>Email sent 05.07.23 with record of meeting.</p> <p>Information session to allow for individual LALCs to decide level of consultation required on an informed basis.</p> <p>05.07.23: Thanked SCZLALC</p>	<p>23.05.23: Thanked COE</p> <p>27.06.23: ppt approval</p> <p>11.07.2023 South Coast zone noted record of meeting and confirmed individual LALCs would be in touch direct if they needed further information</p>	<p>No objections or claims</p> <p>No claims or objections raised with the proposed activity.</p>	<p>Will follow up with ALC zones regarding presenting to forums as discussed.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>FN-NSWALC-20230509-Email</p> <p>FN-NSWALC-20230516-Meeting</p> <p>FN-NSWALC-20230521-Email</p> <p>FN-NSWALC-20230523-Email</p> <p>FN-SCZLALC-20230627-Email</p> <p>FN-SCZLALC-20230627-Attachment</p> <p>FN-SCZLALC-20230627-Email-2</p> <p>FN-SCZLALC-20230628-Meeting</p> <p>FN-SCZLALC-20230705-Email</p>
Ulladulla Local Aboriginal Land Council	FN-ULALC	<p>Letter sent 16.02.23 with activity sheet</p> <p>Email sent 30.04.23 with the new website link</p> <p>12.05.23: suggested to notify if consultation interest changes</p>	<p>12.05.2023 Called CEO who advised there was no interest in being consulted on these activities</p>	<p>No objections or claims</p>	<p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>FN-ULALC-20230430-Email</p> <p>FN-ULALC-20230512-Email</p> <p>*FNSL</p>

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Wagonga Local Aboriginal Land Council	FN-WLALC	Letter sent 16.02.23 with activity sheet Email sent 30.04.23 with the new website link 04.05.2023 Called and left message 12.05.2023. Called and sent text 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	No response	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-WLALC-20230430-Email *FNSL
First Nations Legal & Research Services	GA-NTSV	Email sent with 2023 activity sheet 03.03.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-NTSV-20230303-Email *
Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	LO-GLaWAC	Letter sent via website for 2023 Cooper Energy Activities on 30.03.23 Email sent 29.05.23 with new website link Email sent 31.05.23 with	20.04.23: interested in meeting to have an initial consultation 05.05.2023 Meeting invite sent with copy of Cooper Energy's initial contact email 07.06.23: shared their objectives	No Objections or claims Reasonable request will be actioned: -Would like to be	Noted in meeting record: COE would include GLaWAC on Emergency Contact consultation list and share this with Vic DTP.	LO-GLaWAC-20230420-Email LO-GLaWAC-20230505-Email LO-GLaWAC-20230529-Email LO-GLaWAC-20230607-Email LO-GLaWAC-20230614-Meeting

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		<p>updated new website link</p> <p>14.06.23 Meeting in GLaWAC office</p> <p>15.06.23 COE thanked GLaWAC for their time and discussion, the contact details and will add to the comms plan.</p> <p>Email sent 16.06.23 with record of meeting. COE: Provided overview of environmental plans, noted spill risks, discussed potential opportunities at Orbost of weed and pest management, and rangers as marine mammal observers</p> <p>20.06.23: Fw email about the scope of the work to be carried out, and requested confirmation that GLaWAC would be interested in quoting</p> <p>15.08.23: Reply the text request for a follow up meeting and requested available dates.</p> <p>16.08.23. Record of previous meeting for background</p> <p>16.08.23: Highlighted part of a previous discussion on 20.06.23</p>	<p>of the GLaWAC Renewable Energy strategy website, if further advise contact for GLaWAC</p> <p>14.06.23 Meeting in GLaWAC office</p> <p>GLaWAC: identified potential opportunity to train rangers in oiled wildlife response, expressed their goal to get the community back on Country with sustainable opportunities, noted artifacts/special sites and are working with government to develop a Sea Country Indigenous Protected Area.</p> <p>Noted interest in being part of any oil spill response and related training</p> <p>15.06.23: Great to virtually meet and provided the contact details for emergency response</p> <p>20.06.23: Thanked for the summary</p> <p>21.06.2023 Will discuss possible scope of work with On Country team</p>	<p>involved in any spill response potentially affecting Country</p> <p>Reasonable requests that require further discussions</p> <ul style="list-style-type: none"> - Discussed possible training in OWR - Discussed possible training as MFOs 	<p>Will follow up on OWR and MFO training.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>LO-GLaWAC-20230616-Email</p> <p>LO-GLaWAC-20230615-Email</p> <p>LO-GLaWAC-20230615-Email-2</p> <p>LO-GLaWAC-20230620-Email</p> <p>LO-GLaWAC-20230621-Email</p> <p>LO-GLaWAC-20230815-Email</p> <p>LO-GLaWAC-20230816-Email</p> <p>LO-GLaWAC-20230816-Email-2</p> <p>LO-GLaWAC-20230817-Email</p> <p>*FNSLW</p>

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			17.08.23: thanked COE for the info and the call			
Ngambri LALC	FN-NGLALC	Email sent 12.05.23 with new website link 12.05.2023 Called and left message 15.05.2023 Called and sent text 18.05.2023 Understood and remain available to meet in future 28.06.2023 Presented activities overview to South Coast LALC forum; individual LALCs can follow up for consultation as suits their requirements. COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	17.05.23: Called COE and advised would be available to meet next day 18.05.2023 Cancelled meeting due to personal reasons	Note from South Coast Zone forum: COE to include ALC Zone directors as initial contact for Emergency Response consultation list, with individual South Coast CEOs as additional contacts	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	FN-NGLALC-20230512-Email FN-NGLALC-20230517-Email FN-NGLALC-20230518-Screenshot
Commercial fishing organisations (Commonwealth and state)						
Abalone Victoria Central Zone Ltd	CF-AVCZ	Email sent 08.03.23 with 2023 COE Activities pdf Email sent 23.05.23 with new website link 26.07.2023 Form submitted requesting contact details for emergency response	07.08.2023 Contact details provided	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-AVCZ-20230308-Email CF-AVCZ-20230523-Email CF-AVCZ-20230726-Form CF-AVCZ-20230807-Email *

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Australian Wildcatch Fishing (Corporate Alliance Enterprises)	CF-AWF	Letter sent out with activity sheet 24.02.23 Email sent 23.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-AWF-20230523-Email *CCL
Commercial Fishermen's Co-Operative	CF-CFCO	Letter sent out with activity sheet 24.02.23 Email sent 01.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-CFCO-20230601-Email *CCL
Southern Squid Jig Fisher	CF-SSJF	Letter sent out with activity sheet 24.02.23 Email sent 28.02.23 with updated activity Email sent 06.07.23 with new website link 26.07.23: Requested contact details to be included in the Emergency contacts directory	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SSJF-20230228-Email CF-SSJF-20230706-Email CF-SSJF-20230726-Email *CCL
Abalone Council Australia	CF-ACA	Email sent with 2023 activity sheet 24.02.23 Email sent new website link 23.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ACA-20230224-Email CF-ACA-20230523-Email *

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Abalone Council Victoria	CF-ACV	Email sent 05.06.23 with new website link 26.07.23: requested contact details to include in emergency contacts directory 26.07.23: Thanked ACV 28.07.23: COE explained the consultation is just for the 4 EP as per the attached email (of 5 June 2023) and there is no consultation for drilling activities atm	26.07.23: provided contact details 27.07.23: asked if COE is planning to undertake any exploration in the Otway Basin in the near future	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ACV-20230605-Email CF-ACV-20230726-Email CF-ACV-20230726-Email-2 CF-ACV-20230726-Email-3 CF-ACV-20230727-Email CF-ACV-20230728-Email
Australian Southern Bluefin Tuna Industry Association	CF-ASBTIA-PL	Email sent with 2023 activity sheet 24.02.23 Email sent 23.05.23 with new website link Email sent 1.6.23 with links to consultation website	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-ASBTIA-PL-20230224-Email CF-ASBTIA-PL-20230523-Email CF-ASBTIA-PL-20230601-Email *
Bass Strait Scallop Industry Association	CF-BSSIA	Letter sent out with activity sheet 24.02.23 Email sent 14.03.23 with activity update Email sent 01.06.23 with new website link	No response but represented by SETFIA	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-BSSIA-20230314-Email CF-BSSIA-20230530-Email CF-BSSIA-20230601-Email *CCL
Commonwealth Fisheries Association (CFA)	CF-CFA	Email sent with 2023 activity sheet 24.02.23 Email sent 1.6.23 with links to consultation website	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	COE-All-Activities-2023-Update CF-CFA-20230224-Email CF-CFA-20230601-Email *

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					engagements described in the EP.	
Eastern Zone Abalone Industry Association	CF-EZAIA-SUDA	Email with links to new website sent 1.6.23 Email sent 01.06.23 of three EP related to ongoing operations 04.06.23: thanked for sharing the SIA doc	01.06.23: shared info with members and attached a paper about Ocean Access	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-EZAIA-SUDA-20230601-Email CF-EZAIA-SUDA-20230601-Email-2 CF-EZAIA-SUDA-20230602 CF-EZAIA-SUDA-20230601-Attachment CF-EZAIA-SUDA-20230604-Email
Lakes Entrance Fishermen's Society Cooperative Limited (LEFCOL)	CF-LEFCOL	Email sent with 2023 activity sheet 24.02.23 Email sent 1.6.23 with links to consultation website	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-LEFCOL-20220408-Email COE-All-Activities-2023-Update CF-LEFCOL-20230224-Email CF-LEFCOL-20230601-Email *
NSW Professional Fishermen's Association	CF-NSWPFA	Letter sent out with activity sheet 24.02.23 Email sent 01.06.23 with new website link.	08.06.23: Automatic reply	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-NSWPFA-20230601-Email CF-NSWPFA-20230608-Email *CCL

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Port Franklin Fishermen's Association	CF-PFFA	Email with links to new website sent 1.6.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-PFFA-20230601-Email
South east trawl fishing industry association (SETFIA)	CF-SETFIA	Meeting held 21.02.23 going over all Cooper Energy's proposed activities. 23.05.23 email sent with meeting notes Email sent 1.6.23 with new website links	Discussion regarding plotting Cooper Energy infrastructure in shapefiles, fisher awareness campaign, confirmation of changes occurring in the SE fisheries and the need to overcommunicate the position of Cooper's infrastructure, PSZ safety video	No objections or claims	Cooper Energy to progress with vessel plotter checks, continue with notifications to fleets and SETFIA to update records and reissue the PSZ safety video. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SETFIA-20230221-Meeting CF-SETFIA-20230523-Email CF-SETFIA-20230601-Email
Seafood Industry Australia	CF-SIA	Letter sent out with activity sheet 24.02.23 Email sent 01.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SIA-20230601-Email *CCL

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Seafood Industry Victoria (SIV)	CF-SIV	<p>Email sent with 2023 activity sheet 24.02.23</p> <p>05.04.2022 Activities update sent</p> <p>Meeting 02 .05.23</p> <p>Meeting notes sent on 04.05.2023</p> <p>Map sent on 04.05.23</p> <p>update of final record sent on 10.05.23. COE: Provided overview of NOPTA and NOPSEMA roles, current operations, and abandonment plans, presented overview of spill risk, potential extent and differences in hydrocarbons, and highlighted DTP role in state waters. SIV: continue involvement, noted all Victorian licence holders represented by SIV, described research funding.</p> <p>Email sent 26.05.23 with new website link</p> <p>13.07.23: Confirming that activities consultation website had been shared with members to check issues that have been raised</p> <p>14.07.23: Appreciate if SIV could share activity info</p>	<p>06.04.2023 Confirmed will post activities update on SIV website.</p> <p>02.05.23: Thanked the information sent and highlighted the meeting held that afternoon.</p> <p>05.05.23: SIV thanked COE for following up with the link and will review the notes provided</p> <p>08.05.23: Suggested on alteration from the meeting, looks forward to engaging further on a fee-for-service arrangement for commercial fishers to be kept informed</p> <p>14.07.23: Requested to distribute the proposed amended message to invite members to review activities.</p> <p>14.07.23: Thanked CE for their understanding and confirmed email of activities to members</p>	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	<p>CF-SIV-20220405-Email</p> <p>CF-SIV-20220406-Email</p> <p>CF-SIV-20230224-Email</p> <p>CF-SIV-20220504-Email</p> <p>CF-SIV-20230508-Email</p> <p>CF-SIV-20230510-Email</p> <p>CF-SIV-20230713-Email</p> <p>CF-SIV-20230714-Email</p> <p>CF-SIV-20230714-Email-2</p> <p>CF-SIV-20230714-Email-3</p> <p>CF-SIV-20230714-Email-4</p> <p>CF-SIV-20230714-Email-5</p> <p>*</p>

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		14.07.23: Acknowledged to receive service model proposal and appreciated if SIV could send out the email proposed				
Tuna Australia	CF-TA	Email sent with 2023 activity sheet 24.02.23 Email sent 26.05.23 with new website link Email sent 30.05.23 about meeting in-person and requested TA contact details 12.07.2023 Advised that a services agreement not needed at this time as assessment shows no active fishing in the relevant fisheries in CE's activities' areas	15.03.23: Attached industry position statement for engaging energy companies and to contact during consultation phase 19.03.23: Thanked for reaching out, but have stress on their resources and attached a project development plan in the marine space and requested to contact again after reviewing the document if wish to pursue a working relationship 30.05.23: Linked conversation with the program manager, provided background info of the company, and can assist in providing info from concession and permit owners and holders	No objections or claims Request to discuss potential fees for service reasonable and will be responded to	Declined to set up services agreement at this time. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-TA-20230224-Email CF-TA-20230319-Email CF-TA-20230319-Attachment - Position Statement CF-TA-20230526-Email CF-TA-20230530-Email CF-TA-20230712-email *
Victorian Rock Lobster Association (VRLA)	CF-VRLA	Email sent with 2023 activity sheet 24.02.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VRLA-20220405-Email CF-VRLA-20230224-Email *

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Victorian Scallop Fishermans Association Inc.	CF-VSFA	Email sent with Cooper Energy Activity Update for 2022 activity sheet 19.06.22 Email sent with 2023 activity sheet 24.02.23 Email sent 01.06.23 with new website link 05.06.2023 email re-sent with website links	No response But represented by SIV	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-VSFA-20230224-Email CF-VSFA-20230601-Email CF-VSFA-20230605-Email *
East Gippsland Estuarine Fishermen's Association	CF-EGEFA	Email with links to new website sent 1.6.23 Email sent 04.06.23 acknowledged the industry closure	01.06.23: EGEFA no longer functions due to the state gov closing the industry	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; fishery has been closed.	CF-EGEFA-20230601-Email CF-EGEFA-20230601-Email-2 CF-EGEFA-20230604-Email
Eastern Victoria Sea Urchin Divers Association	CF-EVSUDA	Email with links to new website sent 1.6.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-EVSUDA-20230601
Southern Rock Lobster Ltd	CF-SRL	Email sent with 2023 activity sheet 24.02.23 Email sent 11.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	CF-SRL-20230224-Email CF-SRL-20230405-Email *
Local Government						

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Bega Valley Shire Council	GA-BVSC	Letter sent 16.02.23 with activity sheet 27.04.2023 email with web links and meeting request Email sent 24.05.23 with record of meeting held 19.05.2023. Cooper: Enquired around community interests, provided an overview of Gippsland activities and environmental plans, discussed potential oil spill risks. Discussed sealing / cementing of wells	02.05.23: response advising the Mayor and Council's Director Community, Environment and Planning, are available 11:00am – 11:30am on Friday 19 May. 19.05.2023 Meeting held, no objections or claims BVSC: Discussed energy supply in the region, bushfire recovery, questioned whether cementing the wells would seal them, discussed approach to emergency response for oil spills from wells and vessels and if there would be additional consultation regarding future drilling activities	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-BVSC-20230427-Email GA-BVSC-20230430-Email GA-BVSC-20230502-Email GA-BVSC-20230519-Meeting GA-BVSC-20230524-Email *FNSL
East Gippsland Shire Council	GA-EGSC	Letter sent 16.02.23 with activity sheet Email sent 25.04.23 08.05.23 Meeting. Email sent 11.05.23 with record of meeting. Cooper Energy: provided background info on why council may be contacted, and activities to be covered by the three environment plans, highlighted potential oil spill risk, noted interest in seeking other potentially relevant persons, and confirmed to follow up with the Orbost	Email auto response 17.02.23 Email auto response 27.04.23 05.05.23: noted and forwarded to the Assets and Environment Department 22.05.23: Email of XXX's email address 08.05.23 Meeting EGSC: primary interest is the onshore gas plant, suggested consulting with the Orbost Chamber of Commerce, see no issues regarding proposed activities, satisfied with no further required consultation	No objections or claims Request to consult with Orbost Chamber of Commerce is reasonable and will be actioned	Confirmed COE will consult with Orbost Chamber of Commerce. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-EGSC-20230217-Email GA-EGSC-20230425-Email GA-EGSC-20230427-Email GA-EGSC-20230505-Email GA-EGSC-20230511-Email GA-EGSC-20230511-Email-2 GA-EGSC-20230522-Email *FNSL

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		Chamber of Commerce. 11.05.23: COE added note for previous email (contacted Chamber of Commerce)				
Eurobodalla Shire Council	GA-ESC	Letter sent 16.02.23 with activity sheet Email requesting a meeting by the end of April 2023 Email sent 27.04.23 with the new website link 30.04.23: trying to schedule a meeting on 18.05	27.04.23 correspondence 04.05.23: XXX is unable to meet, but passed the Email onto the Executive Assistant to the General Manager 09.05.23: Email of attached response to 09.05.23: Attachment of letter stating that there is not any foreseeable implications to the shire from the activities 12.05.23: Both the Mayor and GM are unavailable to meet	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-ESC-20230427-Email GA-ESC-20230430-Email GA-ESC-20230504-Email GA-ESC-20230509-Email GA-ESC-20230509-Letter GA-ESC-20230512-Email *FNSL
Wellington Shire Council	GA-WSC	Letter sent 16.02.23 with activity sheet Email sent 25.04.23 with new website link 09.05.2023 Teams meeting, used activities website as presentation material to provide background to activities Email sent 09.05.23: COE thanked WSC for sending a list of groups to be consulted with	Email auto response 17.02.23 Email auto response 25.04.23 01.05.2023: to correspond with Leah about organising a teams meet Email 03.05.23 setting up a meeting with the mayor, the CEO and WSC 09.05.2023 Teams meeting, no objections or claims noted 09.05.23: Email sent with attached community groups	No objections or claims. Request to consult with listed community groups reasonable and will be actioned.	Noted COE will contact listed community groups to see if they would like to be consulted on activities. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-WSC-20230217-Email GA-WSC-20230425-Email GA-WSC-20230501-Email GA-WSC-20230509-Meeting GA-WSC-20230509-xcel GA-WSC-20230509-Email-2 GA-WSC-20230524-Email GA-WSC-20230524-Email-2 *FNSL

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		<p>Email sent 24.05.23 of COE updating that he has contacted everyone on the list</p> <p>Email sent 24.05.23 with record of meeting. Cooper: provided background on broader requirements for consultation, ongoing operations, and BMG field, noted Patricia-Baleen shut in. WSC: familiar with oil and gas activities, no issues raised, and suggested engaging with QUBE-COE</p>				
Members of Parliament						
Member of Parliament	GA-LHMGS	<p>letter sent 22.02.23 with activity sheet</p> <p>Email sent 16.05.23 with new website link</p>		No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-LHMGS-20230516-Email *CCL
Member of Parliament	GA-MPGIPA	<p>letter sent 22.02.23 with activity sheet</p> <p>Email sent 16.05.23 with new website link</p>	<p>16.05.23: Automatic reply</p> <p>No response</p>	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-MPGIPA-20230516-Email GA-MPGIPA-20230516-Email-2 *CCL

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Member of Parliament	GA-MPGIPB	letter sent 22.02.23 with activity sheet Email sent 16.05.23 with new website link	16.05.23: Automatic reply Letter returned to sender No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-MPGIPB-20230516-Email GA-MPGIPB-20230516-Email-2 *CCL
Member of Parliament	GA-UHMEV	letter sent 22.02.23 with activity sheet Letter and activity sheet resent to alternative address 19.04.23 Email sent 16.05.23 with new website link	Letter returned to sender No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-UHMEV-20230516-Email *CCL
Oil and Gas						
Asset Energy Pty Ltd	OG-AE	Email with 2023 activity sheet sent 08.03.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-AE-20230308-Email OG-AE-20230512-Email *
Carnarvon Hibiscus Pty Ltd	OG-CHIB	Email sent with 2023 activity sheet 24.02.23 Follow up Email sent 16.05.23 Email sent 06.06.23 thanking for the response	30.05.23: thanked for informing and do not see any impact to their current activities or acreage position in the basin. Do not require further notification	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-CHIB-20230224-Email OG-CHIB-20230516-Email OG-CHIB-20230530-Email OG-CHIB-20230606-Email *

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The Crown in right of Victoria	OG-CRV	Email sent with 2023 activity sheet 28.02.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-CRV-20230228-Email OG-CRV-20230512-Email *
Emperor Energy	OG-EEOB	Email sent with 2023 activity sheet 28.02.23 Email sent 26.05.23 to keep us informed of any progress on drilling Judith-2	12.05.23: thanked for the details, no objections, and provided details of proposed drilling of Judith 2 well. 28.05.23: Confirmed to keep COE informed	No objection or claim Request to provide notifications reasonable and will be actioned	Confirmed will provide notifications. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-EEOB-20230228-Email OG-EEOB-20230512-Email OG-EEOB-20230512-Email-2 OG-EEOB-20230512-PDF OG-EEOB-20230526-Email OG-EEOB-20230528-Email *
Esso (a subsidiary of Exxon Mobil)	OG-ESSO	Email sent with 2023 activity sheet 28.02.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-ESSO-20230228-Email OG-ESSO-20230512-Email *
Liberty Petroleum Corporation	OG-LPC	Email sent with 2023 activity sheet 28.02.23 Email sent 16.05.23 with new website link Follow-up email sent 16.05.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-LPC 20230228_Email OG-LPC-20230516-Email *

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SGH Energy	OG-SGHE	Contact request sent via webform 22.06.23 Email sent 22.06.23 Email sent 03.08.23 to request updated contact details for emergency response. Email sent 04.08.23 to notify that the group email is being updated and included the best contact details	Email received 03.09.23 to confirm updated contact details and request return details from COE	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-SGHE-20230622-Email OG-SGHE-20230803-Email OG-SGHE-20230803-Email-2 OG-SGHE-20230804-Email
3D Oil Limited	OG-TOL	Letter sent 16.02.23 with activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-TOL-20230512-Email *CCL
Offshore Wind						
Bluefloat Energy (Greater Gippsland Offshore Wind)	OG-BE	Letter 22.02.23 and activity sheet Email sent 12.05.23 with new website link	Email auto response 12.05.23	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-BE-20230512-Email OG-BE-20230512-Email-2 *CCL

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Corio Generation (Great Eastern Offshore Wind Farm)	OG-CG	Letter 22.02.23 and activity sheet 09.02.23 phone call Email sent 12.05.23 with new website link	Email sent 09.03.23 highlighting proposed projects	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-CG-20230309-Email OG-CG-20230512-Email *CCL
Flotation Energy	OG-FE	Letter sent 16.02.23 with activity sheet 12.05.2023 Sent activities website link Email sent 26.05.23: thanked for the catchup and will follow up with FE	17.05.23: Requested to remain connected, understand none of the activities will interact with their area 26.05.23: Fw shape files for COE Email received 26.05.23: noting prior correspondence suggesting collaboration	No claims or objections	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OG-FE-20230512-Email OG-FE-20230517-Email OG-FE-20230526-Email OG-FE-20230526-Attachment OG-FE-20230526-Email-2 *CCL
Star of the South	OI-SS	Web contact form used to provide text from letter and included link Email sent 12.05.23 with link to new website	16.05.23: Automatic reply	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-SS-20230512-Email OI-SS-20230516-Email CCL
Port Anthony Renewables	OI-PAR	Email sent 05.06.23 with new website link	No response received	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-PAR-20230605-Email
Other						

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Golden Beach VMMR Recreation Reserve Club	LR-GBVMMR	<p>Email sent 18.05.23 with new website link</p> <p>Email sent 18.05.23 requesting a time to meet on the 23rd of May</p> <p>Email sent 04.06.23 with record of meeting. VMNR: noted previous spill by Esso, expressed broader view from communities is needed, acknowledged risks and impacts with no specific issues raised. Cooper: provided overview of the environment plans and impacts and risks from the activities.</p> <p>22.06.23: Confirmed that the flyers were sent out and attached photos of package and briefing note</p>	<p>23.05.23: Confirmed meeting at VMMR clubrooms</p> <p>04.06.23: requested flyers be mailed and will assist in making the flyers available to residents</p> <p>05.06.23. thank you</p> <p>05.06.23: Fw thank you email</p> <p>22.06.23: Noted that bag was addressed to Golden Bay and not Golden Beach, and will distribute the flyers</p> <p>22.06.23: Will let know if the package does not arrive</p> <p>29.06.23: Confirmed the parcel has arrived and the flyers will be distributed over the weekend</p>	<p>No objections or claims</p> <p>Request to provide community info via flyers was reasonable and will be actioned</p>	<p>Flyers sent to VMMR.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>LR-GBVMMR-20230518-Email</p> <p>LR-GBVMMR-20230519-Email</p> <p>LR-GBVMMR-20230524-Meeting</p> <p>LR-GBVMMR-20230604-Email</p> <p>LR-GBVMMR-20230605-Email</p> <p>LR-GBVMMR-20230605-Email-2</p> <p>LR-GBVMMR-20230622-Email</p> <p>LR-GBVMMR-20230622-Email-2</p> <p>LR-GBVMMR-20230622-Image</p> <p>LR-GBVMMR-20230622-BriefingNote</p> <p>LR-GBVMMR-20230629-Email</p>
Australian Oceanographic Services Pty Ltd	OI-AOS	<p>Email sent with 2022 Activity Statement 08.04.2022</p> <p>Email sent with 2023 activity sheet 28.02.23</p> <p>Attachment 01.03.23: Northern Star Expression of interest</p> <p>Email sent 21.04.23 with new website link</p>	<p>11.02.2023 Thanked COE</p> <p>01.02.2023 Offered contract services</p>	<p>No objection or claim</p> <p>Request to share services capabilities internally reasonable and actioned</p>	<p>Acknowledged services provided and shared internally.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>OI-AOS-20220408-Email</p> <p>OI-AOS-20230228-Email</p> <p>OI-AOS-20230301-Email</p> <p>OI-AOS-20230301-PDF</p> <p>OI-AOS-20230421-Email *</p>

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Golden Paradise Beach Ratepayers and Residents Association	LR-GPBRRRA	<p>Email sent 18.05.12 with new website link</p> <p>19.05.23: COE thanked for the quick response are happy for the information to be presented to the larger community</p> <p>Email sent 04.06.23 with record of meeting. GPBRRRA: Provided overview of developing plan for an art gallery, expressed concern of an oil spill to the are on a fishing competition, reward no commensurate with impact and risk, no specific issues around the environment plan but recommended reaching out to the broader community. Cooper: provided overview of the environment plans and impacts and risks from the activities</p> <p>04.06.23: COE thanked GPBRRRA</p>	<p>19.05.23: Thanked for the info and requested time and day to meet and if happy to disseminate the info from the website to a larger community</p> <p>04.06.23: Thanked COE for meeting notes, and provided a link</p> <p>Published full page advertisement in their local newsletter inviting consultation</p>	<p>No objections or claims</p> <p>Request to provide community info via advertisement in local newsletter was reasonable and will be actioned</p>	<p>Confirmed placement of advertisement in newsletter.</p> <p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.</p>	<p>LR-GPBRRRA-20230518-Email</p> <p>LR-GPBRRRA-20230519-Email</p> <p>LR-GPBRRRA-20230519-Email-2</p> <p>LR-GPBRRRA-20230523-Meeting</p> <p>LR-GPBRRRA-20230604-Email</p> <p>LR-GPBRRRA-20230604-Email-2</p> <p>LR-GPBRRRA-20230604-Email-3</p>
Port Albert Progress Association	LR-PAPA	<p>Email sent 11.05.23 of new website link</p>	<p>No response received</p>	<p>No claims or objections raised with the proposed activity.</p>	<p>COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing</p>	<p>LR-PAPA-20230511-Email</p>

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					engagements described in the EP.	
Seaspray Ratepayers Association	LR-SRA	Email sent 11.05.23 with new website link	No response received	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	LR-SRA-20230511-Email
Catherine Hill Bay Progress Association	OI-CHBPA	Letter sent out by email 08.03.23 with activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-CHBPA-20230308-Email OI-CHBPA-20230512-Email *CCL
Yarram/Port Albert/Tarraville Anglican (Church and Markets)	OI-YPATA	Email sent 18.05.23 with new website link (Jenny Wicking)	No response received	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-YPATA-20230518-Email
Ports						

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Port Authority NSW - Port Kembla - Port of Eden - Port Botany - Newcastle	PO-PAN	Letter sent 16.02.23 with activity sheet Email sent 1.6.23 with website links	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	PO-PAN-20230601-Email *CCL
Gippsland Ports	OI-GP	20.04.23 email exchange regarding port entry requirements for upcoming campaign involving vessels Pacific Gannet and MMA Vigilant.	20.04.23: Ongoing discussions on planning for BMG and Gippsland Ops visual inspections	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-GP-20230420-Email
Recreational Fishing						
Recreational Fishing (NSW)	RI-RF	Letter sent 16.02.23 with activity sheet Email sent 1.6.23 with website links 26.07.23: Requested contacted details to include in the Emergency contact directory 26.07.23: COE explained the reason for including NSW in the unlikely event of a spill	26.07.23: Provided contact details and explained they are not active in Gippsland/Otway waters 26.07.23: Thanked COE for their explanation	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-RF-20230601-Email RI-RF-20230726-Email RI-RF-20230726-Email-2 RI-RF-20230726-Email-3 RI-RF-20230726-Email-4 *CCL
Victorian Bays and Inlets Fisheries Association	RI-VBIFA	Letter sent 03.03.23 with activity sheet	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	*CCL

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					engagements described in the EP.	
Victoria Game Fishing Club	RI-VGFC	letter sent 16.02.23 with activity sheet Email sent 16.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-VGFC-20230516-Email *CCL
Victorian Recreational Fishers Association (VRFish)	RI-VRFA	Email sent with 2023 activity sheet 28.02.23 Email sent 05.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	VRFA-20230228-Email RI-VRFA-20230605-Email *
Recreational Groups						
Academy of Scuba	RI-AS	letter sent 16.02.23 with activity sheet Email sent 04.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-AS-20230504-Email *CCL
Boating Industry Association of Victoria	RI-BIAV	letter sent 16.02.23 with activity sheet Letter and activity sheet resent to alternative address 19.04.23	Letter returned to sender No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	RI-BIAV-20230530-Email *CCL

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		Email sent 30.05.23 with new website link			engagements described in the EP.	
Dive Industry Association of Australia	RI-DIAA	Letter sent out with activity sheet 24.02.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-DIAA-20230512-Email *CCL
Diving Industry of Victoria	RI-DIV	Letter 16.02.23 and activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-DIV-20230512-Email *CCL
Ocean Racing Club of Victoria	RI-ORCV	Email and 2023 activity update sheet sent 08.03.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-All-Activities-2023-Update RI-ORCV-20230308-Email RI-ORCV-20230512-Email *
Paddle NSW	RI-PN	Letter 16.02.23 and activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	RI-PN-20230512-Email *CCL

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					engagements described in the EP.	
Paddle Victoria	RI-PV	Letter 16.02.23 and activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-PV-20230512-Email *CCL
SCUBA Divers Federation of Victoria	RI-SDFV	Letter sent out with activity sheet 24.02.23 Email sent 12.05.23 with new website link	Letter returned to sender No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-SDFV-20230512-Email *CCL
Surfing Victoria	RI-SV	Letter and 2023 activity sheet sent 03.03.23 Email sent 05.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-SV-20230605-Email *CCL
Windsurfing NSW Association	RI-WNA	Letter sent out by email with activity sheet 10.03.23 Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	RI-WNA-20230310-Email RI-WNA-20230512-Email *CCL

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					engagements described in the EP.	
Windsurfing Victoria	RI-WV	Letter 16.02.23 and activity sheet Email sent 12.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	COE-Coastal_Communities-2023-Letter COE-All-Activities-2023-Update RI-WV-20230512-Email *CCL
Research						
Blue Whale Study	OI-BWS	Email sent 24.02.23 including 2023 activity update Email sent 08.04.22 including 2022 activity update Email sent 13.03.2023 including aerial surveys from Dec/Jan in the Gippsland. 4.03.2023 Email sent 21.04.23 with new website link	27.02.2023 Requested sightings data 14.03.2023 Acknowledged receipt of sightings 16.03.2023 Noted intent to review sightings	No claims or objections raised with the proposed activity.	COE have historic arrangement to share sightings data with Blue Whale Study. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-BWS-20230314-Email COE-All-Activities-2023-Update OI-BWS-20230224-Email OI-BWS-20230227-Email OI-BWS-20230307-Email OI-BWS-20230308-Email *
Deakin University – School of Life and Environmental Sciences	OI-DU-SLES_JA	Email sent with 2023 activity sheet 24.02.23	No response with respect to this EP	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	OI-DU-SLES_JA-20230504-Email *

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					engagements described in the EP.	
Fisheries Research and Development Corporation	OI-FRDC	Letter sent out with activity sheet 24.02.23 Email sent 01.06.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-FRDC-20230601-Email *CCL
Fishwell Consulting	OI-FC	Letter sent out with activity sheet 24.02.23 Email sent 16.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-FC-20230516-Email *CCL
Institute for Marine and Antarctic Studies (IMAS) – University of Tasmania	OI-IMASUT	Letter sent out by email with activity sheet 24.02.23 Email sent 16.05.23 with new website link	16.05.23: Resolved case No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	OI-IMASUT-20230516-Email OI-IMASUT-20230516-Email-2 *CCL
State Government Agencies						

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Department of Energy Environment and Climate Change (DEECA) – Biosecurity and Agriculture Services	GA-DEECA-BAS	24.02.2023 Activity update email sent	No response with respect to this EP	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email *
DEECA - Biodiversity Division	GA-DEECA-BD	Email sent with 2023 activity sheet 24.02.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email *
DEECA – Earth Resources Regulation	GA-DEECA-ERR / GA-DJPR-ERR	Email sent with 2023 activity sheet 24.02.23	03.10.23. Advised that the pipelines function remains in part with the Energy Group within DEECA No objections or claims	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email GA-DEECA-ERR-20230310-Email *
DEECA – Marine National Parks and Marine Parks	GA-DEECA-NPMP	Email sent with 2023 activity sheet 24.02.23	14.04.23: Confirmed that there is no overlap with activities and any Australian Marine Parks and do not require further notification unless changes result in overlap or new impact to marine park. Useful links and advice provided	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email GA-DEECA-NPMP-20230414-Email

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Transport Safety Victoria (now Maritime Safety Victoria)	GA-TSVMS	Cooper Energy Activity Update 2022 Provided additional information on activity outlook.	Department offered to issue notice to mariners as appropriate for activities within Victorian State waters.	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-TSVMS-20230224-email
Department of Jobs Skills Industry and Regions (DJSIR)-Regional Development Victoria (RDV)	GA-DJSIR-RDV	Email sent with 2023 activity sheet 24.02.23 11.07.2023 Email sent to RDV Director with new website link	27.02.23: failed delivery Delivery ok, but no response received from alternate email address	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DJSIR-RDV-20230224-Email GA-DJSIR-RDV-20230224-Email-2 GA-DJSIR-RDV-20230711-Email*
Department of Transport and Planning (DTP) – Victoria	GA-DOTPV / GA-DELWP-DoT / GA-MRPV	Email sent with Cooper Energy Offshore Victoria OPEP (VIC-ER-EMP-0001) Rev 8 in 03.08.2022 Emails exchanges regarding meetings, TRPs, sharing of guidance and drill planning Email sent with 2023 activity sheet 24.02.23 Meeting notes from	Appreciated the information and provided contact to report in case of need advice issued to mariners or an exclusion zone enacted 2022 emails: Appreciated the visit and looked forward to the desktop exercise in 2023. 2023 emails: Spill drill scoping and spill drill meeting notes 16.06.23: DTP Vic thank you	No objections or claims	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DOTPV-20220803-Email GA-DOTPV-20220803-Victoria-OPEP GA-DOTPV-20221208-Victoria GA-DOTPV-20221208-Victoria-Guidance GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email

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		<p>18.04.2023</p> <ul style="list-style-type: none"> - COE gave overview of activities, BMG decommissioning timing and spill risks - Discussed planning for forthcoming drill <p>15.06.2023 Shared GunaiKurnai contacts and noting their Values Adviser could support the State IMT</p> <p>05.07.2023 Drill held with DTP focussed on BMG</p> <ul style="list-style-type: none"> - discussed dispersant stock and availability - primary impact area for drill was east of GunaiKurnai RAP area . -recommendation by DTP that a heritage specialist could do initial assessment via the restricted access Victorian Aboriginal Heritage Register and help engage with the relevant Traditional Owners <p>10.07.23: COE made contact in respect of TO groups in East Gippsland.</p>	<p>response</p> <p>05.07.2023 Drill held with DTP focussed on BMG</p> <ul style="list-style-type: none"> - discussed dispersant stock and availability - primary impact area for drill was east of GunaiKurnai RAP area . -recommendation by DTP that a heritage specialist could do initial assessment via the restricted access Victorian Aboriginal Heritage Register and help engage with the relevant Traditional Owners <p>DTP offered to potentially provide additional TO contacts</p> <p>14.07.23: MRPV(DTP) thanked for the call and said they'll try to provide contacts in East Gippsland for Traditional Owner groups (east of the Gunaikurnai RAP boundary). Contact also thinks the process of technical input in an emergency similar across emergencies in general.</p> <p>Note: While noted that DTP would contact the individual TOs in this region COE will also endeavour to consult with them in respect of this EP.</p>			<p>GA-DOTPV-20220615-Victoria</p> <p>GA-DOTPV-20220714-Victoria</p> <p>*</p>

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Department of Planning and Environment - Environment and Heritage Group NSW	GA-DPEEHG	Email sent with 2023 activity sheet 24.02.23 21.04.23: website link Email sent 26.05.23 about noting their awareness of consulting for the OPEP	01.03.23: promised contact in the marine and coast team and had sent it on there 21.04.23: thanked the information and advised to send key milestone updates to the same address 27.04.23: requested if the company has any operations in NSW	No objections or claims Reasonable request for notifications will be actioned	Confirmed will be updated on key milestones. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DPEEHG-20230224-Email GA-DPEEHG-20230301-Email GA-DPEEHG-20230421-Email GA-DPEEHG-20230427-Email GA-DPEEHG-20230526-Email *
Department of Primary Industries – Fisheries NSW	GA-DPI	Email sent with 2023 activity sheet 24.02.23 Email sent enquiring about commercial fishing data 02.02.23	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DPI-20230202-Email GA-DPI-20230224-Email *
Parks Victoria	GA-PV	Email sent with 2023 activity sheet 24.02.23 Email sent 18.05.23 with new website link and attached state oil pollution response guidance note 06.06.23 confirmed to continue to keep them informed	31.05.2023 Confirmed contact for Parks Vic eastern region and requested to be kept informed	No objections or claims Request to be kept informed reasonable, and will be actioned	Confirmed COE will keep PV Eastern Region informed. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email 1 GA-PV-20230518-Email GA-PV-20230518-Attachment GA-PV-20230531-Email GA-PV-20230606-Email *

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Transport for NSW	GA-TNSW / GA-NSWRMS	Email sent with 2023 activity sheet 24.02.23	06.07.23: Confirming COE attendance at the annual NSW SRT workshop to present, and included a brief outline of the workshop. No further response with respect to this EP	No objections or claims. Reasonable request to provide OPEP and TRPs will be actioned	Confirmed COE will provide BMG Decommissioning OPEP and TRPs. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-TNSW-20230224-Email GA-TNSW-20230706-Email *
Victorian Fisheries Authority (VFA)	GA-VFA	Email sent with 2023 activity sheet 24.02.23 Email sent 12.06.23 requesting if available to meet and discuss the projects and VFA's roles and responsibilities meeting to discuss VFA's functions and interactions with fisheries Email sent 24.07.23 to either arrange a meeting or call	Out of office received 24.02.23 No response; called but on leave and provided contacts for temp replacement Unable to arrange meeting with person filling in for role	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	GA-DoTPV_DEECA_DJSIR_PV_VFA_TSV-20230224-Email 1 GA-VFA-20230612-Email GA-VFA-20230719-Email GA-VFA-20230724-Email *
Surf Life Saving Clubs						
Lakes Entrance Surf Life Saving Club	SL-LESLSC	Letter sent 21.02.23 and 2023 activity update sheet Email sent 04.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	SL-LESLSC-20230504-Email *CCL

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
Life Saving Victoria	SL-LSV	Letter sent out with activity sheet 24.02.23 Email sent 04.05.23 with new website link	No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	SL-LSV-20230504-Email *CCL
Seaspray Surf Lifesaving Club	SL-SSLC	Email sent 18.05.23 with new website link	No response received	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	SL-SSLC-20230518-Email
Tourism						
NSW Tourism Industry Council	RI-NTIC	Letter sent 22.02.23 with activity sheet Replacement letter sent to updated address 15.03.23 with activity sheet Email sent 1.6.23 with website links	Letter returned to sender No response	No claims or objections raised with the proposed activity.	COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing engagements described in the EP.	RI-NTIC-20230601-Email *CCL
Victorian Tourism Industry Council	RI-VTIC	Email sent 17.02.23 with activity sheet 03.03.23 Meeting. VTIC was interested in sponsorship and financial partnership opportunities between VTIC and COE. VTIC did not have any comments on the	Email sent 17.02.23 20.02.23: requested a chat to explore opportunities. Meeting organised by COE	No objections or claims Request for partnership with COE reasonable, and will be considered	Committed to revert on partnering potential. COE considers that the stakeholder's interests have been adequately addressed; consultation will continue in line with ongoing	RI-VTIC-20230217-Email RI-VTIC-20230308-Email *

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Stakeholder	Stakeholder ID	Information Provided	Summary of Stakeholder Response	COE Assessment of Objection / Claim	COE Response	Record # (Stakeholder ID-Date-Item) (Note: not stamped in sensitive info but dates provide link)
		material sent. 08.03.23: Will discuss email internally and revert Email sent 16.05.23 with new website link			engagements described in the EP.	

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As noted in 10.2.1, additional opportunity was provided to each of the following relevant persons to be consulted and to seek out additional potentially relevant persons. No further suggestions were received regarding additional potential relevant persons. This significant sampling combined with other extended enquiry yielding no new Relevant Persons supports our determination that sufficient effort has been made.

Requirements and Aims	How met
Sufficient time	Additional emails sent more than two to three months from submission date
Sufficient information	In addition to prior emails containing summary information and links to the activities website, the link was again included. No additional information has been requested.
Clarity of purpose	The email highlighted Gippsland Offshore Operations as an EP under consultation; the activities website contained an overview of relevant persons rights and Cooper Energy obligations
Clarity of information	The activities website summarises the activities and related impacts and risks; the website also has a link to the existing EP

Table 4: Relevant Persons Consultation logged post mid-August 2023

Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
AMP Licence Holders							
OI-AARNPL	AARNet Pty Ltd	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					this person be asked to contact Cooper Energy so they could be consulted		
OI-JGP	Stakeholder ID: OI-JGP	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-JGP	Stakeholder ID: OI-JGP	2023-08-18	Email	In	Delivery receipt	N/A	N/A
RC-MPF	Major Projects Foundation Ltd	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RC-MPF	Major Projects Foundation Ltd	2023-08-18	Email	In	No objections	N/A	N/A
OI-SCMY	Stakeholder ID: OI-SCMY	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					- requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted		
OI-SCMY	Stakeholder ID: OI-SCMY	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OI-SP	Stakeholder ID: OI-SP	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-SP	Stakeholder ID: OI-SP	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CN-TMFT	The Trustee for The Minderoo Foundation Trust	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CN-TMFT	The Trustee for The Minderoo Foundation Trust	2023-08-18	Email	In	Email acknowledgement	N/A	N/A
Business							

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
B-OCC	Orbost Chamber of Commerce	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
B-OCC	Orbost Chamber of Commerce	2023-08-18	Email	In	Delivery receipt	N/A	N/A
Commercial fishing organisations (Commonwealth and state)							
CF-ACA	Abalone Council Australia	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-ACA	Abalone Council Australia	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-ACV	Abalone Council Victoria	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
CF-ACV	Abalone Council Victoria	2023-08-18	Email	In	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-AVCZ	Abalone Victoria (Central Zone) Ltd (AVCZ)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-AVCZ	Abalone Victoria (Central Zone) Ltd (AVCZ)	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-ASBTIA-PL	Australian Southern Bluefin Tuna Industry Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-ASBTIA-PL	Australian Southern Bluefin Tuna Industry Association	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-AWF	Australian Wildcatch Fishing	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<ul style="list-style-type: none"> - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 		
CF-AWF	Australian Wildcatch Fishing	2023-08-21	Email	In	Read receipt	N/A	N/A
CF-CFCO	Commercial Fishermen's Co-Operative	2023-08-18	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
CF-CFCO	Commercial Fishermen's Co-Operative	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-CFA	Commonwealth Fisheries Association (CFA)	2023-08-18	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
CF-CFA	Commonwealth Fisheries Association (CFA)	2023-08-18	Email	In	Delivery receipt	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
CF-EVSUDA	Eastern Victoria Sea Urchin Divers Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-EVSUDA	Eastern Victoria Sea Urchin Divers Association	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-EZAIA-SUDA	Eastern Zone Abalone Industry Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-EZAIA-SUDA	Eastern Zone Abalone Industry Association	2023-08-21	Email	In	Read receipt	N/A	N/A
CF-EZAIA-SUDA	Eastern Zone Abalone Industry Association	2023-09-20	Email	Out	<p>EZAIA</p> <ul style="list-style-type: none"> • Confirmed existing memberships and representation. <ul style="list-style-type: none"> ○ Individual licence holders are not members of SIV, and are represented by their association through their Executive Officer ○ EZAIA is a member of the Abalone Council of Victoria, which is a member of SIV, and via the state 	No issues raised	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<p>body, is represented in the Abalone Council of Australia (ACA)</p> <ul style="list-style-type: none"> ○ Contact is on the board of the ACA. • For the purposes of consultation, the EO represents members and shares information with members on consultation and other issues. • Direct consultation with members might be called for on more complex projects, and in such instances, a proponent could present to membership during a planned membership meeting such as during an AGM. • For the Cooper Energy activities, no issues were raised, and no direct consultation is required with members given the nature of activities - decommissioning and a 5-year EP revision. <p>COE</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> • Gave a brief update on decommissioning as follow up to earlier correspondence and phone call <ul style="list-style-type: none"> ○ Noted vessels were mobilising next month for Phase 1 of the decommissioning work which would take approximately 3 months. </div> <p>General</p> <ul style="list-style-type: none"> • A general discussion on challenges facing primary industries, thoughts on the need for ongoing research on impacts of oil and gas activities on the marine 		

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<div style="border: 1px solid black; padding: 10px;"> <p>environment, and discussion on challenges facing the wild catch abalone industry in Victoria. The industry partnership agreements (IPA) between ACA and FRDC were also noted, as was the potential benefit through better sharing of data acquired during oil and gas operations.</p> </div>		
CF-EZAIA-SUDA	Eastern Zone Abalone Industry Association	2023-09-20	Email	In	Noted a recent article on decommissioning	Information shared; no issues raised	N/A
CF-LEFCOL	Lakes Entrance Fishermen's Society Cooperative Limited (LEFCOL)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-LEFCOL	Lakes Entrance Fishermen's Society Cooperative Limited (LEFCOL)	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-NSWPFA	NSW Professional Fishermen's Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					- sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted		
CF-NSWPFA	NSW Professional Fishermen's Association	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-PFFA	Port Franklin Fishermen's Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-PFFA	Port Franklin Fishermen's Association	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-SIA	Seafood Industry Australia	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-SIA	Seafood Industry Australia	2023-08-18	Email	In	Delivery receipt	N/A	N/A
CF-SIV	Seafood Industry Victoria (SIV)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<ul style="list-style-type: none"> - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 		
CF-SIV	Seafood Industry Victoria (SIV)	2023-08-21	Email	In	Read receipt	N/A	N/A
CF-SETFIA	South East Trawl Fishing Industry Association (SETFIA)	2023-08-18	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
CF-SETFIA	South East Trawl Fishing Industry Association (SETFIA)	2023-08-18	Email	In	Read receipt	N/A	N/A
CF-SRLL	Southern Rock Lobster Limited	2023-08-18	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
CF-SRLL	Southern Rock Lobster Limited	2023-08-18	Email	In	Delivery receipt	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
CF-TA	Tuna Australia	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-TA	Tuna Australia	2023-08-22	Email	In	Provided industry position statement	N/A	None, a commercial suggestion
CF-TA	Tuna Australia	2023-08-22	Email	Out	Noted we had responded to this in July and given our assessment had shown there was no active fishing in the relevant fisheries, the setting up of an agreement was not warranted at this time. Still happy to discuss.	N/A	None, a commercial issue
CF-VSFA	Victorian Scallop Fisherman's Association	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
CF-VSFA	Victorian Scallop Fisherman's Association	2023-08-18	Email	In	Delivery receipt	N/A	N/A
ENGOS							

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-ACS	Australian Coastal Society - Victorian Chapter	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-ACS	Australian Coastal Society - Victorian Chapter	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-ACF	Australian Conservation Foundation	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-ACF	Australian Conservation Foundation	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-AMCS	Australian Marine Conservation Society	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-AMCS	Australian Marine Conservation Society	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-EV	Environment Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-EV	Environment Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-FEM	Friends of the Earth - Melbourne	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-FEM	Friends of the Earth - Melbourne	2023-08-22	Email	In	Shared with colleague who has an interest in decommissioning, and hope to meet on next Melbourne visit	N/A	N/A
EG-G	Greenpeace	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-G	Greenpeace	2023-08-21	Email	In	Auto response	N/A	N/A
EG-IFAW	International Fund for Animal Welfare	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-IFAW	International Fund for Animal Welfare	2023-08-21	Email	In	Read receipt	N/A	N/A
EG-LO	Living Ocean	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-LO	Living Ocean	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-MMF	Marine Mammal Foundation	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-MMF	Marine Mammal Foundation	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-OW	Ocean Watch	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-OW	Ocean Watch	2023-08-21	Email	In	Read receipt	N/A	N/A
EG-RTA	Rising Tide Australia	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-RTA	Rising Tide Australia	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-SSA	Sea Shepherd Australia	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-SC	Surfers for Climate	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-SC	Surfers for Climate	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-SFA	Surfrider Foundation Australia	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-SFA	Surfrider Foundation Australia	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-NCCNSW	The Nature Conservation Council of NSW	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
EG-NCCNSW	The Nature Conservation Council of NSW	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-WDCA	Whale and Dolphin Conservation Australia	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-WDCA	Whale and Dolphin Conservation Australia	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-WSM	Wilderness Society Melbourne	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
EG-WSM	Wilderness Society Melbourne	2023-08-21	Email	In	Delivery receipt	N/A	N/A
EG-WWF	World Wildlife Fund	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					this person be asked to contact Cooper Energy so they could be consulted		
EG-WWF	World Wildlife Fund	2023-08-21	Email	In	Delivery receipt	N/A	N/A
First Nations							
FN-BBLALC	Batemans Bay LALC	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
FN-BELALC	Bega LALC	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
FN-BFNAC	Bidwell first nations clans aboriginal corporation	2023-08-25	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					this person be asked to contact Cooper Energy so they could be consulted		
FN-BODALALC	Bodalla LALC	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
FN-COLALC	Cobowra LALC	2023-09-30	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
FN-COLALC	Cobowra LALC	2023-09-30	Email	In	Read receipt	N/A	N/A
FN-ELALC	Eden LALC	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
FN-FVTOC	Federation of Victorian Traditional Owner Corporations	2023-09-06	Email	Out	<p>General mailout</p> <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted <p>Advised we have met with EMAC and GLaWAC</p>	N/A	N/A
GA-NTSV	First Nations Legal & Research Services	2023-09-15	Email	Out	Meeting request	N/A	N/A
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-08-24	Email	In	Suggested meeting date	N/A	N/A
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-08-28	Email	Out	<p>General mailout</p> <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted <p>Confirmed availability for 13 September 2023</p>	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-09-05	Email	In	Confirming meeting time for 13 Sept	N/A	N/A
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-09-08	Email	Out	Recommended agenda items for meeting	N/A	N/A
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-09-12	Email	In	Confirmed meeting participants	N/A	N/A
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-09-22	Email	Out	<p>CE</p> <ul style="list-style-type: none"> - Noted our discussions with Deakin Uni on marine archaeology and also their Tasmanian land bridge project - Provided quick operations update - vessels arriving next month for decommissioning BMG operations - Re training for oiled wildlife, AMOSC is looking to discuss with DTP and DEECA so that any training aligns with their processes - Re emergency contacts, noted that while we captured these, DTP is the Control Agency and will decide the communications/consultation protocols in the event of any emergency response activities impacting state waters - On marine mammal observer training, we need to align this with when potential work opportunities present so that training is timely and not wasted. - Queried how it was determined what type of consultation needed to go to GLaWAC members; how did delegation of authority work within 	No issues raised	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<p>GLaWAC.</p> <p>GLaWAC</p> <ul style="list-style-type: none"> - GLaWAC noted that submerged heritage is of interest to the community, great that this work is being done, but GLaWAC's primary focus is on protecting the known heritage sites, and it didn't have resources to get involved in submerged lands projects - Regarding training (OWR/MMO), reiterated community interest and good to follow up on this - Regarding consultation such as on Cooper Energy's EPs, the board comprising Elders delegates GLaWAC management to act on behalf of members. - Should something be of a nature where it was considered GLaWAC members should be consulted, GLaWAC management would do this on behalf of a proponent so that it was carried out in a culturally appropriate manner 		
LO-GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	2023-08-25	Email	Out	<p>General mailout</p> <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
FN-ILALC	Illawarra LALC	2023-08-21	Email	Out	<p>General mailout</p> <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports 	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<ul style="list-style-type: none"> - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 		
FN-JLALC	Jerrinja LALC	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
FN-KKP	Krowathunkoolong Keeping Place	2023-08-25	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted <p>Noted we had consulted with GLaWAC</p>	N/A	N/A
FN-KKP	Krowathunkoolong Keeping Place	2023-08-28	Email	In	Read receipt	N/A	N/A
FN-LTAT	Lake Tyers Aboriginal Trust	2023-08-25	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase 	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<ul style="list-style-type: none"> - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 		
FN-MELALC	Merrimans Local Aboriginal Land Council	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
FN-MOGOLALC	Mogo LALC	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted <p>Noted still available to do the walk along the coast together where there were numerous cultural sites</p>	N/A	N/A
FN-NGLALC	Ngambri LALC	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports 	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					<ul style="list-style-type: none"> - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 		
FN-NOLALC	Nowra LALC	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
FN-NOLALC	Nowra LALC	2023-08-23	Email	In	Read receipt	N/A	N/A
FN-NSWALC	NSW Aboriginal Land Council	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted 	N/A	N/A
FN-WLALC	Wagonga LALC	2023-08-21	Email	Out	General mailout <ul style="list-style-type: none"> - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to 	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					this person be asked to contact Cooper Energy so they could be consulted		
Offshore wind							
OG-BE	Bluefloat Energy (Greater Gippsland Offshore Wind)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OG-BE	Bluefloat Energy (Greater Gippsland Offshore Wind)	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OG-CG	Corio Generation (Great Eastern Offshore Wind Farm)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OG-CG	Corio Generation (Great Eastern Offshore Wind Farm)	2023-08-18	Email	In	Delivery receipt	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
OG-FE	Flotation Energy (Seadragon)	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OG-FE	Flotation Energy (Seadragon)	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OI-PAR	Port Anthony Renewables	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-PAR	Port Anthony Renewables	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OI-SS	Star of the South	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
OI-SS	Star of the South	2023-08-18	Email	In	Acknowledged receipt	N/A	N/A
Other							
OI-AOS	Australian Oceanographic Services Pty Ltd	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-AOS	Australian Oceanographic Services Pty Ltd	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OI-CHBPA	Catherine Hill Bay Progress Association	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-CHBPA	Catherine Hill Bay Progress Association	2023-08-21	Email	In	Delivery receipt	N/A	N/A
LR-GBVMMR	Golden Beach VMMR Recreation Reserve Club	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
					- sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted		
LR-GBVMMR	Golden Beach VMMR Recreation Reserve Club	2023-08-21	Email	In	Passed on thanks.	N/A	N/A
LR-GPBRRRA	Golden Paradise Beach Ratepayers and Residents Association	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
LR-GPBRRRA	Golden Paradise Beach Ratepayers and Residents Association	2023-08-21	Email	In	Delivery receipt	N/A	N/A
LR-PAPA	Port Albert Progress Association	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
LR-PAPA	Port Albert Progress Association	2023-08-21	Email	In	Delivery receipt	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
Recreational fishing							
RI-RF	Recreational Fishing (NSW)	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-RF	Recreational Fishing (NSW)	2023-08-21	Email	In	Read receipt	N/A	N/A
RI-VGFC	Victoria Game Fishing Club	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-VGFC	Victoria Game Fishing Club	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-VRFA	Victorian Recreational Fishers Association (VRFish)	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

Gippsland Offshore Operations Environment Plan

Gippsland | Offshore Operations | EP

Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
RI-VRFA	Victorian Recreational Fishers Association (VRFish)	2023-08-21	Email	In	Delivery receipt	N/A	N/A
Recreational groups							
RI-AS	Academy of Scuba	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-AS	Academy of Scuba	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-BIAV	Boating Industry Association of Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-BIAV	Boating Industry Association of Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-BIAV	Boating Industry Association of Victoria	2023-10-11	Email	In	Message deleted notification	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
RI-DIAA	Dive Industry Association of Australia	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-DIAA	Dive Industry Association of Australia	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-DIV	Diving Industry of Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-DIV	Diving Industry of Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-ORCV	Ocean Racing Club of Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-ORCV	Ocean Racing Club of Victoria	2023-08-22	Email	In	Read receipt	N/A	N/A

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
RI-PN	Paddle NSW	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-PN	Paddle NSW	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-PV	Paddle Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-PV	Paddle Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-SDFV	SCUBA Divers Federation of Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-SDFV	SCUBA Divers Federation of Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A

Gippsland Offshore Operations Environment Plan

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Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
RI-SV	Surfing Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-SV	Surfing Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A
RI-WNA	Windsurfing NSW Association	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-WNA	Windsurfing NSW Association	2023-08-26	Email	In	Email delete receipt	N/A	N/A
RI-WV	Windsurfing Victoria	2023-08-21	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-WV	Windsurfing Victoria	2023-08-21	Email	In	Delivery receipt	N/A	N/A

Gippsland Offshore Operations Environment Plan

Gippsland | Offshore Operations | EP

Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
Research							
OI-BWS	Blue Whale Study	2023-08-29	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-FC	Fishwell Consulting	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
OI-FC	Fishwell Consulting	2023-08-18	Email	In	Delivery receipt	N/A	N/A
OI-IMASUT	Institute for Marine and Antarctic Studies (IMAS) - University of Tasmania	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A

Gippsland Offshore Operations Environment Plan

Gippsland | Offshore Operations | EP

Relevant Person ID	Relevant Person	Date	Event Method	In/Out	Event Summary	Assessment of Merit	Measures Adopted
OI-IMASUT	Institute for Marine and Antarctic Studies (IMAS) - University of Tasmania	2023-08-18	Email	In	Read receipt	N/A	N/A
Surf life saving clubs							
SL-LESLSC	Lakes Entrance Surf Life Saving Club	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
Tourism							
RI-VTIC	Victorian Tourism Industry Council	2023-08-18	Email	Out	General mailout - moving to ongoing consultation phase - concluding primary consultation and completing consultation reports - sensitive information should be highlighted so as not to be published - requested that any potentially relevant persons that are known to this person be asked to contact Cooper Energy so they could be consulted	N/A	N/A
RI-VTIC	Victorian Tourism Industry Council	2023-08-18	Email	In	Delivery receipt	N/A	N/A

Offshore Victoria Oil Pollution Emergency Plan



Victoria | ER | EMP

ATTENTION: For First Strike (initial 48hrs)

Response Actions see:

Section 2.4 – ‘Regulatory Notifications’

Section 2.5 - ‘Action Sequence Checklists’

Purpose

To instruct the response to an unplanned release of hydrocarbons

Scope

The OPEP provides response instructions for vessels and facilities including:

Otway Subsea Facilities: Casino, Henry, Netherby

Gippsland Subsea Facilities: Patricia Baleen, Sole

Role	Name	Job Title	Signature	Document Control
Document Originator:	J Morris	Environment Advisor		Doc No.VIC-ER-EMP-0001
Document Reviewer:	O Glade-Wright	Environment & Sustainability Manager	Ollie Glade-Wright <small>Digitally signed by Ollie Glade-Wright Date: 2024.02.06 16:33:51 +08'00'</small>	Rev: 10
Document Approver:	N Childs	Chief Officer Corporate Services	Nathan Childs <small>Digitally signed by Nathan Childs Date: 2024.02.07 13:39:37 +10'30'</small>	Rev Date: February 2024

Health, Safety and Environment Policy



Cooper Energy | HSEC | Policy

This policy describes our approach to managing Health, Safety and Environmental risks at Cooper Energy

Our Commitment

Cooper Energy is committed to taking all reasonably practicable steps to protect the health and safety of our workers, contractors, partners, and the communities in the areas where we operate.

In addition, we will ensure our business is conducted in an environmentally responsible manner.

Our Actions

We will:

- **Integrate** health, safety and environmental requirements into our daily work, our business planning and our decision making
- **Comply** with all relevant health, safety and environmental laws and regulations
- **Provide** resources and systems to enable delivery of our health, safety and environmental objectives
- **Identify, control and monitor** risks that have the potential to harm people and the environment to as low as reasonably practical
- **Empower** our people, regardless of position, to "Stop the Job" if they consider it necessary to prevent harm to themselves, others or the environment
- **Consult, communicate and promote participation** of our workforce to build and maintain a strong health, safety and environment culture
- **Ensure** all employees and contractors are trained, competent and suitably supervised so that works are undertaken in a safe and environmentally responsible manner
- **Collaborate** proactively with our stakeholders and the communities where we operate
- **Investigate and learn** from our incidents and from those in our industry
- **Set, measure and monitor** health, safety and environmental targets to drive continuous improvement in our performance
- **Report** publicly and transparently on our health, safety and environmental performance

Governance

The **HSE Improvement Forum** has oversight of this policy. The Managing Director is accountable for communicating this Policy and for ensuring compliance with its undertakings. All **Executive Leadership Team** members and Managers shall ensure the effective implementation, management and monitoring of our HSE Management System and its subsequent outcomes.

All Staff are responsible for compliance with our policy, standards, and procedures.

This policy will be reviewed at appropriate intervals and revised as necessary to keep it current.

Policy authorised by

Jane Norman

Managing Director & CEO

Date: 13 July 2023 Review Date: 13 July 2026

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1 Scope of OPEP

This Offshore Victoria Oil Pollution Emergency Plan (OPEP) (VIC-ER-EMP-0001) has been prepared to support Cooper Energy’s Limited (Cooper Energy) assets and activities in offshore Victorian waters.

The OPEP consolidates Cooper Energy’s response to all spill risks across the Patricia-Baleen (PB) and Sole) (Figure 1-1) and OtwayCasino, Netherby and Henry (CHN) (Figure 1-2) assets, given the commonality of many of their oil spill risks and resources to respond. Where there are specific requirements for scenarios associated with assets or activities, these are described in this plan.

This OPEP has been prepared in accordance with Regulation 22(8) (9) (10) (11) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (OPGGG(E)R) 2023 Commonwealth (Cth) and Regulation 17 of the Offshore Petroleum and Greenhouse Gas Storage Regulations (OPGGSR) 2021 Victoria (Vic).

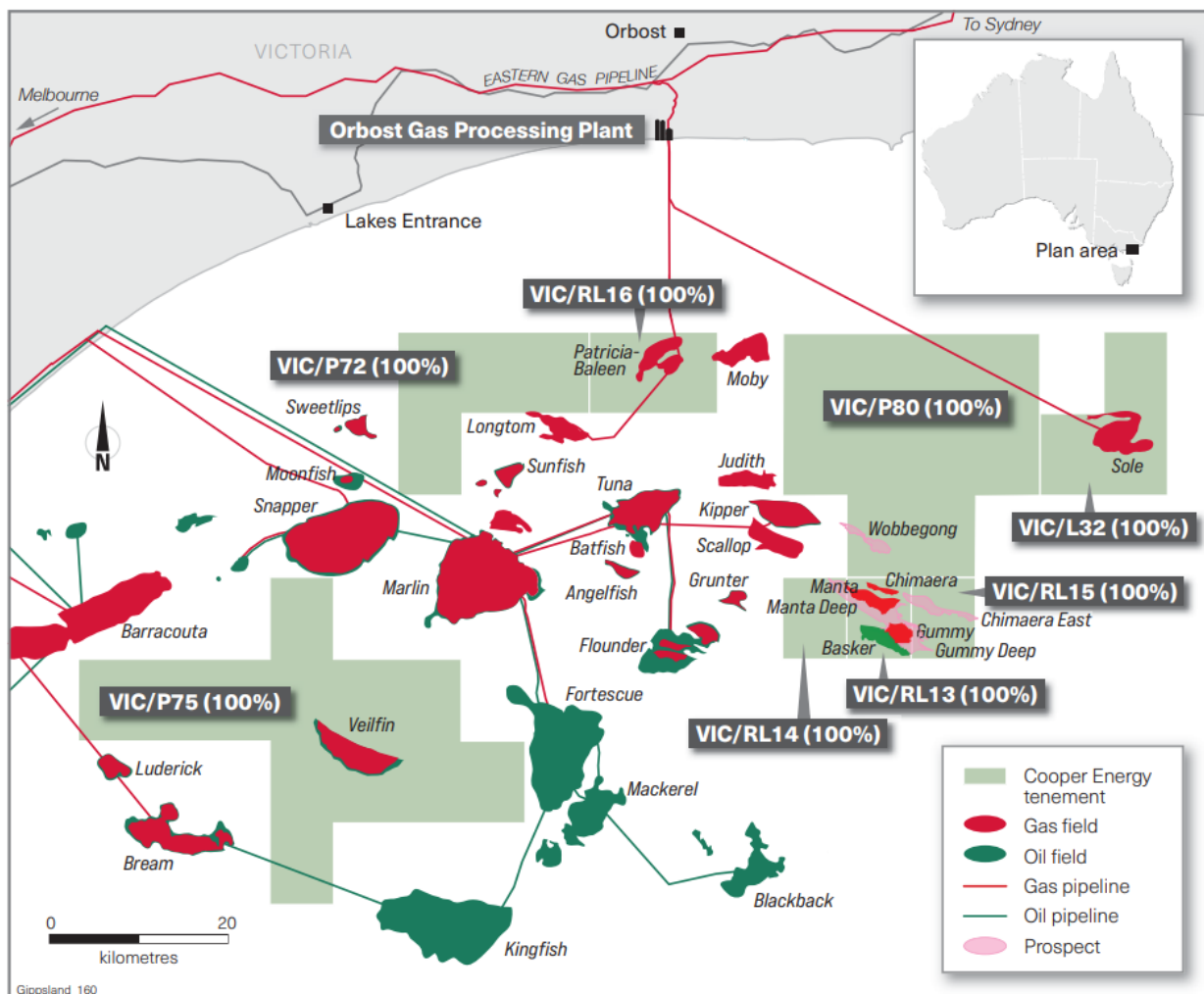


Figure 1-1: Cooper Energy Offshore Gippsland Assets

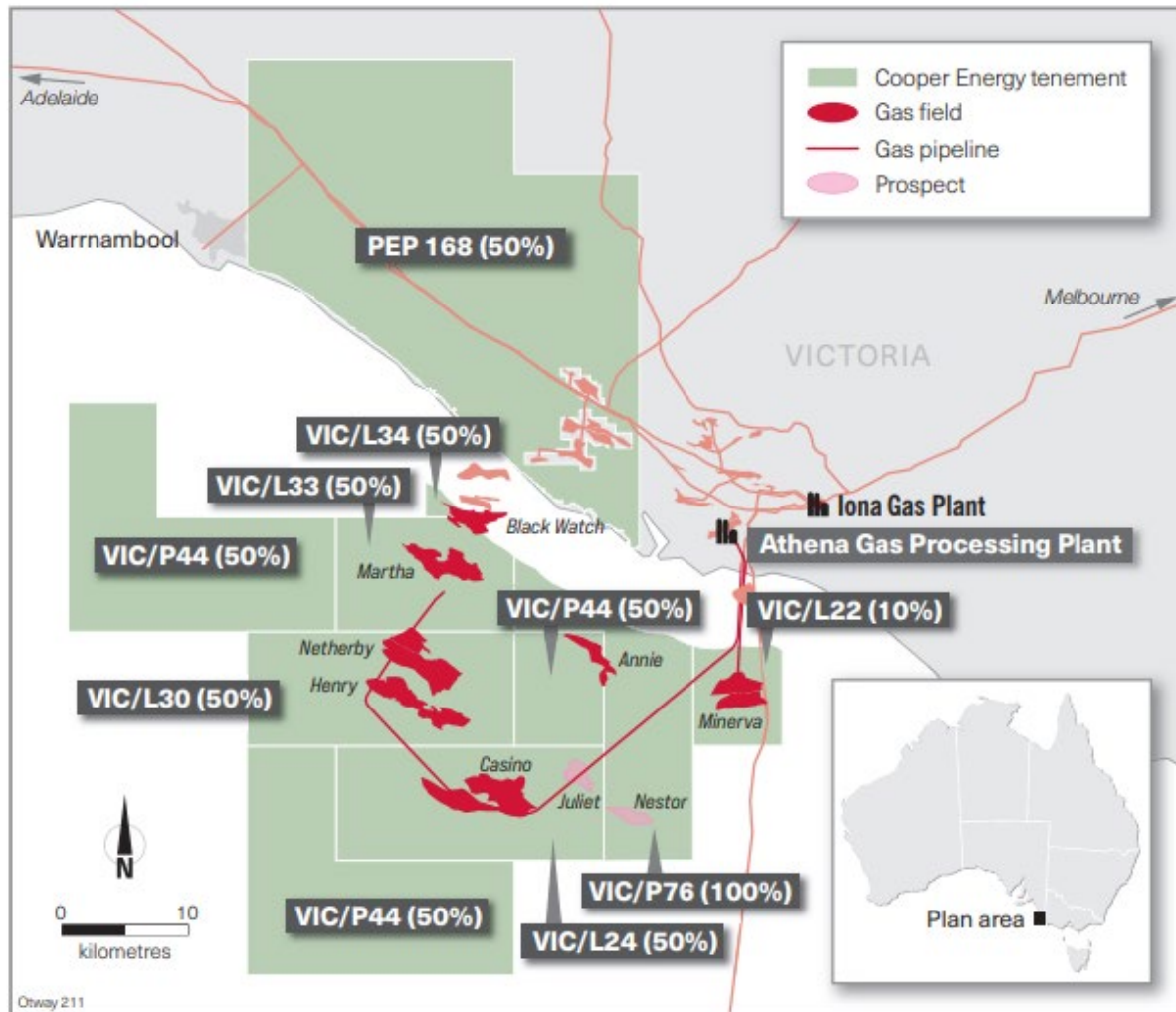


Figure 1-2: Cooper Energy Offshore Otway Assets

1.1 Facilities and Activities Relevant to the OPEP

The spill scenarios for the assets and activities described in Table 1-1 are identified in the corresponding Environment Plans (EP).

Table 1-1: Facilities and Activities within the Scope of the Offshore Victoria OPEP

Asset	Description	Activities	Fluid Types
PB – Gippsland Basin	Gas and condensate infrastructure (temporary suspended) located in petroleum titles VIC/RL16, VIC/PL31 and VIC/PL31(V) from the VIC/PL31 tie-in point to the Longtom Pipeline (VIC/PL38) to the Victorian shoreline (mean low water mark).	PB non-production phase activities which includes integrity management on the following offshore assets in Commonwealth and Victorian state waters: <ul style="list-style-type: none"> two subsea production wells, Patricia -2 and Baleen-4 (currently shut-in) in 54 m water depth 	Gas and condensate Hydraulic fluid Nitrogen MEG Marine diesel oil (MDO)

Asset	Description	Activities	Fluid Types
		<ul style="list-style-type: none"> one suspended well (Patricia-1) in 54 m water depth 24 km x 300 mm (ND) subsea pipeline from Patricia-2 and Baleen-4 wells to shore. The pipeline is non-operational and suspended. It contains nitrogen (4,550 m³), natural gas (2,700 m³), residual Longtom condensate (5 m³) and Mono-ethylene glycol (MEG) / water mixture (150 m³ in a 40:60 ratio) a subsea umbilical located 20 m to the west of the pipeline running from the gas plant to the subsea wells. 	
Sole – Gippsland Basin	An operating gas field located in petroleum title VIC/L32, ~32 km south of the Bemm River in Victoria. Includes Sole wells connected to the Orbost Gas Plant via Licenced Pipeline VIC/PL43 and VIC/PL006401(V), a 65 km subsea pipeline and umbilical cable.	<p>Sole operations activities which include integrity management of the following assets and activities in Commonwealth and Victorian state waters:</p> <ul style="list-style-type: none"> two subsea producing wells (Sole-3 and Sole-4) in 124 m water depth one plugged and abandoned well (Sole-2) in 125 m water depth operations of pipeline to the Orbost Gas Plant a subsea umbilical located 20 m to the west of the pipeline running from the gas plant to the subsea wells. 	Gas and condensate Hydraulic fluid MEG MDO
Otway stage I & II – Otway Basin	A gas and condensate infrastructure servicing subsea completions in the CHN fields located in petroleum titles VIC/L24 (Casino) and VIC/L30 (Henry and Netherby) and Licensed Pipelines VIC/PL37, VIC/L42 and Vic/PL37 (V) from the gas fields to the Victorian shoreline (shore crossing location).	<p>Operations and maintenance activities on the following facilities in Commonwealth and Victorian state waters:</p> <ul style="list-style-type: none"> subsea wells (Netherby-1, Casino-4, Casino-5 and Henry-2) in ~63-70 m water depth 32.6 km x 300 mm Nominal Diameter (ND) subsea pipeline (Casino-5 well to shore-crossing) 22 km x 300 mm ND subsea pipeline (Casino-5 to Pecten east pipeline) 31.2 km x 120 mm Electro-hydraulic umbilical (EHU) cable (Casino-5 to shore crossing) 22 km x 135 mm EHU cable (Casino-5 to Netherby-1 well). 	Gas and condensate Hydraulic fluid MDO

1.2 Spill scenarios

Table 1-2 describes the spill scenarios for which this OPEP has been developed.

Table 1-2: Spill scenarios for this OPEP

Spill Risk*	Fluid type	Worst-Case Volume*	PB	Sole	Otway
Loss of Containment (LoC) minor spill (level 1)	MDO, hydraulic oil	Up to 50 m ³	✓	✓	✓
Vessel LoC (collision) (level 1/2)	MDO	250 m ³ surface release over 6 hours. 500 m ³ surface release over 6 hours.	✓	✓	✓
Subsea LoC (pipeline or infrastructure leak) (level 1/2)	Gas / condensate / diesel	PB: 5 m ³ Longtom condensate, 2,700 m ³ gas Sole: 0.5 m ³ Otway: 50 m ³	✓	✓	✓
Loss of well control (LOWC**) (level 1)	Gas / condensate	PB: 24.4 MMscf/d gas (0.4 m ³ /d) Sole: 160 MMscf/d gas (1.6 m ³ /d) Otway: 41 MMscf/d (0.1 m ³ /d)	✓ (Cth)	✓ (Cth)	✓ (Cth)

* Further details regarding worst-case discharge volumes, discharge locations, potential release durations and environmental impacts and risks are detailed within each relevant activity-specific EP.

**These scenarios require unconstrained flow from the well, this is not considered credible during steady state operations (SOL-DC-WMP-0001, CHN-HS-SMP-0001).

1.3 OPEP Exclusions

This OPEP does not include the following:

- the Longtom development (consisting of production wells, pipeline and associated subsea infrastructure) tied into the offshore PB assets, these are managed by the Longtom asset owner
- onshore spill scenarios including gas plants
- assets not defined in Section 1.1 of this OPEP.

1.4 Supporting documents

Cooper Energy manages emergencies from the offshore operations and activities in accordance with the Cooper Energy Incident Management Plan (IMP) (COE-ER-ERP-0001). The purpose of the IMP is detailed in Section 2.1.

This OPEP is integrated with the IMP and related documentation and supports the in-force EPs for the offshore Victoria assets and activities. The OPEP should be read in conjunction with the respective EPs as well as the supporting documents:

- Cooper Energy IMP (COE-ER-ERP-0001)
- Cooper Energy Crisis Management Plan (CMP) (COE-ER-ERP-0003)
- Offshore Victoria Source Control Plan (VSCP) (VIC-DC-ERP-0001)
- Offshore Victoria Operational and Scientific Monitoring Plan (OSMP) (VIC-ER-EMP-0002)
- tactical response plan – shoreline protection and clean up
- tactical Response Plans (site-specific)
- vessel shipboard marine pollution emergency plan (SMPEP) or equivalent and Emergency Response Plans (ERPs) for vessels undertaking activities on Cooper Energy's behalf.

Additionally, this OPEP has been developed to integrate with the:

- Australian National Plan for Maritime Environmental Emergencies (NatPlan) (AMSA 2020)
- Victorian Maritime Emergencies (non-search and rescue [NSR]) Subplan (State of Victoria 2021)
- New South Wales (NSW) State Waters Marine Oil and Chemical Spill Contingency Plan (NSW Government 2016)
- Tasmanian Marine Oil Spill Contingency Plan (TasPlan) (EPA Tasmania 2022)
- Australian Marine Oil Spill Plan (AMOSPlan) (AMOSOC 2021).

Figure 1-3 details the relationship between this plan and other related documentation.

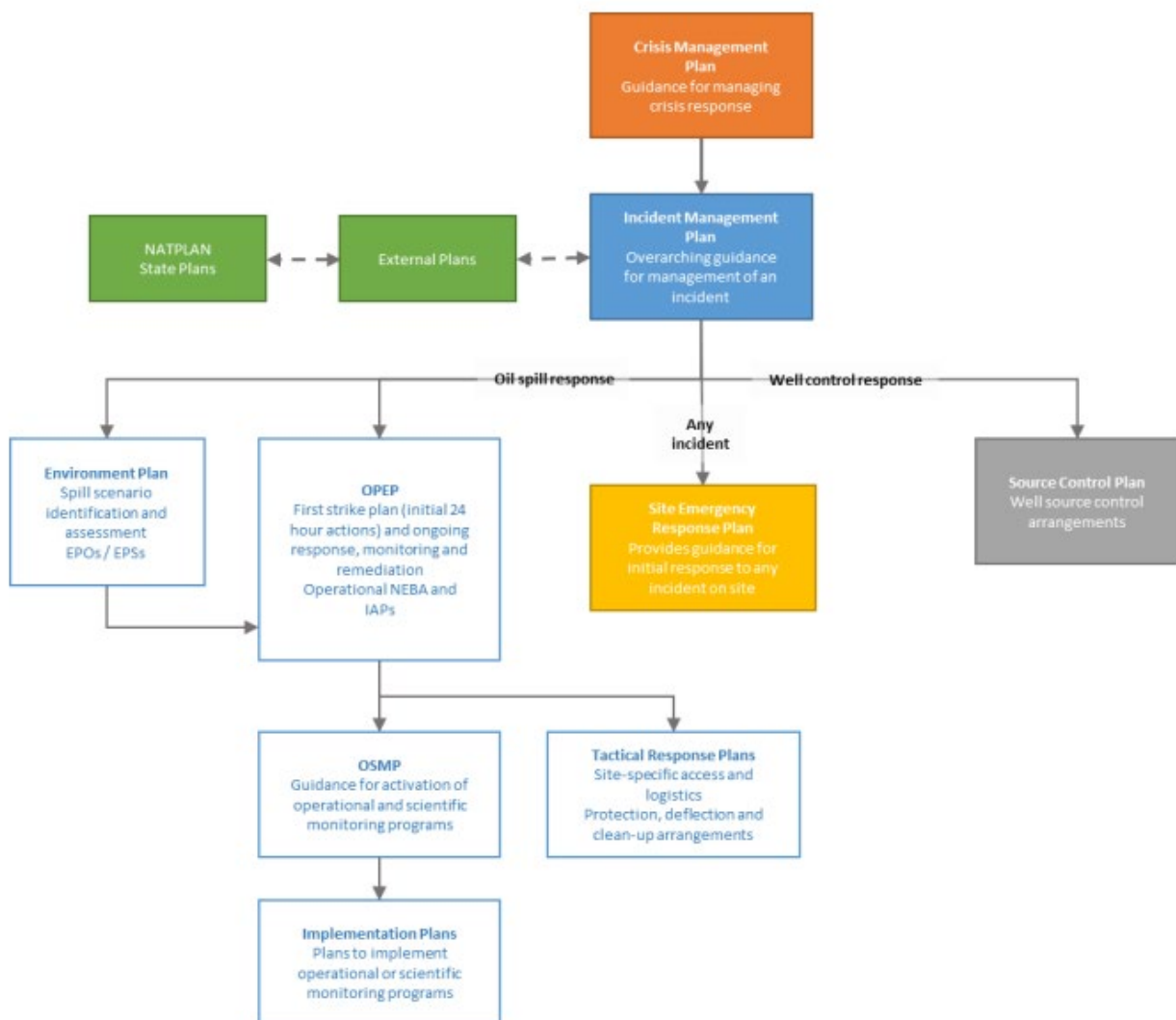


Figure 1-3: Relationship Between Cooper Energy Emergency and Oil Response Plans

1.5 Review of OPEP

Internal OPEP Reviews

The OPEP should be reviewed internally at least annually, in addition to the following circumstances:

- prior to undertaking a new activity not currently provided for, and prior to the submission or re-submission of a new EP for activities, in accordance with the management of change (MoC) process
- following any exercises or other means of testing of the arrangements, as required, to capture learnings
- following activation, to capture lessons learned.

Changes to the OPEP or the OSMP resulting from exercise outcomes, altered contractual arrangements, corrective actions, routine information updates (i.e. contact details change), or other items will be managed as per the MoC process.

State Government OPEP Review Arrangements

From the Victorian Joint Industry and State Oil Pollution Responses Guidance Note (DTP 2023):

It is recognised that after an OPEP is accepted, titleholders may incorporate additional assets and update its OPEP during the 5-year lifespan before re-submission to NOPSEMA. In such circumstances, timely notification and consultation is required should these asset(s) alter or increase the likelihood or threat of pollution, and/or pose a significant difference to the spill scenario modelled in the original OPEP such as including a different product.

Any internal/organisational alterations to titleholder response arrangements detailed in their OPEPs such as emergency management structure amendments, do not necessitate further consultation. However, to promote an ongoing partnership and enhance collaborative engagement, amendments would be useful to share electronically between titleholder and Department of Transport and Planning (DTP).

This process is relevant to NSW and Tasmania (Tas) marine pollution agencies (where relevant), unless otherwise advised by those teams.

1.6 Training and Testing Arrangements

In accordance with Regulation 22(13b) (14) of the OPGGS(E)R, the response arrangements will be tested:

- when they are introduced
- when they are significantly amended
- not later than 12 months after the most recent test
- if a new location for the activity is added to the EP after the response arrangements have been tested, and before the next test is conducted – testing the response arrangement in relation to the new location as soon as practicable after it is added to the plan
- if a facility becomes operational after the response arrangements have been tested and before the next test is conducted – testing the response arrangements in relation to the facility when it becomes operational.

The effectiveness of response arrangements will be measured by the Performance Standards detailed in Table 1-3 for each exercise type. At the completion of the exercise, the observers (where relevant to the test) and participants will hold a debrief session during which the exercise is reviewed, and lessons

learned and areas for improvement are identified. All exercises will be documented, and corrective actions/recommendations tracked to closure. For Cooper Energy exercises, lessons learned, and actions will be captured via action tracking system (e.g. Synergi).

Training and testing arrangements appropriate to the nature and scale of Cooper Energy’s activities are included in Table 1-4. The arrangements detail those actions which will be undertaken by Cooper Energy and response partners to maintain readiness for the oil spill response scenarios. Position specific training and competency provisions are detailed in Section 3.2. Response organisations such as Australian Marine Oil Spill Centre (AMOSOC), State and National response teams also run testing and exercise regimes to maintain preparedness for credible spill events across a broader portfolio of areas and activities; these are outlined below but do not form part of Cooper Energy’s specific training and exercise plans for the activity.

Table 1-3: OPEP Testing Performance Outcomes, Standards, and Measurement Criteria

Performance Outcome	Control	Performance Standards	Measurement Criteria
Response personnel are trained and prepared to respond to a worst-case spill scenario for the activity. The OPEP is implemented and is effective in mitigating a spill event.	C1 Response training.	Response personnel are trained according to schedule.	<ul style="list-style-type: none"> training records.
	C2 Response exercise and testing.	Exercise and testing are completed according to schedule.	<ul style="list-style-type: none"> exercise and testing plan progress tracked via Synergi.
		Lessons from exercises and testing are captured, actioned and integrated into the relevant part of the OPEP.	<ul style="list-style-type: none"> exercise report including observations and opportunities for improvement actions are managed through Synergi.

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Table 1-4: OPEP Training and Testing Schedule and Objectives

Aspect	Who	Plan	Timing	Preparedness Activity Scope (Arrangements and Capabilities tested)	Training/Testing Objectives	Indicative duration	Evaluation / lessons learned
Training	Cooper Energy	OPEP	5 years renewal.	International Maritime Organization (IMO) oil spill response training for Incident Management Team (IMT), Forward Operations Base (FOB) and Field Team Lead Roles.	Demonstrated competency to undertake lead role in an IMT.	3-5 days	Feedback during training.
Training	Cooper Energy	OPEP	On joining the IMT, FOB or Field Team.	Offshore Victorian OPEP induction for: <ul style="list-style-type: none"> IMT FOB Field Team Lead and Support Roles. OPEP induction covers aspects including titleholder obligations, Scenarios, hydrocarbon fate/behaviour, response documents, response organisation, response options, response termination and debrief.	Demonstrated understanding of OPEP responses, roles, and support services.	1.5 hours	Feedback during training.
Training	AMOSC & AMOSC Core Group	AMOSC Plan	Every 2 years.	IMO oil spill response training for IMT, FOB and Field Team Lead Roles, and training of specialist roles such as aerial surveyor. Training provided in accordance with AMOSC core group agreement.	Demonstrated competency to undertake lead role in an IMT.	3-5 days	Feedback during training.
Training	Cooper Energy	Source Control Emergency Response Plan (SCERP)	Valid during well activities.	Current well control training certificate for relevant Source Control Team Leads.	Demonstrated competency to undertake lead role in source control team task groups.	3-5 days	Feedback and testing during training.
Training	Cooper Energy	OPEP	Annually.	Incident control system refresher training for IMT Incident Commander (IC) and Functional Leads.	Understanding of IMT incident control system.	1 hour	Feedback during training.
Exercise	Cooper Energy & AMOSC	OPEP	Annually.	OPEP drill (Desktop): <ul style="list-style-type: none"> IMT response teams form and initiate alert and call-out of response teams to respective incident control centres notifications to regulators undertaken within the regulatory timeframes (simulated) first-strike response operation activated monitoring and surveillance (simulated) within implementation timeframes contact external resources to confirm support first strike response common operating picture established Incident Action Plan (IAP) generated for the next operational period integrating information from monitoring and surveillance and net environmental benefit assessment (NEBA) recommendations. 	IMT Roles are provided for, and responsibilities are understood. IMT communications and systems support coordinated and efficient response. Capability to develop IAP for the next operational phase of a response. Response Option Initiation inside OPEP implementation timeframes. External resources are available to respond.	1 day	Observer for the duration of the drill. Evaluation against the planned scope and objectives.

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Aspect	Who	Plan	Timing	Preparedness Activity Scope (Arrangements and Capabilities tested)	Training/Testing Objectives	Indicative duration	Evaluation / lessons learned
Exercise	Cooper Energy & OSMP contractors	OSMP	Annually.	<p>OSMP Drill:</p> <ul style="list-style-type: none"> call out of external resources for at least two OSMP module simultaneously (nominally hydrocarbon weathering assessment and coastal shoreline assessment [simulated scenario]) test of logistical arrangements to meet implementation timeframes form nominated modules confirm sufficient Principal Investigators for all OSMP Modules. 	<p>Response Options are initiated according to OPEP implementation timeframes.</p> <p>IMT-OSMP Contractor communications are established.</p> <p>External resources sufficient for a worst-case scenario for the activity are available to respond.</p>	½ day	Evaluation against the planned scope and objectives.
Exercise	Cooper Energy	OPEP / Crisis Management Plan	Prior to well activities.	<p>Crisis Management Team (CMT) will be notified during a level 2/3 incident and may need to provide support to the IMT:</p> <ul style="list-style-type: none"> CMT forms and establishes communications with the IMT IC CMT obtain situational awareness external notifications are issued (simulated) including media release. 	<p>CMT Roles are provided for, and responsibilities are understood.</p> <p>CMT-IMT Communication protocols are understood.</p> <p>Notifications developed efficiently.</p>	2 hours	Observer for the duration of the drill. Evaluation against the planned scope and objectives.
Exercise	AMOSC, National and State response personnel	AMOSC Plan / NatPlan	Ongoing testing and exercise regime.	<p>IMT Desktop and Operational exercises spanning all potential response strategies both nearshore and offshore including:</p> <ul style="list-style-type: none"> monitoring and evaluation containment and recovery chemical dispersant application protection and deflection shoreline response wildlife response. <p>These exercises involve field responders and use of response equipment.</p>	In accordance with AMOSC Plan, National Plan and State Response Plan Testing and Exercise priorities.	5-10 days	Evaluation against the planned scope and objectives.

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Aspect	Who	Plan	Timing	Preparedness Activity Scope (Arrangements and Capabilities tested)	Training/Testing Objectives	Indicative duration	Evaluation / lessons learned
Exercise	Cooper Energy	SCERP	Prior to well activities.	<p>SCERP Drill:</p> <ul style="list-style-type: none"> SCERP Leads availability to implement selected source control options is verified communications between leads are established vessel and Mobile Offshore Drilling Unit (MODU) availability and mobilisation times are verified equipment (relief well long leads) availability and mobilisation times are verified. 	SCERP source control response times verified. Source control response logistics confirmed.	½ day	Evaluation against the planned scope and objectives.
Exercise	Cooper Energy and Response Contractors	OPEP / OSMP / SCERP	Annually May be undertaken with other exercises or separately.	<p>Callout response contact details and personnel availability verification:</p> <ul style="list-style-type: none"> OPEP contractors OSMP contractors SCERP contractors. 	Personnel required to implement OPEP, OSMP and SCERP are available to respond.	½ day	Evaluation against the planned scope and objectives.
Exercise	Cooper Energy Vessel Service Partners	OPEP	During mobilisation or transit to site.	Communications check between vessel and shore-based response personnel.	Incident notification channels are established.	30 minutes	Improvements are identified, logged and resolved.
Exercise	Vessel Service Partners	SMPEP or equivalent	Prior to and during offshore campaign according to vessel schedule.	Vessel SMPEP drills.	Personnel are familiar in their role and equipment available for SMPEP strategies.	2 hours	Evaluation against the planned scope and objectives.

1.7 Regulatory Responsibilities

This plan recognises that under existing Commonwealth and State Intergovernmental Agreements, authorities have been nominated with statutory and control responsibility for spills within harbours, State waters and Commonwealth waters around Australia.

While Cooper Energy remains accountable for spills relating to its petroleum activities, the nominated Control Agency (CA) will vary depending on source, size and location of the spill. Table 1-5 provides a summary of Statutory Agency and CA scenarios in the event of a spill.

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) has the regulatory responsibility for any activities in Commonwealth waters covered in this OPEP.

Although Victoria have conferred functions for the regulation of health and safety and structural integrity to NOPSEMA for petroleum activities occurring in State waters, State Authorities (as relevant) retain the regulatory responsibility for any spill response activities in State waters covered in the OPEP. The Department of Transport and Planning (DTP) is the CA for a spill response in Victorian waters. The Department of Energy, Environment, and Climate Action (DEECA) (formerly DELWP) is the lead agency for responding to wildlife impacted by marine pollution in Victorian waters or along the coastline.

Table 1-5: Summary of Regulatory Responsibilities (Statutory and Control Agencies)

Spill Source	Spill Level	State Waters (<3 nm from coast baseline)	Commonwealth Waters (>3 nm from coast baseline)	Statutory Agency	Control Agency
Subsea LoC	1	✓		Vic DTP	Cooper Energy
			✓	NOPSEMA	Cooper Energy
	2/3	✓		Vic DEECA	Vic DTP
			✓	NOPSEMA	Cooper Energy
Vessel Collision	1	✓		Vic DTP	Vessel owner / Operator
			✓	Australian Maritime Safety Authority (AMSA)	Vessel owner / Operator
	2/3	✓		Vic DTP	Vic DTP / relevant Port Authority
			✓	AMSA*	AMSA
Wildlife	1	✓		Vic DEECA	-
			N/A**	-	-
	2/3	✓		Vic DEECA	-
			N/A**	-	-

* Within 500 m petroleum safety zone the statutory agency will be NOPSEMA

** Where wildlife is captured in Commonwealth waters and brought to shore for assessment and treatment, they will fall under the responsibility of the Lead Agency for Wildlife impacted by marine and freshwater pollution (e.g. DEECA for Victoria) and all relevant state-based legislation.

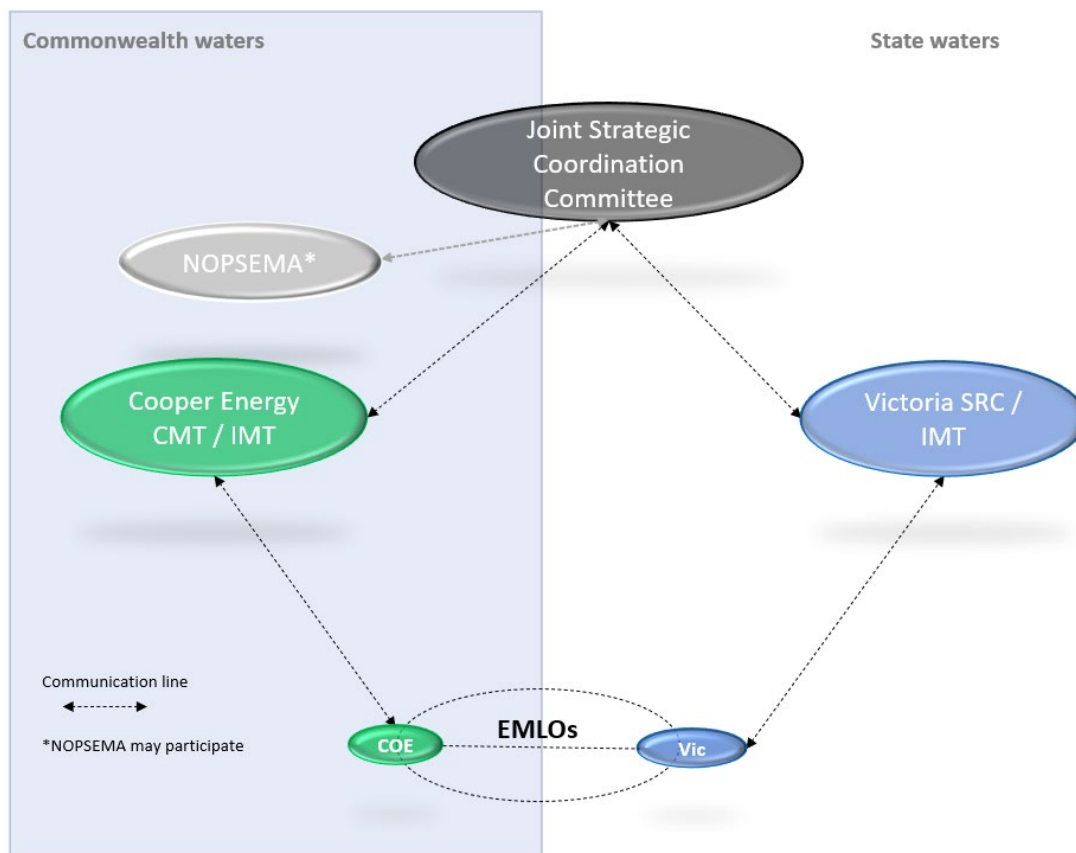
1.7.1 Joint Strategic Coordination Committee (Cooper Energy Interface with State Governments)

Figure 1-3 shows the control and coordination arrangements for cross-jurisdictional maritime emergencies. Transboundary arrangements from state to state is covered by the NatPlan. Where State and Commonwealth waters are impacted by cross-jurisdictional marine pollution incidents, a Joint Strategic Coordination Committee (JSCC) will be established. The role of the JSCC is to facilitate effective coordination between Cooper Energy and the State CA IMTs.

Initiation: Initially, the JSCC would be administered by DTP and convened by the State Controller Maritime Emergencies (SCME).

Organisation: The JSCC will be jointly chaired by the SCME and Cooper Energy Senior Representative. The JSCC will ensure a coordinated response across the multiple control agencies.

The worst-case scenarios presented within this OPEP demonstrate that it is unlikely that an incident will impact multiple states.



Adapted from DTP Joint Industry and State Oil Pollution Response Guidance Note (2023)

Figure 1-4: Cross-jurisdictional Control and Coordination Structure

2 Response Activation

2.1 Cooper Energy Incident Management Plan and OPEP Activation

Cooper Energy manages emergencies from its offshore activities in accordance with the Cooper Energy IMP. The purpose of the IMP is to provide the IMT with the necessary information to respond to an emergency. The IMP:

- describes the emergency management process
- details the response process
- lists the roles and responsibilities for the IMT members
- includes duty cards for the IMT Members.

All spill events under the scope of this OPEP will be reported to the Cooper Energy Duty Manager by operator/maintainers or by contracted vessel masters. The Cooper Energy Duty Manager will notify the IC of the incident, providing the following information to allow the IC to assess the required response level:

- the source of the spill and the location
- the type of hydrocarbon released
- how much material has been released (e.g. estimated size based on a 'known' hydrocarbon inventory; estimates based on flowrates; or an estimate based upon the appearance and area of oil on the sea surface [refer to Section 7])
- whether the source been contained or whether the spill is continuing
- worst-case scenario
- weather conditions – wind speed and direction, swell and current speed and direction (if available).

Based on the information made available, the IC is responsible for:

- identifying the CA (Section 1.7 provides description of regulator responsibilities)
- determining the response level
- activating the Cooper Energy IMT (either where Cooper Energy is the CA or is directed by the CA)
- implementing the OPEP.

2.2 Control Agency

The CA is determined based on the source of the spill and whether the spill takes place in Commonwealth or State waters. Control agencies for the spill scenarios within the scope of this this OPEP are detailed in Table 1-5.

AMSA is the designated CA for oil spills from vessels within the Commonwealth jurisdiction. Upon notification of an incident involving a vessel, AMSA will assume control of the incident and respond in accordance with AMSA's Marine Pollution Response Plan. Co-ordination of resources under NatPlan will occur through formal request of the appointed IC.

Where a spill originates in Commonwealth waters but has the potential to impact State waters or lands, the State CA will establish an IMT and may assume control of response activities within State jurisdiction. Where response activities are implemented in Commonwealth jurisdiction, the CA remains either AMSA for vessel spills or Cooper Energy for spills relating to petroleum activities.

2.3 Response Level

The level of spill response depends on the nature and scale of the spill, whether on-site resources can manage the response or additional support resources are required, and the environmental sensitivities at risk.

The IC must make an initial assessment of the spill level based upon the initial information provided and NatPlan criteria. Table 2-1 provides NatPlan criteria for spill level classification together with guidance on possible level classifications for credible maximum spill scenarios applicable for to this OPEP.

Throughout the response, the Cooper Energy IC must continue to assess the response level in accordance with the NatPlan criteria, considering factors which may lead to escalation of the response level. Within State boundaries, the State CA will determine the response level.

Table 2-1: NatPlan Guidance on Spill Level Classification

Criteria	Level 1	Level 2	Level 3
Management			
Jurisdiction	Single jurisdiction	Multiple jurisdiction	Multiple jurisdictions including international
Number of Agencies	First Response Agency	Routine multi-agency response	Agencies from across government and industry
Incident Action Plan	Simple/Outline	Outline	Detailed
Resources	Onsite resources required only	Requires intra-state resources	Requires national or international resources
Type of Incident			
Type of response	First Strike	Escalated	Campaign
Duration	Single shift	Multiple shifts Days to weeks	Extended response Weeks to months
Hazard	Single Hazard	Single Hazard	Multiple Hazards
Resources at Risk			
Human	Potential for serious injuries	Potential for loss of life	Potential for multiple loss of life
Environment (Habitat)	Isolated impacts with natural recovery in a few weeks	Significant impacts and recovery may take months. Remediation required.	Significant area and recovery may take months or years. Remediation required.
Wildlife	Individual fauna	Groups of fauna or threatened fauna	Large numbers of fauna
Economy	Business level disruption	Business failure	Disruption to a sector
Social	Reduced services	Ongoing reduced services	Reduced quality of life
Infrastructure	Short term failure	Medium term failure	Severe impairment
Public Affairs	Local and regional media coverage	National media coverage	International media coverage
Cooper Energy Assets – Spill Scenarios – Notional Level Classification			
Offshore Victoria Operations	Vessel LoC Subsea LoC	Vessel LoC Subsea LoC	

2.4 Notification and Ongoing Consultation Requirements

Table 2-2 describes what, who, when, why and how initial and ongoing consultation will be undertaken when the OPEP is activated.

Table 2-2: Initial and Ongoing Consultation Arrangements

What	Who	Why	When	How	Contacts Source
Primary Notifications Information: Incident Details and Actions underway.	Internal, Regulators and Cas and associated support Agencies.	Has jurisdiction for an aspect of the response.	As defined in the OPEP.	Targeted communications. <i>Calls, Email, Remote and face to face meetings.</i>	OPEP. Emergency Contacts Register.
Secondary Notifications Information: Incident Details and Actions underway.	Relevant Persons including those newly identified during an incident.	May be impacted by the spill or the response.	As soon as practicable if within the predicted spill impact zone.	Broad communications (media and dynamic website or as directed by CA). <i>Direct contact via agreed / available contact details, and / or as directed by the CA.</i>	Emergency Contacts Register. Relevant persons database.
Ongoing Consultation Incident Details Actions Underway and Completed	Internal, Regulators and Cas and associated support Agencies.	Has jurisdiction for an aspect of the response.	As defined in the OPEP or as agreed for the next operational period.	Targeted communications. <i>Calls, Email, Remote and face to face meetings.</i>	OPEP. Emergency Contacts Register.
Ongoing Consultation	Relevant Persons including those newly identified during an incident.	May be impacted by the spill or the response.	Regular or otherwise as agreed with Cas depending on nature/scale of the incident. When there is a significant change in the spill impact zone.	Broad communications (media and dynamic website or as directed by CA). <i>Direct contact via agreed / available contact details, and / or as directed by the CA.</i>	Emergency Contacts Register. Relevant persons database.

Internal and regulatory notifications must be made in accordance with requirements outlined in Table 2-3 for vessel spills, Table 2-4 for spills from loss of infrastructure integrity.

It is important that information generated during an initial response is accurately recorded, transmitted, acted upon and ultimately stored for future use. The information is to include:

- incident details – where, what, when, how, why (where possible)
- extent of spill
- immediate actions taken.

Copies of forms referenced in these tables and Appendix 1 can be found on the Cooper Energy SharePoint system: Regulatory Management System:

<https://cooperenergy.sharepoint.com/sites/HSEC2/Emergency/Forms/Documents.aspx?web=1>

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Table 2-5 also provides additional external notifications (excluding response resources) which may be required depending on the nature and scale of the spill incident (specified scenarios). These notifications will be made by the IC or delegate.

Table 2-6 provides the performance outcomes, standards and measurement criteria for regulatory notification.

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Table 2-3: Notification Requirements for a Vessel spill (Level 1 / 2 / 3)

Vessel Spill Notifications				
From	To	Type	Timing	Supporting Information
Vessel Master	Cooper Energy Duty Manager	Verbal	Immediately	Contact details provided within campaign emergency response bridging document. Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
	AMSA – All spills to sea Australian Hydrographic Service	Verbal	Immediately (no later than 2 hours after incident)	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written notification	As soon as possible (ASAP)	Complete a marine pollution report (POLREP) online available at: https://amsa-forms.nogginoca.com/public/polrep.html
		Written updates	As requested, or every 24 hours	Complete and issue a situation report (SITREP)/POLREP and IAP SITREP/POLREP available at: https://amsa-forms.nogginoca.com/public/polrep.html
Cooper Energy Duty Manager	Cooper Energy IMT Cooper Energy CMT	Verbal	As required	IMT Duty Roster CMT Duty Roster Emergency Roster and Emergency Contacts Directory
Cooper Energy Duty Manager (or delegate)	NOPSEMA (and copy to the National Offshore Petroleum Titles Administrator [NOPTA]) Dangerous occurrences at or near facilities must be reported to NOPSEMA under the applicable safety case. Occurrences include: <ul style="list-style-type: none"> any hydrocarbon spill >80 L spill has caused, or has the potential to cause, moderate to significant environmental damage. (Refer to activity-specific EP spill risk assessment)	Verbal	As soon as practicable and no later than 2 hours	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written notification	As soon as practicable after oral notification	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written report	As soon as practicable, but within 3 days of incident	Complete and issue written report: NOPSEMA Form N-03000-FM0831 A543965
Vessel Master or Cooper Energy Duty Manager (or	State and Port Authorities <u>Level 1 / 2 / 3 Vessel spills (threatening State waters)</u> As relevant to Port (Port Master) and/or State Waters (State Duty Officer). Authorities include:	Telephone	ASAP (no later than 2 hours after risk identification)	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

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Vessel Spill Notifications				
delegate) as relevant	<p>Victorian State Waters Port of Portland Gippsland Ports For level 2/3 spills notify the State Duty Officer</p> <p>NSW State Waters Maritime emergency (24 hours) NSW Maritime</p> <p>NSW Port (phone diverted for out-of-hours response) Port of Eden Port of Kembla Port of Sydney Port of Newcastle Port of Yamba</p> <p>Tasmanian State Waters Environmental Protection Agency (EPA) Tasmania Radio: TasPorts Vessel Traffic Services VHF radio channel 16/14/12 Call sign "relevant port name VTS"</p>			
Cooper Energy Duty Manager (or delegate)	DTP – State Waters (<3 nm) <ul style="list-style-type: none"> level 2/3 spill threatening State waters spill has caused, or has the potential to cause, moderate to significant environmental damage in State waters. (Refer to activity-specific EP spill risk assessment)	Verbal	As soon as practicable and no later than 2 hours	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written notification	As soon as practicable after oral notification	POLREP available at: https://amsa-forms.nogginoca.com/public/polrep.html Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Email	As soon as practicable after oral notification	
Cooper Energy IC (or delegate)	Resources/Contractors	Telephone	As directed	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Cooper Energy IC (or delegate)	Director of National Parks	Verbal	As soon as practicable	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020

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Vessel Spill Notifications				
	Spill with potential to impact Australian Marine Park(s) or impact matters of national environmental significance (including potential for oiled wildlife)			Emergency Roster and Emergency Contacts Directory
Cooper Energy IC (or delegate)	Relevant Persons (fishers, adjacent titleholders, Traditional Owners, etc.)	Telephone	As soon as practicable	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

Table 2-4: Notification Requirements for Loss of Infrastructure Integrity (Subsea LoC – condensate)

Subsea LoC Notifications				
From	To	Type	Timing	Supporting Information
Cooper Energy Duty Manager (or delegate)	Cooper Energy IMT Cooper Energy CMT	Verbal	As required	IMT Duty Roster CMT Duty Roster Emergency Roster and Emergency Contacts Directory
Cooper Energy Duty Manager (or delegate)	NOPSEMA Commonwealth Waters (>3 nm) <ul style="list-style-type: none"> spill has caused, or has the potential to cause, moderate to significant environmental damage. (Refer to activity-specific EP spill risk assessment)	Verbal	As soon as practicable and no later than 2 hours	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written notification	As soon as practicable after oral notification	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
		Written report	As soon as practicable, but within 3 days of incident	Complete and issue written report: NOPSEMA Form N-03000-FM0831 A543965
Cooper Energy Duty Manager (or delegate)	AMSA Australian Hydrographic Service	Verbal	As soon as practical and no later than 2 hours	Any marine pollution incident must be reported to AMSA including where NatPlan resources are required. Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Cooper Energy Duty Manager (or delegate)	DTP – State Waters (<3 nm) <ul style="list-style-type: none"> level 2/3 spills (threatening State waters) 	Verbal	As soon as practicable and no later than 2 hours	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

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Subsea LoC Notifications				
	<ul style="list-style-type: none"> spill has caused, or has the potential to cause, moderate to significant environmental damage. (Refer to activity-specific EP spill risk assessment) 	Written notification	As soon as practicable after oral notification	POLREP available at: https://amsa-forms.nogginoca.com/public/polrep.html Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Cooper Energy Duty Manager (or delegate)	State and Port Authorities <u>Level 1 / 2 / 3 (threatening State waters)</u> As relevant to Port (Port Master) and/or State Waters (State Duty Officer). Authorities include: Victorian State Waters Port of Portland Gippsland Ports For Level 2-3 spills notify the State Duty Officer	Telephone	ASAP	Port of Portland: (03) 5525 0999 Gippsland Ports: (03) 5150 0500 Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Cooper Energy IC (or delegate)	Resources/Contractors	Telephone	As directed	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020. Emergency Roster and Emergency Contacts Directory
Cooper Energy IC (or delegate)	Relevant Persons (fishers, adjacent titleholders, Traditional Owners, etc.)	Telephone	As soon as practicable	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

Table 2-5: Additional External Notifications

Stakeholder	Issue	Spill Level	Timeframe	References
Australian Hydrographic Service	Protection of mariners from safety and environmental impacts of spill	2, 3	2 hours	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Vic – DEECA	Oiled Wildlife in respective state jurisdictions	1, 2, 3	Immediately, or whenever wildlife in Victoria's jurisdiction is expected to be impacted.	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Tas – EPA			Immediately, or whenever wildlife in Tasmania's jurisdiction is expected to be impacted.	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

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Stakeholder	Issue	Spill Level	Timeframe	References
NSW – Department of Primary Industries			Immediately, or whenever wildlife in NSW jurisdiction is expected to be impacted.	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory
Department of Climate Change, Energy, the Environment and Water	Damage to wildlife of national environmental significance (NES)	1, 2, 3	As soon as practicable following the discovery of impact to wildlife of NES (but not longer than 7 days) and/or under the direction of relevant State authority.	Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-ER-EMP-0020 Emergency Roster and Emergency Contacts Directory

Table 2-6: Spill Notification Performance Outcome

Performance Outcome	Control	Performance Standard	Measurement Criteria
Notification and reporting to regulators and other relevant persons occur in a timely manner.	C3 Response Communications	Notifications and written reporting to be undertaken in accordance with the relevant content and timeframes specified in Table 2-3 to Table 2-5.	<ul style="list-style-type: none"> Incident log verifies this action has been undertaken in the required timeframe.

2.5 Action Sequence Checklists

The sequence of actions following alerting the IMT and activating this OPEP will be determined based on the spill scenario and level. Specific action sequence checklists are provided in this section for the following scenarios:

- vessel collision resulting in a MDO spill (level 1/2) (Table 2-7).
- subsea (LoC of Condensate [level 1/2]) (Table 2-8).

Table 2-7: Spill Response Action List – MDO Spill

Vessel LoC – MDO Spill – Response Actions		
Action	Responsible Party	Timing / Additional Information
On discovery of the spill notify the Vessel Master.	Spill Observer	ASAP
Manage the safety of all personnel. Secure sources of ignition and alert all personnel (appropriate to the level of the spill).	Vessel Master	ASAP
If safe, stop the spill through source control actions. Assess incident and prevent further spillage. Estimate the quantity of oil released and provide initial incident information. In the event of a significant (level 2/3) spill, deploy the oil spill tracking buoy (if available) following the deployment instructions.	Vessel Master	ASAP
Notify the Cooper Energy Duty Manager of the spill, providing information available from preliminary spill assessment. Including: <ul style="list-style-type: none"> what is it – oil type / group / properties? where is it – latitude/longitude? how big is it – area/volume? where is it going – weather conditions / currents / tides? what is in the way – resources at risk? when will it get there – weather conditions / currents / tides? what is happening to it – weathering processes predicted. 	Vessel Master	ASAP
Based on the preliminary spill assessment and operational monitoring from the Vessel Master approximate the spill level. Assess response required. Response commensurate to the size and level of risk.	Cooper Energy Duty Manager	ASAP
Undertake regulatory notifications and other stakeholder notifications (as required). Refer to Section 2.4.	Cooper Energy Duty Manager	ASAP
Assemble Cooper Energy IMT (as required). Number of, and team members selected, will be based upon the nature and scale of response required. The IC is responsible for: <ul style="list-style-type: none"> identifying the CA 	Cooper Energy Duty Manager	ASAP

Vessel LoC – MDO Spill – Response Actions		
<ul style="list-style-type: none"> determining the response level activate the Cooper Energy IMT (either where Cooper is the CA or is directed by CA) implementing this first strike plan and the OPEP (where relevant). <p>NOTE: Cooper Energy is in a support role for this scenario as AMSA (Commonwealth waters) or designated State CA (state waters).</p>		
<p>Activate AMOSC Member Agreement to support the response if require. Cooper Energy Authorising Officer to activate via the AMOSC Duty Manager</p> <ul style="list-style-type: none"> level 1 spill for remote advice level 2 for on-site support (e.g. aerial observers, shoreline assessment and clean-up team (SCAT), oil spill trajectory modelling (OSTM), shoreline clean-up coordinators, boom equipment). <p>See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for AMOSC call-our authority personnel.</p>	IC or Delegate	Cooper Energy Offshore Victoria OPEP: Section 3.1
<p>Login to AMOSC Website for the latest equipment and personnel information. See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for log in details (username and password). http://www.amosc.com.au</p>	Planning Officer or delegate	
<p>Determine spill trajectory – weather conditions and perform initial vector analysis. See Spill Response Tools on IMT SharePoint for Trajectory Estimator</p>	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 7
<p>Identify protection priorities at risk and confirm response strategies via NEBA.</p>	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 4
<p>Based on operational monitoring and in consultation with CA, where applicable activate the relevant Tactical Response Plan (TRP).</p>	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 7
<p>Support IAP (as required) in consultation with AMOSC and CA (AMSA or State CA).</p>	IC or Delegate	Cooper Energy Offshore Victoria OPEP: Section 5
<p>Allocate responsibilities to support implementation of IAP (as required).</p>	IC or Delegate	
<p>In collaboration with CA undertake consultation with appropriate land managers for any shoreline activities (as required).</p>	IC or Delegate	
<p>As directed by CA, implement response strategies and monitor effectiveness.</p>	IC or Delegate	Cooper Energy Offshore Victoria OPEP: Section 5
<p>As directed by CA, continue until termination criteria is met.</p>	IC or Delegate	Cooper Energy Offshore Victoria OPEP: Section 5
Monitor and Evaluate – if required (NOTE: Cooper Energy is in a support role for this scenario)		
<p>Obtain weather data via of the Bureau of Meteorology (http://www.bom.gov.au/) for the spill location.</p>	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 7
<p>Use vectoring to identify predicted spill trajectory or initiate modelling (as required) via AMOSC Duty Manager. Determine Spill Trajectory – weather conditions and vectoring and/or modelling via AMOSC Duty Manager.</p> <ul style="list-style-type: none"> AMOSC Duty Manager: Emergency Roster and Emergency Contacts Directory <p>See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for AMOSC and RPS contact.</p>	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 7

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Vessel LoC – MDO Spill – Response Actions		
Undertake automated data inquiry for oil spills (ADIOS) modelling using hydrocarbon characteristics in Section 4.2. https://response.restoration.noaa.gov/adios	Planning Officer (or delegate)	
As directed by CA, mobilise aerial observation (if level 2) See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for Aerial Services Provider. Confirm the 'opening status' of estuaries identified as areas for priority protection. Preliminary information may be obtained via: http://www.estuarywatch.org.au/	Logistics Officer (or delegate)	Cooper Energy Offshore Victoria OPEP: Section 7
Access oil spill tracking buoy live feed data if a buoy has been deployed from the vessel: Website: https://myionu.track-viewer.com/Login.aspx See Spill Response Tools on IMT SharePoint for username and password for tracking buoy data.	Logistics Officer (or delegate)	Cooper Energy Offshore Victoria OPEP: Sections 7
Shoreline assessment and clean-up - if required (NOTE: Cooper Energy is in a support role for this scenario)		
As directed by CA (as relevant to State) and in consultation with AMOSC identify SCAT.	IC (or delegate)	Cooper Energy Offshore Victoria OPEP: Section 9
In consultation with CA (as relevant to State) identify SCAT locations.	Planning Officer (or delegate)	Cooper Energy Offshore Victoria OPEP: Section 9
As directed by CA (as relevant to State) initiate SCAT surveys.	Operations Officer/OSMP Support Contractors	Cooper Energy Offshore Victoria OPEP: Section 9
Undertake NEBA for shoreline clean-up as required.	Planning Officer (or delegate)	Cooper Energy Offshore Victoria OPEP: Section 5
Protection and deflection – if required (NOTE: Cooper Energy is in a support role for this scenario)		
Assess deployment location with AMOSC, CA (as relevant to State) and relevant waterway manager.	Operations Officer	Cooper Energy Offshore Victoria OPEP: Section 8
As directed by CA (as relevant to State), mobilise equipment and people to location.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 8
In consultation with EPA, and as directed by CA (as relevant to State), mobilise waste management contractor.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 11
Oiled Wildlife Response (OWR) – if required (NOTE: Cooper Energy is in a support role for this scenario)		
Notify relevant State Authority if any oiled wildlife is identified or have the potential to be impacted and provide support services as directed. Refer to Cooper Energy Contacts directory on the Cooper Energy Intranet VIC-EREMP-0020 Emergency Roster and Emergency Contacts Directory	IC (or delegate)	Cooper Energy Offshore Victoria OPEP: Section 10
In consultation with State lead agency for wildlife response, and as directed by CA (as relevant to State), mobilise waste management contractor.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 10
Scientific monitoring – if required (NOTE: Cooper Energy is in a support role for this scenario)		
Consult with government environmental department (as relevant), and State Statutory Authority on the scope of the scientific monitoring if required.	Planning Officer	Cooper Energy Offshore Victoria OPEP: Section 12
Initiate scientific monitoring contractor. 24/7 Emergency Response Hotline: Emergency Roster and Emergency Contacts Directory	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 12

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Vessel LoC – MDO Spill – Response Actions		
As directed by CA (as relevant to State) define monitoring and control sites. CA may consult with AMOSC to define monitoring and control sites.	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 12
Continue with scientific monitoring until termination criteria are met.	Planning Officer or delegate	Refer OSMP

Table 2-8: Spill Response Action List – Subsea LoC – Condensate

Subsea LoC - Condensate – Response Actions		
Action	Responsible Party	Timing/ Additional Information
<p>On discovery of the spill:</p> <ul style="list-style-type: none"> initiate source control to prevent further spillage notify the Duty Incident Manager providing initial incident information in the event of a significant (level 2/3) spill, deploy the oil spill tracking buoy (if available and safe to do so) following the deployment instructions. 	Site Operator / Maintainer	ASAP
<p>Undertake spill assessment.</p> <ul style="list-style-type: none"> what is it - oil type / group / properties? where is it – latitude / longitude? how big is it -area / volume? where is it going - weather conditions / currents / tides? what is in the way - resources at risk? when will it get there - Weather conditions / currents / tides? what is happening to it - weathering processes predicted? assess response required response commensurate with the size and level of risk marine safety assessment undertaken. 	Cooper Energy Duty Manager	ASAP
Undertake regulatory notifications and other stakeholder notifications (as required). Refer to Section 2.4.	Cooper Energy Duty Manager or delegate	ASAP
<p>Assemble Cooper Energy IMT (as required). Number of, and team members selected, will be based upon the nature and scale of response required.</p> <p>The IC is responsible for:</p> <ul style="list-style-type: none"> determining the response level activating the Cooper Energy IMT and Source Control Team (SCT) implementing the OPEP (where relevant). <p>N.B. the Cooper Energy SCT initiate the VSCP (VIC-DC-ERP-0001)</p>	Cooper Energy Duty Manager	ASAP
<p>Activate AMOSC Member Agreement to support the response. Cooper Energy Authorising Officer to activate via the AMOSC Duty Manager.</p> <ul style="list-style-type: none"> AMOSC (level 2/3 for advice/support) (e.g. aerial observers, SCAT, OSTM) AMOSC Duty Manager: Emergency Roster and Emergency Contacts Directory <p>See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for call-our authority personnel.</p>	Cooper Energy Authorising Officer	
Login to AMOSC Website for the latest equipment and personnel information:	Planning Officer or delegate	

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Subsea LoC - Condensate – Response Actions		
See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for website login (username and password). http://www.amosc.com.au		
Contact AMSA (level 2/3 for support) as per Table 2-4: Emergency Roster and Emergency Contacts Directory	Cooper Energy Duty Manager	
Determine Spill Trajectory – weather conditions and vectoring and/or RPS modelling via AMOSC Duty Manager. <ul style="list-style-type: none"> AMOSC Duty Manager: Emergency Roster and Emergency Contacts Directory See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for AMOSC and RPS contact .	Planning Officer or delegate Officer	
Identify protection priorities at risk and confirm response strategies via NEBA in consultation with CA for State waters (DTP) where state waters may be impacted.	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 5
Based on operational monitoring and in consultation with DTP activate the relevant TRP, where applicable.	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 4
Develop IAP in consultation with Well Control Specialists (where relevant), AMOSC and DTP (where State water may be impacted) and implement.	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 5
In collaboration with DTP undertake consultation with appropriate land managers for any shoreline activities.	IC or delegate	
Implement response strategies and monitor effectiveness.	Operations Officer	Cooper Energy Offshore Victoria OPEP: Section 5
Response Termination – continue until termination criteria met.	IC or delegate	Cooper Energy Offshore Victoria OPEP: Section 5
Monitor & Evaluate		
Obtain weather data via of the Bureau of Meteorology (http://www.bom.gov.au/) for the spill location.	Planning Officer or delegate	Cooper Offshore Victoria OPEP: Section 7
Use manual vectoring to identify predicted spill trajectory. Spill Response Tools on IMT SharePoint for Trajectory Estimator Initiate RPS modelling using Form in Section 4 and via AMOSC Duty Officer: <ul style="list-style-type: none"> AMOSC Duty Manager: Emergency Roster and Emergency Contacts Directory 	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 7
Undertake ADIOS modelling using hydrocarbon characteristics in Section 4.2 - https://response.restoration.noaa.gov/adios	Planning Officer or delegate	Cooper Energy Offshore Victoria OPEP: Section 4
As directed by CA, mobilise aerial observation (if level 2/3) to commence operations in daylight hours. See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for aerial services provider. Confirm the 'opening status' of estuaries identified as areas for priority protection. Preliminary information may be obtained via: http://www.estuarywatch.org.au/	Operations and Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 7
Mobilise vessel observations and confirm deployment of satellite tracking buoys (as appropriate if level 2/3 incident). Access oil spill tracking buoy live feed data if a buoy has been deployed from the vessel: Website: https://myionu.track-viewer.com/Login.aspx See Spill Response Tools on IMT SharePoint for username and password for tracking buoy data.	Operations and Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 7

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Subsea LoC - Condensate – Response Actions		
Protection and Deflection – if required		
Assess deployment location with AMOSC, CA (DTP) and relevant waterway manager.	Operations Officer	Cooper Energy Offshore Victoria OPEP: Section 8
As directed by CA (DTP), mobilise equipment and people to location.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 8
In consultation with EPA, and as directed by CA (DTP), mobilise waste management contractor.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 11
Shoreline Assessment and Clean-up - if required		
As directed by CA (DTP) and in consultation with AMOSC identify SCAT.	Operations Officer	Cooper Energy Offshore Victoria OPEP: Section 9
In consultation with CA (DTP) AMOSC to identify SCAT locations.	Planning Officer / DTP	Cooper Energy Offshore Victoria OPEP: Section 9
As directed by CA (DTP) initiate SCAT surveys.	Operations Officer / OSMP Support Contractors	Cooper Energy Offshore Victoria OPEP: Section 9
Undertake NEBA (Appendix 2) for shoreline clean-up as required.	Planning Officer / DTP	Cooper Energy Offshore Victoria OPEP: Section 5
Initiate shoreline clean-up (as required).	Operations and Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 9
Mobilise waste management contractor. See Cooper Energy Emergency Roster and Emergency Contacts Directory (VIC-ER-EMP-0020): Emergency Roster and Emergency Contacts Directory for waste contractor contact.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 11
OWR – if required		
Notify DEECA if any oiled wildlife is identified or has the potential to be impacted and provide support services as directed.	Cooper Energy IMT	Cooper Energy Offshore Victoria OPEP: Section 10
In consultation with EPA, state lead agency for oiled wildlife, and as directed by CA (DTP), mobilise waste management contractor.	Logistics Officer	Cooper Energy Offshore Victoria OPEP: Section 11
Scientific Monitoring – if required		
Consult with EPA, state lead agency for oiled wildlife, and DTP on the scope of the scientific monitoring if required.	Planning Officer	Cooper Energy Offshore Victoria OPEP: Section 12
Initiate scientific monitoring contractor 24/7 Emergency Response Hotline: Emergency Roster and Emergency Contacts Directory	Planning Officer	Cooper Energy Offshore Victoria OPEP: Section 12
As directed by CA (DTP) define monitoring and control sites. DTP may consult with AMOSC to define monitoring and control sites.	Planning Officer / DTP	Cooper Energy Offshore Victoria OPEP: Section 12
Continue with scientific monitoring until termination criteria are met.	Cooper Energy IMT	Refer to OSMP
Planning beyond First Strike Period		
Create an IAP for ongoing operational period using the IAP template in Appendix 1	Cooper Energy Planning / Information Officer	Cooper Energy Offshore Victoria OPEP: Appendix 1

2.6 Safety Exclusion Zones

On activation of the OPEP, the Cooper Energy Operations Officer will establish a safety exclusion zone for all level 2/3 spill incidents. The extent of the exclusion zone will be determined based on the risks associated with the incident and may be informed by modelling to predict areas where safety thresholds are exceeded.

All aircraft and vessels will observe the exclusion zone around infrastructure to prevent personnel exposure to safety hazards. All vessels and aircraft are to remain up wind and up-current from the source of the spill.

The following additional notifications will be made to protect the health and safety of third-party marine stakeholders:

- exclusion zones will be established on-water around the source and slick area by requesting a Notice to Mariners via the Australian Hydrographic Service (refer to Table 2-9) and via the AMSA rescue coordination centre who will issue an AusCoast warning
- Cooper Energy to notify adjacent petroleum titleholders and relevant persons to advise of the spill conditions and any exclusion requirements (refer to Table 2-9).

Safety exclusion zones are maintained until the hydrocarbon release is terminated and the Cooper Energy Spill IC has determined there is no hazard to personnel, contractors or third-party marine users. The establishment of safety exclusion zones is captured as an enforceable environment performance outcome in the event of a spill and is described along with the corresponding performance standards and measurement criteria in Table 2-9.

Table 2-9: Safety Exclusion Zones

Applicable Level	Performance Outcome	Control	Standard	Measurement Criteria
2/3	Establish and implement safety exclusion zones.	C4: Exclusion Zones.	IAP documents the need for, and if required, refines throughout the incident safety exclusion areas to prevent exposure of Cooper Energy contractors and third parties to hazardous conditions.	<ul style="list-style-type: none"> • IAP reflects these constraints have been identified and communicated to user groups.

3 Emergency Response Organisation

Cooper Energy’s emergency management structure is scalable according to the level of incident. In general, incident response is managed by the Cooper Energy response teams listed in Table 3-1. The relationship between these groups is provided in Figure 3-1.

Incidents that are extremely large, complex, or protracted, may be managed more effectively by splitting the management of that incident between two or more response teams (i.e. source control and oil spill response). An incident could be split geographically or functionally depending on the circumstances. Cooper Energy’s incident control system provides for remote access and integration of IMT personnel.

Table 3-1: Emergency Response Groups

Parameter	CMT	IMT and Field Teams	Well SCT
Role	Manages corporate strategic issues (i.e. wider spill implications) and provides support in terms of finance, insurance, legal, external affairs, media, Joint Venture (JV) partner liaison, Australian Securities Exchange (ASX) releases and Government Department liaison.	Supports tactical response for the oil spill and supports site-based Emergency Response Team (ERT). Interface between local relevant persons, external spill response and support agencies.	Responsible for planning and recovery from source control and well incidents.
Leader	CMT Leader	IC.	SCT Leader
Plan	Cooper Energy CMP	Cooper Energy IMP Cooper Energy OPEP Cooper Energy TRP	Cooper Energy Offshore VSCP Activity SCERP
Nominal Location	CMT Room Level 8, 70 Franklin St, Adelaide, SA	Incident Control Centre Level 8, 70 Franklin St, Adelaide, SA Note, the IMT may move to another nominated location such as AMOSC in Geelong or as nominated by Vic DTP. FOB and Field Teams will be directed by the IMT to locations identified through the IAP cycle.	Perth Level 15, 123 St Georges Terrace, Perth Western Australia (WA)
Interface with regulator/industry response plans and resources	-	NatPlan Victorian Maritime Emergencies NSR subplan NSW State Waters Marine Oil and Chemical Spill Contingency Plan TasPlan AMOSPlan	Memorandum of understanding (MoU) between Titleholders
External Liaison Positions within Team	AMOSOC Industry Intergovernmental Advisor.	Liaison Officers (AMOSOC, AMSA, State CA, State government Lead Agencies) (as required). Note – Cooper Energy Liaisons should be prepared to deploy to Government Agency Location (e.g. Melbourne or Canberra).	-

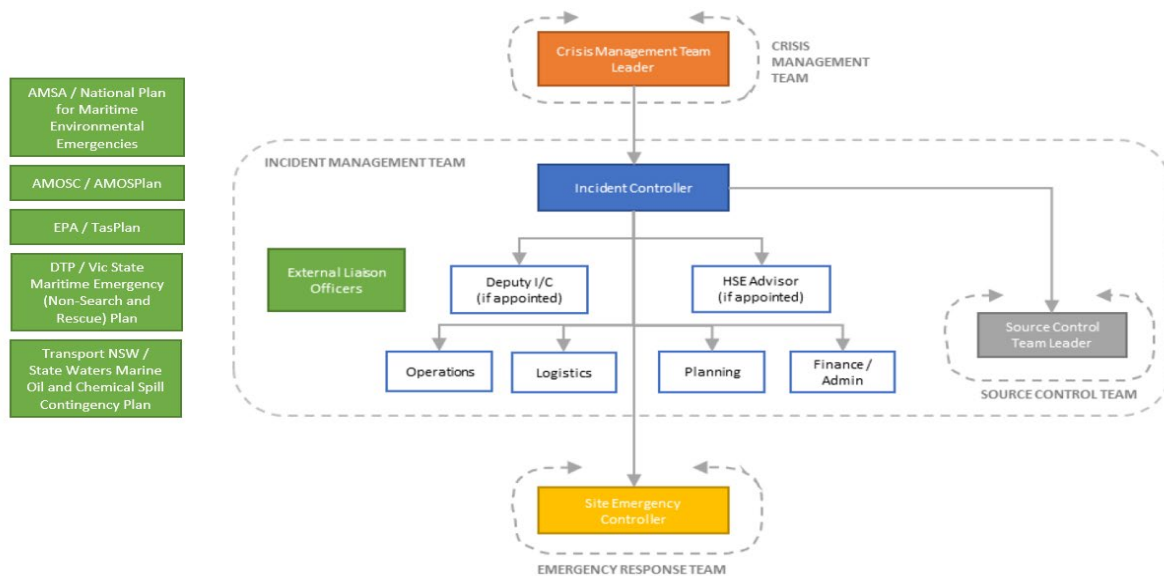


Figure 3-1: Cooper Energy Oil Spill Response Structure

3.1 Spill Management Team – Level Structures

Figure 3-1 and Table 3-2 provides the Cooper Energy emergency response structure, which is scalable, according to the emergency or oil spill level.

This structure is consistent with the Australasian Inter-service Incident Management System structure adopted by NatPlan and Victorian Maritime Emergencies NSR subplan where the IC holds overall management responsibility for activities to control the incident. Use of this structure provides consistency in role definition between Cooper Energy and regulator/industry plans and allows external trained resources to fit seamlessly into the Cooper Energy IMT structure in a surge capacity.

Table 3-2: Cooper Energy Emergency Response Structure

<p>Level 1 Spill Management Structure</p> <p>A level 1 spill is within the response capabilities of Cooper Energy site or the vessel operator’s resources. The response structure is site-based with notification to the Cooper Energy Duty Manager.</p> <p>The Cooper Energy IMT or CMT may be mobilised if there is a possibility that the spill incident could escalate.</p>
<p>Level 2 Spill Management Structure</p> <p>A level 2 spill incident, where Cooper Energy is the control agency for the spill, will likely activate the Cooper Energy IMT to support oil spill response. The IC will nominate the positions which need to be filled and allocate subordinate functions as required.</p> <p>In a level 2 spill event the IC must notify the CMT Leader and determine if the spill response requires support from CMT resources. Additional resources (i.e. media) may be mobilised as required. The mobilisation and composition of the CMT are detailed in the IMP.</p> <p>For level 2 spills where Cooper Energy is not the control agency (i.e. significant vessel spills), the Cooper Energy IMT will support the CA (either AMSA or relevant State Authority). A Cooper Energy liaison officer may be deployed to the AMSA or State Authority incident team to facilitate support activities (i.e. equipment and personnel).</p>
<p>Level 3 Spill Management Structure</p>

A level 3 spill incident requires resources which exceed the capacity of Cooper Energy. Cooper Energy may request additional personnel from external agencies such as AMOSC, industry mutual aid (core group) assistance through AMOSPlan (via AMOSC) and AMSA to act as surge resources for the Cooper Energy IMT in an on-going large-scale response.

The IMT would be expected to mobilise for a level 3 spill event when notified by the Duty Manager.

If the level 3 spill event is well-related, the SCT will also be activated to initiate source control. The IC will interface with the SCT Leader.

3.2 Roles and Responsibilities

3.2.1 Incident Management Team

Figure 3-2 provides details of a level 3 oil spill support organisation. Each unit within the Planning, Operations, Logistics and Finance/Administration functional area is headed by a coordinator who reports to their relevant functional officer.

The initial Cooper Energy IMT resourcing strategy, and responsibilities for these key roles is provided in Table 3-3. Surge capacity resources are also nominated together with the role competency requirements.

In the event of a prolonged large-scale oil spill event, additional resources would be sourced from external agencies to fulfil the necessary roles.

Individual Oil Spill Response Officer Position Checklists are provided in Appendix 3 of this OPEP. Maximum IMT resourcing requirements for the worst credible discharge have been evaluated in consultation with AMOSC. Appendix 5 provides further information on where IMT personnel will be sourced from to match the response requirements identified in the OPEP.

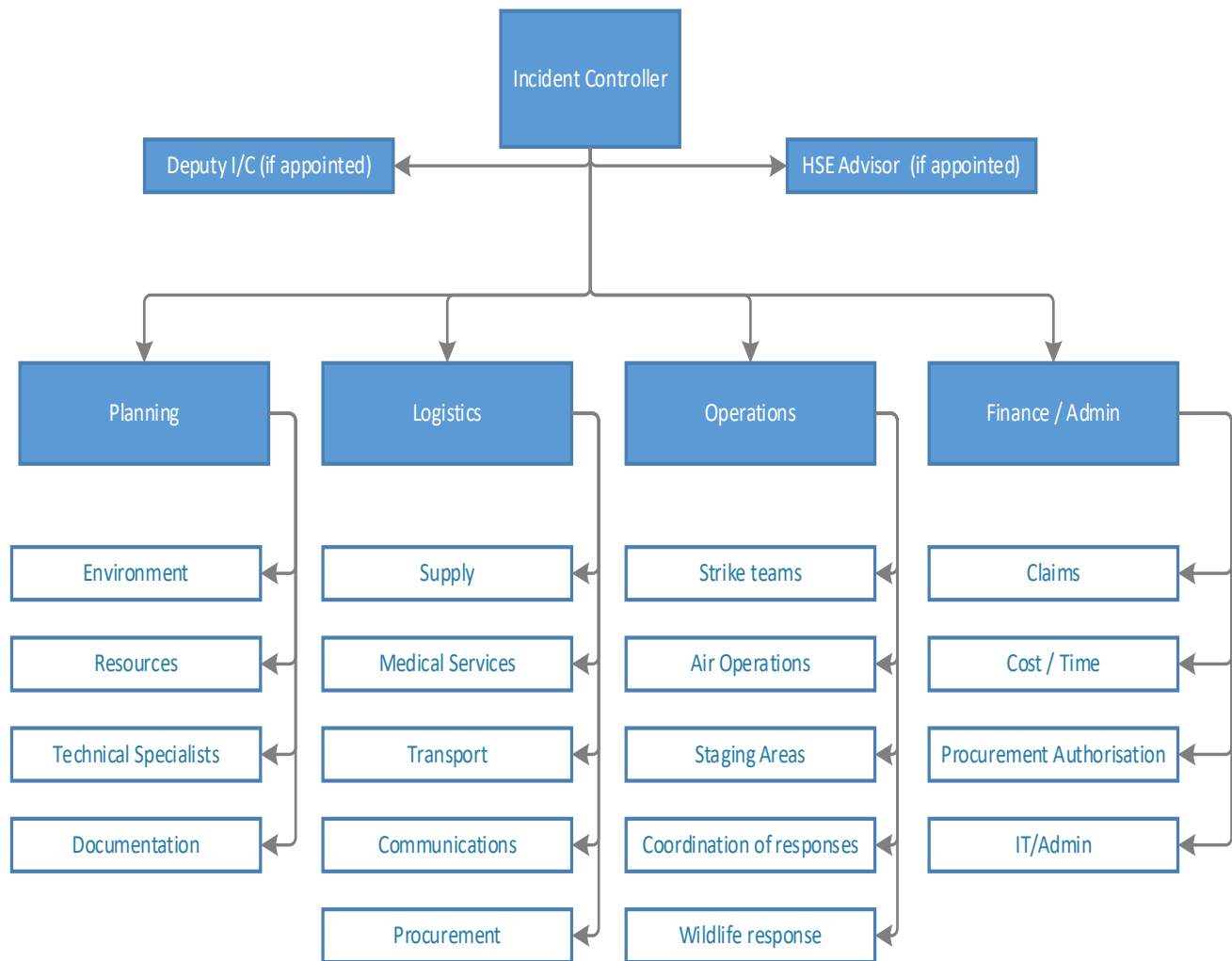


Figure 3-2: Spill Level 2/3 Support Organisation (Indicative)

Table 3-3: IMT Lead Roles, Responsibilities, Competencies and Provision

Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
Incident Controller	Management of all activities necessary for the resolution of an incident.	Safe and efficient response structure and organisation.	IMO3 or equivalent OPEP Induction	Cooper Energy / AMOSC Core Group AMSA Liaison Officer/ CA Emergency Management Liaison Officer (or equivalent)
Safety Officer	Oversees the health and safety of the response operations.	Health and Safety Plans, control measures and evaluation.	Industry Health Safety & Environment	Cooper Energy

Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
			(HSE) role >5 years OPEP induction	
Liaison Officer	Relaying critical information to key stakeholders (government, community). Feeding back stakeholder concerns to the IC for resolution.	External / public/ stakeholder affairs are managed.	Industry or communications role >3 years OPEP Induction	Cooper Energy / AMOSC Core group
Planning Officer	Collection, analysis and dissemination of information and development of plans for the resolution of an incident.	Drive the planning process that develops the IAP. Tracking resources. COP – situational assessment (intelligence).	IMO2 or equivalent Internal competencies* OPEP Induction	Cooper Energy / AMOSC Core Group / AMSA National Response Team (NRT)
Environment Officer	Reports to Planning Officer. Collects and analyse environmental information for areas that are or may be impacted by the incident. Undertakes NEBA. Works with experts to provide concise and accurate environmental advice to the IC.	OPEP strategies are tactically implemented consistent with good global practice, accounting for the net environmental benefit of each strategy. Assessment of environmental risks.	Internal competencies* OPEP Induction	Cooper Energy / Environmental Consultancy or AMOSC Core Group. (External interface: State Environmental Officers)
Operations Officer	Tasking and application of resources to achieve resolution of an incident.	Run the operations in the field. Provide technical input to the production of the next operational period IAP. Draft the daily operational orders for each field team. Provide tech input to the safety plans.	IMO2 or equivalent Internal competencies* OPEP Induction	AMOSC Core Group, AMSA NRT
Logistics Officer	Acquisition and provision of human and physical resources, facilities, services, and materials to support achievement of incident objectives.	Acquire resources and materials that match the operations. Ensure resources are serviced and maintained to required specifications.	IMO2 or equivalent Internal competencies* OPEP Induction	AMOSC Core Group, AMSA NRT
Finance and Administrator Officer	Management of all financial and administrative activities to enable and record the incident.	Tracks all costs and provides financial oversight consistent with the CA requirements.	Internal competencies* OPEP Induction	Cooper Energy

Notes: *Defined for role and maintained as part of the Cooper Energy training and competence matrix.

Support from NRT under National Plan arrangements and AMOSC-AMSA Memorandum of Understanding (MoU).

3.2.2 Forward Operating Base and Field Teams

The IMT will provide support to the Field Team Forward Operating Base (FOB) Leads (Table 3-4). The FOB(s) will be located near to response activities to manage and provide for the daily operations of the field response. All roles may not be necessary for the entire response.

Table 3-4: FOB and Field Team Lead Roles, Responsibilities, Competencies and Provisions

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Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
FOB Lead	Set-up and management of the forward operating base, IT systems, personnel, materials and equipment.	Functional FOB for response.	IMO2 or equivalent OPEP Induction	Cooper Energy / AMOSC
Safety Officer	Coordinate welfare requirements for all field response personnel.	Implementation of health and safety plan measures.	Industry HSE role >5 years OPEP induction	Cooper Energy
Aerial Operations Manager	Coordination of aerial response operations.	Aerial response operations are implemented in line with the IAP.	IMO2 or equivalent OPEP Induction	AMOSC
Aerial Observer	Plotting and recording of oil spill.	Observer reports outlining location, extent and thickness of oil.	AMOSC Aerial Surveillance Course or equivalent OPEP Induction	AMOSC
Marine Operations Manager	Coordination of marine response operations.	Marine response operations are implemented in line with the IAP.	IMO1 or equivalent OPEP Induction	AMOSC
Shoreline Operations Manager	Coordination of shoreline response operations.	Shoreline response operations are implemented in line with the IAP.	IMO1 or equivalent OPEP Induction	AMOSC
SCAT Team Leads	Coordinate day to day SCAT at respective field location.	SCAT operations are implemented in line with the IAP.	IMO1 or equivalent	AMOSC and AMOSC Core Group
Shoreline Response Team Leads	Coordinate day to day shoreline response at respective field location.	Shoreline response operations are implemented in line with the IAP.	IMO1 or equivalent OPEP Induction	AMOSC Core Group and NRT
TRP Team Leads	Coordinate tactical response at respective tactical response site.	Response operations are implemented in line with TRPs/IAP.	IMO1 or equivalent	AMOSC Core Group
Oiled Wildlife Coordinator	Coordinate OWR.	OWR is implemented in line with TRPs/IAP.	AMOSC Functional specific training OWR management OPEP Induction	AMOSC Core Group
Oiled Wildlife Rehabilitation Manager	Coordinate rehabilitation of oiled wildlife rescued during the response.	Process implemented for the rehabilitation of oiled wildlife.	Functional specific training OWR management	Philip Island Nature Park

3.2.3 Source Control Team (Well Incident)

The Cooper Energy Offshore Victoria Source Control Plan (VIC-DC-ERP-0001) provides details and guidance on emergency well control management for Cooper Energy's offshore Victoria assets and activities. It covers the activities to be carried out to assess the well control and to plan and execute appropriate response measures to regain control of and secure the well.

The IC will interface with the SCT (Section 3, Figure 3-3). Figure 3-3 details the SCT structure and Table 3-5 roles, responsibilities, competencies, and where initial and surge personnel can be sourced. All roles may not be necessary for the entire response.

A detailed resourcing plan is developed as part of the drilling campaign SCERP.

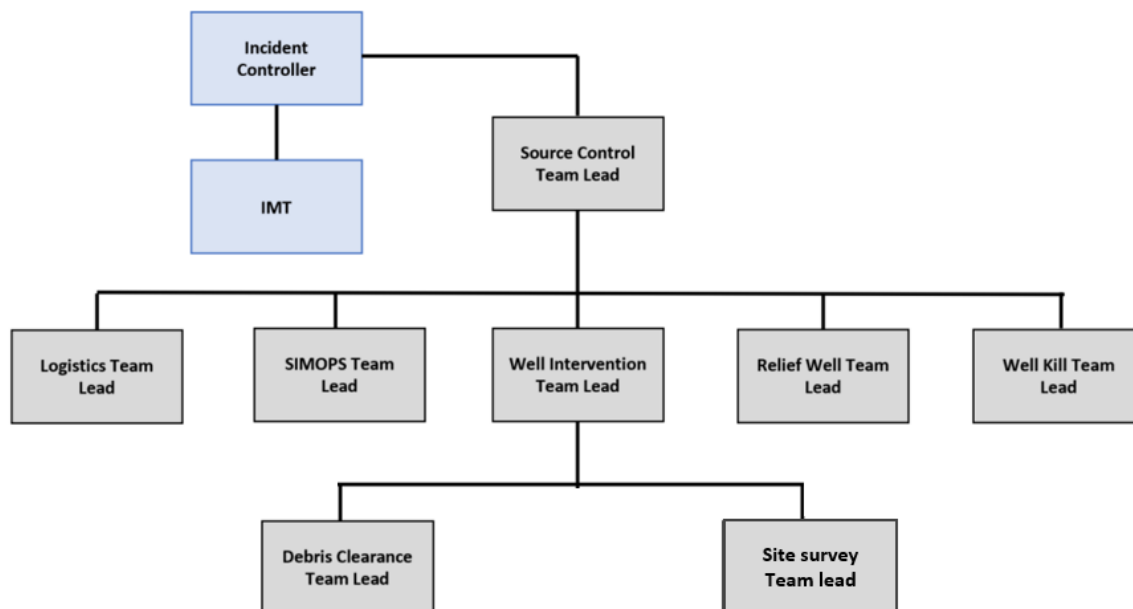


Figure 3-3: Source Control Team Structure

Table 3-5: Source Control Team Lead Roles, Responsibilities, Competencies and Provision

Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
SCT Lead	The SCT Leader gathers all the information from the source control subgroups to manage and report on the progress of the various source control methods being pursued.	Approve and authorise the implementation of a Source Control Action Plan.	IMO III, International Well Control Forum (IWCF) Subsea Supervisor Well Control or equivalent	Cooper Energy Labour Agency Service Partners
Well Intervention Team Lead	The Well Intervention Team Leader reports to the SCT Leader and supports activities related to site surveys, debris removal, subsea dispersant and well intervention of the incident well.	Approve and authorise the implementation of a: <ul style="list-style-type: none"> • site survey plan • well intervention plan • debris removal plan. 	IMO II, IWCF Subsea Supervisor Well Control	Cooper Energy Labour Agency Service Partners
Site Survey Team Lead	The Site Survey Team Leader is responsible for the management and coordination of surveying the site subsea.	Provides data for all other source control efforts to assist in the development of the operational plans and procedures.	Experience offshore subsea survey lead role	Cooper Energy Labour Agency Service Partners

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Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
Debris Removal Team Lead	The Debris Removal Team Leader is responsible for the management and coordination of subsea debris removal operations.	Coordinate the development of operational plans and procedures, secure resources, and manage debris removal operations to ensure clear access for the relief well.	Experience offshore subsea operations lead role	Cooper Energy Labour Agency Service Partners
Simultaneous Operations (SIMOPS) Team Lead	The SIMOPS Leader reports to the SCT Leader and supports activities related to SIMOPS plans and activities of the incident well.	Approve and coordinate activities at the incident site. Coordinate and schedule all activities within the SIMOPS area. Coordinate with other groups for the transport of all well control materials to the site. Create and maintain SIMOPS plan detailing organization and process flow. Establish On-Site SIMOPS Control/Coordination Centre.	Experience SIMOPS lead role	Cooper Energy Labour Agency Service Partner
Relief Well Team Lead	The Relief Well Leader reports to the SCT Leader and supports activities related to planning and operations for drilling the relief well and well kill modelling, planning and operations associated with well kill from the relief well to the incident well.	Determine if impacted rig may be used for relief rig. Determine number of relief wells to be drilled. Obtain and assess information on reservoir and wellbore geometry. Source rigs to drill the well(s) Identify available resources (i.e. rig, oil country tubular goods, pumping fluids). Identify surface location and develop relief well plan. Submit permit(s) and receive approval. Finalize well design drill relief well.	Experience offshore well construction lead role. IWCF Subsea Supervisor Well Control or equivalent	Cooper Energy Labour Agency Service Partners
Well Kill Team Lead	Well Kill Team Leader is responsible for the management and coordination of well kill operations.	Coordinate the development (and approval) of the well kill plans and procedures, secure resources, and manage well kill operations via a relief well or capping stack, concurrently with all other source control efforts until the well is dead.	Experience offshore drilling lead role	Cooper Energy Labour Agency Service Partner
Logistics Team Lead	The Logistics Team Leader will support the SCT during a subsea well containment incident. The Logistics Team will coordinate internal and external to the SCT to ensure that all necessary resources and services for source control operations are procured.	Approve and authorise the implementation of SCERP logistics strategy, manage vessel support, materials support, facility support, and communications support for source control operations.	Experience logistics lead role	Cooper Energy Labour Agency Service Partner

3.2.4 Crisis Management Team

The Cooper Energy CMT typically comprises senior executives representing the major areas of the Cooper Energy business (Table 3-6). The CMT Leader will activate support as required to assist with legal and media issues.

The focus of the CMT includes:

- supporting the IMT to contain an incident
- communicating with all relevant stakeholders and managing the demand for information
- strategic planning of control and recovery processes.

Table 3-6: Crisis Management Team Roles, Responsibilities, Competencies and Provision

Initial Responder	Responsibilities	Output	Responder Competency/ Training	Sourced from
CMT Lead	Overall responsibility for management of the CMT including overall responsibility for internal and external communications to the Board, JV partners, ASX and other stakeholders.	Supports the IC to provide Safe and efficient response structure and organisation.	Chief Officer (or delegate)	Cooper Energy
External Affairs / Stakeholder relations	Advise on development of internal and external affairs and communications strategy. Brief company spokesperson.	Provision of information to external parties in timely manner.	Manager (or delegate)	Cooper Energy
Legal	Assist in the development of a positive legal direction.	Legal implications of the response are assessed and communicated to the CMT lead.	General council, Manager (or delegate)	Cooper Energy
Finance	Financial notifications, provision of adequate funds, advice on financial impacts.	Response is adequately funded to implement the IAP.	Chief Officer (or delegate)	Cooper Energy
Human Resources	Source relief and specialist personnel.	Response is adequately resourced to implement the IAP.	Manager (or delegate)	Cooper Energy

4 Pre-Operational Response Options

Spill response options will be based on the general conditions, oil type and the response priorities. This section describes pre-operational spill response options based on known scenarios, fate and trajectory predictions and an assessment of impacts.

The response taken in an actual event may draw on this information initially but must be appropriate to the conditions of the spill at the time. Approaches to support the live operational response are provided in Section 5.

4.1 General Environmental Conditions of the Bass Strait

Victoria's climate can be characterised as cool temperate, with cool wet winters and cool summers. Water temperatures in Bass Strait are between 12.6°C and 18.4°C (average 15°C).

4.1.1 Wind

The Gippsland Basin lies within the eastern portion of the Bass Strait, which is a sea straight separating Tasmania from the southern Australian mainland. Hindcast modelled wind data from the National Centres for Environmental Predictions Climate Forecast System Reanalysis for the period 2008 to 2017 (inclusive), showed winds were typically from the southwest during the summer months and west-southwest during the winter months, with average monthly wind speeds under 16 knots, winds can at times blow over 52 knots at the release location (RPS 2021).

Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Hindcast modelled wind data from the National Centres for Environmental Predictions Climate Forecast System Reanalysis for the period 2010 to 2019 (inclusive), showed wind direction were typically from the southeast in summer through the westerly sectors to the northwest for winter, with average monthly wind speeds ranging from 10 knots during summer to 13 knots during winter (RPS 2023).

Figure 4-1 shows the average wind data in both Gippsland and Otway basin.

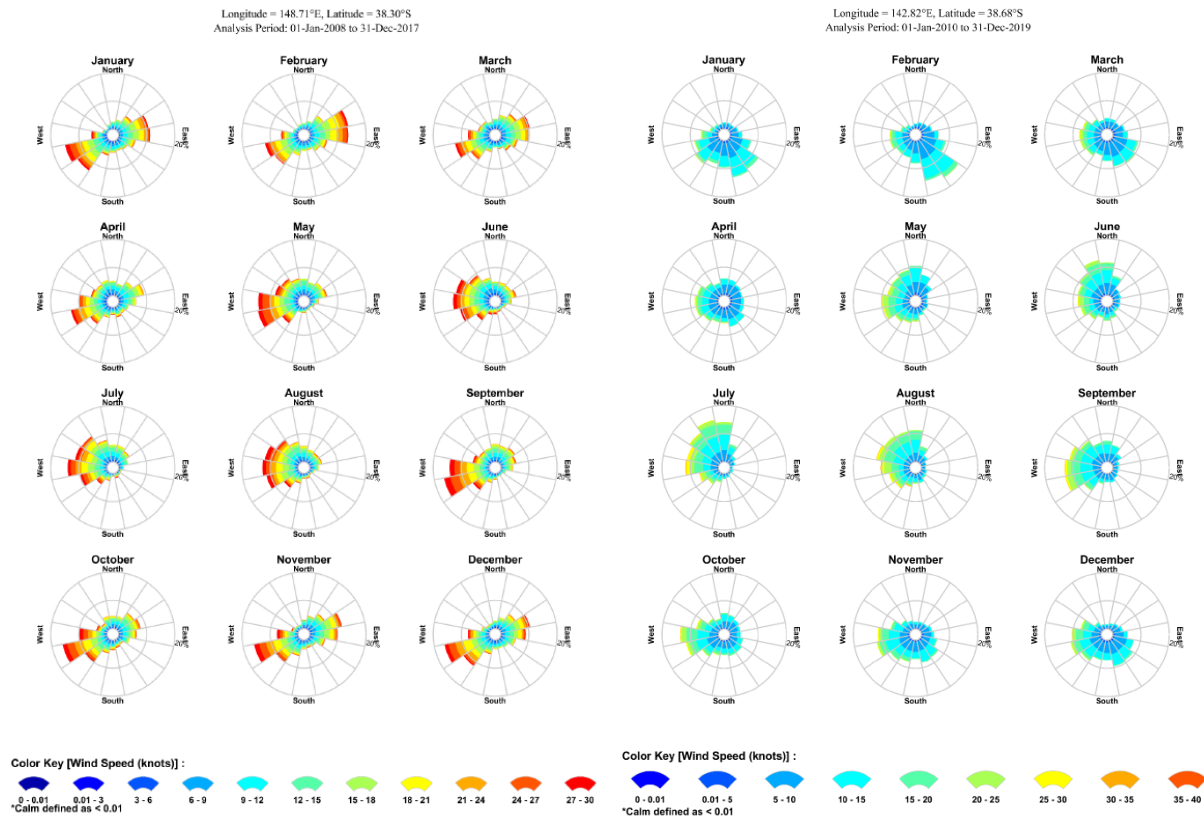


Figure 4-1: Modelled Monthly Wind Data Gippsland Basin (left (RPS 2021)) and Otway Basin (right (RPS 2023))

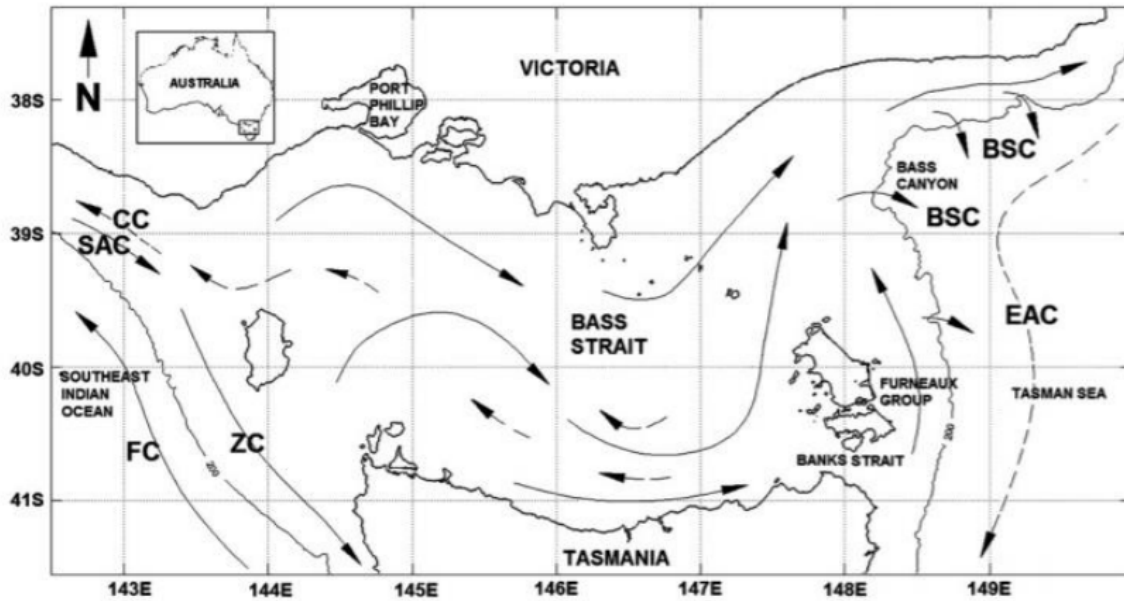
4.1.2 Surface Currents

The Bass Strait region has a reputation for high winds and strong tidal currents (Jones, 1980). Currents within the strait are primarily driven by tides, winds and density driven flows. In winter and spring, waters within the strait are well mixed with no obvious stratification, while during summer the central regions of the strait become stratified (Baines and Fandry 1983, Middleton and Black 1994).

The varied geography and bathymetry of the region, in addition to the forcing of the south-eastern Indian Ocean and local meteorology lead to complex shelf and slope circulation patterns (Middleton and Bye 2007). During winter there is a strong eastward water flow due to the strengthening of the South Australian Current (fed by the Leeuwin Current in the Northwest Shelf), which bifurcates with one extension moving through the Bass Strait, and another forming the Zeehan Current off western Tasmania (Sandery and Kanpf 2007). During summer, water flow reverses off Tasmania, King Island and the Otway Basin travelling westward, as the coastal current develops due to south-easterly winds (Figure 4-2). Surface currents flow with different intensities within the Gippsland Basin and Bass Strait depending on the time of year.

The current speed in the Gippsland Basin ranged between 0.18 m/s (July and October) to 0.24 m/s (May) while maximum current speeds ranged between 0.59 m/s (December) and 0.96 m/s (March) (RPS 2021). Figure 4-3 illustrates the monthly current rose distributions based on 10-year dataset for the period 2008 to 2017 (inclusive).

The current speed in the Bass Strait ranged between 0.15 m/s (April) to 0.24 m/s (July) while maximum current speeds ranged between 0.72 m/s (February) and 1.10 m/s (September) (RPS 2023). Figure 4-3 illustrates the monthly current rose distributions based on 10-year dataset for the period 2010 to 2019 (inclusive).



Source: (Sandery and Kanpf 2007)

Figure 4-2: Schematic Representation of Currents in the Region. Dashed Arrows Denote Summer Currents. Shelf Break Depth (200 m isobath) is Indicated

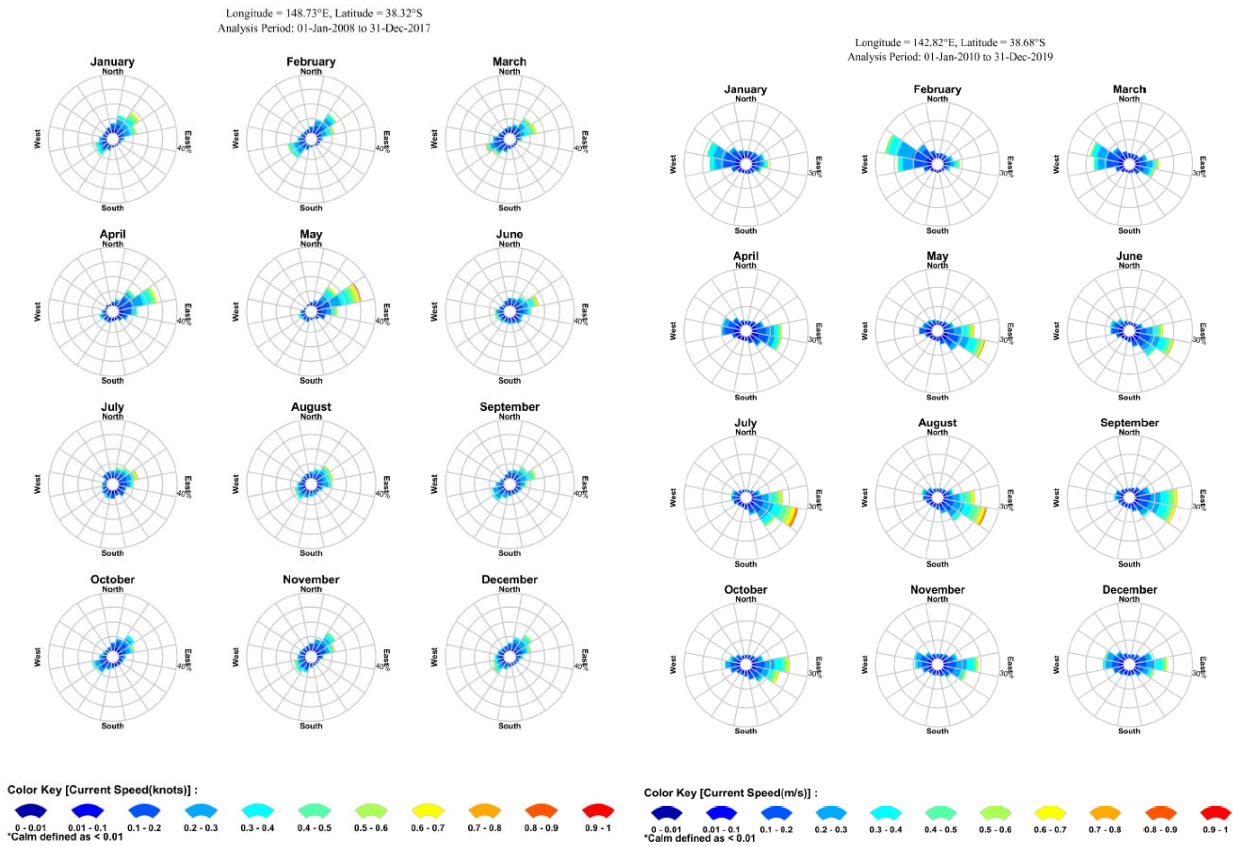


Figure 4-3: Modelled Monthly Surface Current Data Gippsland Basin (left (RPS 2021)) and Otway Basin (right (RPS 2023))

4.1.3 Water Temperature and Salinity

Monthly average sea surface temperatures in the Gippsland Basin range from 14.1°C (September) to 20.5°C (March) (RPS 2021), while in the Bass Strait range from 13.4°C (September) to 18.2°C (March) (RPS 2023). Salinity tends to remain consistent throughout the year, between 35.4-35.6 psu (RPS 2021, RPS 2023).

Figure 4-4 shows the monthly temperature and salinity profiles throughout the water column in both the Gippsland and Otway Basin.

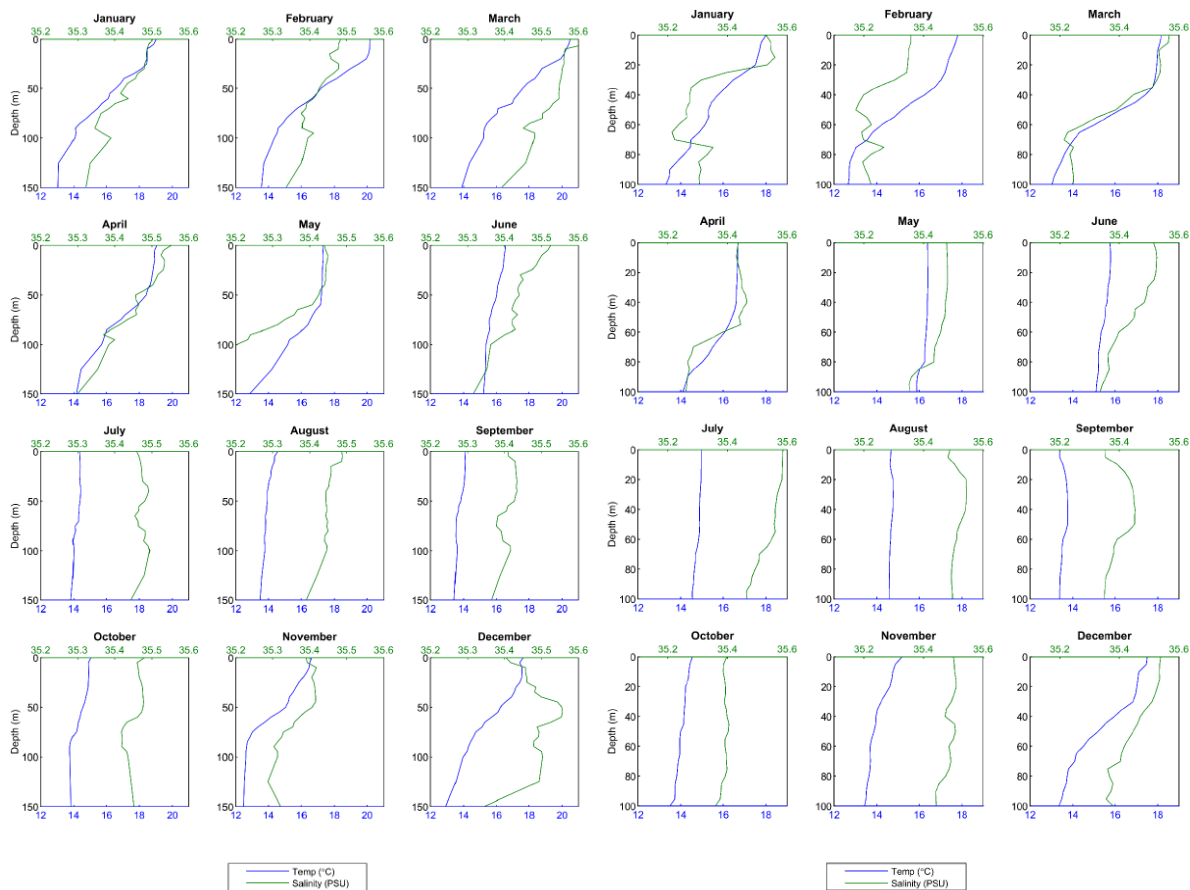


Figure 4-4: Monthly Temperature and Salinity Profiles Throughout the Water Column Gippsland Basin (left (RPS 2021)) and Otway Basin (right (RPS 2023))

4.2 Hydrocarbon Characteristics

4.2.1 Marine Diesel Oil

Vessels engaged will use MDO which is a mixture of both volatile and persistent hydrocarbons and is classified as Group II oil (light-persistent) based on categorisation and classification derived from AMSA (2015) guidelines. The classification is based on the specific gravity of hydrocarbons in combination with relevant boiling point ranges. Under constant wind speed, MDO has the following behaviour at sea:

- the hydrocarbon spreads very rapidly to thin thicknesses elongated in the direction of the wind and current
- evaporation is the dominant process contributing to the removal of spilled MDO from the sea surface (depending upon wind conditions, sea state and sea temperature).
- MDO residues usually consist of heavy components which may persist for longer and tend to disperse as oil droplets in the upper layers of the water column in the presence of waves but can re-float to the surface if wave energies abate.

Table 4-1 provides the physical properties of MDO.

Table 4-1: MDO Properties and Behaviour

Properties		MDO
American Petroleum Institute (API) Gravity		24
Density@25°C g/ml		0.89
Dynamic Viscosity @ 25°C (cP)		14.0
Pour Point (°C)		-9
Boiling Point Curve (% mass)	Volatiles (<180°C)	4.0
	Semi-volatile (180-265°C)	32.0
	Low Volatility (265-380°C)	54.0
	Residual (>380°C)	10.0
Group		II

Source: Oil Spill Modelling Annie-2 (RPS 2023)

4.2.2 Patricia and Baleen

The PB reservoirs are dry gas as provided in Table 4-2. The reservoirs are now substantially depleted although Baleen has been observed to be pressure recharging over time.

Approximately 5 m³ of Longtom condensate remains in the offshore PB pipeline in its current non-operations phase. The physical characteristics of the Longtom are provided in Table 4-3.

Table 4-2: PB Reservoir Conditions

Properties	Patricia-1	Patricia-2	Baleen-4
Maximum Pressure at Reservoir Depth	541 psia	541 psia	700 psia
Maximum temperature	49°C	49°C	49°C
Gas Specific Gravity	0.572	0.572	0.563
Condensate to Gas Oil Ratio (GOR)	~0.1 bbl/MMscf	~1 bbl/MMscf	~1 bbl/MMscf

Source: Well Operations Management Plan (WOMP) (Santos 2014), PB Asset SCERP (Cooper Energy 2022a)

Table 4-3: Longtom Condensate Physical Properties

Properties		Longtom Condensate
API Gravity		51.2
Density@25°C g/ml		0.777
Dynamic Viscosity @ 20°C (cP)		1.081
GOR		10.85 stb/MMscf
Pour Point (°C)		-9 (when fresh)
Boiling Point Curve (% mass)	Volatiles (<180°C)	61.5
	Semi-volatile (180-265°C)	14.3
	Low Volatility (265-380°C)	21.1
	Residual (>380°C)	3.1

Properties	Longtom Condensate
International Tanker Owners Pollution Federation (ITOPF) Group	I

Source: Pipeline Safety Case – Non-Operational Phase (*Santos 2015*)

4.2.3 Sole

The Sole reservoir is a dry gas reservoir with very limited condensate observed or recovered during the well tests on Sole-2, Sole-3 and Sole-4. Physical characteristics of the Sole gas and condensate are provided in Table 4-4 and Table 4-5 respectively.

Table 4-4: Physical Characteristics of Sole Gas

Properties	Sole
Maximum Pressure at Reservoir Depth	1,147 psi
Maximum temperature	43°C
Gas Specific Gravity	0.589
Condensate to Gas Ratio	<0.1 bbl/MMscf

Source: Basic Data Report (*Cooper Energy 2018*); Sole Asset SCERP (*Cooper Energy 2022b*)

Table 4-5: Sole Condensate Physical Properties (*Intertek 2021*)

Properties	Sole Condensate	
API Gravity	36.6	
Density@20°C g/ml	0.8414	
Dynamic Viscosity @ 20°C (cSt)	1.709	
Pour Point (°C)	<-36	
Boiling Point Curve (% mass)	Volatiles (<180°C)	37.2
	Semi-volatile - Residual (>180°C)	62.8
ITOPF Group	II	

Source: Sole condensate Assay (*Intertek 2021*)

4.2.4 Otway Facilities

The Otway reservoirs access the Waarre formation and are similar in nature. The CHN reservoirs have been producing for over a decade and hence are depleted relative to initial pressures.

The condensates of the Otway reservoirs are classified as a Group I oil (non-persistent). Table 4-6 provides the CHN and Annie reservoir conditions. The Annie-1 well was drilled and abandoned in 2019; it is located ~11 km northeast of the Casino field, and modelling for Annie-1 well has been used as a conservative proxy for response planning purposes¹ in lieu of CHN specific modelling. Table 4-7 details the physical characteristics of the Annie condensate.

Table 4-6: CHN and Annie Field Reservoir Conditions (*Santos 2014*)

¹ Refer to CHN-EN-EMP-001 for further information.

Parameter	Casino Waarre C	Casino Waarre A	Henry	Netherby	Annie
Pressure at Reservoir Depth (psia)	Undepleted: 2850 Current: 515	Undepleted: 2830 Current: 880	Undepleted: 2670 Current: 880	Undepleted: 2550 Current: 505	Undepleted: 3280
Temperature (°C)	80	87	80	76	100
Gas Specific Gravity	0.59-0.65	0.59-0.65	0.59	0.58	0.66
Condensate to GOR	Undepleted: 1.1 bbls/MMscf Current: 0.3 bbls/MMscf				1.1 bbls/MMscf

Table 4-7: CHN and Annie Condensate Physical Properties

Properties	CHN Condensate	Annie Condensate
API Gravity	51.2	48.23
Density@25°C g/ml	0.774	0.78
Dynamic Viscosity @ 25°C (cP)	0.14	1.06
Pour Point (°C)	-54	-30
Boiling Point Curve (% mass)	Volatiles (<180°C)	84
	Semi-volatile (180-265°C)	14
	Low Volatility (265-380°C)	2
	Residual (>380°C)	-
ITOPF Group	I	I

4.3 Response Option Effectiveness

An assessment of the suitability and effectiveness of spill response options for the hydrocarbon types which could potentially be released from Cooper Energy’s activities was undertaken in preparation of the corresponding EPs.

Table 4-8 provides a summary of this assessment and lists the response options suitable for mitigating spill impacts according to hydrocarbon type which may be present on the CHN, PB and Sole assets.

Given the hydrocarbon types the primary response strategy will be to initiate source control and then monitor and evaluate the spill (natural weathering). Additional, secondary measures to protect specific environmental sensitivities within the spill response area where response activities may offer net benefit includes protection and deflection, shoreline monitoring and clean-up (on sandy beaches) and OWR.

Further information on each of the selected response strategies is provided in Section 6 to Section 11.

Table 4-8: Response Option Summary for MDO, CHN, PB and Sole Hydrocarbons

Response Option (OPEP Section Reference)	Description	MDO	PB and Sole*	Otway
Source Control (OPEP Section 6)	Limit flow of hydrocarbons to environment.	✓	✓	✓
Monitor & Evaluate (OPEP Section 7)	Direct observation-aerial or marine, vector calculations, OSTM, satellite tracking buoys. To maintain situational awareness, all monitor and evaluate options suitable.	✓	✓	✓

Response Option (OPEP Section Reference)	Description	MDO	PB and Sole*	Otway
Dispersant Application	Breakdown surface spill & draw droplets into upper layers of water column. Increases biodegradation and weathering and provides benefit to sea-surface air breathing animals.	X	X	X
Contain and Recover	Booms and skimmers to contain surface oil where there is a potential threat to environmental sensitivities.	X	X	X
Protect & Deflect (OPEP Section 8)	Booms and skimmers deployed to protect environmental sensitivities.	✓	✓	✓
Shoreline Clean-up (OPEP Section 9)	The selection and application of shoreline clean-up methods will take into account environmental sensitives based on NEBA.	✓	✓	✓
Oiled Wildlife Response (OPEP Section 10)	Consists of capture, cleaning and rehabilitation of oiled wildlife. May include hazing or pre-spill captive management.	✓	✓	✓

*Minor condensate content.

4.4 Priority Protection Areas

Predictive modelling has been used to identify the areas that may be exposed to hydrocarbons from hypothetical worst-case spill scenarios. To identify the primary response planning areas the oil exposures from NOPSEMA's Environment bulletin - Oil spill modelling (2019) were used:

- a sea surface oil exposure of 50 g/m² as this represents the practical limit for surface response options; below this loading, oil containment, recovery, and chemical treatment (dispersant) become ineffective
- a shoreline contact exposure of 100 g/m² as this represents the minimum loading that is not likely to inhibit the potential for recovery; hydrocarbons below this loading may be best remediated by natural coastal processes alone.

The primary response planning areas were developed based on the modelling combination of the worst-case spill scenarios that covered the greatest area above the exposures previously stated for the PB and Sole and Otway assets.

Based on the modelling outputs, priority protection areas have been identified as have other areas where response strategies may be practically implemented. Figure 4-5 shows the primary response areas for Cooper Energy's PB and Sole assets and activities. Figure 4-6 shows the primary response areas for Cooper Energy's Otway assets and activities.

A timely and appropriate response for the identified areas for priority protection have been planned for in the EPs to ensure that the risks and impacts are ALARP and acceptable. A series of TRPs have been developed to assist in implementing a rapid response (Section 4.4.2).

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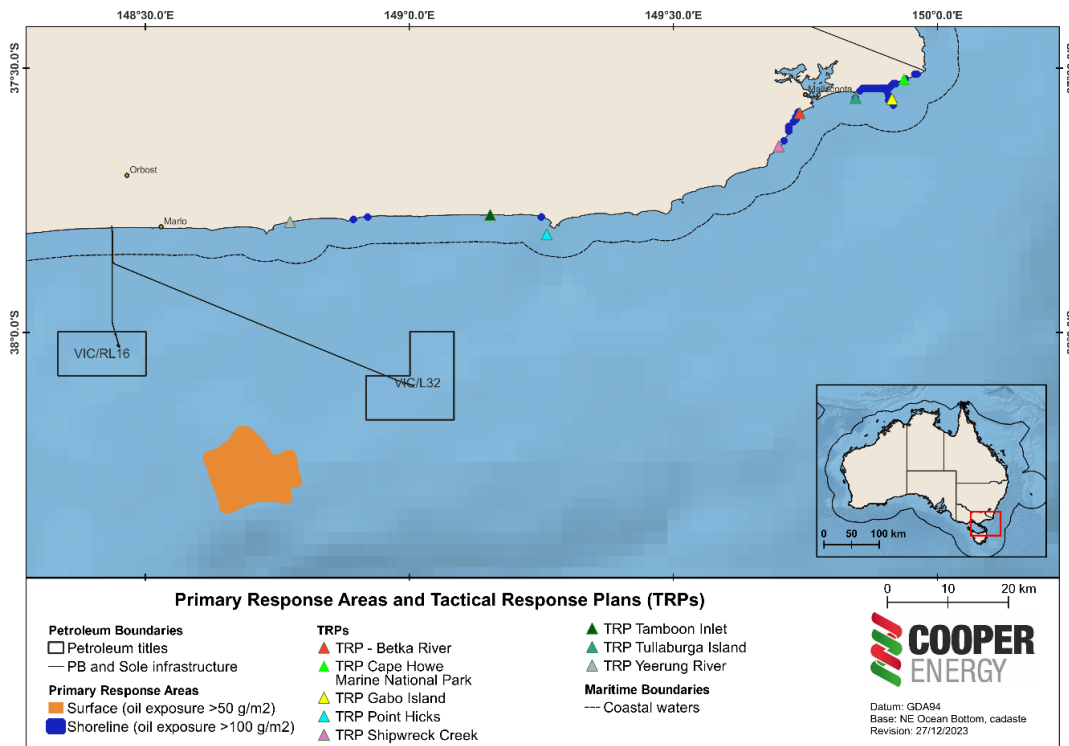


Figure 4-5 PB and Sole Primary Response Area

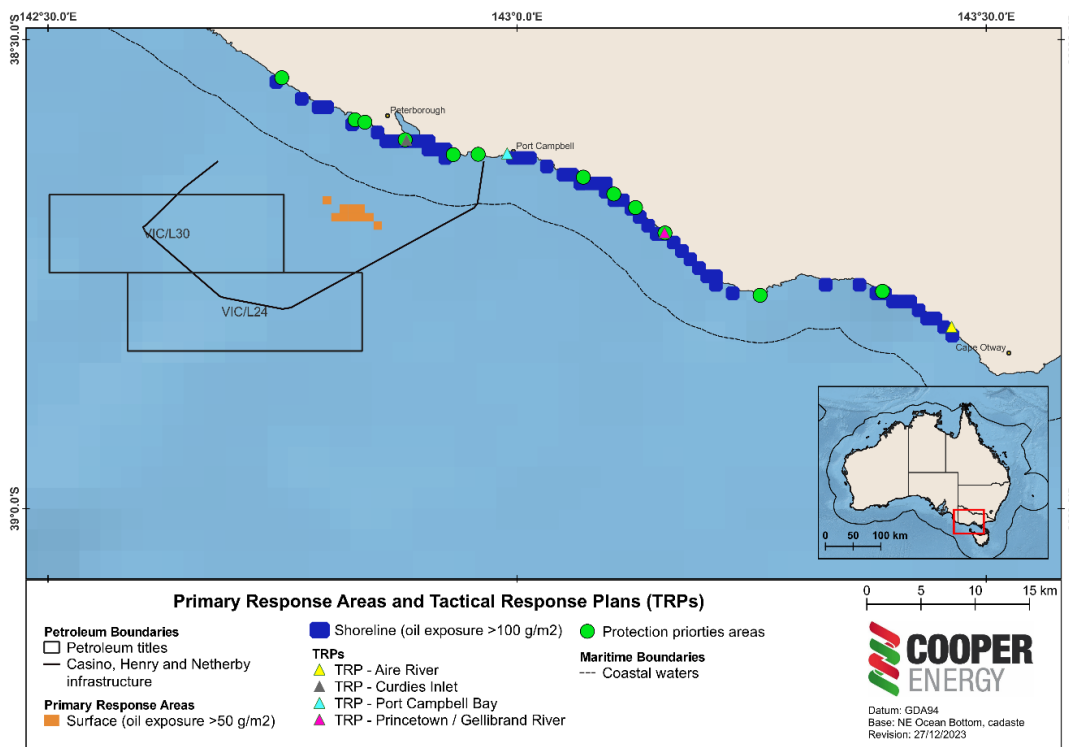


Figure 4-6: Otway Basin Primary Response Areas

4.4.1 Sensitivity Criteria

To support the identification of priority response areas, shoreline sensitivity analysis and mapping was undertaken guided by the International Petroleum Industry Environmental Conservation Association principles and informed by the regional description of the environment and understanding of receptor presence in the region. Coastal landform types, habitats and other receptors within the region have been ranked based upon sensitivity to hydrocarbon exposure in accordance with the criteria in Table 4-9.

Table 4-9: Sensitivity Criteria

Sensitivity	Code	Criteria
Severe Impact	S1	Region of known sensitive habitat (e.g. mangrove, saltmarsh, wetlands) or landform type (e.g. sheltered tidal flats, sheltered rocky coasts), which if impacted may have significant impacts and long recovery periods. Known presence of feeding, breeding, or nesting behaviours of threatened species (e.g. biologically important areas [BIAs]). Other areas of ecological or social significance (e.g. marine protected areas, Ramsar wetlands, threatened ecological communities, Commonwealth heritage listed areas).
Medium Impact	S2	Region of known moderately sensitive habitats (e.g. seagrass) or landform type (e.g. exposed tidal flats) which have a medium recovery period (~2-5 years). Known presence of feeding, breeding, or nesting behaviours of non-threatened species (e.g. BIAs). Other areas of ecological or social significance (e.g. commercial fishing, tourist attractions, cultural heritage sites).
Low Impact	S3	Region of known low sensitivity habitat (e.g. subtidal rock) or landform type (e.g. sandy beaches, exposed rocky coasts) which have a rapid recovery period (~1 year). Other areas with expected minimal impact to marine life, commercial activities, public areas or cultural heritage sites.

4.4.2 Tactical Response Plans for Priority Protection Areas

TRPs are developed for sensitive sites predicted to be exposed to a hydrocarbon spill where there is limited time to contact above response threshold of $>100 \text{ g/m}^2$ (as determined by predictive modelling). It is estimated that it takes approximately five days to develop and ground truth a tactical response plan and 24-48 hours to mobilise equipment and personnel to site; thus, those areas of high sensitivity within the priority response area with the potential to be exposed to hydrocarbons within 7 days were identified as the priority protection areas.

The primary response planning areas identified in Figure 4-5, relevant to the PB and Sole assets and activities, are detailed in Table 4-10 along with the appropriate TRP. Table 4-11 includes the sites identified in Figure 4-6 for CHN activities with the appropriate TRP. Further TRPs to those identified in these tables will be developed to cover sites and sensitivities in additional locations in case it is required. This would be undertaken as a part of IAPs in the operational response.

In addition to site-specific TRPs, the following Response Plans have been developed:

- species response plans:
 - southern right whale
 - sperm whale
 - white-faced storm petrel
 - short-tailed shearwater.

- TRP – shoreline protection & clean up. Developed in collaboration with ExxonMobil, the purpose of the TRP is to provide a plan outlining the strategy to be adopted and actions required to undertake safe and effective shoreline protection and clean-up along any shoreline type, in response to a release of hydrocarbons to the marine environment in the Gippsland region
- up to date TRP listings are available at: IMT SharePoint Site – Tactical Response Plans. TRPs have been developed for various projects over a number of years, hence there is a much larger catalogue of TRPs available for reference than meets the criteria for the current operational activities; these are also available on the IMT SharePoint Site – Tactical Response Plans.

Table 4-10: Priority Response Planning Areas for Scenarios Identified for the PB and Sole Assets and Activities

Location	Latitude	Longitude	Summary	TRP
Betka river	-37.57	149.75	High coastal habitat sensitivity	Betka River
Cape Howe	-37.52	149.94	High coastal habitat sensitivity High biological sensitivity	Cape Howe Marine National Park
Gabo Island	-37.56	149.91	High coastal habitat sensitivity High biological sensitivity	Gabo Island
Point Hicks	-37.80	149.27	High biological sensitivity	Point Hicks
Shipwreck Creek	-37.64	149.70	High coastal habitat sensitivity High biological sensitivity	Shipwreck Creek
Tamboon Inlet	-37.78	149.14	High coastal habitat sensitivity High biological sensitivity	Tamboon Inlet
Tullaburga Island	-37.55	149.84	High biological sensitivity	Tullaburga Island
Yeerung River	-37.79	148.78	High coastal habitat sensitivity High biological sensitivity	Yeerung River

Table 4-11: Priority Response Planning Areas for Scenarios Identified for the Otway Assets and Activities

Location	Latitude	Longitude	Summary	TRP
Curdies Inlet	-38.60	142.87	State terrestrial protected area, International Union for Conservation of Nature (IUCN) Category III High coastal habitat sensitivity High biological sensitivity	Curdies Inlet
Lower Aire River Inlet (and Aire River mouth)	-38.81	143.46	State terrestrial protected area, IUCN Category II High coastal habitat sensitivity High biological sensitivity	Aire River Inlet
Port Campbell	-38.61	142.99	Coastal settlement Amenity beach, tourism, camping, fishing High coastal habitat sensitivity High biological sensitivity	Port Campbell
Prinetown Wetlands (and Gellibrand River mouth)	-38.70	143.16	Coastal settlement Main industries are tourism and fishing (including port for rock lobster fishery)	Prinetown / Gellibrand River

4.4.3 Pre-spill Net Environmental Benefit Assessment

An assessment of effective spill mitigation techniques and the net benefit they offer to specific environmental sensitivities is provided in the following tables Table 4-12 and Table 4-13.

NOTE: wildlife response activities will focus on addressing wildlife welfare as a result of the spill regardless of the NEBA. The NEBA is an important tool in decision making, but provided it is safe to do so, all accessible wildlife with welfare needs should be addressed.

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Table 4-12: Sensitivities within the Priority Response Planning Areas identified for the PB and Sole assets, Response Option Feasibility & Planning NEBA

Receptor	Classification		Priority Response Planning Area								Response Options							
			Betka River	Cape Howe	Gabo Island	Point Hicks	Shipwreck Creek	Tamboon Inlet	Tullaburga Island	Yeerung River	Response Option Effective?							
	Sensitivity	Marine	Betka River	Cape Howe Marine National Park (NP)	Gabo Island	Croajingolong NP Point Kicks Marine NP	Shipwreck Creek	Croajingolong NP	Tullaburga Island	Cape Conran Coastal Park	Oil Type	Source Control	Monitor and Evaluate	Dispersant Application	Contain and Recover	Protect and Deflect	Shoreline Clean-up	OWR
			MDO	Yes	Yes	No	No	Yes	Yes	Yes								
Condensate ²			Yes	Yes	No	No	N/A	N/A	N/A									
Gas	Yes	Yes	No	No	N/A	N/A	N/A											
Marine Ecology																		
Cetaceans	S1	✓									↑	-			N/A	N/A	N/A	
Pinnipeds	S2	✓		✓	✓						↑	-			N/A	N/A	N/A	
Turtles	S2	✓									↑	-			N/A	N/A	↑	
Fish & Sharks	S2	✓	✓								↑	-			N/A	N/A	N/A	
Seabirds	S1	✓		✓	✓		✓		✓		↑	-			N/A	N/A	↑	
Shorebirds	S1		✓	✓	✓		✓		✓		↑	-			N/A	N/A	↑	
Invertebrates	S3	✓									↑	-			N/A	N/A	N/A	
Plankton	S3	✓									↑	-			N/A	N/A	N/A	
Coastal Habitats																		
Saltmarsh/Seagrass	S1				✓				✓		↑	-			↑	↓	N/A	
Mangroves	S1		✓								↑	-			↑	↓	N/A	
Mudflats	S1		✓								↑	-			↑	↓	N/A	
Kelp Habitats (inter-tidal)	S2										↑	-			N/A	N/A	N/A	

² No shoreline contact or surface sheen above response concentration thresholds is expected for gas or condensate spill; therefore, protection and detection, shoreline clean-up and oiled wildlife response are not applicable.

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Receptor	Classification		Priority Response Planning Area								Response Options							
			Betka River	Cape Howe	Gabo Island	Point Hicks	Shipwreck Creek	Tamboon Inlet	Tullaburga Island	Yeerung River	Response Option Effective?							
	Sensitivity	Marine	Betka River	Cape Howe Marine National Park (NP)	Gabo Island	Croajingolong NP Point Kicks Marine NP	Shipwreck Creek	Croajingolong NP	Tullaburga Island	Cape Conran Coastal Park	Oil Type	Source Control	Monitor and Evaluate	Dispersant Application	Contain and Recover	Protect and Deflect	Shoreline Clean-up	OWR
											MDO	Yes	Yes	No	No	Yes	Yes	Yes
											Condensate ²	Yes	Yes	No	No	N/A	N/A	N/A
										Gas	Yes	Yes	No	No	N/A	N/A	N/A	
Sand Beaches	S3		✓	✓	✓	✓	✓	✓	✓		↑	-			N/A	↑	N/A	
Sub-tidal Reef	S3										↑	-			N/A	N/A	N/A	
Inter-tidal Rocky Plat/Headland	S3		✓			✓	✓				↑	-			N/A	↑	N/A	
Wetlands	S1		✓					✓	✓		↑	-			↑	↓	N/A	
Coastal Ecology																		
Shoreline Birds	S1			✓	✓	✓			✓		↑	-			↑	↑	↑	
Pinniped Haul-out Sites	S2			✓	✓			✓			↑	-			N/A	N/A	↑	
Penguin Colonies	S2			✓	✓				✓		↑	-			N/A	N/A	↑	
Protected Area	S2		✓	✓			✓		✓		↑	-			N/A	N/A	↑	
Socio-economic																		
Tourism	S2		✓	✓	✓	✓	✓			✓	↑	-			↑	↑	N/A	
Amenity beach	S2		✓	✓	✓		✓				↑	-			↑	↑	N/A	
Ports, Harbours, Yacht Club	S3					✓					↑	-			↑	↑	N/A	
Commercial Fishing / Aquaculture	S2	✓									↑	-			N/A	↑	N/A	
Recreational Fishing/Diving	S3		✓			✓	✓	✓		✓	↑	-			N/A	↑	N/A	
Shipwrecks (submerged)	S3										↑	-			N/A	N/A	N/A	
Aboriginal Heritage/Cultural	S2		✓	✓	✓	✓	✓	✓	✓	✓	↑	-			↑	↓	N/A	

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Legend

Benefits Assessment:	Effectiveness Assessment:
↑ Net Benefit Compared with only Monitor & Evaluate	Yes: Option suitable for oil type, few restrictions in implementing
↓ Net Loss Compared with only Monitor and Evaluate	Possible: Option suitable for oil type, potential limitations on application
- No net benefit or Loss	Not Recommended: Option not suitable for oil type
NA: Option is not applicable to the Receptor given credible worst-case discharge potential	

Table 4-13: Sensitivities within the Priority Response Planning Areas identified for the Otway assets, Response Option Feasibility & Planning NEBA

Receptor	Classification		Priority Response Planning Area				Response Options							
			Curdies Inlet	Aire River Wetlands	Port Campbell	Princetown Wetlands	Response Option Effective?							
	Sensitivity	Marine	Otway NP Aire River Beach Aire River	Otway NP Aire River Beach Aire River	Port Campbell Port Campbell Beach Port Campbell Inlet	Port Campbell NP Twelve Apostles Marine NP Gellibrand Rover	Oil Type	Source Control	Monitor and Evaluate	Dispersant Application	Contain and Recover	Protect and Deflect	Shoreline Clean-up	OWR
							MDO	Yes	Yes	No	No	Yes	Yes	Yes
							Condensate	Yes	Yes	No	No	Yes	Yes	Yes
							Gas	Yes	Yes	No	No	No	No	No
Marine Ecology														
Cetaceans	S1	✓						↑	-			N/A	N/A	N/A
Pinnipeds	S2	✓						↑	-			N/A	N/A	↑
Turtles	S2	✓						↑	-			N/A	N/A	↑
Fish & Sharks	S2	✓				✓		↑	-			N/A	N/A	N/A
Seabirds	S1	✓				✓		↑	-			N/A	N/A	↑
Shorebirds	S1					✓		↑	-			N/A	N/A	↑

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Receptor	Classification		Priority Response Planning Area				Response Options							
			Curdies Inlet	Aire River Wetlands	Port Campbell	Princetown Wetlands	Response Option Effective?							
	Sensitivity	Marine	Otway NP Aire River Beach Aire River	Otway NP Aire River Beach Aire River	Port Campbell Port Campbell Beach Port Campbell Inlet	Port Campbell NP Twelve Apostles Marine NP Gellibrand Rover	Oil Type	Source Control	Monitor and Evaluate	Dispersant Application	Contain and Recover	Protect and Deflect	Shoreline Clean-up	OWR
							MDO	Yes	Yes	No	No	Yes	Yes	Yes
Condensate							Yes	Yes	No	No	Yes	Yes	Yes	
Invertebrates	S3	✓				✓	↑	-			N/A	N/A	N/A	
Plankton	S3	✓				✓	↑	-			N/A	N/A	N/A	
Coastal Habitats														
Saltmarsh/Seagrass	S1		✓	✓	✓	✓	↑	-			↑	↓	N/A	
Mangroves	S1						↑	-			↑	↓	N/A	
Mudflats	S1						↑	-			↑	↓	N/A	
Kelp Habitats (inter-tidal)	S2						↑	-			↑	N/A	N/A	
Sand Beaches	S3		✓	✓	✓	✓	↑	-			↑	↑	N/A	
Sub-tidal Reef	S3					✓	↑	-			↑	N/A	N/A	
Inter-tidal Rocky Plat/Headland	S3		✓	✓	✓	✓	↑	-			↑	↑	N/A	
Wetlands	S1		✓	✓	✓	✓	↑	-			↑	↓	N/A	
Coastal Ecology														
Shoreline Birds	S1		✓	✓	✓	✓	↑	-			↑	↑	↑	
Pinniped Haul-out Sites	S2						↑	-			↑	N/A	↑	
Penguin Colonies	S2		✓	✓		✓	↑	-			↑	N/A	↑	
Protected areas	S2		✓	✓	✓	✓	↑	-			N/A	N/A	↑	

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Receptor	Classification		Priority Response Planning Area				Response Options							
			Curdies Inlet	Aire River Wetlands	Port Campbell	Princetown Wetlands	Response Option Effective?							
	Sensitivity	Marine	Otway NP Aire River Beach Aire River	Otway NP Aire River Beach Aire River	Port Campbell Port Campbell Beach Port Campbell Inlet	Port Campbell NP Twelve Apostles Marine NP Gellibrand Rover	Oil Type	Source Control	Monitor and Evaluate	Dispersant Application	Contain and Recover	Protect and Deflect	Shoreline Clean-up	OWR
							MDO	Yes	Yes	No	No	Yes	Yes	Yes
Condensate							Yes	Yes	No	No	Yes	Yes	Yes	
Gas	Yes	Yes	No	No	No	No	No	No	No	No	No			
Socio-economic														
Tourism	S2		✓	✓	✓	✓		↑	-			↑	↑	N/A
Amenity beach	S2		✓	✓	✓	✓		↑	-			↑	↑	N/A
Ports, Harbours, Yacht Club	S3				✓			↑	-			↑	↑	N/A
Commercial Fishing / Aquaculture	S2	✓			✓			↑	-			↑	↑	N/A
Recreational Fishing/Diving	S3		✓	✓	✓	✓		↑	-			↑	↑	N/A
Shipwrecks (submerged)	S3		✓		✓	✓		↑	-			N/A	N/A	N/A
Aboriginal Heritage/Cultural	S2		✓		✓			↑	-			↑	↓	N/A

Legend

Benefits Assessment:	Effectiveness Assessment:
↑ Net Benefit Compared with only Monitor & Evaluate	Yes: Option suitable for oil type, few restrictions in implementing
↓ Net Loss Compared with only Monitor and Evaluate	Possible: Option suitable for oil type, potential limitations on application
- No net benefit or Loss	Not Recommended: Option not suitable for oil type
N/A: Option is not applicable to the Receptor given credible worst-case discharge potential	

5 Operational Response

Section 4 presents the predicted response options to a spill, however in the event of a spill, the proposed likely response strategies will be reviewed and verified prior to implementation to ensure that the assumptions made in the planning process are valid and the response strategy will be effective.

5.1 Verification of Response Strategy

The process for reviewing response strategies is illustrated in Figure 5-1. The purpose of including this process in the OPEP is to ensure effective and efficient decision making into selecting response strategies which are suitable to the conditions at the location at the time of the spill event. Outputs from this process are captured through the spill response NEBA process.

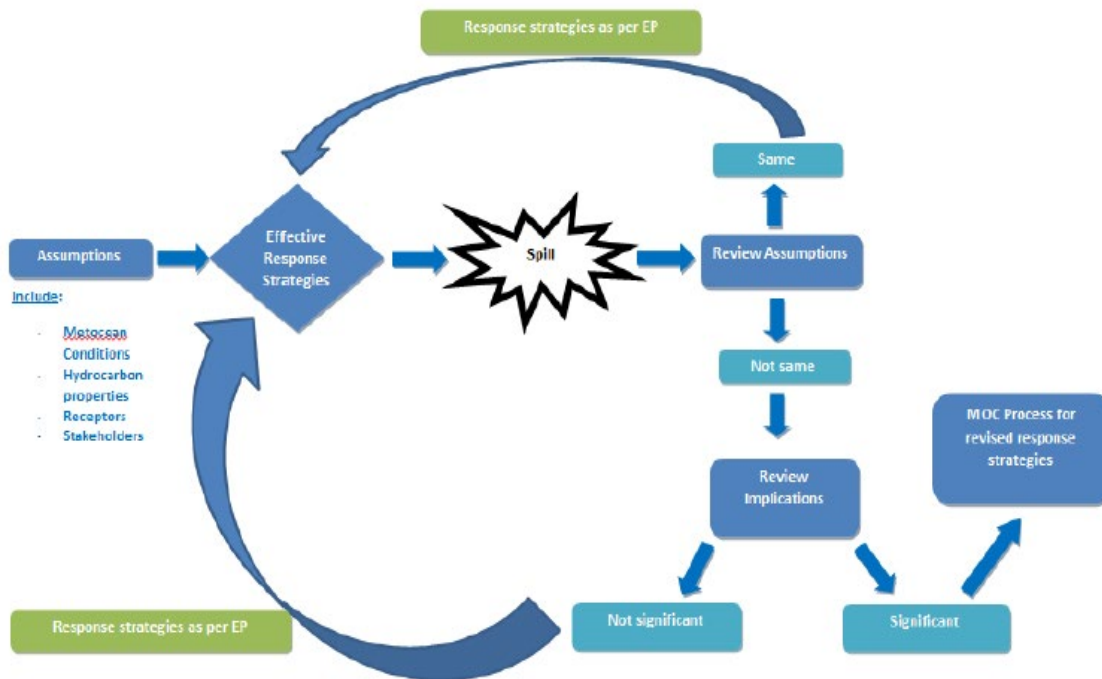


Figure 5-1: Process for Reviewing Response Strategy Effectiveness in the Event of a Spill

5.2 Spill Operational NEBA

A NEBA is used to compare the environmental and socio-economic benefits of implementing a response option against a 'do-nothing' (monitor and evaluate) strategy. The process considers the advantages and disadvantages of implementing a response to arrive at a response strategy for the location which results in the lowest overall environmental and socioeconomic impacts.

The NEBA process has been developed to help facilitate the selection of the most appropriate response options to effectively combat an oil spill.

Pre-spill (planning) NEBAs have been undertaken for locations within the respective asset response Environment that may be affected to identify response strategies which may offer a net benefit. In the

event of a spill, an operational NEBA will be completed to confirm net benefits based upon the spill volume, spill type, spill location, weather conditions, weathering and trajectory predictions (including any aerial surveillance output), and the sensitivities requiring protection.

If impacts to Victorian state waters or shorelines are predicted, or have occurred, an operational NEBA will be undertaken in consultation with the DTP Liaison Officer or Victorian Environmental and Scientific Coordinator to confirm the net benefits for the strategy.

To ensure consistency of approach between Cooper Energy and DTP with respect to NEBAs, Cooper Energy has adopted the Victorian NEBA protocol from Victorian Maritime Emergencies NSR subplan which is consistent with the pre-spill (planning) NEBA undertaken in Section 4. The Victorian Maritime Emergencies NSR subplan NEBA template is provided in Appendix 2.

When the operational NEBA is finalised, the IC must endorse the assessment. The NEBA must be used to develop the IAP for the spill incident.

Provided it is safe to do so, all accessible wildlife with welfare needs should be addressed DEECA, supported by the Titleholder, regardless of the NEBA.

5.3 Incident Action Plan

An IAP will be prepared at the time of the spill, outlining the short-term operational objectives and activities for the response. It will detail the response mechanisms and priority areas for protection based on the actual circumstances of the event, considering the spill trajectory and weather conditions, but also importantly safety considerations. The IAP will provide details of the operational activities and objectives to be achieved over a specified, short-term period. Initially this may be for the subsequent few hours only, but once the operation is underway it is likely to address the activities required over each of the following 24-hour periods or longer.

The main steps in planning the response and preparing the IAP are:

- setting the incident objectives – what are we trying to do or what are we trying to protect?
- describing the strategies – for example, deployment of planes for aerial surveillance
- developing the tactics – detail how we will undertake these strategies including responsibilities, logistics, etc.

An IAP is a critical step in the response strategy. It is the responsibility of the Planning Officer to prepare an IAP under the direction of the IC for his endorsement. The Cooper Energy oil spill IMT will implement and monitor the effectiveness of the IAP ensuring regular updates to the plan are made as appropriate.

To ensure that the IAP is appropriate for the nature of the spill, Cooper Energy will seek the advisory support of technical experts or liaison officers from DTP, DEECA (wildlife), AMSA and/or AMOSC.

An IAP template is included in Appendix 1.

5.4 Effectiveness Monitoring

During the incident response, the effectiveness of the response will be assessed using the NEBA process. This assessment must utilise predictive modelling results, received monitoring data in the context of the affected environment, the environmental conditions and the level of hydrocarbons released.

Initially this will be undertaken every 24 hours (as minimum) or when relevant new information is received, until the termination criteria have been met. The NEBA, in consultation with the DTP will be used to inform the decision to terminate the response (refer to Section 5.5).

Outcomes of the effectiveness monitoring will inform the IAP process.

5.5 Response Termination

Generally, the decision to stop the spill response will be made by the CA when response efforts are not returning any tangible benefit. This may include a gradual downsizing of response teams and resources or complete termination of the response. Cooper Energy will undertake a NEBA with the relevant response team members / liaison officers to inform the decision to terminate the response in line with the NEBA format used in formulating the spill response strategy.

Decision factors will include:

- the efficacy and benefit of the response options implemented against natural cleaning
- the significance of the environmental receptor impacted
- potential for environmental damage caused by further clean-up efforts weighed up against other factors such as response team risk in undertaking the activity
- any other requirements under national or state plans.

Table 5-1 provides indicative termination criteria which may be amended because of response team advice and/or the outcomes of relevant persons consultation during a spill event. Although indicative, it provides a guide for the purpose of capability planning.

For spill clean-up operations in Victorian waters, termination of response will be taken by the state IC.

The IC will ensure that all relevant organisations and personnel are notified to stand down once the termination criteria have been satisfied. Upon conclusion of the response, the IC must:

- inform all personnel involved in the response
- advise all government authorities involved in the response
- provide an incident brief internally and to all government authorities involved in the response
- instigate an investigation into the cause of the spill
- prepare reports and collate all documents including statements concerning the incident
- undertake an inventory of all consumables and prepare accounts for dissemination.

Table 5-1: Spill Response Termination Criteria

Response Option	Termination Criteria
Source Control (Vessel/subsea)	<p>Termination criteria varies according to the incident and spill level:</p> <ul style="list-style-type: none"> • for vessels: the spill source has been eliminated (e.g. fuel tank is secure [tank rupture]) or the leak has been contained and controlled on-board • for pipeline: the pipeline is verified as isolated from feedstock • for a subsea well leak incident: the hydrocarbon release has been contained and well control re-established.
Monitor and evaluate	<p>Termination occurs when the following criteria is fulfilled:</p> <ul style="list-style-type: none"> • the spill has ceased • the spill is no longer visible to human observers. Specifically, a silver/grey sheen as defined by the Bonn Agreement Oil Appearance Code is not observable and 24 hours has elapsed since the last confirmed observation of surface hydrocarbons • modelling results (OM1) do not predict surface exposures at visible levels. <p>Termination criteria to be agreed with DTP in state waters.</p>

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Response Option	Termination Criteria
Chemical dispersion	N/A
Contain and recover	N/A
Protect and deflect	<p>To be determined in consultation with State CA and aligned with the National Plan Response, Assessment and Termination Guidance (NP-GUI-025). Suggested termination criteria:</p> <ul style="list-style-type: none"> the spill is no longer observable to human observers and all oil has impacted shorelines and is unlikely to remobilise slick thickness and characteristics mean that protection/deflection booms will not be effective as determined by the NEBA NEBA concludes that continued activity will not produce any net environmental benefit. NEBA has been signed off by State CA IC.
Shoreline assessment and clean-up	<p>To be determined in consultation with State CA, and aligned with the National Plan Response, Assessment and Termination Guidance (NP-GUI-025). Suggested criteria:</p> <ul style="list-style-type: none"> the spill has ceased no additional response or clean-up of habitat is predicted location areas predicted to be contacted by hydrocarbons have been contacted independent scientific advice indicates that hydrocarbon levels are below 100 g/m² or further clean-up activities are unlikely to materially decrease hydrocarbon impacts on environmental sensitivities.
OWR	<p>To be determined in consultation with State CA and relevant State nominated oiled wildlife authority. Suggested criteria:</p> <ul style="list-style-type: none"> OWR is discontinued when all affected/recovered animals are cleaned and rehabilitated to their natural habitat as advised by the Lead CA.

6 Source Control

6.1 Response Activities

6.1.1 Vessel releases (level 1/2)

The performance outcome for vessel-related hydrocarbon releases is provided in Table 6-1.

Table 6-1: Source Control – Vessels (level 1/2 spills)

Spill Level	Environmental Performance Outcome	Control	Performance Standard	Measurement Criteria
1/2	Source control, isolation and containment prevent hydrocarbon release to the marine environment.	C5 Vessel SMPEP or equivalent	In a level 1/2 spill, the vessel implements SMPEP (or equivalent) to prevent/limit discharge to the environment.	Vessel incident report verifies action taken.

Level 1 Spill

Vessels engaged to undertake petroleum activities on Cooper Energy assets operate under SMPEPs (or equivalent to class). In the event of a spill the relevant vessel SMPEP (or equivalent) will be implemented to limit the volume of hydrocarbon released to the environment.

Level 2 Spill

In the event of a spill such as a diesel release from a vessel, the vessel master will initiate actions to reduce the fuel to the marine environment as identified in the vessel SMPEP (or equivalent according to class).

While preserving the structural integrity and stability of the vessel, actions include reducing the affected tank inventory by pumping contents into an empty tank, possibly pumping water into the leaking tank to create a water cushion to prevent cargo loss or other measures as listed in the vessel's SMPEP (or equivalent). By immediately implementing these controls the amount of hydrocarbon released to the environment will be reduced.

6.1.2 Subsea Loss of Containment – Infrastructure (level 1)

A subsea infrastructure LoC could occur because of dropped objects, corrosion and other damage, with a volume in the order of 1 m³.

On notification of an incident associated with a loss of containment resulting from loss of integrity or dropped object, the IC will assess damage and accessibility, and options to minimise the release; this may include plugging of release points.

6.1.3 Subsea Loss of Containment - Pipeline Releases (level 1/2)

Operation of the Otway and PB and Sole facilities is monitored on a 24/7 basis by the respective onshore gas plants (Figure 1-1 and Figure 1-2). The pipelines contain gas and condensate and in the event of a pipeline release due to an integrity breach a key strategy is the Facility Emergency Shutdown (ESD) system:

- individual well shutdown is initiated by the Master Control System in the event of a low-low pressure downstream of the production choke valve. This shutdown is independent of the Gas Plant and the Facility ESD system

- pipeline is continuously monitored from the onshore plant to ensure it is operating within its predefined operating envelope. Initiation of the pipeline ESD system will shut down production and isolate hydrocarbon inventories in the pipeline if abnormal conditions outside the normal operating envelope are detected
- surface controlled subsurface safety valves meet the acceptable leak rates defined by API RP 14B and ESD valves according to API RP 14H
- the ESD system is considered safety critical equipment under the respective Facility Safety Cases. Performance Standards developed for this equipment ensures it functions according to design standards.

6.1.4 Subsea Loss of Containment – Well leak (level 3)

On notification of an incident associated with a loss of well control, the Cooper Energy Duty Manager will notify the IC of the incident. The IC will activate the relevant SCERP and notify the Cooper Energy SCT Leader. Upon SCERP initiation, the SCT Leader will mobilise the Cooper Energy SCT and Well Control Contractors and collectively these resources will assess and determine the appropriate source control option based upon the available surveillance/survey information.

Options to manage well control incidents (intervention and relief well installation) are to be considered as a means for source control during the operations phase, with vessel and MODU specifications required to implement these source control options identified within the SCERP.

Details of source control response feasibility and estimated response time are detailed in the respective EP.

6.2 Response Resources

6.2.1 Source Control

Cooper Energy maintains contracts/agreements with specialist vendors to supply technical services and guidance for source control operations.

Well source control activities, including methodologies and resources to implement source control and limit the hydrocarbon released to the environment are detailed in a SCERP for the respective activity.

Table 6-2 details the planned resource availability as applicable to a drilling activity.

Table 6-2: Source Control Resource Availability (Drilling)

Resource	Resource Requirement	Resource Availability / Provider
Survey, Debris Clearance, Intervention		
Engineering support	Well and subsea engineering support services	Available throughout projects and operations.
Vessels	Installation support vessel with knuckle boom crane (nominal >50 tonnes for safe deployment of subsea equipment) and remotely operated vehicle (ROV) capacity (or ROV can be deployed from separate vessel).	Vessels of opportunity typically available either in the region or elsewhere within Australia and could be mobilised via Australian Petroleum Production & Exploration Association (APPEA) MoU or direct agreement.
Offshore Personnel	Vessel crew and response equipment technicians to install, run and monitor equipment.	Vessel crew provided through vessel operator. Equipment Technicians provided through response specialists. Equipment operator provided through source control contractor or separate offshore engineering contractor.

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Resource	Resource Requirement	Resource Availability / Provider
ROVs and ROV crew	Work Class ROV and crew 24 hours/day to install and operate subsea equipment.	Refer to 'Vessels'
Equipment	<p>Survey and debris clearance equipment:</p> <ul style="list-style-type: none"> • Camera inspection ROV operated • ROVs • Grinders / super grinders • Impact wrenches • Multipurpose cleaning tools • Remote control units • Hydraulic cutters • Chop saws • Diamond wire cutters • Hydraulic power units • ROV dredges • Torque tools • Test jig • Pressure control equipment intervention skid and operating equipment • Linear valve override tools • Manipulator knife • Flying lead orientation tool • Umbilicals 	Survey and debris clearance equipment could be mobilised from equipment providers such as AMOSC (subsea first response toolkit package within Australia), or Wild Well Control (international) subject to additional agreement for the particular package required at the time.
Relief Well		
Engineering Support	Well and subsea engineering support services	Available throughout projects and operations. For additional support, Cooper Energy maintains several contracts and agreements with personnel agencies and engineering houses that can provide technical writer's and risk engineering services to support regulatory documentation workflows, submission, and review process.
Relief Well MODU	Technically suitable rig and support vessels (nominally 2 x anchor handling and tow support vessels).	Multiple suitable semi-submersible MODUs generally operate offshore Australia or are available internationally; moored rigs would already be operating with anchor handling tug supply vessels. MoU has been established between Australian operators (including Cooper Energy) to expediate access to suitable MODUs for relief well drilling. If required Cooper Energy can request the use of a MODU that may be under contract to another operator.
Materials	Casing and Wellhead (standard specifications) Drilling fluids Mooring	<p>Multiple materials suppliers to Australia, to enable mobilisation of relief well materials to site inside 50-days of an incident requiring response activation.</p> <p>Multiple providers of drilling fluids with plants either operational or can be set-up in the Southeast region.</p> <p>Mobile Offshore Unit moorings or rental moorings.</p>
Offshore Personnel	Vessel crew and response equipment technicians to install, run and monitor equipment.	Vessel crew provided through vessel operator. Equipment Technicians provided through response specialists. Equipment operator provided through source control contractor or separate offshore engineering contractor.
ROVs and ROV crew	Work Class ROV and crew 24 hours/day to install and operate subsea equipment.	Refer to 'Vessels'

Resource	Resource Requirement	Resource Availability / Provider
Cooper Energy Relief Well Readiness Form	<p>The Cooper Energy Relief Well Readiness Form is a live document and supports source control preparedness by documenting current information on the availability and location of resources required to manage a LoC from a well, more specifically:</p> <ul style="list-style-type: none"> • available and suitable MODUs and contacts • available installation support vessel and contacts • available equipment* required to support a source control response and contacts. <p>*Tracked equipment includes wellhead systems, conductor, surface and intermediate casing.</p>	The Cooper Energy Relief Well Readiness Form is verified every 6-months during operations phase.
Regulatory Approvals		
Safety Case	Facility Safety Case Revision required for vessels undertaking well activities.	<p>Preferential selection of MODUs and vessels with existing Australian safety cases (monitored via the relief well readiness form).</p> <p>Safety case specialists available within Australia to enable expedition of Safety Case Revision preparation (technical limit to prepare estimated at three weeks + one week for prioritised regulatory approval).</p>
Additional resources		
Gas monitors	Existing vessel / rig gas monitoring; additional portable gas monitoring / portable gas monitoring as required.	Multiple providers.

6.3 Environmental Risk Assessment (Source Control)

An assessment of possible environmental impact and risk associated with source control techniques is undertaken as part of the Otway Offshore Operations EP (CHN-EN-EMP-0001).

6.4 Environmental Performance Outcomes (Source Control)

Table 6-3 provides the performance outcomes, standards and measurement criteria for source control.

Table 6-3: Source Control Performance Outcomes and Standards

Performance Outcome	Control	Environmental Performance Standard	Responsible person	Measurement Criteria
Cooper Energy maintains capability to implement the Source Control Emergency Response	C6 Source Control Emergency Response Planning	<p>A SCERP aligned to the APPEA Source Control Guideline will be available and will include (or be supplemented by):</p> <ul style="list-style-type: none"> • accepted WOMP and Field Safety Case which provide for source control activities • pre-identified quadrant(s) suitable for relief well locations covering all well clusters • nominal mooring analysis for drilling in field from moored MODU, where applicable. 	Chief Operating Officer	SCERP in place

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Performance Outcome	Control	Environmental Performance Standard	Responsible person	Measurement Criteria
	C7 Source Control Emergency Response Personnel	<p>Cooper Energy maintains:</p> <ul style="list-style-type: none"> resourcing plan to enable the implementation of source control strategies defined within the SCERP relevant to the activity scope. agreements or contractor pre-qualifications with specialist service providers, including: <ul style="list-style-type: none"> well control specialist (e.g. Wild Well Control) well engineering services providers Australian safety case expertise subsea engineering services ROV contractors. 	Chief Operating Officer	Contracts/ agreements demonstrate preparedness.
	C8 Source Control Emergency Response Equipment	<p>Cooper Energy maintains agreements or contractor pre-qualifications with service providers in line with the strategies and equipment defined within the campaign SCERP, including:</p> <ul style="list-style-type: none"> survey equipment debris clearance equipment intervention equipment industry MoU for access to relief well resources including relief well MODU. 	Chief Operating Officer	Contracts/ agreements demonstrate preparedness.
	C9 Source Control Response Resources Monitoring	<p>Cooper Energy monitors the location and availability of source control response resources and materials defined within the campaign SCERP, including:</p> <ul style="list-style-type: none"> available and suitable MODUs and contacts available construction support vessels and contacts available equipment* required to support a source control response and contacts. <p>*Tracked equipment includes wellhead systems, conductor, surface and intermediate casing strings.</p>	Chief Operating Officer	<p>Completed relief well readiness form (verified every 6-months during operations)</p> <p>SCERP response time model (RTMs) (reviewed annually, accounting for information received through the relief well readiness form)</p>
	C10 Source Control Response Logistics	<p>Cooper Energy maintains agreements or contractor pre-qualifications with the following specialists:</p> <ul style="list-style-type: none"> freight services provider. 	Chief Operating Officer	Contracts/ agreements demonstrate preparedness.
	C11 Source Control Response Exercises	Cooper Energy conducts source control desktop exercise in accordance with the activity SCERP.	Chief Operating Officer	Facilitated by third party with report issued in 30 days.
Implement Source Control Emergency Response	C12 Source Control Response	Applicable source control response resources are mobilised within the shortest practicable timeframe and within the timeframes identified by the SCERP RTM (refer to asset EP).	Cooper Energy IC	Incident log verifies field mobilisation

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Performance Outcome	Control	Environmental Performance Standard	Responsible person	Measurement Criteria
Plan to eliminate the release of hydrocarbons to the environment				within SCERP RTM timeframes.
No unacceptable risk chemicals used for activities described	C13 Chemical selection process	All planned chemical discharges shall be assessed and deemed acceptable before use, in accordance with Cooper Energy's Offshore Environment Chemical Assessment Process (COE-MS-RCP-0042).	IC	Chemicals will meet the requirements of the Cooper Energy Offshore Chemical Assessment Procedure

7 Monitor and Evaluate

Ongoing monitoring and evaluation of the oil spill is a key strategy and critical for maintaining situational awareness and to complement and support the success of other response activities. In some situations, monitoring and evaluation may be the primary response strategy where the spill volume/risk reduction through dispersion and weathering processes is considered the most appropriate response. Monitor and evaluate will apply to all marine spills identified. Higher levels of surveillance such as vessel/aerial surveillance, OSTM and deployment of satellite tracking drifter buoys will only be undertaken for level 2/3 spills given the nature and scale of the spill risk.

It is the responsibility of the CA to undertake monitoring and evaluation during the spill event to inform the response and assess the impacts.

7.1 Response Activities

Monitoring and evaluation will include the following:

- spill size estimation:
 - information regarding the incident (volumes, inventory etc.)
 - aerial and vessel observations.
- spill movement and behaviour:
 - aerial and vessel observations
 - utilisation of satellite tracking drifter buoys.
- spill trajectory prediction:
 - OSTM
 - vector analysis (manual calculation)
 - ADIOS (a spill weathering model).

Refer to activity-specific EPs for the evaluation of potential impacts and risk and as low as reasonably practicable (ALARP) evaluation associated monitoring and evaluation strategies.

7.1.1 Spill Size Estimation

The spill size may be determined based on:

- the estimated amount of hydrocarbon released from a ‘known’ hydrocarbon inventory
- an estimate of release rates from time of the commencement of the incident
- an estimate of the appearance of oil on the sea surface observed during visual observations and based on the likely thickness and type of oil (refer to Table 7-1 and Figure 7-1).

Table 7-1: Guidelines for Estimating Spill Volume

Code	Description of Appearance	Approximate Thickness (µm)	Approximate litres per km ²
1	Sheen	0.04 to 0.30	40-300
2	Rainbow	0.3 to 5.0	300-5,000
3	Metallic	5.0 to 50	5,000-50,000

Code	Description of Appearance	Approximate Thickness (μm)	Approximate litres per km^2
4	Discontinuous true oil colour (heavy oil)	50 to 200	50,000 – 200,000
5	Continuous true colour (heavy oil)	>200	>200,000
Other	Mousse or Emulsion		

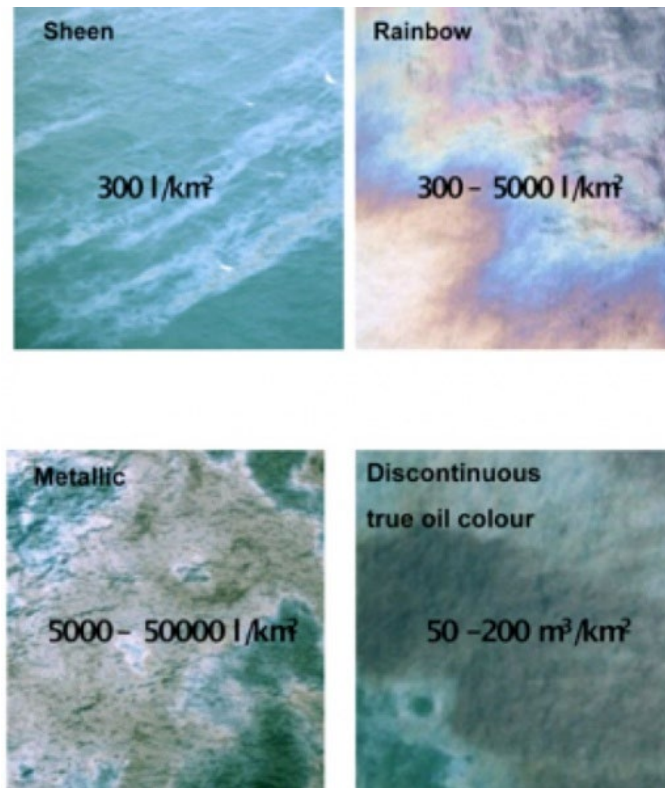


Figure 7-1: Bonn Agreement Oil Appearance Code (Examples)

7.1.2 Spill Movement and Behaviour Monitoring

The movement and behaviour of an oil slick may be monitored through several methods:

- aerial and/or vessel based visual observations
- tracking buoys.

The resources required for this strategy are summarised in Table 7-2 with the corresponding performance outcomes, standard and measurement criteria presented in Table 7-3.

7.1.2.1 Visual Observation - Aerial Surveillance

To gain situational awareness and inform the spill response, observation can be carried out via aerial surveillance.

Trained aerial observers are available and sourced through AMOSC (staff/core group members) and AMSA (NRT Members). The observers will undertake observations over the spill location and any predicted areas of shoreline contact.

From aerial observations, coarse estimates of spill volume can be made based on its appearance at sea, using the area covered and colour of spill (Table 7-1). Examples of appearance are provided in Figure 7-1. AMSA also provides guidance called 'Identification of Oil on Water – Aerial Observation and Identification Guide' which can be found at: <https://www.amsa.gov.au/sites/default/files/2014-01-mp-amsa22-identification-oil-on-water.pdf>

Aerial surveillance observations can only be undertaken in weather conditions deemed safe by the IMT and in good visibility conditions (i.e. 150 ft above ground level (AGL) for the Ceiling & 5,000 m Visibility or 1,500 ft AGL Ceiling & 1,500 m Visibility during daylight hours).

Aerial observations should be documented in the Aerial Observer log contained in the Offshore Victoria OSMP Module OP2 – Hydrocarbon Spill Surveillance and Tracking (VIC-ER-EMP-0005).

7.1.2.2 Visual Monitoring – Vessel Surveillance

Monitoring and evaluation may involve visual monitoring from vessels of opportunity (as available) immediately following a spill incident. For level 2/3 spills, visual observations may also be undertaken from specially chartered vessels, proposed to be onsite within 24 hours.

Spill observers may include project team members, vessel crew and in the event of a level 2/3 spill, AMOSC staff/core group members and/or AMSA NRT members.

Vessel-based observations are only effective if the sea-state conditions are calm.

7.1.2.3 Satellite Tracking Drifter Buoys

Vessels associated with Cooper Energy's activities may carry a satellite tracking drifter buoy for deployment in the event of a significant spill. Instructions are provided for the deployment of the buoy to the vessel master.

At the time of a level 2/3 spill, the drifter buoy will be activated and deployed overboard to allow for real-time satellite tracking of the spill direction and speed. The location of the buoy will be monitored in real-time and through regular data downloads.

Satellite tracking buoys currently in use by Cooper Energy have an operating life/endurance which is determined by the reporting frequency. The default endurance is 30 days based on 30-minute reporting frequency. However, this could be extended out to 365 days endurance for a reporting frequency of 24 hours.

7.1.3 Spill Trajectory Prediction

Spill trajectory can be predicted using either:

- vector calculations
- trajectory modelling
- fate predictions.

7.1.3.1 Vector Calculations

Manual calculations can commence as soon as the preliminary information on the spill is known. For spills in close proximity to shore and where oil spill tracking buoys are utilised, this method may provide the best option for predicting the likely spill trajectory and timeframes before receptors are impacted.

Prior to commencing the calculation, wind and current data is required. This can be obtained via:

- for currents, Oil Spill Tracking Buoy
- for winds, Bureau of Meteorology (BOM) Meteye (<http://www.bom.gov.au/australia/meteye>).

The calculation is based on the spill moving 100% of the current vector and 3% of the wind vector, as shown in Figure 7-2.

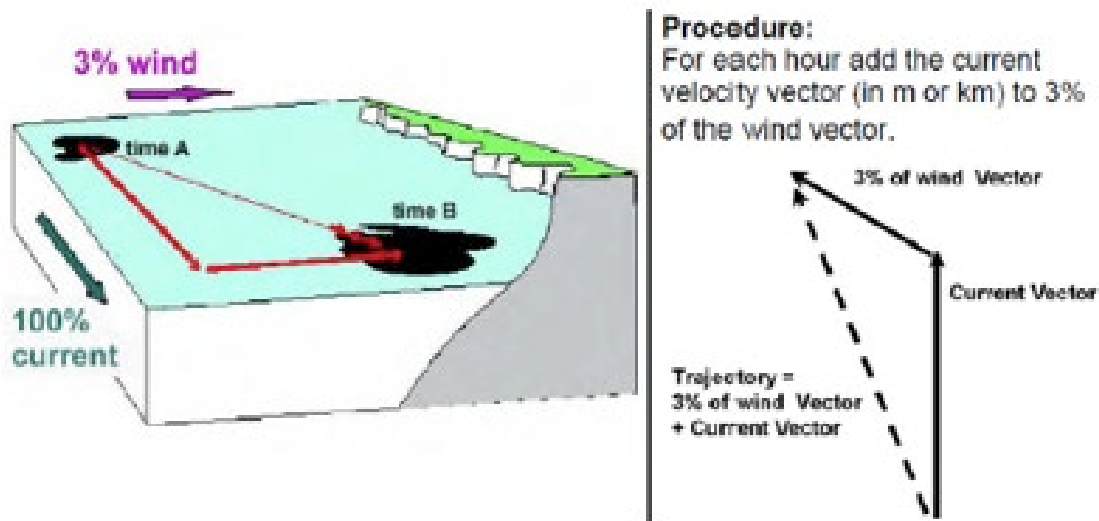


Figure 7-2: Spill Vectoring Overview (AMSA Oil Spill Monitoring Handbook)

7.1.3.2 Oil Spill Trajectory Modelling

The movement of a hydrocarbon slick can be estimated in real time using computerised OSTM available from RPS. Cooper Energy can utilise an AMOSC agreement with RPS to provide real-time modelling of an actual spill event. RPS have previously been utilised to undertake predictive modelling to support the preparation of the asset EPs and this OPEP.

To predict the early movement of larger spills, RPS will undertake real-time OSTM. Preliminary modelling results are generally available within 4 hours following notification of a spill event. RPS are contracted to AMOSC in a 24/7 emergency capability.

For smaller spills closer to shore Cooper Energy may elect not to undertake trajectory modelling due to the limitations of using the model near shore with such small volumes. Satellite tracking drifter buoys together with aerial observations and shoreline assessment may be used to ground truth the spill location.

During the spill, RPS will utilise all available information from operational surveillance monitoring and from satellite imagery (as available) to validate hydrodynamic forecasts.

7.1.3.3 Spill Fate Prediction

The ADIOS can be used to provide weathering predictions of hydrocarbon types for spill volumes at different wind speeds and water temperatures. This computer-based oil spill response tool is available to download from <http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/response-tools/downloading-installing-and-running-adios.html>

7.1.4 Oil Spill Operational Monitoring

Based on the outcomes of the monitoring of spill characteristics, trajectory and behaviour and prediction of likely trajectory and fate of the spill, operational monitoring will be undertaken as per the OSMP.

7.2 Response Resources

Table 7-2 details the resources required to undertake monitor and evaluate activities in accordance with the identified required resources above, their availability and hence Cooper Energy's capability to support a 'monitor and evaluate' response.

Table 7-2: Monitor and Evaluate Resource Capability

Resource	Resource Requirement	Resource Availability	Comments
Satellite Tracking Buoys	1 x Satellite Tracking Buoy offshore	Buoys available from AMOSC or Worley Parsons.	Satellite Tracking Buoy will be located offshore and ready for deployment for the duration of the campaign. Operating instructions which accompany buoy rental will be provided to contracting vessel prior to mobilisation with instruction to deploy from vessel in the event of a significant spill event.
OSTM	Access to RPS via contract to initiate callout on a 24/7 basis.	AMOSC contract with RPS for immediate call-out.	AMOSC membership allows access to RPS contract which provides for Oil Spill Model and Response System results to be provided within two hours and Spill Impact Mapping model system results within four hours of activation. <i>AMOSC Service Level Statement confirms access to RPS Trajectory Modelling within 60 minutes.</i>
Manual Trajectory Calculation	1 x IMT Member (IMO2)	IMT Planning Officer (or equivalent).	Resources available within Cooper Energy.
	Current and Wind Data	BOM "Meteye" Service.	Wind data available online. Current data obtained from satellite tracking buoy.
Satellite Imagery	Access to Kongsberg Satellite (KSAT) Satellite imagery via contract to initiate callout on a 24/7 basis.	AMOSC contract with KSAT Services for immediate call-out.	AMOSC membership allows access to Kongsberg contract which provides access to KSAT Satellite Imagery within 60 minutes of notification. <i>Imagery to be determined at the time of request will dictate supply timeframes depending on satellite availability.</i>
Aerial/Vessel Surveillance	1 x Pilot/Aircraft	Pre-qualification with Offshore Services Australasia (formerly Warrnambool Babcock).	Supplier has identified that surplus aircraft are usually available and can be supplied within 24 hours.

Resource	Resource Requirement	Resource Availability	Comments
	1 x aerial observer	Trained observers via AMOSC.	Available on site – best endeavours eight personnel within three hours and guaranteed terrestrially in 12 hours (AMOSC Service Level Agreement). AMOSC has five trained observers and AMOSC Core Group have four trained members available within 24-48 hours. <i>AMOSC Service Level Statement confirms AMOSC Core Group activation – within one hour of initial activation.</i>
	1 x vessels	Vessel contract with Undersea Marine Pty Ltd.	Cooper Energy maintains an agreement with a Marine Services provider to provide vessels and can be supplied within 24 hours.

7.3 Environmental Risk Assessment (Monitor and Evaluate)

An assessment of possible environmental impact and risk associated with operational monitoring has been undertaken as part of the EPs for the Cooper Energy assets.

7.4 Environmental Performance Outcomes (Monitor and Evaluate)

Table 7-3 identifies monitoring and evaluation strategy outcomes, performance standards and measurement criteria. Cooper Energy oil spill IC (or delegate) will ensure the activity control measures identified below are implemented.

Table 7-3: Monitor and Evaluate Performance Outcomes and Standards

Performance Outcome	Control	Performance standard	Responsible person	Measurement Criteria
Cooper Energy maintains capability to implement operational monitoring in a level 2/3 spill event.	C14: Service Agreements Monitor & Evaluate	Cooper Energy maintains the following agreements (or contractor pre-qualifications) to maintain operational response capabilities: <ul style="list-style-type: none"> AMOSC membership (Aerial Observers, RPS Contract, Kongsberg Contract) aviation support (pre-qualification assessment) marine support services. 	Chief Operating Officer	Contracts, memberships and pre-qualification records are current.
	C15: Oil Spill Tracking Buoy	An oil spill tracking buoy and instructions for deployment will be located offshore at all times during vessel-based campaigns.	Chief Operating Officer	Equipment manifest (or equivalent evidence) verifies tracking buoy is available on-board / offshore.
As requested by the relevant CA Cooper Energy implements operational monitoring to inform spill	C16: Response Aerial Observation	Operational monitoring is initiated during daylight hours within 24 hours for aircraft observation. Observation to be undertaken in accordance with OSMP OP2 (Hydrocarbon Spill Surveillance and Tracking).	Cooper Energy IC	Spill response log notes that aircraft are deployed within 24 hours of spill (or nearest daylight hours immediately post 24 hours). Completed Aerial Observation Logs (as per OSMP OP2) emailed to Cooper Energy IMT.

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Performance Outcome	Control	Performance standard	Responsible person	Measurement Criteria
response (level 2/3 spill only).	C17: Response – Vessel Observation	Operational monitoring from campaign vessels already in-field is initiated immediately (within 2 hours). Observation to be undertaken in accordance with OSMP OP2 (Hydrocarbon Spill Surveillance and Tracking).	Cooper Energy IC	Spill response log notes that in-field vessels are deployed within 2 hours of spill. Completed Observation Logs (as per OSMP OP2) emailed to Cooper Energy IMT.
	C18: OSTM	RPS provides OSTM results within four hours of spill notification in accordance with OSMP OP1 (Operational Forecast Modelling).	Cooper Energy IC	Incident records verify operational monitoring timeframes are met.
	C19: Response – Oil Spill Vector Calculation	Manual vector calculations identify spill impact areas within two hours of spill incident notification.	Cooper Energy IC	Spill response log verifies manual trajectory calculation is provided within two hours of spill notification.
No injuries or death of megafauna resulting from vessel strike within operational area	C20: Prevention of Marine Fauna Collision	Vessel masters will be briefed on caution and 'no approach zones' and interaction management actions as defined in the EPBC Regulations 2000 – Part 8 Division 8.1 and Victorian Wildlife (Marine Mammals) Regulations 2019.	HSE Advisor	Training records confirm vessel masters have been briefed.
		A vessel master (or delegate) will be on duty at all times.	Vessel Master	Bridge watch records confirm vessel master (or delegate) on duty at all times.
		Vessels adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and Victorian Wildlife (Marine Mammals) Regulations 2019.	Vessel Master	Daily operations reports note when cetaceans were sighted in the caution zone and if actions were implemented.
		All vessel crew have completed an environmental induction covering the requirements for marine mammal/vessel interaction consistent with EPBC Regulations 2000 (Chapter 8) and Victorian Wildlife (Marine Mammals) Regulations 2019. This includes a requirement to notify the bridge if marine mammals are sighted in the caution zone.	HSE Advisor	Induction records verify that all vessel crew have completed an environmental induction.
		Trained crew members on active duty will report observations of megafauna located within the cautionary zone (as defined in The Australian Guidelines for Whale and Dolphin Watching) to the vessel master (or their delegate), as soon as it is safe to do so.	Vessel Master	Daily vessel reports note when cetaceans were sighted in the caution zone and if interaction management actions were implemented.
		Surveillance aircraft will ensure buffer distances of 500 m (helicopters) and 300 m (fixed wing) are maintained to whales and dolphins.	Pilots	Flight reports detail when cetaceans sighted and if buffer distances breached.
Injury or death to listed megafauna from vessel strike will be reported	C21: Incident reporting	Any injury to, or mortality of, an EPBC Act Listed Threatened or Migratory Species (including those from a vessel strike) will be recorded on the National Ship Strike database within 72 hours.	Vessel Master	Submission date on the National Ship Strike Database reporting within 72 hours of the incident.

8 Shoreline Response: Protect & Deflect

8.1 Response Activities

Booms and skimmers deployed to protect or deflect oil from environmental sensitivities. Noting that the effectiveness of boom operation is dependent on current, wave and wind conditions.

The methods to be used in the response have been proposed for the priority protection areas. These, where applicable, are detailed in the respective TRPs, but options may include:

- installation of a boom system to collect surface oils on incoming tidal events
- placement of a temporary sand barrier/berm across the inlet mouth if the prevailing flow regime (channel width, depth, and flow) is suitable.

8.2 Response Resources

Response resources would be activated via AMOSC in the first instance, with equipment and resources selected on the basis of the TRP activation and subsequent IAPs. AMOSC has undertaken an assessment of response resource needs for this strategy and have determined how these needs will be met.

Protection and deflection equipment and personnel will be accessed from multiple locations, including:

- AMOSC Geelong equipment stockpile. A selection of boom/skimmer types will be mobilised with the equipment to be deployed at the location selected based upon the environmental conditions on the day.
- AMOSPlan Industry Mutual Aid stockpile (Esso Australia) located at Longford and Barry Beach Marine Terminal. This equipment may be deployed in addition to the AMOSC equipment due to its closer proximity.
- Gippsland Ports Authority (located at Lakes Entrance) also has boom available, to protect estuary systems. This is the property of DTP and Gippsland Ports, as port authority for the Snowy River would provide a first-strike response in the port. In the event of a rapid response to an oil spill threat, the IC (or delegate) would liaise with DTP and Gippsland Ports for deployment of this equipment.
- port Authority of NSW maintains its own stockpile of level 2/3 equipment which is stored at its level 1 equipment locations in Sydney and Newcastle. Oil companies also own a quantity of oil spill response equipment which is stored on their individual premises.

Equipment details are provided in Table 8-1. The timing and resources required were identified based on the Otway scenarios, representing the minimum time for shoreline concentration (>50 g/m²) to occur, which is ~24 hours.

Table 8-1: Protection and Deflection Response Resource List

Resource	Resource Requirement	Resource Availability	Comments
Trained oil spill response personnel	2 x boom deployment personnel 2 x skimmer and recovery personnel	Trained personnel available from AMOSC/AMOSPlan Core Group	As part of AMOSC's Service Level Agreement on a best endeavour's basis, 8 AMOSC personnel can be deployed to site within 12 hours. AMOSPlan Core Group are IMO trained for field deployment of spill equipment and are available on an 'as soon as practicable' basis. 25-30 personnel from this group would be

Resource	Resource Requirement	Resource Availability	Comments
			available within 24-48 hours. These personnel are available through Cooper Energy's membership with AMOSC.
Boom and ancillary equipment	200 m x zoom boom 200 m beach guardian boom 4 x anchor kits (including ropes and floats)	AMOSC Equipment Supply	Loading of equipment would be expected within 12-24 hours. Transit time to Peterborough or Lakes Entrance (for example) from Geelong is ~3 – 5 hours. Boom deployment timeframes for a significant offshore MDO spill should meet the predicted shortest time to shore of 24-48 hours, however it is unlikely that boom deployment could occur within short timeframes involved in instantaneous releases nearshore such as pipeline rupture. Such a scenario could result in relatively small volumes / sheens of low persistence condensate ashore before physical intervention is possible.
Boom Deployment Vessel	1 x Zodiac & Trailer 1 x Coxswain	AMOSC Equipment supply Cooper Energy Marine Services Provider	Contractor is available on a 7-day basis to assist with Boom Deployment Vessel. As above resource availability is expected to meet boom deployment timeframes (24-48 hours).
Boom Deployment Vessel (Contingency)	1 x Vessel (Dinghy 30 HP Trailable)	VIC DTP (Williamstown)	Equipment may be made available on request to VIC DTP.
Skimmer and ancillary Equipment	1 x Multi-head Caradynne Skimmer 1 x Lamor Powerpack 1 x Hose reel	AMOSC Equipment Supply	All equipment can be placed on the back of a Utility and can be carried by personnel. Does not need mechanical equipment to transfer. Availability is expected to meet boom deployment timeframes (24-48 hours).
Temporary Water Storage	2 x Fastank 1 x Transfer Pump and Hose	AMOSC equipment Supplies	Contractor is available on a 7-day basis to assist with water storage. Availability is expected to meet the predicted shortest time to shore of 24 hours but within 48h.
Waste Management Contractor	Waste Management Provider	Cooper Energy has contract with waste management provider in Victoria	Contractor is available on a 7-day basis to assist with emergency waste management issues.
Mechanical Equipment	1 x Mini-Excavator & Driver	Coates Hire (Warrnambool)	Equipment and operator available onsite within 5 hours. Coates Hire has 24/7 call-out and can supply a driver to Peterborough.

8.3 Environmental Risk Assessment (Protect & Deflect)

An assessment of possible environmental impact and risk associated with protect and deflect activities has been undertaken as part of the EPs preparation for the Cooper Energy assets.

8.4 Environmental Performance Outcomes (Protect & Deflect)

Table 8-2 provides the performance outcomes, standards and measurement criteria for the “protect and deflect” response option. The IC (or delegate) will ensure the activity control measures identified below are implemented.

Table 8-2: Protect and Deflect – Performance Outcomes and Standards

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Performance Outcome	Control	Performance standard	Responsible person	Measurement Criteria
Tactical response planning undertaken for priority protection sites	C22 TRPs	TRPs exist for priority protection areas identified in Section 4.4.2 prior to undertaking activities that have the potential to impact these locations.	Chief Operating Officer	TRPs developed prior to petroleum activities that could impact priority protection areas identified in Section 4.4.2.
Cooper Energy maintains capability to implement protect and deflect in a level 2 or 3 spill event.	C23 Service Agreements Protect & Deflect	Cooper Energy maintains the following agreements to maintain shoreline assessment/protect and deflect capabilities: <ul style="list-style-type: none"> • AMOSC membership (equipment, personnel, CORE Group. Mutual aid) • AMOS Plan Industry Mutual aid (equipment) • AMSA support obligations under the National Plan (equipment, personnel) • scientific resource support agreement • marine support services • vessel of Opportunity listing • waste management contract. 	Chief Operating Officer	Agreements/memberships are current. NatPlan
Cooper Energy implements or supplies resources for shoreline protection and deflection (level 2 or 3 spill), appropriate to the nature and scale of predicted shoreline impacts.	C24 Shoreline Assessment – Resource Deployment	SCAT teams deployed and available onsite within 24 hours of spill event (daylight hours permitting) in consultation with the State CA. SCAT information provided to the Planning function of the IMT for NEBA preparation, which will form part of the IAP.	Cooper Energy Incident Controller	Incident management records verify that SCAT teams are deployed to site within the designated timeframe.
	C25 Operational NEBA	An operational NEBA is undertaken to determine net benefits with State CA to confirm implementation of the response strategy.	Cooper Energy Incident Controller	Operational NEBA is available, approved and was undertaken prior to shoreline protect and deflect.
Impacts to cultural heritage and social values are prevented	C26 Consultation with Traditional owners	In consultation with State CA, engage with Traditional Owners to facilitate site surveys and tagging out and protection of identified areas or importance.	Cooper Energy Incident Controller	Incident records verify consultation has occurred and controls implemented.
	C27 Land and Waterway Manager Consultation	In conjunction with State CA, consultation is undertaken with land and waterway manager prior to deployment of equipment to establish recreational user controls along affected coastline.	Cooper Energy Incident Controller	Incident records verify consultation has occurred and controls implemented.
Impacts to native vegetation and fauna are prevented.	C28 Site survey for critical habitat	Surveys are undertaken to identify, mark out and protect nesting and critical habitat. Existing tracks and paths are used where possible to minimise disturbance footprint.	Cooper Energy Incident Controller	Incident records verify surveys have occurred and controls implemented.

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Performance Outcome	Control	Performance standard	Responsible person	Measurement Criteria
	C29 Trained Fauna Handlers	Only trained and accredited teams deployed by the Lead Agency for oiled wildlife will approach and handle fauna.	Cooper Energy Incident Controller (as directed by the Lead Agency)	Shoreline induction reinforces this constraint. Induction records.

9 Shoreline Response: Clean-up

Shorelines in the Gippsland region are predominantly sand with rocky inter-tidal platforms and headlands. Shorelines associated with the Otway region are predominantly shore platforms backed by cliffs with small sections of interspersed sand beaches.

Based on modelling of the spill scenarios associated with the operation of Cooper Energy assets, the potential hydrocarbon exposure to shorelines from a hydrocarbon release is limited to less than 105 m³ (peak volume ashore).

As per Section 2.2, a State IMT would be established in response to a level 2/3 spill, actionable shoreline oil contact (>100 g/m²) is predicted to impact only Victorian coastline. As such, the CA would be DTP for managing shoreline response and/or at-sea response within State waters. Cooper Energy will remain actively engaged in the response until stood down by the DTP IC and will place a Cooper Energy liaison Coordinator within the state IMT. Cooper Energy remains responsible for managing the origin of the spill outside Victorian coastal waters.

DTP will place a Liaison Officer within the IMT to act as the interface with other State government agencies and to ensure ongoing consultation and coordination of Maritime Emergencies resources.

9.1 Response Activities

9.1.1 Shoreline Assessment

Cooper Energy will support shoreline assessment and/or clean-up activities as directed by DTP.

If spill residues are predicted to reach the shoreline or aerial observations show oil has reached the shoreline, an assessment of the area will be undertaken using SCAT.

SCAT execution is described in Appendix 4.

9.1.2 Shoreline Clean-up

If oil is observed on the shoreline a NEBA will be prepared in consultation with DTP to determine whether a clean-up response will be implemented.

Based upon predictions of hydrocarbons fate and behaviour for PB and Sole scenarios, clean-up response would involve the manual removal of minimal amounts of weathered MDO from exposed sandy shorelines. No mechanical removal would be required; however, mechanical washing may be a suitable option for diesel residues where machinery access to the beach is possible.

Based upon predictions of hydrocarbons fate and behaviour for Otway scenarios, clean-up response would involve the manual removal of actionable (>100 g/m²) and weathered condensate and MDO on shorelines. Mechanical washing may be a suitable option for hydrocarbon residues where machinery access to the beach is possible.

To understand the response equipment and personnel associated with shoreline clean-up response, Cooper Energy identified the quantity and type of equipment and personnel required for a single response team (Table 9-1). This information is based upon the assumption that each manual clean-up team has the treatment capacity of 10 m³ per day (based upon a single person collecting 1 m³ per day); and each mechanical collection team had a treatment capacity of 2.4 m³ per hour (based upon bucket size of 0.04 m³ and a single excavation per minute).

Table 9-1: Single Shoreline Clean-up Team Equipment and Personnel Requirements

Equipment/personnel	Requirements
Manual clean-up	
Support personnel	10
Team supervisor	1
Waste storage (per team)	10 m ³ per day
Mechanical collection	
Equipment (single excavator/machine)	1
Operator	1
Waste storage (per team)	25 m ³ per day

Cooper Energy identified the estimated waste types associated with shoreline clean-up response techniques to provide a conservative indication as to the level of waste that may be required to be managed during a response. Based upon a bulking factor of 10 m³ per day for each 'shoreline clean-up team', Cooper Energy has estimated that the volume of waste that may need to be managed could be up to 1,050 m³ based on spill modelling suggesting maximum volume of hydrocarbons ashore is less than 105 m³ and volume of collected oil based on multiplying by a factor of ten (AMSA 2017).

9.1.3 Laboratory Analysis

SCAT resources will obtain samples of any oil on shorelines and send to a National Association of Testing Authorities accredited laboratory for the analysis of hydrocarbon properties (including Benzene, Toluene, Ethyl-benzene, Xylene and Poly-aromatic hydrocarbons) and the physical properties of the oil (including wax content).

9.2 Response Resources

The number and tasks of personnel will vary according to the quantity of spill debris, its rate of delivery to the site and the disposal method chosen. Response resources would be activated via AMOSC in the first instance, with equipment and resources selected based on the TRP activation and subsequent IAPs. Table 9-2 details the resources required to undertake shoreline clean-up activities and their availability to support a 'shoreline clean-up' response.

Table 9-2: Shoreline Assessment and Clean-up Resource Requirements and Capability

Resource	Resource Requirement	Resource Availability	Comments
Shoreline Assessment			
Trained SCAT Crew	2 x Teams Shoreline Assessment Specialists: 1 x wildlife specialist 1 x marine specialist 1 x oil spill specialist	AMOSC/AMOSC Core Group Additional resources from OSMP support group (e.g. GHS), VIC DTP or AMSA National Response Support Team.	As part of AMOSC's Service Level Agreement on a best endeavour's basis, 8 AMOSC personnel can be deployed to site within 12 hours. AMOSPlan Core Group are IMO trained for field deployment of spill equipment and are available on an 'as soon as practicable' basis. 25-30 personnel from this group would be available within 24-48 hours. These personnel are available through Cooper Energy's membership with AMOSC. Cooper Energy contract for scientific specialists allows for deployment to field within 24 hours of notification.

Resource	Resource Requirement	Resource Availability	Comments
Shoreline Clean-up			
Shoreline Clean-up Team Leaders	2 x trained shoreline team leaders (2 teams provided)	AMOSC AMOSC Core Group.	Resourcing as above for SCAT crew deployment.
Shoreline Clean-up Responders	20 persons (2 teams)	AMOSC AMOSC Core Group.	Resourcing as above for SCAT crew deployment.
Waste Management Support Services	Waste Management Contractor	Cooper Energy has contract with waste management provider in Victoria.	Cooper Energy waste contracts to support waste disposal from shoreline clean-up activities.
Beach Clean-up Kit/Trailer	1 x Beach Clean-up Kit (Geelong)	AMOSC.	AMOSC deployment and arrival at site expected within 12 hours.
	2 x Beach Clean-up Kits (Williamstown North) 1 x Beach Clean-up Kit (Port Fairy)	VIC DTP Port of Portland.	Access to equipment via VIC DTP and Port of Portland.
Decontamination Kit	1 x Decontamination Kit (Geelong)	AMOSC.	AMOSC deployment and arrival at site expected within 12 hours.
	1 x Decontamination Kit (Williamstown North) 1 x Decontamination Kit (Portland)	VIC DTP Port of Portland.	Access to equipment via VIC DTP and Port of Portland.
Waste Bags	20 L Plastic Bags	AMOSC.	AMOSC deployment and arrival at site expected within 12 hours.
Mechanical Equipment (surf washing)	Mini-excavators	Third Party Equipment Hire (e.g. Coates Hire) or local excavation Contractors.	Availability of equipment within 5 hours.

9.3 Environmental Risk Assessment (Shoreline Clean-up)

An assessment of possible environmental impact and risk associated with shoreline assessment and clean-up activities has been undertaken as part of the EPs collation for the Cooper Energy assets.

9.4 Environmental Performance Outcomes (Shoreline Clean-up)

Table 9-3 provides the performance outcomes, standards and measurement criteria for shoreline clean-up. The IC will ensure the control measures identified below are implemented.

Table 9-3: Shoreline Response – Performance Outcomes and Standards

Environmental Performance Outcome	Control	Environmental Performance standard	Responsible person	Measurement Criteria
Cooper Energy maintains capability to implement SCAT and shoreline clean-up in a level 2/3 spill event.	C30 Service Agreements Shoreline Clean-up	Cooper Energy maintains the following agreements to maintain shoreline assessment/clean-up response capabilities: <ul style="list-style-type: none"> AMOSC membership (equipment, personnel, Core Group. Mutual aid). 	Chief Operating Officer	Agreements/memberships are current.

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Environmental Performance Outcome	Control	Environmental Performance standard	Responsible person	Measurement Criteria
		<ul style="list-style-type: none"> • AMOSPlan Industry Mutual aid (equipment) • scientific resource support agreement • waste management contract • labour hire provider. 		
Cooper Energy implements or supplies resources for shoreline assessment and clean-up (level 2/3 spill), appropriate to the nature and scale of predicted shoreline impacts.	C31 Shoreline Assessment – Resource Deployment	SCAT teams deployed and available onsite within 12 hours of spill event (daylight hours permitting) in consultation with the DTP. Note: SCAT information will be provided to Planning function of the IMT for NEBA preparation, which will form part of the IAP.	Cooper Energy IC	Incident management records verify that SCAT teams are deployed to site within the designated timeframe.
	C25 Operational NEBA	An operational NEBA is undertaken to determine net benefits with DTP to confirm implementation of the response strategy.	Cooper Energy IC	Operational NEBA is available, approved and was undertaken prior to shoreline clean-up.
Impacts to cultural heritage and social values are prevented	C26 Consultation with Traditional owners	In consultation with State CA, engage with Traditional Owners to facilitate site surveys and tagging out and protection of identified areas or importance.	Cooper Energy IC	Incident records verify consultation has occurred and controls implemented.
	C27 Land and Waterway Manager Consultation	In conjunction with DTP, consultation is undertaken with land and waterway manager prior to deployment of equipment to establish recreational user controls along affected coastline.	Cooper Energy IC	Incident records verify consultation has occurred and controls implemented.
Impacts to native vegetation and fauna are prevented.	C28 Site survey for critical habitat	Surveys are undertaken to identify, mark out and protect nesting and critical habitat. Existing tracks and paths are used where possible to minimise disturbance footprint.	Cooper Energy IC	Incident records verify surveys have occurred and controls implemented.
	C29 Trained Fauna Handlers	Only trained and accredited teams deployed by the Lead Agency for oiled wildlife will approach and handle fauna.	Site Representative	Shoreline induction reinforces this constraint. Induction records.

10 Oiled Wildlife Response

10.1 Wildlife Sensitivities

Based upon the environmental sensitivities present in the NEBA assessment (Appendix 2) and the asset EPs, fauna which may be affected by hydrocarbon residues include seabirds, shorebirds, pinnipeds and whales. The potential for hydrocarbon impact to these species is detailed in respective asset EPs.

10.2 Notification and Response Arrangements

Each State has a dedicated agency responsible for responding to wildlife affected by a marine pollution emergency in State waters. If a small incident which affects wildlife occurs in Commonwealth waters, AMSA may request support from relevant State agency to assess and lead a response if required. State agency response to oiled wildlife is undertaken in accordance with the State specific Wildlife Response Plan (or equivalent).

Cooper Energy will provide support for the response through the provision of resources. The equipment which Cooper Energy can supply or coordinate through external assistance (such as AMOSC) includes:

- vessels for transport of wildlife and equipment
- oiled fauna kits
- wildlife intake and triage
- wildlife cleaning and rehabilitation kits.

Personnel may also be deployed under the direction of State CA to undertaken wildlife response activities. Only trained resources may interact with oiled fauna species in accordance with the *Victorian Wildlife Act 1975*. Should OWR is required, follow the following steps:

- notify the relevant State Duty Officer or State Agency Commander for wildlife within the jurisdiction immediately
- notify AMSA if the oil spill occurs in Commonwealth waters and wildlife is affected
- determine the exact location of the animal and provide accurate directions. Maintain observation until State agency can deploy staff to the site.
- take response actions only as advised by State agency or AMSA:
 - determine the exact location of the animal for accurate directions for appropriately trained wildlife response personnel. Maintain observation and keep people, dogs, and wildlife scavengers away until accredited wildlife teams have arrived
 - avoid handling or treating injured wildlife as this may cause further stress and injury and poses a safety risk to untrained handlers.

10.3 Response Activities

OWR can be broken down into three stages; primary, secondary and tertiary (refer to Table 10-1).

Table 10-1: OWR Phases

Response Phase	Response Activity Description
Primary Response	This response is associated with hydrocarbon recovery and removing the threat of oil to wildlife. For this OPEP this involves source control, deflection and protection and shoreline assessment and clean-up.
Secondary Response	<p>This response uses hazing and pre-emptive capture techniques. Hazing techniques include systems to keep wildlife away from areas where impact is expected through a system of artificial threats (including noise and visual devices). The decision to undertake this within Victorian boundaries would be determined by DEECA as the Lead Agency for oiled wildlife.</p> <p>Pre-emptive capture involves:</p> <ul style="list-style-type: none"> the isolation and/or capture of wildlife from contaminated sites by either physical barriers preventing access or exclusion to contaminated sites transferring the wildlife well away from contaminated sites and releasing them holding the wildlife in short-term captivity, while the contamination threat is removed. <p>Secondary responses are unlikely to be required.</p>
Tertiary Response	<p>Tertiary response will be applied as required by oil spill trained and accredited teams deployed by the Lead Agency.</p> <p>Tertiary response includes capturing, cleaning, rehabilitation, transportation, and stabilisation of contaminated wildlife for release.</p>

10.4 Response Resources

Oiled Wildlife Waste Management

The hydrocarbons associated with the Otwayand PB and Sole activities are volatile, and either light or non-persistent. The ecological environment that may be affected associated with any single spill scenario is also limited. Whilst there is potential for oiled wildlife to occur, the numbers of individuals potentially impacted would likely be small. Based on the WA Oiled Wildlife Response Plan (DBCA DoT 2022) impact rating guide (for resource estimation), the release scenarios in this OPEP is assessed as low-medium, accounting for a relatively low level of response over a protracted period.

Although high numbers of oiled wildlife would not be expected as a result of the scenarios covered in this OPEP, response resources would be activated. AMOSC would be activated in the first instance, in consultation with DTP and DEECA, with equipment and resources selected on the basis of the TRP activation and subsequent IAPs.

Table 10-2 details the resources required to undertake an OWR. However, Cooper Energy will not deploy any resources without first receiving a formal deployment request from relevant State agency.

Table 10-2: Oiled Wildlife Response Resource List

Resource	Resource Requirement	Resource Availability	Comments
Specialist Oiled Wildlife Response Capability	Wildlife Response Commander	To be provided by Lead Agency for oiled wildlife	In accordance with State specific Wildlife Response Plan (or equivalent).
Oiled Wildlife recovery team supervisor	1 per team	To be provided by Lead Agency for oiled wildlife	In accordance with State specific Wildlife Response Plan (or equivalent)
Oiled wildlife response personnel	Trained Group of first response personnel	Lead Agency for oiled wildlife	In accordance with State specific Wildlife Response Plan (or equivalent)
	AMOSC Industry Team (mutual aid):	AMOSC	Industry team trained for field deployment of spill equipment and are available on an 'as

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Resource	Resource Requirement	Resource Availability	Comments
	10 personnel trained to level 2-4 [WA Department of Parks and Wildlife]		soon as practicable' basis. This group would be expected to be available within 24-48 hours of call-out. These personnel are available through Cooper Energy's membership with AMOSC upon request from the Lead Agency. AMOSC Service Level Statement confirms: AMOSC Core Group activation – within 1 hour of initial activation.
	AMOSC developed relationship with: <ul style="list-style-type: none"> blue Planet Marine (Capacity 10-20 OWR responders) Massey University (Capacity 4-6 OWR responders) international Bird Rescue (Capacity 4 OWR responders). 	AMOSC	AMOSC deployment and arrival at site expected on an 'as soon as practicable' basis following formal request from the Lead Agency. These resources are not expected to be required but can be accessed in a spill event.
	National Plan: <ul style="list-style-type: none"> additional response personnel, including management and operational staff. 	AMSA	Access via AMSA NatPlan. NRT Resources are not expected to be required.
OWR Facility establishment and management	1 x Facilities Establishment Group (Dwyertech)	AMOSC Call-off Contract	Current call-off contract has service available within 24 hours of call-out.
Oiled Wildlife Response Kits	1 x OWR Kit (Geelong) 1 x OWR Kit (Fremantle)	AMOSC	Kits can process 50 units per day and Geelong kit available at site within 24 hours of call-out.
	1 x OWR Kit (Bairnsdale) 1 x OWR Kit (Colac) 1 x OWR Kit (Port Phillip) 1 x OWR Kit (Warrnambool) 1 x State-wide Trailer	DEECA	Each kit can process approximately 50 units. To be provided by DEECA.
Oiled Wildlife Response Containers	1 x Container (Geelong) 1 x Container (Fremantle)	AMOSC	Each container can process approximately 100 units per day. Geelong container available onsite within 24 hours of call-out.
	1 x Container (Dampier) 1 x Container (Darwin) 1 x Container (Townsville)	AMSA	Available through NatPlan. Containers process 100 units per day. Equipment is not expected to be required. Deployment of such resources would be expected to take 48-72 hours (road travel) from time of request.
	1 x Container (Sydney)	NSW Maritime	Available through NatPlan request via AMSA. Container can process 100 units per day. Equipment is not expected to be required. Deployment of such resources would be expected to take 48-72 hours (road travel) from time of request.
Vessel Support	1 x Vessel/Master	Undersea Marine Supply-time Agreement with Cooper Energy	Cooper Energy maintains an agreement with Undersea Marine (formerly COMCHART Marine) to provide vessel surveillance activities and can be supplied in 24 hours from call-out.

Resource	Resource Requirement	Resource Availability	Comments
	Vessels of Opportunity	Cooper Energy Vessel Listing	Cooper Energy maintains a list of vessels suitable for surveillance.
Waste Management Support Services	Waste Management Contractor	Cleanaway	Cooper Energy waste contracts to support waste disposal. Availability on-site within 12 hours of call-out.

10.5 Environmental Risk Assessment

An assessment of possible environmental impact and risk associated with oiled wildlife response has been undertaken as part of the EPs which relate to these activities.

10.6 Environmental Performance Outcomes (Oiled Wildlife Management)

Table 10-3 provides the performance outcomes, standards, and measurement criteria for oiled wildlife management. The Cooper Energy Operations Officer (or delegate) will ensure the control measures identified below are implemented.

Table 10-3: Oiled Wildlife Response – Performance Outcomes and Standards

Environmental Performance Outcome	Controls	Environmental Performance standard	Responsible person	Measurement Criteria
Cooper Energy maintains capability to support oiled wildlife management in a level 2/3 spill event.	C32 Service Agreements Oiled Wildlife Response	Cooper Energy maintains the following agreements to maintain OWR response capabilities: <ul style="list-style-type: none"> • AMOSC membership (equipment, personnel) • waste management contract • vessel of Opportunity listing • vessel surveillance agreement. 	Executive Leadership Team Member	Contracts/memberships verify currency of membership.
Cooper Energy provides resources to support oiled wildlife response strategies as directed by State CA.	C33 Notification to State CA or Oiled Wildlife	Relevant state CA is notified as soon as possible after the sighting of oiled wildlife has occurred or if it is considered wildlife likely to be impacted.	Cooper Energy IC	Incident management records verify that verbal and/or written notification was provided to relevant State agency as soon as possible after the sighting was noted.
	C34 Oiled Wildlife Response Kits	AMOSC OWR kits are deployed to site within timeframes as directed by State Agency.	Cooper Energy IC	Incident records verify oiled wildlife response kits are deployed to site as directed by State Agency.
	C35 Oiled Wildlife Resource Resourcing	Cooper Energy meets State Agency resourcing needs throughout the response, meeting IAP performance outcomes.	Cooper Energy IC	Incident log verifies requested Cooper Energy resources met required IAP outcomes for oiled wildlife response.
Wildlife is only approached or handled by State Agency trained oiled wildlife responders	C36 Oiled Wildlife Response Induction	Cooper Energy personnel are inducted into wildlife interaction restrictions.	Cooper Energy IC State Government IC	Induction records. Incident records verify no interaction by Cooper Energy personnel and wildlife without

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Environmental Performance Outcome	Controls	Environmental Performance standard	Responsible person	Measurement Criteria
unless formal direction is received from the State Government IMT.				formal direction and induction by the State Government IMT.
Impacts to native vegetation and fauna are prevented.	C37 Site survey for critical habitat	Surveys are undertaken to identify, mark out and protect nesting and critical habitat. Existing tracks and paths are used where possible to minimise disturbance footprint.	IC	Incident records verify surveys have occurred and controls implemented.
Impacts to cultural heritage and social values are prevented	C26 Consultation with Traditional owners	In consultation with State CA, engage with Traditional Owners to facilitate site surveys and tagging out and protection of identified areas or importance.	IC	Incident records verify consultation has occurred and controls implemented.
Impacts to native vegetation and fauna are prevented.	C28 Site survey for critical habitat	Surveys are undertaken to identify, mark out and protect nesting and critical habitat. Existing tracks and paths are used where possible to minimise disturbance footprint.	Cooper Energy Incident Controller	Incident records verify surveys have occurred and controls implemented.
	C29 Trained Fauna Handlers	Only trained and accredited teams deployed by the Lead Agency for oiled wildlife will approach and handle fauna.	Cooper Energy Incident Controller (as directed by the Lead Agency)	Shoreline induction reinforces this constraint. Induction records.

11 Decontamination and Waste Management

11.1 Waste types and volumes from a Spill Event

Waste types generated through spill response activities may include sand with oil residue, oily water, wash-waters from oiled wildlife clean-up and possible oiled carcass disposal (noting State agency will lead this aspect). It is noted that MDO and light crude oil residues reaching shorelines will still be relatively mobile residues and will penetrate shoreline sediments due to the low viscosity of the oil and will not be as visually obvious as other hydrocarbons (e.g. heavy fuel or crude oils).

Credible spill scenarios and associated hydrocarbon release volumes are described in Table 1-2. By taking the worst-case liquids volume released for each scenario, respective maximum waste volumes have been estimated (Table 11-1).

Table 11-1: Estimated Oil Waste Volumes

Asset	Worst Case Spill Scenario	Maximum Hydrocarbon Shoreline Volume*	Waste Type	Waste Volume**
Gippsland Basin – Sole / PB	Vessel Release	500 m ³	Oily water Sand with oil residue	5,000 m ³
Gippsland Basin – Sole / PB	Subsea release	5 m ³	Oily water Sand with oil residue	50 m ³
Otway Basin - CHN	Vessel release	250 m ³	Oily water Sand with oil residue	2,500 m ³
Otway Basin - CHN	Pipeline release	50 m ³	Oily water Sand with oil residue	500 m ³
General	Oiled Wildlife Waste	-	Wastewater	1 m ³ per unit (1 bird = 1 unit)
		-	Personal protective equipment (PPE)	5 kg per unit per day
	Decontamination stations	-	Wash-water	~1 m ³ /d
		-	PPE	

*Assumes 100% spilled hydrocarbons ashore. It does not account for weathering. Considered to be conservative.

**Assumes a 10-fold increase in volume of stranded oil due to additional volume of oily water and sand.

11.2 Waste Management

11.2.1 Decontamination

In the event that shoreline clean-up is activated, decontamination stations must be placed at control points to prevent the spread of oil residues. Hot and cold zones must be clearly identified at the decontamination station and all response personnel should be briefed on the decontamination procedures before entering the Hot Zone. The decontamination zone should be constantly attended and kept as neat as organised as possible.

Suppliers of decontamination kits are identified in Table 10-2.

11.2.2 Regulatory Requirements/Characterisation

Waste generated as part of shoreline clean-up activities will be handled by Cooper Energy's Waste Management Contractor who will be activated in a level 2/3 event to collect and manage waste generated.

The waste management contractor must ensure:

- suitable receptacles are provided for waste materials into ensure its correct segregation into appropriate regulatory classifications
- wastes are manifested to ensure they are sent to appropriately licensed treatment or disposal facilities
- transportation via correctly permitted vehicles to those locations in accordance with Victorian EPA requirements.

All waste manifests, to ensure recovered oil residues are tracked, must be sent by the Waste Contractor to the Logistics Officer as soon as possible.

11.2.3 Interim Storage & Segregation Requirements and Resources

All requirements for interim storage arrangements must be discussed with Cooper Energy's waste management contractor and a site waste management plan developed in consultation with the EPA, State CA and the appropriate land manager.

The site waste management plan must ensure that all interim storage and handling arrangements are fully bunded, isolated from the public and site activities supervised. All interim storages must have suitable spill kits available to limit spill residues.

Waste storage resources, in addition to Cooper Energy's waste management contractor resources, can be found on the AMSA, AMOSC and relevant State government websites.

11.3 Environmental Risk Assessment

An assessment of possible environmental impact and risk associated with waste management has been undertaken within the shoreline assessment and clean-up section of the respective EPs.

11.4 Environmental Performance Outcomes (Oiled Wildlife Management)

The performance outcomes, standards, and measurement criteria associated with waste management have been addressed in Section 8 (Protection and Deflection) and Section 9 (Shoreline Assessment and Clean-up).

12 Scientific Monitoring

The Offshore Victoria OSMP (VIC-ER-EMP-0002) provides a comprehensive framework for the monitoring programs that may be implemented in the event of a level 2/3 hydrocarbon spill.

12.1 Consultation to Support Operational and Scientific Monitoring

In the event of a level 2/3 spill, Cooper Energy will consult with Commonwealth and State authorities for all areas potentially exposed to hydrocarbons, including Australian Marine Parks to ensure that scientific monitoring is undertaken to the satisfaction of the Commonwealth and State. The State CA will coordinate the whole of State Government advice on the focus, scope and duration of the scientific program.

Cooper Energy will notify these relevant authorities on a level 2/3 spill event and provide operational data to these authorities relevant to the spill level. Cooper Energy will consult with these authorities at the commencement of a level 2/3 spill on any proposed baseline or scientific studies and control sites to allow for feedback and OSMP study implementation plan modification³ to fulfil all State requirements (e.g. on-the-day sampling design, modified scope).

Operational monitoring results will continue to be provided throughout the response to allow for continued feedback and modification of baseline or scientific requirements. Other critical liaison points will be established between relevant authorities through the spill consultation process.

³ OSMP currently provides for study modules with expected scopes. These will be modified accordingly.

13 Demobilisation

There are specific tasks that are required to be undertaken by various response personal on the demobilisation of the response. Some of these are detailed in the sections to follow.

13.1 Demobilisation Tasks for the IC

Upon conclusion of the spill activity, the following tasks will be undertaken by the IC (or delegate):

- advise all relevant contractors and Cooper Energy personnel
- advise all relevant government authorities
- prepare detailed reports on the response activities and outcomes and collate all documents for secure storage and/or submission to regulators
- undertake an inventory of consumables and prepare accounts
- arrange for the return and/or refurbishment of equipment
- investigate the cause of the incident and report to relevant authorities
- assess environmental monitoring requirements.

13.2 Demobilisation Tasks for the Operations Officer

Upon completion of the oil pollution response operation, the Operations Officer (or delegate) will:

- arrange recovery of all equipment and unused materials
- ensure that all equipment is cleaned, to the extent that available facilities allow
- ensure that all equipment is returned to the owner by the quickest possible means (having regard to costs)
- upon its return to the owner, equipment must be thoroughly serviced or replaced in accordance with equipment maintenance schedules prior to being stored.

With regards to marine operations, upon receipt of response termination, the IMT will ensure:

- all equipment is recovered and cleaned
- all vessels return to their respective berths
- all personnel are accounted for
- equipment is safely offloaded and transported to a site for cleaning or repair
- all equipment returned is logged
- all equipment is returned to the correct owner/ location.

For shoreline response activities, the Operations Officer (or delegate) will ensure:

- all equipment is retrieved and stowed away
- all equipment is retrieved and returned to the relevant location for cleaning and redistribution
- any equipment not collected is secured
- all clean-up team members are transported back to the contractor's base for demobilisation
- all shorelines are left free of litter or other refuse.

13.3 Response Debrief/Critique

The IC will hold a post-spill debriefing for any spill for which a response was activated. De-briefing should address:

- spill causes (if known)
- speed of response activation
- effectiveness of tactics and strategies
- equipment suitability
- health and safety issues (if any)
- communications
- integration of OPEP and procedures with other agencies
- lessons learned for implementation in future responses.

14 Revision History

Rev	Issue Date	Revision summary	Originator	Reviewer	Approver
0	24/02/17	Updated from AMOSC and DEDJTR EMD Comments	LC	JH	IM
1	15/03/2017	Issued to NOPSEMA and DEDJTR ERR for Acceptance	LC	DC, JH	IM
2	31/05/17	Revised for NOPSEMA RFFWI	LC	JH	IM
3	15/8/17	Revised for terminology changes	JM	RL	IM
4	13/4/2018	Internal review and revision to reflect update to CEMT and incorporate Sole infrastructure	JE	RL	IM
5	12/9/18	Revised to reflect updates to the CEMT and additional input to incorporate Sole infrastructure installation	PR	OGW	IM
6	27/12/18	Revised to incorporate BMG activities	PR	OGW	IM
7	20/01/19	Revision to include Otway Basin exploration drilling	PR	OGW	IM
7a	04/02/19	Issued to NOPSEMA for assessment	PR	OGW	IM
7b	30/04/2019	Updated to address Vic State review comments & minor revisions post-exercise.	PR	OGW	IM
7c	28/06/2019	Update to reflect new response contracts and additional Vic State comments.	OGW	OGW	IM
7d	03/04/2020	Update to Notification contact details and AMOSC activation DoA.	JH	JJM	IM
7e	30/08/2021	Annual review and update; inclusion of relevant Vic State Gov Review comments for BMG P&A scope.	JJM	JH	MJ
8 (7f)	18/07/2022	Updated figures, references, SCERP details, reconciled facility spill scenarios, added appendix 'systems, forms, templates, tools'. Note Rev 8 and Ref 7f were same version	Xodus Group	JJM	MJ
9	31/08/2023	Update includes removal Otway Basin Phase III drilling and reconcile associated source control Performance Standards. Update of Government Contacts for reporting purposes.	Xodus Group	JJM	DB
9a	04/01/2024	Draft for internal review. Update includes removal of BMG activities, revision of response strategies, priority protection areas and figures	AES	JM	N/a
10	24/01/2024	Minor updates and re-submission with Operations EP.	AES	JM	DB

15 Definitions & Acronyms

Acronym	Definition
ADIOS	Automated Data Inquiry for Oil Spills
AGL	Above Ground Level
ALARP	As low as reasonably practicable
AMOSC	Australian Marine Oil Spill Centre
AMOSPlan	Australian Marine Oil Spill Plan
AMSA	Australian Maritime Safety Authority
API	American Petroleum Institute
APPEA	Australian Petroleum Production & Exploration Association (now AEP)
ASAP	As soon as possible
ASX	Australian Securities Exchange
bbl	Barrels
BIA	Biologically Important Areas
BOM	Bureau of Meteorology
CA	Control Agency
CHN	Casino-Henry-Netherby
Cooper Energy	Cooper Energy Limited and its subsidiaries
CMP	Crisis Management Plan
CMT	Crisis Management Team
cP	Centipoise
DEECA	Department of Energy, Environment and Climate Action (Victoria)
DELWP	Department of Environment, Land Water and Planning (Victoria)
DoT	Department of Transport (Victoria) (now DTP)
DTP	Department of Transport and Planning (Victoria)
EHU	Electro-hydraulic umbilical
EP	Environment Plan
EPA	Environment Protection Authority
EPBC	Environment Protection and Biodiversity Conservation
ERP	Emergency Response Plan
ERR	Earth Resource Regulation
ERT	Emergency Response Team

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Acronym	Definition
ESD	Emergency Shutdown
ESI	Environmental Sensitivity Index
FOB	Foreword Operating Base
GOR	Gas Oil Ratio
HSE	Health Safety & Environment
IAP	Incident Action Plan
IC	Incident Controller
IMO	International Maritime Organization
IMP	Incident Management Plan
IMT	Incident Management Team
ITOPF	Formerly known as International Tanker Owners Pollution Federation
IUCN	International Union for Conservation of Nature
IWCF	International Well Control Forum
JHA	Job Hazard Analysis
JSCC	Joint Strategic Coordination Committee
JV	Joint Venture
Km	Kilometre
KSAT	Kongsberg Satellite
LoC	Loss of Containment
LOWC	Loss of well control
m³	Cubic metres
MEG	Mono-ethylene glycol
MDO	Marine Diesel Oil
mm	Millimetre
MMscf	Million Standard Cubic Feet
MMscfd	Million Standard Cubic Feet per Day
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MoU	Memorandum of Understanding
N/A	Not Applicable
NatPlan	National Plan for Maritime Environmental Emergencies
ND	Nominal Diameter

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Acronym	Definition
NEBA	Net Environmental Benefit Assessment
NES	National environmental significance
Nm	Nautical miles
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Authority
NP	National Park
NRT	National Response Team
NSR	Non search and rescue
NSW	New South Wales
OPEP	Oil Pollution Emergency Plan
OPGGSR	Offshore Petroleum and Greenhouse Gas Storage Regulations
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations
OSMP	Operational and Scientific Monitoring Plan
OSRA	Oil Spill Response Atlas
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
PB	Patricia Baleen
POLREP	Marine Pollution Report
PPE	Personal protective equipment
RFFWI	Request For Further Written Information
ROV	Remotely Operated Vehicle
RPS	RPS Environmental Consultancy
RTM	Response time model
SCAT	Shoreline Clean-up Assessment Technique
SCERP	Source Control Emergency Response plan
SCME	State Controller Maritime Emergencies
SCT	Source Control Team
SEC	Site Emergency Controller
SIMOPS	Simultaneous Operations
SITREP	Situation Report
SMPEP	Shipboard Marine Pollution Emergency Plan
Tas	Tasmania

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Acronym	Definition
TasPlan	Tasmanian Marine Oil Spill Plan
TRP	Tactical Response Plan
Vic	Victoria
VMRA	Victorian Marine Pollution Risk Assessment
VSCP	Victoria Source Control Plan
WA	Western Australia
WOMP	Well Operations Management Plan

16 References

Document code	Title
Internal Documents	
CMS-PB-STD-0001	MS05 – Management Standard Five – External Affairs and Investor Relations
CMS-TS-STD-0001	MS08 – Management Standard Eight – Technical Management
CMS-IM-PCD-0002	Technical Information Management Procedure
CMS-HS-STD-0001	MS09 – Management Standard Nine – Health, Safety and Environment Management
CMS-ER-STD-0001	MS10 – Management Standard Ten - Incident and Crisis Management
CMS-ER-PRO-0002	Incident and Crisis Management Protocol
COE-ER-ERP-0001	Cooper Energy Incident Management Plan
COE-ER-ERP-0003	Cooper Energy Crisis Management Plan
VIC-DC-ERP-0001	Source Control Plan Offshore Victoria
VIC-ER-EMP-0002	Offshore Victoria Operational & Scientific Monitoring Plan
CHN-EN-EMP-0001	Otway Operations (Casino Henry Netherby) Environment Plan
VIC-EN-EMP-0002	Gippsland Offshore Operations Environment Plan
COE-EN-EMP-0001	Description of the Environment
CHN-HS-SMP-0001	Casino Henry Netherby Pipeline Safety Case
SOL-HS-SMP-0007	Sole Pipeline Safety Case
PBN-HS-SMP-0001	Patricia Baleen Pipeline Safety Case
CHN-DC-WMP-0001	Casino Henry Netherby Well Operations Management Plan
SOL-DC-WMP-0001	Sole Well Operations Management Plan
PBN-DC-WMP-0001	Patricia Baleen Well Operations Management Plan
Joint Industry / AMOSC Tactical Response Plans: Tactical Response Plans	
Modelling Reports – all offshore facilities: Modelling	
Oil Profiles – all offshore facilities: Oil Profiles - ADIOS	
External Documents	
Plans	
AMOSPlan (2021): https://amosc.com.au/amosplan/	
AMSA NATPLAN (2020): https://www.amsa.gov.au/marine-environment/national-plan-maritime-environmental-emergencies	
New South Wales Marine Estate Threat and Risk Assessment Report Final Report (2017) : https://www.marine.nsw.gov.au/marine-estate-programs/threat-and-risk-assessment	
Victorian Joint Industry and State Oil Pollution Responses Guidance Notes (2023)	
Victorian Maritime Emergencies (non-search and rescue) Plan (2021): https://www.emv.vic.gov.au/responsibilities/sem-sub-plans/sem-maritime-emergencies-non-search-and-rescue-sub-plan	
Victorian Marine Pollution Risk Assessment (VMR) (DoT, 2011)	
Department of Biodiversity, Conservation and Attractions. Department of Transport. (2022). WA Oiled Wildlife Response Plan for Maritime Environmental Emergencies. Revision 4. https://www.dbca.wa.gov.au/wildlife-and-ecosystems/marine/marine-wildlife-response-oiled-wildlife-response	

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Document code	Title
	Tasmanian Marine Oil and Chemical Spill Contingency Plan (2022): <u>https://epa.tas.gov.au/about-the-epa/policy-legislation-cooperative-arrangements/cooperative-arrangements/marine-oil-and-chemical-spills/tasmanian-marine-oil-spill-contingency-plan-(tasplan)</u>
	Tasmanian Oiled Wildlife Response Plan (2006): <u>https://epa.tas.gov.au/about-the-epa/policy-legislation-cooperative-arrangements/cooperative-arrangements/marine-oil-and-chemical-spills/tasmanian-marine-oil-spill-contingency-plan-(tasplan)</u>

Appendix 1 Systems, Forms, Templates and Tools

Systems / Forms / Templates

Cooper Energy IMT Response System
Includes: Incident Status Boards, External Reporting Forms, Planning Templates

+ Emergency Response

CMT Documents

IMT Documents

Tasks

Conversations

Incident and
Emergency Response

Regulatory
Documents

OPERATIONS

Incident Status Board

PLANNING

Incident Action Plan

LOGISTICS

Logistics & Resources
Board

OPERATIONS &
ADMIN

Medical Board

PLANNING &
ENVIRONMENT

NEBA

PLANNING &
ENVIRONMENT

PEARL

PLANNING

SITREP

DEPUTY IC
/LIAISON

Stakeholder
Management

Tools

Weather and Tides <http://www.bom.gov.au/> / <https://www.windy.com>

Trajectory/velocity calculator, Oil Volume estimator, marine travel calculator: [Spill Response Tools](#)

Oil Spill Tracking Buoy online tracking access: [Oil Spill Tracking Buoy](#)

Victoria CoastKit – A tool developed by DELWP (now DEECA) to provide an online data repository for the community to explore and use Victoria’s marine and coastal information: <https://mapshare.vic.gov.au/coastkit/>

Victoria EstuaryWatch. A citizen science program that supports the monitoring and recording of estuary health: <http://www.estuarywatch.org.au/>

Tasmania LISTmap. Hosted by the Tasmanian government. Listmap is publicly accessible, searchable geospatial tool providing access to a wide range of information including oil spill sensitivity layers, shoreline types, species presence and seasonal sensitivity: <https://maps.thelist.tas.gov.au/listmap/app/list/map>

Systems / Forms / Templates

Oil Spill Response Atlas (OSRA). GIS based system which compiles relevant Australian geographic information for oil spill response management: [Oil Spill Response Atlas \(OSRA\).pdf](#)

Response Planning Map Layers: [Oil Spill Response Map Layers](#)
Login to Perth IMT or Adelaide IMT to use the Response Map

Appendix 2 Net Environmental Benefit Assessment (NEBA) Template

The NEBA template is available on Cooper Energy IMT Response System

Purpose

NEBA is a simple tool intended to rapidly assess the risks posed by an oil spill to a specific location as well as facilitate and simultaneously document the decision-making process to most effectively deploy resources and minimise environmental impacts. This provides evidence to justify priority setting and response option selection.

Impacts are ranked from slight - severe and recovery time is considered from slow – rapid using an assessment (below). Protection priority of resources is ranked numerically. This includes the assessment of whether the sensitivity (impact) ranking of various spill response options would increase, decrease or remain the same when compared with no action (natural recovery i.e. monitor and evaluate).

This process should be conducted by the IMT Planning Officer (or delegate) in consultation with appropriately qualified experts from AMOSC, AMSA, DTP and other agencies (as required). Resources required include the respective asset Environment Plans, this OPEP, OSRA maps, OSTM/vectors for the spill event and marine charts. Local knowledge of the resources at stake is highly desirable to inform the assessment.

Instructions

1. Identify which of the sensitive resources occur in the affected area and list details. Resources are grouped into 3 categories (water surface, shoreline, water column) and may have biological/ecological (emphasis), economic or social/cultural significance. Use OSTM in conjunction with an OSRA or Maritime Incident Geospatial Support map of the projected impact area.
2. Rank sensitivity (Low/Medium/High) using the Resource Oil Sensitivity Matrix (below) to give a qualitative measure of likely impact if no response actions are taken (Natural Recovery i.e. Monitor and Evaluate). Sensitivity can be assessed by selecting a potential impact rank (Slight/Minor/Major/Severe) and recovery time (>10 years/5-10 years/2-5 years/<1 year). For particular shoreline types, use the Environmental Sensitivity Index (ESI) rankings in (below) (shoreline types) as a guide. Record this information for each resource in the NEBA.
3. Assign priority protection numbers (1-n) for each resource based upon sensitivity rankings assuming no response actions are taken (Natural Recovery i.e., Monitor and Evaluate). Highest priority resources should be assigned '1' – n is lowest priority. Resources may be ranked equally. Record this information for each resource in Table A4-1.
4. Assess whether the sensitivity (impact) ranking would increase (□), decrease (□) or remain the same (–) for each of the 3 remaining response strategies (Dispersant Application, Offshore Containment and Recovery, Protection and Deflection & Shoreline Clean-up). The Oiled Wildlife Response Strategy is adopted for all level 2/3 spills.
5. Select which overall response strategy (Natural Recovery i.e., Monitor and Evaluate, Dispersant Application, Offshore Containment and Recovery, Protection and Deflection and Shoreline Clean-up) would reduce or increase the sensitivity (impact) ranking for the highest priority shorelines/resources for protection. I.e., what response option provides net environmental benefit.

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			RECOVERY TIME			
			SLOW		RAPID	
			< 1 year	2 – 5 years	5 – 10 years	>10 years
			1	2	3	4
Potential Impact Rank	Severe	A	High 1A	High 2A	High 3A	Medium 4A
	Major	B	High 1B	High 2B	Medium 3B	Low 4B
	Minor	C	High 1C	Medium 2C	Medium 3C	Low 4C
	Slight	D	Medium 1D	Low 2C	Low 3D	Low 4D

Shoreline Types	ESI	High	ESI	Medium	ESI	Low
	9	Sheltered tidal flats	5	Mixed sand and gravel beaches	1	Exposed Rocky Shores
	10	Salt marshes and mangroves	6	Gravel beaches	2	Exposed Wave-Cut Platform
			7	Exposed tidal flats	3	Fine-medium grain sand beaches
			8	Sheltered rocky-rubble coasts	4	Coarse grain sand beaches

Resource sensitivity assessment matrix and shoreline type sensitivity ranks

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Net Environmental Benefit Analysis - Environmental Effects of Response Options Risk Analysis Matrix

Receptor Type	Sensitivity (adjust as required)	Protection Priority Ranking (Insert Locations)			Expected impact under each scenario (adjust as required)						
		Priority site 1	Priority site 2	Priority site 3	Source control	Monitor and Evaluate	Chemical Dispersant	Offshore Containment and Recovery	Protect & Deflect	Shoreline Assessment/Clean-up	Oiled Wildlife
Significant marine ecology											
Cetaceans (whales, dolphins)	S1				↑	-	NA	↑	NA	NA	NA
Seabirds (feeding, roosting, nesting)	S1				↑	-	NA	↑	NA	NA	↑
Shorebirds (feeding, roosting, nesting)	S1				↑	-	NA	↑	NA	NA	↑
Pinnipeds (seals, sea lions)	S2				↑	-	NA	↑	NA	NA	NA
Turtles	S2				↑	-	NA	↑	NA	NA	↑
Fish and Sharks (including spawning/nursery areas)	S2				↑	-	NA	↑	NA	NA	NA
Marine Invertebrates (sponges, molluscs, crustaceans, etc.)	S3				↑	-	NA	↑	NA	NA	NA
Abalone	S3				↑	-	NA	↑	NA	NA	NA
Significant coastal habitats											
Saltmarshes	S1				↑	-	NA	↑	↑	↓	NA
Mangroves	S1				↑	-	NA	↑	↑	↓	NA
Mudflats	S1				↑	-	NA	↑	↑	↓	NA
Seagrass	S1				↑	-	NA	↑	↑	↓	NA
Estuaries / wetlands	S1				↑	-	NA	↑	↑	↓	NA
Kelp habitats (inter-tidal)	S2				↑	-	NA	↑	NA	NA	NA
Littoral Rainforest / Coastal Vine Thickets	S3				↑	-	NA	↑	↑	↓	NA
Intertidal rocky flat/headland	S3				↑	-	NA	↑	NA	↑	NA

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Receptor Type	Sensitivity (adjust as required)	Protection Priority Ranking (Insert Locations)			Expected impact under each scenario (adjust as required)						
		Priority site 1	Priority site 2	Priority site 3	Source control	Monitor and Evaluate	Chemical Dispersant	Offshore Containment and Recovery	Protect & Deflect	Shoreline Assessment/ Clean-up	Oiled Wildlife
Sub-tidal reef	S3				↑	-	NA	↑	NA	NA	NA
Sand beaches	S3				↑	-	NA	↑	NA	↑	NA
Significant coastal ecology											
Pinniped haul-out sites	S2				↑	-	NA	↑	NA	NA	↑
Penguin colonies	S2				↑	-	NA	↑	NA	NA	↑
Protected area - Marine Parks or Sanctuaries	S2				↑	-	NA	↑	NA	NA	↑
Significant Socio-economic											
Tourism	S2				↑	-	NA	↑	↑	↑	NA
Commercial Fisheries / Aquaculture	S2				↑	-	NA	↑	NA	↑	NA
Cultural Heritage sites	S2				↑	-	NA	↑	↑	↑	NA
Amenity beaches	S3				↑	-	NA	↑	↑	↑	NA
Ports, Harbours, Yacht Clubs, Marinas	S3				↑	-	NA	↑	↑	↑	NA
Shipwrecks (submerged)	S3				↑	-	NA	↑	NA	NA	NA
Recreational fishing / diving	S3				↑	-	NA	↑	NA	↓	NA
Approvals											
Approved By:			Signature:				Company / Agency:				
Position in IMT:			Contact Number:				Email:				

Appendix 3 Cooper Energy Oil Spill Team Duty Cards

Cooper Energy Oil Spill IMT Lead Roles:

- IC
- Operations Officer
- Planning Officer
- Finance Officer
- Logistics Officer

COE INCIDENT CONTROLLER (DUTY CARD 1)

ROLE [Incident Controller]
The Cooper Energy Incident Controller has overall responsibility for the management of the Cooper Energy's response and integration with government response agencies.
RESPONSIBILITIES
<input type="checkbox"/> Activate and lead the overall management of the IMT. <input type="checkbox"/> Notify and keep the CMT/ IMT Liaison Coordinator informed as appropriate. <input type="checkbox"/> Determine strategic objectives & general direction for managing the situation. <ul style="list-style-type: none"> <input type="checkbox"/> Establish the immediate priorities. <input type="checkbox"/> Ensure that adequate safety measures are in place. <input type="checkbox"/> Ensure that the needs of any people affected by the emergency are handled appropriately. <input type="checkbox"/> Establish an appropriate organization and coordinate support as required. <input type="checkbox"/> Maintain a personal log. <input type="checkbox"/> Direct provision of appropriate responses to affected contractors. <input type="checkbox"/> Approve and authorise the implementation of an Incident Action Plan <input type="checkbox"/> Terminate response activities when appropriate
SPECIFIC TASKS
Initial Actions <ul style="list-style-type: none"> <input type="checkbox"/> Activate and lead the overall management of the IMT. <input type="checkbox"/> Obtain briefing on emergency from the Site Emergency Controller (SEC) or ERT contact and review initial assessment. <ul style="list-style-type: none"> <input type="checkbox"/> Use the emergency Information Capture Form <input type="checkbox"/> Activate the necessary members of the IMT. <input type="checkbox"/> Proceed to the IMT Room <ul style="list-style-type: none"> <input type="checkbox"/> Ensure Room is fully set-up before response commences. <input type="checkbox"/> Obtain status report. <input type="checkbox"/> Communicate with CMT/ IMT Liaison Coordinator as appropriate. <ul style="list-style-type: none"> <input type="checkbox"/> Advise CMT/ IMT Liaison Coordinator of any requirement for immediate support. <input type="checkbox"/> Arrange schedule for ongoing contact

ROLE [Incident Controller]
<p>Determine strategic objectives & general direction for managing the situation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish the immediate priorities: <ul style="list-style-type: none"> <input type="checkbox"/> Define IMT objectives. <input type="checkbox"/> If necessary, confer with operator or government agencies to agree on common objectives and priorities. <input type="checkbox"/> Chair initial IMT briefing. <ul style="list-style-type: none"> <input type="checkbox"/> Communicate priorities to the team. <input type="checkbox"/> Confirm ongoing means of communications with SEC has been established to Operations Officer <input type="checkbox"/> Confirm which regulatory agencies need to be notified. <input type="checkbox"/> Confirm with Planning Officer that all appropriate log-keeping, issues and actions, and status boards are maintained.
<p>Ongoing Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Refer to and follow the IMT Process <input type="checkbox"/> Hold regular IMT updates. <ul style="list-style-type: none"> <input type="checkbox"/> Time out, phones switched to time out mode. <input type="checkbox"/> Every 30 minutes initially (as a guide) <input type="checkbox"/> Monitor effectiveness of response and review issues & actions and priorities. <input type="checkbox"/> With Planning Officer, establish short-term/long-term recovery goals, milestones, and resource requirements. <input type="checkbox"/> Brief CMT/IMT Liaison as required. <input type="checkbox"/> Delegate Responsibilities <ul style="list-style-type: none"> <input type="checkbox"/> Allow yourself to focus on setting strategic objectives for next operational period. <input type="checkbox"/> Determine duration and structure of response operations. <ul style="list-style-type: none"> <input type="checkbox"/> Decide duration of current operational period (start thinking of when to stand down or next day operations) <input type="checkbox"/> Identify additional personnel needs to maintain 24-hour support. <p>Stand Down</p> <ul style="list-style-type: none"> <input type="checkbox"/> Communicate end of IMT response to all relevant internal and external parties <input type="checkbox"/> Provide copies of all emergency related documents and logs to the Log Keeper <input type="checkbox"/> Stand down those people not required in managing ongoing recovery process. <input type="checkbox"/> Hold debrief of IMT, specialist advisors, support teams and receive feedback. <input type="checkbox"/> Review any capability gaps and opportunities for improvement in the response. <input type="checkbox"/> Review and approve the emergency report. <input type="checkbox"/> Commission post-emergency investigation <input type="checkbox"/> Ensure accepted recommendations have been incorporated into the IMP

COE OPERATIONS OFFICER (DUTY CARD 2)

ROLE [Operations Officer]
<p>Reports to IC and is responsible for monitoring and supervising operational response operations in the field. Implements the operational plans to achieve response objectives and protect people, the environment and property</p>
RESPONSIBILITIES
<p>Maintain two-way communication with scene. Establish facts/needs. Coordinate immediate response. Identify key issues. Provide/resource technical support for IC</p>
SPECIFIC TASKS

Initial Actions

- Identify the SEC and where located - obtain all available information on the situation.
- Agree call schedule with the SEC or ERT
- Use the emergency Status Board/ Form
- Assess emergency, including emergency potential.
- Start a personal log.

Ongoing Actions

- Propose and agree immediate priorities with the IC.
- Update Planning Officer on situation for development of the Action Plan
- Work with ERT to identify logistical support requirements.
- Identify issues and actions required for the next period - mark and track on Issues board.
- Source and provide technical information and support required by the response teams.
- Develop strategy (i.e., what we are attempting to achieve)
- Identify tactics/breaking down tactics into manageable tasks (i.e., how we are going to implement strategy)
- Confer with response contractors / consultants for equipment and techniques.
- Allocate tactical resources based on strategy requirements.
- Provide updates to the situation board to reflect current operations in the field.
- Resource additional technical support as required.

Stand Down

- Attend the IMT debrief.
- Provide copies of all emergency related documents and logs to the Log Keeper
- Monitor the demobilization of response teams

COE PLANNING OFFICER (DUTY CARD 3)

ROLE [Planning Officer]
Reports to the IC and manages the IMT related planning functions and information capture for the response
RESPONSIBILITIES
Responsible for the collection, evaluation, dissemination, and use of emergency information Oversees the display of information on the status boards. Oversees environmental support for the response operations. Development of recovery planning options Collection and retention of emergency plans and documents Activates and manages the Log Keeper
SPECIFIC TASKS
<p>Initial Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assist the IMT-Leader to maintain and use the Brainstorming/Planning Board/ Form <input type="checkbox"/> Mobilize any additional resources or specialist advisors immediately required to commence recovery planning <input type="checkbox"/> Ensure Log Keeper is in place and the IMT is maintaining an auditable trail. <input type="checkbox"/> Provide immediate notifications to regulatory authorities as required under legislation or as per accepted regulatory documentation. <input type="checkbox"/> Identify one or more Emergency Management Liaison Officers continue notifications and ongoing consultation in accordance with Section 2.4 (Notification Requirements) of the OPEP. <input type="checkbox"/> Consider activating additional Environmental and Community Consultation Support: <input type="checkbox"/> Setup and maintain a document retention process for all response documentation. <input type="checkbox"/> Start a personal log. <p>Ongoing Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Drive and monitor the IM process. <input type="checkbox"/> Prepare the Action Plan – compile data from display boards and use Situation, Mission, Execution, Administration and (Logistics), Command (and Communication) guide for format: <input type="checkbox"/> Identify environmental issues and where necessary seek advice and support from environmental technical authorities/ environmental specialists. <input type="checkbox"/> Establish time for next operational period (generally starting the next morning for 24-hour duration) <input type="checkbox"/> Create strategic objectives for next operational period and submit to IMT-Leader for approval. <input type="checkbox"/> Create meeting schedule and advise IMT-Leader on planning process issues. <input type="checkbox"/> Develop plans for recovery operations to implement tomorrow, the next day, next week etc. <input type="checkbox"/> Consolidate the Action Plan and assemble for final approval and signoff. <p>Stand Down</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ensure team members and supports complete any outstanding log/record keeping. <input type="checkbox"/> Ensure all log sheets are collected before the team leaves the room. (All notebooks to be copied and / or originals to be retained) <input type="checkbox"/> Arrange for copies of all email traffic and emergency files to be collated and stored. <input type="checkbox"/> Consider need to photograph Incident Control Centre and key display boards before it is tidied. <input type="checkbox"/> Contribute to the development of the post emergency report.

COE FINANCE & ADMIN OFFICER (DUTY CARD 4)

ROLE [Finance & Admin Officer]
Reports to the IC and manages IMT related HR and Financial aspects of the response
RESPONSIBILITIES
<ul style="list-style-type: none"> - Coordinate all general administrative support requirements for the IMT and response activities overall. - Handle accounting services and financial record-keeping, track, and report on emergency costs - Manage HR issues and emergency contact notifications.
SPECIFIC TASKS
<p>Initial Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Determine if additional Finance & Admin support personnel are needed. Coordinate their activation and manage their activities. <input type="checkbox"/> Activate additional telephone responders if required. <input type="checkbox"/> Use the Medical Planning Board/ Form – to capture and display casualty management information. <input type="checkbox"/> Start a personal log. <p>Ongoing Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish procedures for use in establishing financial controls. <input type="checkbox"/> Establish & communicate pre-approved spending authorities for the IMT. <input type="checkbox"/> Establish contact and coordinate finance-related activities with other agency finance personnel. <input type="checkbox"/> Coordinate with the IMT-Leader and Sections to determine immediate financial needs. <input type="checkbox"/> Provide the IMT-Leader with information on the financial implications of major and/or costly actions taken or being considered by IMT, contractor, government agency, etc. <input type="checkbox"/> Coordinate with appropriate Company and contractor or government agency personnel to receive timely and accurate information on the costs that they incur. <input type="checkbox"/> Ensure that insurers have been notified and provided with accurate facts concerning the emergency. <input type="checkbox"/> Set up appropriate financial reviews and controls for all contracts, agreements and other legally binding documents used by the IMT during the response, as appropriate. <p>Stand Down</p> <ul style="list-style-type: none"> <input type="checkbox"/> During demobilization, ensure that any outstanding IMT related costs or other financial issues have been resolved, insurance requirements have been met and there is a system in place to receive and process any remaining claims. <input type="checkbox"/> Prepare a final report accounting for all costs incurred during the response. <input type="checkbox"/> Attend the IMT debrief. <input type="checkbox"/> Provide copies of all emergency related documents and logs to the Planning Function

COE LOGISTICS OFFICER (DUTY CARD 5)

ROLE [Logistics Officer]
Reports to the IC and manages Logistics. Coordinates the provision, storage and transportation of supplies and resources required for the emergency response and recover
RESPONSIBILITIES
<ul style="list-style-type: none"> - Coordinate all logistic requirements for the IMT and response activities overall. - Liaise with Finance to establish normal expenditure control and any necessary insurance controls. - Manage logistic issues and emergency contact notifications. - Negotiate with contractors, consultants, external enterprises, and agencies
SPECIFIC TASKS
<p>Initial Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Obtain a full briefing on the emergency, paying attention to marine and air logistics considerations in supporting the response or actions in place. <input type="checkbox"/> Evaluate the logistics ramifications of the current response and any planned actions. <input type="checkbox"/> Identify existing or potential international and macro logistics issues. <input type="checkbox"/> Consult with other ESG members to calculate the levels and identify the sourcing of additional resources and services needed to support response operations. <input type="checkbox"/> Start a personal log. <p>Ongoing Actions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide logistics support to the affected site in accordance with tactical plans developed by the IMT. <input type="checkbox"/> Assess the local availability of equipment and personnel suitable to support the response and recovery activities. <input type="checkbox"/> Negotiate with contractors, consultants, external enterprises, and agencies for supply of personnel, equipment, and services. <input type="checkbox"/> Coordinate reception, assembly, storage, and deployment in liaison with the IMT and Site Logistics Officer <input type="checkbox"/> In conjunction with IMT Information Officer, ensure a logistics status board is maintained showing all support resources, aircraft and marine movements supporting the operation. <input type="checkbox"/> Maintain an overview of weather conditions and their effect on aircraft and marine movements. Relay information as required. <input type="checkbox"/> Ensure inventories are kept of all equipment, materials, services, and supplies purchased, rented or borrowed or obtained during the response operation. <input type="checkbox"/> Liaise with Finance Officer to establish normal expenditure control and any necessary insurance controls which may be required. <input type="checkbox"/> Document all emergency actions on log sheets pass to Information Officer <p>Stand Down</p> <ul style="list-style-type: none"> <input type="checkbox"/> During demobilisation, ensure that any outstanding IMT related costs or other financial issues have been resolved, insurance requirements have been met and there is a system in place to receive and process any remaining claims. <input type="checkbox"/> Prepare a final report accounting for all costs incurred during the response. <input type="checkbox"/> Attend the IMT debrief. <input type="checkbox"/> Provide copies of all emergency related documents and logs to the Planning Function

Appendix 4 SCAT Execution

To undertake the assessment, the shoreline predicted to be contacted will be divided into segments within which the shoreline character is relatively homogenous in terms of physical features and sediment type. Methods adopted to describe State shoreline segments have been derived based on relevant State Agency processes; namely the Victorian Marine Pollution Risk Assessment (VMRA) (DoT, 2011) for Gippsland Basin and the NSW Marine Threat and Risk Assessment (TARA) (BMT WBM, 2017) for New South Wales coastline. There is no specific shoreline clean-up process for Tasmania, therefore any response would follow the process described in the Tasmanian Marine Oil Spill Contingency Plan.

Once the SCAT is onsite, the following tasks will be conducted:

1. Undertake a Job Hazard Analysis with the team to identify hazards and put controls in place where possible.
2. Conduct a segment overview or full site walk over to gain the overall perspective of the survey area and verify the pre-determined segment boundaries are correct.
3. Complete observations and measurements of the segment. The following shoreline characteristics should be documented during the baseline assessment:
 - shoreline description including shoreline type (beach, cliff, reef, dune etc.), substrate (bedrock, boulder, pebble, gravel, sand etc.) and energy (high or low).
 - biological character of the shoreline – flora and fauna inhabiting the shoreline.
 - in addition, the following information about the site under assessment should be documented:
 - site access (e.g., road or track access).
 - site hazards and constraints (e.g., steep cliffs, slippery rocks).
 - sensitive areas (e.g., bird nesting areas).
 - features and landmarks (natural or man-made); and
 - potential decontamination and waste storage areas.
4. Take photos and videos wherever possible.
5. Annotate or draw maps and beach profiles.
6. Fill in Shoreline Assessment Form.

The Shoreline Assessment form as contained in the OSMP Module OP4B – Coastal Shoreline Assessment (Gippsland) will be used to record the shoreline assessment results. The assessment will be communicated to the IMT and used to inform the NEBA to determine whether the implementation of shoreline clean-up activities will be of net benefit. The daily NEBA outcome will be used to inform the IAP.

Post Exposure Shoreline Assessment

In the event that oil reaches the shoreline, the SCAT will undertake a post exposure assessment. This includes recording the following description of the oiling:

- oil character (colour, viscosity, stickiness)
- percentage oil cover and position
- oil thickness and depth.

The SCAT must immediately notify the Cooper Energy Operations Officer of any observed, or at-risk oiled wildlife, to inform the potential Oiled Wildlife Response if required.

Offshore Victoria Oil Pollution Emergency Plan



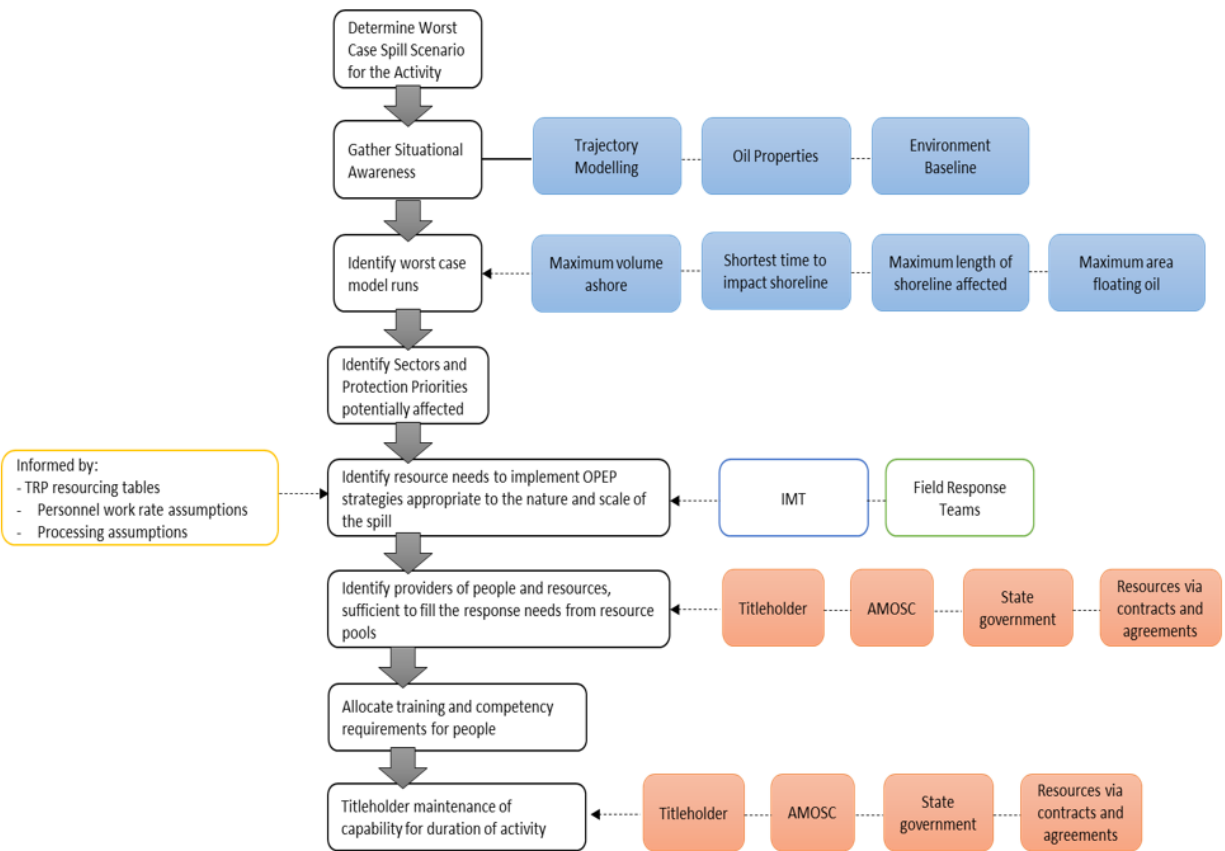
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In the event a shoreline clean-up response is activated, the SCAT must be undertaken twice daily to document the effectiveness of the clean-up response measures implemented. This information will be provided to the Cooper Energy Operations Officer.

Appendix 5 Response Resources Needs Assessment

Cooper Energy’s IMT structure is designed to be scalable to meet the particular requirements of any credible spill scenario associated with Cooper Energy’s offshore Victorian assets and activities. Analysis of personnel requirements vs the resource pool accessible via agreement in place during the activity indicates a sufficient level of trained and competent people.

Figure below shows the process used by Cooper Energy to determine response needs. Against these needs, resource pools are assigned from Cooper Energy and response parties.



Response Resource Assessment Process

Cooper Energy Gippsland Subsea Development

Acoustic Modelling for Assessing Marine Fauna Sound Exposures

JASCO Applied Sciences (Australia) Pty Ltd

23 November 2023

Submitted to:

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Cooper Energy

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P001784-001
Document 03192
Version 2.0



Suggested citation:

Muellenmeister, A.M., V.E. Warren, S.C. Connell, and M. W. Koessler. 2023. Cooper Energy Gippsland Subsea Development: Acoustic Modelling for Assessing Marine Fauna Sound Exposures. Document 03192, Version 2.0. Technical report by JASCO Applied Sciences for Cooper Energy.

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Executive Summary

JASCO Applied Sciences (JASCO) undertook a modelling study of underwater sound levels associated with Cooper Energy's proposed Gippsland operations.

The modelling study considered the concurrent sound of an Inspection, Maintenance and Repair (IMR) vessel using dynamic positioning, the sound of a remotely operated vehicle (ROV) performing underwater cutting, and the sound of a Dive Support Vessel (DSV) using dynamic positioning. The modelling consisted of six scenarios across three different locations: the Patricia-Baleen well location (53 m water depth), the nearshore pipeline located between the Orbost Gas Plant and Patricia-Baleen (41 m water depth), and the Sole well location (123 m water depth). All modelling locations are situated within the pygmy blue whale possible foraging Biologically Important Area (BIA) and within the recently revised southern right whale migration BIA. The modelled scenarios considered the concurrent operation of the IMR under DP and the ROV vessel as well as the IMR under DP, ROV vessel and the DSV under DP. The IMR vessel and ROV were modelled at the same geographic (i.e., horizontal) location, but with different source depths, for the three locations modelled. The Patricia-Baleen modelling location was positioned nominally between the Patricia-Baleen wells for modelling purposes. The DSV was modelled 500 m east of the Patricia-Baleen well location, the nearshore pipeline and the Sole well location.

The modelling study specifically predicted distances from operations where underwater sound levels reached thresholds corresponding to behavioural response, impairment (temporary reduction in hearing sensitivity or temporary threshold shift; TTS) and injury (permanent threshold shift or PTS). The animals considered here included low-, high-, and very-high-frequency cetaceans, Otariid pinnipeds, sea turtles, and fish including fish larvae and eggs.

The modelling methodology considered the source levels of the *Skandi Singapore* and *MV Offshore Guardian* (which Cooper Energy has identified as a representative IMR vessel and DSV, respectively), the source level of ROV cutting tools, and environmental properties that affect sound propagation. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and accumulated sound exposure levels (SEL, L_E) as appropriate for non-impulsive (continuous) noise sources.

This study considered SEL over an accumulation period of 24 hours (SEL_{24h}). The SEL_{24h} is a cumulative metric that reflects the dosimetric effect of noise levels within a 24-hour exposure period based on the assumption that an animal is consistently exposed to such noise levels at a fixed position. The corresponding SEL_{24h} radii represent an unlikely worst-case scenario as it is more realistic that marine mammals, fish, and turtles would not stay in the same location for this length of time. Therefore, a reported radius for SEL_{24h} criteria does not mean that marine fauna travelling within this radius of the source will be affected or impaired, but rather that an animal could be exposed to the sound level associated with impairment (either PTS or TTS) if it remained in that location for 24 hours.

Marine mammals

For both LF and VHF cetaceans, the maximum ranges to the PTS isopleths were greatest at the nearshore pipeline location (Scenarios 3 and 4, maximum range of 80 m for LF cetaceans and 90 m for VHF cetaceans), while the maximum ranges to TTS isopleths were greatest at the Patricia-Baleen location (Scenarios 1 and 2, maximum range of 2.22 km for LF cetaceans and 990 m for VHF cetaceans). The PTS thresholds for Otariid pinnipeds and HF cetaceans were not reached within the limits of the modelled resolution (20 m). Table 1 summarises the maximum ranges to PTS and TTS thresholds for marine mammals.

The maximum distance to the NOAA (2019) marine mammal behavioural response criterion of 120 dB re 1 μ Pa (SPL) was greatest for the nearshore pipeline location (Scenarios 3 and 4), 8.70 km,

compared to 7.82 km and 7.03 km for the Patricia-Baleen and Sole modelled scenarios. The difference was primarily influenced by the different seabed sediments and regional bathymetry at each site.

Table 1. Maximum (R_{max}) horizontal distances (in km) to relevant thresholds for marine fauna.

Hearing group	Threshold Type	Metric	Threshold	Patricia-Baleen wells		Nearshore Pipeline		Sole wells	
				Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
				R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)	R_{max} (km)
Low frequency cetaceans	PTS ^a	$L_{E,24h}$	199	0.06	0.06	0.07	0.08	0.06	0.06
	TTS ^a	$L_{E,24h}$	179	2.22	2.22	2.11	2.11	1.41	1.43
High frequency cetaceans	PTS ^a	$L_{E,24h}$	198	–	–	–	–	–	–
	TTS ^a	$L_{E,24h}$	178	0.05	0.06	0.05	0.06	0.05	0.06
Very high-frequency cetaceans	PTS ^a	$L_{E,24h}$	173	0.07	0.08	0.09	0.09	0.06	0.07
	TTS ^a	$L_{E,24h}$	153	0.95	0.99	0.92	0.95	0.89	0.91
Otariid pinnipeds	PTS ^a	$L_{E,24h}$	219	–	–	–	–	–	–
	TTS ^a	$L_{E,24h}$	199	0.02	0.03	0.02	0.03	0.02	0.02
All Marine Mammal Groups	Behavioural Response ^b	L_p	120	7.82	7.82	8.69	8.70	7.02	7.03

L_p = unweighted root-mean-square sound pressure level (dB re 1 μ Pa)

$L_{E,24h}$ = sound exposure level over 24 hours (dB re 1 μ Pa² s)

^a Southall et al. (2019) criteria for marine fauna

^b NOAA (2019) recommended unweighted behavioural threshold for marine mammals

A dash indicates the level was not reached within the limits of the modelled resolution (20 m)

Sea turtles

The threshold criteria from Finneran et al. (2017) gives the PTS and TTS for sea turtles. PTS is predicted to occur at distances less than 20 m, if at all, while the TTS threshold occurs up to 60 m away.

Fish

Popper et al. (2014) gives guidelines regarding recoverable injury and TTS for fish. However, to exceed these guidelines the fish must remain at these distances for either 12 or 48 hours. The threshold for TTS in fish with a swim bladder involved in hearing was reached within 30 m at all three locations, if a fish remains in a static location for 12 hours. The 48-hour threshold for recoverable injury for fish with a swim bladder involved in hearing was not reached within the limits of the modelled resolution (20 m) at any site.

1. Introduction

JASCO Applied Sciences (Australia) performed a modelling study of underwater acoustic noise levels associated with Cooper Energy's proposed operations in the vicinity of their Gippsland subsea infrastructure. The modelling study considered the concurrent sound of an Inspection, Maintenance and Repair (IMR) vessel using dynamic positioning, the sound of a remotely operated vehicle (ROV) performing underwater cutting, and the sound of a Dive Support Vessel (DSV) under dynamic positioning associated with activities situated alongside the Patricia-Baleen and Sole well locations and at the nearshore pipeline between the Orbost Gas Plant and Patricia-Baleen.

All modelling locations are situated within the pygmy blue whale (*Balaenoptera musculus breviceauda*) possible foraging Biologically Important Area (BIA) and within the recently revised southern right whale (*Eubalaena australis*) migration BIA.

The modelling study specifically predicted distances from operations to where underwater sound levels reached noise effect thresholds and criteria. The corresponding thresholds include levels associated with behavioural response, impairment (temporary reduction in hearing sensitivity or temporary threshold shift; TTS), and injury (permanent threshold shift; PTS). The animals considered included low-, high-, and very-high-frequency cetaceans, Otariid pinnipeds, sea turtles, and fish including fish larvae and eggs. Estimated underwater acoustic levels are presented as sound pressure levels (SPL, L_p), and accumulated sound exposure levels (over 24 hours) (SEL_{24h} , $L_{E,24h}$), as appropriate for non-impulsive (continuous) noise sources.

This report is structured as follows: the remainder of Section 1 provides details of the scenarios considered for modelling, Section 2 explains the metrics used to represent underwater acoustic fields and the effect criteria considered. Section 3 details the methodology for predicting the source levels and modelling the sound propagation, including the specifications of the considered sound sources and the environmental parameters. The acoustic modelling results are presented in Section 4 then discussed in Section 5.

1.1. Details of Modelling Scenarios

Three locations were considered for modelling: the Patricia-Baleen well location (53 m water depth), the nearshore pipeline located between the Orbost Gas Plant and Patricia-Baleen (41 m water depth), and the Sole well location (123 m water depth). For modelling purposes, the nearshore pipeline location had been located on the border of the southern right whale 'migration and resting on migration' BIA in order to conservatively assess the effects of the sound sources on the BIA. However, this southern right whale 'migration and resting on migrating' BIA has now been superseded by a new migration BIA, and a reproduction BIA; the nearshore pipeline location remains within the revised migration BIA. Both the previous and revised southern right whale BIAs are presented on the maps in this report for clarity (refer Figure 1).

Three concurrent noise sources were modelled at each location:

- Dynamic positioning (DP) operations of an Inspection, Maintenance and Repair (IMR) vessel. Cooper Energy has indicated that the vessel is likely to be of a similar type and class to the vessel *Skandi Singapore*.
- Cutting tool noise from a remotely operated vehicle (ROV) performing underwater cutting of sub-sea infrastructure.
- Dynamic positioning (DP) operations of a Dive Support Vessel (DSV). Cooper Energy has indicated that the vessel is likely to be of a similar type and class to the vessel *MV Offshore Guardian*.

The exact positions of the vessel and ROV at each location is not known and will likely vary due to operational conditions and requirements during the works. Therefore, the IMR and ROV were modelled at the same geographic (i.e., horizontal) location at each of the three locations, but with different source depths that reflect the activity being modelled (Table 2). The Patricia-Baleen modelling location was positioned nominally between the Patricia-Baleen wells for modelling purposes. At each location, the DSV was modelled with a 500 m offset to the east.

Figure 1 displays an overview of the modelling area showing the modelled sites, the pygmy blue whale and southern right whale BIAs, including the now superseded 'migrating and resting on migration' BIA, and the regional bathymetry. Tables 2 and 3 outline the modelled site locations and scenarios.

Table 2. Location details for the modelled sites, and source depths.

Site	Designation	Latitude (S)	Longitude (E)	MGA ¹ Zone 55		Water Depth (m)
				X (m)	Y (m)	
1	Patricia-Baleen wells IMR	38° 01' 17.22"	148° 26' 15.20"	626180	5790830	53
2	Patricia-Baleen wells ROV					
3	Patricia-Baleen wells DSV	38° 01' 16.97"	148° 26' 35.70"	626680	5790830	52
4	Nearshore pipeline IMR	37° 51' 50.32"	148° 25' 45.33"	625720	5808314	41
5	Nearshore pipeline ROV					
6	Nearshore pipeline DSV	37° 51' 50.08"	148° 26' 05.80"	626220	5808314	41
7	Sole wells IMR	38° 06' 00.07"	149° 00' 31.37"	676129	5781182	123
8	Sole wells ROV					
9	Sole wells DSV	38° 05' 59.72"	149° 00' 51.90"	676629	5781182	123

¹ Map Grid of Australia (MGA)

Table 3. Summary of the modelled scenarios.

Scenario	Associated Site(s)	Location	Scenario description	Operation Time
1	1 + 2	Patricia-Baleen wells	IMR under DP + ROV Cutter	24 h
2	1 + 2 + 3		IMR under DP + DSV under DP + ROV Cutter	
3	4 + 5	Nearshore Pipeline	IMR under DP + ROV Cutter	
4	4 + 5 + 6		IMR under DP + DSV under DP + ROV Cutter	
5	7 + 8	Sole wells	IMR under DP + ROV Cutter	
6	7 + 8 + 9		IMR under DP + DSV under DP + ROV Cutter	

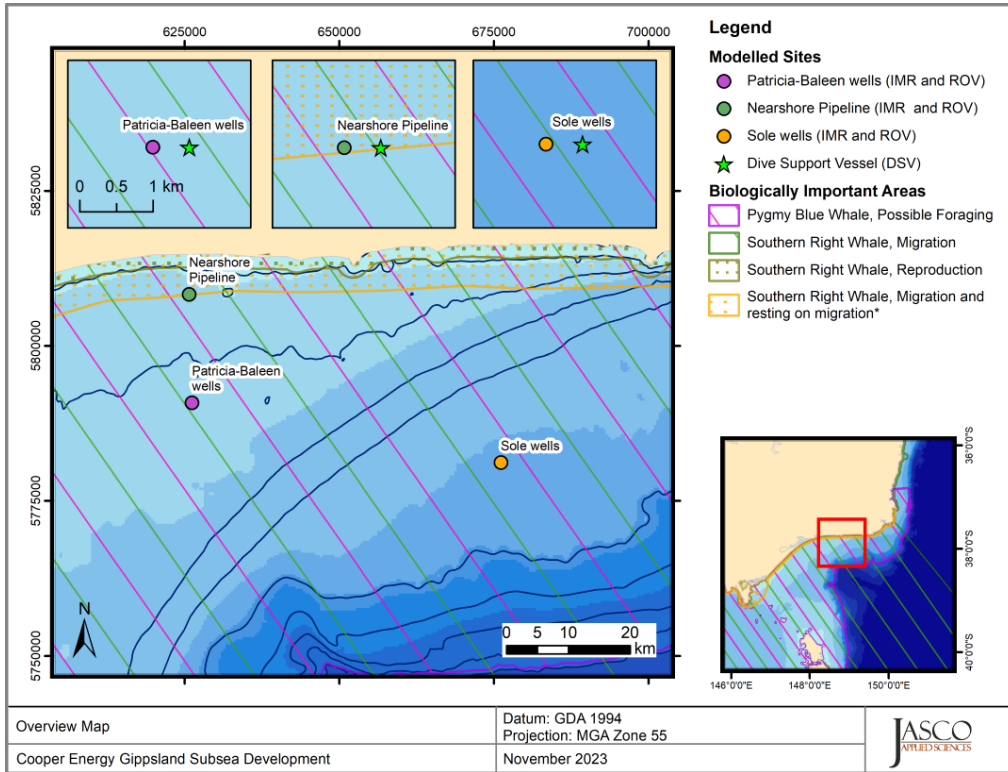


Figure 1. Overview map of the modelled sites, biologically important areas, and features of the Cooper Energy Gippsland Subsea Development project. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

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 an adverse effect on animals. Whether acoustic 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-hour period. 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:

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 μ Pa (SPL; L_p) for non-impulsive sound sources.
3. Sound exposure guidelines for fish, fish eggs, and larvae (Popper et al. 2014).
4. Frequency-weighted accumulated sound exposure levels (SEL; $L_{E,24h}$) from Finneran et al. (2017) for the onset of permanent threshold shift (PTS) and temporary threshold shift (TTS) in sea turtles.

Section 2.1, along with Appendix A.3 and A.4, expands on the thresholds, guidelines, and sound levels for marine mammals. Section 2.2 expands on the criteria for fish and sea turtles.

2.1. Marine Mammals

Cetaceans represent a potentially sensitive receptor group of marine mammals and were the focus of this assessment. Otariid (eared) pinnipeds were also considered. The criteria applied in this study to assess possible effects of non-impulsive noise sources on marine mammals are summarised in Table 4 and further explained in Sections 2.1.1 and 2.1.2. 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.

Table 4. Criteria for effects of non-impulsive noise exposure, including vessel noise, for marine mammals: Unweighted SPL and weighted 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 _{24h} ($L_{E,24h}$; dB re 1 μ Pa ² ·s)	Weighted SEL _{24h} ($L_{E,24h}$; dB re 1 μ Pa ² ·s)
Low-frequency (LF) cetaceans	120	199	179
High-frequency (HF) cetaceans		198	178
Very High-frequency (VHF) cetaceans		173	153
Otariid pinnipeds		219	199

L_p denotes sound pressure level and has a reference value of 1 μ Pa.

$L_{E,24h}$ denotes cumulative sound exposure over a 24 h period and has a reference value of 1 μ Pa²·s.

2.1.1. Behavioural Response

The NOAA non-pulsed noise criterion was selected for this assessment because it represents the most commonly applied behavioural response criterion by regulators. Accordingly, behavioural responses were assumed to occur in areas ensonified above an unweighted SPL of 120 dB re 1 μ Pa (NOAA 2019). Appendix A.3 provides more information about the development of this criteria.

Southall et al. (2021) provide recommendations and discusses the nuances of assessing behavioural response, however the authors of the study do not present new numerical thresholds for onset of behavioural responses for marine mammals, so the previously established guidelines from the US National Oceanic and Atmospheric Administration (NOAA) (2019) have been used.

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 4). Appendix A.3 provides more information about the Southall et al. (2019) criteria.

2.2. 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 Table 5 for completeness only.

For fish, 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), 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.

Table 5 lists the relevant effects thresholds from Popper et al. (2014) for shipping and continuous noise, most of which relate to relative risk based on distance from the sound source. Some evidence suggests that fish sensitive to acoustic pressure show a recoverable loss in hearing sensitivity, or injury when exposed to high levels of noise (Scholik and Yan (2002), Amoser and Ladich (2003), Smith et al. (2006)); this is reflected in the SPL thresholds for fish with a swim bladder involved in hearing (shaded cells in Table 5). Finneran et al. (2017) presented quantitative thresholds for turtle injury, considering frequency weighted SEL, which have been applied in this study for vessels (Table 6).

Table 5. Criteria for non-impulsive (vessel) 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)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: Swim bladder not involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: Swim bladder involved in hearing (primarily pressure detection)	(N) Low (I) Low (F) Low	170 dB SPL for 48 h	158 dB SPL for 12 h	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Sea turtles	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) High (I) Moderate (F) Low
Fish eggs and fish larvae	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

Sound pressure level dB re 1 µPa.

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. Acoustic effects of non-impulsive noise on sea turtles, weighted SEL_{24h}, Finneran et al. (2017).

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

3. Methods

The following sections describe the inputs used for this underwater noise modelling study. Section 3.1 details the modelled sources for the nominal vessels and Sections 3.2 and 3.3 provide details on the applied modelling techniques and model configuration information.

3.1. Acoustic Sources

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. Sound levels tend to be the highest when thrusters are used to position the vessel and when the vessel is transiting at high speeds. 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). A vessel produces broadband noise emissions with most of the energy emitted below a few kilohertz. Sound from onboard machinery, particularly sound below 200 Hz, dominates the sound spectrum before cavitation begins (Spence et al. 2007).

Source specific considerations for underwater noise emission are presented in the subsections below. For the considered vessel, the depth of the source was based on the approximate location of cavitation. For noise from the ROV cutter operations, the source was modelled at a nominal 5 m from the seabed following client supplied information, which indicated that most activities involving ROV cutting will be associated with infrastructure installed on the seafloor.

The exact position of the vessel and ROV in these scenarios is not known and will likely vary due to operational conditions and requirements during the project. Therefore, the concurrent sound from the IMR vessel and the ROV sources were modelled simultaneously at the same geographic (i.e., horizontal) location but with source depths that reflect the activity being modelled. At each location, the DSV was modelled with a 500 m offset to the east.

3.1.1. Inspection, Maintenance and Repair (IMR) Vessel

The IMR vessel planned for the Cooper Energy Gippsland Subsea Development project will be similar to the *Skandi Singapore*. The *Skandi Singapore* is a purpose-built dive support vessel designed for safe and efficient offshore operations. The vessel has an overall length, breadth, and draft of 107.1, 21.0, and 6.6 m, respectively. While in operation, it will hold position by using thrusters under DP. As such, the underwater noise emitted is expected to originate primarily from cavitation in the thrusters whilst under DP.

For modelling purposes, the *Skandi Singapore* has been represented with a source level associated with the *MMA Leeuwin*, a similarly sized vessel, which was measured while undertaking comparable activities (Esso 2021). The overall broadband level of the *MMA Leeuwin* has been scaled up as it is a vessel with less installed power (4960 kW compared to 10500 kW of the *Skandi Singapore*). The broadband (10 Hz to 25 kHz) source level of the vessel has therefore been modelled as 184.4 dB re 1 $\mu\text{Pa}^2\text{m}^2\text{s}$. The spectra has been represented *via* scaling the spectra of the *Siem Sapphire* (McPherson et al. 2021). The final spectrum is shown below in Figure 2. The vessel was modelled as a single point source with a source level spectrum representative of the cumulative contribution of all thrusters.

The source depth of the *Skandi Singapore* has been modelled as 70% of the vessel draft (draft of 6.6 m, resulting in a source depth of 4.6 m), per ISO 17208-1 (2016).

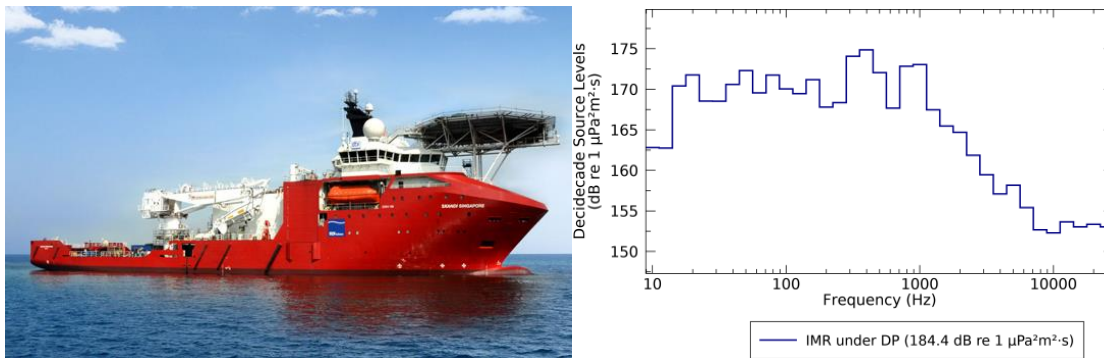


Figure 2. Energy source level (ESL) spectra (in decidecade frequency-band) for the IMR vessel under DP (Photo source: DOF Subsea).

3.1.2. Dive Support Vessel (DSV)

The DSV planned for the Cooper Energy Gippsland Subsea Development project will be similar to the *MV Offshore Guardian*. The *MV Offshore Guardian* is a dive support and ROV vessel designed for safe and efficient offshore operations. The vessel has an overall length, breadth, and maximum draft of 34.0, 11.0, and 2.2 m, respectively. While in operation, it will hold position by using thrusters under DP. As such, the underwater noise emitted is expected to originate primarily from cavitation in the thrusters whilst under DP.

For modelling purposes, the *MV Offshore Guardian* has been represented with a source level based on a similarly sized vessel previously measured by JASCO. This measured vessel has been used as a reference vessel and is suitable for a proxy because it is similar in size and matches the proposed operations. The broadband (10 Hz to 25 kHz) source level of the DSV has therefore been modelled as 159.8 dB re 1 $\mu\text{Pa}^2\text{m}^2\cdot\text{s}$. The spectra has been represented *via* scaling the spectra of the *Siem Sapphire* (McPherson et al. 2021). The final spectrum is shown below in Figure 3. The vessel was modelled as a single point source with a source level spectrum representative of the cumulative contribution of all thrusters.

The source depth of the *MV Offshore Guardian* has been modelled as 70% of the maximum vessel draft (draft of 2.2 m, resulting in a source depth of 1.5 m), per ISO 17208-1 (2016).

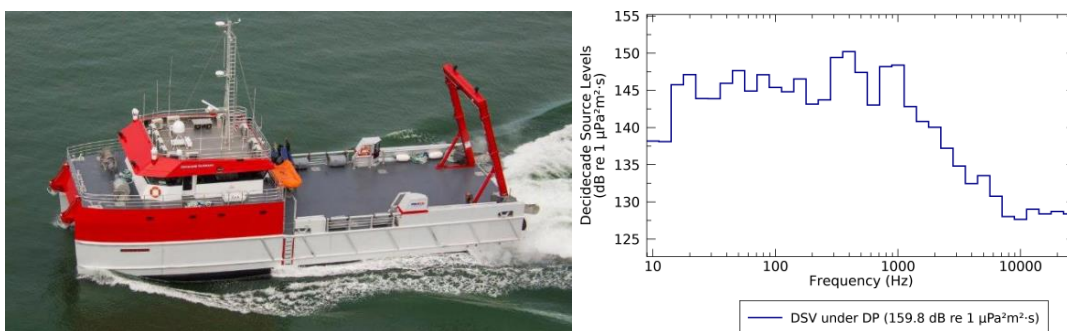


Figure 3. Energy source level (ESL) spectra (in decidecade frequency-band) for the DSV under DP (Photo source: Guardian Offshore AU Pty Ltd).

3.1.3. ROV

The model considered the operation of a remotely operated vehicle (ROV) undertaking cutting activities. This source was previously used for Cooper Energy in Connell et al. (2021). Published literature available to quantify the underwater sound fields from cutting technologies is very limited.

Pangerc et al. (2016) described the underwater sound measurement data during an underwater diamond wire cutting of a 32" conductor (10 m above seabed in ~80 m depth) and found that at lower frequencies, the operation was generally indistinguishable above the background noise; however, the sound that could be associated with the diamond wire cutting was primarily detectable above the background noise at the higher acoustic frequencies (above around 5 kHz). The background noise levels were substantially higher at lower frequencies; therefore, it is likely that the spectra of the noise peaks at lower frequencies, which has been approximated between 2.5 and 20 kHz.

In another study, the US Navy measured underwater sound levels when the diamond saw was cutting caissons for replacing piles at an old fuel pier at Naval Base Point Loma and reported an average SPL for a single cutter at 136.1–141.4 dB re 1 μ Pa at 10 m, as reported in Fairweather Science (2018).

In the absence of other information, the information provided in Pangerc et al. (2016) was used to estimate a representative decidecade-band spectra for the diamond wire saw underwater, which was scaled to have a level of 141.4 dB re 1 μ Pa at 10 m and then then backpropagated using spherical spreading ($20\log_{10}(R)$) to determine an ESL spectra (in decidecade frequency bands). This was estimated to be the most appropriate approach given the limited information available. Figure 4 shows the representative decidecade-band ESL spectra, with a broadband ESL for the cutter being 161.4 dB re 1 μ Pa.

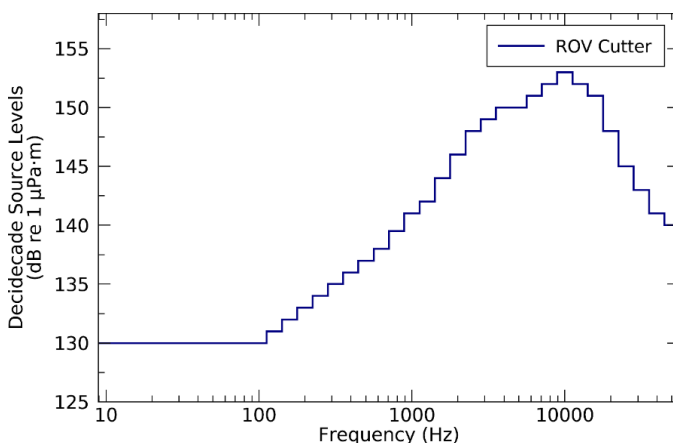


Figure 4. Energy source level (ESL) spectra (in decidecade frequency-band) for the diamond cutter, operated by the ROV, which has a broadband ESL (10 Hz to 25 kHz) of 161.4 dB re 1 μ Pa.

3.2. Geometry and Modelled Regions

JASCO's Marine Operations Noise Model (MONM-BELLHOP; see Appendix B.2.2) was used to predict the acoustic field at frequencies of 10 Hz to 25 kHz for the considered source. 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 25 kHz. The MONM and BELLHOP results were combined to produce results for the full frequency range of interest. Modelling calculated propagation loss up to 100 km from the source, 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 $\Delta\theta = 2.5^\circ$ for a total of $N = 144$ radial planes. Receiver depths were chosen to span the entire water column over the modelled area, from 1 m to a maximum of 4250 m.

For the nearshore pipeline site, where the seabed geoacoustic model consisted of a thin layer (2.5 m) of sand overlaying calcarenite, an additional broadband correction was applied to the results from MONM-BELLHOP to better account for the additional propagation loss associated with a limestone (calcarenite) seabed (see Appendix B.2.4). The broadband correction was applied to the IMR vessel source, but it was not deemed necessary to apply to the ROV source as it would have had negligible impact on the high frequencies produced by the ROV cutter.

To produce the maps of received sound level isopleths, and to calculate distances to specified sound level thresholds, the maximum-over-depth level was calculated at each sampling point within the modelled region. The radial grids of maximum-over-depth levels were then resampled (by linear triangulation) to produce a regular Cartesian grid. The contours and threshold ranges were calculated from these grids of the modelled acoustic field.

3.3. Accumulated SEL

In this study, the sound source was considered to be continuously operating with new sound energy constantly being introduced to the environment. The reported source levels are usually in terms of sound pressure levels (SPL), representing the average instantaneous acoustic level of a considered source. The evaluation of the cumulative sound field (i.e., in terms of SEL_{24h}) depends on the number of seconds of operation during the accumulation period.

The SPL modelling results were converted to SEL by the duration of the activity, which is appropriate for non-impulsive noise sources. SEL was assessed over 24 h and for a stationary vessel/source. The conversion from SPL was obtained by increasing the levels by $10 \cdot \log_{10}(T)$, where T is 86,400 s (the number of seconds in 24 h). Additional information on acoustic metrics can be found in Appendix A.1.

4. Results

4.1. Acoustic Modelling Tabulated Results

Table 7 presents the maximum and 95% distances (defined in Appendix B.3) to SPL isopleths. Table 8 presents the maximum distances to frequency-weighted SEL_{24h} thresholds, as well as total ensouffied area.

For the results below, the distances to isopleths/thresholds were reported from the most dominant single source. Maps are provided in Section 4.2 to assist with contextualising tabulated distances.

Additional results considering just the DSV under DP operations can be found in Appendix C.

Table 7. SPL: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL). Scenario descriptions are given in Table 3.

SPL (L_p ; dB re 1 μ Pa)	Patricia-Baleen wells				Nearshore Pipeline				Sole wells			
	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
170 ^a	–	–	–	–	–	–	–	–	–	–	–	–
160	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
158 ^b	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
150	0.06	0.06	0.07	0.07	0.11	0.11	0.11	0.11	0.06	0.06	0.07	0.07
140	0.51	0.50	0.52	0.50	0.60	0.56	0.61	0.56	0.37	0.36	0.37	0.36
130	2.53	2.39	2.53	2.39	2.59	2.23	2.59	2.24	1.71	1.62	1.72	1.62
120 ^c	7.82	7.22	7.82	7.23	8.69	7.78	8.70	7.80	7.02	6.69	7.03	6.70
110	21.2	19.4	21.2	19.5	27.4	24.6	27.5	24.6	21.2	19.6	21.3	19.6

^a 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).

^b 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).

^c Threshold for marine mammal behavioural response to non-impulsive noise (NOAA 2019).

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

Table 8. *Weighted SEL_{24h}*: Maximum (R_{max}) horizontal distances (in km) from the sound source to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017), and ensonified area (km^2). Scenario descriptions are given in Table 3.

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re $1 \mu Pa^2 \cdot s$)	Patricia-Baleen wells				Nearshore pipeline				Sole wells			
		Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS													
LF cetaceans	199	0.06	0.012	0.06	0.014	0.07	0.018	0.08	0.018	0.06	0.010	0.06	0.011
HF cetaceans	198	-	-	-	-	-	-	-	-	-	-	-	-
VHF cetaceans	173	0.07	0.018	0.08	0.019	0.09	0.024	0.09	0.023	0.06	0.010	0.07	0.019
Otariid pinnipeds	219	-	-	-	-	-	-	-	-	-	-	-	-
Sea Turtles	220	-	-	-	-	-	-	-	-	-	-	-	-
TTS													
LF cetaceans	179	2.22	12.86	2.22	12.90	2.11	11.73	2.11	11.79	1.41	5.507	1.43	5.549
HF cetaceans	178	0.05	0.008	0.06	0.011	0.05	0.008	0.06	0.011	0.05	0.008	0.06	0.011
VHF cetaceans	153	0.95	2.735	0.99	2.895	0.92	2.438	0.95	2.573	0.89	2.367	0.91	2.455
Otariid pinnipeds	199	0.02	0.002	0.03	0.003	0.02	0.002	0.03	0.003	0.02	0.002	0.02	0.002
Sea Turtles	200	0.05	0.008	0.05	0.008	0.06	0.012	0.06	0.014	0.04	0.005	0.04	0.007

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

4.2. Sound Field Maps and Graphs

Maps of the estimated sound fields, threshold contours, and isopleths of interest for SPL and SEL_{24h} sound fields are presented for the six modelled scenarios. The SPL results are presented in Figures 5 to 10 (Section 4.2.1), whilst the SEL_{24h} results are presented in Figures 11 to 15 (Section 4.2.2).

4.2.1. SPL Sound Level Contour Maps

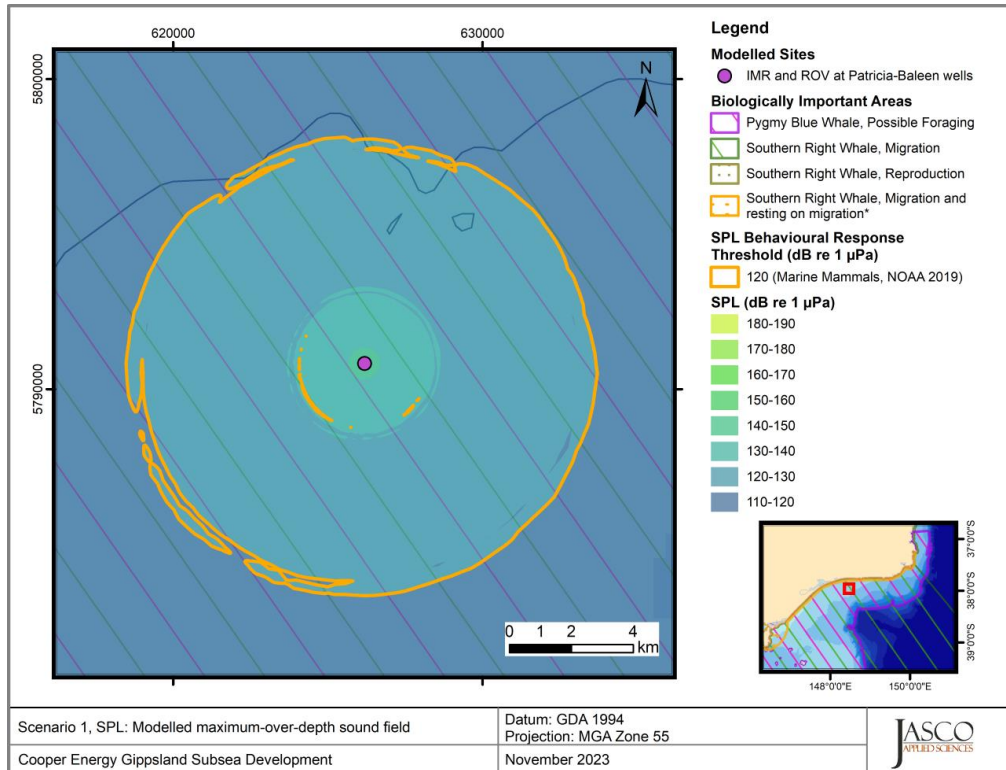


Figure 5. Scenario 1, IMR under DP and ROV at Patricia-Baleen wells: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

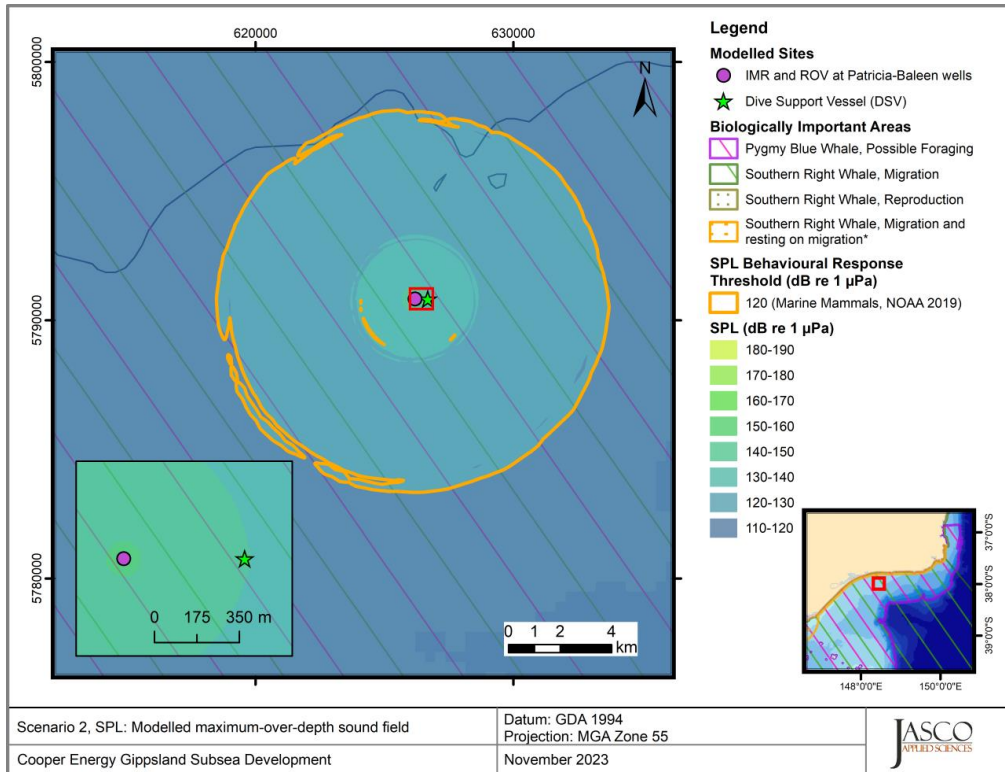


Figure 6. Scenario 2, IMR under DP, ROV, and DSV under DP at Patricia-Baleen wells: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

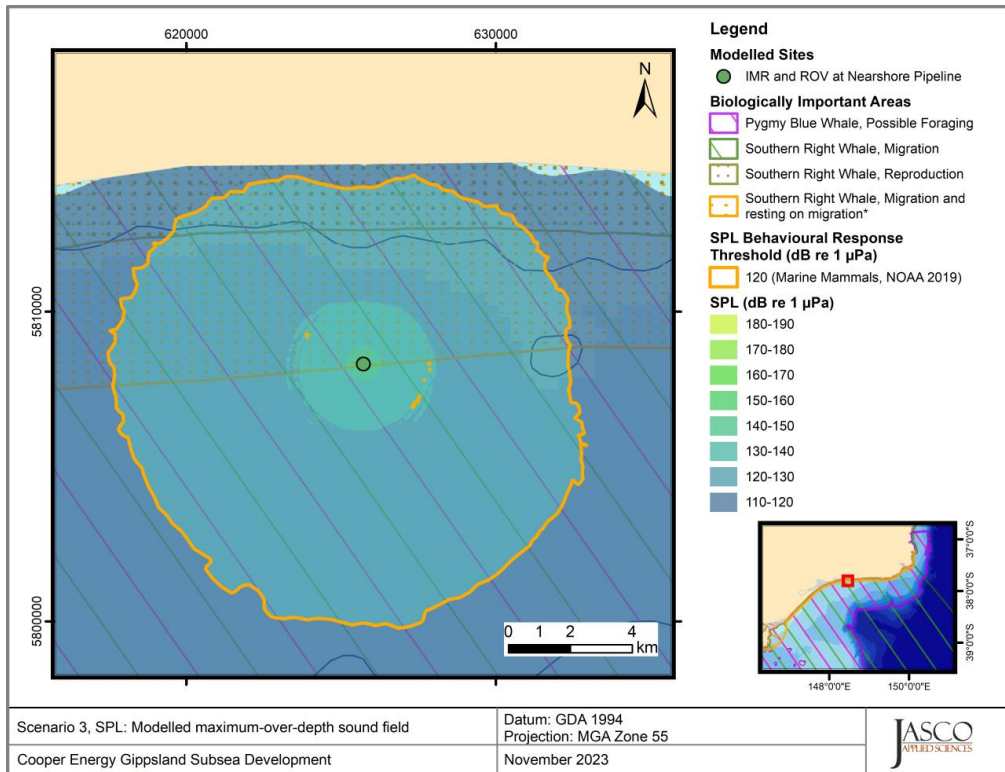


Figure 7. Scenario 3, IMR under DP and ROV at nearshore pipeline: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

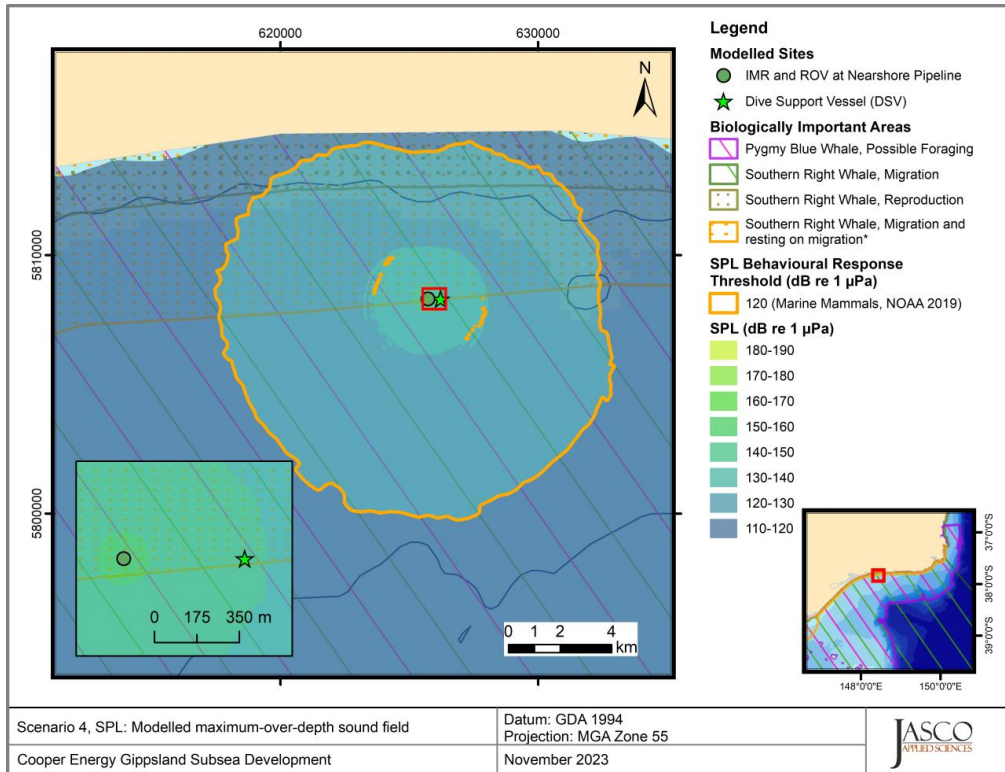


Figure 8. Scenario 4, IMR under DP, ROV, and DSV under DP at nearshore pipeline: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

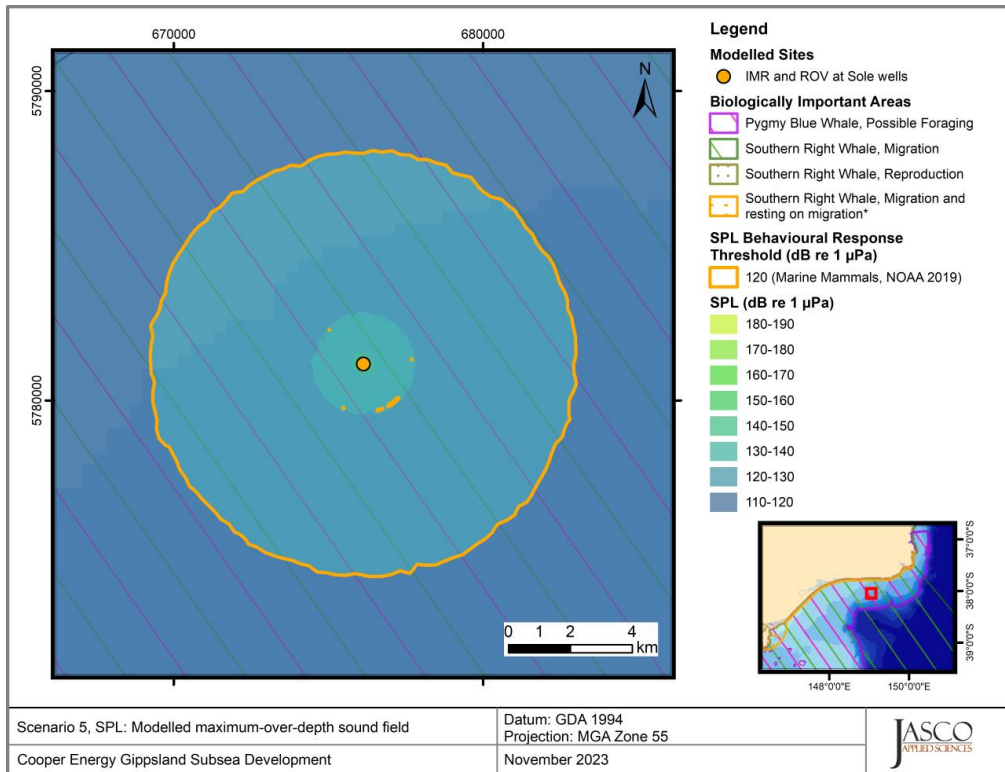


Figure 9. Scenario 5, IMR under DP and ROV at Sole wells: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

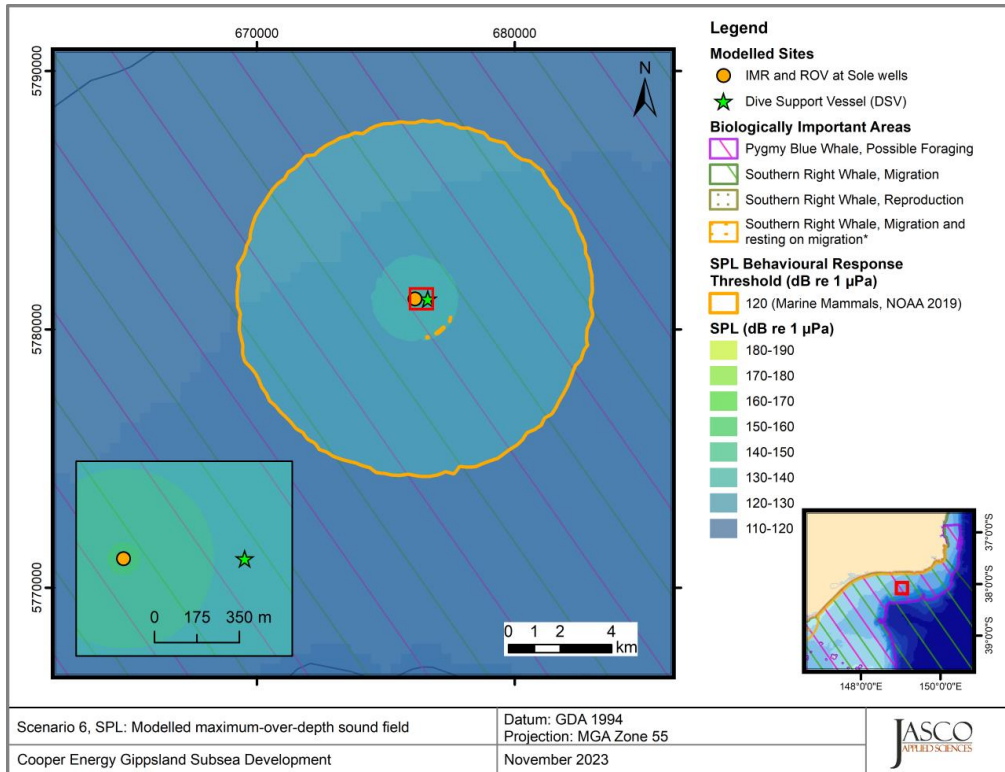


Figure 10. Scenario 6, IMR under DP, ROV, and DSV under DP at Sole wells: Sound level contour map showing the unweighted maximum-over-depth sound field in 10 dB steps, and the isopleth for behavioural response threshold for marine mammals. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

4.2.2. Accumulated SEL_{24h} Sound Level Contour Maps

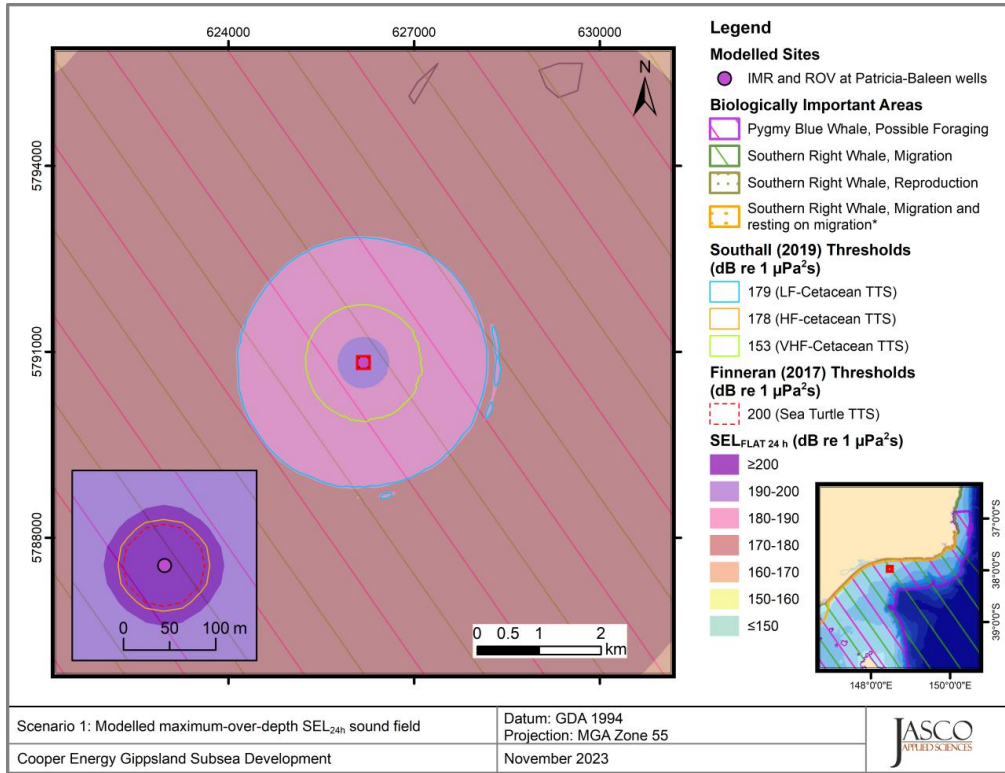


Figure 11. Scenario 1, IMR under DP and ROV at Patricia-Baleen wells, SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

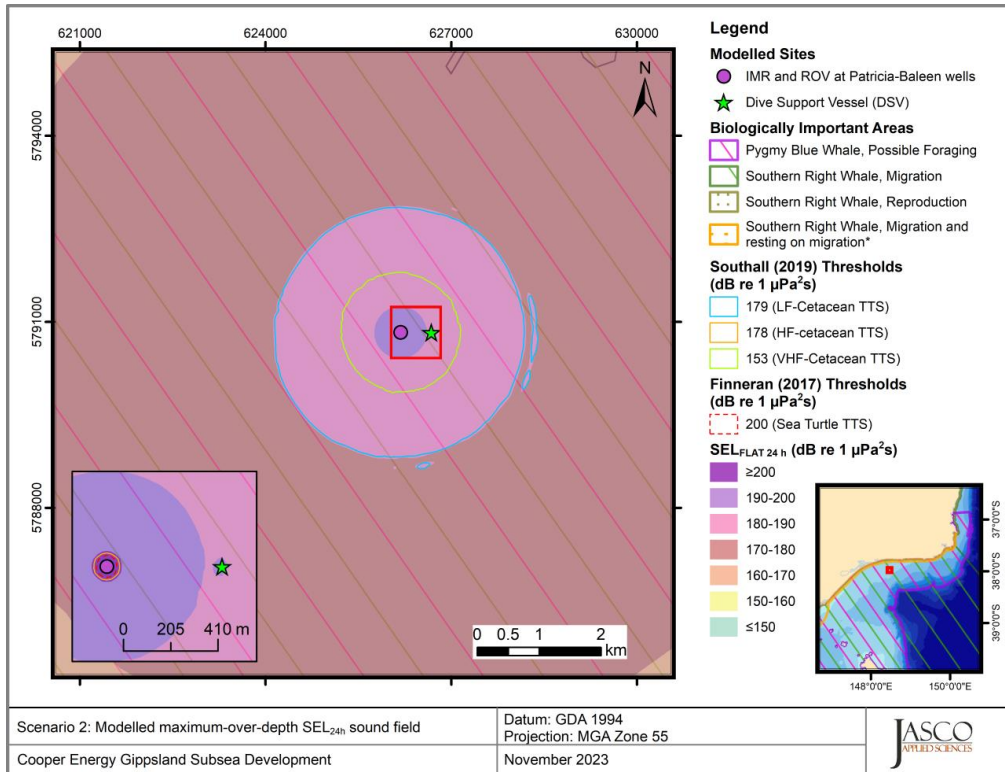


Figure 12. Scenario 2, IMR under DP, ROV, and DSV under DP at Patricia-Baleen wells, SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

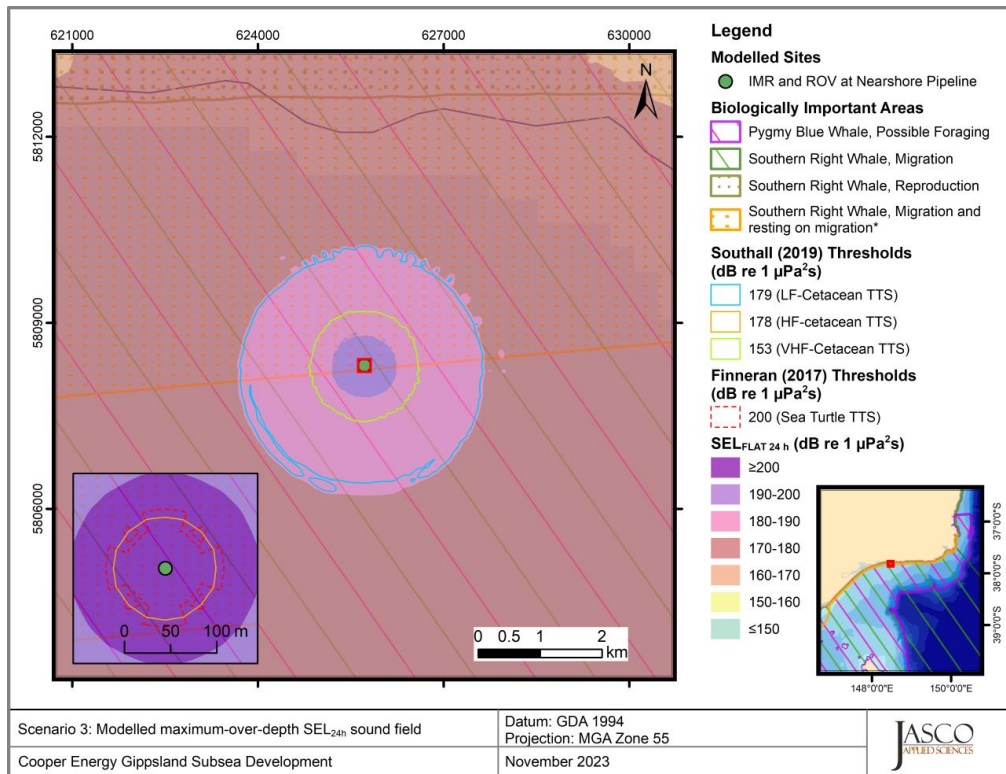


Figure 13. Scenario 3, IMR under DP and ROV at nearshore pipeline, SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

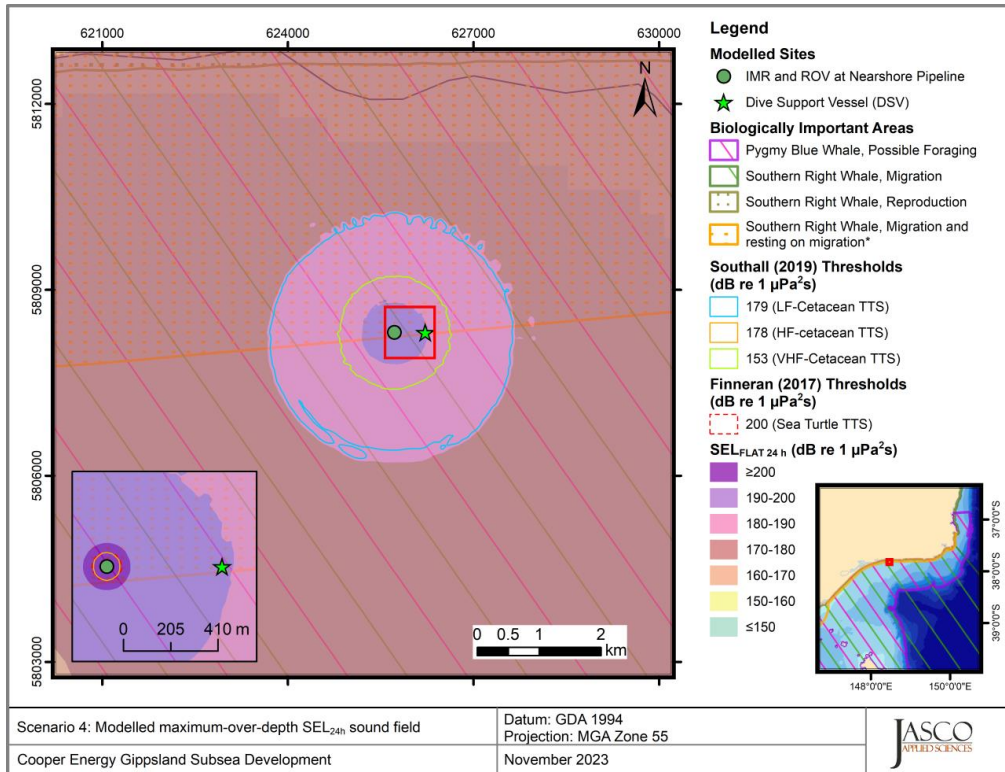


Figure 14. Scenario 4, IMR under DP, ROV, DSV under DP at nearshore pipeline, SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

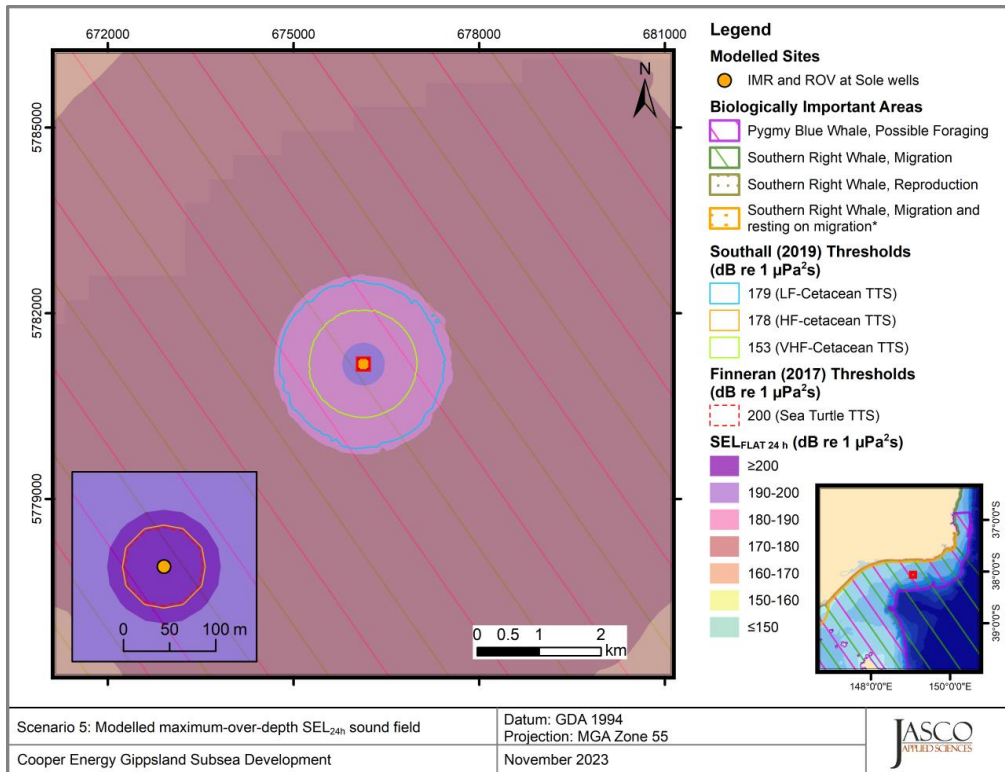


Figure 15. Scenario 5, IMR under DP and ROV at Sole wells, SEL_{24h} : Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

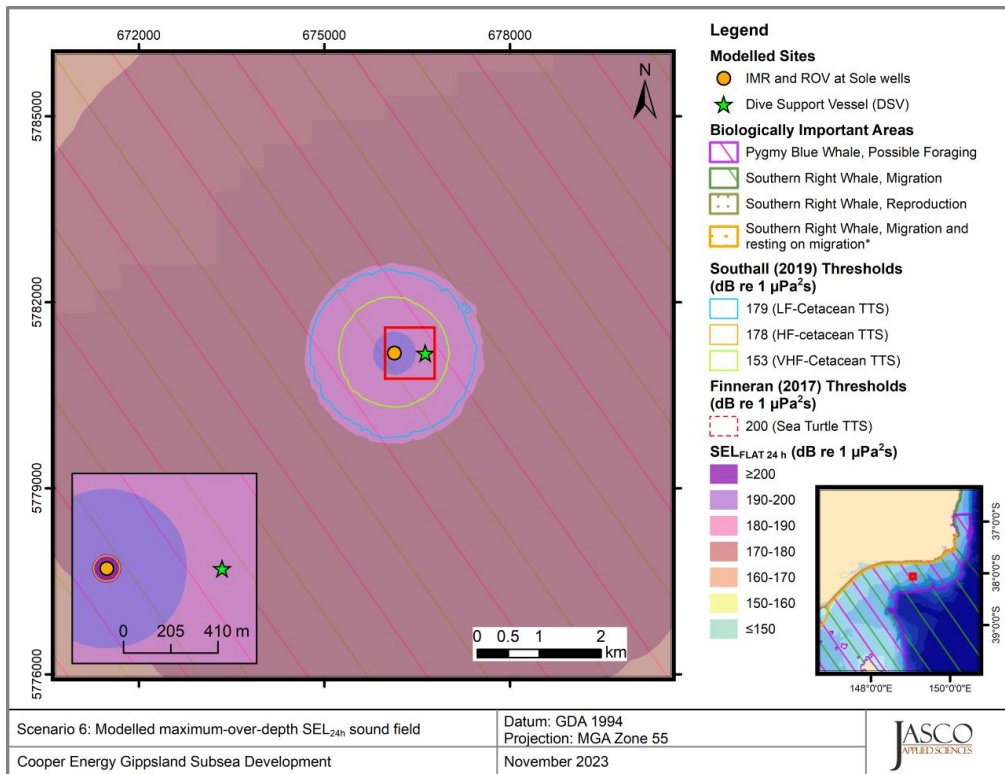


Figure 16. Scenario 6, IMR under DP, ROV, and DSV under DP at Sole wells, SEL_{24h}: Sound level contour map showing unweighted maximum-over-depth SEL_{24h} results, with isopleths for TTS in low-, high- and very-high-frequency cetaceans and sea turtles. Please note that the southern right whale migration and resting on migration biologically important area marked by an asterisk (*) has now been superseded by the recently released biologically important areas (migration, and reproduction) for southern right whales by DCCEEW and is shown here for context only.

5. Discussion and Conclusion

This modelling study predicted underwater sound levels associated with Cooper Energy's proposed operations in the vicinity of their Gippsland subsea infrastructure. Concurrent sound from an IMR vessel under DP, an ROV performing underwater cutting, and a DSV under DP were modelled at three locations; the Patricia-Baleen and Sole well locations and at the nearshore pipeline between the Orbost Gas Plant and Patricia-Baleen. The IMR and ROV were modelled simultaneously at the same geographic (i.e., horizontal) location but with source depths that reflected the activity being modelled. At each location, the DSV was modelled with a 500 m offset to the east.

The modelled sound source of the ROV performing cutting incorporated high frequency energy (peaking at 10 kHz) compared to the spectra modelled for the IMR vessel and DSV under DP, which contained its highest energy at levels below 1 kHz. The broadband sound level of the IMR vessel under DP was approximately 20 decibels higher than the ROV source. The hearing range of the LF cetacean group is most closely aligned with the IMR vessel and DSV noise sources (refer Appendix A.4), and the ROV cutter contributes sound in the hearing range of the HF and VHF cetaceans.

All modelled locations are situated on the continental shelf in water depths of 53 and 52 m at Patricia-Baleen, 41 m at the nearshore pipeline, and 123 m at Sole. However, the geoacoustic profiles at the three locations differed. At the Patricia-Baleen and Sole sites, seabed sediments were modelled as 100 m of varying sand types overlaying well-cemented calcarenite at deeper depths. At the nearshore pipeline site, however, the sand layer was modelled as 2.5 m thick and the well-cemented limestone/calcarenite lithology was much closer to the seafloor. Due to the thin layer of sand overlaying the calcarenite at the nearshore pipeline site, additional modelling was conducted to better estimate propagation loss due to the limestone/calcarenite. This is discussed further in Appendix B.1.3 and B.2.4. The distribution of sand over limestone/calcarenite appears to be variable as discussed in Appendix B.1.3. Due to this variability, the sand layer may be present or absent depending on exact location and hence radii may be smaller than predicted.

The sound speed profile (Appendix B.1.2) was derived from data from the U.S. Naval Oceanographic Office's Generalized Digital Environmental Model V 3.0 (GDEM; Teague et al. 1990, Carnes 2009). The profile was defined by considering propagation characteristics of both the relatively shallow site locations and nearby sub-marine canyon. The month of June was selected as this represented the month most supportive of sound propagation, based on an analysis of the temperature, salinity and sound speed profiles extracted from this database. The considered sound speed profile was primarily downward refracting apart from a slight upward refracting layer, which extended approximately 20 m down from the sea surface (Figure B-2). This layer has the potential to trap high frequency energy above ~2100 Hz (Jensen et al. 2011) near the sea surface that would otherwise dissipate more rapidly in range due to propagation, absorption, and seabed losses.

SPL results were similar for the modelled sites. The maximum range to the 120 dB re 1 μ Pa isopleth, which represents the marine mammal behavioural response criterion, was longest for the nearshore pipeline location; 8.70 km compared to 7.82 km and 7.03 km for the Patricia-Baleen and Sole modelled sites respectively (Table 7). The difference was primarily influenced by the different seabed profile at the nearshore pipeline modelled location. At all modelled sites, the 120 dB re 1 μ Pa isopleths were relatively circular and bathymetry had very little influence on propagation, except isopleths from the nearshore pipeline site that interacted with the coastline. There were only minor differences between scenarios considering the IMR and ROV operations only (Scenarios 1, 3 and 5) and scenarios including the DSV (Scenarios 2, 4 and 6).

The 24 h cumulative SEL sound level contours were also relatively circular. In all three scenarios, successive reflections between the seabed and the sea-surface resulted in convergence zones, evident as ‘sound islands’, resulting in multiple occurrences of the LF cetacean TTS isopleth, a short distance from the main isopleth region. The R_{max} results provided in this report refer to the maximum distance between the sound sources and the farthest isopleth. For both LF and VHF cetaceans, the maximum ranges to the PTS isopleths were greatest at the nearshore pipeline location, while the maximum ranges to TTS isopleths were greatest at the Patricia-Baleen site.

The PTS thresholds for Otariid pinnipeds, HF cetaceans and turtles were not reached within the limits of the modelled resolution (20 m) at any site. Due to the discretely sampled 20 m calculation grids of the modelled sound fields, distances to these levels could not be estimated for practicable computational purposes. The maximum horizontal range to a 24 h SEL threshold was 2.22 km to the LF cetacean TTS threshold from the Patricia-Baleen modelling site, corresponding to an ensonified area of 12.9 km² (Table 8).

The threshold for TTS in fish with a swim bladder involved in hearing was reached within 30 m at all three sites, if a fish remains in a static location for 12 hours. The 48 hour threshold for recoverable injury for fish with a swim bladder involved in hearing was not reached within the limits of the modelled resolution (20 m) at any site.

Table 9. Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to the marine mammal behavioural response criterion of 120 dB re 1 μ Pa (SPL), and maximum (R_{max}) horizontal distances (in km) and ensonified area (km²) for the frequency-weighted LF-cetacean SEL_{24h} TTS thresholds per scenario.

Scenario	Location	Description	Behavioural response (SPL) ¹		LF-cetacean TTS (SEL _{24h}) ²	
			120 dB re 1 μ Pa		179 dB re 1 μ Pa ² ·s	
			R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	Area (km ²)
1	Patricia-Baleen wells	IMR under DP + ROV Cutter	7.82	7.22	2.22	12.86
2		IMR under DP + ROV Cutter + DSV under DP	7.82	7.23	2.22	12.90
3	Nearshore pipeline	IMR under DP + ROV Cutter	8.69	7.78	2.11	11.73
4		IMR under DP + ROV Cutter + DSV under DP	8.70	7.80	2.11	11.79
5	Sole wells	IMR under DP + ROV Cutter	7.02	6.69	1.41	5.507
6		IMR under DP + ROV Cutter + DSV under DP	7.03	6.70	1.43	5.549

¹ NOAA (2019) recommended unweighted behavioural threshold for marine mammals.

² Southall et al. (2019) criteria.

Glossary

1/3-octave

One third of an [octave](#). *Note:* A 1/3-octave is approximately equal to one [decidecade](#) ($1/3 \text{ oct} \approx 1.003 \text{ ddec}$).

absorption

The conversion of [sound](#) energy to heat energy. Specifically, the reduction of [sound pressure](#) amplitude due to particle motion energy converting to heat in the propagation medium.

acoustic noise

[Sound](#) that interferes with an acoustic process.

acoustic self-noise

[Sound](#) at a receiver caused by the deployment, operation, or recovery of a specified receiver, and its associated platform (ISO 18405:2017).

agent-based modelling

A computer simulation of autonomous agents (sometimes called animats) acting in an environment, used to assess the agents' experience of the environment and/or their effect on the environment. See also [animal movement modelling](#).

ambient sound

[Sound](#) that would be present in the absence of a specified activity (ISO 18405:2017). It is usually a composite of sound from many sources near and far, e.g., shipping vessels, seismic activity, precipitation, sea ice movement, wave action, and biological activity.

animal movement modelling

Simulation of animal movement based on behavioural rules for the purpose of predicting an animal's experience of an environment. A type of [agent-based modelling](#).

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.

audiogram

A graph or table of [hearing threshold](#) as a function of [frequency](#) that describes the hearing sensitivity of an animal over its hearing range.

auditory frequency weighting

The process of applying an [auditory frequency-weighting function](#). An example for marine mammals are the auditory frequency-weighting functions published by Southall et al. (2007).

auditory frequency-weighting function

Frequency-weighting function describing a compensatory approach accounting for a species' (or functional hearing group's) frequency-specific hearing sensitivity.

background noise

Combination of [ambient sound](#), [acoustic self-noise](#), and, where applicable, sonar reverberation (ISO 18405:2017) that is detected, measured, or recorded with a signal.

bandwidth

A range within a continuous band of frequencies. Unit: hertz (Hz).

broadband level

The total [level](#) measured over a specified [frequency](#) range. If the frequency range is unspecified, the term refers to the entire measured frequency range.

cavitation

A rapid formation and collapse of vapor cavities (i.e., bubbles or voids) in water, most often caused by a rapid change in pressure. Fast-spinning vessel propellers typically cause cavitation, which creates a lot of noise.

cetacean

Member of the order Cetacea. Cetaceans are aquatic mammals and include whales, dolphins, and porpoises.

compressional wave

A mechanical vibration wave in which the direction of particle motion is parallel to the direction of propagation. Also called a longitudinal wave. In seismology/geophysics, it's called a primary wave or P-wave. [Shear waves](#) in the seabed can be converted to compressional waves in water at the water-seabed interface.

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.

critical band

The auditory [bandwidth](#) within which [background noise](#) strongly contributes to [masking](#) of a single tone. Unit: hertz (Hz).

critical ratio level

The difference between the [sound pressure level](#) of a masked tone, which is barely audible, and the spectral density level of the [background noise](#) at similar frequencies, referenced to 1 Hz. Unit: decibel (dB).

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 \approx 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.

delphinid

Member of the family of oceanic dolphins (Delphinidae), composed of approximately 35 extant species, including dolphins, porpoises, and killer whales.

energy source level

A property of a **sound** source equal to the **sound exposure level** measured in the **far field** plus the **propagation loss** from the acoustic centre of the source to the receiver position. Unit: **decibel (dB)**. **Reference value:** 1 $\mu\text{Pa}^2 \text{m}^2 \text{s}$.

ensonified

Exposed to **sound**.

equal-loudness-level contour

Curve that shows, as a function of **frequency**, the **sound pressure level** required to produce a given loudness for a listener having normal hearing, listening to a specified kind of **sound** in a specified manner (ANSI S1.1-2013).

far field

The zone where, to an observer, **sound** originating from an array of sources (or a spatially distributed source) appears to radiate from a single point.

frequency

The rate of oscillation of a periodic function measured in cycles per unit time. The reciprocal of the period. Unit: **hertz (Hz)**. Symbol: *f*. 1 Hz is equal to 1 cycle per second.

frequency weighting

The process of applying a **frequency-weighting function**.

frequency-weighting function

The squared magnitude of the [sound pressure](#) transfer function (ISO 18405:2017). For [sound](#) of a given [frequency](#), the frequency-weighting function is the ratio of output power to input power of a specified filter, sometimes expressed in decibels. Examples include the following:

- *Auditory frequency-weighting function*: compensatory frequency-weighting function accounting for a species' (or [functional hearing group](#)'s) frequency-specific hearing sensitivity.
- *System frequency-weighting function*: frequency-weighting function describing the sensitivity of an acoustic recording system, which typically consists of a [hydrophone](#), one or more amplifiers, and an analog-to-digital converter.

functional hearing group

Category of animal species when classified according to their hearing sensitivity, hearing anatomy, and susceptibility to [sound](#). For marine mammals, initial groupings were proposed by Southall et al. (2007), and revised groupings are developed as new research/data becomes available. Revised groupings proposed by Southall et al. (2019) include low-frequency cetaceans, high-frequency cetaceans, very high-frequency cetaceans, phocid carnivores in water, other carnivores in water, and sirenians. See [auditory frequency-weighting functions](#), which are often applied to these groups. Example hearing groups for fish include species for which the swim bladder is involved in hearing, species for which the swim bladder is not involved in hearing, and species without a swim bladder (Popper et al. 2014).

geoacoustic

Relating to the acoustic properties of the seabed.

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 [sound pressure](#) transducer. A passive electronic device for recording or listening to underwater [sound](#).

hydrostatic pressure

The pressure at any given depth in a static liquid that is the result of the weight of the liquid acting on a unit area at that depth, plus any pressure acting on the surface of the liquid. Unit: pascal (Pa).

impulsive sound

Qualitative term meaning [sounds](#) that are typically transient, brief (less than 1 s), broadband, with rapid rise time and rapid decay. They can occur in repetition or as a single event. Sources of impulsive sound include, among others, explosives, seismic airguns, and impact pile drivers.

isopleth

A line drawn on a map through all points having the same value of some specified quantity (e.g., sound pressure level isopleth).

knot (kn)

Unit of vessel speed equal to 1 nautical mile per hour.

level

A measure of a quantity expressed as the logarithm of the ratio of the quantity to a specified [reference value](#) of that quantity. For example, a value of [sound pressure level](#) with reference to $1 \mu\text{Pa}^2$ can be written in the form $x \text{ dB re } 1 \mu\text{Pa}^2$.

low-frequency (LF) cetaceans

See [functional hearing group](#).

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](#).

Monte Carlo simulation

A method of investigating the distribution of a non-linear multi-variate function by random sampling of its input variable distributions.

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.

otariid

Member of the family Otariidae, one of the three groupings of [pinnipeds](#) (along with [phocids](#) and walrus). These eared seals, commonly called fur seals and sea lions, are adapted to semi-aquatic life; they use their large fore flippers for propulsion underwater and can walk on all four limbs on land.

otariid pinnipeds underwater (OW)

See [functional hearing group](#).

other marine carnivores in water (OCW)

See [functional hearing group](#).

parabolic equation method

A computationally efficient solution to the acoustic wave equation that is used to model [propagation loss](#). The parabolic equation approximation omits effects of backscattered [sound](#) (which are negligible for most ocean-acoustic propagation problems), simplifying the computation of propagation loss.

particle acceleration, particle displacement, particle motion, particle velocity

See [sound particle acceleration](#), [sound particle displacement](#), [sound particle motion](#), [sound particle velocity](#).

peak sound pressure level (PK), zero-to-peak sound pressure level

The **level** (L_{pk}) of the squared maximum magnitude of the **sound pressure** (p_{pk}^2) in a stated **frequency** band and time window. Defined as $L_{pk} = 10 \log_{10}(p_{pk}^2/p_0^2) = 20 \log_{10}(p_{pk}/p_0)$. Unit: **decibel (dB)**. **Reference value** (p_0^2) for **sound** in water: $1 \mu\text{Pa}^2$.

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 N th 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**.

phocid

Member of the family Phocidae, one of the three groupings of **pinnipeds** (along with **otariids** and walrus). These true/earless seals are more adapted to in-water life than are **otariids**, which have more terrestrial adaptations. Phocids use their hind flippers to propel themselves underwater.

phocid pinnipeds underwater (PW), phocid carnivores in water (PCW)

See **functional hearing group**.

pinniped

Member of the superfamily Pinnipedia, which is composed of **phocids** (true seals or earless seals), **otariids** (eared seals or fur seals and sea lions), and walrus.

point source

A source that radiates **sound** as if from a single point.

propagation loss (PL)

Difference between a **source level** (SL) and the level at a specified location, $PL(x) = SL - L(x)$. Unit: **decibel (dB)**. See also **transmission loss**.

radiated noise level (RNL)

A **source level** that has been calculated assuming **sound pressure** decays geometrically with distance from the source, with no influence of the sea-surface or seabed. Often used to quantify source levels of vessels or industrial operations from measurements. See also **monopole source level**.

received level

The **level** of a given field variable measured (or that would be measured) at a given location.

reference value

Standard value of a quantity used for calculating underwater [sound level](#). The reference value depends on the quantity for which the level is being calculated:

Quantity	Reference value
Sound pressure	$p_0^2 = 1 \mu\text{Pa}^2$ or $p_0 = 1 \mu\text{Pa}$
Sound exposure	$E_0 = 1 \mu\text{Pa}^2 \text{ s}$
Sound particle displacement	$\delta_0^2 = 1 \text{ pm}^2$
Sound particle velocity	$u_0^2 = 1 \text{ nm}^2/\text{s}^2$
Sound particle acceleration	$a_0^2 = 1 \mu\text{m}^2/\text{s}^4$

sensation level

Difference between the [sound pressure level](#) and [hearing threshold](#) at a specified [frequency](#).

Unit: [decibel \(dB\)](#).

shear wave

A mechanical vibration wave in which the direction of particle motion is perpendicular to the direction of propagation. Also called a secondary wave or S-wave. Shear waves propagate only in solid media, such as sediments or rock. Shear waves in the seabed can be converted to [compressional waves](#) in water at the water-seabed interface.

sirenians (SI)

Members of the order Sirenia, which includes several manatee species and the dugong. See also [functional hearing group](#).

sound

A time-varying disturbance in the pressure, stress, or material displacement of a medium propagated by local compression and expansion of the medium. In common meaning, a form of energy that propagates through media (e.g., water, air, ground) as pressure waves.

sound exposure

Time integral of squared [sound pressure](#) over a stated time interval in a stated [frequency](#) band. The time interval can be a specified time duration (e.g., 24 h) or from start to end of a specified event (e.g., a pile strike, an airgun pulse, a construction operation). Unit: pascal squared second ($\text{Pa}^2 \text{ s}$). 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: $1 \mu\text{Pa}^2 \text{ s}$.

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 ($\text{Pa}^2 \text{ s}/\text{Hz}$).

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 motion

Movement caused by the action of [sound](#) of the smallest volume of a medium that represents its mean physical properties. Important for determining effects of underwater noise on fishes and invertebrates because their hearing organs sense particle motion rather than sound pressure.

sound particle displacement

Displacement of a material element caused by the action of [sound](#), where a material element is the smallest element of the medium that represents the medium's mean density (ISO 18405:2017). Unit: metre (m). Symbol: δ .

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_{rms}^2) in a stated [frequency](#) band and time window: $L_p = 10 \log_{10}(p_{rms}^2/p_0^2) = 20 \log_{10}(p_{rms}/p_0)$, where rms is the abbreviation for root-mean-square. Unit: [decibel \(dB\)](#). [Reference value](#) (p_0^2) for [sound](#) in water: $1 \mu Pa^2$. SPL can also be expressed in terms of the root-mean-square (rms) with a [reference value](#) of $p_0 = 1 \mu Pa$. 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.

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 (ISO 18405:2017).

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: $1 \mu\text{Pa}^2 \text{m}^2$.

spectrogram

A visual representation of acoustic amplitude over time and frequency. A spectrogram's resolution in the time and frequency domains should generally be stated as it determines the information content of the representation.

spectrum

Distribution of acoustic signal content over [frequency](#), where the signal's content is represented by its power, energy, mean-square [sound pressure](#), or [sound exposure](#).

surface duct

The upper portion of a water column within which the gradient of the [sound speed profile](#) causes [sound](#) to refract upward and therefore reflect repeatedly off the surface resulting in relatively long-range sound propagation with little loss.

temporary threshold shift (TTS)

Reversible loss of hearing sensitivity caused by noise exposure. Compare with [permanent threshold shift](#).

thermocline

A depth interval near the ocean surface that experiences larger temperature gradients than the layers above and below it due to warming or cooling by heat conduction from the atmosphere and by warming from the sun.

transmission loss (TL)

The difference between a specified level at one location and that at a different location: $TL(x_1, x_2) = L(x_1) - L(x_2)$ (ISO 18405:2017). Unit: [decibel \(dB\)](#). See also [propagation loss](#).

unweighted

Term indicating that no [frequency-weighting function](#) is applied.

very high-frequency (VHF) cetaceans

See [functional hearing group](#).

wavelength

Distance over which a wave completes one cycle of oscillation. Unit: metre (m). Symbol: λ .

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Appendix A. Acoustic Metrics

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 $p_0 = 1 \mu\text{Pa}$. 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 $1 \mu\text{Pa}$) 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:

$$L_p = 10 \log_{10} \left(\frac{1}{T} \int_T g(t) p^2(t) dt / p_0^2 \right) \text{ dB} \quad (\text{A-1})$$

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 $1 \mu\text{Pa}^2 \cdot \text{s}$) is the time-integral of the squared acoustic pressure over a duration (T):

$$L_E = 10 \log_{10} \left(\int_T p^2(t) dt / T_0 p_0^2 \right) \text{ dB} \quad (\text{A-2})$$

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:

$$L_{E,N} = 10 \log_{10} \left(\sum_{i=1}^N 10^{\frac{L_{E,i}}{10}} \right) \text{ dB} . \quad (\text{A-3})$$

If applied, the frequency weighting of an acoustic event should be specified, as in the case of weighted SEL (e.g., $L_{E,LF,24h}$; 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 i th band, $f_c(i)$, is defined as:

$$f_c(i) = 10^{\frac{i}{10}} \text{ kHz} \quad (\text{A-4})$$

and the low (f_{lo}) and high (f_{hi}) frequency limits of the i th decade band are defined as:

$$f_{lo,i} = 10^{\frac{-1}{20}} f_c(i) \quad \text{and} \quad f_{hi,i} = 10^{\frac{1}{20}} f_c(i) \quad (\text{A-5})$$

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 ($f_c(10) = 10$ Hz) to band 44 ($f_c(44) = 25$ kHz).

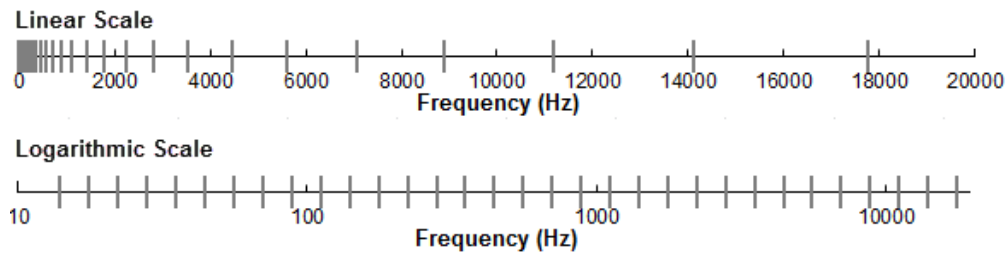


Figure A-1. Decidecade frequency bands (vertical lines) shown on a linear frequency scale and a logarithmic scale.

The sound pressure level in the i th band ($L_{p,i}$) is computed from the spectrum $S(f)$ between $f_{lo,i}$ and $f_{hi,i}$:

$$L_{p,i} = 10 \log_{10} \int_{f_{lo,i}}^{f_{hi,i}} S(f) df \text{ dB} \quad (\text{A-6})$$

Summing the sound pressure level of all the bands yields the broadband sound pressure level:

$$\text{Broadband SPL} = 10 \log_{10} \sum_i 10^{\frac{L_{p,i}}{10}} \text{ dB} \quad (\text{A-7})$$

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.

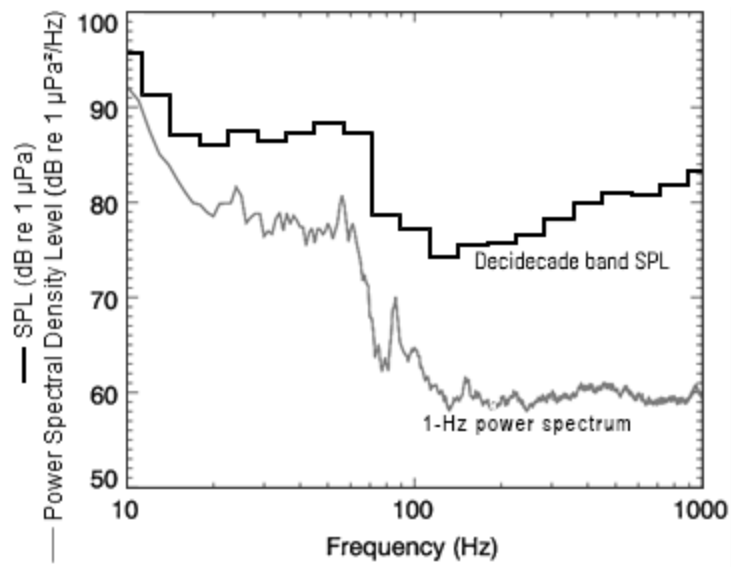


Figure A-2. Sound pressure spectral density levels and the corresponding decidecade band sound pressure levels of example ambient noise shown on a logarithmic frequency scale. Because the decidecade bands are wider with increasing frequency, the decidecade band SPL is higher than the power spectrum.

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 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 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 $\mu\text{Pa}^2\cdot\text{s}$. 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 $\mu\text{Pa}^2\cdot\text{s}$.

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 to Malme 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:

$$G(f) = K + 10 \log_{10} \left[\left(\frac{(f/f_{lo})^{2a}}{\left[1 + (f/f_{lo})^2\right]^a \left[1 + (f/f_{hi})^2\right]^b} \right) \right] \quad (A-8)$$

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, but mid-frequency cetaceans were reclassified as high-frequency

cetaceans, and the former high-frequency cetaceans were reclassified as 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	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
Very-high-frequency cetaceans (true porpoises, <i>Kogia</i> , river dolphins, <i>Cephalorhynchus</i> spp., <i>Lagenorhynchus cruciger</i> and <i>L. australis</i>)	1.8	2	12,000	140,000	1.36
Otariid pinnipeds (fur seals, sea lions)	2.0	2	940	25,000	0.64

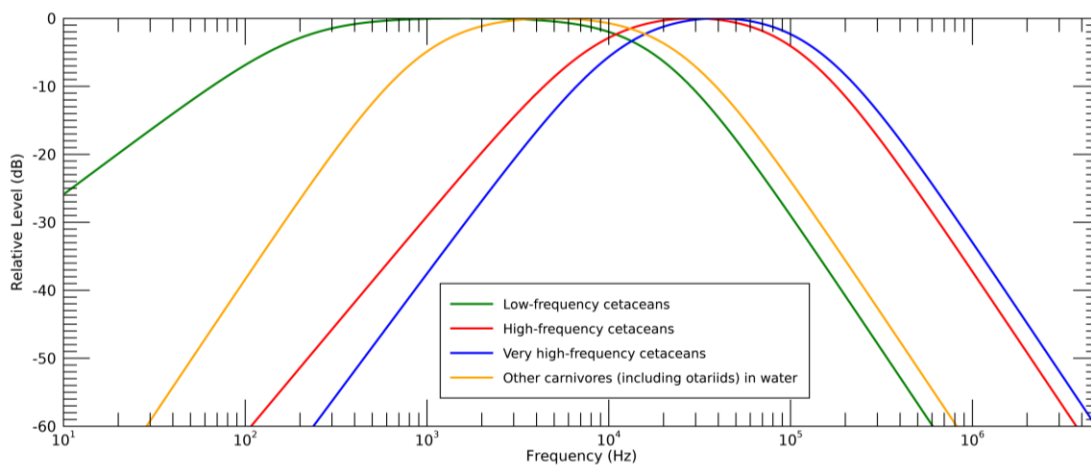


Figure A-3. Auditory weighting functions for functional marine mammal hearing groups used in this project as recommended by Southall et al. (2019).

Appendix B. Methods and Parameters

B.1. Environmental Parameters

B.1.1. Bathymetry

Water depths throughout the modelled area were extracted from the Australian Bathymetry and Topography Grid, a 9 arc-second grid rendered for Australian waters (Whiteway 2009). Bathymetry data were re-gridded onto a Map Grid of Australia (MGA) coordinate projection (Zone 55) with a regular grid spacing of 200 × 200 m (Figure B-1).

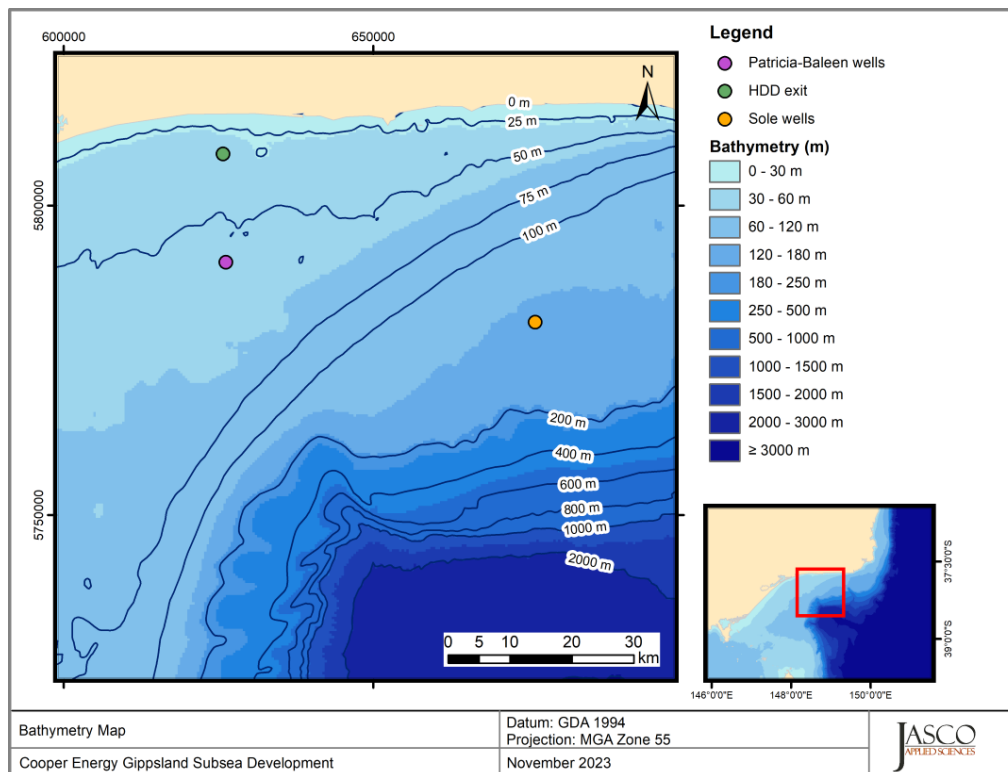


Figure B-1. Bathymetry of the region and the modelled site locations.

B.1.2. Sound Speed Profile

The speed of sound in sea water is a function of temperature, salinity, and pressure (depth) (Coppens 1981). Sound speed profiles were obtained from the US Navy’s Generalized Digital Environmental Model (GDEM; NAVO 2003). Considering the greater area around the proposed MODU installation area and deep waters, the sound speed profiles were assumed to be representative of typical propagation conditions annually. Monthly average profiles to 200 m and to 4400 m are shown in Figure B-2. June was selected as it represented the month most supportive of sound propagation.

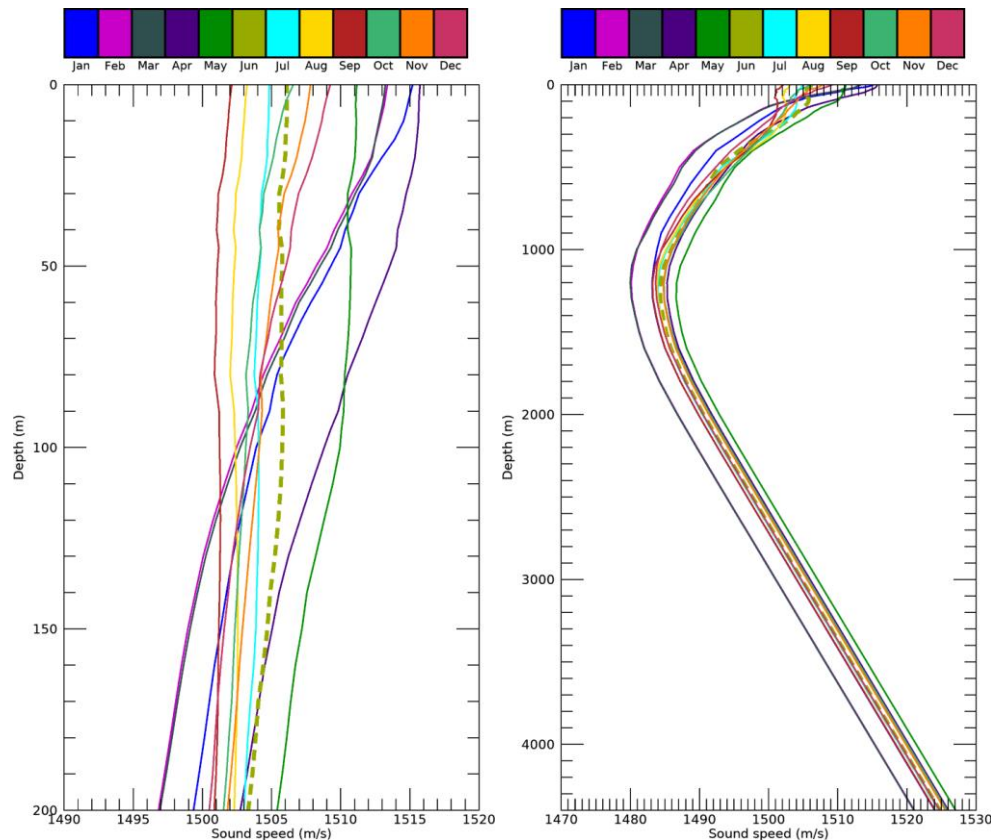


Figure B-2. Monthly average speed modelling sound speed profiles to 200 m (left) and to 4400 m (right) Profiles are calculated from temperature and salinity profiles from Generalized Digital Environmental Model V 3.0 (GDEM; Teague et al. 1990, Carnes 2009).

B.1.3. Geoacoustics

The propagation model used in this study considered a single geoacoustic profile for each site. In shallow water environments where there is increased interaction with the seafloor, the properties of the substrate have a large influence over the resulting propagating sound. Geoacoustic parameters are closely related to the geological environment and composition of the seabed.

The geology in the area was ascertained from boreholes from Holdgate et al. (2003) and Mitchell et al. (2007), as well as shallow geophysical reports supplied by Cooper Energy. The boreholes from Holdgate et al. (2003) and Mitchell et al. (2007) extended approximately 100 m below the seafloor. From these data, two geologic profiles of the seabed were proposed; one relevant to the vicinity of the Patricia-Baleen and Sole well locations, and one for the nearshore pipeline location.

Both the boreholes and interpretative geophysical reports indicate that there is the potential for limestone/calcarenite to be present and/or outcrop close to the seabed, with an overlying thin veneer of fine sand sediment of varying thickness. The interpretative geophysical reports indicate that within the vicinity HHD exit modelled location, the seabed is likely characterised by a sand layer that varies from 0–5 m in thickness. As such, the seabed has been modelled as a nominal 2.5 m thick layer of sand on top of limestone/calcarenite for the nearshore pipeline site. For the Patricia-Baleen and Sole modelled locations, the considered data suggests a more variable seabed structure within the area surrounding the modelled location. As such, an estimate of the typical seabed structure was derived considering the boreholes from Holdgate et al. (2003) and Mitchell et al. (2007). The resultant seabed profile generally consisted of unconsolidated sediments, increasing in consolidation with depth.

Limestone/calcarenite near the seafloor generally results in higher rates of loss with increasing distance from a sound source, as compared to sites with unconsolidated sediments. The higher rate of

loss is particularly evident with thin or absent overlying layers of sediment (Duncan et al. 2009). The thicker any overlying sediment, the less lossy the seabed is over a long distance. Additional modelling was conducted to account for the propagation loss associated with a limestone/calcarenite seabed at the nearshore pipeline (see Appendix B.2.4).

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. The required parameters geoacoustic parameters for modelling sound propagation are the density (ρ), compressional-wave speed, (c_p), shear-wave speed (c_s), compressional-wave attenuation (α_p), and shear-wave attenuation (α_s). These properties have been estimated from the analysis described above and are presented in Tables B-1 and B-2.

Table B-1. Geoacoustic profile for the nearshore pipeline modelled sites.

Depth below seafloor (m)	Material	Density (g/cm ³)	P-wave speed (m/s)	P-wave attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0–2.5	Fine to Medium Sand	2.1	1697–1816	0.23–0.67	276	3.65
> 2.5	Well-Cemented Calcarenite	2.7	2600	0.5		

Table B-2. Geoacoustic profile for the Patricia-Baleen and Sole modelled sites.

Depth below seafloor (m)	Material	Density (g/cm ³)	P-wave speed (m/s)	P-wave attenuation (dB/λ)	S-wave speed (m/s)	S-wave attenuation (dB/λ)
0–5	Medium Fine Sand	2.07	1697–1868	0.23–0.83	347	3.65
5–10		2.07	1868–1936	0.83–1.02		
10–15		2.07	1936–1985	1.02–1.15		
15–38	Fine Sand	2.06	1985–2068	1.15–1.37		
38–45	Muddy Sand	2.06	2068–2097	1.37–1.43		
45–57	Fine Sand	2.06	2097–2142	1.43–1.52		
57–100	Muddy Sand	2.06	2142–2268	1.52–1.75		
> 100	Well-Cemented Calcarenite	2.7	2600	0.5		

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 $\mu\text{Pa}^2\cdot\text{s m}^2$, 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 $\mu\text{Pa}^2\cdot\text{s}$ by:

$$\text{RL} = \text{SL} - \text{PL} \quad (\text{B-1})$$

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 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 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 $N = 360^\circ/\Delta\theta$ number of planes (Figure B-3).

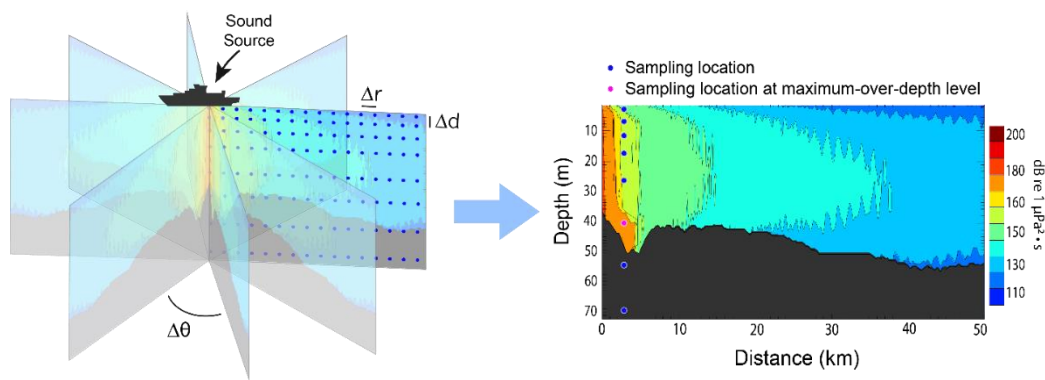


Figure B-3. The N×2-D and maximum-over-depth modelling approach used by MONM.

MONM treats frequency dependence by computing acoustic propagation loss at the centre frequencies of decade bands. Sufficiently many decade 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 decade 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 decade 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-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.2.3. Wavenumber Integration Model

VSTACK computes propagation loss versus depth and range for arbitrarily layered, range-independent acoustic environments using the wavenumber integration approach to solve the exact (range-independent) acoustic wave equation. This model is valid over the full angular range of the wave equation and can fully account for the elasto-acoustic properties of the sub-bottom. Wavenumber integration methods are extensively used in the field of underwater acoustics and seismology where they are often referred to as reflectivity methods or discrete wavenumber methods. VSTACK computes sound propagation in arbitrarily stratified water and seabed layers by decomposing the outgoing field into a continuum of outward-propagating plane cylindrical waves. Seabed reflectivity in the model is dependent on the seabed layer properties: compressional and shear wave speeds, attenuation coefficients, and layer densities. Additionally, VSTACK assumes range-invariant bathymetry with a horizontally stratified medium (i.e., a range-independent environment) which is azimuthally symmetric about the source. Typically, VSTACK is best suited to modelling the sound field near the source; however, it can also be used in conjunction with MONM to account for additional bottom loss in high shear speed seabeds as described in Section B.2.4.

B.2.4. Limestone Seabed Propagation Loss

For the nearshore pipeline site, where the seabed geoaoustic model consisted of a thin layer of sand (2.5 m) overlaying calcarenite, an additional broadband correction was applied to the propagation loss

results from MONM to better account for the additional propagation loss associated with a limestone (calcarenite) seabed (Duncan et al. 2009). The accuracy of the broadband calculated propagation loss for the south-eastern continental shelf of Australia depends significantly upon the frequency content of the radiating sound source together with thickness of any overlying layers of unconsolidated sediment (e.g. sand) on top of calcarenite likely to occur within the region.

In general, the thinner the sand layer, the greater the overall propagation loss. In this study, comparisons were conducted using JASCO's Marine Operations Noise Model (MONM), a wide-angle parabolic equation and JASCO's wavenumber integration model (VSTACK, Appendix B.2.3) which can fully account for the elasto-acoustic properties of the sub-bottom.

An additional broadband correction was applied to the propagation loss results from MONM to better account for the additional propagation loss associated with a calcarenite/limestone seabed. The differences between the broadband per-pulse SEL from MONM and VSTACK were extracted at the same modelled ranges and depths for corresponded range independent environments. The 90th percentile of the resultant dB differences in range bins were selected to generate a correction function for representative sites to be modelled. The conversion functions were applied after to the summed decade band levels from MONM, but before gridding, and the calculation of radii tables.

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.

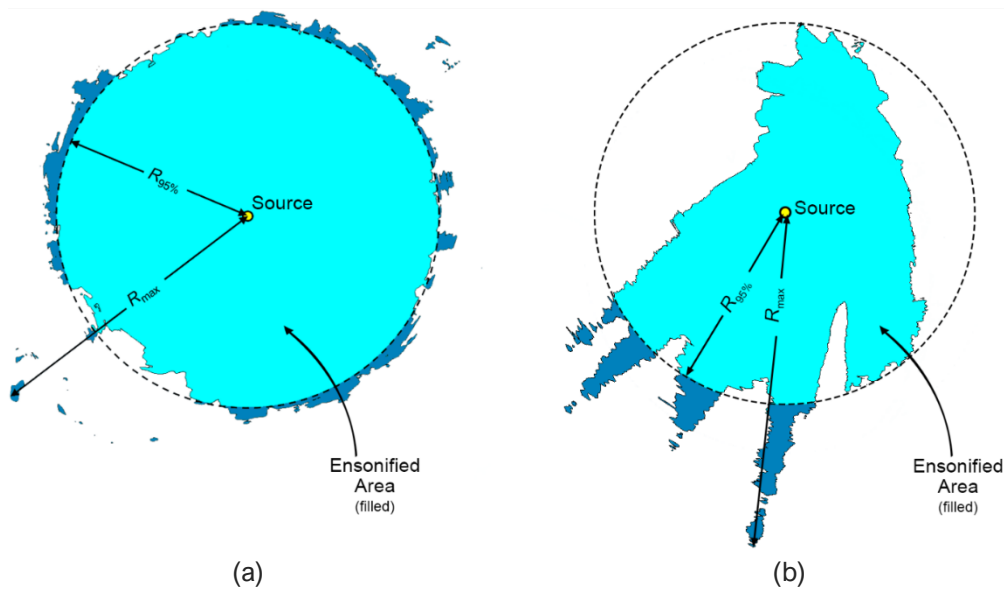


Figure B-4. Sample areas ensonified to an arbitrary sound level with R_{max} and $R_{95\%}$ ranges shown for two different scenarios. (a) Largely symmetric sound level contour with small protrusions. (b) Strongly asymmetric sound level contour with long protrusions. Light blue indicates the ensonified 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 Arctic, 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 C. Additional Acoustic Modelling Results

The maximum and 95% distances (defined in Appendix B.3) to SPL isopleths and the maximum distances to frequency-weighted SEL_{24h} thresholds, as well as total ensonified area, for just the DSV under DP operations are presented in the following sections.

C.1. Acoustic Modelling Tabulated Results

Table C-1. SPL: Maximum (R_{max}) and 95% ($R_{95\%}$) horizontal distances (in km) to sound pressure level (SPL) for just the DSV under DP operations.

SPL (L_p ; dB re 1 μ Pa)	DSV under DP operations					
	Patricia-Baleen wells		Nearshore pipeline		Sole wells	
	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)	R_{max} (km)	$R_{95\%}$ (km)
170 ^a	–	–	–	–	–	–
160	–	–	–	–	–	–
158 ^b	–	–	–	–	–	–
150	–	–	–	–	–	–
140	–	–	–	–	–	–
130	0.03	0.03	0.03	0.03	0.04	0.04
120 ^c	0.20	0.18	0.24	0.23	0.11	0.10
110	0.93	0.86	1.15	1.06	0.68	0.63

^a 48 h threshold for recoverable injury for fish with a swim bladder involved in hearing (Popper et al. 2014).

^b 12 h threshold for TTS for fish with a swim bladder involved in hearing (Popper et al. 2014).

^c Threshold for marine mammal behavioural response to non-impulsive noise (NOAA 2019).

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

Table C-2. *Weighted SEL_{24h}*: Maximum (R_{max}) horizontal distances (in km) from the DSV under DP sound source to frequency-weighted SEL_{24h} PTS and TTS thresholds based on Southall et al. (2019) and Finneran et al. (2017), and ensouified area (km^2).

Hearing group	Frequency-weighted SEL_{24h} threshold ($L_{E,24h}$; dB re $1 \mu Pa^2 \cdot s$)	DSV under DP operations					
		Patricia-Baleen wells		Nearshore pipeline		Sole wells	
		R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)	R_{max} (km)	Area (km^2)
PTS							
LF cetaceans	199	-	-	-	-	-	-
HF cetaceans	198	-	-	-	-	-	-
VHF cetaceans	173	-	-	-	-	-	-
Otariid pinnipeds	219	-	-	-	-	-	-
Sea Turtles	220	-	-	-	-	-	-
TTS							
LF cetaceans	179	0.03	0.004	0.03	0.004	0.04	0.004
HF cetaceans	178	-	-	-	-	-	-
VHF cetaceans	153	0.03	0.004	0.03	0.004	0.04	0.005
Otariid pinnipeds	199	-	-	-	-	-	-
Sea Turtles	200	-	-	-	-	-	-

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