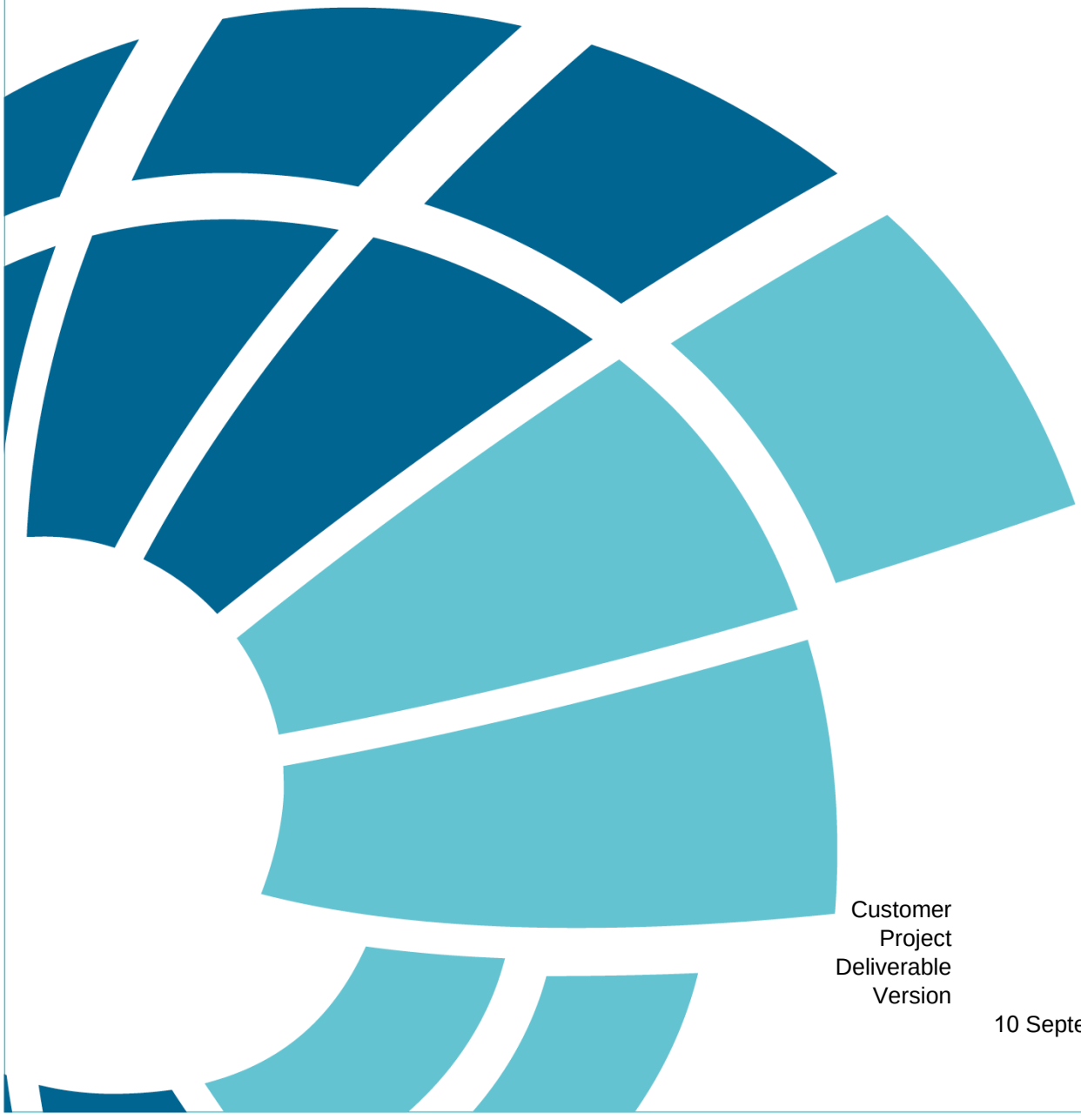
Gippsland Skies Offshore Wind Project

EPBC Act Referral Supporting Materials



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Amendment Record

The Amendment Record below records the history and issue status of this document.

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Contents

Glossary

Term	Definition
ADCP	Acoustic doppler current profiler
AMP	Australian Marine Park
ALARP	As low as reasonably possible, risk assessment terminology and benchmark for risk reduction
BRUVS	Baited remote underwater video station
CHIRP	Compressed high-intensity radar pulse
COD	Commercial operations date
CPT	Cone penetrometer testing
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DDC	Drop down camera
DDV	Drop down video
DEECA	Department of Energy, Environment and Climate Action
Downscale metocean modelling	Modelling of oceanic conditions using collected data
DP	Dynamic positioning
EAC	East Australian Current
EES	Environment Effects Statement under the Victorian Environment Effects Act 1978.
EIA	Environmental impact assessment
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FLA	Feasibility license area, proposed location of offshore wind farm
FLS	Floating LiDAR system (fLiDAR)
HVAC	High voltage alternating current
Investigations	Marine survey investigations, survey activities
Investigation area	The area includes the FLA (together with a 1 nautical mile [nm] buffer area around the FLA) and potential cable corridor.
kN	Kilonewton
MBES	Multi-beam echosounder
mbsf	Metres below seafloor
MNES	Matter of national environmental significance
NOAA	National Oceanic and Atmospheric Administration
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority

Term	Definition
OEI Act	Offshore Electricity Infrastructure Act 2021
OIR	Offshore Infrastructure Regulator
OSP	Offshore substation platform
Project	The Gippsland Skies Offshore Wind Project
PTS	Permanent threshold shift (noise)
RAP	Registered aboriginal party
SBP	Sub-bottom profiler
SSS	Side scan sonar
SWIFT	State Wide Integrated Flora and Fauna Team
TEC	Threatened Ecological Community
TTS	Temporary threshold shift (noise)
UAV	Unmanned autonomous vessel
UCH	Underwater cultural heritage
WTG	Wind turbine generator

Executive Summary

Gippsland Skies Pty Ltd (Gippsland Skies), a joint venture between Mainstream Renewable Power, Reventus Power, AGL and DIRECT Infrastructure was granted an offshore wind feasibility licence area (**FLA**) approximately 30km from the nearest Victorian mainland (Wilsons Promontory) in the Bass Strait within the Gippsland Declared Area OEI-01-2022 Part 3. Gippsland Skies proposes to develop an offshore wind farm within the Gippsland Declared Area OEI-01-2022 Part 3 (the Project).

This first referral for Gippsland Skies relates to the proposed marine survey investigations that will occur intermittently over a period of up to eight years across the FLA (together with a 1 nautical mile buffer area around the FLA) and the potential cable route corridor to inform offshore wind farm design and development. This includes providing baseline data for future environmental impact assessments, referrals and approvals under key Commonwealth and State legislation.

Gippsland Skies currently envisages that the proposed offshore wind Project will be developed in phases. Consequently, it is proposed that the Project will be the subject of 5 separate referrals that will include the offshore wind turbine generators (**WTG**) and associated offshore infrastructure.

This referral covers the marine survey activities and is the first referral. The activities described and assessed in this referral will inform the future referral/s. It is understood that the Project will be responsible for development of onshore grid infrastructure up to the designated point of connection to the Victorian shared transmission network and the onshore route will be developed by VicGrid and the subject of a separate approval process.

This marine survey investigations assessment includes a broad range of activities proposed to be undertaken, including metocean investigations (involving the deployment of floating LiDAR, waverider buoys and acoustic doppler current profilers), geophysical and geotechnical surveys and biological surveys activities.

A search of the investigation area was undertaken using the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) protected matters search tool (PMST). The Matters of National Environmental Significance (**MNES**) that emerged from this search included the Commonwealth Marine Area and the threatened species/ecological communities and migratory species that are or may be present in the investigation area.

A number of threatened and migratory species that are known to or may occur in the investigation area are listed in the PMST results. The search returned 95 listed threatened species and 68 listed migratory species. Due to the surveys included in this document being marine based, terrestrial species identified in the PMST search (refer to Annex A) have been excluded from this report, resulting in a total of 56 threatened and 69 migratory species potentially occurring in the investigation area.

An assessment against the Department of Environment (2013) Significant Impact Guidelines 1.1 - Matters of National Environmental Significance has been undertaken for the species listed in the PMST results.

With control measures in place for the proposed investigations, all planned events will have negligible residual impact consequences, and all unplanned events will have low residual risk ratings, and there will be no significant impacts to MNES as assessed against the EPBC Act significant impact guidelines.

1 Introduction

Gippsland Skies Pty Ltd (**Gippsland Skies**), a joint venture company comprised of Mainstream Renewable Power, Reventus Power, AGL and DIRECT Infrastructure, proposes to construct and operate the Gippsland Skies Offshore Wind Project offshore of west Gippsland, Victoria (the **Project**). The feasibility licence area (**FLA**) is located approximately 30km from the nearest Victorian mainland (Wilsons Promontory) in the Bass Strait within the Gippsland Declared Area OEI-01-2022 Part 3.

To progress the Project, Gippsland Skies proposes to undertake a range of marine survey investigations (the **investigations**) across the FLA (together with a 1 nautical mile [nm] buffer area around the FLA) and potential cable corridor (the **investigation area**). The investigations aim to inform design development and to provide baseline data for future environmental impact assessments (**EIA**) for the purposes of seeking approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) and for the preparation of an Environment Effects Statement (**EES**) under the Victorian *Environment Effects Act 1978.* An EPBC Act referral will be submitted to obtain a decision on whether the investigations would constitute a controlled action under the EPBC Act. This document has been prepared to support the EPBC referral by summarising the survey techniques, their potential environmental impacts on Matters of National Environmental Significance (**MNES**) and measures that will be undertaken to mitigate these during the course of the investigations over the next eight years.

Under the *Offshore Electricity Infrastructure Act 2021* (**OEI Act**), and the draft Offshore *Electricity Infrastructure Amendment Regulations 2024*, specific activities proposed under a feasibility licence require a Management Plan to be approved by the Offshore Infrastructure Regulator (**OIR**). Regulations are currently being finalised under the OEI Act and were published for consultation on 12 April 2024.

1.1 Scope and Objectives

This assessment outlines the investigations proposed to be undertaken to support the Project design and future EIA. It provides a description of the proposed methodologies for the investigations as well as the potential environmental impacts and risks these may cause and management measures to be provided to eliminate or reduce these to as low as reasonably practicable (**ALARP**) and to ensure that there are no significant impacts to MNES.

Table 1.1 outlines that investigations that form the action that is the subject of this Referral and those that are described for context and completeness, but not part of the Referral.

Table 1.1 Summary of Gippsland Skies investigations

Investigation	Assessed as an 'action' for this Referral?	Description
Geophysical surveys	Yes	Section 3.1.2
Geotechnical investigations	Yes	Section 3.1.3
Metocean surveys	Yes	Section 3.3.2
Boat-based benthic habitat surveys, including benthic grabs, drop down camera (DDC) and drop down video (DDV).	Yes	Section 3.2
Passive acoustic monitoring (PAM) surveys	No – for information and context only	Section 3.6.5

Investigation	Assessed as an 'action' for this Referral?	Description
Boat-based ecology surveys - Baited remote underwater video (BRUV) surveys for fish. - Visual surveys for marine mammals, reptiles, birds and bats. - Water quality, e-DNA and seabed sediment data collection.	No – for information and context only	Sections 3.4, 3.5, 3.6.2 & 3.6.3
Aerial-based marine mammal and bird surveys	No – for information and context only	Sections 3.6.4 & 3.6.5

The objectives of this assessment are to:

- Describe the approach and methodology for conducting the investigations
- Describe the environmental impacts and risks arising from the investigations
- Describe control measures to be put in place to minimise any impacts and risks to the surrounding marine environment to ensure there are no significant impacts to MNES.

1.2 High level overview of Proposed Action

Gippsland Skies proposes that the activities that form the action that is the subject of this referral are as follows:

- Geophysical surveys - including multibeam echosounder (MBES), side scan sonar (SSS), sub-bottom profiling (SBP), magnetometry and 2D shallow seismic may be required if the SBP confirms the need to move to the use of this type of equipment due to seabed geology and water depth.
- Geotechnical surveys - including boreholes, cone penetration testing (CPT) and coring
- Metocean surveys - including floating LiDAR wind measurement systems (FLS), wave/current measuring devices (e.g. Waverider buoys) and Acoustic Doppler Current Profilers (**ADCPs**)
- Boat-based benthic habitat surveys, including benthic grabs, DDC and DDV.

As noted in Table 1.1, the following activities are described in this document for context and completeness, but do not form the action of this Referral because they are benign activities that will have no impacts (significant or otherwise) on MNES:

- PAM surveys – primarily for whales and background underwater noise, but other marine fauna may also be incidentally recorded
- Boat-based surveys – for marine mammals, marine reptiles, birds and bats
  - BRUV surveys for fish.
  - Visual surveys for marine mammals, reptiles, birds and bats.
  - Water quality, e-DNA and seabed sediment data collection.
- Aerial-based visual surveys – for marine megafauna and birds

No tagging of fauna is proposed at this time under this referral.

These activities are further described in Section 3.

2 Project Location and Description

The Gippsland Skies FLA is located in the Bass Strait, approximately 30 km off the coast of Victoria between Walkerville and Tidal River and is 626.39 square kilometres (**km^2**) in size.

By way of overview, the proposed 2.5 gigawatt (**GW**) Offshore Wind Project is comprised of:

- Offshore wind array infrastructure (turbines and inter-array cables)
- Offshore substation platforms (**OSP**s) and associated transmission infrastructure (including cabling)
- Transmission infrastructure corridor infrastructure (including cabling)
- An onshore substation, transition joint bay, cables and associated transmission infrastructure
- An onshore hydrogen production facility.

The wind turbine generators (**WTG**s) and offshore substations will be wholly located within the Gippsland Skies FLA at water depths between 74-80 metres (**m**) (based on the data currently available).

The proposed cable corridor will connect to the mainland and is based on VicGrid's nominated onshore connection point for offshore wind in the Seaspray region. The proposed cable corridor is 137 km long, and varies in width from 3 km to 23 km (refer to Figure 2.1). This proposed corridor will be refined to be narrower during a further cable routeing study prior to surveys being carried out.

Gippsland Skies currently envisages that the proposed offshore wind project will be developed over the next seven years. The indicative phasing of the 2.5GW Project is set out below, subject to regulator guidance, detailed design, assessment and obtaining all requisite approvals. Consequently, the Project will be the subject of separate referrals. It is understood that the Project will be responsible for development of onshore grid infrastructure up to the designated point of connection to the shared transmission network and the onshore route will be developed by VicGrid and be the subject of a separate approval process.

- **Referral 1 – Marine survey investigations (the subject of this referral).**
- Referral 2 – Project Phase 1 is anticipated to involve the development of a proposed 500MW-1,000MW offshore wind project and offshore substation, together with associated transmission infrastructure and an onshore substation, with construction expected to commence in 2029 and the commercial operations date (**COD**) anticipated to be reached in 2032.
- Referral 3 - is expected to involve the transmission infrastructure corridor, with a target for delivery in 2032 to connect Phase 1.
- Referral 4 - Project Phase 2 is expected to comprise a proposed 1,000MW-1,500MW offshore wind project (depending on the final capacity of Phase 1 of the Project as further described in Referral 2 in due course) and offshore substation (including transmission infrastructure), with construction expected to commence in 2032 and the COD anticipated to be reached in 2035.

  Referral 5 - Project Phase 3 offshore wind array for a 500MW project and (potentially shared) offshore substation and transmission, and onshore hydrogen production facility**,** with a target for delivery in 2037. Note that Phase 3 may include a separate offshore substation (in the same way as Phases 1 and 2) or it may share a common offshore substation with Phase 2.

  GSPL is considering further dividing Referral 5 in order to create a sixth referral exclusively for the proposed onshore hydrogen facility component, which is currently envisioned to form part of Referral 5. Should this occur, there would be a sixth referral, as follows:

- **Referral 6** – an onshore hydrogen production facility, including a hydrogen production system, power infrastructure (converter station, battery storage, etc), hydrogen export infrastructure, and a water supply and treatment system (including but not limited to a desalination plant). It is envisaged that the hydrogen production facility would be located on a site with an area of up to 46ha and would form part of Phase 3.

The exact capacity of each of the Phases of the proposed 2.5GW Project will be subject to further refinement throughout the feasibility assessment stage. As such, the exact capacity of each Phase may ultimately differ from the proposed capacity ranges set out above and will be confirmed in each of the relevant Referrals for the Project Phases in due course. The intention is to lodge referrals 2-5 at the same time to enable assessment of the site.

The cable route water depths are approximately 80 m at the deepest point and gradually get shallower as they approach the intertidal area.

2.1.1 Offshore array infrastructure

The key offshore components of the Project include:

- WTGs (depending on size, the preliminary number ranges between 104 and 167)
- Fixed wind turbine foundations, nominally jacket structures supported on pin piles
- Inter-array cables
- Offshore cable protection (rock, concrete mattresses, rock bags, frond mattresses)
- Offshore substation platforms (**OSPs**)
- Offshore high voltage alternating current (**HVAC**) export cable to a coastal crossing location (discussed further below in Section 2.1.2).

2.1.2 Offshore HVAC export cable to shore (shared corridor)

The offshore export cable will follow an export corridor to where it will connect to the Project's onshore substation (subject to identification by VicGrid of the connection point). Additionally, where possible, the Project would seek to co-locate with other offshore wind and infrastructure assets.

Infrastructure within this export corridor will include:

- Offshore HVAC export cable;
- Offshore cable protection (rock, concrete mattresses, rock bags, frond mattresses); and
- The horizontal directional drill (**HDD**) exit point.

The proposed cable corridor adjoins (but does not cross) the northwest boundary of the Beagle Australian Marine Park (**AMP**) toward a landfall that will ultimately connect and align with the Gippsland Renewable Energy Zone area and VicGrid's proposed offshore wind connection point, assuming it is ultimately located within the study area currently the subject of public consultation.

2.1.3 Investigation Area

A number of principles, including social licence principles, were considered in the early appraisal process that led to the proposed Feasibility Licence Area boundary and proposed cable corridor. The process used a number of available datasets, and the multi-criteria assessment (**MCA**) methodology used social, environmental, and engineering criteria. This early feasibility work was further refined with specialist studies.

The investigation area will cover the areas identified in Figure 2.1 as the ‘Gippsland Skies Feasibility Licence Area’ (together with a 1 nautical mile buffer area around the Gippsland Skies FLA as depicted in Figure 2.1), ‘and ‘Proposed Corridor’. The investigations will include both marine-based and aerial survey activities. The marine field work addresses all investigations required up to the high-water mark of the coastline. Section 3 further describes the investigations that are proposed to take place.

Ninety Mile Beach
Marine National Park
Jack Smith Lake
Woodside Beach
Mcloughlins Beach
Nooramunga
Marine & Coastal
Park
Port Albert
Port Franklin
Fish Creek
Port Welshpool
Corner Inlet
Marine and
Coastal Park
Snake Island
Shallow Inlet
Marine and
Coastal Park
Waratah Bay
Sandy Point
Corner Inlet
Marine Park
OEI-01-2022 Part 1
Rabbit Island
Seal Island
Cape Liptrap
Notch Island
Cliffy Island
Shellback Island
Wilsons Promontory
Rag Island
Tidal River
Mount Oberon
Great Glennie Island
OEI-01-2022 Part 2
Wilsons
Promontory
Marine Park
Forty Foot Rocks
Hogan Island
West Moncoeur Island
Rodondo Island
Beagle
Australian
Marine Park
Devils Tower
Dover Island
Bass
Strait
Curtis Island
Cone Islet
Big Rock
OEI-01-2022 Part 3

Legend

- Gippsland Skies Feasibility Licence Area
- Proposed Cable Corridor
- Proposed Marinus Link cable
- Declared Area - OEI-01-2022 (Gippsland)
- Survey Area Buffer (1 Nautical Mile)
- VicGrid Connection Area
- Australian Marine Park
- Victorian Marine Protected Area
- State Waters Limit

Title:

Map of Gippsland Skies Offshore Wind Project investigation Area

Drawing: 2.1

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3 Proposed Activities

3.1 Geophysical and Geotechnical Surveys

3.1.1 Background

Limited data is available within the Project area, hence the requirement to undertake detailed geophysical and geotechnical surveys. Publicly available geophysical survey data shows inadequate coverage of the site. Limited offshore geophysical survey data has been obtained from the National Offshore Petroleum Information Management System (**NOPIMS**) as well as historical case studies reported from oil and gas developments located west of the Project area. A higher resolution and complete coverage of data is required in order to feed into a number of studies and assessments, including marine archaeology, benthic habitat mapping, engineering constraints and geohazards.

3.1.2 Geophysical Surveys

Survey Techniques

The geophysical survey is the first step in investigating the seabed conditions and shallow geology of the investigation area. Several techniques are used and are represented in Figure 3.1.

The precise details of the equipment to be used during the geophysical survey will be confirmed following the appointment of a survey contractor. However, for the purposes of the assessment contained in this report, the range given (or type of equipment listed) is intended to represent both realistic and worst-case scenarios.

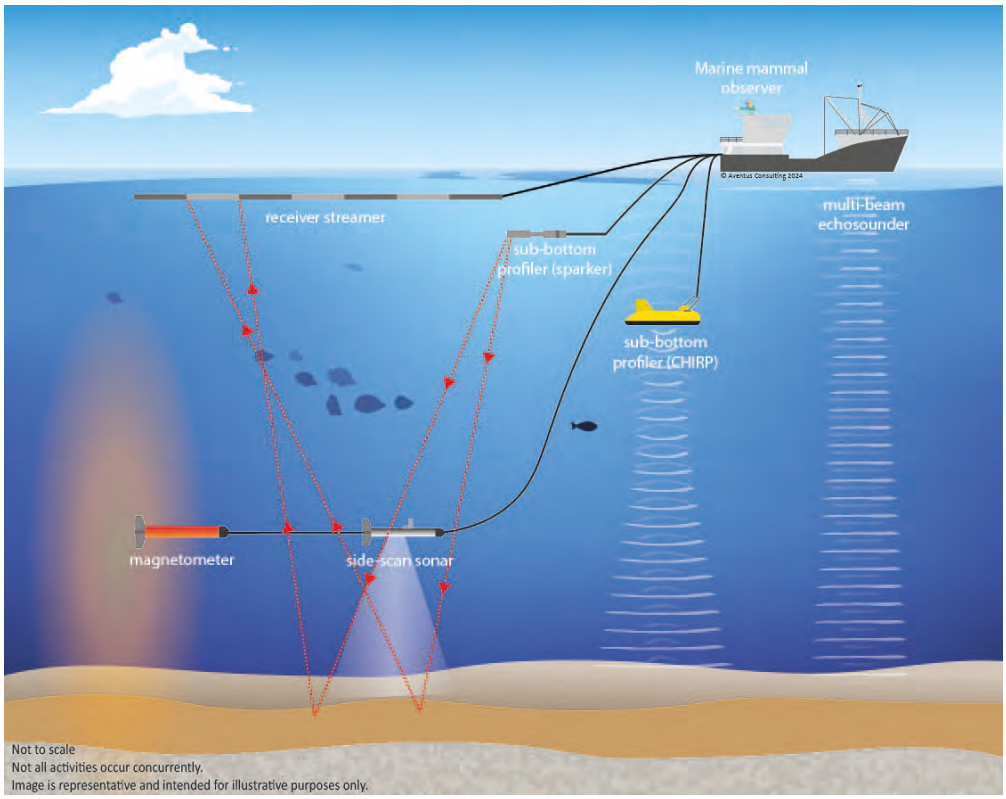


Figure 3.1 Indicative geophysical survey activities and processes to be used for the investigation.

The techniques listed below will be used and are described in detail in Table 3.1.

- Multi-beam echo sounder (**MBES**).
- Side scan sonar (**SSS**).
- Sub-bottom profiling (**SBP**) which may include pingers, compressed high-intensity radar pulse (**CHIRP**), boomer, sparker, parametric echosounder.
- Magnetometer.
- 2D shallow seismic (mini air guns). Use of this equipment is subject to the results of the SBP survey. If needed, 2D shallow seismic will be used within the investigation area where further ground depth penetration is required to obtain good quality of data.

Details regarding the sound outputs of this equipment are included in Table 3.2. Impacts and risks associated with the geophysical investigations are assessed in Section 7 and Section 8, respectively.

Table 3.1 Description of geophysical survey activities

Purpose/function	Typical Method
Multi-beam echo sounder	
The purpose of the MBES investigation is to acquire detailed measurements of surface depth (known as 'bathymetry') in the activity area.	A hull-mounted MBES will likely be used. A MBES acquires a wide swath (strip) of bathymetry data perpendicular to the vessel track and provides full seabed coverage with no gaps between vessel tracks. A MBES transmits a broad acoustic pulse from a transducer over a swath across track. The MBES then forms a series of received beams that are each much narrower and form a 'fan' (with a half-angle of 30-60°) across the seabed, perpendicular to the vessel track. The transducer(s) then 'listen' for the reflected energy from the seabed. In general, if all other parameters are constant, a rougher surface will backscatter more energy than a smooth surface and therefore, return higher amplitude signals. Collecting the fan of received beams establishes the two-way travel time of the acoustic pulse from which the water depth is calculated, using the velocity of seawater. The fans of seabed coverage produce a series of strips along each track, which are lined upside-by-side to generate two dimensional (**2D**) geo-referenced bathymetric maps of the seabed. The width of each strip depends on water depth and the acquisition system, but there will be overlap between each swath. The MBES equipment is generally operated at a speed of 3-4 knots (5.5–7.4 km/hr). See Figure 3.3 for an example of the equipment.
Side scan sonar	
Detects seabed hazards such as existing pipelines, shipping containers, boulders, debris, shipwrecks, reefs and craters.	The SSS method of surveying generates oblique acoustic images of the seabed by towing a sonar 'towfish.' The towfish is provided with power and digital telemetry services and towed from the vessel using a reinforced or armoured tow cable. The tow fish is equipped with a linear array of transducers that emit, and later receive, an acoustic energy pulse in a specific frequency range. Typically, a dual-channel, dual-frequency SSS is used. The acoustic energy received by the SSS towfish provides information as to the general distribution and characteristics of the surficial sediment and outcropping strata. Shadows result from areas of no energy return, such as shadows from large boulders or sunken ships, and aid in interpretation of the sonogram image. The resultant SSS image is created by assembling each swath of data into a geo-referenced composite that represents the acoustic character of the seabed within the study area. All data is digitally recorded and allows for a geo-referenced mosaic of the data so that a digital model of the seabed can be created. A single cable will tow the SSS (and magnetometer, as described later in this table) in a piggyback configuration, with the SSS ahead of the magnetometer. The SSS will be about 20 m from the stern of the vessel and magnetometer will be 10 m behind the SSS. The cable will be towed 10-15 m above the seabed. See Figure 3.3 for an example of the equipment.

Purpose/function	Typical Method
Sub-bottom profiler	
A SBP is used to investigate the layering and thickness of the uppermost seabed sediments (shallow geology). See Figure 3.1 for an example of the equipment.	There are multiple different types of SBP (which may include pingers, CHIRP, boomer, sparker, parametric echosounder), which exhibit a trade-off between data resolution and depth of penetration based on the frequency of the acoustic signal. These are described below. The SBP system is hull-mounted or towed and operated at the same time as the MBES and SSS.
	Very high frequency systems including pingers, parametric echo sounding and compressed high-intensity radar pulse These produce a swept-frequency signal. CHIRP systems usually employ various types of transducers as the source. The transducer that emits the acoustic energy also receives the reflected signal. CHIRP signals typically penetrate only about 5-10 m into the seabed (depending on shallow seabed geology) and provide the best resolution, but lowest penetration of all three options. The beam width is usually between 15° and 55°. CHIRP system transducers are usually circular and point downwards. A CHIRP is normally hull-mounted when used for shallow water operations, or alternatively may be towed in a similar fashion to the SSS.
	High-frequency boomers These consist of a circular piston moved by electro-magnetic force (comprising an insulated electrical coil adjacent to a metal plate). The high voltage energy that excites the boomer plate is stored in a capacitor bank. A shipboard power supply generates an electrical pulse that is discharged to the electrical coil causing a magnetic field to repel a metal plate. This energetic motion generates a broadband, high amplitude impulsive acoustic signal in the water column that is directed vertically downward. “Boomer sources show some directionality, which increases with frequency. Although they can be considered omnidirectional for frequencies below 2 kHz, they are quite directional in the vertical”[1] A boomer system offers a moderate penetration depth of up to 100 m below the seabed, depending on shallow seabed geology. Boomers are mostly surface towed but may also be towed below the surface to avoid sea surface wave noise and movement.
	Medium-frequency sparkers These are noise sources that create an electric arc between electrodes with a high voltage energy pulse. The arc momentarily vaporises water in a localised volume and the vapour expands, generating a pressure wave. Sparkers can use the same capacitor bank as boomers. Sparkers provide low-resolution data to a much greater penetration depth below the seabed (~100 mbsf), depending on the shallow seabed geology. Sparkers are surface towed. Ideally the SBP should be able to provide imagery that penetrates to a minimum depth of at least 30 m below the mud line, however this is dependent on the seabed geology.

[1] https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/seismic-surveys-code-of-conduct/twg-reports-2016/07-scr-nonstd-survey.pdf

Purpose/function	Typical Method
	The receiver for the sparker or boomer system is usually a hydrophone or hydrophone array consisting of a string of individual elements located within a neutrally buoyant synthetic hydrocarbon filled tubing or a solid streamer. They typically contain 8 to 12 hydrophone elements evenly spaced in a tube that is 2.5 to 4.5 m in length and 25 mm in diameter. The cable may be wholly solid-state or filled with approximately 5 litres of hydrophone fluid.
	Parametric echosounders Parametric echosounders are non-linear transducer sources that transmit two slightly different high frequencies (e.g. 100 and 110kHz) at high sound pressures (Wunderlich et al, 2005). These slightly different frequencies interact with the water column and create new frequencies. One of these new frequencies is the difference between the two high frequency signals (e.g. 10kHz), and this lower frequency can be used for sub-bottom profiling and object detection. Non-linear acoustic profiling provides the following advantages: • Narrow sound beams at low frequencies with small and portable transducers • Shorter signals without significant ringing effect • A narrow beam without side lobes that results in less volume and bottom reverberation • High penetration and resolutions in both horizontal and vertical directions due to short low-frequent pulses
Magnetometer	
This equipment detects metallic objects on or below the seabed (e.g., buried pipelines, petroleum wellheads, shipwreck debris and dropped objects such as unexploded ordinances, cables, anchors, chains) that may not be identified via acoustic detection means.	A magnetometer sensor is housed in a towfish and is towed as close to the seabed as possible and sufficiently far away from the vessel to isolate the sensor from the magnetic field of the vessel. It is a passive sensor, emitting no noise, no light and no magnetic field. A marine magnetometer is used to identify any magnetic anomalies associated with existing pipelines/cables or potential wrecks/debris at the seabed or buried at shallow depth, which would be hazardous to seabed installations. The marine magnetometer records the magnetic total field as magnetic induction values in Nano-Tesla (nT) by both channels. High-pass filters are applied to remove the Earth field and long-wavelength anomalies associated with local geology, geomagnetic diurnal variations and vessel heading effects. The residual anomalies have short wavelengths resulting from surface and shallow buried objects. Based on residual anomaly profiles or residual anomaly grid derived from multi-lines, target picking analyses every small area of apparent dipole anomalies and provides the following two pieces of information for each contact: magnetic anomaly size and wavelength of the anomaly field. “Magnetic anomaly” refers to the difference between local total magnetic field strength (magnitude of magnetic induction) and the background values. A magnetised target generates detectable anomalies of different values within a certain area. Usually, the absolute value of the strongest peak/trough within the anomalous area is presented for each target. However, the anomaly size of a target is not a direct measure to the magnetisation of the target but a non-linear combination of the

Purpose/function	Typical Method
	magnetisation and the distance of detection. These anomalies, or targets, indicate possible objects on the seabed that should be avoiding during seabed operations. These are towed approximately 10-15m above the seabed. See Figure 3.1 for an example of the equipment.
2D shallow seismic	
Provides near-surface geological structural information and detects geohazards such as shallow gas. The shallow seismic activity may be undertaken separately to the other geophysical and magnetometer investigations.	A vessel similar in size to the vessel deployed for the other geophysical investigations will likely be used to conduct the 2D shallow seismic survey. The deeper data acquired through shallow seismic surveying supplements the MBES, SSS and SBP data. The equipment deployed for shallow seismic surveys must be able to provide information to a depth of at least 100 m below the seabed (and generally down to a few hundred metres below the seabed). Shallow seismic investigations typically use a mini airgun, small bubble pulser or small sparker system. See Figure 3.3 for an example of the equipment. A multi-channel (approximately 48 channels) streamer is used, which will be about 150 m long and is towed near the sea surface. The streamer will be towed about 50 m from the stern of the vessel at 1 m below the sea surface. The offset distance from the stern of the vessel will be tested during field mobilisation trials to optimise the distance so as to avoid acoustic interference between the vessel and the streamer.

Timing and Spatial Coverage

The geophysical surveys are proposed to take place over three campaigns. The staging of geophysical surveys is expected to be as follows:

- First campaign – The entire investigation area will be surveyed. The SBP data from this stage will indicate if 2D shallow seismic is required in the investigation area. Survey timing will be dependent on securing the vessel and subject to approvals (including the receipt and timing of EPBC approval) but is proposed to commence in Quarter 4 of 2024 or Quarter 1 of 2025.
    - The time to survey the FLA is estimated at 7-10 weeks, subject to weather.
    - The cable corridor will be subject to further refinement in width prior to the commencement of surveys, and is expected to take 7-10 days to survey, subject to weather.
    - There will likely be main line separation of 100 -150 m with cross lines every 2 km, optimised for the FLA and cable corridor.
- Second campaign (per Project Phase) – This is a refined survey based on the results of the first campaign that will undertake more detailed surveying (tighter spaced survey lines) over proposed WTG and OSP locations and inter-array cable locations. The campaign is currently proposed to commence in 2027, but this may change based on vessel availability closer to the time. A requirement for 2D seismic equipment will be limited to the proposed HDD site in the proposed cable corridor unless site conditions found during the initial survey require mini air guns/similar to be used to obtain good quality data.
    - This campaign is estimated to take 2-3 weeks to complete, subject to weather.
    - The survey design will be influenced by the results of the first campaign, planned according to the proposed WTG locations. At this stage, the number of survey line kilometres is unable to be determined.
- Third campaign – This will be a pre-construction survey using survey ROV (equipped with MBES, SSS, SBP and magnetometer) to refine the location of all infrastructure and confirm the absence of seabed obstacles ahead of construction. The timing of the third campaign is likely to commence in 2028/29, but this may change based on vessel availability closer to the time.
    - This campaign is estimated to take up to 4-6 weeks to complete, subject to weather.

All survey techniques will be used in the first campaign. For campaigns two and three, all or only a combination of some survey techniques will be used.

During each of these campaigns, survey operations will operate on a continuous basis (24-hour operations). Typically, the geophysical survey vessels will travel at an average speed of 3 - 6 knots.

Equipment

Table 3.2 describes the typical frequencies and sound pressure levels at which the geophysical equipment would typically operate at, with Figure 3.3 depicting typical equipment.

Table 3.2 Description of typical equipment utilised during geophysical surveys

Survey Technique	Typical Equipment and Specifications	Sound Frequency Range (kHz) (DoC, 2016)	Sound Source Levels (dB re 1µPa @ 1 m (DoC, 2016)
Multi-beam echo sounder	• MBES transducer heads typically measure 48 x 11 x 19 cm and weigh up to 13 kg. • MBES operate over a range of frequencies, with a typical shallow water MBES operating between 200–700 kHz. • The maximum source levels are about 236–242 dB re 1 µPa @ 1 m for the 1° and 2° beams (DoC, 2016). Based on the equipment selection, the maximum source level for this activity is expected to be 210 dB re 1 µPa @ 1 m.	200-700	236-242
Side scan sonar	• The towfish is constructed of stainless steel and is a cylindrical torpedo-like device, typically ~1.2 m long that weighs 18 kg in the air (12 kg in the water) and can be operated by one person. • SSS systems typically operate at dual frequencies; - A low frequency of about 100 –120 kHz (with a swath range of 150-200 m); and - A high frequency mostly of 400 kHz to 900 kHz is utilised (with a swath range of 50-100 m or more) • The maximum source levels typically have a range between 210–220 dB re 1 µPa @ 1 m (DoC, 2016). • Acoustic pulse rate shot is a few times per second with consequent along-track resolution of ~1 m depending on the frequency and settings used.	100-120 and up to 900	210-220
SBP - Pingers, parametric echosounders, CHIRP	• This system utilises an FM signal across a full range of frequencies, typically either 2-16 kHz or 4-24 kHz (low to high frequency).	2-16 or 4-24	200-205

Survey Technique	Typical Equipment and Specifications	Sound Frequency Range (kHz) (DoC, 2016)	Sound Source Levels (dB re 1µPa @ 1 m (DoC, 2016)
	• The maximum source levels of a CHIRP are about 200–205 dB re 1 µPa @ 1 m (DoC, 2016).		
SBP - Boomers	• The typical frequency spectrum of boomer systems ranges between 0.2 and 10 kHz, with an effective bandwidth of 1 to 10 kHz (low to high frequency) (DoC, 2016). • The sound source level can vary from 100 to 220 dB re 1 µPa @ 1 m (DoC, 2016).	0.05-4	215-225
SBP - Sparkers	• The generated frequencies are generally between 50 Hz (0.05 kHz) and 4 kHz (low to high frequency) (DoC, 2016). • The sound source level is typically between 215 and 225 dB re 1 µPa @ 1 m (DoC, 2016).	0.2-10	100-220
Magnetometer	• The magnetometer will be towed in a piggy-back configuration to the SSS system, as it does not affect data quality of these other sensors. • The magnetometer towfish is constructed of stainless steel and is a cylindrical torpedo-like type device, typically ~1.4 m long and 7 cm in diameter that weighs ~12–18 kg in the air (4–12 kg in the water) and can be operated by one person. • A magnetometer is capable of a sampling rate of at least 1 Hz and up to 20 Hz. • The type of unit to be used will likely be the Geometrics G-882 marine magnetometer or Marine Magnetics Seaspy Towed Overhauser magnetometer.	N/A	N/A
Shallow Seismic	• Shallow seismic typically uses 2D imaging technology operating in a frequency range of 20 Hz to 500 kHz.	0.2-500	215-225

Survey Technique	Typical Equipment and Specifications	Sound Frequency Range (kHz) (DoC, 2016)	Sound Source Levels (dB re 1µPa @ 1 m (DoC, 2016)
	• The sound source is a small, compressed air unit ranging in volume between 10 and 60 cubic inches (cui). The activation interval will be less than 12.5 m. • An example of the sound source equipment is constructed of stainless steel, typically weighing 50 kg and approximate dimensions of 255 cm (L) x 35 cm (W) x 25 cm (H). • The type of unit to be used is likely to be a mini-GI air gun (12 cui) or AAE Dura-Spark 400 sparker.		

While vessels are yet to be procured, an example of a typical geophysical survey vessel is shown in Figure 3.2. It is likely that most surveys will be undertaken from a single vessel of between 60-90m in length. At times, it is possible that multiple survey vessels (up to three) will be working in the investigation area.

Figure 3.2 Example of vessel used for geophysical surveys (Source: BVG Associates)

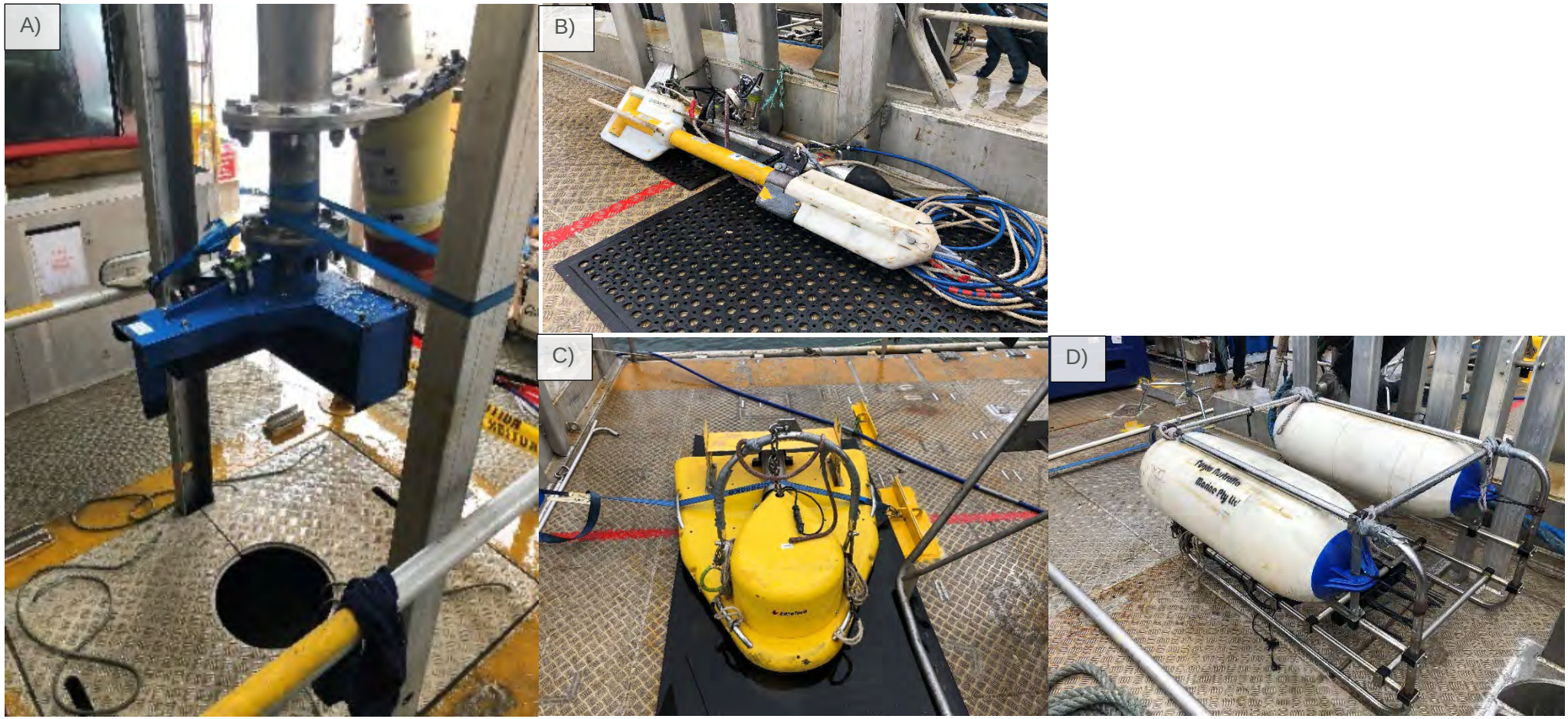


Figure 3.3 Examples of geophysical survey equipment: A) MBES equipment; B) SSS towfish and magnetometer; C) SBP transducer equipment; D) shallow seismic sound source equipment (courtesy of Aventus Consulting)

3.1.3 Geotechnical Surveys

Survey Techniques

Offshore geotechnical investigation methods collect detailed information on the physical properties of the seabed and the underlying shallow sediments to supplement and validate the data gathered from the geophysical survey. Combined, the geophysical surveys and the geotechnical investigations provide key data in selecting the locations for the wind turbines and the design of the foundations to support them.

The proposed geotechnical investigation techniques will include:

- Coring - vibrocore, gravity, piston and box
- CPT - both seabed CPTs and downhole CPTs
- Borehole sampling and in situ testing, including piston sampling in very soft cohesive soils, undisturbed sampling in clays and rotary coring in very hard soils or bedrock.
- Standard penetration tests (**SPT**).

Further information about the techniques for offshore surveys is provided in Table 3.3. The bulk of the samples recovered from the geotechnical investigation will be transported to an onshore laboratory for testing that is used in the design of wind turbine foundations, and in the assessment of the requirements for installation of foundations, submarine cables and WTGs. Some initial geotechnical testing will be performed on the laboratory on the geotechnical vessel. Offshore landfall surveys to characterise habitats in waters close to the coast will also be undertaken, with further information about this equipment provided in Section 3.6.

A schematic of the offshore borehole sampling and CPT testing is provided in Figure 3.4.

Impacts and risks associated with the geotechnical investigations are assessed in Section 7 and Section 8, respectively.

Timing and Spatial Coverage

The number of geotechnical investigation campaigns will depend on the homogeneity of the site that will be determined following the initial geophysical study. It is anticipated that geotechnical investigations will take place over up to three campaigns. An overview of the expected nature of the campaigns is outlined here:

- First campaign – This will involve preliminary geotechnical investigations across the investigation area. This campaign is likely to take 2-3 months to complete and is proposed to commence in 2025/2026, subject to vessel availability. This timeframe assumes the following number of samples (noting that engineering design is not finalised but that the numbers below are considered upper estimates):
- Up to 20 borehole locations (FLA)
- Up to 5 boreholes or CPTs within the HDD exit pit area.
- Up to 20 CPT locations (using the 200 kN unit) dependent on the geophysical survey results (FLA)
- Up to 68 CPT locations (using the 10-35 kN unit), every 2 km along the cable corridor.
- Up to 10 of vibrocores within the FLA.
- Up to 34 coring locations (every 4 km along the cable corridor)
- Up to 34 thermal conductivity testing locations (every 4 km along the cable corridor)

- Up to 40 sediment grab sample locations, though this is dependent on the geophysical survey results from the FLA and cable corridor.

- Second campaign – this is likely to be split across the three project phases of the FLA and is proposed to commence in 2027 and/or 2028, as outlined below:
  - Phase 1, about 9 -12 weeks in duration
  - Phase 2, about 18 - 24 weeks
  - Phase 3, about 6 - 8 weeks.
- Third campaign – This will entail the detailed geotechnical investigations aligned with each proposed development phase to confirm detailed design within the investigation area. They are likely to take place intermittently over several years and are proposed to commence in 2029 for Phase 1 project and between 2029 and 2032 for all three phases and at this stage, are planned to involve taking one borehole sample and one downhole CPT sample at each of the proposed WTG locations (between 104 and 167 locations, depending on final WTG sizing). The HDD exit pit location will be subject to 5-10 borehole or CPT sampling in this phase, and the choice of preferred method will depend on soil conditions. There is the potential for the second and third campaign to be condensed into one campaign. The duration of time to undertake the deeper geotechnical investigations during this campaign is heavily influenced by the soil conditions encountered, so the time frames estimated for the previous campaigns may increase for this third campaign.

Shallow geotechnical investigations (gravity corer, vibrocorer, seabed CPT and thermal conductivity tests) along the inter-array cable corridor is estimated to take 2 - 4 weeks.

Based on the number of samples outlined for the geotechnical campaigns above, the total area of seabed disturbance (predominantly based on seabed disturbance from using seabed frames) is estimated to be:

- First campaign – estimated at 0.001km^2 disturbance, which is 0.00005% of the investigation area

- Second and third campaign - estimated at 0.003km^2 disturbance in total, which represents 0.00011% of the investigation area

In total, the seabed disturbance of all campaigns is 0.004km^2 and impacts 0.00016% of the investigation area.

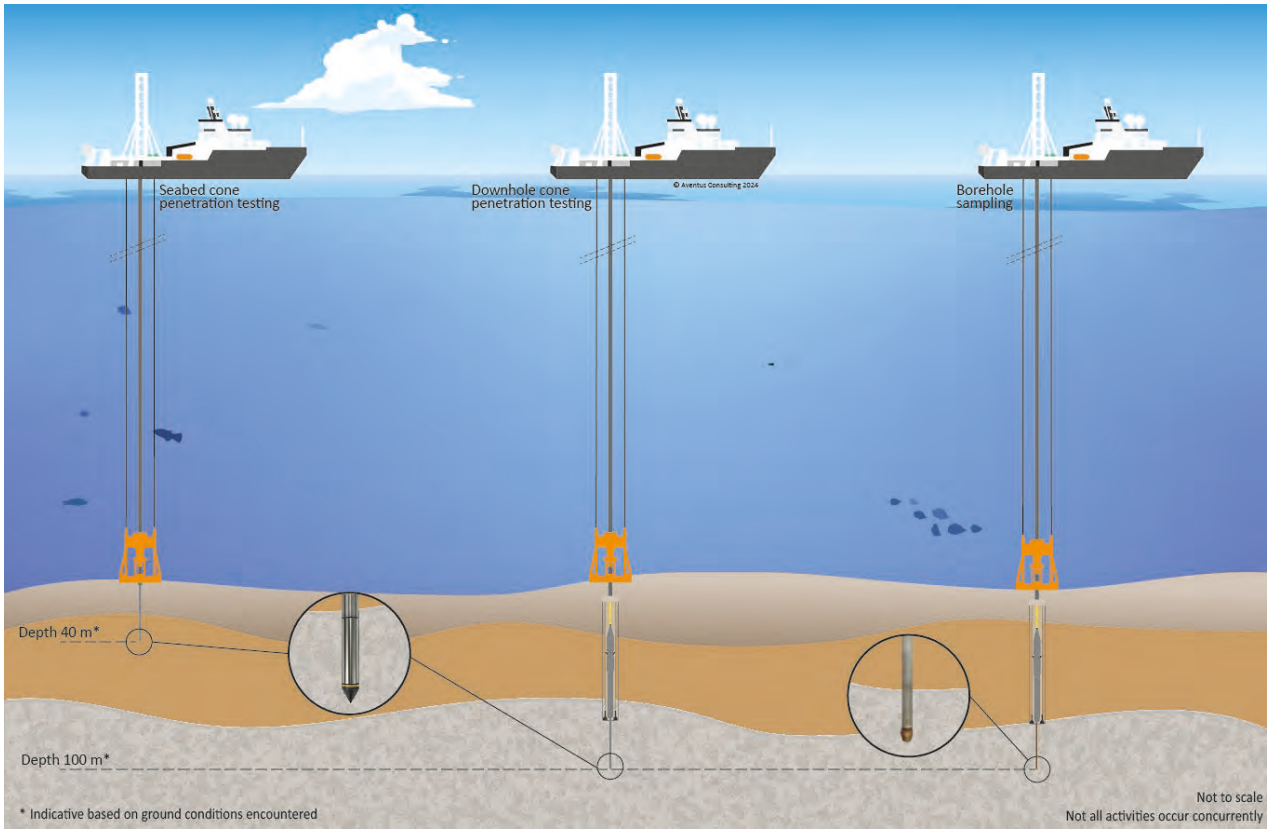


Figure 3.4 Indicative geotechnical survey activities and processes to be used for the investigations

Table 3.3 Description of typical geotechnical survey activities

Purpose/function	Typical Method
Seabed Grab Sampling	
Seabed grab sampling provides samples for undertaking geological analysis of unconsolidated seabed sediments (e.g. sands, silts and clays).	Grab sampling is a process of collecting small samples of surface sediments from the seafloor. Only surface sediments are collected and the sampler has limited ability to penetrate to depth. Grab samples typically use a Van Veen grab sampler, which is a light-weight sampler designed to take large samples in soft seabed sediments. It has long lever arms and sharp cutting edges on the bottom of the scoops. See Figure 3.5 for example of equipment. The weighted jaws, chain suspension, and doors and screens allow flow-through during lowering to the seabed (using a winch). When the lowering cable is taut the grabs 'arms' are locked open. Then, when the grab touches the seabed, the cable becomes slack, which releases catches and, on recovery, the cables attached at the top of the arms exert tension on the arms extending from the jaws, causing them to lift, and cause the jaws to dip deeper into the sediment, and trap material as they tightly close. Typically, samples may be obtained at areas of geological change or interest that have been identified by the SSS and SBP data.
Coring	
The various types of coring provide samples for undertaking geological and geotechnical analysis of formations below the seabed and to characterise sediment. No drilling muds are required in the coring process and no drill cuttings are generated.	**Vibrocoring** Vibrocoring is a technique for collecting core samples in unconsolidated sediments by using a vibrating device (generally referred to as 'vibrohead') to drive a coring tube into the seabed. See Figure 3.5 for an example of this equipment. Typically, two large electrical motors power two concentric weights, which produce the necessary vibration. Once the unit is on the sea floor, the high-power vibrator motors are engaged and drive the core barrel with PVC liner into the seabed. Sampling itself is of a very short duration at each location (typically 5 to 10 minutes) and will be undertaken in the cable corridor and within the FLA.
	Box coring Box corers are designed to take 'undisturbed' samples from the top of the seabed and are suitable for almost every type of sediment. This is typically required for sampling related to ecological surveys rather than geotechnical requirements, but may be collected at the same time, and has been included here for completeness. The box core relies on its own weight for penetration of the seafloor and has a single swing arm that closes after being triggered to retain the sample on retrieval. Operation is simple and straightforward; when the frame touches the seafloor, a gimbal suspension combined with the weight of the core box ensures the box is always in the vertical position. When the

Purpose/function	Typical Method
	weight is taken off the hoist cable, the trigger mechanism releases the cylinder-shaped core box. This can penetrate the seabed to depths ranging between 5 cm and 1 m using the weight of the box corer to push it into the sediment. The driving force can be adjusted by adding or removing lead weights. Both the top and bottom of the core box are now automatically closed, and the seabed sample is collected. The box is then removed from the corer enabling unrestricted access to the sample surface and sides. Sampling itself is of a very short duration at each location.
	Piston (or gravity) coring A piston corer is normally used on soft, unconsolidated sediments. The coring unit is deployed from the side of the vessel using a dedicated coring deployment system comprising a winch, overhead coring boom and core handling system. See Figure 3.6 for an example of this equipment. A piston corer is lowered by wire rope to the seabed. It has a trigger device that hits the seabed before the core barrel and releases the corer allowing it to freefall. As the barrel enters the sediment, a special internal piston creates a vacuum and helps to draw the core into the barrel. Core catchers prevent the sediment from coming out of the coring tube. This suction reduces compaction of the sample in the inner sleeve. The coring system can be assembled with different length cores ranging from 3 m to 24 m (typically no greater than 6 m). Sampling itself is of a very short duration at each location and given the small activity area, this testing may only take a few hours in total.
Cone Penetrometer Test (CPT)	
CPT determines soil strength and helps to delineate soil stratigraphy. In the preliminary geotechnical investigation expected to occur during the first campaign, CPTs will be located at the intersection of geophysical survey lines. This ground-truths the geophysical data and provides soil strength data that can be used for geotechnical analysis.	CPT involves the in-situ measurement of the resistance of ground to continuous penetration of an instrumented cone. Two options are possible for CPTs: 1) Seabed CPT, which involves lowering a frame to the seabed and pushing the CPT cone into the sediment at a steady penetration rate (usually 2 cm per second) until the unit reaches refusal. See Figure 3.6 for an example of this equipment. 2) Downhole CPT, which involves drilling to achieve additional depth and then commencing the cone push from defined depth. In both processes, the CPT cone measures the resistance to the push and these measurements allow high quality interpretation of ground conditions and pore pressure dissipation testing. When the required, maximum or refusal penetration depth is reached, the CPT rod is retrieved and all equipment is withdrawn from the seabed. A small hole will remain in the seabed, which will collapse or close due to soil movement and lateral pressure.

Purpose/function	Typical Method
	A seabed CPT typically takes 2-2.5 hours to complete, depending on water depth, equipment size and depth capability. Downhole CPTs can take longer depending on the depth at which the CPT is being targeted. For soft soils, the standard conical shaped CPT cone may be replaced by a full-flow penetration cone. A full-flow penetration cone is either ball shaped (spherical) or T-bar shaped. The cross-sectional area of a full-flow penetrometer typically varies between 40 - 150 cm^2. While the standard rate of penetration for full-flow penetration test is identical to the CPT at 20 mm/s, variable rate testing can also be applied. When the required penetration depth is reached, all equipment is withdrawn from the seabed. A small hole will remain in the seabed, which will eventually collapse and infill with the movement of sediments. CPT units typically vary between 10 Kilonewton (kN)and 200 kN with maximum penetration capabilities of between 10 m and 40 m. The smaller units will be used for testing in the cable corridor (about 68 locations in the first campaign) and a larger CPT unit will be used for testing in the FLA (about 20 locations during the first campaign) and in the deeper waters of the cable corridor and HDD pit.
Seabed sediment thermal conductivity testing	
Seabed sediment thermal conductivity testing is performed to measure the thermal conductivity of the seabed sediment material. The results are used for cable design with testing undertaken in the cable corridor. The equipment can be deployed from similar vessels used for grab sampling and seabed CPTs.	In situ thermal conductivity tests can be performed using a needle probe or temperature cone penetration test (**TCPT**). Both sensors are typically attached to a smaller size seabed CPT unit, and testing is performed to relevant test depth, typically in the range of 1-3m below the seabed. The needle probe test measures in situ soil thermal resistivity by deploying a long and thin metallic needle probe containing a heating wire and a temperature sensor. The thermal needle is pushed into the soil structure at specific depths for the controlled generation and application of heat. The temperature sensor measures the thermal response, including the increase in temperature of the contiguous soil mass. Analysis of the measured results provide the thermal resistivity. The TCPT uses a standard cone penetrometer with the addition of a temperature sensor. It records the temperature decay during a strategic interruption of the CPT to determine the thermal properties of the seabed, taking advantage of heat generated from friction during penetration.
Borehole sampling	
Borehole sampling gathers geotechnical soil and rock core samples to a minimum depth equivalent to the likely penetration	For the preliminary geotechnical investigation, boreholes are typically performed within the FLA at selected intersections of geophysical survey lines to provide a general understanding of the site conditions within the FLA. In the detailed geotechnical investigations, boreholes will generally be performed at the planned WTG locations.

Purpose/function	Typical Method
depth needed for piles to support the WTG foundations (and HDD exit, in order to classify soil types. The boreholes may include Standard Penetration Tests **(SPT**) depending on the soils encountered. Borehole sampling will be undertaken in the FLA and potentially the HDD exit point area.	The boreholes will be undertaken using up to two specialist geotechnical vessels, using dynamic positioning to remain on location (i.e. not anchors) that may be 80-90 m in length (subject to final procurement). The vessels will transit to site, and upon arrival will set up the initial borehole using either a dynamic positioning system and/or a 4-point anchoring system. A derrick vessel or modular drilling unit is also being considered. Borehole investigations involve the deployment of a seabed frame unit (of approximately 3 m x 3 m footprint), which is deployed using a heavy-duty riser or deployment wires. Using the deployment wires, the drill string is lowered into place and can be drilled to the rockhead level as well as below. Drilling fluid will be used during the borehole sampling process to lubricate the drill bit, transport cuttings out of the borehole to keep the borehole clean and to prevent the borehole from collapsing during the coring process. A widespread range of wireline downhole sampling tools are available, which can be deployed through the drill string and latched into place in the bottom of the drill string. This includes piston sampling, push sampling, wireline core barrel and percussion (hammer) sampling. The sampling tool will depend on the encountered soil conditions. Using this drill string a device is then used to collect a core or barrel of sediment and bedrock to a depth of up to 100m below the seabed. This core is recovered to the vessel and taken for further analysis onshore. If necessary, seabed skirts will be added to the seabed frame to increase stability and reduce differential settlement of the frame into the seabed. Cuttings are discharged directly to the seabed during borehole sampling. Drill cuttings are inert pieces of rock, sand and other particles removed from the borehole during the sampling process. Cuttings range in size from very coarse to very fine particles. Total drill cuttings for 100m deep borehole expected to be less than $1m^3$. Drilling fluids are used to lubricate the drill bits. Seawater is the primary constituent of geotechnical drilling fluids. Inert drilling fluid additives may be added to the seawater to form a water-based mud (WBM). Where sandy soils are encountered, a downhole SPT will be conducted at regular intervals. The test involves dropping a standard hammer weight and measuring the number of blows to progress a cone ended rod through the soil to a distance of 150mm. This generates a number, the SPT ‘N’ value that characterises the density of the soil used in foundation design. A down hole PS logger may be deployed for measurement of compression and shear velocities of surrounding rock and soil from deep uncased boreholes. The system uses a probe, containing a source and two receivers placed one metre apart and suspended on a cable. Deployment of the tool requires a stable borehole allowing to deploy the full length of the tool. The source generates a pressure wave in the borehole fluid which is converted into seismic waves, the sound of which is attenuated by the substrate of the borehole wall. Along the wall at each receiver location the seismic waves are converted back into pressure waves in the fluid and received by the geophones that send the data to the recorder on the surface.

Purpose/function	Typical Method
	Upon completion of each borehole, the seabed unit will be recovered to deck level and the equipment made secure for transit. Each borehole will take about 30 hours (a quarter of which would be set up). Once complete, the vessel(s) will transit to the next test site and the process repeated until the survey is concluded. A small hole will remain in the seabed, which will eventually collapse and infill with the movement of sediments.

Equipment

A variety of different equipment will be used for geotechnical surveys, as summarised in Table 3.4.

Table 3.4 Descriptions of geotechnical survey equipment

Survey Aspect	Typical Specifications
Seabed Grab Sampling	• Grab samples may be taken during geotechnical surveys, or separately as part of the dedicated ecological surveys. • Van Veen grab samplers are generally constructed of stainless steel with lead blocks. Depending on the model used, they can weigh 2.4–30 kg in air and generally obtain less than 3 litres of sediment. • The grab sample skims the seabed surface and each sample volume is less than 0.5 m^3.
Coring - vibrocoring	• Vibrocorers typically core to a depth of up to 12 m (using 3 m segments), though a depth of 3 m may be sufficient. Corer barrels can be up to 112 mm in diameter, with cores up to 96 mm in diameter. Approximately 0.05 m^3 volume is typically recovered. • The width of the winch tower required to lower and operate the corer is typically up to 1.2 m, the dimensions of the base supports is up to 5 x 5 m (25 m^2), and the weight of the equipment varies from 1,450 kg (3 m segment) up to 4,000 kg (for a 12 m segment) depending on whether the unit uses standard or high power. • Vibration force can vary between 44 kN (standard power) and 89 kN (high power).
Coring - box	• Dimensions of the box vary but typically have a footprint of about 1 m^2 and a volume of up to 0.5 m^3 (based on typical box corer dimensions).
Coring - piston (or gravity)	• Piston corers typically core to a depth of up to 6 m (using 3 m segments). Core barrels generally contain an inner PVC liner with a diameter of 0-90 mm that retains the sample. • Piston corers with a 6 m length and diameter of 8 cm, for a volume of approximately 0.03 m^3.
CPT	• A CPT unit consists of a seabed frame, drive system and a rod with a CPT cone attached. The CPT cone is equipped with a sensor that measures the tip resistance, sleeve friction and pore water pressure. • Seabed CPT systems are available in a wide range of sizes and can be mobilised from a wide range of vessel types. For surveys along the cable corridor, smaller seabed systems may be more suitable, and may use a semi-flexible coiled rod deployed from by a wheel system. Within the FL area, larger systems that can achieve deeper penetration are more likely to be used and the rod is typically deployed as a stiff vertical rod. • Smaller systems can be mobilized by crane or A-frame from smaller vessels, whilst the larger CPT units require a larger survey vessel and are typically deployed from dedicated drilling vessels. • CPT units typically vary between 10 kN and 200 kN. The seabed footprint for a smaller 10 kN unit (e.g., Neptune 3000) is typically 1.6m x 1.6m (2.5 m^2), while a larger 200 kN unit (e.g., Manta Heavy) is typically 3m x 3m (9m^2). • The CPT unit consists of a rod that has a small cone at its base (with typical cone tips having a cross-sectional area of 2, 5, 10 or 15 cm^2).

Survey Aspect	Typical Specifications
Seabed sediment thermal conductivity testing	• Both Thermal CPT and needle probe are deployed by using a smaller seabed CPT unit than that described in the row above. • The seabed footprint of a typical 10 kN unit is 1.6m x 1.6m (Neptune 3000).
Borehole Sampling	Wireline-deployed hydraulically-operated push or piston samplers may be used to recover high quality samples as a result of the fixed piston that rests on the bottom of the borehole. The type of sample tube used will depend on the soil/rock type expected and for piston/push would typically be around 70-80 mm diameter. Rotary core samples of bedrock will be up to 90mm diameter and 1.5m long. Potential drill fluid additives include: - Guar - A high-yield organic xanthan gum polymer used to impart viscosity to the drilling fluid. It is readily biodegraded via bacterial activity (~2 kg/m^3 of drilling fluid) - Bentonite - A naturally-occurring high-density mineral milled to a uniform particle size and used to increase fluid density. It is inert in the environment (~25 kg/m^3 of drilling fluid) - Barite - A naturally-occurring high density mineral milled to uniform particle size and used to increase the fluid density. It is inert in the environment (15 kg/m^3 of drilling fluids). • The exact types and composition of the drill fluid will not be known until after the geotechnical contractor has been engaged. In the absence of Australian standards governing drilling mud chemical additives, all drilling fluid additives used will be of low eco-toxicity, with only ‘Gold’/’Silver’ (CHARM) or ‘D’/’E’ (non-CHARM) OCNS-rated chemicals to be used in accordance with the UK Offshore Chemical Notification Scheme (OCNS). A down hole PS logger can be deployed for measurement of compression and sheer velocities of surrounding rock and soil from deep uncased boreholes. The system uses a probe that is approximately 7 m in length, containing a source and two receivers placed 1 m apart and suspended on a cable. The probe is lowered into the borehole to the specified depth.
Standard Penetration Test (SPT)	The SPT test involves dropping a standard hammer weight and measuring the number of blows to progress a cone ended rod through the soil to a distance of 150mm.

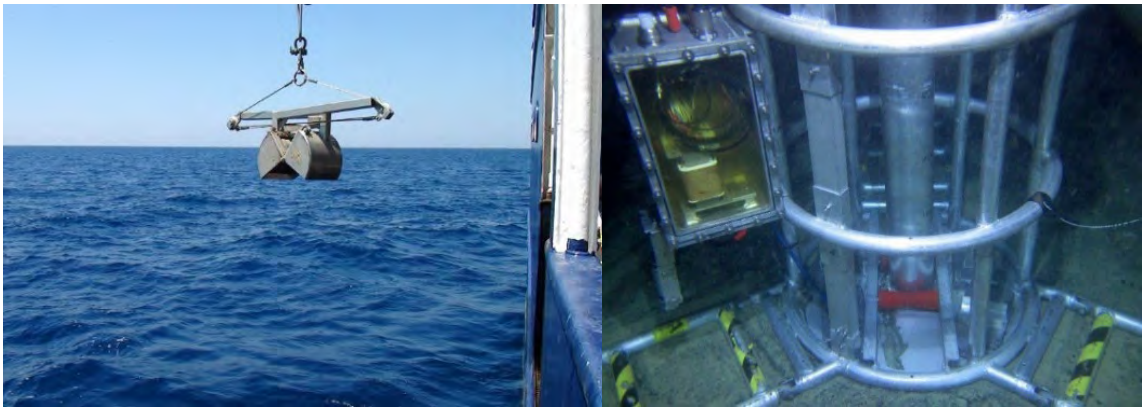


Figure 3.5 Example of Van Veen grab sampler (left, courtesy of G2 Surveys) and vibrocoring equipment (right, courtesy of SEAS Offshore Pty Ltd)

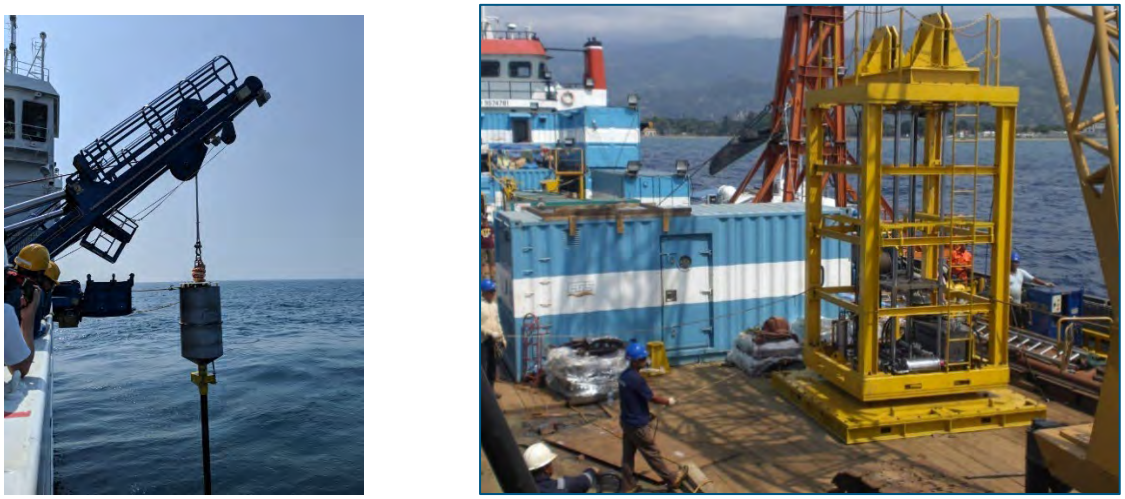


Figure 3.6 Example of piston coring equipment (left, courtesy of OSIL) and cone penetrometer test equipment (right, courtesy of EGS)

Surveys in shallower waters within Victorian state waters are likely to be performed from a small to medium sized self-elevating jack-up barge of up to 50 m in length equipped with cable percussion, rotary coring capabilities and top push CPT testing equipment. The jack-up barge is either towed or moves under its own power into position and jacks up to the operating height. When operations are complete, the jack-up jacks itself down and moves to the next location. Units can operate in water depths ranging from 1 m to 20 m (out from Mean High Water Springs). Vessels typically utilised for geotechnical surveys are required to be dynamically positioned to ensure they are kept in place for the duration of sampling.

The vessel used in the offshore surveys in these anticipated environments and conditions may be up to 104 m in length and could be a Modular Drilling Unit or a dynamic positioning vessel, with smaller vessels used in nearshore conditions being between 20-60m in length. The contractor's choice, configuration and scheduling of vessel(s) may vary with resource availability, timing or other factors determined during procurement.

3.2 Benthic Habitat Survey

3.2.1 Objectives

The aim of these investigations is to develop an understanding of seafloor habitat characteristics to inform Project EIAs and design.

The objectives of the benthic habitat portion of the investigations are:

- To describe the baseline benthic habitat across the FLA and proposed cable corridor to inform the baseline characterisation for the purpose of environmental impact assessment
- To characterise the grain type and any possible contaminants within seabed sediments.

3.2.2 Survey Techniques

The benthic survey will be initially designed using desktop information and site-specific geophysical data to identify sampling locations and intensity according to likely habitat types; the exact number of samples cannot be confirmed until geophysical surveys are undertaken but will be statistically representative. Benthic survey techniques are likely to include:

- Benthic grab samples
- DDC and DDV
- An intertidal walkover survey.

Benthic Grab Sampling

Benthic sediment samples will be obtained using either a box corer or day grab (depending on the sediment type, box corer suited to soft sediments whereas day grab is suited to harder sediments) deployed from a vessel mounted A-frame or davit arm. Upon successful collection, the following physical features of each grab sample will be recorded:

- Depth of penetration.
- Sediment colour
- Visual sediment grain size description
- Evidence of noticeable odour/sheen

Timing and Spatial coverage

Benthic grab samples may be retrieved following the geophysical survey if the seasonal timing permits, but are more likely to be undertaken separately; this will be confirmed upon completion of contractual arrangements. The number of benthic and sediment grab sample locations will be dependent on the geophysical survey results from within the FLA and cable corridor. Additional samples may be required within the 1nm buffer as reference samples. Discussions will be held with regulators on this requirement prior to surveys commencing, however an estimate of requirements has been included in 3.1 (p28). The grab samples would disturb an area of approximately 1m^2, which will result in a very minor area of disturbance.

Imagery Collection

A DDC (i.e., camera housed in water-proof casing and mounted in a stainless-steel frame) will be deployed from a vessel to take representative photos of the seabed types encountered in the investigation area. This sampling technique is non-invasive, with the camera lowered to the seabed and the camera triggered. A DDV acquires video images, in a similar (or combined) frame that may be towed behind the vessel close to the seabed using a weighted towfish and communications cable. Some systems may be combined depending on equipment availability and preferred methodology. See Figure 3.7 and Figure 3.8 for an example of the type of equipment used.

These will be operated remotely from a nearby vessel.

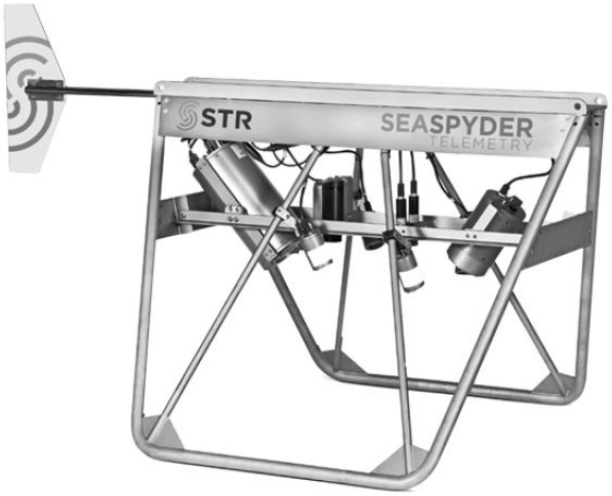


Figure 3.7 Example of a DDC used for benthic habitat image collection (Source: STR, n.d.)

Figure 3.8 Example of a DDV camera used for benthic habitat mapping (Source: Spotx, 2024)

3.3 Physical and Chemical Environment Surveys

3.3.1 Background

Collection of physical, wind, water quality and sediment quality data is vital to understanding the existing marine physical environment and to inform the design process. The objective of collecting physical and chemical data is to provide a baseline for comparison after construction of the Project to determine potential impacts on water and sediment quality.

This section provides details on the data to be collected and relevant collection frameworks.

Traditional methods of data collection are presented below, however it is acknowledged that technology in this field is rapidly changing and a combination of equipment and deployment methods may be used. Much of this data can now be gathered remotely or using unmanned autonomous vessels (**UAV**). This has advantages, including reduced potential for workplace health, safety or environmental incidents, and more rapid data collection rates. Should autonomous vessels be utilised, these will be continually monitored by an operator to ensure there is no potential for a vessel to strike either another vessel or marine fauna.

The impacts and risks associated with the deployment and operation of these surveys are assessed in Section 7 and Section 8, respectively.

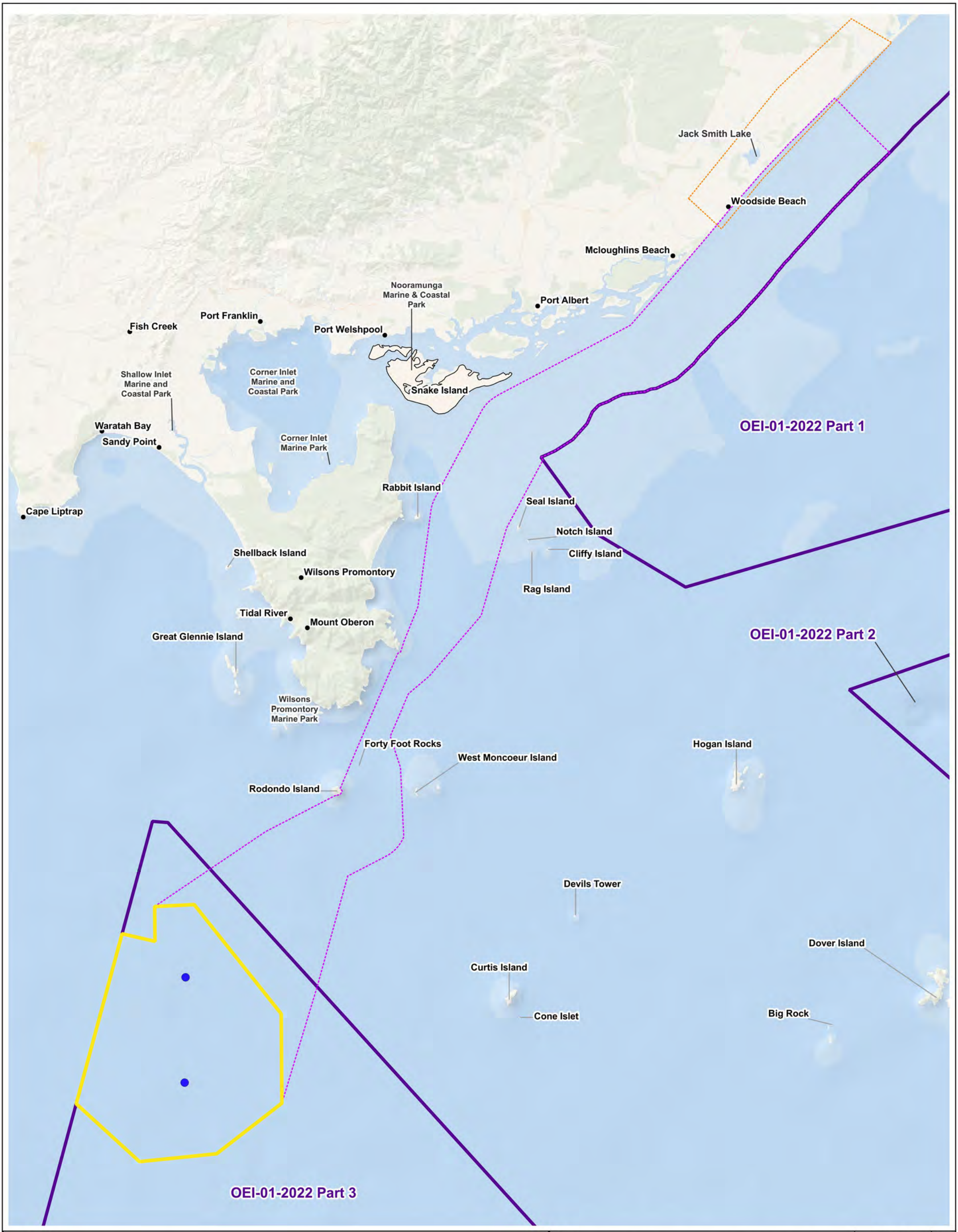
3.3.2 Wind and Oceanography

Data on wind speeds, ocean currents and wave heights will need to be collected to inform the engineering of the Project design. This data collection will be undertaken using the following equipment that may be measured by separate or combined equipment:

- Floating LiDAR Systems (**FLS**) - two deployed within the FLA.
- Wave measuring buoys - up to six devices.
- ADCPs - up to four devices.

Two FLS will be deployed in the FLA for the purpose of measuring wind speed and direction . Deployment locations have not yet been finalised, but are notionally set to be located at the locations on Figure 3.9 (corresponding to approximately 39.446712624°S and 146.157896417°E; 39.569548170° S and 146.155003589°E).

The two FLS will be fixed to the seabed with cabling and an anchor/block/mooring system. FLS can be powered by solar and wind, with their deployment at sea making these reliable power sources. They will be fitted with navigation lighting. Example images of this equipment are provided in Figure 3.10.



Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- VicGrid Connection Area
- Indicative FLS Deployment Location

Title:

Indicative deployment locations of FLS systems within FLA

Drawing: 3.9

Rev: D

BMT endeavours to ensure that the information provided in this map is correct at the time of publication.

BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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Figure 3.10 (Source: RPS Group) (LHS) Example of FLS being towed to site (Source: RPS Group, 2020). (RHS) Example of FLS, depicting size of the equipment

ADCPs will be deployed to measure the current velocities within the array area and at points along the cable route using the doppler effect of sound waves to measure the speed and direction of currents. See Figure 3.11 for a schematic representation of a typical seabed ADCP device. These could be deployed either on fixed buoys or from UAVs. If fixed, equipment may be located on the seafloor in a trawl resistant frame (mooring cage), as shown in this figure. This type of ADCP, due to their positioning on sea floor with little access to sunlight, are usually battery powered. See Figure 3.12 for example of a mooring cage.

A wave measuring device, likely to be a floating device on the surface tethered to the seabed, uses accelerometers and internal gyroscopic systems to capture information on wave height and wave direction (IMOS, n.d.). These devices are often solar powered due to their positioning offshore. See Figure 3.13 for an example of a wave measuring buoy device.

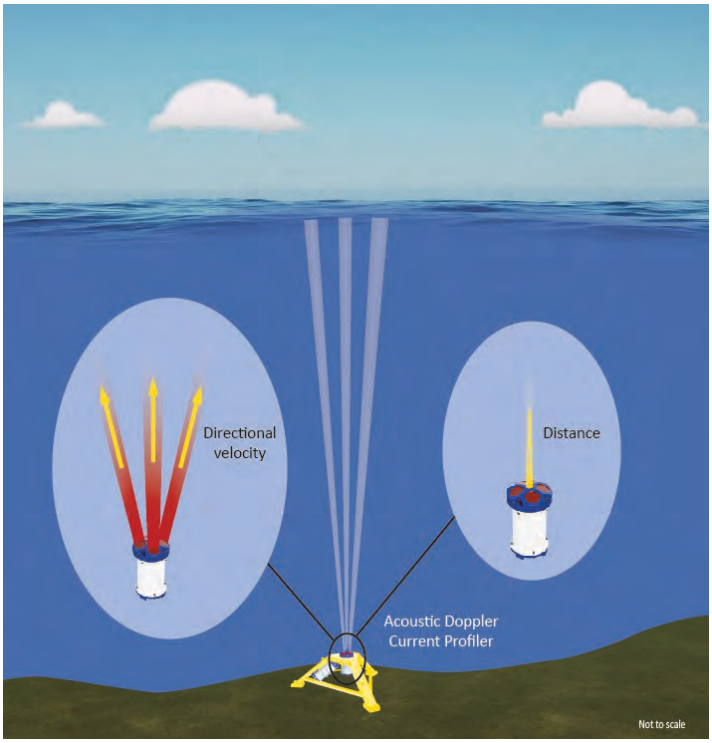

Figure 3.11 Typical ACDP device seabed arrangement (Source: Aventus Consulting)

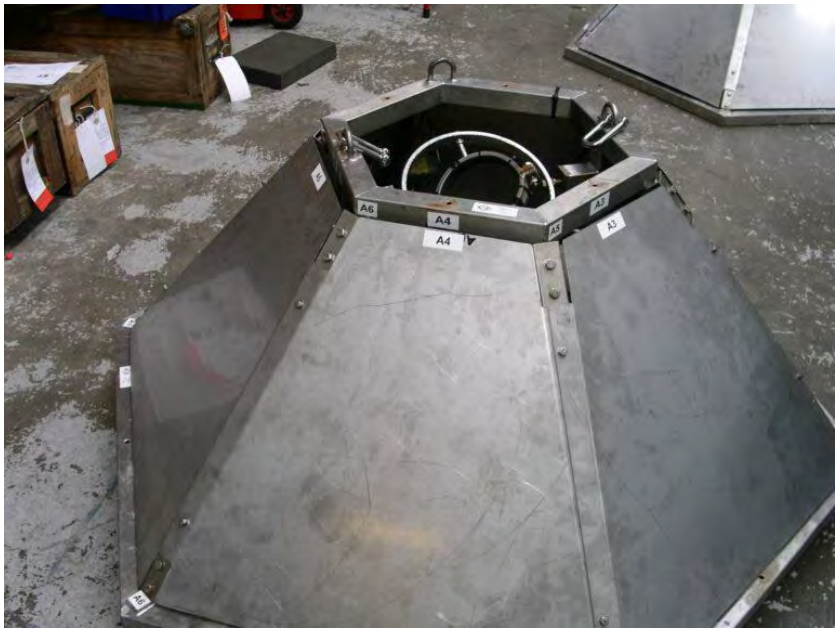

Figure 3.12 Example of ADCP mooring cage (Source: Unique Group, 2024a)

Figure 3.13 Example of a wave measuring buoy device (Source: Unique Group, 2024b)

Equipment Description

A vessel with capacity to launch equipment such as ADCPs or tow FLS equipment will be required. This should include a crane/winch capable of instrument deployment and would likely be a smaller vessel of between 30-60 m. A number of instruments may need to be deployed and installed on ocean buoys for periods of time. These will need to be of sufficient size to withstand severe ocean conditions, and will need to be securely moored to the ocean floor. The FLS, which also collects metocean data, would also be anchored to the sea floor while collecting data.

The devices will largely be deployed for up to 36 months for each stage (so potentially deployed for up to nine years). The exception to this is the wave measuring devices, which may be left in place for the duration of development, to support construction. The use of marker buoys will be determined in conjunction with the relevant maritime authorities.

Prior to the deployment of any mooring equipment, a DDV camera will be used to confirm the presence or absence of obstacles, marine fauna, cultural heritage sites or threatened vegetation communities (e.g. giant kelp forest).

As per Figure 3.10, FLS are towed to site. Once on location, a tether (ballast weight/mooring) will be dropped (after visual check with DDV camera) to ensure the FLS remain on location.

Steps for deployment of the wave measuring buoys following a visual check with the DDV camera are:

- The ballast weight will be manoeuvred over the vessel using the crane, sling and quick release mechanism. A stopping sling with safety hook will be attached to the weight and connected to a bollard on deck for security and the crane will be detached from the weight.
- The crane will be connected to the lifting bridle on the wave buoy and the buoy lifted overboard and lowered to the sea surface. The buoy will then be released from the crane using a quick release mechanism.
- The buoy will drift away as the vessel moves towards the deployment location or the vessel will hold station and let the mooring drift away from the vessel, depending on conditions at the site at the time of deployment. The bungee and mooring rope will be slowly paid out, coming up tight on to the ballast weight.
- The stopping chain will then be removed from the ballast weight.
- On position, the weight will be released using the release.

The deployment position will be recorded on the differential global positioning system to confirm to the Australian Hydrographic Office the location of the metocean equipment.

The positions of the FLS and the buoys will be briefly monitored after deployment to ensure the mooring has not been compromised during deployment.

ADCP devices will be deployed in a trawl-resistant mooring frame due to the presence of commercial trawl fisheries in the investigation area. These devices must ideally be deployed on a flat surface, otherwise a gimbal may be required for support to ensure the device is flat and able to accurately record information. Recoverability is also important for these devices, so the ADCP will be fitted with an acoustic release system that allows the release of a buoy upon receiving an acoustic signal, allowing retrieval of the equipment and downloading of data.

3.4 Baseline Water Quality Assessment

Baseline water quality sampling will be undertaken to characterise background water quality. This will enable the identification of any impacts to water quality resulting from the construction and operation of the Project. The following sampling may occur:

- *In situ* measurements of physical parameters at the surface to collect data on pH, water temperature, turbidity, electrical conductivity and chlorophyll. This may be undertaken from satellite imagery, fixed instrumentation or grab samples using a manned or unmanned vessel. These may either be taken from fixed locations or if from a UAV, at any location within the investigation area as the vessel moves.
- *In situ* profiles of physical water quality parameters through the water column, potentially from UAVs that lower data collection devices from a winch.
- Collection of water samples through the water column for the laboratory analysis of physical, chemical and biological parameters.

Samples will be taken for a period of between 12 months and two years at regular intervals that sufficiently capture seasonal variations.

3.5 Baseline Sediment Assessment

Sediment quality sampling will be undertaken to provide background quality information for sediment in the investigation area to inform future sampling after Project inception and to quantify any impacts the Project may have had. It will also allow Gippsland Skies to understand possible contaminants that may be mobilised as part of future construction activities (e.g. cable laying, pile installation).

The samples will be undertaken using a box corer or Van Veen grab sampler (as described in Table 3.4), with the number of samples to be determined depending on the location and spatial extent of benthic habitat identified. Sufficient samples will be undertaken to ensure there is a statistically representative survey of all major habitat types. Samples will be tested for a range of contaminants based on a risk assessment of site history.

The impacts and risks associated with the obtaining sediment samples are assessed in Section 7 and Section 8, respectively.

3.6 Biological Surveys

3.6.1 Background

The biological survey program will be designed to support future EIA by characterising the environment and will comprise the following elements:

- Field measurements of:
  - benthic flora and fauna communities on hard substrates and subtidal soft sediments
  - shellfish and fish communities on reefs and subtidal soft sediments
  - seabird, migrating parrot and shorebird communities
  - marine megafauna communities (whales, dolphins, seals).
- Desktop analysis of fisheries catch and effort, and fisheries habitat values.

The sampling frameworks for these surveys are outlined in the following sections 3.6.2 to 3.6.5.

The impacts and risks associated with undertaking the biological surveys are assessed in Section 7 and Section 8, respectively.

3.6.2 Benthic Flora and Invertebrate Sampling Framework

Table 3.5 below outlines the survey framework for benthic flora and invertebrates.

Table 3.5 Benthic flora and invertebrate sampling framework

Element	Description
Objectives	• Quantify the characteristics and spatial/temporal patterns in benthic flora and fauna communities to: - map and describe any ecological constraints (e.g. threatened species, pest species, otherwise sensitive communities) in the investigation area - characterise baseline conditions in benthic communities
Dependencies	Sampling site selection dependent on understanding of substrate conditions and habitat mapping (see Sections 3.1 and 3.2).
Spatial coverage	Measurements are to provide sufficient resolution to broadly describe benthic communities at representative habitat types/depths in the investigation area, with a focus on the likely Project infrastructure footprint
Sampling locations	Multiple sites representative of different environmental settings. The number and location of sites is to be determined based on the habitat mapping
Temporal (duration, frequency)	2 seasonal surveys (winter, summer) over 12 months (2-3 months duration)
Methodology	The sampling methodologies are expected to encompass the following quantitative techniques: • towed camera underwater visual census on hard substrates and soft sediments: - replicate transects will be surveyed for mobile invertebrates (sea-stars, sea urchins, abalone, rock lobster etc.), sessile macroinvertebrates and macroalgae, where relevant using the methods of Przeslawski and Foster (2020) - the abundance of mobile invertebrates will be counted from video footage - the percentage cover of macroalgae and sessile invertebrates will be counted in replicate quadrats on the transect lines • Underwater camera visual surveys on vertical reef faces (Przeslawski and Foster, 2020): - replicate video-quadrats will be surveyed for invertebrates and macroalgae - the percentage cover of macroalgae and sessile invertebrates will be counted in replicate quadrats on each transect • Van Veen grab, box coring or cores for the collection of soft sediment benthic macroinvertebrates (beaches, subtidal sediments) in accordance with methods in Przeslawski and Foster, 2020): - replicate samples will be collected at each site - sediment samples shall be sieved and retained material will be placed into a sample container with 5% buffered formaldehyde solution In the laboratory, invertebrates will be sorted, identified (to the lowest practical level) and counted. • Samples for infaunal analysis and Particle Size Analysis (PSA) will be taken using equipment such as a 0.1 m² mini-Hamon grab (or similar) deployed from a winch or A frame on the survey vessel. • Where samples for sediment chemistry analysis are required, a separate grab (e.g. a Van-Veen or Day grab) will be used to collect the samples.

3.6.3 Shellfish and Fish Communities

Sampling framework for shellfish and fish communities in the investigation area is provided in Table 3.6

Table 3.6 Shellfish and fish communities sampling framework

Element	Description
Objectives	Quantify the characteristics and spatial/temporal patterns in fauna communities to: • map and describe any ecological constraints (e.g. threatened species, pest species, species of direct fisheries significance) in the investigation area • characterise baseline conditions in shellfish and fish communities.
Dependencies	• Sampling site selection dependent on understanding of substrate conditions and bathymetry (see Sections 3.1 and 3.2)
Spatial coverage	• Measurements are to provide sufficient resolution to broadly describe fish and shellfish communities at representative habitat types/depths in the investigation area, with a focus on the likely Project infrastructure footprint
Sampling locations	• Multiple sites representative of different environmental settings. The number and location of sites is to be determined based on the bathymetry survey, which will be undertaken as part of the geophysical survey. Sampling locations will where practical, be the same as benthic community sites.
Temporal (duration, frequency)	• 2 seasonal surveys (winter, summer) over a 12-month period and possible 2-3 months in duration.
Methodology	The sampling methodologies are expected to encompass the following quantitative techniques: • towed camera underwater visual census on reefs and soft sediments. Where relevant, the methods of Przeslawski and Foster (2020) will be followed: - the same transects used to sample mobile invertebrates and macroalgae will be surveyed for fish and cephalopods. Fish and cephalopods will be counted on belt transects, with the transect width varying depending on target species (e.g. 10 m for mobile fish and cephalopods, 2 m for cryptic fish and large demersal invertebrates) - the abundance of fish and shellfish will be counted from video footage • Benthic baited remote underwater video stations (BRUVS) on reefs and soft sediments, in accordance with Langlois et al. (2018): - stereo BRUVS will be deployed for standard time periods (typically 1 hour) at multiple sites in representative habitat types - fish and other species will be identified to species (where possible), counted and measured for length • eDNA may be collected if required at reefs and soft sediment habitats, in accordance with NESP (2020): - eDNA samples will be collected at multiple sites in representative habitat types - the sampling methods are to be determined but are expected to include water samples, sediment samples and plankton tows - sediment samples will be returned to the surface, processed, stored and transported in accordance with standard methods - samples will be analysed by in the laboratory – specific assays to be determined • Potentially undertaking a standardised fishery stock assessment using methods to assess the population of the southern rock lobster, in accordance with Linnane et al. (2019): - sampling will be conducted using Fishery-independent Monitoring Survey Methods (FIMS) in September and January

Element	Description
	- replicate transects will be located in representative habitats, and pots will be set on each transect - lobsters will be counted, sized, sexed and females only will be visually assessed for reproductive stage.
Data analysis	• Summary statistics of the abundance of threatened species, pest species and species of fisheries significance • Univariate and multivariate comparisons of fish and shellfish species and communities among sites, depths and times • Univariate and multivariate analysis of potential linkages between fish and shellfish communities and environmental variables
Quality control and quality assurance	• As per Przeslawski and Foster (2020)

3.6.4 Seabirds and Shorebirds

Table 3.7 provides the seabird and shorebird survey framework to obtain data for use in future EIAs. A large number of seabirds listed as threatened and migratory under the EPBC Act potentially migrate through, forage in or otherwise use the investigation area. These include biologically important areas (**BIAs**) for the following species:

- White-faced storm petrel, Campbell albatross, shy albatross, wandering albatross, bullers albatross, Indian yellow nosed albatross, black-browed albatross, short-tailed shearwater, common diving petrel (see Table 4.1).

The region contains breeding areas for a number of other seabirds, potentially migratory pathways for parrot species that migrate between Tasmania and the mainland (orange-bellied parrot and swift parrot) as well as habitat for shorebirds in the nearshore environment.

The Federal *Survey Guidelines for Australia's Threatened Birds* (Department of Environment, Water, Heritage and the Arts (**DEWHA**), 2010) provides a methodology for determining the likelihood of a species' presence or absence at a site, and will be followed for this survey.

Table 3.7 Seabirds and shorebirds survey framework

Element	Description
Objectives:	• Determine the presence/absence of threatened seabirds and shorebirds within the investigation area • Identify any habitat features that may attract birds in greater numbers • Record behavioural characteristics of birds utilising the investigation area (i.e. flight height, direction, etc)
Relevant Guidelines:	• NOIZ 2004. Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K. Royal Netherlands Institute for Sea Research. • *Survey guidelines for Australia's threatened birds* (DEWHA, 2010).
Dependencies:	• Nil
Spatial coverage:	• Measurements are to provide sufficient resolution to broadly understand use of the investigation area by seabirds, shorebirds and other migratory species (i.e. parrots), as well as species richness.
Sampling locations	• Seabirds: Shipboard surveys with paired observers are proposed and/or aerial surveys (paired with AI identification techniques), where all birds observed are

Element	Description
	counted, using a few transects randomly across the investigation area, but concentrated on the FLA where the WTGs will be installed. Incidental observations will also be noted. Sampling locations will be sufficient to provide statistical power to enable a Before-After-Control-Impact (**BACI**) methodology for ongoing monitoring. A BACI approach or methodology is commonly used in the marine and terrestrial environment to employ statistical tests on differences between 'control' and 'impact' sites, both temporally and spatially. • Shorebirds: Fixed point bird or aerial surveys at the coastline to detect migratory shorebirds (particularly breeding species) – transects through area of disturbance at the shoreline.
Temporal (duration, frequency)	• Monthly surveys will be undertaken for seabirds, shorebirds and parrots for a period of 24 months, with an additional survey in June and July proposed during migration/residency times for threatened and migratory species, fairy prion and albatross species subject to requirements. • Surveys will be avoided in adverse weather conditions (i.e. high rainfall intensity, high wind velocities, fog) or in poor light.
Methodology	The sampling methodologies may encompass the following techniques: • Aerial surveys using fixed wing aircraft flying a grid-based survey design with flight lines spaced approximately 2 or 3.5 km apart. • Boat-based seabird observational surveys along pre-defined transects for species richness and relative Abundance. Potential for up to one hour may be spent chumming at a predetermined point within the FLA to attract any species from the broader area (i.e. seabirds using the area but may not have been detected during transect surveys).

3.6.5 Marine Megafauna

The investigation area overlaps BIAs for a number of marine megafauna species, including the white shark and pygmy blue whale. It also provides habitat for a number of other megafauna species, including whales, seals, turtles (vagrants), dolphins, sharks and rays. The primary potential impacts to these species from the early-phase activities (such as G&G surveys), construction and operation of the Project is underwater noise and entanglement, therefore the marine megafauna surveys are designed with these impacts in mind.

The National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (DCCEEW, 2024a) provide guidance on the best practice survey techniques for determining the presence (or likely absence), abundance (or density), distribution and habitat use (including behaviours) of cetaceans, marine turtles (in water), and the dugong, with a focus on conducting biological surveys to inform development of EIAs. As such, marine megafauna surveying will be undertaken in accordance with the methodologies provided in these guidelines.

There are currently no national guidelines for underwater noise assessment, though DCCEEW is currently in the process of developing these. Other relevant guidelines are the National Physical Laboratory (**NPL**) Good Practice Guide for Underwater Noise Measurement (2014), which provides the methodology for collecting data as well as the National Oceanic and Atmospheric Administration (**NOAA**) Fisheries Marine Mammal Acoustic Technical Guidance (2018) (which is currently in a consultation process with the view of being revised), which sets thresholds for permanent and temporary shifts in marine mammal behaviour. A combination of these guidelines will be used to ensure that data is correctly collected and analysed to predict the potential impacts to marine megafauna as a result of underwater noise.

Any personnel undertaking marine megafauna survey work will be trained in marine mammal observation procedures and will be required to strictly adhere to regulations/guidelines about maintaining safe distances from cetaceans. This plan addresses initial data collection; further modelling of underwater noise and assessment of the area of impact for marine megafauna will be undertaken as the Project EIA progresses. The framework for marine megafauna sampling is detailed in Table 3.8.

Table 3.8 Marine megafauna sampling framework

Element	Description
Objectives:	• Determine the presence/absence of megafauna within the investigation area • Identify any habitat features that may attract megafauna in greater numbers than other areas • To gain a better understanding of the distribution, abundance, movements and habitat use (in particular nursing or resting areas) by megafauna within the investigation area • Understand background noise within the investigation area, including contributions from oceanographic, biological and anthropogenic activity to enable future impact modelling
Relevant Guidelines:	• Australian National Guidelines for Whale and Dolphin Watching, 2017 (whilst not directly relevant, these guidelines will be followed during all field work to ensure there is no disturbance to megafauna from site surveys) • DCCEEW National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (2024) • EPBC Regulations 2000 (provides distances and vessel operations when marine mammals enter into a caution zone) • EPBC Policy Statement 2.1: Interaction between offshore seismic exploration and whales • NPL Good Practice Guide for Underwater Noise Measurement (2014) • Fisheries Marine Mammal Acoustic Technology Guidance (NOAA, 2018)
Spatial coverage:	• Measurements are to provide sufficient resolution to understand use of the investigation area by marine megafauna. • Spatial coverage will also be guided by preliminary modelling to predict the likely area of underwater noise generation.
Temporal (duration, frequency)	• Acoustic monitoring (or other survey methods) using PAM devices placed on the seabed would be undertaken to understand the presence of megafauna species within the investigation area and would be supplemented by aerial or boat-based surveys; PAM devices are expected to be in place for at least 24 months (see next row). Observation-based surveys may also occur for species if existing data is not sufficient (several published and unpublished data sets are available that may suffice).
Methodology	The sampling methodologies are expected to encompass the following techniques, as encouraged by the National Survey Guidelines: • Review of historical records and observations or other open-source data • Deploying PAM devices (i.e. directional landers) at between two to five locations within the investigation area to detect the presence of cetaceans. Bottom-moored recorders would be deployed for the entirety of the cetacean migration season in locations within or adjacent to the investigation area and the data analysed by specialists to confirm species type. • At least one other survey method will be used (in accordance with the national Survey Guidelines, which may include either vessel-based or aerial line transects conducted perpendicular to the coast over the investigation area (these will only be conducted if existing records and surveys are not sufficient to fully characterise use of the area).

Element	Description
	Aerial surveys will be undertaken using fixed-wing aircraft at monthly intervals for at least 24 months with video/photography equipment on board to record sightings. These images will then be processed using AI techniques to identify megafauna types and behaviours. The methodology for the aerial surveys will involve a grid-based survey with flight lines spaced approximately 3.2 km apart. Aerial surveys are undertaken at a height of approximately 300m (corresponds to tip height of a turbine). The impacts of aircraft noise are considered negligible for cetaceans at this height. • E-DNA techniques for detecting the presence/absence of marine species will also be reviewed to determine its suitability as a survey technique. • Data from acoustic monitoring will be used to inform modelling as part of the Project EIA. Modelling will be undertaken for construction activities, vessel operations and movements, operational and decommissioning noise. • There is no plan at this time to tag cetaceans (or any other marine fauna) to monitor their movement patterns.

4 Description of the Existing Environment

4.1 Oceanography

Recent surveys undertaken by BMT have informed the characterisation of oceanography in the investigation area. The ambient metocean conditions of the investigation area are characterised by a predominantly westerly to south-westerly wind and wave climate, with some occurrence of easterly storms. Wind speeds typically vary around 6 to 12 m/s, with little seasonal variation, although stronger wind speeds occur around winter months, July to September. Significant wave heights are typically in the order of 1.5 to 2.5m but can go up to around 7m. Peak wave periods in the order of 8 to 14s are common. There is slight seasonal variation, with more energetic wave conditions occurring during winter, May through to September, and the least energetic wave conditions during the summer months of December to February.

The area typically experiences easterly flowing surface currents of 0.1 to 0.6 m/s speed, sometimes greater than 1m/s. Near the seabed, the predominant current direction is towards the south-east, with slower speeds that rarely exceed 0.5 m/s. Currents are slightly stronger in the months of April to August, and weaker during summer, December to February. Subsurface water temperatures range from around 12 degrees Celsius in August to September to 21 degrees Celsius in February to March. The tidal range in this area is of approximately 3 m.

Three key water currents influence Bass Strait, which (apart from the Bass Strait Cascade) are illustrated in Figure 4.1 and Figure 4.2, showing summer and winter variation. These are as follows:

- **Leeuwin Current**: The Leeuwin Current transports warm, sub-tropical water southward along the Western Australian (WA) coast and then eastward into the Great Australian Bight (**GAB**), where it mixes with the cool waters from the Zeehan Current running along Tasmania's west coast (Department of the Environment (**DoE**), 2015). The Leeuwin and Zeehan currents are stronger in winter than in summer, with the latter flowing into Bass Strait during winter.

- **East Australian Current**: The East Australian Current (**EAC**) is up to 500 m deep and 100 km wide, flows southwards adjacent to the coast of NSW and eastern Victoria, and carries with it warm equatorial waters (DoE, 2015). The EAC is strongest in summer when it can flow at a speed of up to 5 knots, but flows more slowly (2-3 knots) in winter where it remains at higher latitudes.

- **Bass Strait Cascade**: The Bass Strait Cascade occurs during winter along the shelf break, which brings nutrient-rich waters to the surface as a result of the eastward flushing of the shallow waters of the strait over the continental shelf mixing with cooler, deeper nutrient-rich water (DoE, 2015).

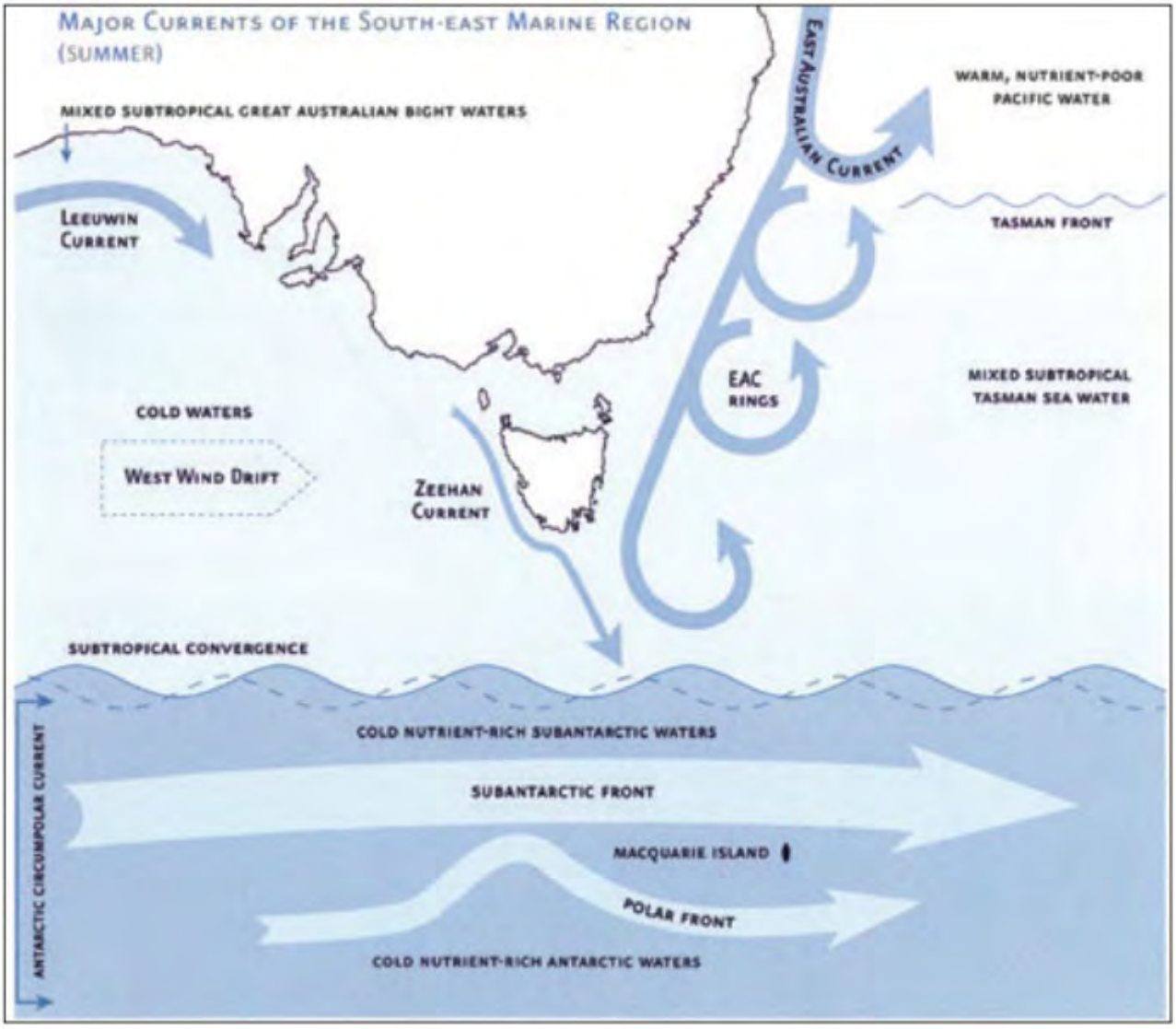

Figure 4.1 South-east marine region summer ocean currents (Source: DoE, 2015)

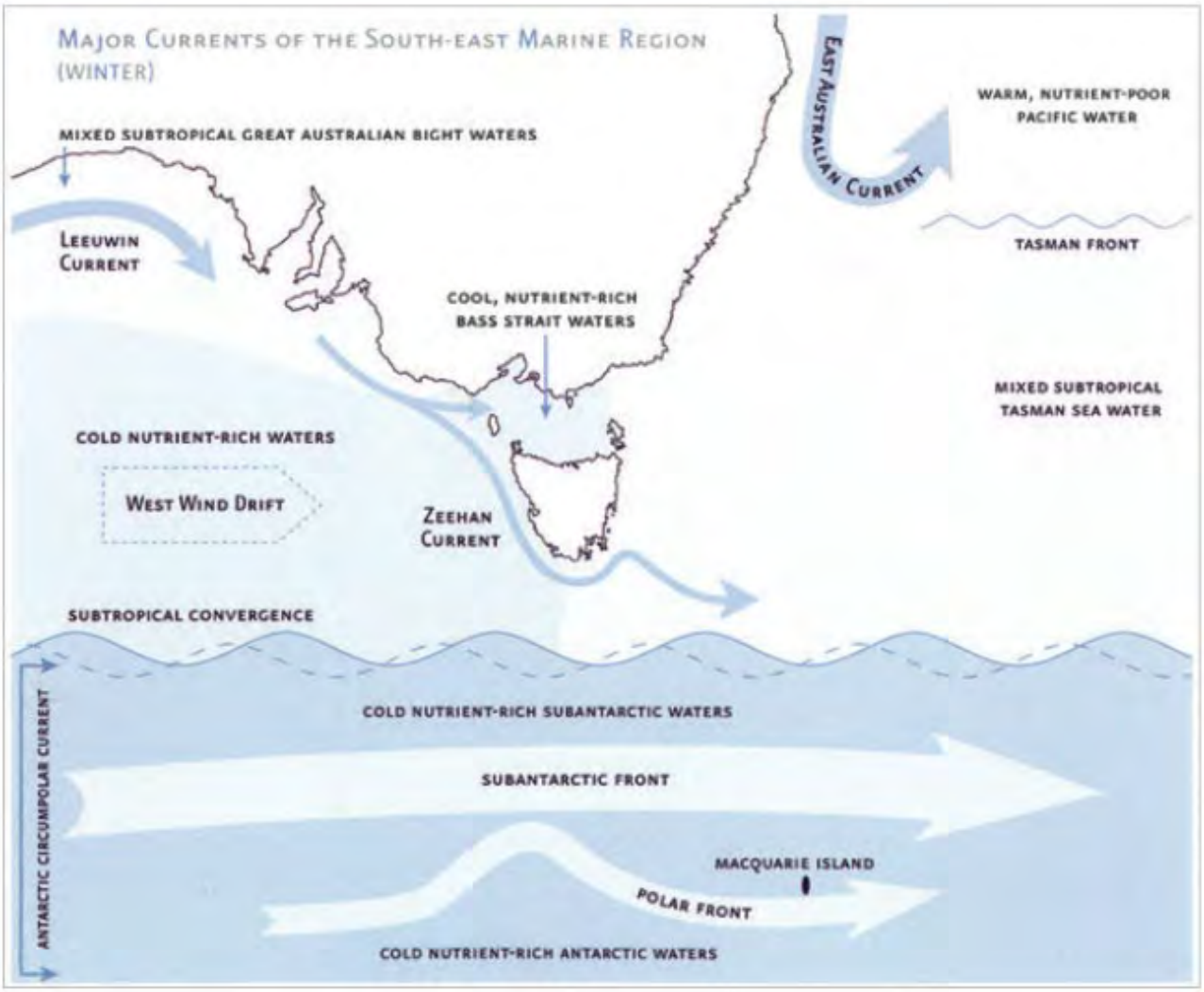

Figure 4.2 South-east marine region winter ocean currents (Source: DoE, 2015)

4.2 South-East Marine Profile

The investigation area occurs within the South-east marine region of Australia. The South-east marine region profile describes the ecosystems, conservation values and uses of Commonwealth marine waters in south-eastern Australia, including Bass Strait (DoE, 2015).

The region is generally considered to have low productivity, with the exception of localised hotspots that include the Bonney Upwelling (which extends from southeast South Australia to southwest Victoria), the Bass Strait Cascade on the shelf break east of Bass Strait, and the East Australian Current along the eastern edge of the Region. The investigation area is located on the continental shelf, in an area mapped as 'basin', which was formed through the break-up of the older Gondwana continent.

A number of key ecological features (**KEFs**) exist within the south-east marine environment, however none of these features occur within the investigation area, with the closest being located over 50km to the north-east (Upwelling East of Eden) (AMSIS, 2024b).

4.3 Matters of National Environmental Significance

A search of the PMST administered by DCCEEW identified the following MNES that fall within or in the vicinity of the investigation area. Please refer to the attachment for the results of the PMST search. It is noted that the entire Commonwealth Marine area is a MNES and that most of the matters described below sit within the Commonwealth Marine area.

4.3.1 Australian Marine Parks

The nearest AMP to the investigation area is the Beagle AMP. The Beagle AMP is located 22.8 km from the FLA and is adjacent to (but is not within) the proposed cable corridor.

The Beagle AMP protects rocky reefs and sponge gardens and is an important foraging area for seabirds that breed on the Kent Islands within the park (Parks Australia, 2024). The Kent Islands are a cluster of five granitic islands in Bass Strait, which also have Tasmanian Marine Protected Areas covering all waters up to three nautical miles (nm) around them.

The Beagle AMP provides shelter for shark species in the winter and scallop beds on sandy substrate provide foraging for these species. Port Jackson sharks (*Heterodontus portusjacksoni*) have been observed near the reef ridges. Fish species within the AMP that are commonly observed include Degen's leatherjacket (*Thamnaconus degeni*), butterfly perch (*Caesioperca lepidoptera*), barber perch (*Caesioperca razor*), common gurnard perch (Neosebastes scorpaenoides), Melbourne silverbelly (*Parequula melbournensis*), jackass morwong (*Nemadactylus macropterusrosy*), wrasse species, sand flathead (*Platycephalus bassensis*) and draughtboard shark (*Cephaloscyllium laticeps*).

4.3.2 Wetlands of National Importance

The PMST search indicates that the Corner Inlet Ramsar site is located in close proximity to the investigation area (as per Figure 4.3). In some areas of the proposed cable corridor, the wetland runs between 0-10km from the boundary (but does not intersect).

The Corner Inlet Ramsar site is 67,186 hectares (ha). The proposed cable corridor runs directly adjacent to the south-eastern part of the wetland for 14 km. This Ramsar site is fringed by mangroves, saltmarshes, sandy beaches and intertidal mudflats. The only extensive bed of Broad-leafed Seagrass (*Posidonia australisin*) in Victoria occurs within the wetland. The area supports 390 species of marine invertebrates and 390 species of native flora. The wetland site provides extensive tidal flats at low tide which are important feeding areas for waders. Thirty-two wader species have been recorded within the wetland, and it is estimated that nearly 50% of overwintering migratory waders in Victoria occur in Corner Inlet. Nationally threatened species that utilise the Ramsar site include the orange-bellied parrot (*Neophema chrysogaster*), growling grass frog (*Litoria reniformis)*, Australian grayling (*Prototroctes maraena*) and swift parrot (*Lathamus discolor*) (Australian Wetland Database, 2023).

Jack Smith Lake
Corner Inlet Ramsar Wetland
Woodside Beach
Mcloughlins Beach
Nooramunga Marine & Coastal Park
Port Albert
Port Franklin
Fish Creek
Port Welshpool
Shallow Inlet Marine and Coastal Park
Corner Inlet Marine and Coastal Park
Snake Island
Waratah Bay
Sandy Point
Corner Inlet Marine Park
OEI-01-2022 Part 1
Rabbit Island
Seal Island
Cape Liptrap
Notch Island
Cliffy Island
Shellback Island
Wilsons Promontory
Rag Island
Tidal River
Mount Oberon
Great Glennie Island
OEI-01-2022 Part 2
Wilsons Promontory Marine Park
Forty Foot Rocks
Hogan Island
West Moncoeur Island
Rodondo Island
Devils Tower
Dover Island
Curtis Island
Cone Islet
Big Rock
OEI-01-2022 Part 3

Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- Ramsar Wetlands
- VicGrid Connection Area

Title:

Gippsland Skies investigation area proximity to Corner Inlet Ramsar Wetland

Drawing: 4.3

Rev: D

N 0 5 10 km

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4.3.3 Threatened Species/Ecological Communities and Migratory Species

A search of the PMST provided a list of threatened species/ecological communities and migratory species that are present in the investigation area (Refer to Annex A). Table 4.4 provides an overview of the identified threatened matters and their likely presence within the investigation area and whether a BIA is present for that species in the investigation area. Only species considered to have actual potential to occur in the investigation area have been included in Table 4.4. Where a species has 'Marine' in the status column, this means they are a listed marine species. The search for the proposed cable corridor matters was undertaken without a buffer (as these areas already have significant buffer built in and the route will be subject to further refinement prior to survey). The search for the FLA area incorporated an additional buffer of 1 nautical mile (1.85km).

The search identified 95 threatened species and 68 migratory species in the investigation area.

Due to the surveys included in this document being marine based, terrestrial species identified in the PMST search have been excluded from this report (Refer to Annex B).

Birds

A high number of the identified threatened and migratory species for the investigation area are shorebird and seabird species. Critically endangered and endangered species identified across the investigation area are:

- Australasian bittern (*Botaurus poiciloptilus*)
- Curlew sandpiper (*Calidris ferruginea*)
- Lesser sand plover (*Charadrius mongolus*)
- Northern royal Albatross (*Diomedia sanfordi*)
- Swift parrot (*Lathamus discolor*)
- Nunivak bar-tailed godwit (*Limosa lapponica baueri*)
- Black-tailed godwit (*Limosa limosa*)
- Southern giant-petrel (*Macronectes giganteus*)
- Orange bellied parrot (*Neophema chrysogaster*)
- Eastern curlew (*Numenius madagascariensis*)
- Gould's petrel (*Pterodroma leucoptera leucoptera*)
- Australian painted snipe (*Rostratula australis*)
- Shy albatross (*Thalassarche cauta*)
- Grey-headed albatross (*Thalassarche chrysostoma*)
- Common greenshank (*Tringa nebularia*).

Further, a number of BIAs for bird species are located within the investigation area. BIAs are indications that an area has a high level of importance for a species, either threatened or migratory, under the EPBC Act. A list of the BIAs for bird species overlapped by the investigation area is provided in Table 4.1, as per the Australian Marine Spatial Information System (AMSIS) (DCCEEW, 2024b).

Table 4.1 BIAs for bird species occurring within the investigation area

Species	Behaviour	Occurs in FLA	Occurs in cable corridor
Short-tailed shearwater (*Ardenna tenuirostris*)	Foraging	Yes	Yes
	Reproduction	No	Yes
Wandering albatross (*Diomedea exulans*)	Foraging	Yes	Yes
Little penguin (*Eudyptula minor*)	Foraging	No	Yes
White-faced storm petrel (*Pelagodroma marina)*	Foraging	Yes	Yes
Common diving petrel (*Pelecanoides urinatrix*)	Foraging	Yes	Yes
Buller's albatross (*Thalassarche bulleri*)	Foraging	Yes	Yes
Indian, yellow-nosed albatross (*Thalassarche chlororhynchos bassi*)	Foraging	Yes	No
Black-browed albatross (*Thalassarche melanophris*)	Foraging	Yes	Yes
Shy albatross (*Thalassarche cauta cauta*)	Foraging likely	Yes	Yes
Campbell albatross (*Thalassarche melanophris impavida*)	Foraging	Yes	Yes

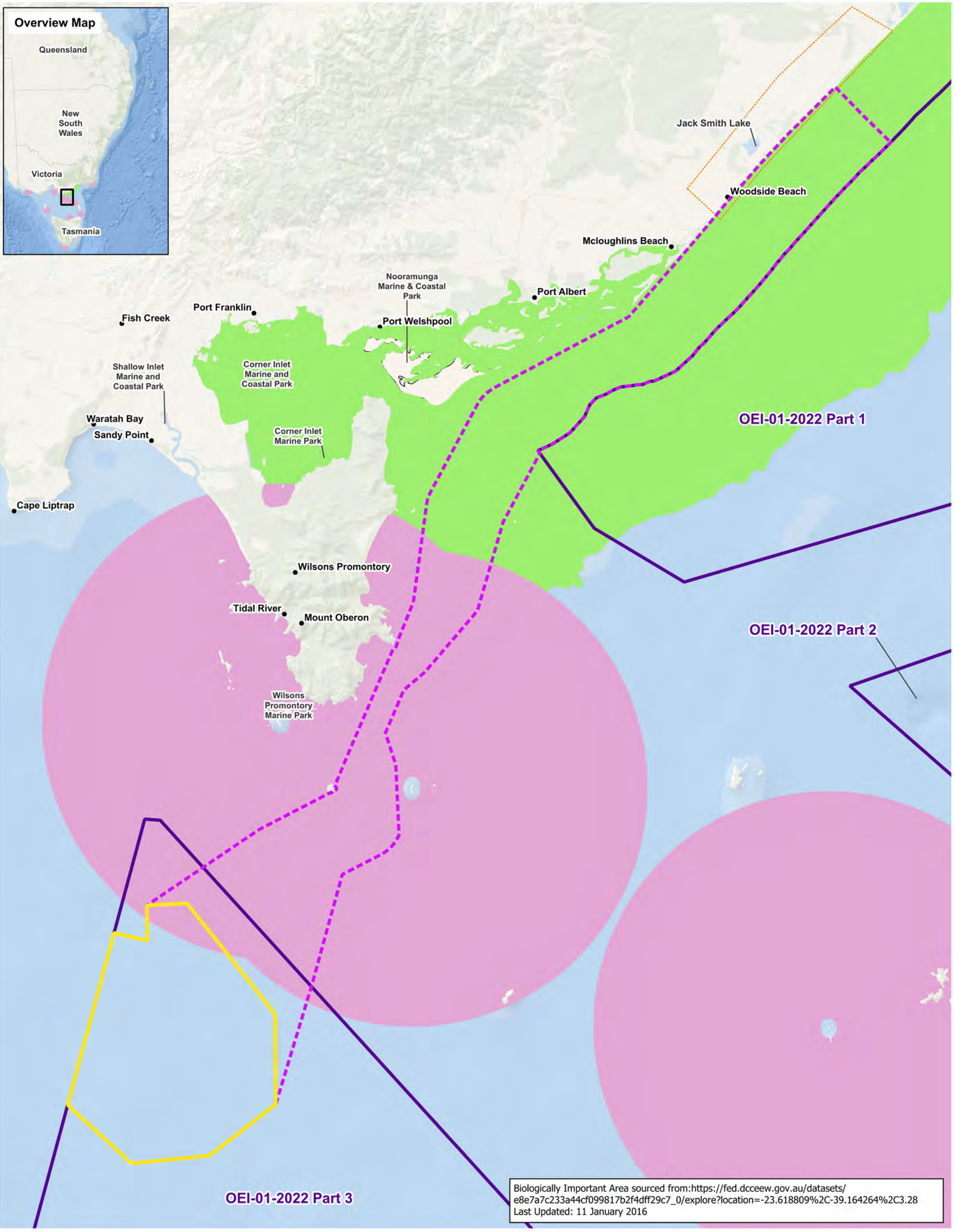
Fish and Sharks

No critically endangered or endangered fish or shark species were identified in the PMST search of the investigation area (apart from the eastern dwarf galaxias, though this is not expected to occur in the investigation area). The great white shark BIA is overlapped by the investigation area (as per Table 4.2 and Figure 4.4). The investigation area overlaps with approximately 844km^2 of the breeding BIA and 617km^2 of the foraging BIA. In comparing these areas with total areas of each BIA, this represents a percentage overlap of 14.8% and 0.73% respectively.

The white shark (*Carcharodon carcharias*), also known as the great white shark, is listed as a vulnerable species under the EPBC Act. This species is known to be a temporary resident in areas it inhabits, however there is evidence to suggest that this species is philopatric (returns to their birth site for biological purposes) (DCCEEW, 2016). There are two populations of white shark within Australian waters: the eastern and the southern-western populations, with the eastern population known to be present along the entire eastern seaboard (CSIRO, 2021). According to the AMSIS mapping, the proposed cable corridor (but not the FLA) occurs within the section mapped as a reproduction (or breeding) area for this species (see Figure 4.4).

Table 4.2 BIA for the great white shark within the investigation area

Species	Behaviour	Occurs in FLA	Occurs in cable corridor
White shark (*Carcharodon carcharias*)	Breeding	No	Yes
	Foraging	Yes	Yes



Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- VicGrid Connection Area

BIA Types

- Breeding (nursery area)
- Foraging

Title:

BIA for the Great White Shark in relation to investigation area

Drawing: 4.4

Rev: D

BMT endeavours to ensure that the information provided in this map is correct at the time of publication.

BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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Filepath: I:\A12195.i.lcm_Acacia_OWF\QGIS\GippslandWest\001009_004_Gippsland_Skies_BIA.qgz

Threats to this species identified in the Recovery Plan for the White Shark (2013) are from the commercial fishing industry and shark control activities (such as beach meshing or drum lining).

The other shark species identified are the school shark (*Galeorhinus galeus*), shortfin mako shark (*Isurus oxyrinchus*), whale shark (*Rhincodon typus*) and the porbeagle/mackerel shark (*Lamna nasus*). The presence of these species or species habitat in the investigation area are stated as either 'may' or 'likely to occur'. The school shark does have an important breeding area within Corner Inlet, and while the investigation area does not intersect with Corner Inlet, it would be accessed through the investigation area (DCCEEW, 2004b). The school shark is actively fished primarily within the Southern and Eastern Scalefish and Shark Fishery. Migratory and movement details on the other species is limited. The key threats, however, to shark species are from fishing and accidental catch. Both the shortfin mako shark and porbeagle are oceanic species (with the porbeagle known to occasionally enter coastal areas), therefore these species are less likely to be seen in the investigation area (DCCEEW, 2012; DCCEEW, 2024c). The whale shark is commonly seen off Western Australia at Ningaloo Reef, Christmas Island and in the Coral Sea, and are considered unlikely to occur off Victoria (DCCEEW, 2005).

EPBC Act-listed fish species that may occur within the investigation area are fished within a number of Victorian fisheries (blue warehou (*Seriolella brama)*) or are primarily freshwater species that may spend a small amount of their lifecycle in coastal areas but most time in coastal rivers (Australian grayling, dwarf galaxias) (DCCEEW, 2024c; Saddlier, Jackson & Hammer, 2010). The blue warehou may occur in the investigation area however these are legally fished in this area and are widespread throughout the fisheries. The eastern dwarf galaxia (*Galaxiella pusilla*) is listed as endangered. Its distribution is restricted to freshwater habitats and is not a marine species and is therefore not described or assessed further here.

Marine Mammals

Endangered marine mammal species identified in the investigation area are the southern right and pygmy blue whale, as per Table 4.3. The investigation area falls within the boundaries of BIAs for both of these species (although the PMST search does not identify the southern right whale BIA as occurring, it is assumed the occurrence in the investigation area is still valid based on AMSIS mapping).

Table 4.3 BIAs for the southern right and pygmy blue whale within the investigation area

Species	Behaviour	Occurs in FLA	Occurs in cable corridor
Pygmy blue whale (*Balaenoptera musculus brevicauda*)	Foraging	Yes	Yes
Southern right whale (*Eubalaena australis*)	Migration (approx. October - April)	Yes	Yes
	Reproduction (approx. May – September)	No	Yes

Southern right whale

The southern right whale (*Eubalena australis*) is a large baleen whale, listed as an endangered species under the EPBC Act. Two populations of the southern right whale inhabit Australian waters; eastern and western, with the eastern southern right whale being the population of interest for the investigation area.

The investigation area falls entirely within the BIA for the southern right whale, which spans the entirety of the Bass Strait and extends around the southern coast of Australia. According to the National Conservation Values Atlas mapping, the FLA lies only within the migratory section (indicating presence

of the species during April to October), while the cable corridor route intersects with the reproduction BIA (see **Figure 4.7**). The reproduction BIA indicates areas where the species are present during May to September. The National Recovery Plan for the species reports this predominantly occurs in shallow coastal waters (<10m depth) within 1km of the coastline (DCCEEW, 2024d). The eastern population of the species is estimated at 268 (or between 146-650) whales, with a rate of increase of 4.7 percent between 1996 and 2017. This is still very low in comparison with the estimated historical numbers.

The national conservation management plan for the species provides data for breeding and migration pathways along the eastern Australia coast, which is visualised in **Figure 4.5**. In Victoria, the National Recovery Plan reports that there are increasing sightings of the species along the Gippsland Coast, with regular aggregation in waters off Warrnambool at Logans Beach. It should be noted that the BIA for the southern right whale was not listed in the PMST search, therefore information on this was sourced from the AMSIS.

The State Wide Integrated Flora and Fauna Team (SWIFFT) provide sighting data for southern right whales in Victoria each year (2022). This image shows a few sightings offshore of Wilsons Promontory National Park, although higher numbers are shown elsewhere, particularly around western Victoria and Warrnambool, where aggregation and higher breeding activity occurs. Most records of reproductive activity within Victoria occur in an area closer to the South Australian border, near Warrnambool, with the species present in Australia in winter months.

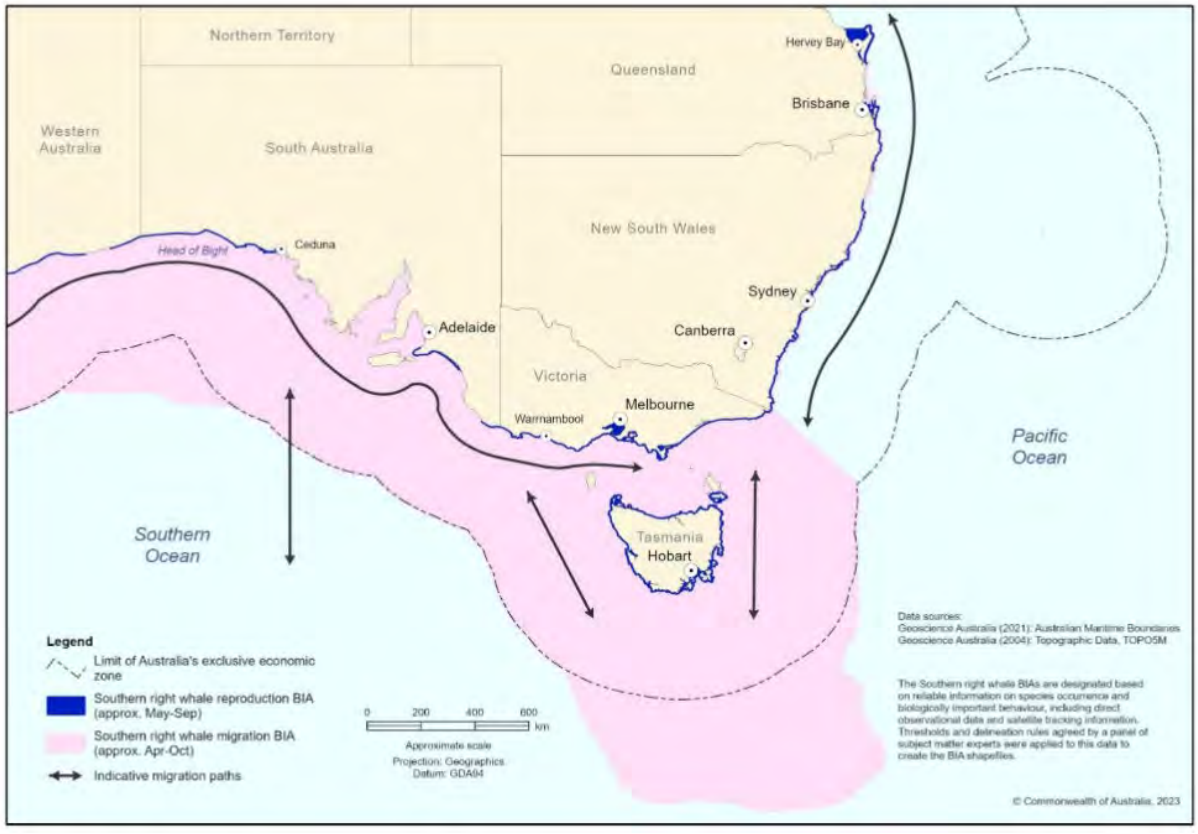

Figure 4.5 Southern right whale Biologically Important Areas and Habitat Critical to the Survival (reproduction BIA) in eastern Australia (DCCEEW, 2024c)

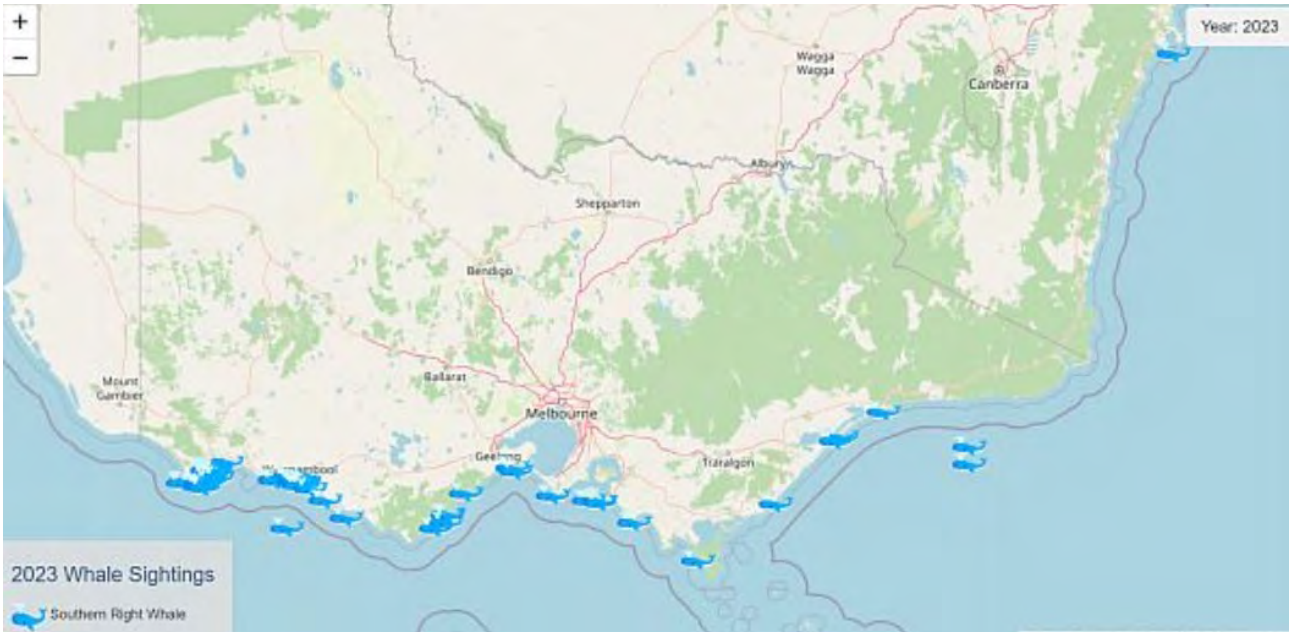

Figure 4.6 Southern right whale sightings in 2023 (SWIFFT)

Jack Smith Lake
Woodside Beach
Mcloughlins Beach
Nooramunga Marine & Coastal Park
Port Albert
Port Franklin
Fish Creek
Port Welshpool
Shallow Inlet Marine and Coastal Park
Corner Inlet Marine and Coastal Park
Waratah Bay
Sandy Point
Corner Inlet Marine Park
Cape Liptrap
Wilsons Promontory
Tidal River
Mount Oberon
Wilsons Promontory Marine Park
OEI-01-2022 Part 1
OEI-01-2022 Part 2
OEI-01-2022 Part 3

Biologically Important Area sourced from:https://fed.dcceew.gov.au/datasets/e8e7a7c233a44cf099817b2f4dff29c7_0/explore?location=-23.618809%2C-39.164264%2C3.28
Last Updated: 11 January 2016

Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- VicGrid Connection Area

BIA Types

- Migration
- Reproduction

Title:
BIA for southern right whale in relation to the investigation area

Drawing: 4.7

Rev: D

BMT endeavours to ensure that the information provided in this map is correct at the time of publication.

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Threats posed to the southern right whale, as per the National Recovery Plan (2024), that are relevant to the proposed surveys include entanglement, underwater noise and collision. Further information on these risks and how they will be mitigated is discussed in Section 6.

Pygmy blue whale

The pygmy blue whale (*Balaenoptera musculus brevicauda*) is a subspecies of the blue whale and a type of baleen whale. While the blue whale is listed as an endangered species under the EPBC Act, there is insufficient information present on population numbers of pygmy blue whales to determine a protection category.

This species has two known seasonal feeding aggregations off the Australian coastlines, one of which occurs in the Bonney Upwelling, at least 500km west of the investigation area near Portland, Victoria (DCCEEW, 2015). The Blue Whale Conservation Management Plan identifies that the species occupies the western area of the Bonney Upwelling system in November and December and then move to the eastern area off South Australia and Victoria between January and April. The plan identifies that other foraging areas include Bass Strait, hence the presence of the foraging BIA overlaying the investigation area (see Figure 4.9). The investigation area occurs within the 'possible foraging area' according to the conservation plan, with this categorisation being based of limited direct observations or through indirect evidence, such as occurrence of krill in close proximity to whales or satellite tagged whales showing circling tracks.

Migratory patterns generally involve this species travelling up the west coast of Australia to Indonesia, rather than migrating through the Bass Strait and along the east coast (Barlow et al, 2023). A study by Branch et al in 2023 identifies five known populations of pygmy blue whale that have been determined through song type analysis; north-west Indian ocean, central Indian ocean, south-west Indian ocean, south-east Indian Ocean and south-west Pacific Ocean. These populations further suggest that individuals mostly reside west of the investigation area, except for the south-west Pacific Ocean population. However, some acoustic monitoring in Bass Strait has identified pygmy blue whale calls during times that they would be expected to be migrating, indicating their course east and potential for these individuals to be seeking alternative wintering grounds. According to BIA mapping, there are no breeding grounds that occur within the investigation area or in close proximity. Figure 4.8, from the Blue Whale Study, shows the concentration of blue whales between 1998 and 2016, illustrating their presence in vicinity of the Bonney Upwelling (2022).

Threats posed to the pygmy blue whale are the same as those identified for the southern right whale.

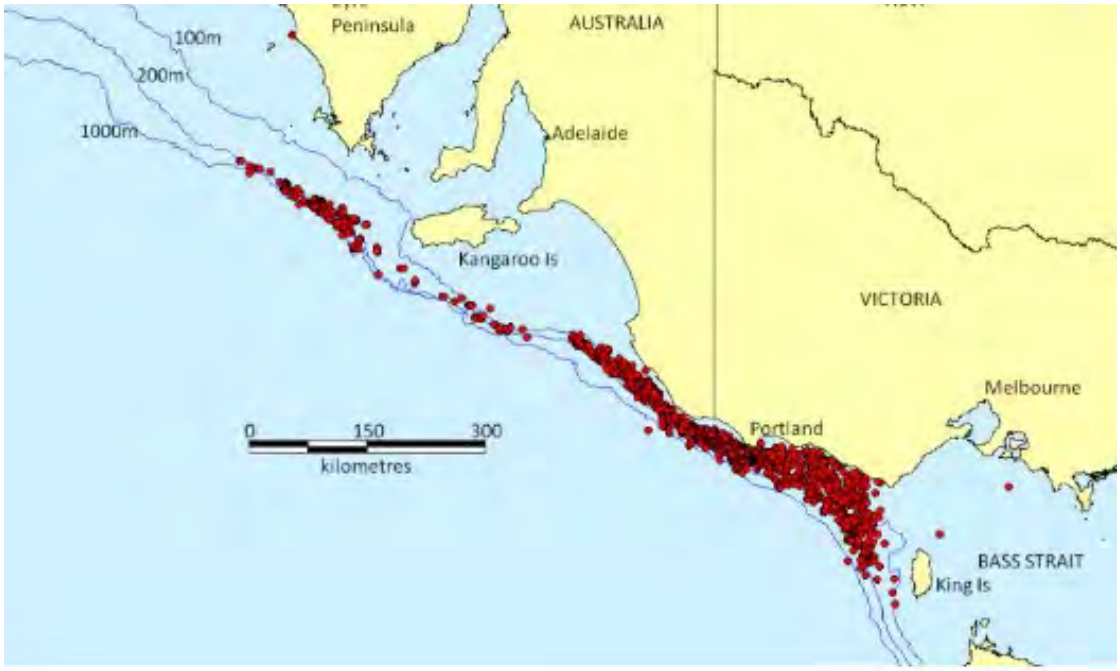
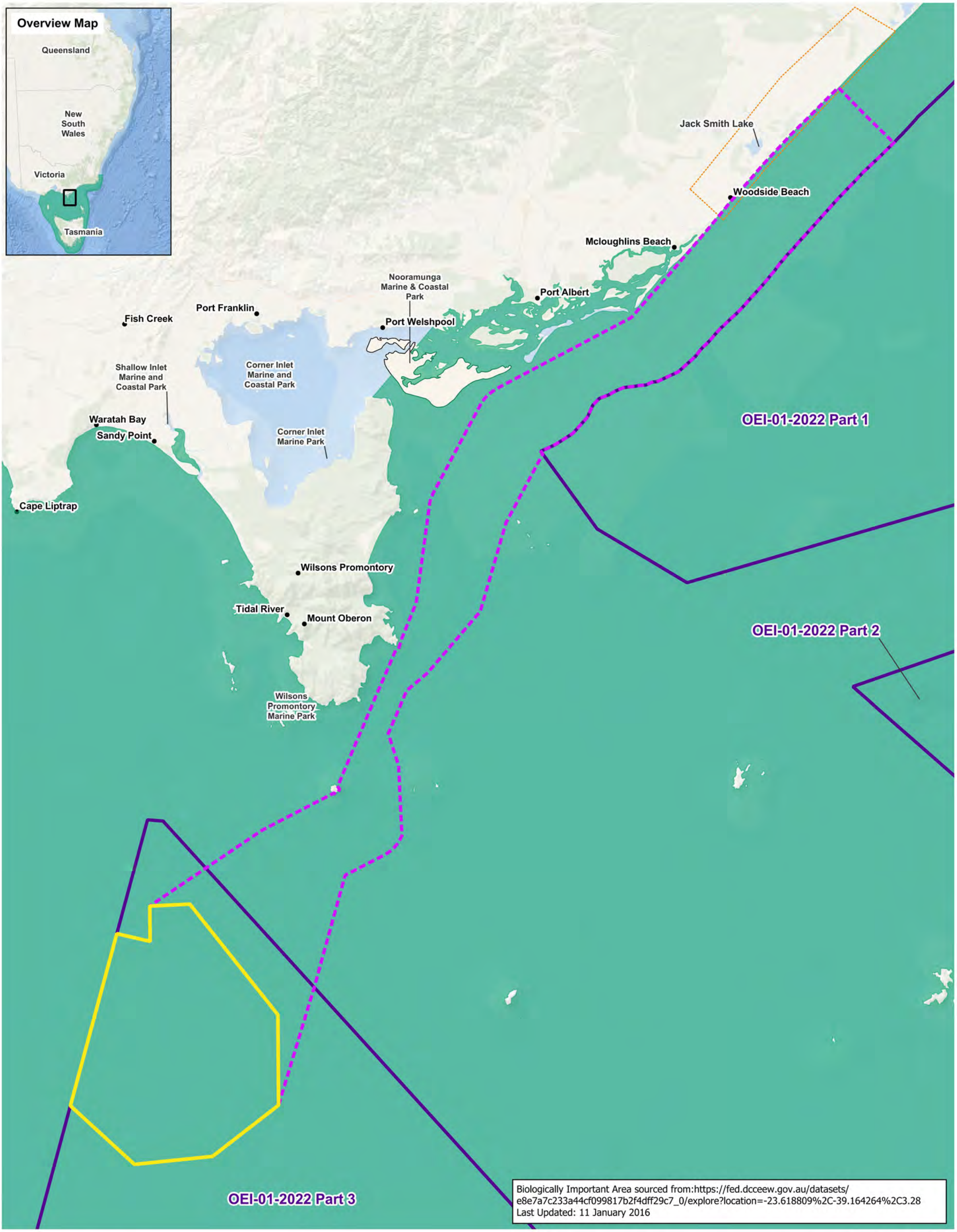


Figure 4.8 Distribution of approximately 1600 blue whale sightings around the Bonney Upwelling 1998-2016 (Source: Blue Whale Study, 2022)



Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- VicGrid Connection Area

BIA Types

- Foraging

Title:

BIA for pygmy blue whale in relation to investigation area

Drawing: 4.9

Rev: D

BMT endeavours to ensure that the information provided in this map is correct at the time of publication.

BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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Other Marine Mammals

The PMST identified the dusky dolphin (*Lagenorhynchus obscurus*), humpback whale (*Megaptera novaeangliae*) and killer whale *(Orcinus orca)* as migratory species (not threatened) with habitat that may occur, is known to occur, or is likely to occur in the investigation area (descriptions respective to order of species listed). No BIAs for any of these species are mapped to occur in the investigation area (noting that the killer whale and dusky dolphin do not have mapped BIAs), therefore while they may occur in the area, they would likely be passing through to reach another more favourable area.

The sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*) and pygmy right whale (C*aperea marginata*) were identified to have areas that are likely to or may support foraging, feeding or other behaviour within the investigation area. According to DCCEEW, migratory and movement patterns for these species are largely unknown, and in the case of the fin whale this is also true for breeding locations.

The Australian fur seal *(Arctocephalus pusillus doriferus)* (listed as likely to occur) and long-nosed fur seal *(Artocephalus forsteri)*(listed as may occur) forage (based on the indicative distribution maps and best available knowledge) and have breeding colonies in the Bass Strait, predominantly the Bass Strait islands, with a key threat to these species being fishing in the area and entanglement (DCCEEW, 2024c; Tasmanian Government, 2024).

Reptiles

Reptiles identified to potentially be present in the investigation area are loggerhead (*Caretta caretta*) (endangered), green (*Chelonia mydas*) (Vulnerable) and leatherback turtles (*Dermochelys coriacea*) (Vulnerable). The loggerhead and leatherback turtle are endangered species while the green turtle is vulnerable. Nesting areas for these turtles are located further north off the coast of Queensland or Northern Territory, or off Western Australia (AMSIS, 2024b). As such, any turtles in the investigation area are likely passing through and potentially foraging and would be unlikely to remain in one area for an extended time.

Threatened Ecological Communities

The PMST search notes that four threatened ecological communities (**TEC**) may occur within the investigation area (overlapped by the proposed cable corridor) . Three of these TECs were determined to not be present within the investigation area based on their terrestrial nature (Tasmanian white gum wet forest, Tasmanian forests and Woodlands and Natural damp grassland of the Victorian Coastal Plains). As the proposed investigations will be undertaken only within the marine environment (defined as works below highest astronomical tide [HAT]), these three terrestrial TECs will not be encountered as part of marine survey works and are not included in Table 4.4.

The vulnerable TEC of subtropical and temperate coastal saltmarsh may be present within intertidal areas in proximity to the cable corridor. While marine survey works are very unlikely to directly impact this community, there is potential for indirect impacts to water quality (e.g. in the event of a diesel spill), although this is still highly unlikely. DCCEEW (2013a) mapping indicates this TEC is widespread along the eastern and southern coast of Australia (Figure 4.10). As can be seen in Figure 4.10, the proposed cable corridor is likely to encounter this TEC.. This TEC is common in intertidal areas, often located between the mean high tide and mean spring tide levels (DCCEEW, 2013a). These communities host a wide range of vegetation types, including grasses, succulent herbs, shrubs and non-vascular plants such as epiphytic algae, diatoms and cyanobacterial mats (DCCEEW, 2013a).

While this TEC may be present, further ground truthing studies would need to be undertaken to determine whether its characteristics meet those required for the EPBC Act to apply to those areas (DCCEEW, 2013a). Characteristics that determine this include their location, patch size and tidal connection.

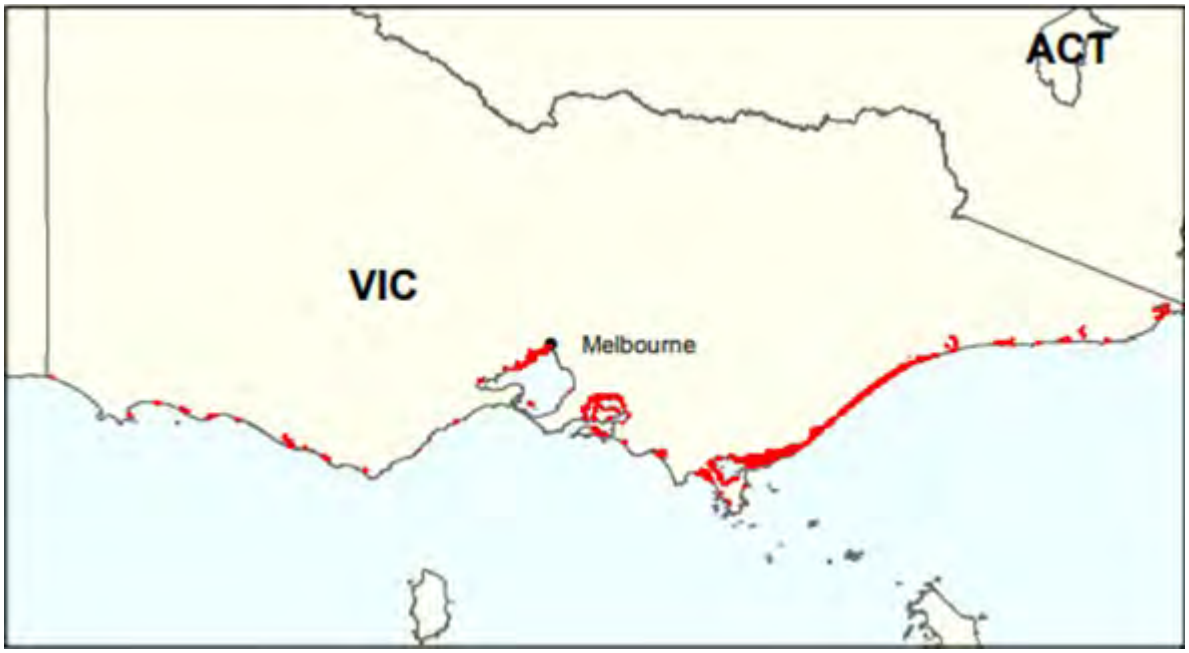


Figure 4.10 Mapping of locations of subtropical and temperate coastal saltmarsh community (sourced from DCCEEW, 2013b)

Table 4.4 Threatened and migratory species identified within investigation area

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Subtropical and temperate coastal saltmarsh		Vulnerable	Community likely to occur		Yes	
Birds						
Actitis hypoleucos	Common Sandpiper	Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Apus pacificus	Fork-tailed Swift	Migratory, Marine	Species or species habitat likely to occur		Yes	
Ardenna carneipes	Flesh-footed Shearwater, Fleshy-footed Shearwater	Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Ardenna grisea	Sooty Shearwater	Vulnerable, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Arenaria interpres	Ruddy Turnstone	Vulnerable, Migratory, Marine	Roosting known to occur		Yes	
Bubulcus ibis	Cattle Egret	Marine	Species or species habitat may occur within area		Yes	
Botaurus poiciloptilus	Australasian Bittern	Endangered	Species or species habitat likely to occur		Yes	
Calidris acuminata	Sharp-tailed Sandpiper	Vulnerable, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Calidris alba	Sanderling	Migratory, Marine	Roosting known to occur		Yes	
Calidris canutus	Red Knot, Knot	Vulnerable, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Calidris ferruginea	Curlew Sandpiper	Critically Endangered, Migratory, Marine	Species or species habitat may occur	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Calidris melanotos	Pectoral Sandpiper	Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Calidris pugnax	Ruff	Migratory, Marine	Roosting known to occur		Yes	
Calidris ruficollis	Red-necked Stint	Migratory, Marine	Roosting known to occur		Yes	
Calidris tenuirostris	Great Knot	Vulnerable, Migratory, Marine	Roosting known to occur		Yes	
Charadrius bicinctus	Double-banded Plover	Migratory, Marine	Roosting known to occur		Yes	
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	Vulnerable, Migratory, Marine	Species or species habitat likely to occur		Yes	
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	Endangered, Migratory, Marine	Roosting known to occur		Yes	
Charadrius ruficapillus	Red-capped Plover	Marine	Roosting known to occur within area		Yes	
Charadrius veredus	Oriental Plover, Oriental Dotterel	Migratory, Marine	Species or species habitat known to occur within area		Yes	
Diomedea antipodensis	Antipodean Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Diomedea antipodensis gibsoni	Gibson's Albatross	Vulnerable, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Diomedea epomophora	Southern Royal Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Diomedea exulans	Wandering Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	Yes
Diomedea sanfordi	Northern Royal Albatross	Endangered, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Fregetta grallaria grallaria	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Vulnerable	Species or species habitat likely to occur		Yes	
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Vulnerable, Migratory, Marine	Species or species habitat known to occur		Yes	
Gallinago megala	Swinhoe's Snipe	Migratory, Marine	Roosting likely to occur within area		Yes	
Gallinago stenura	Pin-tailed Snipe	Migratory, Marine	Roosting likely to occur within area		Yes	
Haliaeetus leucogaster	White-bellied sea-eagle	Marine	Species or species habitat known to occur within area		Yes	
Halobaena caerulea	Blue Petrel	Vulnerable, Marine	Species or species habitat may occur	Yes	Yes	
Himantopus himantopus	Pied stilt, Black-winged Stilt	Marine	Roosting known to occur within area		Yes	
Hirundapus caudacutus	White-throated Needletail	Vulnerable, Migratory, Marine	Species or species habitat known to occur		Yes	
Lathamus discolor	Swift Parrot	Critically Endangered, Marine	Species or species habitat known to occur		Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Limosa lapponica	Bar-tailed Godwit	Migratory, Marine	Species or species habitat known to occur within area		Yes	
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Endangered	Species or species habitat known to occur		Yes	
Limosa limosa	Black-tailed Godwit	Endangered, Migratory, Marine	Roosting known to occur		Yes	
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	Endangered, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Macronectes halli	Northern Giant Petrel	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Motacilla flava	Yellow Wagtail	Migratory, Marine	Species or species habitat may occur within area		Yes	
Myiagra cyanoleuca	Satin Flycatcher	Migratory, Marine	Species or species habitat known to occur within area		Yes	
Neophema chrysogaster	Orange-bellied Parrot	Critically Endangered, Marine	Migration route likely to occur	Yes	Yes	
Neophema chrysostoma	Blue-winged Parrot	Vulnerable, Marine	Species or species habitat known to occur		Yes	
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Critically Endangered, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Numenius minutus	Little Curlew, Little Whimbrel	Migratory, Marine	Roosting likely to occur within area		Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Numenius phaeopus	Whimbrel	Migratory, Marine	Roosting known to occur within area		Yes	
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable, Marine	Species or species habitat may occur	Yes	Yes	
Pandion haliaetus	Osprey	Migratory, Marine	Species or species habitat known to occur within area		Yes	
Phoebetria fusca	Sooty Albatross	Vulnerable, Migratory, Marine	Species or species habitat likely to occur	Yes	Yes	
Pluvialis fulva	Pacific Golden Plover	Migratory, Marine	Roosting known to occur within area		Yes	
Pluvialis squatarola	Grey Plover	Vulnerable, Migratory, Marine	Roosting known to occur		Yes	
Pterodroma leucoptera leucoptera	Gould's Petrel, Australian Gould's Petrel	Endangered	Species or species habitat may occur	Yes	Yes	
Pterodroma mollis	Soft-plumaged Petrel	Vulnerable, Marine	Species or species habitat may occur	Yes	Yes	
Pycnoptilus floccosus	Pilotbird	Vulnerable	Species or species habitat known to occur		Yes	
Recurvirostra novaehollandiae	Red-necked Avocet	Marine	Roosting known to occur within area		Yes	
Rhipidura rufifrons	Rufous Fantail	Migratory, Marine	Species or species habitat likely to occur within area		Yes	
Rostratula australis	Australian Painted Snipe	Endangered, Marine	Species or species habitat likely to occur		Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Stercorarius antarcticus	Brown Skua	Marine	Species or species habitat may occur within area	Yes	Yes	
Sterna striata	White-fronted Tern	Marine	Foraging, feeding or related behaviour likely to occur within area	Yes	Yes	
Sternula albifrons	Little Tern	Migratory, Marine	Species or species habitat may occur within area		Yes	
Thalassarche bulleri	Buller's Albatross, Pacific Albatross	Vulnerable, Migratory, Marine	Species or species habitat may occur	Yes	Yes	Yes
Thalassarche bulleri platei	Northern Buller's Albatross, Pacific Albatross	Vulnerable, Marine	Species or species habitat may occur	Yes	Yes	
Thalassarche carteri	Indian Yellow-nosed Albatross	Vulnerable, Migratory, Marine	Species or species habitat likely to occur	Yes	Yes	Yes
Thalassarche cauta	Shy Albatross	Endangered, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	Yes
Thalassarche chrysostoma	Grey-headed Albatross	Endangered, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	Yes
Thalassarche melanophris	Black-browed Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	Yes
Thalassarche salvini	Salvin's Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour likely to occur	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Thalassarche steadi	White-capped Albatross	Vulnerable, Migratory, Marine	Foraging, feeding or related behaviour known to occur	Yes	Yes	
Thinornis cucullatus	Hooded Plover, Hooded Dotterel	Marine	Species or species habitat known to occur within area		Yes	
Thinornis cucullatus cucullatus	Eastern Hooded Plover, Eastern Hooded Plover	Vulnerable, Marine	Species or species habitat known to occur		Yes	
Tringa brevipes	Grey-tailed Tattler	Migratory, Marine	Roosting known to occur within area		Yes	
Tringa glareola	Wood Sandpiper	Migratory, Marine	Roosting known to occur within area		Yes	
Tringa nebularia	Common Greenshank, Greenshank	Endangered, Migratory, Marine	Species or species habitat known to occur		Yes	
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	Migratory, Marine	Roosting known to occur within area		Yes	
Xenus cinereus	Terek Sandpiper	Vulnerable, Migratory, Marine	Roosting known to occur		Yes	
Fish and Sharks						
Carcharodon carcharias	White Shark, Great White Shark	Vulnerable, Migratory	Foraging, feeding or related behaviour known to occur	Yes	Yes	Yes
Galeorhinus galeus	School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Conservation Dependent	Species or species habitat may occur	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Heraldia nocturna	Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Hippocampus abdominalis	Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse	Marine	Species or species habitat may occur within area	Yes	Yes	
Hippocampus breviceps	Short-head Seahorse, Short-snouted Seahorse	Marine	Species or species habitat may occur within area	Yes	Yes	
Hippocampus minotaur	Bullneck Seahorse	Marine	Species or species habitat may occur within area	Yes	Yes	
Histiogamphelus briggsii	Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Histiogamphelus cristatus	Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Hypselognathus rostratus	Knifesnout Pipefish, Knife-snouted Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Isurus oxyrinchus	Shortfin Mako, Mako Shark	Migratory	Species or species habitat likely to occur	Yes	Yes	
Kaupus costatus	Deepbody Pipefish, Deep-bodied Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Kimblaeus bassensis	Trawl Pipefish, Bass Strait Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Lamna nasus	Porbeagle, Mackerel Shark	Migratory	Species or species habitat likely to occur	Yes	Yes	
Leptoichthys fistularius	Brushtail Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Lissocampus caudalis	Australian Smooth Pipefish, Smooth Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Lissocampus runa	Javelin Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Maroubra perserrata	Sawtooth Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Mitotichthys semistriatus	Halfbanded Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Mitotichthys tuckeri	Tucker's Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Notiocampus ruber	Red Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Phycodurus eques	Leafy Seadragon	Marine	Species or species habitat may occur within area	Yes	Yes	
Phyllopteryx taeniolatus	Common Seadragon, Weedy Seadragon	Marine	Species or species habitat may occur within area	Yes	Yes	
Prototroctes maraena	Australian Grayling	Vulnerable	Species or species habitat may occur	Yes	Yes	
Pugnaso curtirostris	Pugnose Pipefish, Pug-nosed Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Rhincodon typus	Whale Shark	Vulnerable, Migratory	Species or species habitat may occur		Yes	
Seriolella brama	Blue Warehou	Conservation Dependent	Species or species habitat known to occur	Yes	Yes	
Solegnathus robustus	Robust Pipehorse, Robust Spiny Pipehorse	Marine	Species or species habitat may occur within area	Yes	Yes	
Solegnathus spinosissimus	Spiny Pipehorse, Australian Spiny Pipehorse	Marine	Species or species habitat may occur within area	Yes	Yes	
Stigmatopora argus	Spotted Pipefish, Gulf Pipefish, Peacock Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Stigmatopora nigra	Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Stipecampus cristatus	Ringback Pipefish, Ring-backed Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Syngnathoides biaculeatus	Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish	Marine	Species or species habitat may occur within area		Yes	
Urocampus carinirostris	Hairy Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Vanacampus margaritifer	Mother-of-pearl Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Vanacampus phillipi	Port Phillip Pipefish	Marine	Species or species habitat may occur within area	Yes	Yes	
Vanacampus poecilolaemus	Longsnout Pipefish, Australian Long-snout	Marine	Species or species habitat may occur within area	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
	Pipefish, Long-snouted Pipefish					
Mammals						
Arctocephalus forsteri	Long-nosed Fur-seal, New Zealand Fur-seal	Marine	Species or species habitat may occur within area	Yes	Yes	
Arctocephalus pusillus	Australian Fur-seal, Australo-African Fur-seal	Marine	Species or species habitat likely to occur within area	Yes	Yes	
Balaenoptera borealis	Sei Whale	Vulnerable, Migratory	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Balaenoptera musculus	Blue Whale	Endangered, Migratory	Species or species habitat likely to occur	Yes	Yes	Yes
Balaenoptera physalus	Fin Whale	Vulnerable, Migratory	Foraging, feeding or related behaviour likely to occur	Yes	Yes	
Caperea marginata	Pygmy Right Whale	Migratory	Foraging, feeding or related behaviour may occur	Yes	Yes	
Eubalaena australis	Southern Right Whale	Endangered, Migratory	Species or species habitat known to occur	Yes	Yes	Yes
Lagenorhynchus obscurus	Dusky Dolphin	Migratory	Species or species habitat may occur	Yes	Yes	
Megaptera novaeangliae	Humpback Whale	Migratory	Species or species habitat known to occur	Yes	Yes	
Orcinus orca	Killer Whale, Orca	Migratory	Species or species habitat likely to occur	Yes	Yes	

Scientific Name	Common Name	EPBC Act Status	Presence	FLA	PC	BIA
Pteropus poliocephalus	Grey-headed flying-fox	Vulnerable	Species possible to occur in intertidal areas	No	Yes	
Reptiles						
Caretta caretta	Loggerhead Turtle	Endangered, Migratory, Marine	Species or species habitat known to occur	Yes	Yes	
Chelonia mydas	Green Turtle	Vulnerable, Migratory, Marine	Species or species habitat may occur	Yes	Yes	
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	Endangered, Migratory, Marine	Species or species habitat known to occur	Yes	Yes	

4.4 Cultural Heritage

4.4.1 Indigenous Cultural Heritage

The significant impact guidelines criteria for determining impacts to MNES are set out in Section 9. The criteria states that an action is likely to have a significant impact if there is a real chance or possibility that it will 'have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck'. Aboriginal cultural heritage values may be present within the Commonwealth marine area MNES and are protected under the *Underwater Cultural Heritage Act 2018.*

Gippsland Skies understands that the investigation area has cultural values for Traditional Owners and that these values may be tangible, intangible, known and unknown. Identification of these cultural values is critical to ensure that they can be managed alongside Traditional Owners groups. Gippsland Skies is committed to achieving free, prior, and informed consent with Traditional Owners.

There are three Traditional Owner groups identified as having interests in the region, as described below:

- Gunaikurnai Land and Waters Aboriginal Corporation (**GLaWAC**) – a Registered Aboriginal Party (**RAP**) for much of the Gippsland region, to the east of Wilsons Promontory. Their land covers an area from Warragul in the west to the Snowy River in the east, and from the Great Divide in the north to the coast in the south, including the coastal regions to the 3 nm state waters boundary. In 2022, an agreement was signed between the Federal Government and GLaWAC to start the process of establishing a Sea Country Indigenous Protection Area (IPA) (GLaWAC, 2024).
- Bunurong Land Council Aboriginal Corporation (**BLCAC**) – the RAP for the western port region, covering an area from the Mornington Peninsula, across to Inverloch including the coastal regions to the boundary of state waters. The Bunurong Peoples' land extends from the Werribee River south to Wilson's Promontory. The land of these RAPs is relevant to the proposed cable corridor, as it will make landfall on this land.
- The Palawa Traditional Owners whose traditional lands encompass Tasmania and many of its coastal islands potentially may have an interest in the offshore array area.

The investigations have the potential to impact cultural values within the investigation area. Gippsland Skies will consult with the above-listed Traditional Owner groups to commence understanding cultural values (known, unknown, tangible, and intangible) and how the investigations may impact these values specifically. It is Gippsland Skies' intention to carry out this engagement in advance of and during the investigations schedule to ensure that Traditional Owner feedback and expectations can be incorporated where possible. This process will also seek to minimise any inadvertent impact to known or unknown cultural values within the submerged area. The consultation process will also meet the requirements of the *Offshore Electricity Infrastructure Act 2021* (**OEI Act**) and associated regulations in support of the preparation of a Management Plan for tethered infrastructure and geotechnical activities under the OEI Act.

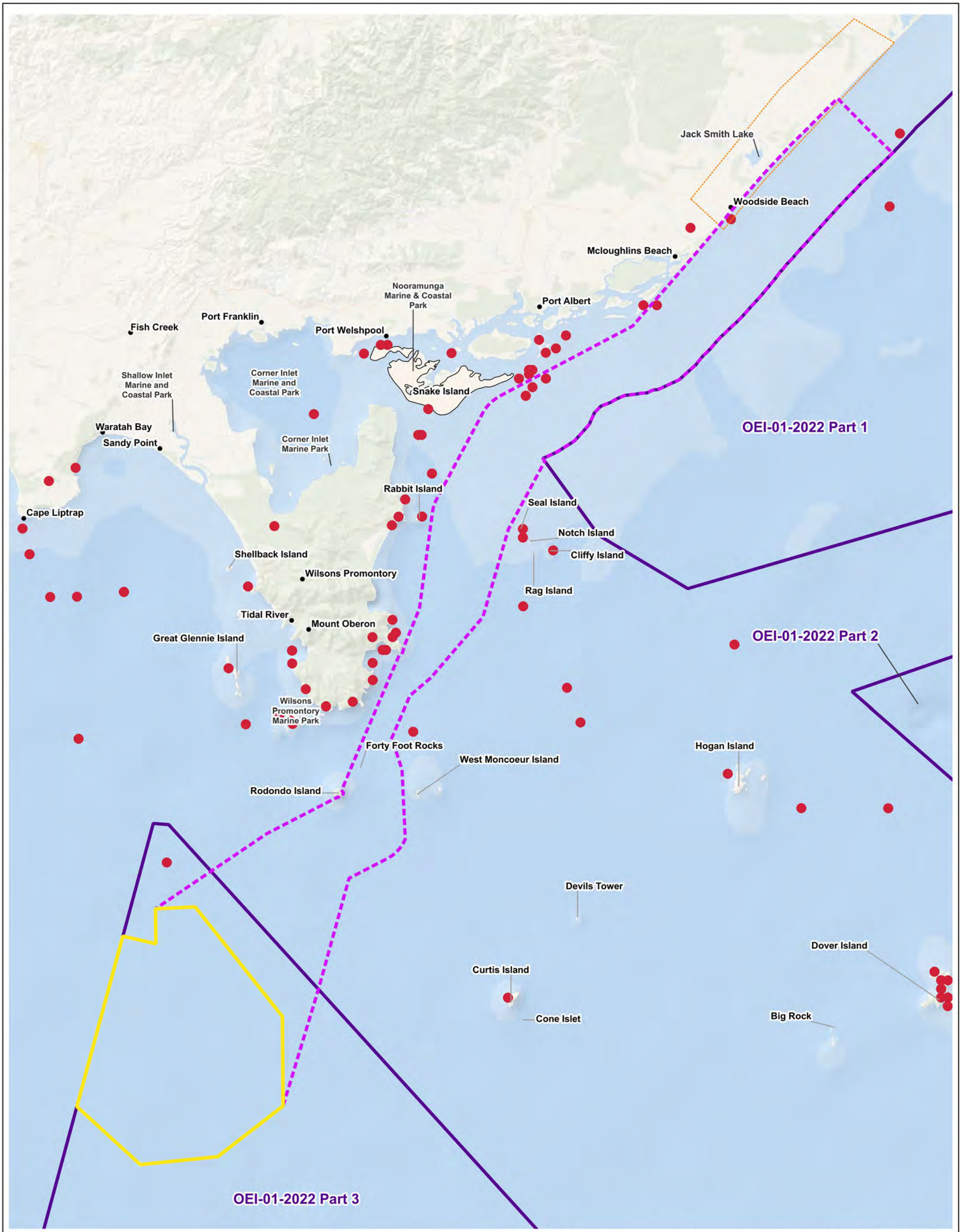
Core samples have been identified as having an increased potential to cause impact to cultural values as they will be physically impacting the submerged landscape. It is Gippsland Skies' intention to carry out the marine geophysical surveys first as this will allow the identification of potentially sensitive submerged landforms (terrestrial analogues). This will ensure appropriate protocols can be put in place alongside consultation with the Traditional Owner groups.

Gippsland Skies intends to consult with the Manager of Major Projects at First Peoples-State Relations (**FPSR**) prior to the survey program and alongside the Traditional Owner groups. This will ensure that current or best practice advice can be incorporated into the survey program.

The marine geophysical and geotechnical survey program is an important assessment component for Gippsland Skies. The results of the program will be important in guiding future assessments of cultural values through future statutory processes. Gippsland Skies is committed to the ongoing assessment of cultural values within the project area.

4.4.2 Non-Indigenous Cultural Heritage

The Commonwealth Government maintains a register of UCH (the Australasian Underwater Cultural Heritage Database), which includes shipwrecks or other items of maritime historical interest (e.g., WW2 plane wrecks). There are a number of potential shipwrecks along the coast within and adjacent to the investigation area. While no shipwrecks are mapped within the FLA, several are mapped within the proposed cable corridor (*P.S. Thistle*, *Wave*, *Albertross 2*, *Emily* and *Sarah*) (2021). According to DCCEEW, none of these wrecks have protected zones around them (2019). Figure 4.11 shows the location of shipwrecks in the area. Any shipwrecks within the investigation area will be identified during the magnetometer, SSS and SBP surveys.



Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- Australian National Shipwrecks
- VicGrid Connection Area

Title:

Map of underwater shipwrecks within and in proximity to the investigation area (Source: DCCEEW, 2021)

Drawing: 4.11

Rev: D

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4.5 Benthic Habitat

The substrate throughout the FLA is mapped as calcareous gravel, sand and silt, while the substrate in proposed Corridor East traverses a mix of calcareous gravel, sand and silts and, silt and gravel with less than 50% mud (CSIRO, 2015). There is a large section of calcareous ooze approximately 5 km south of the FLA. The nearshore environment along the Victorian coastline adjacent to the cable corridor is largely mixed soft substrate and consolidated hard substrata according to Seamap Australia (2023) (see Figure 4.12). The proposed cable corridor passes through some small areas of invertebrates, consolidated hard substrata, sand and seagrass. The benthic habitat types of the FLA are poorly known at this stage.

The nearshore benthic habitats for the proposed cable corridor would traverse mainly mixed soft substrata, with some saltmarsh (Seamap Australia, 2023).

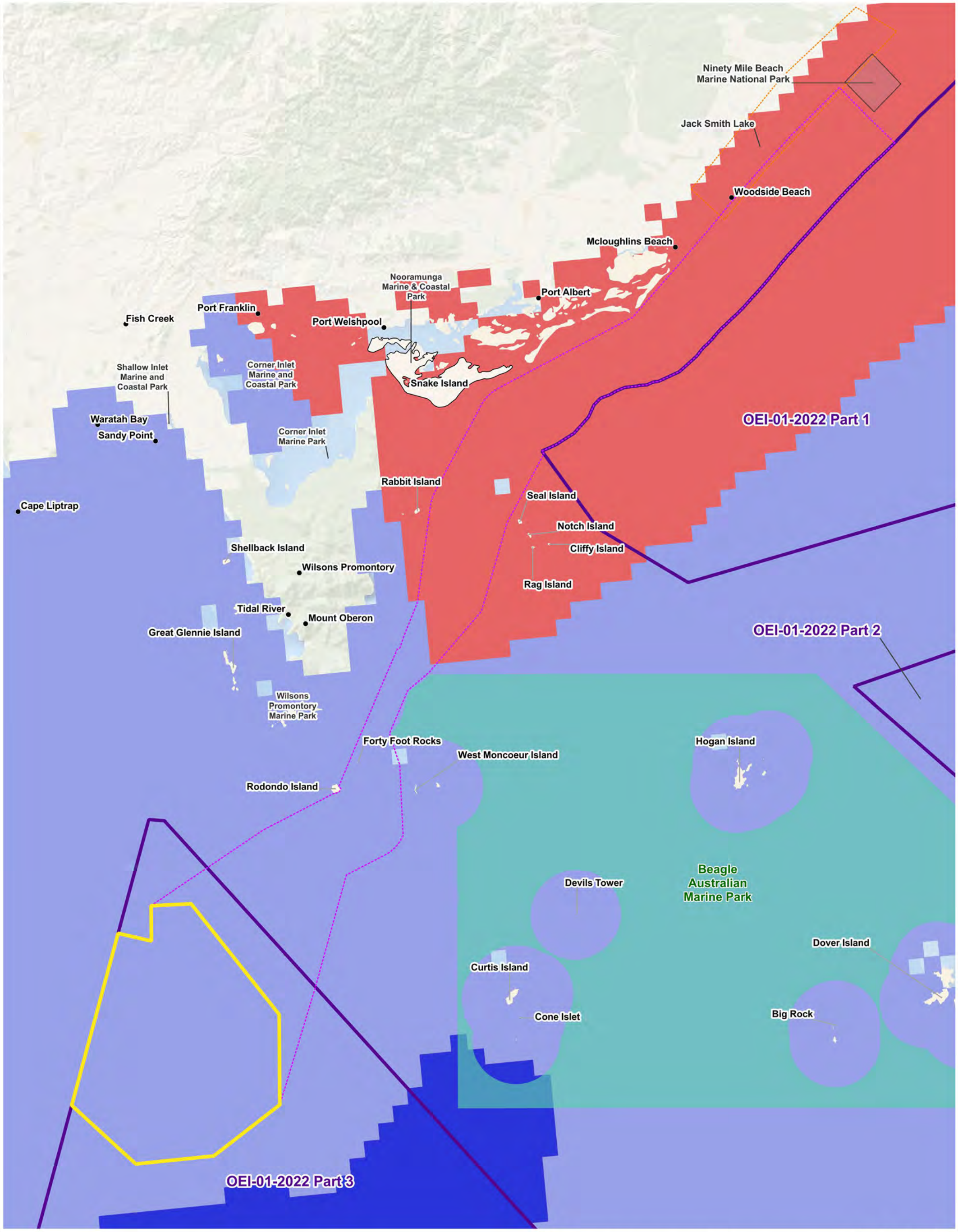
Based on information provided in the Victorian Environmental Assessment Council (**VEAC**) 'Assessment of the Values of Victoria's Marine Environment' report, the investigation area falls within a number of biounits (marine assets of which are described in Table 4.5 and mapped in Figure 4.15). namely:

Table 4.5 Summary of mapped marine assets within biounits that are overlapped by the proposed cable corridor

MA Number	MA Name	MA Description
MA 96	Wilsons Promontory south islands	Supports wall and pinnacle reef habitats uncommon elsewhere in Victoria, highly productive due to water clarity, high diversity of epifauna (sponges, stalked ascidians, sea whips)
MA 98	Open sea pelagic environment	Important for conservation-listed juvenile great white shark, southern right whale, humpback whale, killer whale, bottlenose dolphin, common dolphin, leopard seal, leatherback and green turtles
MA 100	Nooramunga – Corner Inlet all mudflats	Highly productive mudflats. Microphytobenthos (benthic microalgae) present in top millimetres of oxygenated sediments, support diverse benthic invertebrates. Significant feeding ground for resident and migratory birds
MA 105	Port Albert to Lake Entrance sandy plain	Most diverse benthic infauna communities recorded, including ghost shrimp (*Biffarius arenosus, Trypaea australiensis*)
MA 106	Woodside Beach	Endemic seastar (*Coscinasterias muricata*) occurs in large numbers, rare crab *Halicarcinus* sp., opisthobranch *Platydoris galbana*
MA 107	McGauran Beach	Soft coral (*Pseudogorgia godeffroyi*) only occurs in Victoria between McGuarans and Delray beaches
MA 108	90 Mile Beach to Lakes Entrance low profile reefs	Patchy, low-profile reefs periodically covered by sand dominated by sessile invertebrates

While the cable corridor does not pass through the Beagle AMP, it does pass alongside it. As noted earlier, the cable corridor will be further refined down in size prior to survey activities commencing. A study undertaken in 2018 by Barrett et al (2021) collected field data to build baseline information on the benthic habitats in shelf waters of the Beagle AMP. The study found that the seabed closest to the investigation area has extensive areas of mobile, sedimentary bedforms and limited areas of raised rocky reef. A highly diverse epifaunal assemblage was recorded from AUV imagery, with 205 biological morphospecies identified and seven substratum types. Sponges were the dominant organism with 159 morphospecies, of which massive forms were most common. Large aggregations of Port Jackson shark (*Heterodontus portjacksoni*) were observed along the central ridge features (west of the AMP), and while not an intended target of AUV-based sampling, indicated that the reef ridges in the Beagle AMP may be an important shelter location for this species during winter foraging migrations to Bass Strait, and that adjacent scallop beds may be a significant food source (although this remains to be tested).

According to the data from this study mapped in Seamap Australia, the areas of the Beagle AMP immediately adjacent to the investigation area (in the vicinity of the proposed cable corridor) were mapped as consolidated hard substrata and cobble, with small areas of fine sediment. In the investigation area, the seabed is mapped as mixed hard substrata and on the border of the AMP, mapped as containing mixed filter feeder community.



Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- Australian Marine Park
- VicGrid Connection Area

Benthic Substrate

- Calcareous gravel, sand and silt
- Calcareous ooze
- Sand, silt and gravel with less than 50% mud

Title:

Mapping of benthic substrata across investigation area (Source: Seamap, 2023)

Drawing: 4.12

Rev: D

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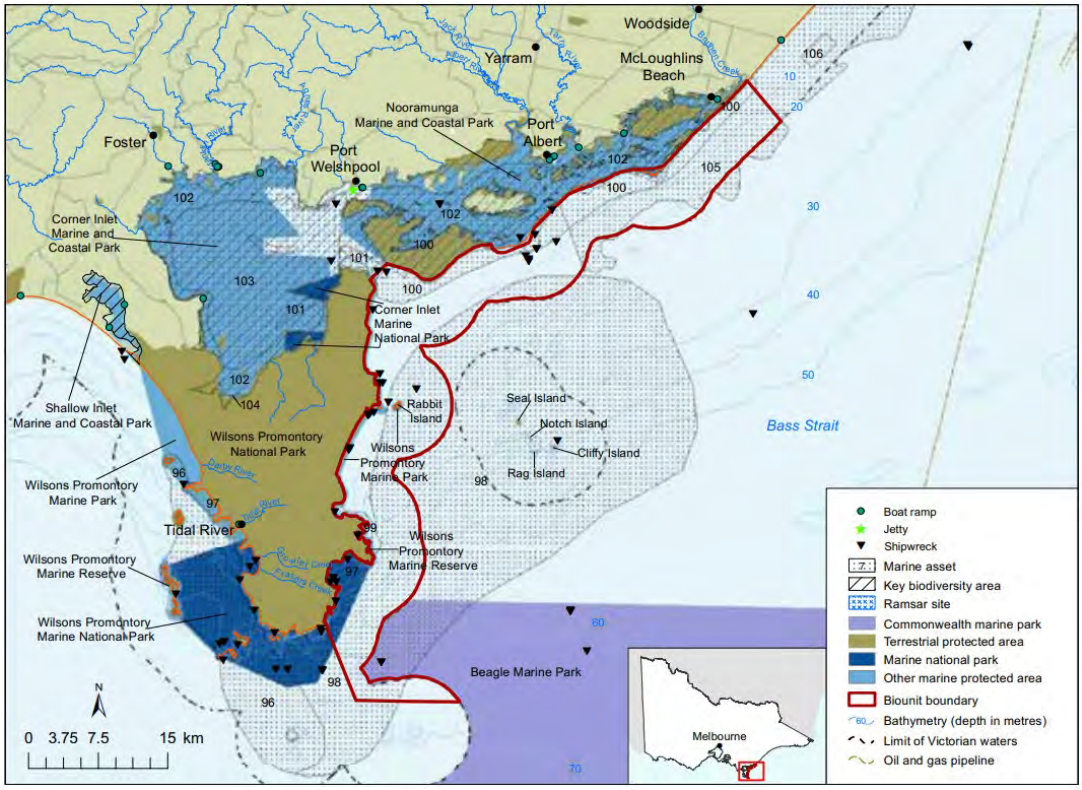

Figure 4.13 Nearshore environmental values of Wilsons Promontory East biounit (Source: VEAC, 2019)

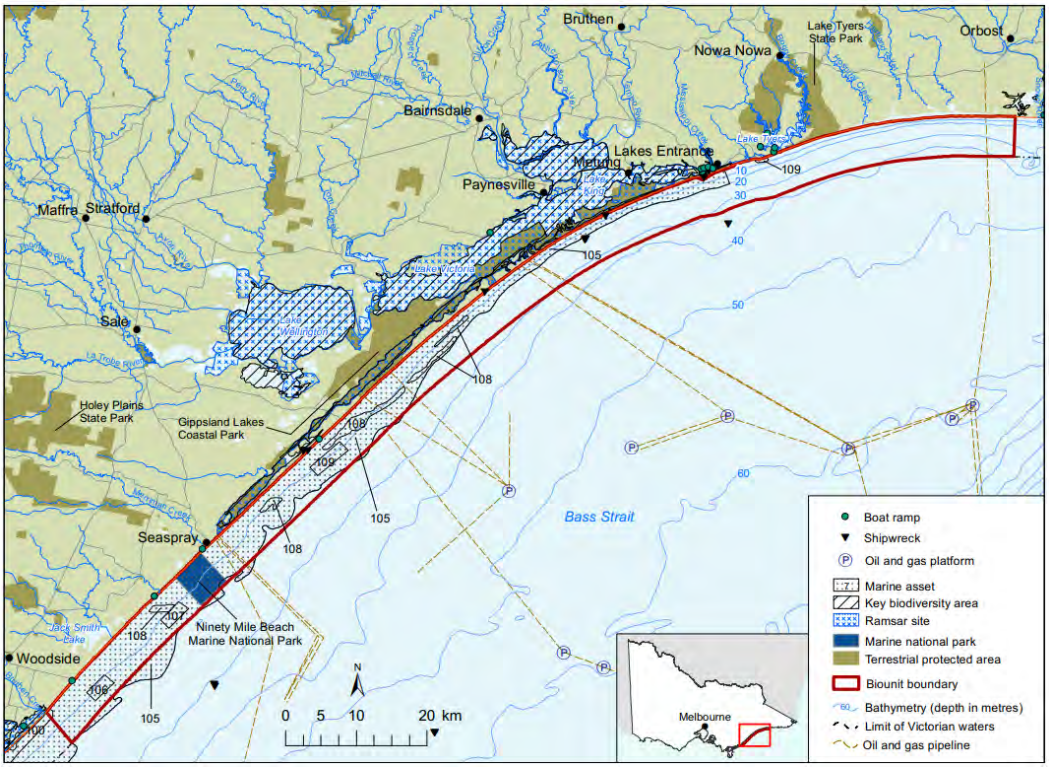

Figure 4.14 Nearshore environmental values of Ninety Mile Beach biounit (Source: VEAC, 2019)

Ninety Mile Beach
Marine National Park
Jack Smith Lake
Woodside Beach
Mcloughlins Beach
Nooramunga
Marine & Coastal
Park
Port Albert
Port Franklin
Fish Creek
Port Welshpool
Corner Inlet
Marine and
Coastal Park
Snake Island
Shallow Inlet
Marine and
Coastal Park
Waratah Bay
Sandy Point
Corner Inlet
Marine Park
OEI-01-2022 Part 1
Rabbit Island
Seal Island
Notch Island
Cliffy Island
Rag Island
Cape Liptrap
Shellback Island
Wilsons Promontory
Tidal River
Mount Oberon
Great Glennie Island
OEI-01-2022 Part 2
Wilsons
Promontory
Marine Park
Forty Foot Rocks
West Moncoeur Island
Hogan Island
Rodondo Island
Beagle
Australian
Marine Park
Devils Tower
Dover Island
Curtis Island
Cone Islet
Big Rock
OEI-01-2022 Part 3

Marine Asset Type

- 90 Mile Beach to Lakes Entrance low profile reefs
- Cape Liptrap reefs
- Corner Inlet deep channels
- Corner Inlet Mangroves
- Corner Inlet Posidonia Habitat
- McGauran Beach
- Nooramunga - Corner Inlet all mudflats
- Nooramunga - Corner Inlet Zostera habitat
- Open sea pelagic environment
- Port Albert to Lakes Entrance sandy plain
- Refuge Cove to Sealers Cove
- South Walkerville
- Venus Bay Arch Rock
- Wilsons Promontory deepwater habitat
- Wilsons Promontory south islands
- Woodside Beach

Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- VicGrid Connection Area
- Australian Marine Park

Title:
Map of biounit marine assets that intersect with the investigation area (Source: DataVic, 2023)

Drawing: 4.15

Rev: D

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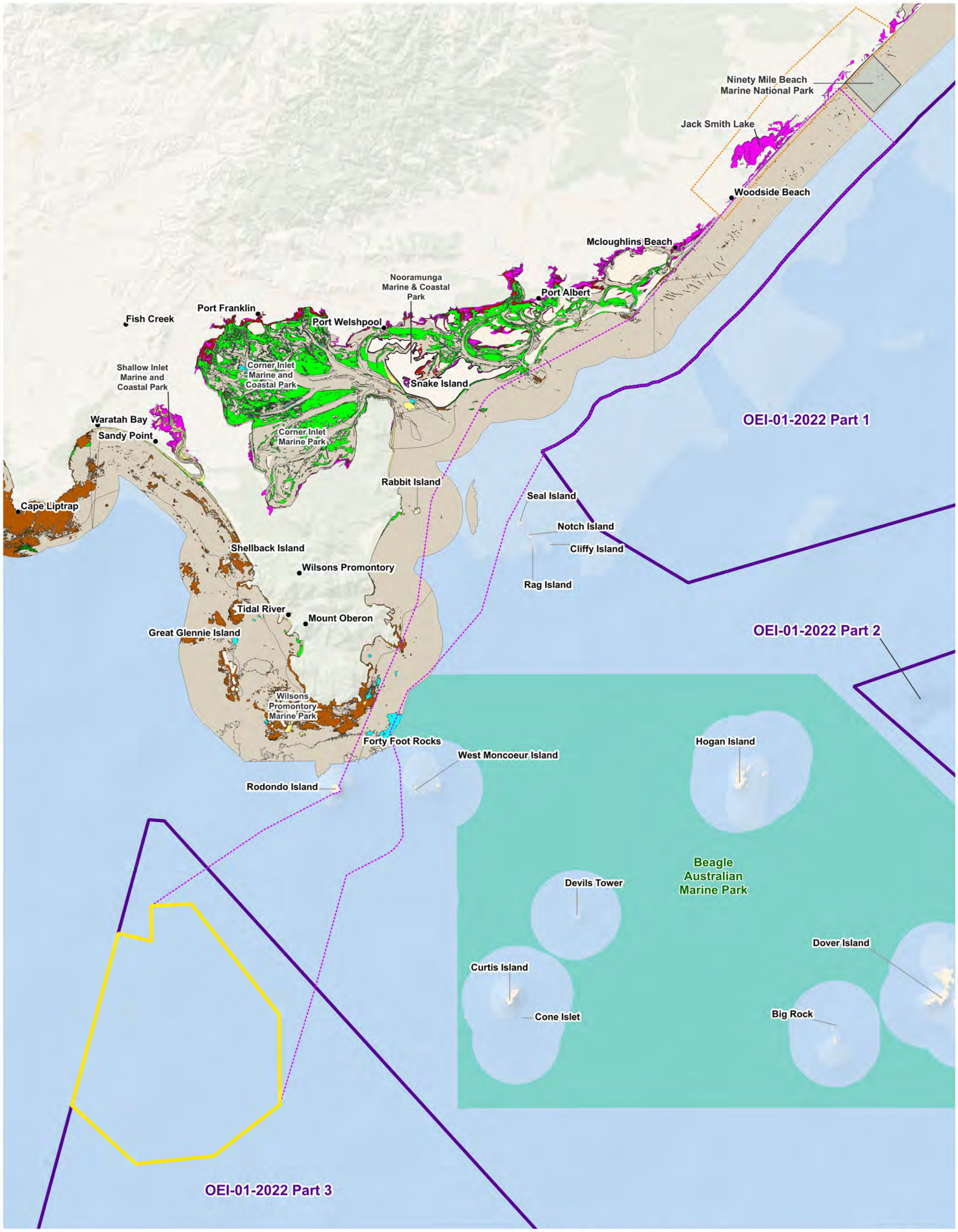

Legend

- Gippsland Skies Feasibility License Area
- Proposed Cable Corridor
- Declared Area - OEI-01-2022 (Gippsland)
- Australian Marine Park
- VicGrid Connection Area

Benthic Habitat Type

- Consolidated Hard Substrata
- Hard Substrata
- Invertebrates
- Macroalgae
- Mangrove
- Mixed Soft Substrata
- Saltmarsh
- Sand
- Seagrass
- Silt

Title:

Benthic habitat types within investigation area (Source: Seamap, 2023)

Drawing: 4.16

Rev: D

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4.6 Other Sea Uses

Fisheries

A number of commercial fisheries exist within the investigation area, a summary of which is provided in Table 4.6.

Table 4.6 Fisheries located within investigation area

Jurisdiction	Fishery Name	Location	
		FLA	PC
Commonwealth	Bass Straight Central Zone Scallop Fishery	Yes	
	Eastern Tuna & Billfish Fishery	Yes	Yes
	Eastern Skipjack Fishery (not currently active)	Yes	Yes
	Southern Bluefin Tuna Fishery	Yes	Yes
	Small Pelagic Fishery (no recent fishing effort)	Yes	Yes
	Southern Squid Jig Fishery	Yes	Yes
	Southern & Eastern Shark Scalefish and Shark Fishery		
	Shark Hook Sector	Yes	Yes
	Trawl Sector	Yes	Yes
	Scalefish Hook Sector (<2000t/yr)	Yes	Yes
Victoria	Bass Straight Scallop Fishery		Yes
	Rock Lobster Fishery		Yes
	Abalone Fishery		Yes
	Wrasse Fishery		Yes
	Pipi Fishery		
	Pipi Management Zone		Yes
	Sea Urchin Fishery (Central Zone)		Yes
	Giant Crab Fishery (Eastern Zone)		Yes
Tasmania	Scalefish Fishery (North West Coast)	Yes	Yes
	Rock Lobster		
	Western Region	Yes	Yes
	Western Region – Northern Bass Strait	Yes	Yes
	Abalone Fishery		
	Octopus Fishery (Bass Strait West)	Yes	Yes
	Calamari Fishery (North West Coast)	Yes	Yes
	Giant Crab Fishery	Yes	Yes

Target species of these fisheries are listed in Table 4.7. Of these species, only the southern bluefin tuna and blue warehou are species that are listed as threatened under the EPBC Act.

Table 4.7 Target species for commercial fisheries licensed to operate in investigation area

Fishery	Target Species
Commonwealth	
Bass Strait Central Zone Scallop Fishery	Commercial scallop (*Pecten fumatus*) and minimal quantities of doughboy scallop (*Mimachlamys asperrima*)
Eastern Tuna and Billfish Fishery	Albacore tuna (Thunnus alulunga), bigeye tuna (*T. obesus*), yellowfin tuna (*T. albacares*), broadbill swordfish (*Xiphias gladius*), striped marlin (*Tetrapturus audux*)
Southern Squid Jig	Arrow squid (*Nototodarus gouldi*)
Southern Bluefin Tuna	Southern bluefin tuna (*Thunnus maccoyii*)
Southern and Eastern Scalefish and Shark Fishery	
Commonwealth Trawl Sector	Key species targeted are eastern school whiting (*Sillago flindersi*), flathead (*Platycephalus richardsoni*) and gummy shark (*Mustelus antarcticus*)
Scalefish Hook Sector	Key species targeted are gummy shark (*Mustelus antarcticus*), elephantfish (*Callorhinchus milii*) and draughtboard shark (*Cephalo-scyllium laticeps*).
Shark Gillnet and Shark Hook Sector	Gummy shark (*Mustelus antarcticus*) is the key target species, with bycatch of elephant fish (*Callorhinchus milii*), sawshark (*Pristiophorus cirratus, P. nudipinnis*), and school shark (*Galeorhinus galeus*).
Victoria	
Bass Strait Scallop Fishery	Commercial scallop (*Pecten fumatus*)
Rock Lobster Fishery	Southern rock lobster (*Jasus edwardsii*). Very small bycatch of species including southern rock cod (*Lotella and Pseudophyci spp*), hermit crab (family *Paguroidea*), leatherjacket (*Monacanthi dae* spp) and octopus *(*Octopus spp).
Abalone Fishery	Blacklip abalone (*Haliotis rubra*) is the primary target, with greenlip abalone (*H. laevigata*) taken as a bycatch.
Wrasse Fishery	Blue-throat wrasse (*Notolabrus tetricus*) saddled wrasse (*N. fucicola*), orange-spotted wrasse (*N. parilus*). (Portland).
Pipi Fishery	Pipi (*Donax deltoides*)

Fishery	Target Species
Sea Urchin Fishery (Central Zone)	White sea urchin (*Heliocidaris erythrogramma*) and black long-spined sea urchin (*Centrostephanus rodgersii*)
Giant Crab Fishery (Eastern Zone)	Giant Crab (*Pseudocarcinus gigas*)
Tasmania	
Scalefish Fishery (North West Coast)	Multi-species fishery including banded morwong (*Cheilodactylus spectabilis*), tiger flathead (*Neoplatycephalus richardsoni*), southern school whiting (*Sillago flindersi*), Australian salmon (*Arripis trutta*), barracouta (*Thyrsites atun*), bastard trumpeter (*Latridopsis forsteri*) and blue warehou (*Seriolella brama*)
Rock Lobster	Southern rock lobster (*Jasus edwardsii*). Very small bycatch of eastern rock lobster (*J. verreauxi*) accounting for less than 1% of the fishery.
Abalone Fishery	Blacklip abalone (*Haliotis rubra*) is the primary target, with greenlip abalone (*H. laevigata*) taken as a bycatch (typically accounting for 5% of the total wild harvest).
Octopus Fishery (Bass Strait West)	Pale octopus (*Octopus pallidus*)
Calamari Fishery (North West Coast)	Southern Squid (*Sepioteuthis australis*)
Giant Crab Fishery	Giant Crab (*Pseudocarcinus gigas*)

The overlap between the investigation area and these fisheries ranges between 0.008% and 7.39% of total fishery area.

Commonwealth and state fisheries authorities, fishing associations and fishers relevant to these fisheries will be consulted as part of the Project's consultation and engagement process for both the EPBC referral and the Management Plan .

5 Environmental Legislation and Relevant Guidelines

While the Project's major offshore infrastructure will be located within Commonwealth waters and thus subject to the OEI Act and EPBC Act, the export cable will be located in Commonwealth and Victorian coastal waters (i.e. state waters). Thus, the investigations will require consideration of legislation for both jurisdictions as relevant and specific to marine survey activities.

5.1 Relevant Commonwealth Legislation

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the primary piece of legislation for the assessment, management and protection of nationally significant species, habitats or places in Commonwealth waters. The EPBC Act also sets out requirements for activities in the Australian Whale Sanctuary, which protects all cetaceans (whales, dolphins) in Australian waters, which is comprised of the Commonwealth marine area beyond coastal waters as well as the Exclusive Economic Zone (**EEZ**). These areas cover waters from 12 nm to 200 nm from the territorial sea baseline.

This assessment supports a referral to be made under the EPBC Act for the investigations in the marine environment that may have significant impacts on MNES.

MNES potentially impacted by the investigations are:

- Listed threatened species
- Listed migratory species
- Commonwealth marine areas
- Wetlands of International Importance (Ramsar).

The proposed cable corridor intersects a number of BIAs, which indicates important areas for a particular lifecycle of a threatened or migratory species. These are described in Section 4.3.3.

5.1.2 Offshore Electricity Infrastructure Act 2021

The OEI Act and associated regulations stipulate the framework to enable construction, operation and decommissioning of offshore electricity infrastructure projects. The framework applies to declared areas for offshore infrastructure activities from 3 nautical miles (**nm**) off the coast to the boundary of the EEZ, with coastal waters up to 3 nm remaining the responsibility of the relevant State government.

A Feasibility Licence is required prior to conducting site feasibility studies to support Project engineering studies. A Feasibility Licence for the Gippsland Skies Offshore Wind Project was granted by the Offshore Infrastructure Regulator on 1 May 2024.

Management Plans are required under the OEI Act for certain development activities, the construction, installation, operation, maintenance and decommissioning of offshore renewable energy infrastructure and transmission infrastructure. This includes fixed or tethered infrastructure that is used to assess the feasibility of exploiting a renewable energy source. The Management Plans must be prepared by the licence holder and submitted to the Offshore Infrastructure Regulator (**OIR**) for assessment and acceptance prior to the commencement of any relevant offshore activities.

For the early phase investigations, this means a Management Plan is required for the deployment and operation of FLS, wave rider buoys, ADCPs and geotechnical investigations. Gippsland Skies will prepare and submit a Management Plan to the OIR to cover these activities.

Works involving the collection of environmental data to inform EIA under the EPBC will not require a Management Plan (e.g., deployment of noise loggers on the seabed, benthic habitat studies, marine fauna studies and so forth).

5.1.3 Underwater Cultural Heritage Act 2018

The *Underwater Cultural Heritage Act 2018* (**UCH Act**) legislates the protection of Australia's shipwrecks, sunken aircraft and other types of UCH, which includes Aboriginal and Torres Strait Islander UCH in Commonwealth waters. The UCH Act clarifies the existing and ongoing jurisdictional arrangements for protecting and managing Australia's UCH, as agreed upon in the 2010 Australia Underwater Cultural Heritage Intergovernmental Agreement. This includes establishing protection zones around identified UCH and permits for traversing a protection zone or interacting with cultural heritage. The investigations must adhere to the following additional requirements:

- Do not disturb or damage UCH and its surrounding environment or remove artefacts, during the course of a visit.
- Observe the requirements of protected zones.
- Provide authorities with a notification of any new UCH discovery within 21 days.
- Report any suspicious or illegal activity that observed around UCH sites.

In 2023, DCCEEW released the draft *Guidelines for working in the near and offshore marine environment to protect Underwater Cultural Heritage* (DCCEEW, 2023a). The marine investigations will comply with these draft guidelines and any subsequent finalisation of the guidelines.

5.2 Relevant Victorian Legislation

5.2.1 Marine and Coastal Act 2018

The *Marine and Coastal Act 2018* (Vic) (**MaCA**) sets objectives and guiding principles for the planning and management of the State's marine and coastal environment. Consent may be required to use, develop or work on marine or coastal Crown land. Marine and coastal Crown land is generally the area between the outer limit of Victorian coastal waters and 200 metres inland of the high-water mark of the sea, to a depth of 200 metres below the surface of that land.

5.2.2 Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (Vic) (**FFG Act**) is a key part of Victoria's legislative framework for the protection and management of biodiversity. Specifically, the FFG Act provides for the listing of threatened flora and fauna species, threatened communities of flora and fauna and potentially threatening processes. Over 2,000 species, communities and threats are currently listed under the FFG Act. A research permit or approval under the FFG may be required for impacts to protected or listed species and/or communities, or to their habitats. It is likely that that most ecologists operating in Victoria would already have such a permit. There are no threatened flora species within the marine environment, therefore a permit would not be required to take plant matter.

5.2.3 Fisheries Act 1995

The purpose of the *Fisheries Act 1995* (Vic) is to provide a legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats. Protected Aquatic Biota (**PAB**) including species of the family Syngnathidae (i.e. seahorses, sea dragons and pipefish) are declared under the *Fisheries Act 1995* (Vic). A permit may be required by the Victorian Fisheries

Authority to take, injure, damage or destroy PAB unless otherwise authorised and pipefish were highlighted in the output from the PMST. Permits can only be issued in accordance with the PAB Permit Policy Statement.

5.2.4 Scientific Research Permits

A range of scientific research permits may be required for the proposed investigations as described here.

EPBC Act - Part 8A Permit
To obtain biological resources (i.e. take and/or remove samples) from a Commonwealth area for the purpose of research and development on any genetic resources, or biochemical compounds, comprising or contained in the biological resources, a permit under Part 8A of the EPBC Regulations 2000 (**the Regulations**) will be required.

Samples to be taken for field work are limited and will likely include sediment samples to characterise marine sediment properties, and fish sampling.

EPBC Act - Cetacean Interference Permits
It is a requirement to obtain a permit under the EPBC Act to take, keep, move, interfere with (harass, chase, herd, tag, mark or brand) a cetacean. A cetacean permit is not sought at this time, as geophysical, geotechnical and metocean investigations will not involve interference with cetaceans. The Project will consult further with the DCCEEW regarding the potential need for permits.

Underwater Cultural Heritage Permit, UCH Act
It is a requirement to obtain a permit under the UCH Act to undertake any sort of activity or works in a protected zone and specified protected underwater cultural heritage site.

There are a number of shipwrecks mapped to be present along the proposed cable corridor (with none in the FLA), though these do not have protection zones around them. Should surveys be required in a protection zone (which is not the case at this time), a permit is required in order to conduct certain site geotechnical and geophysical surveys in or across identified protection zone(s).

5.3 Relevant Guidelines

5.3.1 National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (DCCEEW, 2024a)

These guidelines, finalised in February 2024, provide best practice survey methodologies (i.e. aerial, vessel or acoustic) to ensure adequate data of a high standard is obtained to answer specific questions on species biology and ecology. The Survey Guidelines summarises the best practice survey techniques for determining the presence (or likely absence), abundance (or density), distribution and habitat use (including behaviours) of cetaceans, marine turtles (in water), and the dugong. These guidelines have been used in the scoping of the biological surveys included in these investigations.

5.3.2 EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales" Industry Guidelines (Commonwealth Government, 2008)

The *EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales: Industry Guidelines* was prepared in 2008 with the goal of minimising the likelihood of injury or hearing impairment to whales from offshore seismic surveys, traditionally undertaken by the oil and gas industry in Australia.

These guidelines are relevant for seismic activity in the marine environment only (i.e. surveys that typically use airgun arrays that produce high intensity, low-frequency impulsive sounds). There are currently no Australian guidelines for other forms of underwater noise associated with geophysical or geotechnical surveys. The guidelines are used as a control measure for the geophysical survey techniques using mini-air guns or boomers/sparkers. The Policy Statement is not relevant to any other aspects of the investigations.

Relevantly for the proposed investigations, the guidelines recommend that in areas where BIAs are present, proponents should consider additional protection measures when undertaking seismic activity, such as using greater precaution zones and additional marine mammal observer coverage. For these investigations for example, 2D shallow seismic surveying will not take place in the cable corridor, which overlap with the southern right whale reproduction BIA.

5.3.3 Key Environmental Factors for The Offshore Windfarm Environmental Impact Assessment (DCCEEW, 2023b)

DCCEEW released the guidance document entitled *Key environmental factors for offshore windfarm environmental impact assessment under the EPBC Act 1999* in July 2023. This guidance provides information on the key environmental factors to be considered when developing offshore wind projects in the marine environment. It is understood that DCCEEW is currently working to define appropriate survey protocols for offshore renewable projects.

5.3.4 Survey Guidelines for specific species

Where appropriate, survey guidelines for specific species published by Commonwealth Environment government departments have been considered to inform the survey methodologies for the investigations. In addition to the DCCEEW *National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong* cited in section 5.3.1, these include:

- Survey guidelines for Australia's threatened birds (DEWHA, 2010).
- Survey guidelines for Australia's threatened fish (Department of Sustainability, Environment, Water, Population and Communities, 2011).
- NOIZ 2004. Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K. Royal Netherlands Institute for Sea Research.

NOIZ 2004 contains additional international guidance in relation to aerial surveys.

5.3.5 NOPSEMA Environnent Content Requirements Guideline (NOPSEMA, 2024)

This guideline sets out the contents required of an Environment Plan that is assessed by NOPSEMA (for offshore petroleum projects). In the current absence of regulations under the OEI Act relating to environmental assessment, the ALARP methodology set out in the NOPSEMA guideline has been adopted in this assessment.

6 Impact and Risk Assessment Methodology

The potential impacts from survey investigations have been described and the pathways that may affect MNES identified. Subsequently, a risk assessment has been undertaken to quantify the level of impact, using a methodology consistent with the requirements of ISO 31000:2018 (Risk management: Guidelines).

The consequence, likelihood and risk criteria utilised are presented in Table 6.1, Table 6.2 and Table 6.3, respectively. Section 8 provides the risk assessment without consideration of any mitigation measures. If an acceptable ALARP has not been reached, mitigation measures have been applied to reduce the risk further to an acceptable level.

Table 6.1 Consequence Descriptions for Impact and Risk Assessment

		ENVIRONMENT			SOCIO-ECONOMIC
		Flora & fauna	**Protected areas**	**Contamination**	**Cultural heritage**
1	Negligible	Little or no effect on a small area or number of plants, animals or habitat. No fauna fatalities or plants damaged/removed. No threatened species or habitat affected. Temporary duration of effect (days to weeks). Effects are readily reversible (days). No loss of ecosystem function. No active rehabilitation likely. Species or habitat will readily recolonise/re-populate/ regenerate.	Negligible area (tens of square metres) of damage to or effects on a protected area.	A small hydrocarbon or chemical spill (e.g., <100 litres/0.1 m^3) that requires no active clean up and is likely to naturally remediate. Area affected by the spill has low sensitivity. There is negligible harm to human health, the environment or environmental values.	Negligible damage to identified or unidentified item or place of local Aboriginal or historic cultural heritage value.
2	Minor	Effects (mortality, damage or removal) on a small area (<0.1 ha) or number (<10) of plants, animals or habitat. No threatened species or habitat affected. Short-term duration of effect (<1 year).	Small area (<0.1 ha/0.001 km^2) of damage to or effects on a protected area of local, state or national significance.	A medium-sized hydrocarbon or chemical spill (e.g., up to 1,000 litres/1 m^3) that requires some clean up (hours to days). Response can be dealt with using site or company resources only.	Minor damage to identified or unidentified item or place of local, regional or state Aboriginal or historic cultural heritage value.

	ENVIRONMENT			SOCIO-ECONOMIC
	Flora & fauna	**Protected areas**	**Contamination**	**Cultural heritage**
	Effects are reversible (weeks to months). Nil to minor loss of some ecosystem function. No active rehabilitation likely. Species or habitat will readily recolonise/re-populate/ regenerate.		Area affected by the spill has low to moderate environmental sensitivity. There is minor harm to human health, the environment or environmental values.	
3 Moderate	Effects (mortality, damage or removal) on a moderate area (up to 1 ha) or number (10-100) of plants, animals or habitat (<1 ha). Threatened species or habitat may be affected. Short-term duration of effect (1-5 years). Effects are reversible (months to years). Minor and temporary loss of some ecosystem function. Active rehabilitation may be likely. Species or habitat will recolonise/re-populate/ regenerate over the medium-term.	Moderate area (<1 ha/0.01 km^2) of damage to or effects on a protected area of local, state or national significance.	A large hydrocarbon or chemical spill (e.g., up to 10,000 litres/10 m^3) that takes up to several days to clean up. Response requires state resources. Area affected by the spill has moderate environmental sensitivity. There is a moderate level of harm to human health, the environment or environmental values.	Serious damage to one or more identified or unidentified items or places of local, regional, state or national Aboriginal or historic cultural heritage value.
4 Major	Effects (mortality, damage or removal) on a large area (1-10 ha) or number (100-1,000) of plants, animals or habitat. Threatened species or habitat affected. Long-term duration of effect (5-10 years). Effects are not readily reversible.	Large area (<10 ha/0.1 km^2) of damage to or effects on a protected area of local, state or national significance.	A very large hydrocarbon or chemical spill (e.g., up to 100,000 litres/100 m^3) that requires clean up over days to weeks. Response requires state and national resources. Area affected by the spill has high environmental	Serious/extensive damage to one or more identified or unidentified items or places of local, regional, state or national Aboriginal or historic cultural heritage value.

	ENVIRONMENT			SOCIO-ECONOMIC
	Flora & fauna	**Protected areas**	**Contamination**	**Cultural heritage**
	Major and long-term loss of some ecosystem function. Active rehabilitation required. Species or habitat will not recolonise/re-populate/ regenerate over the long-term without active intervention.		sensitivity. There is a high level of harm to human health, the environment or environmental values.	
5 Critical	Effects (mortality, damage or removal) on a very large area (>10 ha) or number (>1,000) of plants, animals or habitat. Local population extinction may occur. Threatened species or habitat may become locally extinct. Long-term duration of effect (>10 years). Effects are permanent. Extensive and permanent loss of some ecosystem function. Active rehabilitation required but may not be succcessful. Species or habitat will not recolonise/re-populate/ regenerate over the long-term without active intervention.	Extensive area (>10 ha/0.1 km^2) of damage to or effects on a protected area of state, national or global significance.	An extensive hydrocarbon or chemical spill (e.g., over 100,000 litres/100 m^3) that requires clean up over weeks to months. Response requires state, national and international resources. Area affected by the spill has very high environmental sensitivity. There is a very high level of harm to human health, the environment or environmental values.	Destruction or permanent loss of one or more identified or unidentified items or places of state or national Aboriginal or historic cultural heritage value.

The likelihood descriptions used for the risk assessment are provided in Table 6.2.

Table 6.2 Likelihood descriptions for risk assessment.

	Descriptor	Likelihood	Frequency	Experience
1	Rare	<1% (less than once every 100 years).	The event only occurs in rare and exceptional circumstances.	The team have never heard of such an event occurring in the industry.
2	Unlikely	1-10% (once every 10 to 100 years).	The event is unlikely to occur.	Only a few incidents are known of in the industry in the experience of the team.
3	Possible	10-50% (once every 2 to 10 years).	The event may occur.	The team know of a few occurrences in the industry in the last few years.
4	Likely	50-95% (once every 2 years).	This event will probably occur.	The team know that the event is a common occurrence in the industry.
5	Almost certain	>95% (more than once per year).	This event occurs in most circumstances.	The team know that this event is currently occurring or has occurred in the industry in recent months.

Once the consequence and likelihood of the risk has been determined, the below risk rating calculation method has been used (see Table 6.3 and Table 6.4).

Table 6.3 Risk rating calculation methodology

		Consequence				
		1 - Negligible	2 - Minor	3 - Moderate	4 - Major	5 - Critical
Likelihood	1 - Rare	1	2	3	4	5
	2 - Unlikely	2	4	6	8	10
	3 - Possible	3	6	9	12	15
	4 - Likely	4	8	12	16	20
	5 - Almost certain	5	10	15	20	25

Table 6.4 Risk rating categories

Risk rating	Management action
Low (1-5)	Acceptable level of risk provided the risk cannot be eliminated. No further controls are required.
Medium (6-11)	May be acceptable provided the risk has been minimised as far as is reasonably practicable and no other controls can be implemented.
High (12-19)	Generally unacceptable level of risk. Additional control measures must be considered and put in place (if practicable) to reduce the risk rating.
Extreme (20-25)	An unacceptable level of risk. Control measures must be put in place to reduce the risk rating.

Further to the impact and risk assessment prepared, an assessment of significant impacts to MNES has also been prepared. This is in alignment with the Significant Impact Guidelines 1.1 prepared by DCCEEW in 2013.

The identified MNES relevant to the investigation area, as per the PMST search (provided in Section 4.3) are:

- Threatened species (critically endangered, endangered and vulnerable)
- Threatened ecological communities (endangered)
- Migratory species
- Wetlands of international importance
- Commonwealth marine areas

Further descriptions of these MNES are provided in Section 4.3, and an assessment of whether the impact is Significant or Not significant, in accordance with the Significant Impact Guidelines criteria is provided in Section 9.

7 Potential Environmental Impacts

This section describes potential environmental impacts associated with the marine investigations providing information on potential impacts from the activities and describing impact pathways for impacts on MNES within and surrounding the investigation area.

Table 7.1 summarises the potential identified impacts and impact pathways to MNES.

7.1 Underwater Noise

Underwater noise is produced during both geophysical and geotechnical surveys and results in direct and indirect impacts to MNES depending on the fauna group (generally direct impacts to marine mammals, fish and reptiles and indirect impacts to birds). The impact to whales and other marine fauna can depend on the frequencies generated during investigations. Acoustic surveys below 200Hz (Australian Government EPBC Act Policy Statement 2.1) make baleen and some toothed whales most sensitive to sounds at this frequency. Dolphins and porpoises have sensitivities in the higher frequency ranges and are less likely to be disturbed by acoustic surveys. Sharks are also unlikely to be significantly impacted by underwater noise because of their lack of accessory organs for hearing.

For this EIA, the primary focus is on cetacean species that inhabit BIAs within the investigation area, particularly reproductive areas. The southern right whale and the pygmy blue whale are considered most sensitive to low frequency noise (DCCEEW, 2024d; DCCEEW, 2015). While the FLA occurs within the southern right whale reproduction and migration BIAs and within the pygmy blue whale foraging BIA, only a small section of the proposed cable corridor occurs within the mapped reproduction BIA for the southern right whale. There are other marine species, which are also sensitive to underwater noise, including fish and invertebrates.

Impacts to marine fauna are generally described using the following terms:

- Permanent threshold shift (PTS) – Permanent loss of hearing sensitivity caused by excessive noise exposure
- Temporary threshold shift (TTS) – Temporary loss of hearing sensitivity caused by excessive noise exposure
- Behavioural impacts – does not cause hearing loss, however behavioural changes (i.e. avoidance) may occur

7.1.1 Geophysical Surveys

Surveys used to analyse subsurface geological structures utilise techniques that direct acoustic energy into the seabed.

Ruppel et al. (2022) provides a comprehensive assessment of acoustic impacts caused by geophysical surveys, and their impact on marine mammals. As shown in Figure 7.1, many of the geophysical survey techniques proposed for this Project are unlikely to cause anything other than a negligible impact consequence (i.e. MBES, SSS), with the potential exception of SBP equipment (i.e. sparkers, boomers, mini air-guns). Airguns with volumes of <1500in^3 (such as those used for SBP and 2D shallow seismic surveys) are denoted as Tier 2 by Ruppel et al (2022) (see Figure 7.1), however the proposed surveys will be likely to use mini-airguns with a range of less than or equal to 10in^3 each (for a total of up to 40in^3), so are two orders of magnitude smaller than the sources designated as Tier 2 and will have a very low impact consequence to marine mammals.

Category	Short Description	Example Sources
Tier 1	High-energy airgun surveys (includes GI guns)	Total airgun volume > 1500 in^3 or arrays larger than 12 airguns
Tier 2	Low/intermediate energy airgun surveys (includes GI guns)	Total airgun volume < 1500 in^3
Tier 3	HRG seismic sources (most)	Some sparker configurations Impulsive sources requiring further analysis: bubble gun; some 1-and 2-plate boomers
Tier 4	*De minimis* sources (not likely to result in incidental take)	MBES, SSS, hull-mounted SBP; towed SBP evaluated here; parametric SBP [a]; SBES (EK60/80), lowest powered sparkers, 3-plate boomers, ADCP, pingers (locators), acoustic releases, seafloor/water column navigational/tracking acoustics for ROVs, AUVs, etc. [a]

Figure 7.1 Geophysical noise sources and their impact on marine mammals (Ruppel, 2022)

The loudest sound sources used in geophysical survey operations are produced by SBP (e.g. air guns or ‘pingers’) and air guns used for 2D shallow seismic survey, which generate short pulses of sound repeatedly (Kavanagh et al 2019). This technology can produce sound at volumes over 200 dB (max up to 242 dB). This has the potential to cause behavioural impacts or injury to marine fauna, depending on the proximity of animals to the source. The noise impact will vary depending on the water depth, seabed material and exact equipment utilised, however general conclusions can be drawn from scientific literature and other similar surveys.

There are no Australian guidelines for underwater noise thresholds at present, although it is understood that DCCEEW is currently preparing such a document. Thresholds for various marine fauna for a geophysical survey off the Victorian coast in the Otway Basin were modelled and are presented in Figure 7.2 (Beach Energy, 2019). This is one of the few Australian studies that presents noise modelling for a geophysical survey. The results from this modelling are a suitable proxy for the investigation area given they are in similar water depths and in the same temperate waters, though the harder seabed of the Otway Basin compared to the Bass Basin means underwater sound propagates further in the Bass Basin (meaning that the distances to effect for each fauna group in Figure 7.2 are likely to be higher in the Bass Basin where the investigation area is located).

Receptor	Noise Effect Criteria	Boomer Maximum R_{max} Distance (m)	SBP Maximum R_{max} Distance (m)	Noise Effect Criteria Reference
Invertebrates: effect at the seafloor	186–190 dB SEL 192–199 dB SEL_{24h} 209–212 dB PK-PK	Not reached Not reached Not reached	Not reached Not reached Not reached	Day et al. 2016
Invertebrates: no effect at the seafloor	202 dB PK-PK	Not reached	Not reached	Payne et al. 2008
Lobster: no effect at the seafloor	183 dB SEL	Not reached	Not reached	McCauley and Duncan 2016
Squid: behavioural	166 dB SPL	36	Not reached	McCauley et al. 2000
Fish (swim bladder): mortality/potential mortal injury	>207 dB PK or 207 dB SELcum[1]	1.6 Not reached	0.3 Not reached	Popper et al. 2014
Fish (swim bladder): recoverable injury	>213 dB PK or >216 dB SELcum[1]	0.6 Not reached	0.1 Not reached	Popper et al. 2014
Fish (no swim bladder): mortality/ potential mortal injury	>213 dB PK or >219 dB SELcum[1]	0.6 Not reached	0.1 Not reached	Popper et al. 2014
Fish (no swim bladder): recoverable injury	>213 dB PK or >216 dB SELcum[1]	0.6 Not reached	0.1 Not reached	Popper et al. 2014
Fish (swim bladder or no swim bladder): TTS	>186 dB SELcum[1]	Not reached	Not reached	Popper et al. 2014
Turtle: behavioural	166 dB SPL	36	Not reached	NSF 2011
Turtle: mortality/potential mortal injury	>207 dB PK or 210 dB SELcum[1]	1.6 Not reached	0.3 Not reached	Popper et al. 2014
Marine mammals: behavioural	160 dB SPL	145	2	NMFS 2013
Low-frequency cetaceans: PTS (humpback and pygmy blue whales)	219 dB PK 183 dB SEL_{24h}	Not reached Not reached	Not reached Not reached	NMFS 2018
Low-frequency cetaceans: TTS (humpback and pygmy blue whales)	213 dB PK 168 dB SEL_{24h}	Not reached 10	Not reached 10	NMFS 2018
Mid-frequency cetaceans: PTS (dolphins, beaked whales, sperm whales)	230 dB PK 185 dB SEL_{24h}	Not reached Not reached	Not reached Not reached	NMFS 2018
Mid-frequency cetaceans: TTS (dolphins, beaked whales, sperm whales)	224 dB PK 170 dB SEL_{24h}	Not reached Not reached	Not reached Not reached	NMFS 2018
High-frequency cetaceans: PTS (pygmy and dwarf sperm whales)	202 dB PK 155 dB SEL_{24h}	4.5 Not reached	0.6 Not reached	NMFS 2018
High-frequency cetaceans: TTS (pygmy and dwarf sperm whales)	196 dB PK 140 dB SEL_{24h}	8.9 Not reached	1.2 Not reached	NMFS 2018
Phocid pinnipeds: PTS (seals)	218 dB PK 185 dB SEL_{24h}	Not reached Not reached	Not reached Not reached	NMFS 2018
Phocid pinnipeds: TTS (seal)	212 dB PK 170 dB SEL_{24h}	Not reached Not reached	Not reached Not reached	NMFS 2018

Figure 7.2 Underwater noise criteria for marine fauna for a geophysical survey in the Otway Basin, Victoria (Beach Energy, 2019)

The Beach Energy study found that acoustic boomer/sparker or SBP equipment had the following impacts:

- neither a hearing nor behavioural impact on invertebrates (including squid, rock lobster or giant crabs).
- mortality/potential mortal injury for fish (including sharks) with a swim bladder at a maximum distance from the sound source of 1.6m and 0.6m for fish without a swim bladder; the TTS threshold for fish was not reached.
- turtle species may experience some avoidance of any area temporarily but are unlikely to experience PTS or TTS impacts.
- the threshold for behavioural effects in whales is predicted to be a maximum distance of 2m for SBP, and 145m for acoustic boomer/sparker equipment. Thresholds for PTS were predicted to be reached only for high frequency cetaceans at 0.6m for SBPs and 145m for acoustic boomer equipment. TTS for high frequency cetaceans is predicted to occur up to a distance of 1.2m for SBPs and 8.9m for acoustic boomer/sparker equipment.

In the way of marine mammal behaviour, Ruppel et al (2022) also discuss vocalisation of Cuvier's beaked whales (high frequency cetaceans) before, during and after exposure to acoustic sources. This found that across the study there was no difference in the number of clicks or duration of vocalisation, suggesting that animals in the area exposed to the sound did not leave the area. This provides further merit to the short term and limited distance over which impacts from geophysical surveys may be experienced.

Based on the Beach Energy (2019) underwater sound modelling for geophysical surveys, the proposed geophysical survey (particularly boomer/sparker or mini air-gun equipment use) are expected to have a highly localised and temporary impact. All other geophysical survey equipment that may be used is not expected to have a significant impact on individuals or at a population level.

7.1.2 Geotechnical Surveys/Dynamic Positioning

Geotechnical surveys primarily produce noise at the seabed which is readily absorbed and is therefore not anticipated to create significant noise disturbance. The key noise source from geotechnical studies of concern to the southern right and pygmy blue whale is the low frequency vessel noise, most notably from dynamic positioning (**DP**) systems. DP systems produce both high and low frequency sounds, however the high frequency sounds are generally quieter than other components of the sound from these vessels due to pulses being narrowed in frequency, having narrowly directed beams, and the high frequency sound attenuating quicker (BOEM, 2023). The vessel thrusters are the component that produce low frequency noise, and source levels can vary depending on vessel size and type. Example measurements for a coring vessel of 104m in length estimate DP to produce an SPL of 168.9 dB re 1uPa.m), at a dominant frequency of 110-140Hz, with the sound level measured 1km away decreasing to 115 dB re 1uPa.

The National Recovery Plan for the Southern Right Whale *Eubalaena australis* (2024) identifies that large vessels and increased background noise from distant shipping may mask whale's calls and limit their communication abilities and, in instances where individuals are exposed for extended periods, these low frequency sounds could cause PTS or TTS.

An Environment Plan prepared by Cooper Energy (2024) for an offshore oil and gas operation in Gippsland (east of the investigation area) provides modelling results for noise impacts and distances over which thresholds for PTS, TTS and behavioural impacts may be experienced for a number of species, including low frequency cetaceans such as the southern right and pygmy blue whale.

The Cooper Energy Environment Plan involved modelling a number of scenarios relevant to the Project to determine sound exposure from DP operations of an Inspection, Maintenance and Repair Vessel (IMR), dive support vessel (DSV) and a remote operated vehicle (ROV). The modelling used typical commercial vessels as a proxy (as these have similar noise profiles to activity vessels), using the following as proxy values:

- Typical predominant frequencies of 10Hz to 1kHz (up to 10s of kHz in some cases)
- Source levels of 148 to 193 dB re 1uPa m across <25m to >200m vessels.

All modelled scenarios predicted that for low frequency cetaceans (i.e. southern right whales and blue whales):

- PTS (SEL_{24hr}) was likely at 60 to 80m from the point source
- TTS (SEL_{24hr}) was likely to occur between 1.43 to 2.22km from the point source
- Behavioural impacts were likely to occur between 7.03 and 8.70km from the point source.

In terms of PTS and TTS, the values presented above are based on 24-hour cumulative impact; these impacts would only occur if an animal remained stationary within that impact distance for a period of 24 hours. This scenario is not realistic, so PTS and TTS will not occur. These modelling results indicate that the effects of underwater sound will be limited to behavioural effects. This, combined with the short duration of geotechnical investigations at each sampling site, means that the impacts of underwater sound from vessel DP during the geotechnical investigations will not have a significant impact on marine mammals (or other fauna).

7.2 Light Pollution

Vision is a critical cue for wildlife, including seabird and fish species to orient themselves in terms of finding food, avoiding predation and communicating (Australian Government, 2024b). Artificial light is known to adversely affect many species in the marine environment and can result in behavioural changes such as avoidance, disorientation or reduced reproductive effort. It can also attract predators or change the availability of habitat or food resources. Artificial light can disorient flying birds during migration and is therefore considered to have a direct impact on MNES (birds).

The key contributors to light pollution from the survey work will likely be vessel deck and navigational lighting which will be in place 24 hours a day during geotechnical and geophysical surveys, as well as permanent navigation lighting on the moored metocean equipment. To reduce impacts on the marine environment from this lighting, Gippsland Skies will ensure that all lighting considers the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023c). Vessel lighting is temporary only, and will be mobile, so it will have a negligible impact consequence.

Navigational lights on buoys or other oceanography equipment are of a low intensity and is for the purpose of identification and navigation safety only, therefore light intensity from these will not cause disturbance to marine fauna.

7.3 Disturbance of Seabed, Benthic Habitat or Benthic Invertebrates

Boreholes for geotechnical surveys have the potential to cause localised disturbance of benthic habitats within the investigation area and thus result in direct impacts (noting that there are not MNES related to benthic habitats identified in the PMST). Grab sampling for sediment analysis will also disturb the seabed in sampling areas. Other aspects of the surveys that may have impacts on the seabed are oceanography equipment anchoring, vessel anchoring and dropped objects. Management of these risks is described further in Section 8.

7.4 Entanglement

The towed geophysical equipment may pose a risk of entanglement to marine megafauna, which can result in death or injury (Duncan et al. 2017; van Der Hoop et al. 2013), a direct impact. Equipment anchored to the seabed that requires a mooring line to the sea surface (such as floating lidar) may also pose a risk of entanglement to marine megafauna, which would also be a direct impact to MNES (marine mammals) if it was realised.

The Conservation Management Plan for the Blue Whale (DoE 2015) and the National Recovery Plan for the Southern Right whale (DCCEEW, 2024c) lists entanglement as a threat to the species. It will also be a concern for other marine species, such as white sharks. Entanglement has the potential to cause physical injury that can result in loss of reproductive fitness, and mortality of individuals from drowning, impaired foraging and associated starvation, or infection or physical trauma (DoE 2015). These wounds can then expose the animal to infection and entanglement can also result in amputation (e.g. of a flipper or tail fluke), and death over a prolonged period. There is an almost negligible risk of this occurring to megafauna with towed equipment as the equipment is likely to break under the weight of entanglement. With moored equipment, there is also a very low likelihood of entanglement because there will either be just a single mooring line (e.g. wave rider buoy) or in the case of multiple mooring lines (as may be the case with floating lidar), the lines will be spaced far enough apart to avoid entanglement.

During the geophysical surveys, marine mammal observers (MMO) will be utilised on board to identify any marine megafauna in the vicinity of the vessel, allowing surveys to cease if an animal is spotted within the zone of potential underwater sound impact. The MMO will also ensure that equipment is not deployed if animals have been spotted recently in the area. Streamer recovery devices will also be attached to the geophysical towed streamer/s to facilitate recovery in the event of loss so as to reduce the risk of entanglement. Moreover, the likelihood of whales becoming entangled is relatively low as the towed equipment is kept ‘taught’ while it’s being towed.

7.5 Vessel Strike

Cetaceans are naturally inquisitive marine mammals that are often attracted to offshore vessels, and dolphins commonly ‘bow ride’ with offshore vessels. The reaction of whales to the approach of a vessel is quite variable. Some species remain motionless when in the vicinity of a vessel while others are known to be curious and often approach ships that have stopped or are slow moving, although they generally do not approach, and sometimes avoid, faster moving ships (Richardson et al. 1995). Vessel strike is a direct impact to MNES (marine mammals, reptiles, fish).

Peel et al (2016) reviewed vessel strike data (2000-2015) for marine species in Australian waters and identified the following:

- Whales including the humpback, pygmy blue, fin, brydes, pygmy, sperm, and pygmy sperm were identified as having interacted with vessels. The humpback whale exhibited the highest incidence of interaction. A number of these species may migrate through the waters of the investigation area.

- Dolphins including the Australian humpback, common bottlenose and Risso's dolphin species were also identified as interacting with vessels. The common bottlenose dolphin exhibited the highest incidence of interaction. A number of these species may reside in or pass through the waters of the investigation area.
- All turtle species present in Australian waters are identified as interacting with vessels. The green and loggerhead species exhibited the highest incident of interaction. The likelihood of turtles being in the investigation area is considered low.
- There is no evidence, both within Australia and overseas that white sharks are at risk from vessel strike.

Collisions between vessels and cetaceans occur more frequently where high vessel traffic and cetacean habitat coincide (WDCS 2006). There have been recorded instances of cetacean deaths in Australian waters (e.g., a Bryde's whale in Bass Strait in 1992), though the data indicates this is more likely to be associated with container ships and fast ferries (WDCS 2006). Some cetacean species, such as humpback whales, can detect and change course to avoid a vessel (WDCS 2006). The Australian National Marine Safety Committee (NMSC) reports that during 2009, there was one report of a vessel collision with an animal (species not defined) (NMSC 2010).

The DoE (2015) reports that there were two blue whale strandings in the Bonney Upwelling (western Victoria) with suspected ship strike injuries visible. When the vessels are stationary or slow moving, the risk of collision with cetaceans is extremely low, as the vessel sizes and underwater noise 'footprint' will alert cetaceans to its presence and thus elicit avoidance. Laist et al (2001) identifies that larger vessels moving in excess of 10 knots may cause fatal or severe injuries to cetaceans with the most severe injuries caused by vessels travelling faster than 14 knots. When the vessels are operating within the investigation area, they will be travelling slowly or will be stationary, so the risk associated with fast moving vessels is eliminated for this activity.

Vessel operators will implement vessel strike avoidance protocols to reduce the potential for vessel strike with marine mammals and other fauna at sea. Through constant bridge watch, limitation of vessel speed and adherence to required exclusion distances, vessels will comply with Part 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000* via the Australian National Guidelines for Whale and Dolphin Watching for Vessels.

As per Part 8, Division 8.1, paragraph (2) of the *Environment Protection and Biodiversity Conservation Regulations 2000*, a caution zone of 300 metres is established upon siting of a cetacean. Vessels that are not prohibited are to operate at a constant speed of less than 6 knots and minimise noise. Vessels that are not prohibited are to ensure that they do not approach closer than 100 metres to whales and 50 metres for dolphins. If a whale approaches closer than 100 metres, the vessel gears must be disengaged and let the whale approach or reduce vessel speed and continue course away from the whale.

In the scenario there is a whale calf present, the vessel must not enter the caution zone. If a whale calf appears within the caution zone, the vessel must immediately stop the vessel and turn off the vessel engines or disengage gears or withdraw from the caution zone at a constant speed of less than 6 knots.

The MMO and vessel crew will undertake observation for megafauna during daylight hours and record all interactions and any vessel strike that causes injury to, or death of a cetacean will be reported to DCCEEW via the online National Ship Strike Database.

7.6 Marine Pollution

Water pollution from onboard waste, engine and equipment cooling, bilge water and hydrocarbon spills may occur during the investigations. Borehole drilling also has the potential to mobilise sediment and other contaminants at the seabed as well as potentially contribute drilling fluids to the marine

environment. Discharges of these contaminants from vessels may contribute to temporary and localised areas of reduced water quality, which has indirect impacts on MNES.

A number of management strategies will be employed to minimise these risks, as detailed in Section 8.

7.7 Introduced Marine Species

The introduction of pest fauna or flora can occur as a result of transference from equipment or vessels that carry pest species on their hull, other surfaces or in ballast water.

According to the Australian Government's Interactive Map for Marine Pests in Australia, known pest species present in the Port of Melbourne (as the nearest port to the investigation area in the interactive map) are the Asian shore crab, Asian date or bag mussel, European fan worm, European shore crab, Japanese kelp, Northern Pacific sea-star (2019). No pests are mapped beyond major ports.

The risks of IMS introduction (assuming their survival, colonisation and spread) are listed below and are considered to have indirect impacts on MNES:

- Reduction in native marine species diversity and abundance
- Displacement of native marine species
- Depletion of commercial fish stocks (and associated socio-economic effects)
- Changes to conservation values of protected areas.

With appropriate controls such as cleaning and regular inspections of vessels and equipment, this risk is considered low.

7.8 Cultural Heritage Values

The protection of Sea Country will be of importance to Traditional Owner groups; further consultation will be required with the RAP to understand how the investigations will impact on their values and the significance of the investigation area.

The proposed cable corridor has several mapped shipwrecks within it (as described in Section 4.4). Items of cultural significance such as shipwrecks are expected to be detected during bathymetry mapping using sonar equipment.

In order to avoid mapped UCH such as shipwrecks, currently mapped shipwrecks and currently unmapped shipwrecks that may be revealed during the geophysical surveys will be marked in navigation systems for avoidance during the geotechnical investigations (with a 200 m buffer area applied around them to avoid inadvertent damage). Drop cameras will be used prior to deploying anchors for moored equipment and prior to collecting borehole samples to verify the absence of visible heritage features.

7.9 Hydrocarbon spill

In the event of a vessel-to-vessel collision or vessel grounding, there is a potential risk of a marine diesel oil (MDO) spill into the marine environment. This is considered to be a highly unlikely event, despite the investigation area overlapping small parts of a major shipping channel.

The known and potential direct and indirect impacts of an MDO spill to MNES are:

- A temporary and localised reduction in water quality
- Injury or death of exposed marine fauna and seabirds
- Habitat damage where the spill reaches shorelines
- Changes to the functions, interests or activities of other users (e.g., commercial fisheries).

Table 7.1 Identified impacts from proposed planned survey activities and impact pathways for MNES

		Impact Pathway	
Activity	Typical description/methods	Impacts	MNES potentially impacted
Geophysical survey activities – see Section 3.1 for equipment descriptions			
MBES, SSS, magnetometer	Geophysical surveys that are considered 'low risk' and have a low likelihood of disturbance to marine mammals or other marine fauna	**Underwater Noise** High frequency noise from survey equipment General vessel noise	Nil
SBP, 2D shallow seismic	A SBP is used to investigate the layering and thickness of the uppermost seabed sediments (shallow geology). The most likely noise sources to be utilised include boomers, sparkers or mini air-guns	**Underwater Noise** General vessel noise Noise generated from SBP, typically in the range of: - CHIRP = 200–205 dB re 1 µPa @ 1 m - High frequency = 1 to 10kHZ at 100 to 220 dB re 1 µPa @ 1 m - Medium frequency = 50Hz to 4kHz at 215 to 225 dB re 1 µPa @ 1 m Noise generated by shallow seismic surveying, typically in the frequency range of 20 Hz to 500 kHz with a sound source level of 215-225 dB re 1 µPa @ 1 m. **Entanglement** Megafauna may be at risk from towed equipment trailing the vessel May cause death or injury to animals that become entangled Entanglement of seabirds is possible but unlikely given the cables and equipment is	**Threatened Species/Migratory Species** Whales susceptible to high frequency noise sources (i.e. pygmy blue and southern right whales) Fish Turtles **Commonwealth Marine Areas**

		Impact Pathway	
Activity	Typical description/methods	Impacts	MNES potentially impacted
		towed beneath the sea surface and not on the sea surface	
Geotechnical surveys – See Section 3.1 for equipment descriptions			
Coring, borehole and CPT	Various types of coring will be undertaken to provide samples for undertaking geological analysis of formations below the seabed and to characterise sediment. Options available include vibrocoring, box coring, and piston (gravity) coring. CPT determines soil strength and helps to delineate soil stratigraphy. In the Preliminary Geotechnical investigation, CPTs will be located at the intersection of geophysical survey lines. This ground-truths the geophysical data and provides soil strength data that can be used for geotechnical analysis. Borehole sampling gathers geotechnical soil and rock core samples to a minimum depth equivalent to the likely penetration depth needed for piles to support the wind turbine foundations. Borehole sampling and CPT will likely be from a vessel that is dynamically positioned.	**Localised seabed disturbance** Sampling equipment interacting with seabed, damaging potential habitats Loss of benthic fauna present at time of sampling **Underwater Noise** Vibrations will travel through the seabed during coring General vessel noise in the low frequency spectrum causing behavioural disturbance or injury DP noise from vessel while on station undertaking sampling **Cultural Heritage Values** Disturbance of known or unknown cultural heritage values or items on the seabed	**Threatened Species/Migratory Species** Southern right whale Blue whale Fish Turtles **Commonwealth Marine Areas**
Vessel movements within investigation area for all survey work	This activity encompasses vessel movements of small and large vessels to conduct surveys and deploy and retrieve equipment.	**Behavioural disturbance** Vessel noise (further discussed below) Light pollution **Invasive Species Introduction**	**Threatened Species/Migratory Species** Whales Dolphins Sharks Turtles

		Impact Pathway	
Activity	Typical description/methods	Impacts	MNES potentially impacted
		• Vessels sourced from overseas may contain invasive species on the hull or within ballast water **Harm to Individuals** Vessel strike Spill of oil or other contaminants from the vessel causes water quality impacts to the immediate environment or nearby protected areas	**Commonwealth Marine Areas** Water quality **Wetlands of International Importance** Corner Inlet Ramsar Wetland
Other			
Deployment of tethered metocean & water quality equipment	Equipment including wave buoys, ADCP and FLS for characterisation of metocean conditions will be deployed and tethered to the seabed to ensure they stay in the correct location. Other water quality monitoring equipment may also be deployed.	**Localised seabed disturbance** Sampling equipment anchors interacting with seabed, damaging potential habitats Injury to benthic fauna present at time of sampling **Light Pollution** Navigational lighting may cause behavioural disturbance **Entanglement** Marine fauna becomes entangled in mooring lines	**Threatened Species/Migratory Species** Whales Dolphins Seals Sharks Turtles Fish **Commonwealth Marine Areas**
Marine surveys	Marine geophysical, geotechnical, and marine fauna surveys	**Positive impact – Contribution of data from all surveys**	**All species**

8 Risks and Mitigation Measures

This section discusses potential environmental risks from survey activities, as per the methodology provided in Section 6. Where a risk is considered unacceptable, mitigation measures that are to be applied (and the subsequent risk rating) have been described. See Table 8.1 below for the risk assessment.

Table 8.1 Risk assessment

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Impacts (planned events)				
Underwater noise from geophysical surveying - MBES, SSS or magnetometer	Negligible (1)	Risk level is acceptable, and no mitigation measures are proposed	Negligible (1)	Yes
Underwater noise from geophysical surveying - SBP, 2D shallow seismic	Minor (2)	• Two dedicated MMOs will be in place during all geophysical surveys that involve SBP and 2D shallow seismic surveying to implement Part B.1 of the EPBC Act Policy Statement 2.1. In the event of a shortage of available MMOs, at least one of these MMOs will be trained and experienced, while the second may be a trainee MMO under the tutelage of the trained and experienced MMO. Gippsland Skies will be working with suppliers to enable trainee positions to be made available to support the development of skills in Australia and the industry more broadly as part of our workforce and industry development initiatives. Trainee MMOs may come from this initiative. • No 2D shallow seismic will be undertaken along the cable corridor except for a small location around a potential horizontal direction drill exit point and where sufficient quality of data is not able to be obtained using a SBP. • SBP and 2D shallow seismic surveys will not be undertaken within the southern right whale reproduction BIA in the period in which they are most likely to be present (June, July, August). • SBP and 2D shallow seismic surveys will be undertaken in accordance with EPBC Act Policy Statement 2.1 (Part A), including pre-startup visual observations, soft starts (if equipment allows for it – for some equipment it is either on or off and power levels cannot be ramped up), start-up delay, night-time and low visibility operations, power-down and stop work procedures.	Negligible (1)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
		• In accordance with Part B.1 of the EPBC Act Policy Statement 2.1, two trained and experienced MMOs will be aboard the geophysical vessel to implement Part A requirements during SBP and 2D shallow seismic surveying. This will involve: - Commencing visual observation for marine mammals at least 30 minutes prior to the startup of equipment within the observation zone (3 km radius around the survey vessel) - Undertaking continuous visual observation of the observation zone while surveys are occurring - Not undertaking other duties onboard the vessel while undertaking visual observations. - If an MMO identifies that a marine mammal is present in the following zones, the following actions will be taken: - Observation zone (3km radius of vessel) – whales will be monitored to determine whether they are approaching or entering the low power zone. The action can continue. - Low-power zone (1km radius of vessel) - if a whale enters or is about to enter the low power zone, the acoustic source will be powered down to the lowest possible setting until the marine mammal has been sighted to leave the zone or 30 minutes has elapsed since last sighting the individual. - Shutdown zone (500m radius of vessel) – if a whale is sighted in or about to enter the shutdown zone, the acoustic source will be shut down immediately. Equipment will not be re-started until		

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
		such time as the whale has been sighted to leave the zone or 30 minutes has elapsed since light sighting the individual. • In low light conditions (when observations cannot extend to 3km from the vessel) and at night time, SBP and 2D shallow seismic surveying will operate as follows: - It will be permitted without the use of specialised observation technology - if there have **not** been any southern right whales or blue whales observed within the observation zone in the 3 hours preceding low night or the sun set. - It will only be permitted with the use of specialised observation technology – if there **have** been southern right whales or blue whales observed within the observation zone in the 3 hours preceding the onset of low light or sun set. Night-time observations must continue for a minimum of 3 hours after the onset of low light conditions or sunset. - If southern right whales or blue whales are sighted during this time, observations must continue through the night. - If these species are not sighted in those first 3 hours, observations do not need to recommence until sunrise. • If an MMO notices that the action has resulted in injury or death of a marine mammal, work will stop and DCCEEW will be notified within 24 hours of the event. During the cessation of work, the management measures outlined here will be reviewed by Gippsland Skies and the MMOs, and where necessary the control measures will be revised, with the aim of preventing further injury or death. Work will only recommence after this review process has taken place. • When the MMO sights a whale within the observation, low power or shut down zones, the MMO will record the whale behaviour, including any change in behaviour as a result of equipment use.		

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
		-		
Underwater noise from DP associated with the geotechnical vessel	Minor (2)	• Two dedicated MMOs will be in place during all geotechnical investigations to implement EPBC Act Policy Statement 2.1 Part A requirements whenever DP systems are used within the Southern Right Whale BIA (reproduction area) and during their known temporal presence (June, July and August). In the event of a shortage of available MMOs, at least one of these MMOs will be trained and experienced, while the second may be a trainee MMO under the tutelage of the trained and experienced MMO. Gippsland Skies will be working with suppliers to enable trainee positions to be made available to support the development of skills in Australia and the industry more broadly as part of our workforce and industry development initiatives. Trainee MMOs may come from this initiative. • If an MMO identifies that a marine mammal is present in the following zones while the vessel is on DP, the following actions will be taken: - Observation zone (3km radius of vessel) – whales will be monitored to determine whether they are approaching or entering the low power zone. The action can continue. - Low-power zone (1km radius of vessel) - if a whale enters or is about to enter the low power zone, DP will be powered down to the lowest possible setting, but only if safe to do so and there is no risk to vessel or equipment integrity and there is no risk to workplace health and safety, until the marine mammal has been sighted to leave the zone or 30 minutes has elapsed since last sighting the individual. - Shutdown zone (500m radius of vessel) – if a whale is sighted in or about to enter the shutdown zone, DP will be shut down, but	Negligible (1)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
		only if it is assessed as safe to do so and there is no risk to vessel or equipment integrity or workplace health and safety. DP will not be re-started until such time as the whale has been sighted to leave the zone or 30 minutes has elapsed since last sighting the individual. - In low light conditions (when observations cannot extend to 3km from the vessel) and at night time, geotechnical vessel DP operations will operate as follows: DP operations will be permitted without the use of specialised observation technology - if there have **not** been any southern right whales or blue whales observed within the observation zone in the 3 hours preceding low night or the sun set. - DP operations will only be permitted with the use of specialised observation technology (i.e. night vision goggles with thermal clip-ons) and/or infrared/thermal imaging technology)– if there **have** been southern right whales or blue whales observed within the observation zone in the 3 hours preceding the onset of low light or sun set. Night-time observations must continue for a minimum of 3 hours after the onset of low light conditions or sunset. - If southern right whales or blue whales are sighted during this time, observations must continue through the night. - If these species are not sighted in those first 3 hours observations do not need to recommence until sunrise. • If the MMO observes marine mammals within any of the zones while the vessel is using DP, the MMO must record its behaviour (e.g., direction of travel, whether it was obviously feeding, etc). •		

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Underwater noise generated during routine vessel operations	Negligible (1)	• Re-positioning and constant re-starting of vessels will be minimised • The starting and running of engines will avoid rapid changes in revolutions • The starting/departure of vessels and/or onboard equipment will be built up slowly • Vessels will avoid using reverse gear where possible	Negligible (1)	Yes
Discharge of geotechnical drilling muds and fluids	Minor (2)	• Only low-toxicity water-based muds will be used for borehole sampling that are not harmful to water quality. Mud additives must be listed on the UK Centre of Environment Fisheries and Aquaculture Science (CEFAS) Definitive Ranked Lists of Registered Products as Gold/Silver or Group E/D products.	Negligible (1)	Yes
Seabed disturbance	Minor (2)	• Camera to be used to verify absence of fauna prior to sampling • Vessel anchoring to occur only when absolutely necessary • No flora is to be taken from the marine environment unless a sample is required for identification purposes. • Moorings/anchorages are not to be installed in areas containing sensitive marine habitat. • Moorings/anchorages are to be removed from the marine environment when no longer required.	Negligible (1)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Routine liquid and solid vessel discharges (treated sewage, cooling water, oily water, putrescible waste)	Minor (2)	• All vessels will be fitted with appropriate waste receptacles that are sealed and stored correctly. • All waste is to be collected and taken to shore for recycling and disposal • Sewage from vessels will be treated via a treatment system approved by the International Convention for the Prevention of Pollution from Ships (MARPOL) before ocean discharge. • In the event of needing to discharge untreated sewage (e.g. treatment plant malfunction), this will only occur when the vessel is >12nm offshore (as per MARPOL). • Putrescible waste from vessels will also be handled in line with MARPOL requirements, namely implementing a Garbage Management Plan and ensuring that macerated food waste is not discharged within Victorian waters (Commonwealth waters only). • In the event of macerator malfunction, non-macerated food waste can only be discharged when the vessel is >12nm from the shore. • In terms of bilge water and deck drainage, deck cleaning products will be biodegradable and contaminated waters will be treated to <15ppm oil in water using an oil-water separator (OWS) before discharge. • Residual oil will be stored in tanks for onshore disposal. • Hydrocarbon and chemical storage areas will be bunded and drain to the bilge tank, and potable bunds will be used to collect spills or leaks from equipment not contained within a permanently bunded area. • Vessel crews will be trained to be competent in spill response • Spill kits are to be available on board and maintained at all times • Any chain, anchors, mooring systems or other monitoring equipment are to be removed once monitoring has been completed (unless it is not feasible to recover i.e. has become buried and is not retrievable).	Negligible (1)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
		• All refuelling will be undertaken at a licenced bunkering facility with appropriate spill management procedures in place; no refuelling is to be undertaken at sea.		
Light pollution	Negligible (1)	• Navigational lights on equipment will be for the purpose of identification only • All onboard lights directed to operational areas rather than overboard • Lighting to comply with National Light Pollution Guidelines where it is safe to do so and does not pose a safety risk	Negligible (1)	Yes
Risks (unplanned events)				

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Fauna entanglement in towed equipment or mooring lines	Moderate (3) x Possible (3) = Medium (9)	• All deployed instrumentation requiring anchoring will be tethered via a taut line, limiting the possibility of fauna entanglement. • Anchorages will be appropriately designed and secured to withstand currents and weather conditions. • The MMO will remain vigilant of fauna entering the investigation area prior to and during deployment. • All survey equipment will be removed promptly following its use. • No prohibited vessel types (e.g. jet skis, hovercraft etc) will be utilised for field work. • Recovery devices will be attached to tethered equipment to facilitate recovery in the event of loss. • Streamer recovery devices will be utilised to recover broken geophysical streamers.	Minor (2) x Unlikely (2) = Low (4)	Yes
Vessel strike	Moderate (3) x Unlikely (2) = Medium (6)	• All vessels must follow requirements within the Australian National Guidelines for Whale and Dolphin Watching 2017, which implements Part 8 (Interacting with cetaceans and whale watching) of the EPBC Regulations 2000 • While transiting through and operating in the southern right whale reproduction BIA and when operating elsewhere within the marine investigations area, all vessels will operate at a speed of 10 knots or less.	Minor (2) x Rare (1) = Low (2)	Yes
Introduction and spread of invasive species	Critical (5) x Unlikely (2) = High (10)	• All vessels and equipment will be thoroughly cleaned to lower the risk of introducing marine pests • Vessels to be sourced from within Australia where possible • Regular pest inspections are to be carried out on all vessels and equipment	Minor (2) x Rare (1) = Low (2)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Diesel spill from accidental vessel spill or collision	Moderate (3) x Unlikely (2) = Medium (6)	• No vessel refuelling will be undertaken at sea • All vessels to have appropriate navigational lighting and follow AMSA navigational directions • In order to minimise the risk of vessel-to-vessel collisions, vessels contracted to Gippsland Skies will: - Comply with the requirements of: • Navigation Act 2012 (Cth), Chapter 3, Part 3 (Seaworthiness of vessels). • Marine Order 21 (Safety and emergency arrangements). • Marine Order 30 (Prevention of Collisions). • Marine Order 91 (Marine pollution prevention - oil). - Operate navigational lights and communication systems. - Maintain navigational lights and communication systems in accordance with their PMS. - Have trained and competent crew maintaining 24-hour visual, radar and radio watch for other vessels. • Vessels will have approved Shipboard Marine Pollution Equipment Plans (SMPEPs, or equivalent appropriate to class) that is implemented in the event of a large MDO spill. • Vessel crews will be trained in spill response techniques in accordance with their SMPEP. • In accordance with the SMPEP, oil spill response kits will be available in relevant locations around the vessels, are fully stocked and are used in the event of hydrocarbon or chemical spills to deck. • Gippsland Skies will use best endeavours to report any overboard spill to regulatory authorities within 2 hours of the spill or within 2 hours of becoming aware of the spill.	Moderate (3) x Rare (1) = Low (3)	Yes

Environmental Risk	Inherent Impact or Risk Rating (no mitigation)	Mitigation Measures	Residual Impact or Risk Rating (with mitigation)	ALARP Met
Damage to UCH artefacts or sites (tangible or intangible)	Moderate (3) x Unlikely (2) = Medium (6)	• DDC and/or DDV to be used to verify absence of visible UCH sites prior to geotechnical sampling and placement of anchors for tethered or seabed equipment • Currently mapped UCH sites to be mapped for avoidance in vessel navigational systems • Currently unmapped UCH sites that may be revealed during the geophysical surveys will be included in the geotechnical vessels' navigation systems, along with exclusion zones, such that these UCH sites are avoided by the geotechnical investigations • Exclusion zones to be employed surrounding known UCH sites (200 m around shipwrecks, with exclusion zones for any other features discovered during geophysical surveys to be determined based on the feature and its size) • Any UCH sites disturbed or found will be reported to the relevant body (see Section 7.2.8) • Any UCH sites with Aboriginal cultural heritage that are found or disturbed will be discussed with the relevant RAP	Moderate (3) x Rare (1) = Low (3)	Yes

8.1.2 Incident Reporting

In the instance of an environmental incident, the incident will be reported to the relevant authorities. Notification of reportable incidents is the responsibility of Gippsland Skies, therefore all contractors undertaking the survey works on behalf of Gippsland Skies will be aware of their requirements to report incidents to Gippsland Skies as quickly as possible.

For all incidents that require reporting, reports will include details of the incident, measures already undertaken to control the incident and actions that will be undertaken to ensure the incident does not re-occur.

For incidents such as diesel or other chemical spills occurring within Commonwealth waters, these will be reported to DCCEEW via either email (environment.compliance@dcceew.gov.au) or phone call (1800 110 395) within 24 hours after becoming aware of the spill. Using best endeavours, they will also be reported to DEECA on operational.reports@ecodev.vic.gov.au within two hours of becoming aware of the incident (but not more than 24 hours after the incident) on the assumption that a spill is likely to move towards the Victorian coast. Diesel or other chemical spills in Victorian waters will be reported to DEECA using the same details.

Injury or fatality of EPBC Act-listed fauna will be reported to DCCEEW (1800 803 772) within 7 days of the incident. Incidents of injury or fatality to native wildlife in Victorian waters will be reported to the Department of Energy, Environment and Climate Action (DEECA) on 1300 134 444.

Maritime incidents (such as collisions with other vessels, collisions with cultural heritage sites) will be reported to the Australian Maritime Safety Authority (AMSA) as soon as reasonably possible after becoming aware of the incident (via submission of incident alert form 18) and then within 72 hours submit incident report form 19 to provide further information. Incidents involving cultural heritage sites will also be reported to DCCEEW via their online reporting function.

In the instance of a suspected marine pest sighting, this will be reported to ccimpe@aff.gov.au for sightings in Commonwealth waters, or reported to marine.pests@agriculture.vic.gov.au (or call 1300 502 656) for sightings in Victorian waters.

8.1.3 Annual Reporting

Within one month of the end of each financial year in which the Action takes place, Gippsland Skies will submit a post-activity report to DCCEEW. The post-activity report will include:

- A report on all cetacean interactions as required under Section A.4 of the EPBC Act Policy Statement 2.1
- Records of cetacean behaviour within the observation, low power and shut down zones
- Measures taken to mitigate these events or interactions.

9 Significant Impact Assessment

The potential impacts of the above identified risks have been assessed against DCCEEW's 'Significant Impact Guidelines 1.1' (2013), which determine whether or not the proposed action is a controlled action. The MNES potentially impacted by the proposed survey works are threatened species and ecological communities, migratory species, wetlands of international importance and Commonwealth marine areas.

The significant impact assessment associated with the proposed marine investigation activities and their potential to impact on the MNES is presented below in Table 9.1. It considers the impact pathways identified and discussed further in Table 7.1 and the mitigation measures listed in Table 8.1.

Table 9.1 Significant Impact Assessment

MNES Significant Impact Criteria	Significant Impact Assessment
Threatened Species – Critically Endangered and Endangered	
Lead to a long-term decrease in the size of a population	**Mammals (Southern right whale, blue whale)** *No significant impact* The survey work most likely to have an impact is the geophysical and geotechnical surveys, as this will generate low-frequency noise that may interfere with cetacean communication, and introduce physical equipment (including vessels) that may strike fauna. It is expected that behavioural disturbance would be most likely from noise sources and strike from equipment or vessels. These will be mitigated as per control measures. As these aspects of surveys will be short in duration, vessels will be slow moving, and localised to the investigation area, long-term decrease in the size of a population will not occur. **Birds (waders and seabirds)** *No significant impact* The surveys will be undertaken in the marine environment, so impacts to wader species is not applicable. Seabirds that utilise the investigation area for feeding may be impacted by the presence of survey vessels and equipment, however it is not expected that the surveys will directly injure or kill animals. Entanglement of birds in geophysical survey equipment is possible but not expected to occur with the control measures in place. As such, long term decreases in size of bird populations will not occur. **Reptiles (loggerhead turtle and leatherback turtle)** *No significant impact* These reptile species are not known to have nesting areas in the investigation area, therefore are unlikely to be present for long periods of time. Because of this, and because the geophysical and geotechnical surveys will be short in duration, vessels will be slow moving, and restricted to the investigation area, a long-term decrease in the size of turtle populations will not occur.
Reduce the area of occupancy of the species	**Mammals** *No significant impact* Survey activities will be temporary in nature, therefore there will be no lasting reduction in the area of occupancy for any mammal species. Behavioural impacts would be short term. **Birds** *No significant impact*

MNES Significant Impact Criteria	Significant Impact Assessment
	Boat-based bird surveys will have no impacts on reducing the area of occupancy of bird species. Aerial surveys will be short-term (several hours) in a given month, so the likelihood of reduction of bird species' areas of occupancy is rare. Impacts, if any, would be behavioural in nature and will exist only for the duration of the surveys. **Reptiles** *No significant impact* Survey activities will be temporary in nature and these species are migratory and do not have known breeding or habitat areas in the investigation area or Bass Strait, so there will be no reduction in the area of occupancy for any reptile species.
Fragment an existing population into two or more populations	**All species** *No significant impact* The proposed surveys will not divide existing population groups. Surveys will be localised in nature, allowing individuals or groups to move around the vessels and equipment as required, ensuring there are no physical barriers to any species occurring within the investigation area.
Adversely affect habitat critical to the survival of a species	**Mammals** *No significant impact* Geophysical survey noise is determined to be *de minimis*. Dynamic positioning will only be used during borehole drilling activities to keep the vessel on location. It should also be noted that the investigation area (and therefore the BIAs) has a major shipping route passing through it, so there is an existing high baseline of underwater low frequency noise. The short duration of underwater noise-generating activities means that habitat critical to the survival of marine mammals will not be adversely affected. See Section 7 for further information. **Birds** *No significant impact* The proposed activities are predominantly marine based and will not adversely affect habitat critical to the survival of bird species. A number of foraging BIAs for bird species fall within the investigation area. Surveys will be localised and bird species will be able to forage in other areas of the BIA during the investigations. As such, the surveys are not expected to adversely impact critical habitat of bird species. **Reptiles** *No significant impact* The identified turtle species do not have known habitat in the investigation area and therefore no adverse impact to habitat critical to species survival will occur.

MNES Significant Impact Criteria	Significant Impact Assessment
Disrupt the breeding cycle of a population	**Mammals** *No significant impact* The cable corridor portion of the investigation area occurs in close proximity (and in some areas within) to the southern right whale reproduction BIA . Underwater noise generated during geophysical and geotechnical surveys and the potential for vessel strike, pose the greatest risk to individuals. These activities are temporary in nature and will not disrupt the breeding cycle. See Section 7 and 8 for further information. **Birds** *No significant impact* The investigation area is entirely marine based, with the main connection for threatened bird species in the area being feeding at sea to supply food to offspring. Surveys will be localised, and bird species will be able to forage in surrounding areas during the surveys reducing the area available for foraging by a negligible amount. As such, impacts to breeding cycle of threatened birds are not expected. **Reptiles** *No significant impact* The loggerhead and leatherback turtle do not have known nesting areas within the investigation area. While they may forage in the area, their nesting areas are much further north, therefore during breeding times they are unlikely to be located as far south as the investigation area. As such, no impacts to breeding cycles are expected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Mammals** *No significant impact* The proposed survey activities are temporary in nature. No habitat will be modified, destroyed, removed, isolated or decrease in availability or quality such that the species will decline. **Birds** *No significant impact* As the proposed surveys are predominantly marine based, they will not modify, destroy, remove, isolate or decrease habitat for bird species in the investigation area. **Reptiles** *No significant impact*

MNES Significant Impact Criteria	Significant Impact Assessment
	Reptile species are migratory and do not have habitat in or around the investigation area, so the presence of individuals will likely be temporary. As such, the proposed activities are not anticipated to result in impacts on habitat to an extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**All species** *No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to Australian biosecurity rules and regulations to minimise risk of pest species introduction.
Introduce disease that may cause the species to decline	**All species** *No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to minimise risk of disease introduction.
Interfere with the recovery of the species	**All species** *No significant impact* As impacts to species and habitat, as described above, is expected to be unlikely and minor in nature due to the temporary nature of the surveys, the proposed activities are not expected to interfere with the recovery of any of the identified species.
Threatened Species – Vulnerable	
Lead to a long-term decrease in the size of an important population of a species	**Mammals (Sei whale, fin whale)** *No significant impact* The fin and sei whale species are expected to be temporary visitors to the investigation area for foraging and feeding. Their temporary presence and the de minimis nature of geophysical surveys support that there will not be a long-term decrease in the size of their populations. As such, any exposure to survey activities is expected to be short and will not lead to any long-term decreases in the sizes of populations of sei and fin whales. **Birds (shorebirds and seabirds)** *No significant impact*

MNES Significant Impact Criteria	Significant Impact Assessment
	The proposed survey activities are predominantly marine based, with the main threats posed to birds being entanglement in equipment. As surveys will be temporary and localised, the likelihood of these impacts occurring is rare. As such, no long-term impacts to population sizes of vulnerable bird species are expected. **Fish (Great white shark, whale shark)** *No significant impact* The great white shark has a BIA mapped within the investigation area, with nursery areas mapped close to shore alongside the proposed cable corridor. Sharks are unlikely to be impacted by survey noise due to their lack of accessory organs of hearing, and any impacts would likely be behavioural only and occur within tens of metres from the vessel source. Vessel strike and entanglement are unlikely to occur with the control measures in place. As such, no long-term impacts to the great white shark population are expected. Whale sharks are not expected to occur in the investigation area, and if they do, are expected to be only temporary visitors. **Reptiles (Green turtle)** *No significant impact* The green turtle is likely to only be a temporary visitor to the area as they do not have nesting areas located nearby. As such, individuals of this species are unlikely to remain in one location for extended periods, so impacts from the investigations are unlikely. Surveys will be temporary and localised and combined with the control measures in place to minimise risks of noise impacts, vessel strike and entanglement, no long-term impacts to green turtle populations will occur.
Reduce the area of occupancy of an important population	**Mammals** *No significant impact* Survey activities will be temporary in nature, so there will be no lasting reduction in the area of occupancy for any mammal species. Behavioural impacts potentially occurring from geophysical and geotechnical surveys will be short term. Equipment tethered to the seabed will not reduce any area of occupancy for the sei and fin whales. **Birds** *No significant impact* The predominantly marine-based surveys mean the likelihood of reducing bird species' areas of occupancy is negligible. Impacts, if any, would be behavioural in nature and will be temporary (only for the duration of that activity in that area). **Fish**

MNES Significant Impact Criteria	Significant Impact Assessment
	No significant impact Vessel-based activities will be temporary in nature, so there will be no lasting reduction in the area of occupancy for any fish species. The great white shark and whale shark are migratory and therefore only present in the investigation for short periods of time (if at all). Great white shark nursery areas will not be reduced in size by the surveys on a long-term basis, with any nursing sharks expected to move to other areas of the BIA. Equipment tethered to the seabed will not reduce any area of occupancy for vulnerable fish species. **Reptiles** *No significant impact* Vessel-based activities will be temporary in nature, so there will be no lasting reduction in the area of occupancy for any reptile species. These species are migratory and do not have known breeding or habitat areas in the investigation area. Equipment tethered to the seabed will not reduce any area of occupancy for vulnerable turtle species.
Fragment an existing important population into two or more populations	**All species** *No significant impact* The proposed activities are temporary and mobile in nature, therefore once surveys are finished in one location the vessels will move on. There will be no physical barriers in place for vulnerable species, with animals able to swim/fly around the survey equipment if required. As such, no population fragmentation will occur.
Adversely affect habitat critical to the survival of a species	**Mammals** *No significant impact* There is no habitat critical to the survival of the fin and sei whales in the investigation area (there are no mapped BIAs for these species), so there can be no impacts. **Birds** *No significant impact* The foraging BIAs for vulnerable bird species are extensive, and the temporary presence of vessels will not adversely affect the ability to forage in areas around moving vessels or adversely affect habitat critical to the survival of these species. **Fish** *No significant impact* The great white shark BIA is overlapped by the investigation area, but it is extensive, so the small overlap with vessel-based activities (particularly geophysical surveys, which will not have significant effects on the shark because they are

MNES Significant Impact Criteria	Significant Impact Assessment
	not susceptible to sound, see Section 7.1), and its temporary nature in any one location, means that adverse impacts to habitat will not occur. **Reptiles** *No significant impact* The green turtle does not have nesting areas mapped in or near the investigation area, therefore no adverse impacts to critical habitat are expected.
Disrupt the breeding cycle of an important population	**Mammals** *No significant impact* The investigation area is not known to be a breeding area for the sei or fin whale, therefore any survey activities are unlikely to disrupt the breeding cycle of these species. **Birds** *No significant impact* The investigation area is marine based, with the main connection for vulnerable bird species in the area being feeding at sea to supply food to offspring. Surveys will be localised at any one point in time and birds will be able to forage in surrounding areas, reducing the area available for foraging by a very small amount. As such, impacts to breeding cycle of vulnerable bird species are not expected. **Fish** *No significant impact* The great white shark foraging and nursery BIAs are overlapped by the investigation area but it is not extensive, so the small overlap with vessel-based activities (particularly geophysical surveys, which will not have significant effects on the shark because they are not susceptible to sound, see Section 7.1), and its temporary nature in any one location, means that the breeding cycle of the great white shark will not be disrupted. **Reptiles** *No significant impact* The green turtle does not have known nesting areas within the investigation area or Bass Strait. While they may forage in the area, their breeding and nesting areas are much farther north. As such, no impacts to their breeding cycle will occur.
Modify, destroy, remove or isolate or decrease the availability or quality of	**Mammals** *No significant impact*

MNES Significant Impact Criteria	Significant Impact Assessment
habitat to the extent that the species is likely to decline	The proposed survey activities are temporary in nature. No habitat will be modified, destroyed, removed, isolated or decrease in availability or quality such that the species will decline. **Birds** *No significant impact* As the proposed surveys are predominantly marine based, they will not modify, destroy, remove, isolate or decrease habitat for bird species in the investigation area. **Fish** *No significant impact* The proposed survey activities are temporary in nature and will not involve the removal of habitat for vulnerable fish species. No habitat will be modified, destroyed, removed, isolated or decrease in availability or quality such that the species will decline. **Reptiles** *No significant impact* Reptile species are migratory and do not have breeding or nesting habitat in the investigation area or Bass Strait. No habitat will be modified, destroyed, removed, isolated or decrease in availability or quality such that the species will decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**All species** *No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to minimise potential of introduction of invasive species into the marine environment.
Introduce disease that may cause the species to decline	**All species** *No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to minimise potential for introduction of pest species/disease into the marine environment.
Interfere substantially with the recovery of the species	**All species** *No significant impact* The surveys will be temporary and localised with generally negligible to minor environmental impact consequence and low risks, and as such, the proposed activities will not interfere with the recovery of any of the EPBC Act-listed vulnerable species.

MNES Significant Impact Criteria	Significant Impact Assessment
Migratory Species	
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	**Mammals (Sei, Blue, Fin, Pygmy Right, Southern Right, Humpback, Killer whales, Dusky dolphin)** *No significant impact* The impact assessment for southern right and pygmy blue whales is discussed earlier in this table (threatened species). The other migratory cetaceans (i.e. dusky dolphin) identified may utilise the investigation area for migration paths or foraging. The proposed activities will be highly localised and temporary, with animals able to move around the survey equipment as required. As such, no long-term modification, destroying or isolation of important habitat is expected. Control measures will be employed to ensure safe movement of cetaceans sighted in the area (see Section 7 and 8). **Birds (shorebirds, terrestrial and seabirds)** *No significant impact* The marine and aerial surveys will not result in the modification, destruction or isolation of bird habitat. **Fish (Mackerel, Shortfin Mako, Great White, Whale sharks)** *No significant impact* The proposed survey activities are localised and temporary. While the great white shark foraging and nursery BIAs are overlapped by parts of the investigation area, underwater noise is not expected to cause impacts to sharks and vessel movements will be managed to prevent megafauna collision. Modification of habitat for migratory fish (e.g., disturbance of seabed sediments for equipment anchoring or geotechnical sampling) will be extremely localised and reversible in the short term. Activities are not expected to substantially modify, fragment, alter, destroy or isolate an area of important habitat. **Reptiles (Loggerhead, Green and Leatherback turtles)** *No significant impact* The investigation area and surrounding areas of Bass Strait do not contain any breeding or nesting areas for migratory turtles. Open waters used for turtle migration in the investigation area will not be substantially modified, fragmented, altered, destroyed or isolated.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	**All species** *No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to minimise potential for introduction of pest species into the marine environment. As such, the

MNES Significant Impact Criteria	Significant Impact Assessment
	activities will not result in invasive species that are harmful to migratory species becoming established in an area of important habitat for the migratory species.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	**Mammals** **Low frequency cetaceans** *No significant impact* The southern right and pygmy blue whales are the only marine mammals with mapped BIAs within the investigation area (see Section 4.3.3). The other migratory whale species are expected to only pass through the area as temporary foraging visitors. Key impacts and risks from the proposed activities to these low-frequency baleen whale species are the geophysical and geotechnical surveys (due to the generation of underwater noise, risk of vessel strike and entanglement in survey equipment). As assessed earlier, impacts from geophysical activities are considered *de minimis* and low frequency noise from vessels and DP is unlikely to cause PTS or TTS in these species. As these species are migratory (not resident), these impacts are unlikely. As such, with control measures in place to protect cetaceans from noise, vessel strike and entanglement, serious disruption of life cycles of migratory whales is considered unlikely (see Section 7 and 8). **Mid- to high-frequency cetaceans** *No significant impact* Mid to high frequency sound generated by some of the geophysical survey equipment may pose a risk to the behaviour of killer whale and dusky dolphin. These species are only likely to occur in the investigation area temporarily during migration and foraging and are unlikely to be exposed to these surveys over long periods of time. High frequency noise from equipment such as pingers used in the surveys is considered to be *de minimis (*Ruppel et al, 2022). As such, with control measures in place to protect cetaceans from noise, vessel strike and entanglement, serious disruption of life cycles of these cetaceans is considered unlikely. **Birds** *No significant impact* The investigation area is predominantly marine based, with the main connection for migratory bird species in the area being feeding activities at sea to supply food to offspring. Surveys will be localised and bird species will be able to forage in surrounding areas during all activities, reducing the area available for foraging by a very small amount. As such, impacts to life cycle of migratory birds are not expected. **Fish** *No significant impact*

MNES Significant Impact Criteria	Significant Impact Assessment
	A nursing BIA for great white sharks is partially overlapped by the proposed cable corridor of the investigation area. While surveys will be occurring within the BIA, these will be temporary and localised, occupying only a small portion of the wider BIA area. Investigation activities will not seriously disrupt the lifecycle of the species. The other shark species identified do not have known breeding areas in the investigation area, therefore no impact to their lifecycle will occur. **Reptiles** *No significant impact* The identified migratory turtle species do not have known breeding or nesting areas within the investigation area or Bass Strait. While they may forage in the area, their nesting areas are much farther north therefore during breeding times they are unlikely to be located as far south as the investigation area. As such, no impacts to lifecycle of these turtles are expected.
Wetlands of International Importance – Corner Inlet Ramsar Wetland	
Areas of the wetland being destroyed or substantially modified	*No significant impact* Survey activities will not be undertaken within a Ramsar wetland. The proposed cable corridor will run alongside the Corner Inlet Ramsar Wetland in some areas, however the portion that is bordered by the proposed corridor is predominantly terrestrial. There are a few inlets (aerial imagery shows 4) from the ocean into the mapped wetland area, however as surveys will not be conducted directly within the wetland they are not expected to destroy or substantially modify the wetland.
A substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland	*No significant impact* Survey activities will not be undertaken within a Ramsar wetland. The proposed cable corridor will run alongside the Corner Inlet Ramsar Wetland in some areas, however the portion that is bordered by the proposed corridor is predominantly terrestrial. There are a few inlets (aerial imagery shows 4) from the ocean into the mapped wetland area, however the proposed surveys in the marine environment are not anticipated to lead to changes in hydrology of the wetland.
The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected	*No significant impact* Survey activities will not be undertaken within a Ramsar wetland. The proposed cable corridor will run alongside the Corner Inlet Ramsar Wetland in some areas, however the portion that is bordered by the proposed corridor is predominantly terrestrial. There are a few inlets (aerial imagery shows 4) from the ocean into the mapped wetland area, which species may use to travel in and out of the wetland. While survey activities will be occurring within areas potentially used to cross into the Corner Inlet wetland, these will not block all inlets and will only remain in one spot on

MNES Significant Impact Criteria	Significant Impact Assessment
	a temporary basis. Tethered equipment will not be placed in these inlets. As such, fauna will be able to move in and out of the wetland via other inlets if one has a survey vessel in close proximity. Underwater noise impacts from geophysical and geotechnical surveys will not cause long-term impacts to fauna. As such, with control measures in place, impacts to native species of the wetland are not expected to be seriously affected by the proposed investigations.
A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or	*No significant impact* Geotechnical investigations undertaken in proximity to the Corner Inlet wetland may cause temporary and localised changes to water quality due to seabed disturbance, however these impacts will be short-term. As such, these changes are not expected to adversely impact on biodiversity, ecological integrity, social amenity or human health in the long-term.
An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.	*No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to minimise potential for introduction of pest and invasive species into the marine environment. As such, activities are not expected to result in an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.
Commonwealth Marine Areas	
Result in a known or potential pest species becoming established in the Commonwealth marine area	*No significant impact* The proposed activities, while potentially using vessels sourced from overseas, will adhere to relevant biosecurity rules and regulations to ensure introduction of pest species into the marine environment does not occur. Survey activities will not occur within the nearby Beagle AMP. As such, activities are not expected to result in a known or potential pest species becoming established in the Commonwealth marine area.
Modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area result	*No significant impact* The taking of small seabed samples and temporary generation of underwater sound will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity occurs.

MNES Significant Impact Criteria	Significant Impact Assessment
Have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution	*No significant impact* The proposed survey activities will not have long-term adverse effects on a population of marine species, as per discussion above of threatened and migratory species. Cetacean, fish, bird and reptile species identified as potentially occurring in the area (including those with BIAs overlapped by the investigation area) are not expected to be substantially impacted by the activities due to the temporary nature of the impacts and the control measures in place to prevent vessel strike, entanglement and noise impacts. Therefore, activities are not expected to have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution.
Result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity; social amenity or human health	*No significant impact* The investigations will result in routine discharges and emissions to the ocean and the atmosphere that will have a negligible impact consequence on biodiversity, ecological integrity, social amenity or human health.
Result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected, or	*No significant impact* The proposed survey activities will be not introduce any persistent organic chemicals, heavy metals, or other potentially harmful chemicals to the marine environment.
Have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck.	*No significant impact* The proposed surveys will not be undertaken within the Beagle AMP, therefore no damage to any cultural heritage values within the Beagle AMP will occur. Within the Commonwealth marine area MNES, unlikely impacts are expected from intrusive activities such as geotechnical surveys as known and unknown shipwrecks identified during the geophysical survey will be avoided with a buffer placed around the wreck/s. As discussed previously, consultation will be undertaken with Traditional Owners to understand the potential for any tangible and intangible Aboriginal heritage values.

10 Conclusion

With control measures in place for the proposed investigations, all planned events will have negligible residual impact consequences, and all unplanned events will have low residual risk ratings, and there will be no significant impacts to MNES as assessed against the EPBC Act significant impact guidelines.

11 References

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Annex A PMST Search Results

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: 19-Jul-2024

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	95
Listed Migratory Species:	68

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:	106
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
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:	9
Regional Forest Agreements:	1
Nationally Important Wetlands:	2
EPBC Act Referrals:	21
Key Ecological Features (Marine):	None
Biologically Important Areas:	14
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
Corner inlet	Within Ramsar site
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
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may 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 may occur within area
Tasmanian white gum (Eucalyptus viminalis) wet forest	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		

Scientific Name	Threatened Category	Presence Text
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
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
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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 known to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	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 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	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 impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
FISH		

Scientific Name	Threatened Category	Presence Text
Galaxiella pusilla		
Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Endangered	Species or species habitat may occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
FROG		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria raniformis		
Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Uperoleia martini		
Martin's Toadlet [1873]	Endangered	Species or species habitat may occur within area
MAMMAL		
Antechinus minimus maritimus		
Swamp Antechinus (mainland) [83086]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	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
Mastacomys fuscus mordicus		
Broad-toothed Rat (mainland), Tooarrana [87617]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus trisulcatus		
Long-nosed Potoroo (southern mainland) [86367]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to 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 orientalis		
Eastern Spider Orchid [83410]	Endangered	Species or species habitat likely to occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Commersonia prostrata Dwarf Kerrawang [87152]	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
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to 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
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area
Senecio psilocarpus Swamp Fireweed, Smooth-fruited Groundsel [64976]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Xerochrysum palustre		
Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Lissolepis coventryi		
Swamp Skink, Eastern Mourning Skink [84053]	Endangered	Species or species habitat known to occur within area
SHARK		
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
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
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
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 likely to occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	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 impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera 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 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
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area

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 known to occur within area overfly marine area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
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 likely to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea antipodensis gibsoni as Diomedea gibsoni		
Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Gallinago megala		
Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura		
Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea		
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Himantopus himantopus		
Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
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
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
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 likely to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	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 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 brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
[Hippocampus minotaur](#) Bullneck Seahorse [66705]		Species or species habitat may occur within area
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
[Hypselognathus rostratus](#) Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
[Kaupus costatus](#) Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
[Kimblaeus bassensis](#) Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
[Leptoichthys fistularius](#) Brushtail Pipefish [66248]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Stigmatopora argus](#) Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
[Stigmatopora nigra](#) Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
[Stipecampus cristatus](#) Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat likely to occur within area
Reptile		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

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

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 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 may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
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
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

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Beagle	Multiple Use Zone (IUCN VI)

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Jack Smith Lake W.R	Natural Features Reserve	VIC
Ninety Mile Beach	Marine National Park	VIC
Nooramunga Marine & Coastal Park	National Parks Act Schedule 4 park or reserve	VIC
Rodondo Island	Nature Reserve	TAS
Seal Islands W.R.	Nature Conservation Reserve	VIC
Southern Wilsons Promontory	Remote and Natural Area - Schedule 6, National Parks Act	VIC

Protected Area Name	Reserve Type	State
Wilsons Promontory	National Park	VIC
Wilsons Promontory	Marine National Park	VIC
Wilsons Promontory Marine Reserve	National Parks Act Schedule 4 park or reserve	VIC

Regional Forest Agreements [Resource Information]

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

RFA Name	State
Gippsland RFA	Victoria

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Corner Inlet	VIC
Jack Smith Lake State Game Reserve	VIC

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Blue Marlin Offshore Wind Energy Project	2023/09532		Referral Decision
Gippsland Offshore Wind Farm Marine Survey Investigations	2023/09682		Completed
Greater Gippsland Offshore Wind Project	2022/09379		Assessment
Greater Gippsland Offshore Wind Project Initial Marine Field Investigations	2022/09374		Completed
Marine Route Survey for Subsea Fibre Optic Data Cable System - Australia East	2024/09795		Completed
Preliminary Site Investigations for Great Eastern Offshore Wind Project	2024/09890		Referral Decision
Seadragon Offshore Wind, Early Marine Surveys	2023/09670		Completed
Seadragon Offshore Wind Farm	2022/9163		Completed
Controlled action			
Gippsland Regional Port Project	2020/8667	Controlled Action	Assessment Approach

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Star of the South Offshore Wind Farm Project	2020/8650	Controlled Action	Guidelines Issued
Not controlled action			
Development of Turrum Oil Field and associated infrastructure	2003/1204	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
Not controlled action (particular manner)			
Bass Basin 2D and 3D seismic surveys (T/38P & T/37P)	2007/3650	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
Shearwater 2D and 3D marine seismic survey	2005/2180	Not Controlled Action (Particular Manner)	Post-Approval
Southern Flanks 2D Marine Seismic Survey	2010/5288	Not Controlled Action (Particular Manner)	Post-Approval
Tap Oil Ltd Molson 2D Seismic Survey T47P	2008/3967	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
All actions taken in response to the current severe bushfires in Victoria.	2009/4787	Referral Decision	Completed

Biologically Important Areas		[Resource Information]
Scientific Name	Behaviour	Presence

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna tenuirostris Short-tailed Shearwater [82652]	Breeding	Known to occur
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur
Eudyptula minor Little Penguin [1085]	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]	Breeding (nursery area)	Known to occur
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur
Whales		

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda		
Pygmy Blue Whale [81317]	Foraging	Likely to be present

Bioregional Assessments [Resource Information]

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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Annex B Terrestrial species identified within the PMST search area

Terrestrial threatened species identified within the PMST search area removed from risk assessment

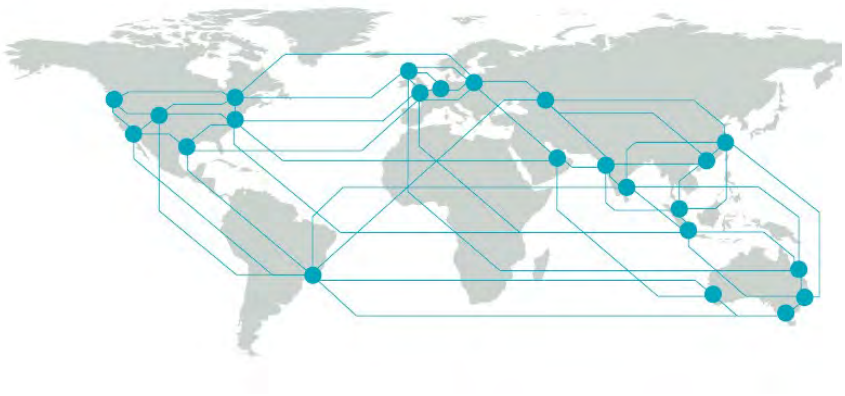
Scientific Name	Common Name	Presence	Threatened Category	Migratory	Marine
Fish					
Galaxiella pusilla	Eastern dwarf galaxias, dwarf galaxias	May - Species or species habitat known to occur within area	Endangered		Freshwater
Reptile					
Delma impar	Striped legless lizard, striped snake-lizard	May - Species or species habitat may occur within area	Vulnerable		
Lissolepis coventryi	Swamp skink, eastern mourning skink	Known - Species or species habitat known to occur within area	Endangered		
Frog					
Litoria aurea	Green and golden bell frog	Likely - Species or species habitat likely to occur within area	Vulnerable		
Litoria raniformis	Southern bell frog, Growling grass frog, Green and golden fFrog, Warty swamp frog, Golden bell frog	Likely - Species or species habitat likely to occur within area	Vulnerable		
Uperoleia martini	Martin's ftadlet	May - Species or species habitat likely to occur within area	Endangered		
Mammals					
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed quoll, Spotted-tail quoll, Tiger quoll (southeastern	May - Species or species habitat may occur within area	Endangered		

	mainland population)				
Isoodon obesulus obesulus	Southern brown bandicoot (eastern), Southern brown bandicoot (south-eastern)	Likely - Species or species habitat likely to occur within area	Endangered		
Mastacomys fuscus mordicus	Broad-toothed rat (mainland), Tooarrana	May - Species or species habitat may occur within area	Endangered		
Petaurus australis australis	Yellow-bellied glider (south-eastern)	Likely - Species or species habitat likely to occur within area	Vulnerable		
Potorous tridactylus trisulcatus	Long-nosed potoroo (southern mainland)	Likely - Species or species habitat likely to occur within area	Vulnerable		
Pseudomys novaehollandiae	New holland mouse, pookila	Likely - Species or species habitat likely to occur within area	Vulnerable		
Birds					
Callocephalon fimbriatum	Gang-gang cockatoo	Likely - Species or species habitat likely to occur within area	Endangered		
Calyptorhynchus lathami lathami	South-eastern glossy black-cockatoo	May - Species or species habitat may occur within area	Vulnerable		
Climacteris picumnus victoriae	Brown treecreeper (south-eastern)	May - Species or species habitat may occur within area	Vulnerable		
Falco hypoleucos	Grey falcon	Likely - Species or species habitat likely to occur within area	Vulnerable		
Grantiella picta	Painted honeyeater	Likely - Species or	Vulnerable		

		species habitat likely to occur within area			
Melanodryas cucullata cucullata	South-eastern hooded robin, Hooded robin (south-eastern)	May - Species or species habitat may occur within area	Endangered		
Pycnoptilus floccosus	Pilotbird	Known - Species or species habitat known to occur within area	Vulnerable		
Plants					
Amphibromus fluitans	River swamp wallaby-grass, Floating swamp wallaby-grass	Likely - Species or species habitat likely to occur within area	Vulnerable		
Caladenia orientalis	Eastern spider orchid	Likely - Species or species habitat likely to occur within area	Endangered		
Caladenia tessellata	Thick-lipped spider-orchid, Daddy long-legs	Likely - Species or species habitat likely to occur within area	Vulnerable		
Commersonia prostrata	Dwarf kerrawang	Likely - Species or species habitat likely to occur within area	Endangered		
Dianella amoena	Matted flax-lily	Likely - Species or species habitat likely to occur within area	Endangered		
Dodonaea procumbens	Trailing hop-bush	Likely - Species or species habitat likely to occur within area	Vulnerable		
Glycine latrobeana	Clover glycine, Purple clover	May - Species or species habitat may occur within area	Vulnerable		
Lepidium hyssopifolium	BasaltpPepper-cress, Peppercress, RubblepPepper	Likely - Species or species habitat	Endangered		

	-cress, Pepperweed	likely to occur within area			
Prasophyllum spicatum	Dense leek-orchid	Likely - Species or species habitat likely to occur within area	Vulnerable		
Pterostylis chlorogramma	Green-striped greenhood	Likely - Species or species habitat likely to occur within area	Vulnerable		
Pterostylis cucullata	Leafy greenhood	Likely - Species or species habitat likely to occur within area	Vulnerable		
Senecio psilocarpus	Swamp fireweed, Smooth-fruited groundsel	Likely - Species or species habitat likely to occur within area	Vulnerable		
Thelymitra matthewsii	Spiral sun-orchid	May - Species or species habitat may occur within area	Vulnerable		
Thesium australe	Austral toadflax, toadflax	May - Species or species habitat may occur within area	Vulnerable		
Xerochrysum palustre	Swamp everlasting, Swamp paper daisy	Likely - Species or species habitat likely to occur within area	Vulnerable		

	Total number species identified in search area	Number within investigation area	Number excluded (terrestrial species)
Fish	3	2	1
Sharks	3	3	-
Reptiles	5	3	2
Frogs	3	-	3
Mammals	12	4	6
Birds	54	46	7
Plants	15	-	15
Total	**95**	**58**	**34**



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