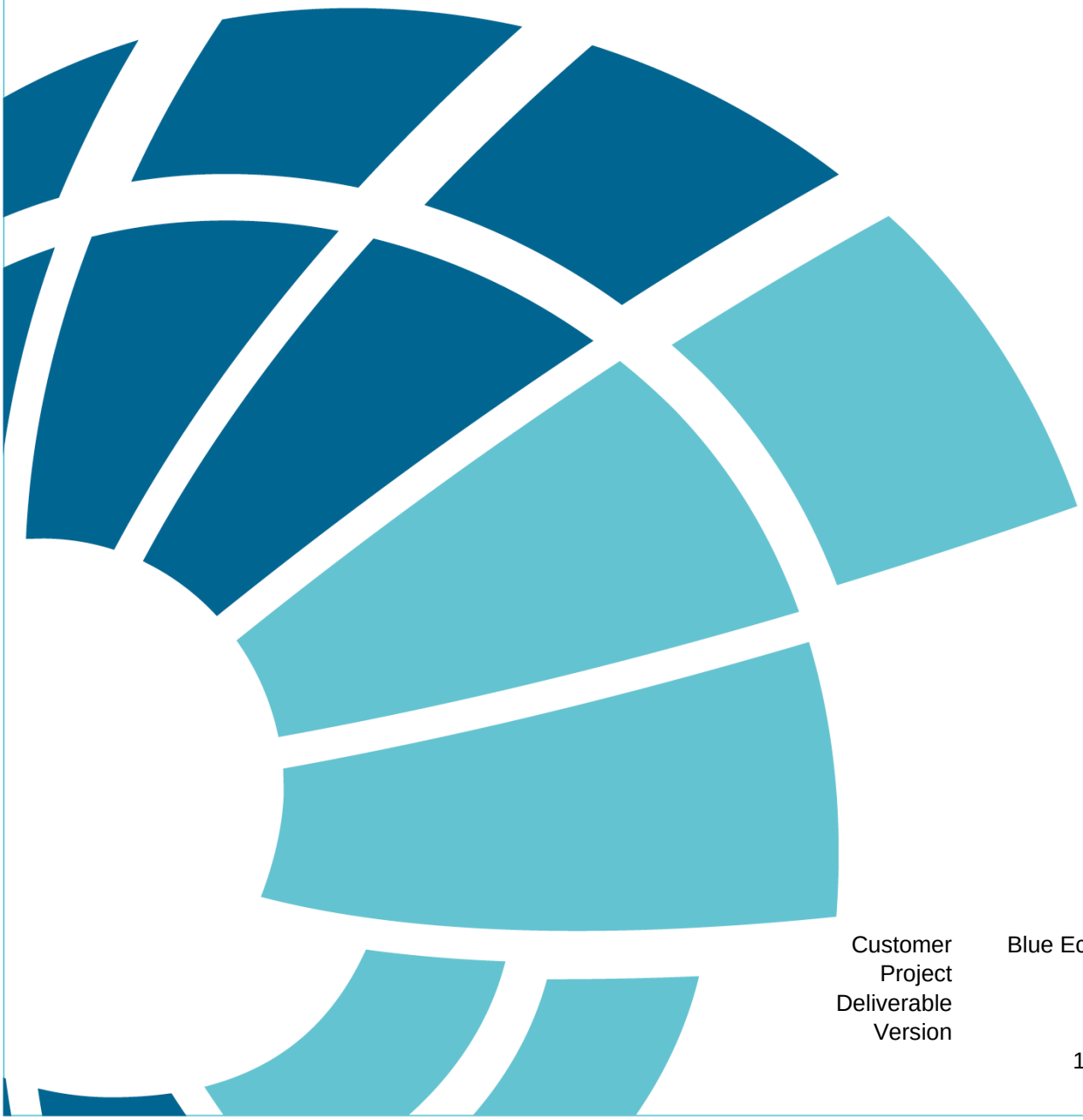
MNES Identification and Impact Assessment

Referral Supporting Information Document



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Acknowledgement of Country

The project team would like to acknowledge the traditional custodians of the land upon which we operate. We pay our respects to their Elders past, present and emerging.

We acknowledge Aboriginal people as Australia's First Peoples and as the Traditional Owners and custodians of the land and water on which we rely.

We recognise and value the ongoing contribution of Aboriginal people and communities to Australian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

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1 Introduction

1.1 Background

BMT Commercial Australia Pty Ltd (BMT) has been engaged by Blue Economy Cooperative Research Centre (BE-CRC) to prepare a significant impact assessment for the proposed research trial aquaculture site (the Project) located within the Bass Strait Blue Economy Zone (BEZ), in Commonwealth waters north of Burnie. The purpose of this report is to present a summary of the potential for significant impacts on Matters of National Environmental Significance (MNES) listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) associated with the proposed activities to support referral under the EPBC Act. Potential impact pathways and proposed controls are described, as well as an assessment against the significant impact criteria outlined in the Commonwealth's Significant Impact Guidelines 1.1. – Matters of National Environmental Significance.

This report presents:

- A high-level description of the proposed Project.
- An overview of the existing marine environment and relevant MNES.
- A summary of potential impact pathways associated with the proposed activities.
- An assessment of the potential for significant impacts on MNES.

1.2 Project description

The Project is located within Bass Strait approximately 12 km offshore from Burnie, Tasmania. For the purposes of this report, the offshore *Study area* includes the BEZ with a 5 km buffer (Figure 1.1). The BEZ is in water depths of ~50-60 m, with the Study area in depths ranging from 35-55 m.

The Project will take place during a three-year period and is designed to test the capability of existing and new sustainable offshore aquaculture systems for finfish (e.g. salmon), while exploring opportunities for seaweed and shellfish. All Project infrastructure will be removed at the end of the trial period (three years).

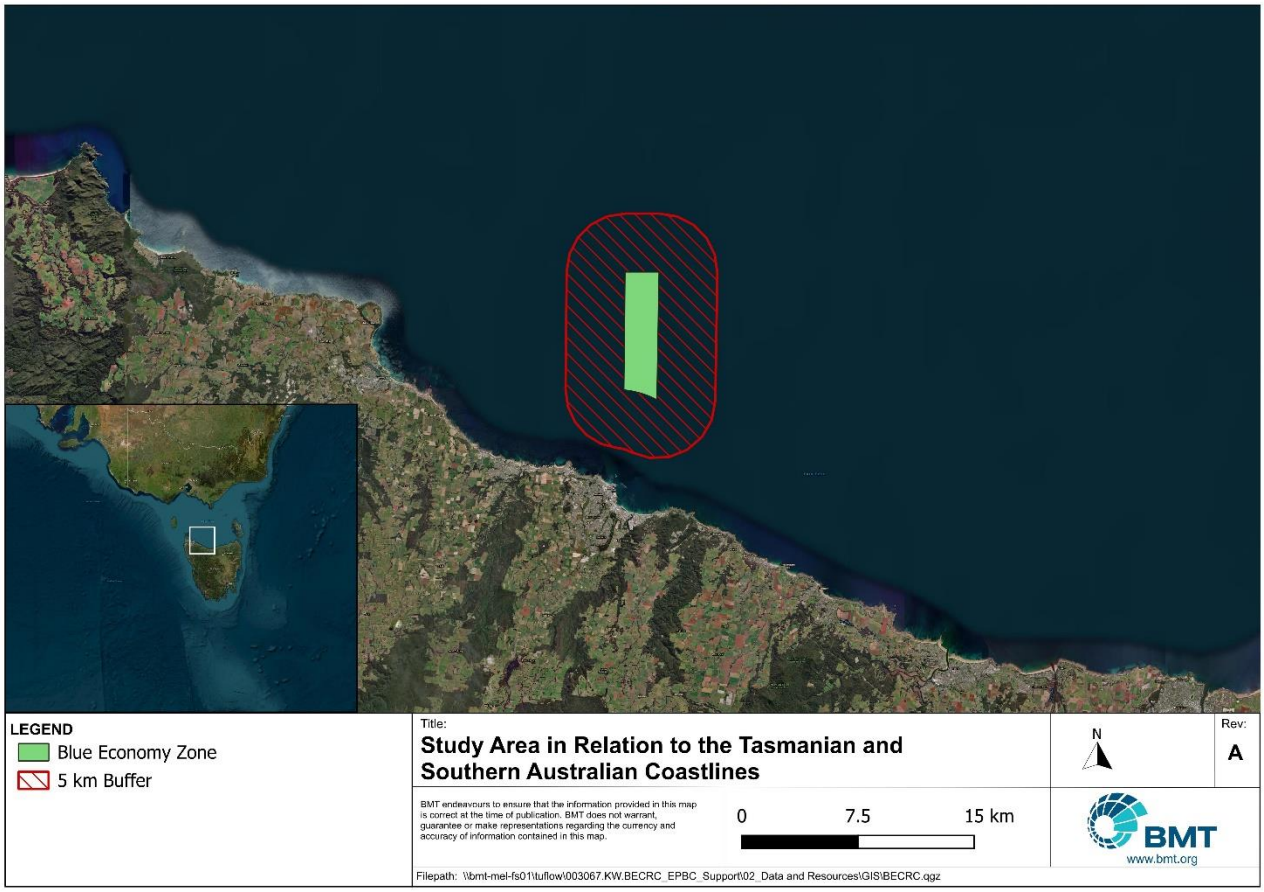

Figure 1.1 The Study area in relation to the Tasmanian and Victorian coastlines.

1.2.2 Equipment

Mooring
The proposed mooring system will consist of a grid of mooring lines secured to the seabed using a system of mooring blocks and anchors. The mooring grid will be suspended below the surface from a series of buoys, located at the corners and intersections of the mooring grid (see Figure 1.2). The pens will be moored to the grid below the can buoys, with the pens floating at the surface (see Figure 1.3). The mooring system and pens will be removed at the end of the trial (three years).

Feeding
Feed will be stored in a hopper for each pen, and typically distributed using a spinner located in the centre of the pen; however, alternative feeding systems may be considered.

Bathing
Bathing may be undertaken using a well boat, where fish are pumped into a freshwater reservoir on the vessel, then pumped back to the pen. However, more likely, bathing will be undertaken using traditional bathing techniques, which requires a pen liner full of fresh water (usually dam water) to be towed to site. Fish are then transferred to the freshwater, bathed, and transferred back into the pen.

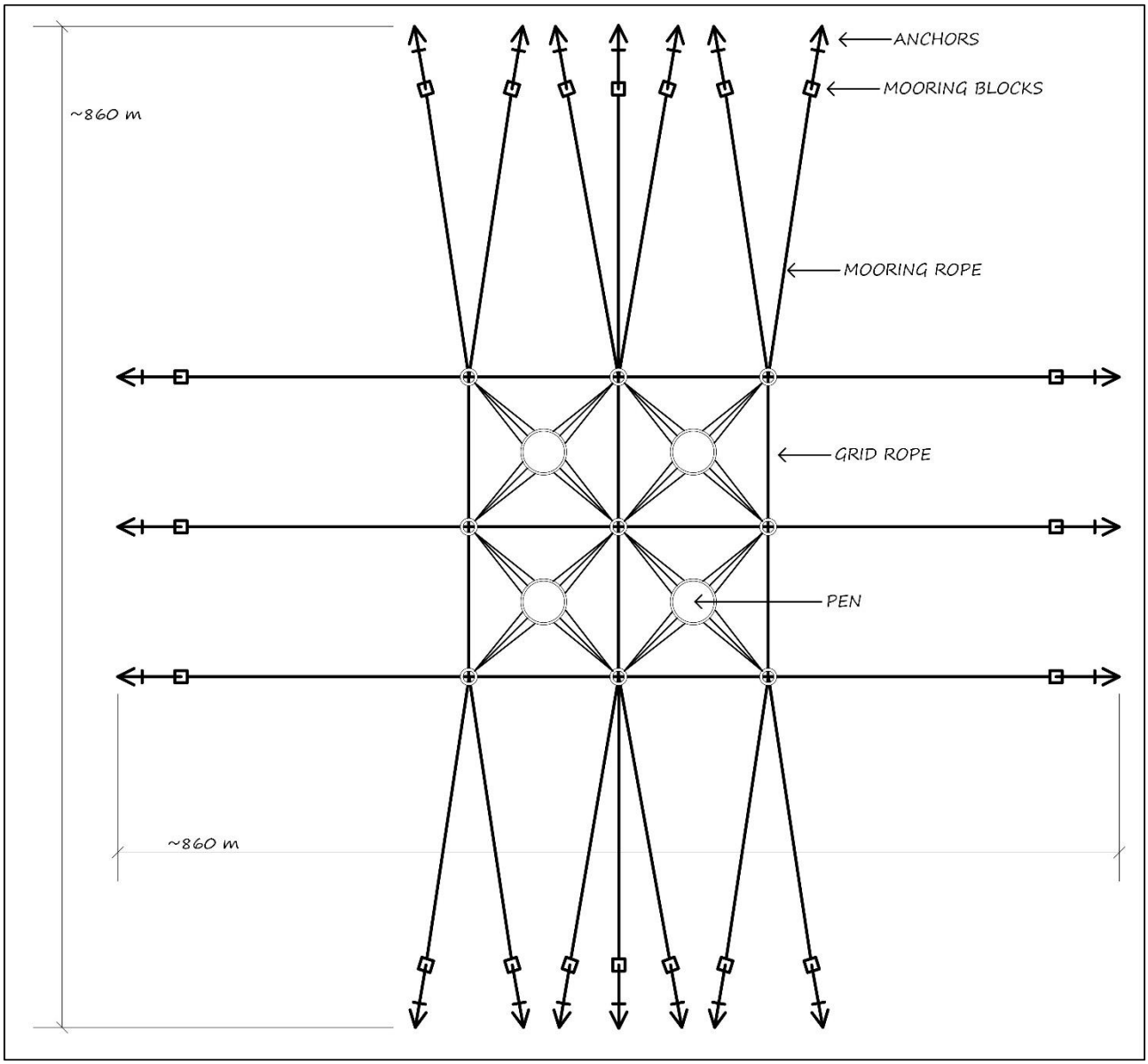

Figure 1.2 Proposed mooring system for the Project

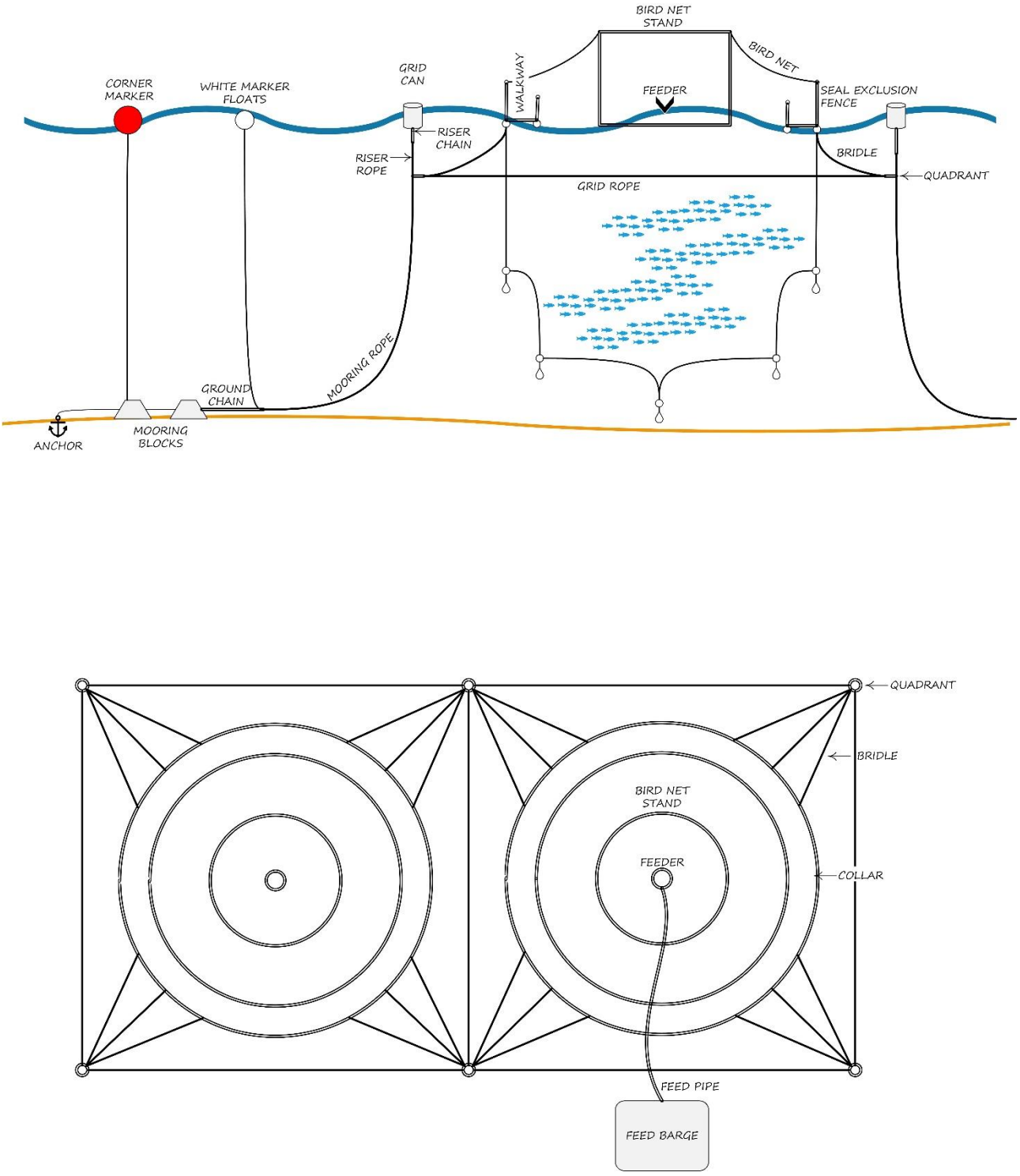

Figure 1.3 Proposed net and pen system for the Project

2 Matters of National Environmental Significance

This section provides an overview of the relevant MNES as they relate to the Study area described in Section 1.2 and illustrated in Figure 1.1. An EPBC Protected Matters Search Tool (PMST) report was generated for the Study area to determine the MNES and other matters protected by the EPBC Act that may occur in or may relate to this area (see Annex A). These include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of international importance (Ramsar)
- The Commonwealth marine environment (including listed marine species)
- World Heritage properties and National Heritage places

Further details for each of these matters are provided in the following sections.

2.1 Listed threatened, migratory and marine species

Under Part 13 of the EPBC Act, species can be listed as one, or a combination, of the following protection designations:

- Threatened (further divided into categories; extinct, extinct in the wild, critically endangered, endangered, vulnerable, conservation-dependent)
- Migratory
- Whale or other cetaceans
- Marine.

A range of species were identified, including mammals, reptiles, sharks, fish and birds. The presence of these species within the Study area may be informed by the presence of Biologically Important Areas (BIAs), as identified in the National Conservation Values Atlas. These are areas that are considered to be particularly important for the conservation of protected species and where aggregations of individuals display biologically important behaviour such as breeding, foraging, resting or migration. BIAs are not defined under the EPBC Act but are designed to assist decision-making under the Act. The Atlas has been reviewed to identify areas of BIAs for protected species that overlap the Study area.

For relevant MNES identified in the EPBC PMST report, likelihood of occurrence was assessed based on the extent of construction and operational activities for the Project, and the known distribution, habitat preference, sightings and historical records of species.

Note: solely freshwater species and terrestrial mammals and birds that appeared in the reports have been excluded from this assessment due to the offshore marine location of the Study area.

2.1.1 Marine Mammals

Eight EPBC listed marine mammals were identified as potentially occurring in the Study area (Table 2.1). An additional seven species of marine mammals were listed in the PMST report under 'other protected matters' (see Annex A). These species include:

- Two whale species
- Three dolphin species
- Two fur seal species.

Identified BIAs for marine mammals that spatially overlap the Study area are presented in Table 2.2, Figure 2.1 and Figure 2.3. The likelihood of occurrence assessment in Table 2.2 is further described and justified in the subsequent species descriptions.

Table 2.1 Listed marine mammal species potentially occurring within the Study area

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
Southern Right Whale	*Eubalaena australis*	EN, Mi	EN	Species or species habitat known to occur within area	Moderate
Sei Whale	*Balaenoptera borealis*	V, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
Fin Whale	*Balaenoptera physalus*	V, Mi	V	Foraging, feeding or related behaviour likely to occur within area	Low
Blue Whale	*Balaenoptera musculus*	EN, Mi	EN	Species or species habitat likely to occur within area	Low
Pygmy Right Whale	*Caperea marginata*	Mi	-	Foraging, feeding or related behaviour may occur within area	Moderate
Killer Whale, Orca	*Orcinus orca*	Mi	-	Species or species habitat likely to occur within area	Low
Dusky Dolphin	*Lagenorhynchus obscurus*	Mi	-	Species or species habitat may occur within area	Low
Humpback Whale	*Megaptera novaeangliae*	Mi	EN	Species or species habitat known to occur within area	Moderate

EPBC Act Status: EN = Endangered, V = Vulnerable, Mi = Migratory
TSP Act Status: EN = Endangered, V = Vulnerable

Table 2.2 Biologically important areas for marine mammals overlapping the Study area.

Common Name	Species Name	Behaviour	Location
Pygmy Blue Whale	*Balaenoptera musculus brevicauda*	Distribution	South-East Marine Region, South West Marine Region, North West Marine Region, Outside
	Balaenoptera musculus brevicauda	Foraging	The majority of Bass Strait and the coastal waters of Tasmania
Southern Right Whale	*Eubalaena australis*	Migration	Eastern and Western Shoreline of Australia and Tasmania extending 5km including any islands in this boundary. Extends outward at 45° angles from Eden NSW and Cape Leeuwin WA to the southern boundary of Commonwealth marine areas.
	Eubalaena australis	Reproduction	Areas extend 2.5km from shore and 100km in both directions along the relevant coast from a midpoint of two confirmed C:C sightings. This includes any islands that intersect the boundary.

Southern right whale

Southern right whales (SRWs) have a circumpolar distribution in the Southern hemisphere between about 16°S and 65°S. They have migratory networks spanning thousands of kilometres, from sheltered coastal wintering grounds to offshore summer feeding grounds. The only area where whales are seen regularly in southeast Australia is Warrnambool, Victoria, with small numbers of whales seen each year in other parts of Victoria, Tasmania, and New South Wales (Watson et al. 2014). Wintering grounds in Western and South Australia (southwest Australia), including key calving grounds, show a high degree of interchange and a strong rate of population growth (Bannister 2011).

Calving/nursery areas appear to be exclusively coastal, either off continental land masses or oceanic islands (CoA 2012a). The biologically important area's (BIA) relevant to SRWs indicate the BEZ spatially overlaps the migration corridor for this species and the extended 5km buffer overlaps with the reproduction BIA (Figure 2.1). At its closest point, the Southern right whale reproduction BIA (see Figure 2.1), is located approximately 3.5 km from the BEZ. Both the migration and reproduction BIA's for SRWs have been recently redefined by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in efforts to reevaluate distributions with respect to species biology, ecology, conservation status, and behaviour.

The extent of the SRW reproduction BIA was developed through analysis of sightings for cow:calf (CC) pairs. Reproductive activities associated with Southern right whales are expected to occur within relatively shallow coastal waters (2 km/20 m depth contours; Pirzl 2008, Charlton et al. 2019). SRWs show high levels of site fidelity for breeding grounds to calve and rear their young returning to the same location every breeding cycle (averages around 3 years) and full weaning is estimated to occur over a period of approximately 1 year (Burnell 2001). In their evidence for the new BIA's DCCEEW noted there exist anecdotal evidence to suggest that in some locations CC pairs are using deeper waters (up to at least 30 m/2.4 km) for reproductive behaviours though this was thought to be rare and therefore not included in the new established BIA.

Recent satellite efforts to track the migration of SRWs indicate that migratory paths are unlikely to intersect with the Study area with most pathways extending from the pole toward the south west. State Wide Integrated Flora and Fauna Teams (SWIFFT) runs a SRW photo identification survey project which has documented sightings off Stanley (~51 km from site, Figure 2.1) as recently as July 7th 2023. Given the closeness of recent sightings and the known use of this area as migration and potential breeding grounds for SRWs the likelihood of them being present in the proposed Study area is Moderate.

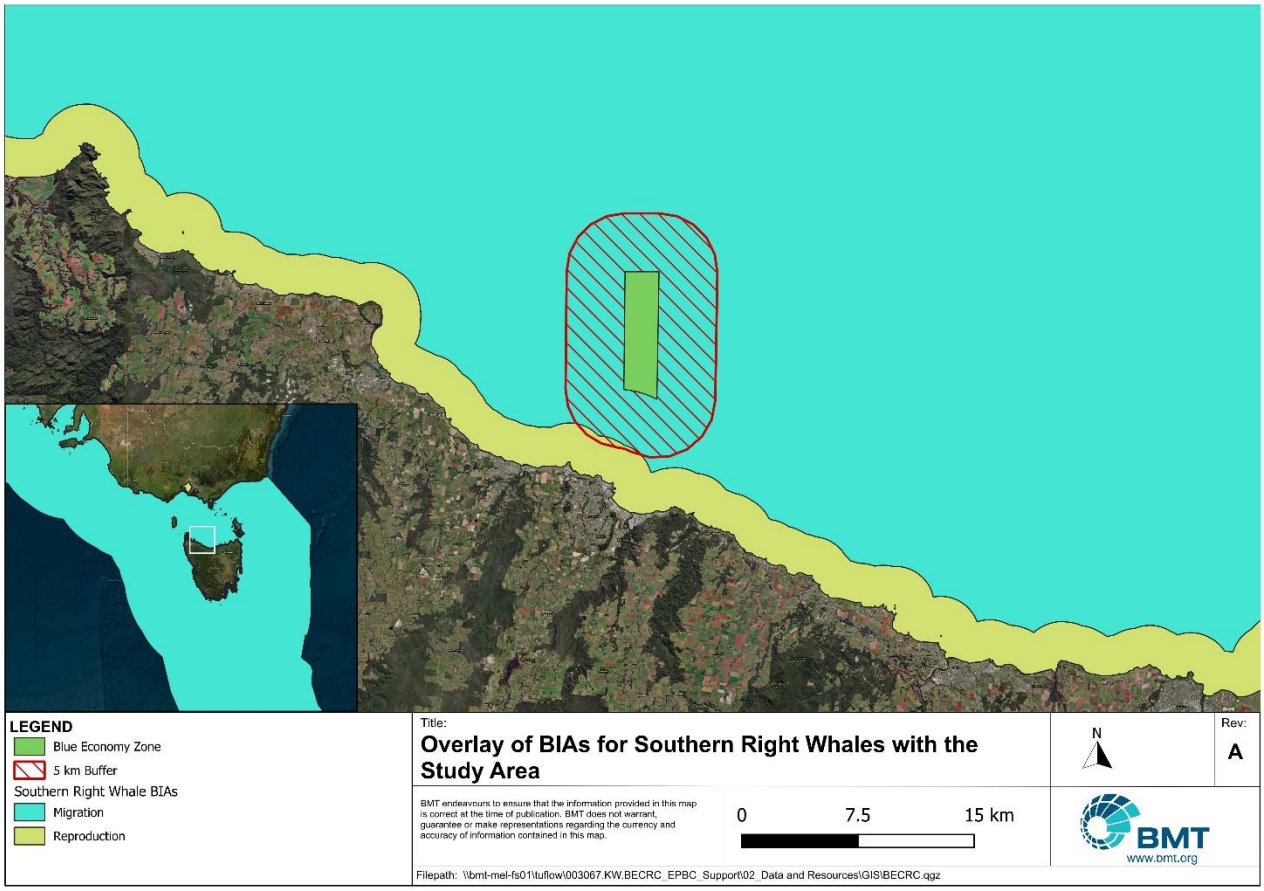

Figure 2.1 Southern right whale biologically important areas that spatially overlap the Study area

Pygmy right whale

Pygmy right whales are circumpolar species found in the Southern hemisphere. The latitudinal range in the Australasian region is estimated to be between 32°– 47°′S (Kemper 2002). Most records are concentrated on the edge of the South Australian gulfs, around Tasmania, at Stewart Island, New Zealand and in Cook Strait (ALA 2023). Records of pygmy right whales are documented across Tasmania with a hotspot being located around Perkins Bay which is near the Study area (Kemper et al. 2013; Figure 2.2). This hotspot was derived using data on live strandings (5 recorded for Perkins Bay area), sightings (none for Perkins Bay) and carcasses (15 recorded for Perkins Bay) between 1884 to early 2007. This species is relatively unknown in terms of migratory and behavioural patterns however given these reports its potential to be within the Study area is Moderate.

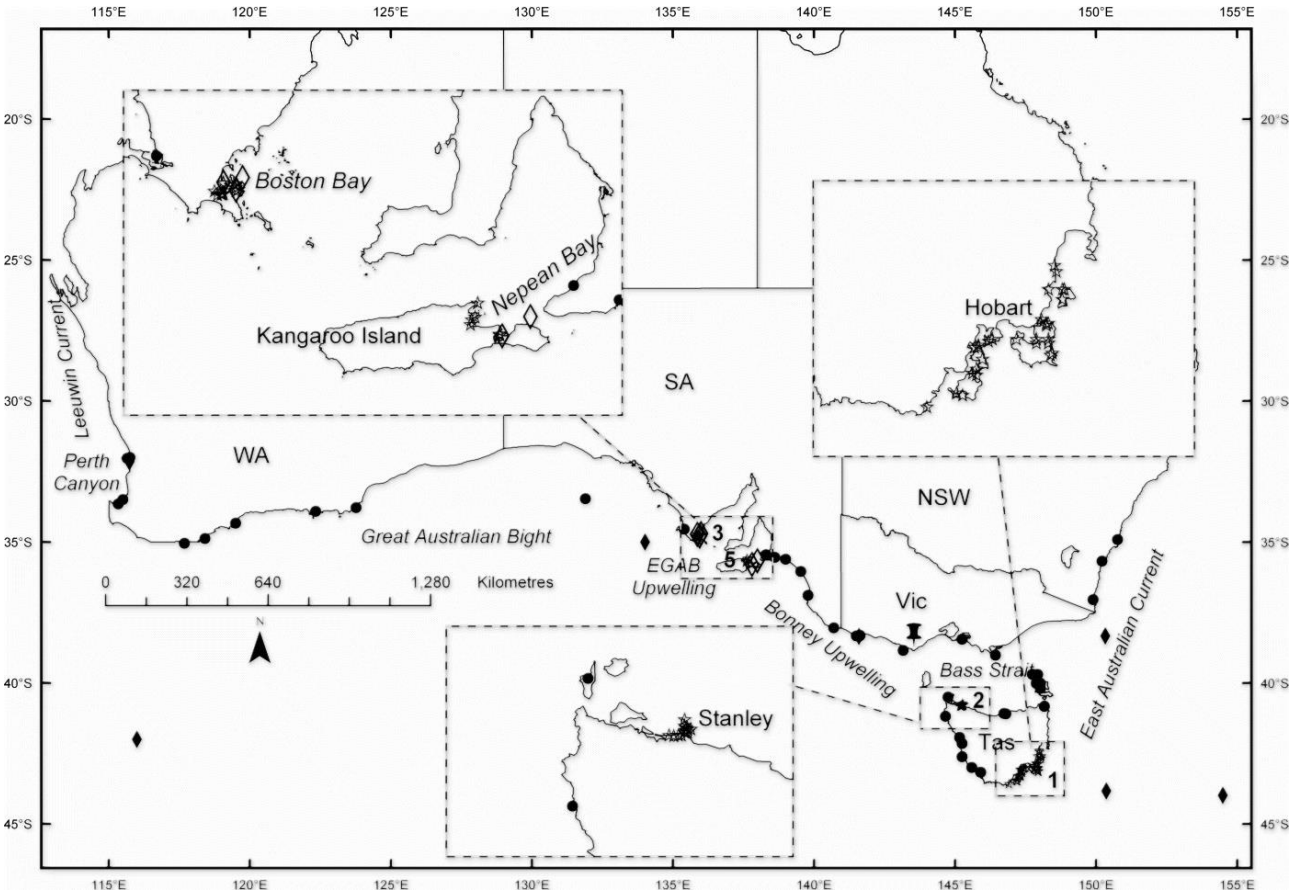

Figure 2.2 Distribution of pygmy right whales strandings and sightings off Australia. Numbers refer to hotspots for sightings. Strandings in hotspots (open stars) and non-hotspots (solid circles). Sightings in hotspots (open diamonds) and non-hotspots (closed diamonds). Source: Kemper et al. 2013.

Blue whale

There are two recognised subspecies of blue whale in the Southern hemisphere that are both recorded in Australian waters, the southern (or 'true' blue whale (*Balaenoptera musculus intermedia*)) and the 'pygmy' blue whale (*Balaenoptera musculus brevicauda*). In general, southern blue whales occur in waters south of 60°S and pygmy blue whales (PBWs) occur in waters north of 55°S (i.e. not in the Antarctic). By this definition, all blue whales in waters around the Study area are assumed to be PBWs and are discussed below.

Movement behaviour of PBWs occurs mostly at the continental shelf edge and slope being predominantly fast and directed with short (a few days) periods of slow movement and 'milling', indicative of foraging, in between. There are two BIA's that spatially overlap the Study area: likely foraging area and known distribution (i.e. entire area of use; Figure 2.3). In a collaborative project using satellite tags and noise loggers the spatial distribution of PBWs was mapped to define areas of importance particularly regarding migration and breeding pathways. This work indicated PBWs were present in the deeper waters offshore the Study area; however, it was temporally limited (present in March only) as a part of their regular migration (Möller et al. 2020). This indicates that while it is possible for PBWs to be present in and around the Study area, they are unlikely to stay for long periods. Their likelihood of occurrence is assessed as Low.

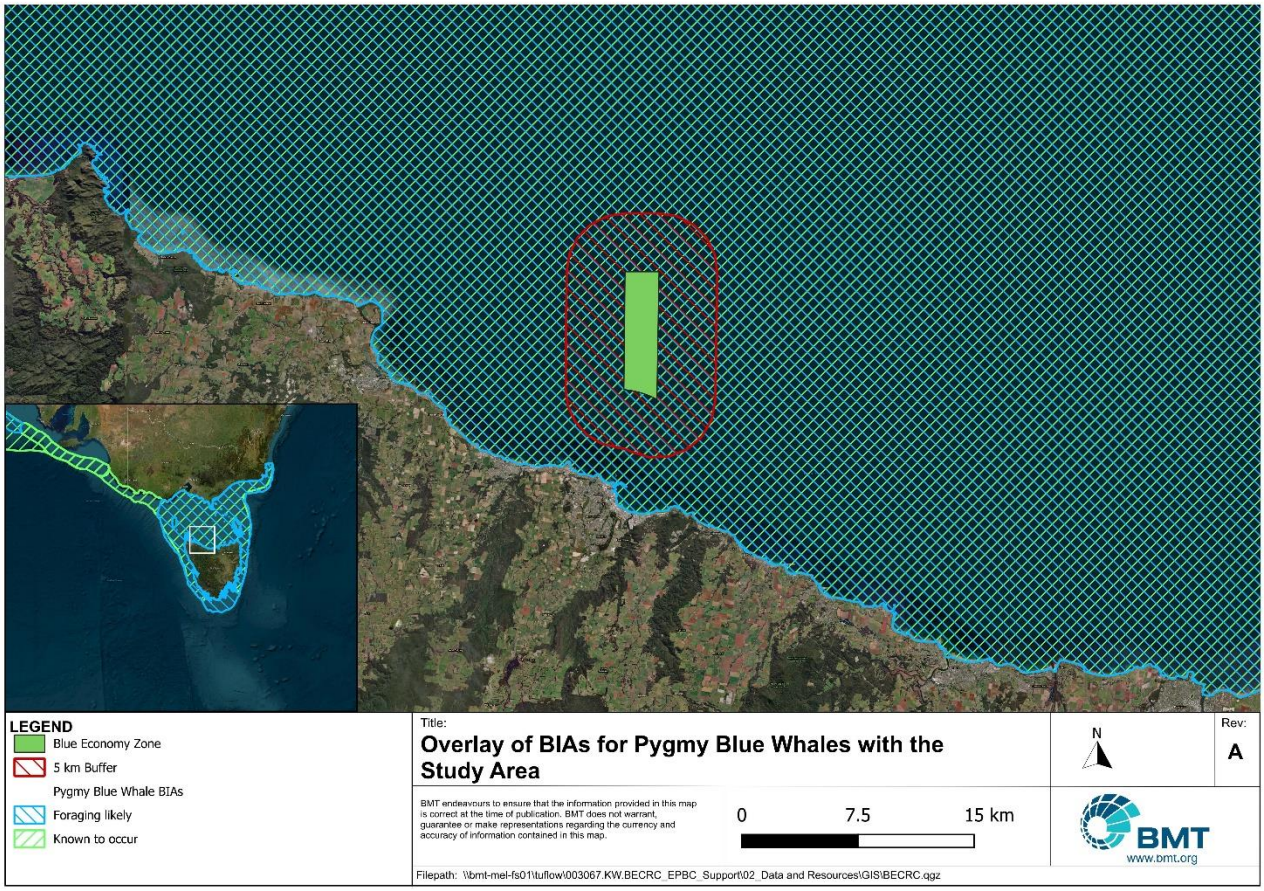

Figure 2.3 Pygmy blue whale biologically important areas that spatially overlap the Study area

Fin whale

Fin whales are typically found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes (NOAA Fisheries 2019). They are often found in large groups including other whale species such as humpback whales and minke whales. For the southern Australian region, the primary subspecies of concern is the *Balaenoptera physalus quoyi*. Recent projects analysing acoustic recordings from 15 locations in Antarctic and Australian waters from 2002 to 2019 have depicted a potential northern migration pathway between Antarctic and Australian waters (Aulich et al. 2019, 2022). This seasonal migration indicates that fin whales may pass through the Study area primarily between July and November. A lack of direct sightings off northwest Tasmania along with the relatively shallow water of the Study area indicates a Low probability of occurrence.

Sei whale

The movement patterns of sei whales are not well known, however they are generally found in deeper waters far from the coastline (NOAA Fisheries 2019). Sei whales are unique among large whales in that they have an unpredictable distribution. A group may move to one location in a given year only to not be seen again for decades. This behaviour contrasts with most large whale species who have predictable migratory pathways, and it makes determining their likelihood of occurrence difficult. Some key behaviours such as breeding are also somewhat unknown for this species. They are considered relatively rare within Australian waters with most that have been reported coming from old whaling records showing them in Albany and some disparate sightings across the Bonney Upwelling (Bannister, 2008). Overall, given the propensity for this species to favour deep offshore locations and the ambiguity of their behavioural patterns their likelihood of occurrence is assessed as Low.

Killer whale, Orca

While orcas are known to be migratory, following regular seasonal movements, exact routes and timings are poorly understood and little is known about orca in Australian waters, although it appears they do follow migratory movements of other whales (e.g. humpback whales). The preferred habitat of orca includes oceanic, pelagic and neritic (relatively shallow waters over the continental shelf) regions, in both warm and cold waters. Given the shallow water depths of the Study area, large numbers of orca are unlikely to be encountered, although transient individuals may be encountered in low numbers. Their likelihood of occurrence is assessed as Low.

Humpback whale

The eastern Australia humpback whale population (known as the Group V population) is genetically distinct from the WA population. These whales were historically hunted to near extinction by the whaling industry however in recent years their numbers have boomed significantly (Noad 2019). Satellite tagged monitoring of humpbacks indicate this species is likely to be found (either transiting for migration or foraging, Figure 2.4) in the water in and around the Study area (Andrews-Goff et al. 2018). However, it is likely that the use of this area as a primary migration route is limited given is not included in the migration BIA for humpback whales along the eastern border of Australia.

As for direct sightings recorded for this species, the closest was observed approximately 20 km from the Study area (ALA 2023). However, most sightings were restricted to the eastern coast of Tasmania in line with the recognised area for the migration BIA of this species. Given that the nearshore habitat has not been identified to support large numbers or aggregations for this species and the relatively sparse sightings near the Study area it is expected that only transient individuals are likely to occur in the area and only during restricted temporal windows (migration). Overall, this indicates a Moderate likelihood of occurrence.

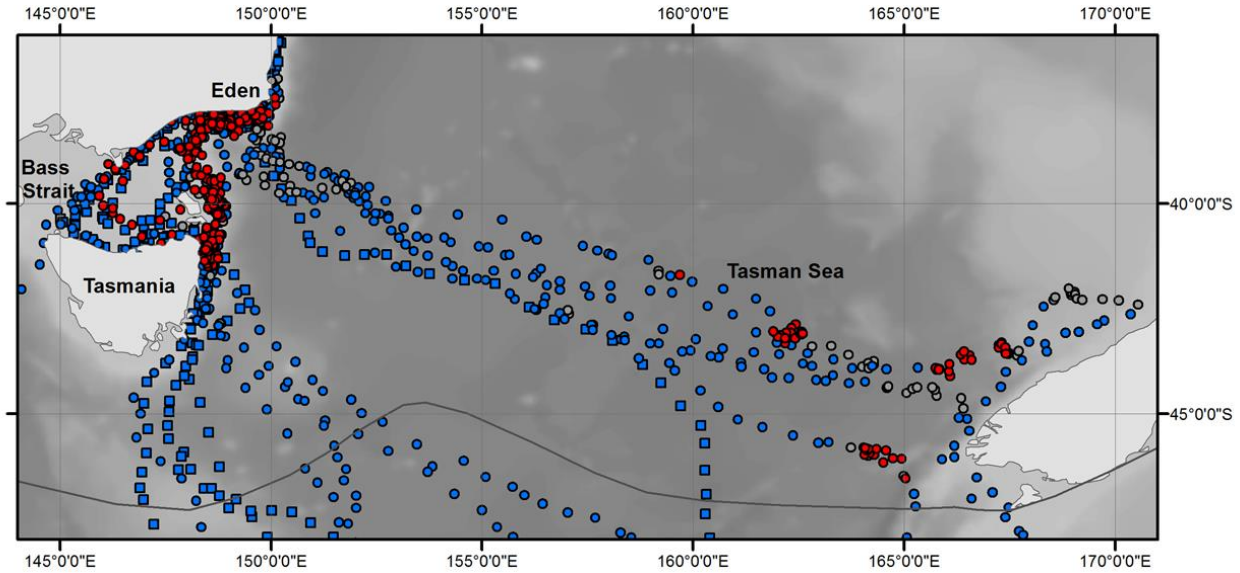

Figure 2.4 Location estimates as compiled by Andrews-Goff et al. 2018, Red dots are indicative of whales undertaking “search” behaviours (more frequent direction shifting indicative of foraging, resting, breeding or other behaviours) while blue dots indicate “transit” behaviours (near to no turning indicative of migratory behaviours) grey dots represent unknown behaviour patterns.

Dusky dolphin

Dusky dolphins are confined to the Southern hemisphere in temperate and subantarctic waters between around 26°S and 55°N (Department of Conservation, n.d.). Dusky dolphins have four recognised subspecies of which the New Zealand Dusky dolphin is considered the most likely to be of significance for the Study area. This species is thought to migrate to the southern waters of Australia after breeding in and around Admiralty Bay New Zealand (Jefferson et al. 2015). Specifics of this migration however are less well documented and as such a wide range is assumed as possible migratory territory. No sightings have been reported near the Study area (ALA 2023), and dusky dolphins have also been found to actively avoid aquaculture sites such as mussel farms (Pearson et al. 2012, Markorwitz et al. 2004) making it generally unlikely that they will be found in the Study area. Thus, their likelihood of occurrence is Low.

2.1.2 Marine Reptiles

Only one EPBC listed marine reptile was identified as having habitat that may occur within Study area: the green turtle (*Chelonia mydas*), listed as Vulnerable and Migratory under the EPBC Act and Vulnerable under the TSP Act.

No BIAs spatially overlap the Study area.

Green Turtle

Green turtles are distributed around the globe in warm tropical to subtropical waters. Green turtles are generally found in tropical and subtropical waters and normally remain within the northern and southern limits of the 20°C isotherms (Marquez 1990); however, individuals may stray into temperate waters and immature green turtles have been recorded foraging in water temperatures of 15°C. Green turtles move across three habitat types, depending on their life stage. In southern Queensland, nesting occurs between late November and January, and there are no known breeding territories that overlap with the Study area.

There have been no recorded sightings of green turtles near to the Study area through the Atlas of Living Australia or Redmap (Sightings - Redmap), and relatively few for all of Tasmania. This is in line with historical sighting records in which green turtle sightings were rare with only eight recorded in relevant museum specimen records and reliable observations from 1846-2010 (Bauer 2011). Given the lack of nearby sightings and the historically documented rarity of this species in Tasmanian waters the likelihood of occurrence for the Study area is Low.

2.1.3 Sharks, Rays and Fish

Seven EPBC listed threatened and/or migratory sharks, rays and fish were identified as potentially occurring within the Study area (Table 2.3). A number of distribution BIAs for the white shark spatially overlap the Study area (Table 2.4; Figure 2.5).

An additional 26 fish species were identified in the PMST report and listed under the EPBC Act as ‘other protected matters’, which were pipefish, pipehorses, seadragons, and seahorses belonging to the family Syngnathidae (see Annex A). Species within this family generally inhabit coastal waters with diverse benthic structure (e.g. seagrasses, rocky or coral reefs). Given the offshore location of the BEZ and Study area, and the benthic habitat assessment of the area (Marine Solutions 2024) there is unlikely to be suitable habitat for syngnathids.

Table 2.3 Listed marine shark, ray or fish species potentially occurring within the Study area

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
White Shark	*Carcharodon carcharias*	V, Mi	V	Species or species habitat known to occur within area	Low
School Shark	*Galeorhinus galeus*	CD	-	Species or species habitat known to occur within area	Moderate
Shortfin Mako	*Isurus oxyrinchus*	Mi	-	Species or species habitat likely to occur within area	Low
Porbeagle	*Lamna nasus*	Mi	-	Species or species habitat likely to occur within area	Low
Blue Warehou	*Seriolella brama*	CD	-	Species or species habitat known to occur within area	Low
Southern Bluefin Tuna	*Thunnus maccoyii*	CD	-	Species or species habitat likely to occur within area	Low
Australian Grayling	*Prototroctes maraena*	V	V	Species or species habitat likely to occur within area	Low

EPBC Act Status: V = Vulnerable, CD = Conservation Dependent, Mi = Migratory
TSP Act Status: V = Vulnerable

Table 2.4 Biologically important areas for shark, ray or fish species overlapping the Study area

Common Name	Species Name	Behaviour	Location
White Shark	*Carcharodon carcharias*	Distribution	South-East Marine Region - between the 60-120m depth contour
		Distribution (low density)	Australian waters from Barrow Island/Montebello Islands, WA to Yeppoon/Swains Reef, Qld
		Known Distribution	South-East Marine Region - Coastal/Shelf/Upper Slope waters out to 1000m depth contour

White shark

White sharks are highly mobile and move rapidly over very large ranges. The white shark is primarily an inhabitant of continental and insular shelf waters but they are also known to inhabit the open ocean. White sharks often occur close inshore near the surf-line and may move into shallow bays. Within Australia, they can be found south of North West Cape in WA to Southern Queensland. More commonly they occur off the South and South West coasts in coastal waters and in the open ocean from the surface to deeper than 1000 m. They display diverse migration strategies, ranging between inshore coastal habitats, to offshore open ocean (Duffy et al. 2012; Bradford et al. 2020). White sharks are often found in regions with high prey density, such as pinniped colonies. Sightings for this species indicate one as close as 5 km from the Study area (ALA 2023) however this represents one of only very few for the region which is in line with the low-density distribution BIA that covers the entirety of the Study area. Areas close to favoured sites and common corridors of travel are likely to experience higher encounter frequencies with white sharks. There are no known favoured sites or migration corridors near the Study area, therefore the likelihood of this species being present in the Study area is Low.

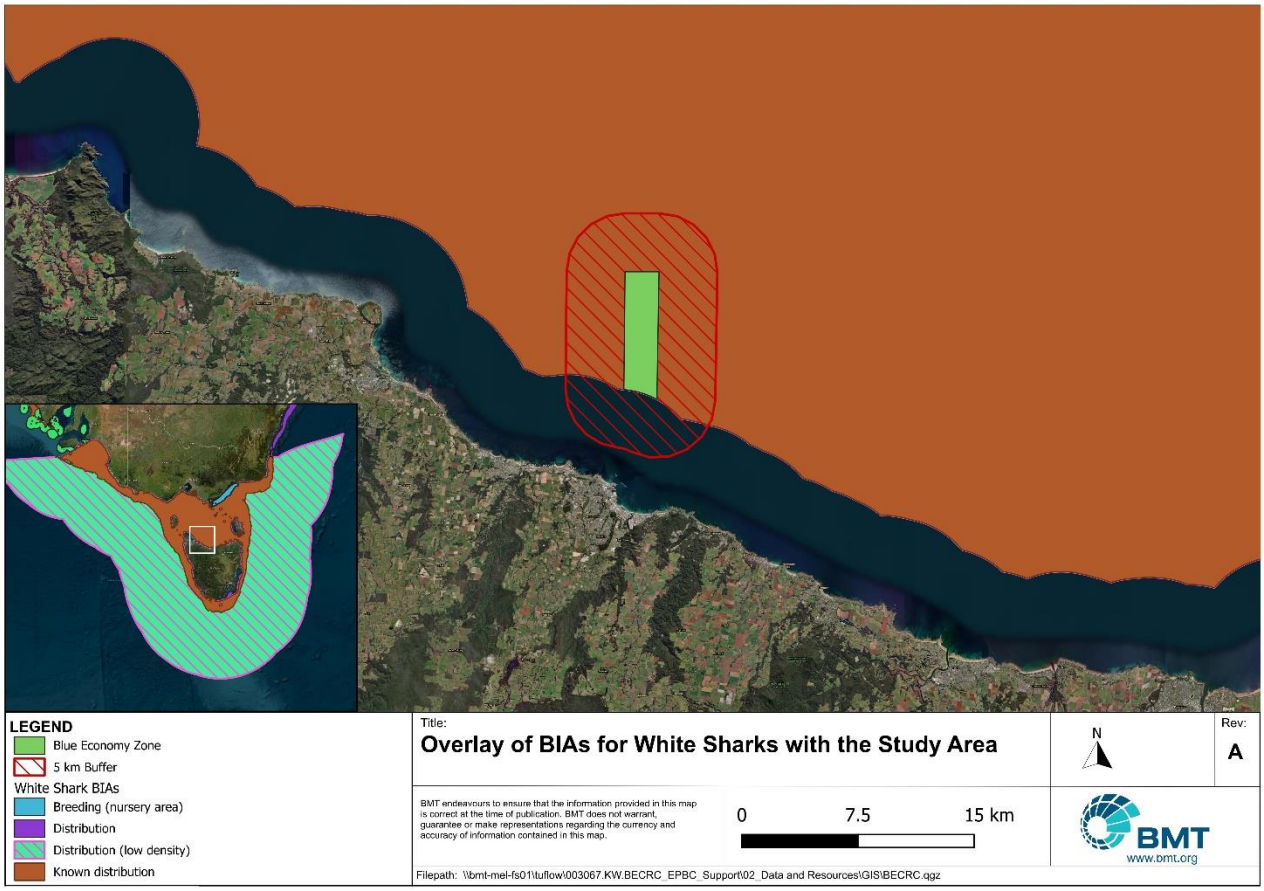

Figure 2.5 White shark biologically important areas that spatially overlap the Study area

School Shark

The school shark is a temperate demersal species found on the continental shelf and slope. They can be found to depths of 550 m, and often move up into the water column at night. School sharks segregate into schools according to size and sex. Size generally increases from inshore to offshore. Pups and juveniles aggregate in shallower 'nursery' waters during the spring and summer. School sharks undertake long migrations of up to 1400 km along the southern coast of Australia, which are thought to be associated with homing to natal mating and pupping grounds (AFMA 2023).

A relatively high number of sightings have been recorded in nearby waters (nearest is 28 km from the Study area; ALA 2023) and minor catches of school sharks have been taken in State waters; therefore, the likelihood of occurrence for this species is Moderate.

Shortfin Mako

The shortfin mako is the fastest recorded shark, and feed on other fast-moving pelagic fishes such as swordfish, tuna, other sharks, as well as squid. Marine mammals and sea turtles are occasionally ingested by this species (Cailliet et al. 2009). The shortfin mako inhabits offshore temperate and tropical seas worldwide (Roberts et al. 2015). As a pelagic species they can be found from the surface to depths of 150 m (McEachran et al. 2021). Juveniles are known to exist in the nearshore area with adults primarily existing in deeper offshore areas (NOAA 2023). There is a recorded sighting of this species near to the Study area (ALA 2023); however, given the wide-ranging nature of this species and the lack of sightings, the likelihood of occurrence is Low.

Porbeagle

The porbeagle is a wide-ranging, coastal oceanic shark found in temperate and cold-temperate waters worldwide, preferring temperatures below 18°C (FRDC 2024). It most commonly occurs in epipelagic waters over the continental shelf, shelf edges, offshore banks, and in the open ocean reaching depths of at least 1300 m. It also conducts long-distance seasonal migrations, generally shifting between shallower and deeper water. No information is available on migratory timing. The porbeagle continues to be caught throughout its range, both intentionally and as bycatch, with varying degrees of monitoring and management. Public sightings around Tasmania have only included the west and south-eastern parts of the state (ALA 2023). Given their extensive distribution, migrations and that they have a broad temperature tolerance, the likelihood of occurrence is Low.

Other Fish Species

There are two saltwater fish species Identified within the Study area; the Southern Bluefin Tuna and the Blue Warehou, both of which are considered conservation dependent. Both species are migratory with wide habitat ranges spanning well beyond the boundary of the Study area. As such, while these species may be present within the Study area, they are likely to be transitory and thus the likelihood of occurrence is Low.

2.1.4 Seabirds and Shorebirds

Forty-one EPBC listed threatened and/or migratory seabirds and shorebirds (marine overfly or migratory) were identified as potentially occurring within the Study area (Table 2.5). No BIAs overlap the Study area.

An additional five species were identified in the PMST report and listed under the EPBC Act as 'other protected matters' (see Annex A).

Table 2.5 Listed seabird and shorebird species potentially occurring within the Study area

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
Eastern Curlew	*Numenius madagascariensis*	CE, Mi	EN	Species or species habitat may occur within area	Low
Swift Parrot	*Lathamus discolor*	CE	EN	Species or species habitat known to occur within area	Low
Curlew Sandpiper	*Calidris ferruginea*	CE, Mi	-	Species or species habitat may occur within area	Low
Grey-headed Albatross	*Thalassarche chrysostoma*	EN, Mi	EN	Species or species habitat may occur within area	Low
Southern Giant-Petrel	*Macronectes giganteus*	EN, Mi	V	Foraging, feeding or related behaviour likely to occur within area	Low
Gould's Petrel	*Pterodroma leucoptera leucoptera*	EN	-	Species or species habitat may occur within area	Low
Shy Albatross	*Thalassarche cauta*	EN, Mi	V	Foraging, feeding or related behaviour likely to occur within area	High
Red Knot	*Calidris canutus*	EN, Mi	-	Species or species habitat may occur within area	Low
Northern Royal Albatross	*Diomedea sanfordi*	EN, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
Eastern Hooded Plover	*Thinornis cucullatus cucullatus*	V	-	Species or species habitat may occur within area	Low
Black-browed Albatross	*Thalassarche melanophris*	V, Mi	EN	Foraging, feeding or related behaviour likely to occur within area	High
Fairy Prion (southern)	*Pachyptila turtur subantarctica*	V	EN	Species or species habitat known to occur within area	Low

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
Sooty Albatross	*Phoebetria fusca*	V, Mi	R	Species or species habitat likely to occur within area	Low
Northern Giant Petrel	*Macronectes halli*	V, Mi	R	Foraging, feeding or related behaviour likely to occur within area	Low
Gibson's Albatross	*Diomedea antipodensis gibsoni*	V	-	Foraging, feeding or related behaviour likely to occur within area	Low
Indian Yellow-nosed Albatross	*Thalassarche carteri*	V, Mi	-	Species or species habitat likely to occur within area	Low
White-capped Albatross	*Thalassarche steadi*	V, Mi	-	Foraging, feeding or related behaviour known to occur within area	Low
Salvin's Albatross	*Thalassarche salvini*	V, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
Buller's Albatross	*Thalassarche bulleri*	V, Mi	-	Species or species habitat may occur within area	Low
Nunivak Bar-tailed Godwit	*Limosa lapponica baueri*	V	-	Species or species habitat may occur within area	Low
Northern Buller's Albatross	*Thalassarche bulleri platei*	V	-	Species or species habitat may occur within area	Low
Blue-winged Parrot	*Neophema chrysostoma*	V	-	Species or species habitat known to occur within area	Low
White-throated Needletail	*Hirundapus caudacutus*	V, Mi	-	Species or species habitat known to occur within area	Low
Blue Petrel	*Halobaena caerulea*	V	V	Species or species habitat may occur within area	Low

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
Soft-plumaged Petrel	*Pterodroma mollis*	V	EN	Species or species habitat may occur within area	Low
Wandering Albatross	*Diomedea exulans*	V, Mi	EN	Foraging, feeding or related behaviour likely to occur within area	Moderate
Southern Royal Albatross	*Diomedea epomophora*	V, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
White-bellied Storm-petrel (Tasman Sea)	*Fregetta grallaria grallaria*	V	-	Species or species habitat likely to occur within area	Low
Campbell Albatross	*Thalassarche impavida*	V, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
Antipodean Albatross	*Diomedea antipodensis*	V, Mi	-	Foraging, feeding or related behaviour likely to occur within area	Low
Australian Fairy Tern	*Sternula nereis nereis*	V	V	Species or species habitat known to occur within area	Low
Common Sandpiper	*Actitis hypoleucos*	Mi	-	Species or species habitat may occur within area	Low
Little Tern	*Sternula albifrons*	Mi	EN	Species or species habitat may occur within area	Low
Fork-tailed Swift	*Apus pacificus*	Mi	-	Species or species habitat likely to occur within area	Low
Satin Flycatcher	*Myiagra cyanoleuca*	Mi	-	Species or species habitat known to occur within area	Low
Sharp-tailed Sandpiper	*Calidris acuminata*	Mi	-	Species or species habitat may occur within area	Low

Common Name	Species Name	EPBC Act Status	TSP Act Status	Type of Presence (EPBC)	Likelihood of Occurrence
Bar-tailed Godwit	*Limosa lapponica*	Mi	-	Species or species habitat known to occur within area	Low
Sooty Shearwater	*Ardenna grisea*	Mi	-	Species or species habitat may occur within area	Low
Latham's Snipe	*Gallinago hardwickii*	Mi	-	Species or species habitat likely to occur within area	Low
Pectoral Sandpiper	*Calidris melanotos*	Mi	-	Species or species habitat may occur within area	Low
Flesh-footed Shearwater	*Ardenna carneipes*	Mi	-	Species or species habitat likely to occur within area	Low

EPBC Act Status: CE = Critically Endangered, EN = Endangered, V = Vulnerable, Mi = Migratory
TSP Act Status: EN = Endangered, V = Vulnerable, R = Rare

Table 2.6 Biologically important areas for bird species overlapping the Study area

Common Name	*Species Name*	Behaviour	Location
Short-tailed Shearwater	*Ardenna tenuirostris*	Foraging	Buffer around Tasmania including Bass Strait
Wandering Albatross	*Diomedea exulans (sensu lato)*	Foraging	South-East Marine Region
White-faced Storm-petrel	*Pelagodroma marina*	Foraging	Buffer around the northern side of Tasmania into Bass Strait
Common Diving-petrel	*Pelecanoides urinatrix*	Foraging	Buffer around Tasmania and Victoria
Buller's Albatross	*Thalassarche buller*	Foraging	Most of the South-east Marine Region
Shy Albatross	*Thalassarche cauta*	Foraging Likely	South-east Marine Region
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Foraging	Most of the South-east Marine Region
Black-browed Albatross	*Thalassarche melanophris*	Foraging	The South-east Marine Region
Campbell Albatross	*Thalassarche melanophris impavida*	Foraging	The South-east Marine Region including Macquarie Island

Wandering Albatross

The wandering albatross (*Diomedea exulans*) is one of the most oceanic of all flying seabirds and has a distribution that includes vast areas of the Southern Ocean. Foraging area for this species extends around the southern tip of Australia completely encapsulating Tasmania including the Study area (Figure 2.6). A high number of recorded sightings have also occurred near to the Study area with the closest being 10.6 km (ALA 2023). Individuals do not however appear to spend significant time in any one area of their foraging territory with the average distance between prey captures being approximately 64 km and comparatively few instances of foraging being targeted to specific patches (Weimerskirch et al. 2005). This indicates that while there may be individuals present nearby individuals tend to use the larger area for foraging. Given the close proximity of sightings and the direct overlap of the foraging BIA, the likelihood of occurrence has been assessed as Moderate.

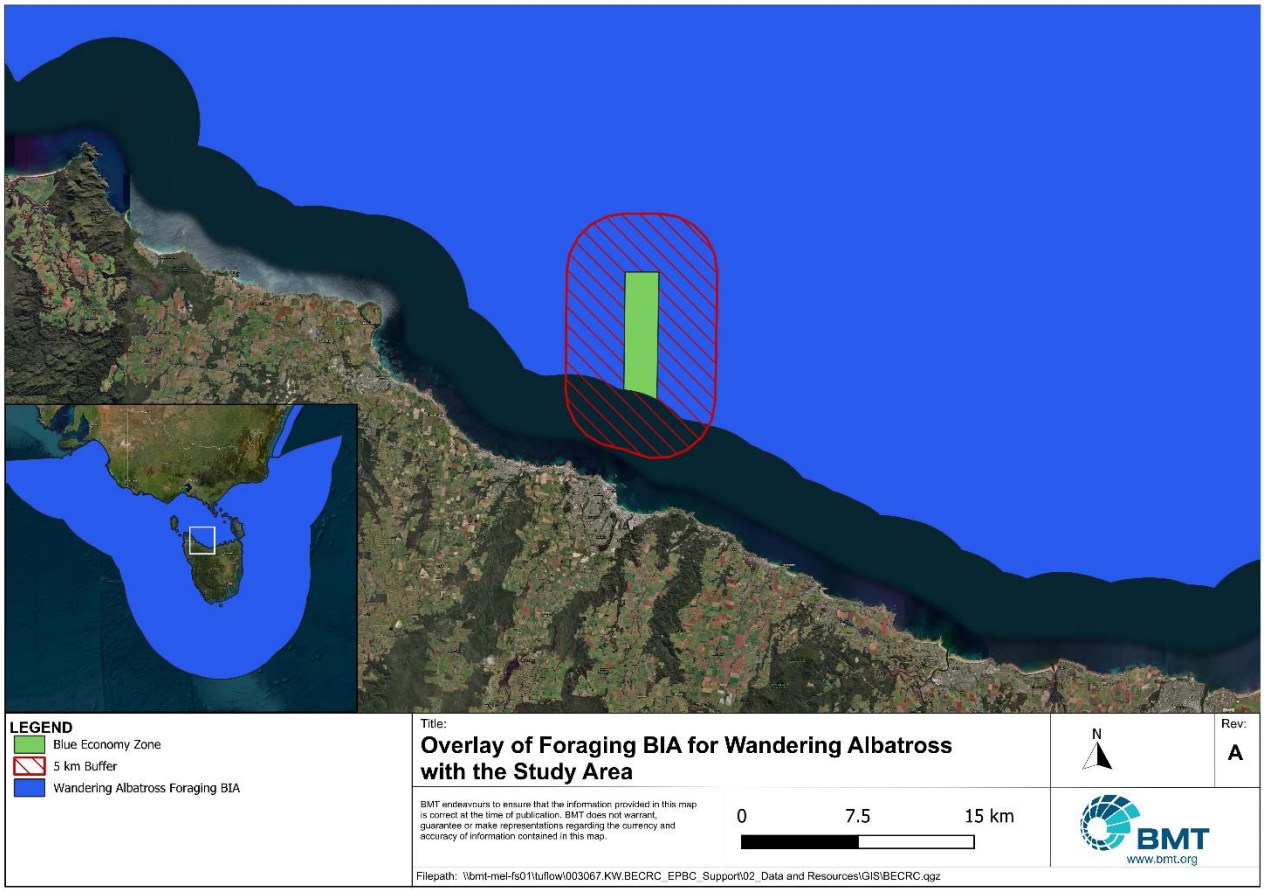

Figure 2.6 Biologically important area for the wandering albatross relative to the Study area.

Buller's Albatross

Buller's albatross is endemic to New Zealand. They breed on Snares Islands, Solander Island, Chatham Islands (Big and Little Sister and Forty-fours Island), and Three Kings Islands (Rosemary Rock). The general foraging territory for adults is generally between 40°S and 50°S from Tasmania to the Chatham Rise (Sagar et al. 2000). The Bullers albatross feeds on a diet of squid, fish, tunicates, octopus, and crustacea (James and Stahl 2000). Although individuals are generally found to forage alone, large numbers may gather to feed at concentrated food sources such as swarms of crustaceans, occasionally making surface plunges or shallow dives (Fenwick 1978). Sightings for this species exist near to the Study area (ALA 2023), although they are sparse. The Study area overlaps the foraging BIA (Figure 2.7), but given their wide range it is unlikely that this area is used by a high number of individuals; therefore the likelihood of occurrence is Low.

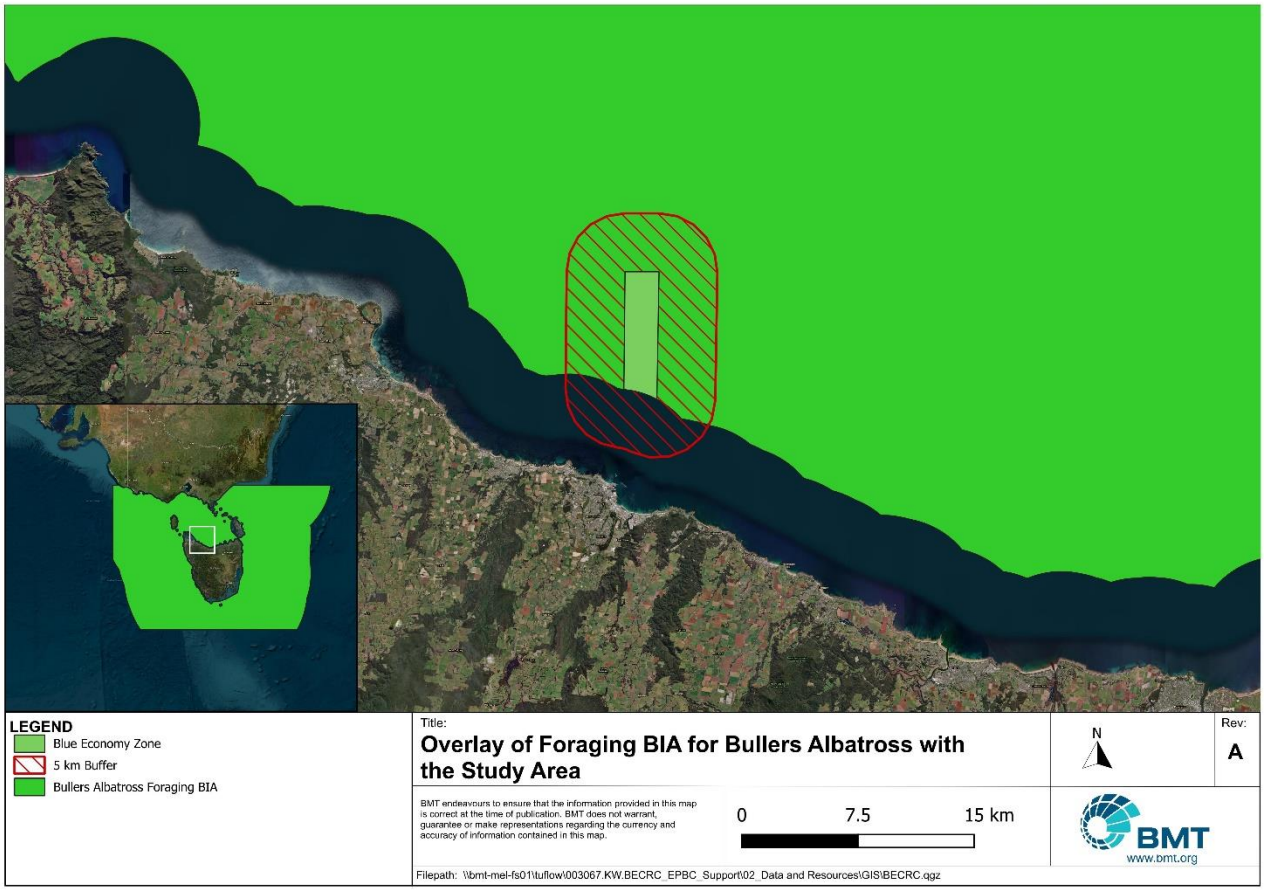

Figure 2.7 Biologically important area for the Bullers albatross relative to the Study area

Shy Albatross

The shy albatross 'likely foraging' area directly overlaps with the Study area (Figure 2.8) and sightings have been recorded approximately 16 km away (ALA 2023). A breeding colony for shy albatrosses is located on Albatross Island, approximately 118 km north-west from the Study area. Shy albatross are known to have wide foraging ranges from their breeding colony and individuals have been identified as utilising the Study area for foraging during incubation periods (Figure 2.9). Individuals have also been recorded to concentrate foraging efforts to the neritic zone (top ocean layer closest to the coastline) along the coast of the Bass Straight (Mason et al. 2023). This along with the proximity of sightings indicates that there is a High likelihood of occurrence for this species in the Study area.

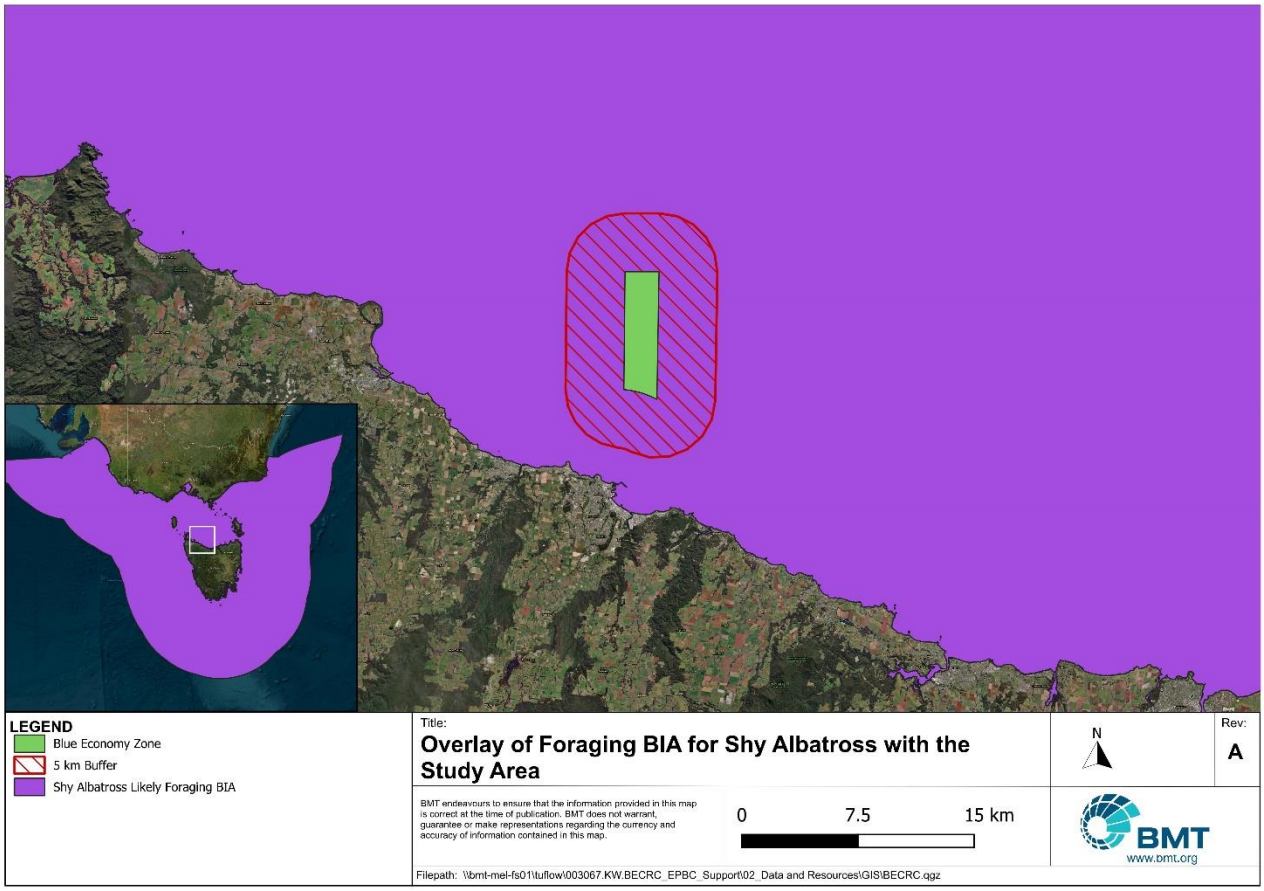

Figure 2.8 Biologically important area for the shy albatross relative to the Study area

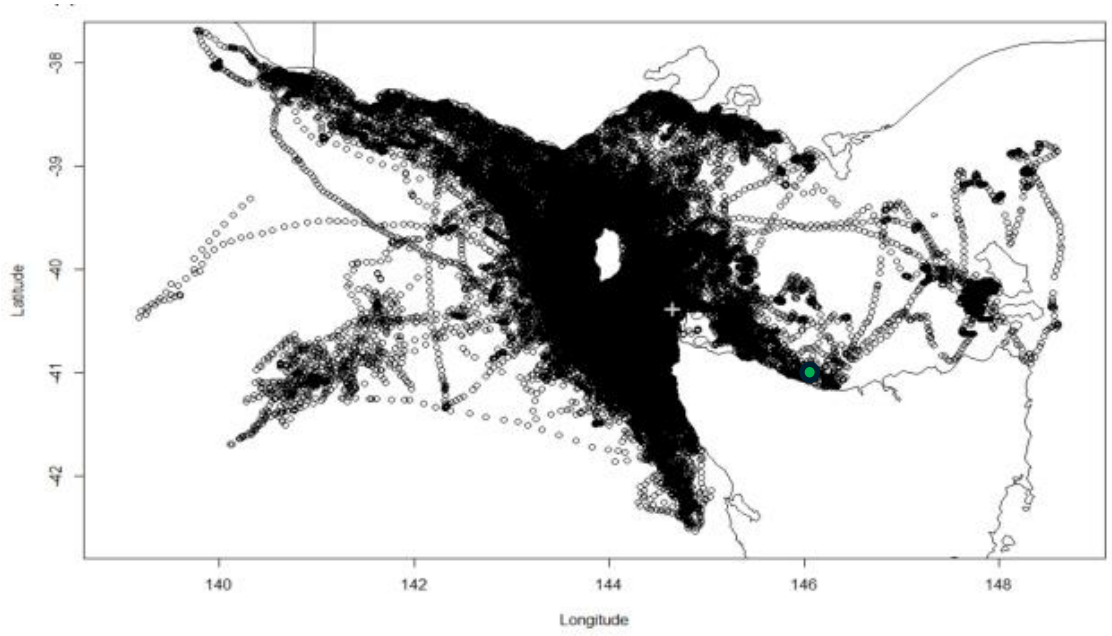

Figure 2.9 Tracks captured for Shy Albatrosses in Mason et al. 2023. Grey symbol (+) represents Albatross Island. Green dot represents Study area location.

Indian Yellow-nosed Albatross

The Indian yellow-nosed albatross is an extremely wide-ranging species with an occurrence range of 35,300,000 km^2. This species breeds on Prince Edward Islands, the Crozet Islands, Kerguelen Island, Amsterdam Island (on the Falaises D'Entrecasteaux) and St Paul Islands in the Indian Ocean. During breeding they continue with relatively long-distance foraging trips of up to 1,500 km from the colony. In general, when adults are foraging at sea they range from South Africa to the Pacific Ocean just beyond New Zealand, between 30°S and 50°S. The foraging BIA for this species that overlaps the Study area (Figure 2.10) represents genral foraging by non-breeding adults. There are no recorded sightings for this species near to the Study area with most occuring along the Victorian shoreline (ALA 2023). Given the lack of direct sightings and the presence of nearby comparable habitat, the likelihood of occurance for this species is Low.

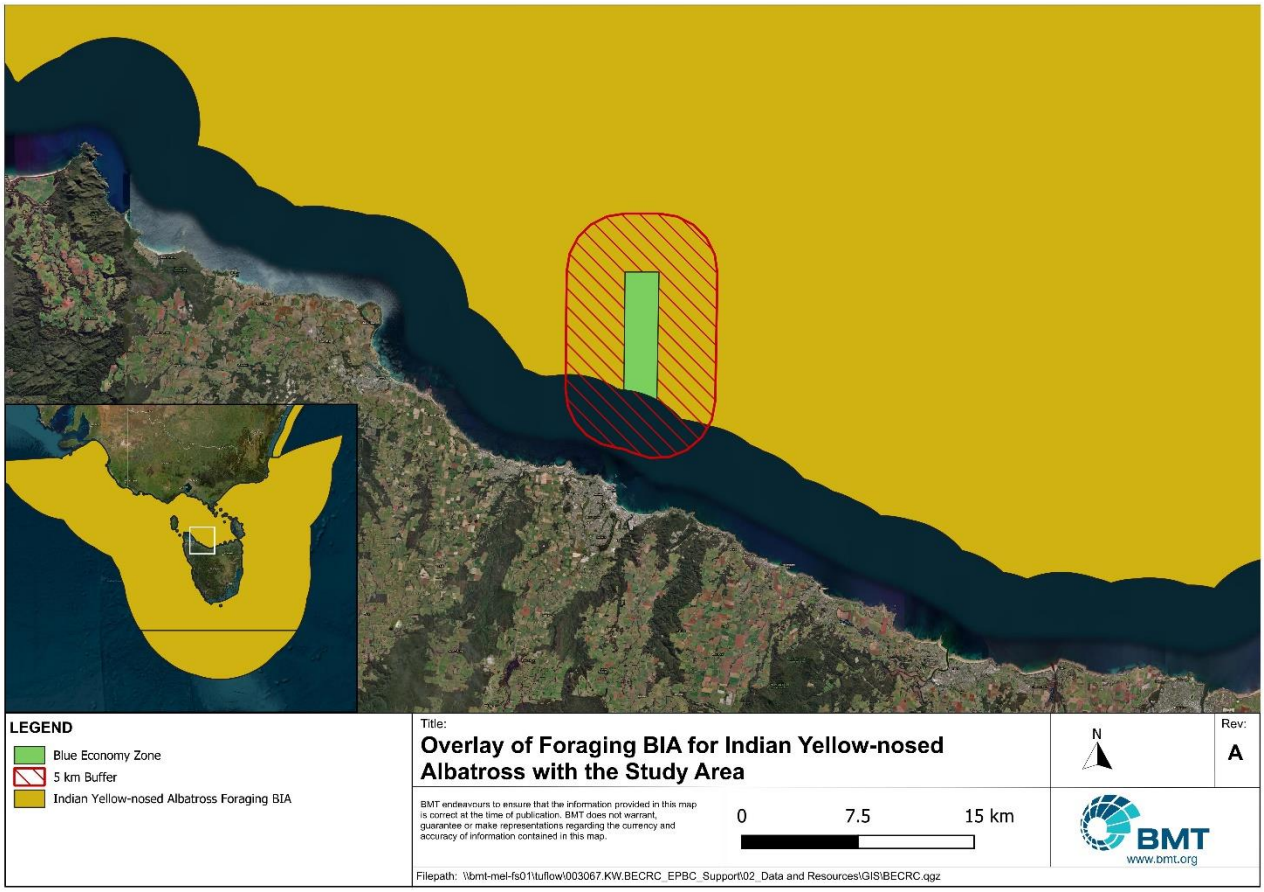

Figure 2.10 Biologically important area for the Indian yellow-nosed albatross relative to the Study area

Black-browed Albatross

Albatrosses and petrels are extremely site-faithful (Bried & Jouventin 1999, Gauthier et al. 2010) and breeding locations and foraging territory are unlikely to shift substantially. The nearest breeding grounds for the black-browned albatross are on Macquarie Island which is over 1774 km south from the Study area. Numerous sightings of this species have been found near to the Study area with one located directly within (ALA 2023). Given the known sightings nearby and that the Study area overlaps the foraging BIA (Figure 2.11), the likelihood of occurrence is High.

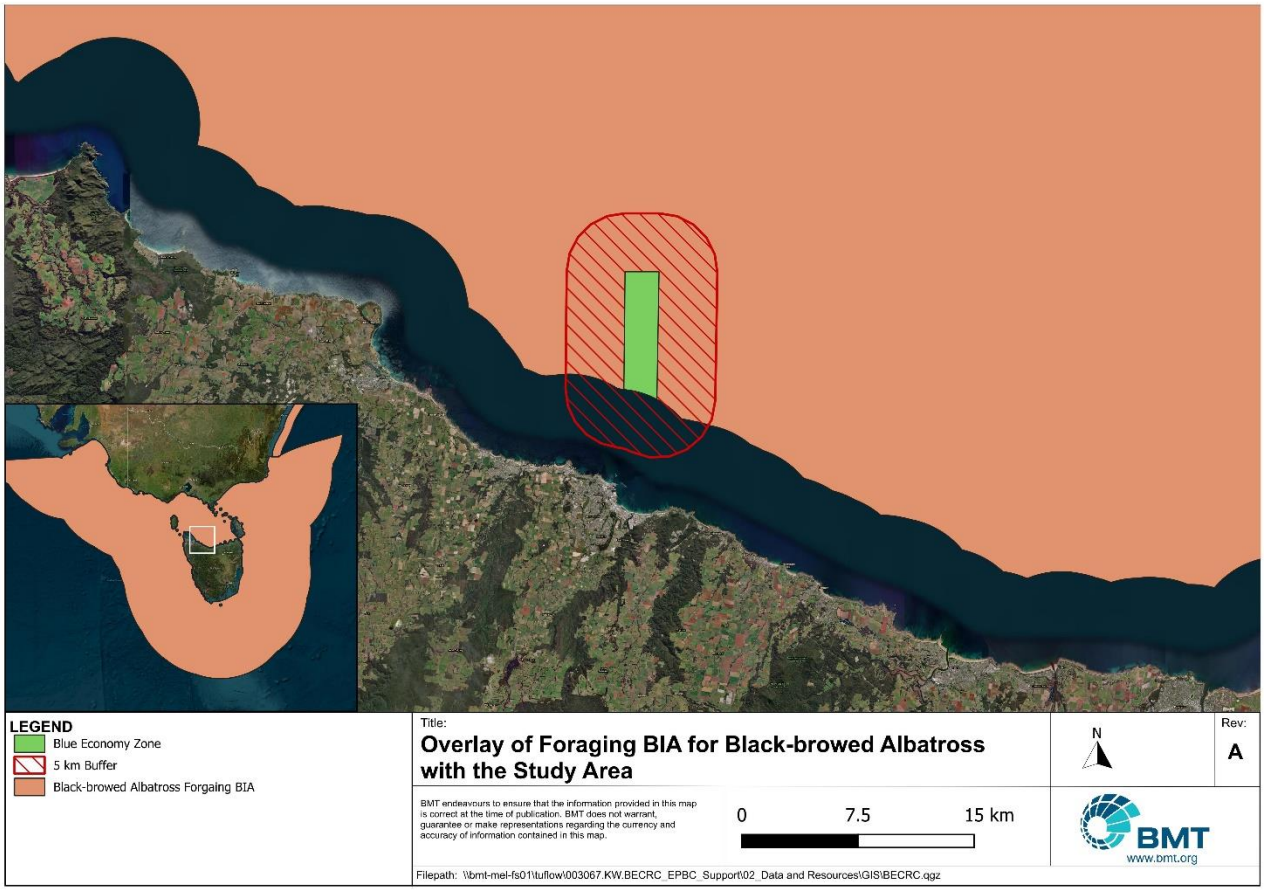

Figure 2.11 Biologically important area for the Black-browed albatross relative to the Study area

Campbell Albatross

Campbell albatross feed by surface-seizing along with shallow dives to depths of up to 5 m preying upon primarily fish (~93%) with small amounts of cephalopods, crustaceans, and carrion (Prince et al. 1994, Harper 1987, Cherel et al. 1999). Breeding is restricted to Campbell Island and foraging ranges from these colonies, although long (up to 2000 km) are sufficiently distanced from the Study area to mitigate any impacts from the proposed project. Little is known about the exact distribution of juveniles or adults outside the breeding season. Adolescent individuals generally appear between 28°S - 43°S, but have a wide longitudinal range, between 115°E - 174°W in summer and 115°E - 146°W in winter (ACAP 2009). During winter, adults are wide ranging throughout the Tasman sea and the south-western Pacific Ocean east of New Zealand, however in summer the distribution of both breeding and non-breeding birds becomes more constricted between 32°S to 44°S (ACAP 2009). The Study area overlaps the foraging BIA (Figure 2.12), but individuals that may be present for foraging would most likely be adults during winter months. There have been no direct sightings recorded for this species within or near to the Study area (ALA 2023). As adult individuals for this species are known to have wide foraging ranges and there are no direct sightings to indicate preference for this area, the likelihood of occurrence for this species is Low.

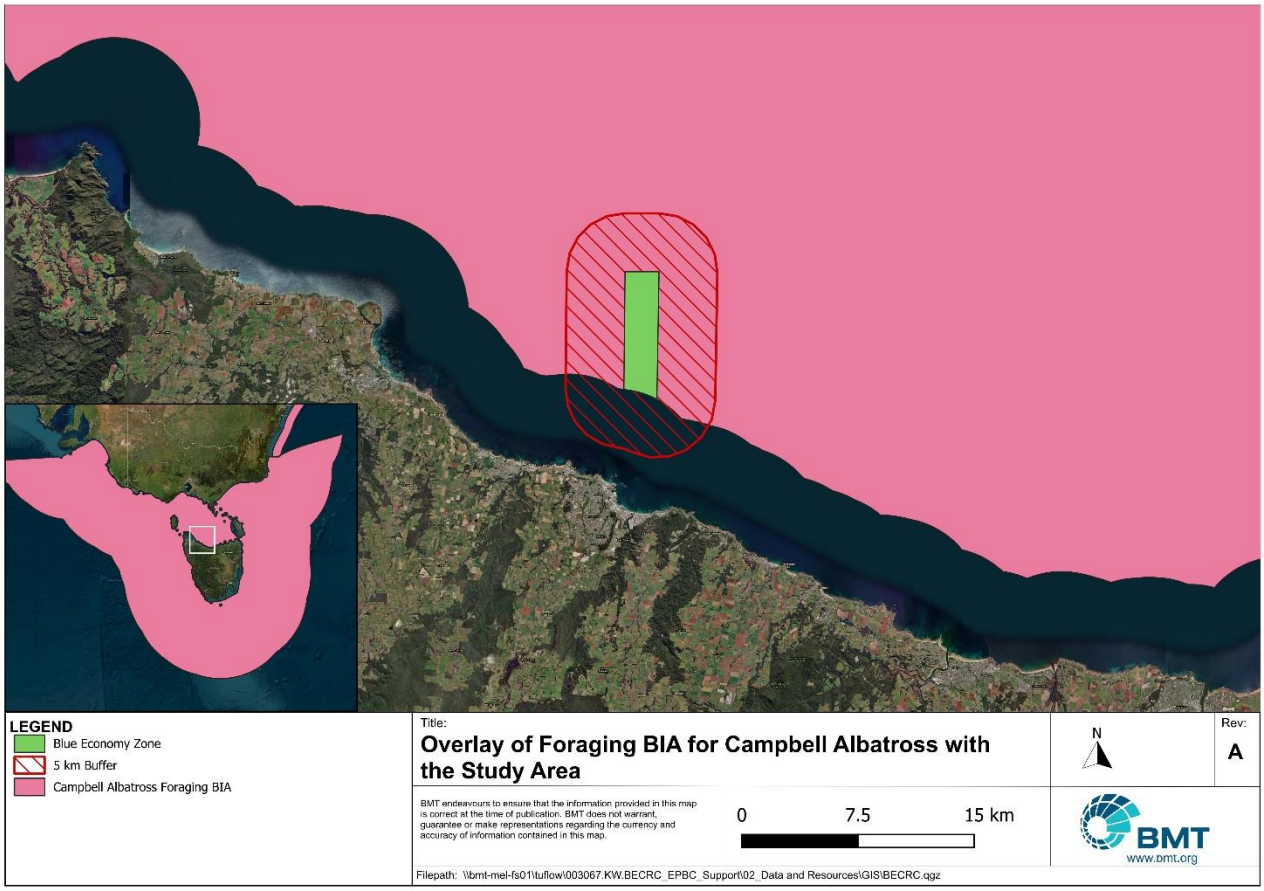

Figure 2.12 Biologically important areas for the Campbell albatross relative to the Study Area

Other Seabirds and Migratory Shorebirds

Seabird species may inhabit Bass Strait year-round, seasonally, or as transient migrants. Breeding populations of several species occur on the offshore islands of Albatross Island, the Hummock Island and Hunter Island, with smaller populations throughout in areas like Lillico, Tasmania. The Study area also spatially overlaps several BIAs, mostly related to foraging (see Table 2.6).

Many species have been recorded within 5 km of the Study area, but suitable habitat for species may not be present directly around the Study area, or the Study area may be outside the common range for many species. For example, albatross species are pelagic, and the Study area lacks the species preferred open ocean habitat. As such, occurrence of many species within the Study area would likely represent transient individuals, and therefore would be Low.

2.2 Threatened ecological communities

Three listed threatened ecological communities (TECs) were identified in the PMST as potentially occurring in the Study area:

- Giant Kelp Marine Forests of South East Australia (Endangered)
- Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata* / *E. brookeriana*) (Critically Endangered)
- Tasmanian white gum (*Eucalyptus viminalis*) wet forest (Critically Endangered)

The Giant Kelp Marine Forests of South East Australia community may occur within the southern side of the buffer area. The closest area identified as having giant kelp is Black Reef, approximately 1.1 km to the south of the buffer area. Although detailed information on flora present in the offshore Study area is sparse, most macrophyte communities in the region are restricted to depths of less than 30 m. The Project is not anticipated to result in any significant impacts to TECs due to the depth of the waters in the Study area.

Although identified in the PMST, the other two TECs are terrestrial and will not be impacted from the proposed activities in the Study area.

2.3 Wetlands of international importance

No Ramsar wetlands of international importance were identified as potentially occurring in the Study area (see Annex A).

2.4 World Heritage properties and National Heritage places

No World Heritage properties or Natural Heritage places were identified as potentially occurring in the Study area (see Annex A).

2.5 The Commonwealth marine environment

The BEZ is located entirely outside of Tasmanian territorial waters, within the Commonwealth marine area. The 5 km buffer area does intersect with Tasmanian state waters.

A search of the Underwater Cultural Heritage database on the 02 January 2024 identified two known shipwrecks within the buffer area, the Meteor (ID no. 7501) and the Blythe Star (ID no. 6939). There is a potential for additional previously unknown shipwrecks to be present within the Study area. All shipwrecks are protected by the *Underwater Cultural Heritage Act 2018*.

A search of the Aboriginal Heritage Register did not identify any Aboriginal cultural heritage values within the Study area. However, there remains a potential for Aboriginal cultural heritage values to be present within the Commonwealth marine area. If present, these values are protected by the *Underwater Cultural Heritage Act 2018*.

Further assessment of potential significant impacts to the Commonwealth marine area are considered in Table 3.1.

3 Potential Impacts and Risks

Potential impacts identified as relevant to MNES include:

- Loss of marine benthic habitat due to mooring activities
- Species behaviour changes due to physical presence of aquaculture pens and vessels
- Reduced marine water quality (pollution)
- Introduction of invasive marine species (IMS)
- Introduction of pathogens and parasites to wild fish populations
- Escape of non-native species
- Marine fauna injury or death due to vessel collision
- Entanglement risk with fish pens or mooring lines
- Changes in local wildlife (e.g. attraction of predators, attraction to artificial lighting)
- Damage to unknown heritage values

Table 3.1 provides an assessment of the potential for significant impacts on MNES from proposed Project activities. Requirements of species recovery plans and conservation advice were considered to identify any conditions that may be applicable to the risk assessment. This assessment has been carried out using the significant impact criteria for MNES as outlined in the Significant Impact Guidelines 1.1 (DoE 2013).

Table 3.1 Assessment of significance of impacts on MNES

Significant Impact Criteria	Assessment
Critically Endangered and Endangered Species	
Lead to a long-term decrease in the size of a population	**Marine Mammals** ***Unlikely*** The PMST identified two endangered whale species as potentially occurring within the Study area, the SRW and the blue whale (more specifically the PBW subspecies). Entanglement/marine debris and vessel disturbance are listed as threats to the recovery of SRWs (DSEWPaC 2012) and PBWs (DoE 2015). Aquaculture equipment has also been identified as having the potential to displace whales as well (DoE 2015). The Study area does overlap important BIAs for both the PBW and SRW. However, these are highly mobile species and the Study area is only a small component of the area travelled or used by these species, reducing the likelihood of disruption of important behaviours or displacement. If any disruption does occur (although unlikely) the impact on individual survival and fitness will be minimal and, in turn, impacts at the population level unlikely. Aquaculture is not known to generate intense or consistently loud underwater sounds or involve large volumes of vessel traffic that may result in habitat displacement relative to other anthropogenic coastal activities in the more general area (e.g. commercial shipping and fishing). The risk of vessel collision with cetaceans is low due to the requirement to adhere to EPBC Regulations 2000 Part 8 Division 8.1 which includes requirements for vessels to maintain slow speeds less than 6 knots within 300 m of cetaceans and maintain minimum distances from any cetaceans (50 m for dolphin and 100 m for whales). There is the potential for wider, more indirect ecosystem effects on marine mammals due to aquaculture in the form of food-web alterations (Black 2001; Kaiser 2001; Würsig & Gailey 2002; Kemper et al. 2003). However, in the open ocean environment and such a short timeframe, this impact is likely to be localised to within several hundred metres of the farm. In general, the large-scale home ranges of PBWs and SRWs ensures that any localised impacts to potential prey resources would not have any substantial flow-on effects to the population. Generally, larger whales are considered more susceptible to entanglement in marine gear from fisheries and aquaculture (e.g. ropes, buoys) than other marine mammals. Entanglement risk can be reduced through proper siting, appropriate design and maintenance features, and strict operational procedures and protocols. The risk of entanglement with infrastructure is considered very low based on expected frequencies and on limited interaction with marine farming infrastructure elsewhere (Price et al. 2017). Risk will be further

Significant Impact Criteria	Assessment
	mitigated by ensuring all pens and moorings meet the technical standards of the Norwegian Standard for Floating Aquaculture Farms (NS 9415) and daily maintenance procedures and frequent structural integrity monitoring. All Project infrastructure will be removed at the end of the trial period (three years).
	Seabirds ***Unlikely*** Artificial lighting, noise emissions and the presence of the infrastructure/vessels from the Project may attract, disorient and/or disrupt foraging efforts of seabirds. The Study area is identified as likely foraging habitat for shy albatross. However, given that this species is highly mobile and that the Study area will comprise a very small proportion of the foraging for this species and others, any impacts are expected be negligible. Entanglement in debris associated with the operation of a marine farm can significantly affect seabirds. Risk will vary with the type of farming method (e.g. fish versus seaweed). Bird entanglement in permanent net structures could potentially occur within the nets holding the fish and the above water bird nets, used to stop birds diving into the fish pens. Individuals may be drawn to the area due to the increased presence of fish (farmed and wild) and during fish feeding events during which birds may become entangled, potentially leading to individual fatalities. However, excess feed for fish is unlikely to accumulate and act as an additional draw for bird species or wild fish species as it is done by specialised feed distribution systems in line with fish behaviour and in patterns that minimise wastage (small amounts often etc.), and feed pellets will sink. Daily maintenance procedures and frequent structural integrity monitoring will be undertaken to avoid degradation that may increase the entanglement risk due to loose netting. In addition, a waste management plan will ensure minimal or no loss of debris from all operations. Given the relatively small number of individuals expected to be present in and around the Study area and the regular upkeep of farm infrastructure, decreases in a population as a result of this Project are expected to be minimal and will therefore not have long term impacts on a population. Albatross primarily take prey from the water surface, and so would most likely take wild fish attracted to the farms as opposed to fish or feed in the farms themselves. Given their feeding habits, and the low rates of food loss expected, the risk of entanglement is likely to be very low. It is not clear that species such as the southern giant-petrel that are attracted to fisheries vessels would also be attracted to fish pens, but it is a possibility. However, given the relatively small number of individuals expected to be present in and around the Study area the risk of entanglement is likely to be very low and not result in a long-term decrease in the size of critically endangered and endangered seabird populations. All Project infrastructure will be removed at the end of the trial period (three years).

Significant Impact Criteria	Assessment
	Shorebirds ***Unlikely*** Although shorebirds do not use the Study Area for foraging or breeding, they may move through it during migrations between breeding and non-breeding habitat. Light emissions, including disturbance from vessels, may disorient these species and cause them to alter their flight path to avoid them. However, as the Study area is small, relative to the distances shorebirds travel during migrations, potential detours to avoid light are unlikely to increase their energy expenditure enough to reduce fitness or survival, and therefore are unlikely to result in a long-term decrease in population size of shorebirds. All Project infrastructure will be removed at the end of the trial period (three years).
Reduce the area of occupancy of the species	A reduction in a species area of occupancy requires that a portion of habitat becomes permanently unsuitable and/or unused. **Marine Mammals** ***Unlikely*** It is unlikely that Project activities will reduce the occupancy of endangered species given the localised extent and short (temporary) time of the impacts predicted. Endangered cetaceans (PBW and SRW) may be temporarily disturbed within their BIAs during the Project due to vessel activity and pen location. However, given the disturbance during the Project will be limited, it is unlikely that Project activities will cause any adverse effects to the large spatial extent of the area of occupancy for these endangered species. All Project infrastructure will be removed at the end of the trial period (three years).
	Seabirds and Shorebirds ***Unlikely*** It is unlikely that Project activities will reduce the occupancy of critically endangered and endangered species given the localised extent and short (temporary) time of the impacts predicted. Endangered seabirds and shorebirds may be temporarily disturbed within their BIAs during the Project due to vessel activity and pen location. However, the potential for impacts to endangered seabirds and shorebirds that could affect occupancy are not considered to be significant given the magnitude and duration of the impacts and the large spatial extent of the area of occupancy for these endangered species. All Project infrastructure will be removed at the end of the trial period (three years).

Significant Impact Criteria	Assessment
Fragment an existing population into two or more populations	***Unlikely*** An existing population can be fragmented into two or more populations by the creation of physical or behavioural barriers to dispersal. Critically endangered and endangered species that are known to, or are likely to use the Study area (Table 2.1 and Table 2.5) are large and/or mobile enough to move around the Project infrastructure. The potential avoidance of the Study area because of light emissions, noise emissions or vessel disturbance could act as a short-term behavioural barrier to dispersal if individuals are not able to move past the area. However, the Study area will not restrict the dispersal or migratory movements of any critically endangered and endangered species present. No risk has been identified that would result in fragmentation of a species population. All Project infrastructure will be removed at the end of the trial period (three years).
Adversely affect habitat critical to the survival of the species	Habitat that is critical to the survival of a species can be adversely affected if it becomes unused and/or unsuitable. The Study area does not overlap any habitat critical for the survival of the critically endangered or endangered marine mammals or birds that may occur in the area (see Table 2.1 and Table 2.5). The Study area does overlap BIAs for the PBW, SRW and shy albatross. **Marine Mammals** ***Unlikely*** The PBW has a foraging BIA and one distribution BIA overlapping the Study area. The distribution BIA covers a very large spatial extent across Australia, and the foraging BIA encompasses Tasmania, the Bass Strait, and southern Victoria. Similarly, the other endangered cetacean species (the SRW), has large spatial BIAs which have been recently updated. Their migration BIA encompasses the entire Bass Strait (and beyond) and the reproduction BIA encompasses the entire coastline of Tasmania as well as much of the southern mainland coast. Given the seabed disturbance during the Project will be very limited (e.g. from mooring etc), only affecting predetermined sites in the BEZ, that the infrastructure (pens) location represents a small area relative to the overall BIAs and that all infrastructure will be removed at the end of the trial (three years), it is unlikely that this activity will cause any adverse effects to the large spatial extent of habitats that are critical to the survival of these endangered species.
	Seabirds and Shorebirds ***Unlikely***

Significant Impact Criteria	Assessment
	Albatross and petrels can travel extremely long distances and cover large oceanic areas of the Southern Ocean, spending majority of their time at sea, especially during their non-breeding periods, generally coming back to land only to breed (ACAP, 2020). Their large ranges and high spatial and temporal availability of their prey make their distribution within their ranges extremely patchy. For albatross and petrels, habitats regarded as critical to survival include remote offshore islands at identified locations in Australia's jurisdiction (DCCEEW 2022). There are no breeding sites identified within, or in close proximity to the BEZ. The closest critical habitat (Albatross Island for the Shy Albatross) is located ~118 km NW of the Study area. Given the offshore location of the Study area, the proposed Project will have no impact to either seabird or shorebird nesting areas. Similarly, there will be no impact to the air space used by seabirds or shorebirds above the Study area. Therefore, it is unlikely that this activity will cause any adverse impacts on habitat critical to the survival of seabird or shorebird species.
Disrupt the breeding cycle of a population	The breeding cycle of a population can be disrupted if any of the stages from mate-finding to the hatching or birth of offspring is impeded. **Marine Mammals** ***Unlikely*** Of the two endangered whale species potentially occurring within the Study area, only the southern right whale has reproductive habitat that spatially overlaps the 5 km buffer area of the Study area (i.e. not the BEZ). Having procedures in place to minimise vessel disturbance (following the EPBC Act prescribed distances and regulations for conduct of vessels around whales) will reduce the risk of impacts from vessels to unlikely. Entanglement and ingestion of marine debris may result in the loss of reproductive fitness or mortality. However, entanglement risk will be reduced through proper siting, appropriate design and maintenance features, and strict operational procedures and protocols. The risk of entanglement with infrastructure is considered very low based on expected frequencies and on limited interaction with marine farming infrastructure elsewhere (Price et al. 2017). Risk will be further mitigated by ensuring all pens and moorings meet the technical standards of the Norwegian Standard for Floating Aquaculture Farms (NS 9415) and daily maintenance procedures and frequent structural integrity monitoring. Therefore, it is unlikely that this activity will disrupt the breeding cycle of this population.
	Seabirds ***Unlikely***

Significant Impact Criteria	Assessment
	There are no known significant breeding areas or sites within or near the Study area for any of the critically endangered and endangered species identified. In addition, the disturbance from the Project activities is expected to be minimal. It is thus unlikely that the proposed Project will disrupt the breeding cycle of these populations. **Shorebirds** ***Unlikely*** Although shorebirds do not use the Study area for foraging or breeding, they may move through it during migrations between breeding and non-breeding habitat. Therefore, any barriers to these movements may prevent breeding events. Light emissions, including disturbance from vessels, may disorient these species and cause them to alter their flight path to avoid them. However, as the Study area is small, relative to the distances shorebirds travel during migrations, potential detours to avoid light are unlikely to increase their energy expenditure enough to reduce fitness or survival, and therefore are unlikely to disrupt the breeding cycle of these species. All Project infrastructure will be removed at the end of the trial period (three years).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Marine Mammals** ***Unlikely*** No sensitive seabed features are known or have been observed (Marine Solutions 2024) to occur in the offshore Project Area. Therefore, the Study area is unlikely to decrease the availability or quality of habitat, and in turn, will not cause any species to decline.
	Seabirds and Shorebirds ***Unlikely*** Use of the Study area for fish farm operations is unlikely to modify the area it exists upon to an extent that shy albatross is likely to decline from it. This is due primarily to the availability of ample alternate habitat that exists well within the normal range of foraging for this species. Regular maintenance as well as careful decommissioning programs at the end of Project lifespan (three years) should also lessen any lasting impacts as a result of fish farming activities.
Result in invasive species that are harmful to a critically endangered or endangered species	***Unlikely*** Vessel traffic that already occurs in the area and the regulatory management practices already in place, biosecurity risk associated with vessel movements is expected to be minor.

Significant Impact Criteria	Assessment
becoming established in the endangered or critically endangered species' habitat	Vessels utilised during the Project will: • Abide by the ballast water exchange guidelines defined in the Australian Ballast Water Management Requirements (DAWE 2020), with no discharge of ballast water within 12 nautical miles of land. • Adhere to the National biofouling management guidelines for non-trading vessels (MPSC 2018). Therefore, the introduction and establishment of invasive marine species through biofouling or ballast water discharge that results in impacts to endangered species is extremely unlikely. All previously used equipment or gear will be thoroughly cleaned, and appropriate treatments applied if necessary to reduce the risk of introduction of invasive species. In addition, standard operating procedures that incorporate industry best-practice will be adhered to for transporting stock. Submerged infrastructure may provide artificial habitat for invasive species. However, open ocean sites may be less vulnerable to colonisation by species, as these taxa are unable to incrementally disperse across the kilometres of soft-sediment benthic habitat that typically isolate open ocean sites from coastal source populations. The risk associated with any species that do establish is also likely to be mitigated to some degree by an operational need to maintain a low level of fouling on nets and farm structures. The Project is unlikely to result in the introduction and establishment of invasive species that are harmful to any critically endangered or endangered species or their habitat.
Introduce disease that may cause the species to decline	***Unlikely*** Disease-causing pathogens in marine environments, including bacteria, viruses, protozoa, and fungi, can occur naturally, or can be introduced from infected hosts or from other contaminants. Disease creates a health risk to marine fauna that can reduces the survival rate and/or breeding success of the population, leading to a population decline. Maintenance of a high health status in farmed fish reduces their susceptibility to putative pathogens. All fish released as part of the Project will be certified healthy prior to release and a site-specific Biosecurity Management Plan will be developed to mitigate risks for each farmed species, including effective disease surveillance to help reduce the risks of establishment of new diseases. The establishment of the offshore BEZ has several advantages with regards to reducing the risk of disease, particularly in relation to improved water quality, large buffer zones between the site and other farming zones, and increased water depth reducing proximity to bottom dwelling fishes which can act as vectors.

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	Therefore, with the offshore location of the Project and the proposed mitigation measures, including regular freshwater bathing for the preventative management of parasites and other diseases, the introduction of diseases that could cause critically endangered or endangered species to decline is extremely unlikely.
Interfere with the recovery of the species	***Unlikely*** Recovery plans, conservation management plans and Threatened Species Scientific Committee (TSSC) approved conservation advice for the critically endangered and endangered species known, likely or that may occur in the Study area, identify the following threatening processes that are relevant to the Project: • Marine mammals – entanglement (aquaculture equipment and marine debris), vessel disturbance, noise interference and habitat modification (infrastructure / coastal development, chemical discharge). • Seabirds – marine pollution (chemicals, debris) and marine infrastructure interactions (including artificial lighting). Impacts within the Study area could have adverse impacts on these species. However, the Project is not expected to seriously impact upon breeding behaviours, nor will it sufficiently decrease or isolate foraging areas to the extent that it is expected to interfere with species recovery. Impacts are considered minor, temporary and/or intermittent, highly localised, and with control measures in place are unlikely to interfere with the recovery of any species.
Vulnerable Species	
Lead to a long-term decrease in the size of an important population of a species	**Marine Mammals** ***Unlikely*** Two vulnerable cetacean species, sei and fin whales, were identified in the EPBC PMST to potentially occur within the Study area. However, there are no known important populations off the coast of Tasmania, including the Study area. Given standard industry controls and additional measures to prevent entanglement, it is highly unlikely that the Project will lead to any long-term decrease in size of their populations. Aquaculture is not known to generate intense or consistently loud underwater sounds or involve large volumes of vessel traffic that may result in habitat displacement relative to other anthropogenic coastal activities in the more general area (e.g. commercial shipping and fishing). The risk of vessel collision with cetaceans is low due to the requirement to adhere to EPBC Regulations 2000 Part 8 Division 8.1 which includes requirements for vessels to maintain slow speeds less than 6 knots within 300 m of cetaceans and maintain minimum distances from any cetaceans (50 m for dolphin and 100 m for whales).

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	Generally, larger whales are considered more susceptible to entanglement in marine gear from fisheries and aquaculture (e.g. ropes, buoys) than other marine mammals. Entanglement risk can be reduced through proper siting, appropriate design and maintenance features, and strict operational procedures and protocols. The risk of entanglement with infrastructure is considered very low based on expected frequencies and on limited interaction with marine farming infrastructure elsewhere (Price et al. 2017). Risk will be further mitigated by ensuring all pens and moorings meet the technical standards of the Norwegian Standard for Floating Aquaculture Farms (NS 9415) and daily maintenance procedures and frequent structural integrity monitoring. All Project infrastructure will be removed at the end of the trial period (three years).
	Marine Reptiles ***Unlikely*** One vulnerable marine turtle species (green turtle) was identified in the EPBC PMST to potentially occur within the Study area. The green turtle is predominately a tropical and subtropical species that nests on sandy beaches. Few sightings have been made around Tasmania, and those recorded have been on the east coast. There are no known important populations within the Study area, and it is likely to be a transitory species. Given that the Study area does not provide critical habitat for this species, the likelihood of encountering turtles is very low, and the management measures to reduce potential impacts on cetaceans will likely benefit this species and reduce the magnitude of potential impact. The risk of the Project leading to a long-term decrease in the size of the populations is considered low.
	Sharks, Rays and Fish ***Unlikely*** One shark (white shark) and one fish (Australian grayling) species were identified as potentially occurring in the Study area. The Australian grayling is a diadromous species that spends most of its life within freshwater habitat but at least part of the larval and/or juvenile stage are spent in coastal seas. Given the offshore location of the BEZ, this species population is unlikely to be significantly impacted by the Project. There are three white shark distribution BIAs that overlap with the Study area. If properly managed through the prompt removal of any dead fish on the bottom of the net(s), then salmon farming activities may not lead to an increase in the presence of sharks in and around the Project. Should a shark approach the Project, no active diversion or harassment of the animals will be practiced, but passive deterrence will occur, and if the species

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	ventures into a situation of potential harm, the crew will immediately advise the Parks & Wildlife Service and/or Department of Natural Resources and Environment Tasmania Marine Conservation Program. White sharks are highly mobile, and the Study area is only a small component of the area travelled or used by these species, reducing the likelihood of disruption of important behaviours or displacement. If any disruption does occur (although unlikely) the impact on individual survival and fitness will be minimal and, in turn, impacts at the population level unlikely. Indirect impacts from benthic habitat disturbance (e.g. anchoring) will be limited to small and defined areas of the seabed, and therefore it unlikely to impact the white shark population more broadly. Based on the expected low frequencies of interaction and the proposed mitigation measures, the Project is unlikely to lead to a long-term decrease in the size of the population of this species. All Project infrastructure will be removed at the end of the trial period (three years).
	Seabirds and Shorebirds ***Unlikely*** Oceanic birds, in particular albatrosses, are known to spend more than 95% of their time traversing the world's oceans in search of prey, and usually only return to land to breed. These species can thus be expected to utilise the Study area for foraging and flyovers only. Individuals may be drawn to the area due to the increased presence of fish and during aquaculture feeding events, of which birds may be entangled potentially leading to individual fatalities. To reduce the risk of excess feed, thereby attracting vulnerable species, feeding will occur during daylight hours, with feeding rates determined by observations of fish behaviour to minimise wastage. The potential for entanglements will be mitigated by net-pen configuration that ensures that all nets are always kept taut and that there will be no tears or holes. Given the relatively small number of sightings and the likelihood of occurrence in and around the Study area and mitigation measures, decreases in populations as a result of this study are expected to be minimal and will therefore not have long term impacts on population. Although shorebirds do not use the Study Area for foraging or breeding, they may move through it during migrations between breeding and non-breeding habitat. Light emissions, including disturbance from vessels, may disorient these species and cause them to alter their flight path to avoid them. However, as the Study area is small, relative to the distances shorebirds travel during migrations, potential detours to avoid light are unlikely to increase their energy expenditure enough to reduce fitness or survival, and therefore are unlikely to result in a long-term decrease in population size of shorebirds.

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	All Project infrastructure will be removed at the end of the trial period (three years).
Reduce the area of occupancy of an important population	**Marine Mammals** ***Unlikely*** Two vulnerable cetacean species (sei and fin whales) were identified in the EPBC PMST to potentially occur within the Study area. However, no specific aggregation areas have been identified within the Study area and they are likely to be transitory species. Given that the Study area does not support important populations of these vulnerable species, their area of occupancy will not be reduced as a result of Project activities.
	Marine Reptiles ***Unlikely*** One vulnerable marine turtle species (green turtle) was identified in the EPBC PMST to potentially occur within the Study area. The green turtle is predominately a tropical and subtropical species that nests on sandy beaches. Few sightings have been made around Tasmania, and those recorded have been on the east coast. There are no known important aggregation sites within the Study area, and it is likely to be a transitory species. Given that the Study area does not support important populations of this vulnerable species, its area of occupancy will not be reduced as a result of Project activities.
	Sharks, Rays and Fish ***Unlikely*** The Australian grayling is a diadromous species that spends most of its life within freshwater habitat but at least part of the larval and/or juvenile stage are spent in coastal seas. Given the offshore location of the BEZ, the area of occupancy of this species will not be reduced as a result of the Project activities. The three white shark distribution BIAs overlap with the Study area. However, no specific aggregation areas have been identified within the Study area. Given the distribution of the white shark covers a large spatial extent in Australian waters, the area of occupancy of this species will not be reduced as a result of Project activities. All Project infrastructure will be removed at the end of the trial period (three years).
	Seabirds and Shorebirds ***Unlikely*** Five species of albatross (black-browed albatross, Campbell albatross, Buller's albatross, wandering albatross, and Indian yellow-nosed albatross) have overlapping BIAs (foraging) with the Study area. However, the BIAs

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	cover a large spatial extent, across the continental shelf waters of Victoria and Tasmania, with no identified aggregation sites within the Study area. Due to the large distribution ranges and lack of aggregation sites, a reduction in the area of occupancy of these vulnerable species and their BIAs is unlikely. All Project infrastructure will be removed at the end of the trial period (three years).
Fragment an existing important population into two or more populations	**Marine Mammals** ***Unlikely*** An existing population can be fragmented into two or more populations by the creation of physical or behavioural barriers to dispersal. Vulnerable marine mammal species that are known to, or are likely to use the Study area (fin and sei whale) are large and/or mobile enough to move around the Project infrastructure. The potential avoidance of the Study area because of light emissions, noise emissions or vessel disturbance could act as a short-term behavioural barrier to dispersal if individuals are not able to move past the area. However, the Study area will not restrict the dispersal or migratory movements of any vulnerable species present. No risk has been identified that would result in fragmentation of a species population.
	Marine Reptiles ***None*** There is not a regional population of green turtles recognised in Tasmania. Any potential disturbances from vessels, pens and activities will be localised. Given the Projects small footprint, the large area of occupancy of the green turtle, and that there are no BIAs of critical habitat, transient individuals will not be displaced and will be able to utilise other areas. Therefore, the Project is unlikely to advance fragmentation of existing populations.
	Sharks, Rays and Fish ***Unlikely*** An existing population can be fragmented into two or more populations by the creation of physical or behavioural barriers to dispersal. The Australian grayling and white shark which are known vulnerable species that are known to, or are likely to use the Study area, are large and/or mobile enough to move around the Project infrastructure. The potential avoidance of the Study area because of light emissions, noise emissions or vessel disturbance could act as a short-term behavioural barrier to dispersal if individuals are not able to move past the area. However, the Study

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	area will not restrict the dispersal or migratory movements. No risk has been identified that would result in fragmentation of a species population.
	Seabirds and Shorebirds ***Unlikely*** An existing population can be fragmented into two or more populations by the creation of physical or behavioural barriers to dispersal. Vulnerable seabird and shorebird species that are known to, or are likely to use the Study area (Table 2.5) are large and/or mobile enough to move around the Project infrastructure. The potential avoidance of the Study area because of light emissions, noise emissions or vessel disturbance could act as a short-term behavioural barrier to dispersal if individuals are not able to move past the area. However, the Study area will not restrict the dispersal or migratory movements of any vulnerable seabird or shorebird species present. No risk has been identified that would result in fragmentation of a species population.
Adversely affect habitat critical to the survival of a species	**Marine Mammals** ***None*** There are no BIAs of critical habitat to the survival of the two vulnerable cetacean species (sei and fin whales) that spatially overlap the Study area; therefore, the Project will not adversely affect habitat critical to the survival of these species.
	Marine Reptiles ***None*** There are no BIAs of critical habitat for the green turtle, therefore the Project will not adversely affect habitat critical to the survival of this species.
	Sharks, Rays and Fish ***Unlikely*** There are no BIAs of critical habitat to the survival of the white shark that spatially overlaps the Study area; therefore, the Project will not adversely affect habitat critical to the survival of this species. The white shark does have a BIA for distribution, where the distribution covers the entire Study area, as well as encompasses Tasmania, the Bass Strait, and southern Victoria.

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	Given the seabed disturbance during the Project will be very limited (e.g. from mooring etc), only affecting predetermined sites in the BEZ, and that the infrastructure (pens) location represents a small area relative to the overall BIAs, it is unlikely that this activity will cause any adverse effects to the large spatial extent of habitats that are critical to the survival of this vulnerable species.
	Seabirds and Shorebirds ***Unlikely*** There are no BIAs of critical habitat to the survival of the vulnerable seabird and shorebird species, however there are five species of albatross which have foraging BIAs which overlap the Study area (Table 2.6). Albatross and petrels can travel extremely long distances and cover large oceanic areas of the Southern Ocean, spending majority of their time at sea, especially during their non-breeding periods, generally coming back to land only to breed (ACAP, 2020). Their large ranges and high spatial and temporal availability of their prey make their distribution within their ranges extremely patchy. For albatross and petrels, habitats regarded as critical to survival include remote offshore islands at identified locations in Australia's jurisdiction (DCCEEW 2022). Given the offshore location of the Study area, the proposed Project will have no impact to either seabird or shorebird nesting areas. Similarly, there will be no impact to the air space used by seabirds or shorebirds above the Study area. Therefore, it is unlikely that this activity will cause any adverse impacts on habitat critical to the survival of seabird or shorebird species.
Disrupt the breeding cycle of an important population	**Marine Mammals** ***Unlikely*** Fin and sei whales are not known to have reproductive habitat in the area.
	Marine Reptiles ***None*** There are no documented breeding or nesting areas for green turtles in Tasmania.
	Sharks, Rays and Fish ***Unlikely*** For the Australian grayling, spawning occurs in fresh water. The larvae are then swept downstream to estuaries and move into coastal marine waters, where it is believed they remain for about six months before returning to

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	fresh water. Given the offshore location of the BEZ, the Project is unlikely to significantly disrupt the breeding cycle of this population. There are no known breeding areas or nursery BIAs for the white shark within or near the Study area. Although they may experience some form of disturbance/displacement from the Project activities, given the distribution of the white shark covers a large spatial extent in Australian waters no plausible pathway has been identified for the Project activities to disrupt the breeding cycle of an important population.
	Seabirds ***Unlikely*** There are no known significant breeding areas or sites within or near the Study area for any of the critically endangered and endangered species identified. In addition, the disturbance from the Project activities is expected to be minimal. It is thus unlikely that the proposed Project will disrupt the breeding cycle of these populations. **Shorebirds** ***Unlikely*** Although shorebirds do not use the Study area for foraging or breeding, they may move through it during migrations between breeding and non-breeding habitat. Therefore, any barriers to these movements may prevent breeding events. Light emissions, including disturbance from vessels, may disorient these species and cause them to alter their flight path to avoid them. However, as the Study area is small, relative to the distances shorebirds travel during migrations, potential detours to avoid light are unlikely to increase their energy expenditure enough to reduce fitness or survival, and therefore are unlikely to disrupt the breeding cycle of these species
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Marine Mammals** ***Unlikely*** No sensitive seabed features are known to occur in the offshore Study area. Therefore, the Study area is unlikely to decrease the availability or quality of habitat, and in turn, will not cause any species to decline.
	Marine Reptiles ***Unlikely*** Benthic habitat disturbance will be minor and vessel/pen presence are unlikely to affect the availability or quality of habitat for the green turtle. Few sightings have been made around Tasmania, and those recorded

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	have been on the east coast. There are no known important populations within the Study area, and it is likely to be a transitory species. The Project activities are unlikely to result in a measurable change in the population size of green turtles.
	Sharks, Rays and Fish ***Unlikely*** No sensitive seabed features are known to occur in the offshore Study area. Therefore, the Study area is unlikely to decrease the availability or quality of habitat, and in turn, will not cause any species to decline.
	Seabirds and Shorebirds ***Unlikely*** Use of the Study area for fish farm operations is unlikely to modify the area it exists upon to an extent that the vulnerable albatross species are likely to decline from it. This is due primarily to the availability of ample alternate habitat that exist well with the normal range of foraging for this species. Regular maintenance as well as careful decommissioning programs at the end of study lifespan should also lessen any lasting impacts as a result of fish farming activities.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	***Unlikely*** A Biosecurity Management Plan will be developed for each farmed species to address potential biosecurity risks. In addition, vessels utilised during the Project will: • Abide by the ballast water exchange guidelines defined in the Australian Ballast Water Management Requirements (DAWE 2020), with no discharge of ballast water within 12 nautical miles of land. • Adhere to the National biofouling management guidelines for non-trading vessels (MPSC 2018). Therefore, the introduction and establishment of invasive marine species through biofouling or ballast water discharge that results in impacts to migratory species is extremely unlikely.
Introduce disease that may cause the species to decline	***Unlikely*** With the offshore location of the Project and the proposed mitigation measures, including regular freshwater bathing for the preventative management of parasites and other diseases, the introduction of diseases that could cause vulnerable species to decline is extremely unlikely.
Interfere substantially with the recovery of the species	***Unlikely***

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	Recovery plans, conservation management plans and Threatened Species Scientific Committee (TSSC) approved conservation advice for the vulnerable species known, likely or that may occur in the Study area, identify the following threatening processes that are relevant to the Project: • Marine mammals – entanglement (aquaculture equipment and marine debris), vessel disturbance, noise interference and habitat modification (infrastructure / coastal development, chemical discharge). • Marine reptiles - entanglement (aquaculture equipment and marine debris), vessel disturbance, noise interference and habitat modification (infrastructure / coastal development, chemical discharge). • Sharks, rays, and fish - entanglement (aquaculture equipment and marine debris), vessel disturbance, noise interference and habitat modification (infrastructure / coastal development, chemical discharge). • Seabirds – marine pollution (chemicals, debris) and marine infrastructure interactions (including artificial lighting). Impacts within the Study area could have adverse impacts on these species. However, the Project is not expected to seriously impact upon breeding behaviours, nor will it sufficiently decrease or isolate foraging areas to the extent that it is expected to interfere with species recovery. Impacts are considered minor, temporary and/or intermittent, highly localised, and with control measures in place are unlikely to interfere with the recovery of any species.
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	***Unlikely*** The PMST report of the Study area listed the following number of marine migratory species: • Eight cetacean species • One marine turtle species • Three shark species • 29 seabird/shorebird species For the migratory species not listed in the previous sections, there is no known critical habitat in the Study area. It is therefore highly unlikely the Project will substantially modify, destroy, or isolate an area of important habitat for any of these migratory species.
Result in an invasive species that is harmful to the migratory species becoming established in	***Unlikely*** A Biosecurity Management Plan will be developed for each farmed species to address potential biosecurity risks. In addition, vessels utilised during the Project will:

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an area of important habitat for the migratory species	• Abide by the ballast water exchange guidelines defined in the Australian Ballast Water Management Requirements (DAWE 2020), with no discharge of ballast water within 12 nautical miles of land. • Adhere to the National biofouling management guidelines for non-trading vessels (MPSC 2018). Therefore, the introduction and establishment of invasive marine species through biofouling or ballast water discharge that results in impacts to migratory species is extremely unlikely.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	**Marine Mammals** ***Unlikely*** As discussed above, the Project activities are unlikely to seriously disrupt the lifecycle for listed migratory cetaceans present, given the standard industry controls and additional control measures proposed. Further there is no evidence that any of the migratory listed cetaceans meet the criteria of an 'ecologically significant proportion' in the Study area. As for the remaining migratory species, little information is available on the population sizes of killer whales, pygmy right whales, and dusky dolphins in the area, but sighting records suggest that they are transient individuals. The Study area is also not considered to be an important migratory corridor (not a recognised BIA) for the humpback whale and is therefore unlikely to contain an ecological significant proportion of either the Group V (east Australian) population, or the population migrating along Western Australia (Breeding Stock D). Regardless, the proposed activities are not likely to seriously disrupt the lifecycle of these species.
	Marine Reptiles ***Unlikely*** As discussed above, there have been no sightings or historical evidence of green turtles within the Study area. Given that there also are no documented nesting or breeding areas within Tasmania, and no known important populations of green turtles, it is unlikely that the Project will seriously disrupt the lifecycle of this migratory species.
	Sharks, Rays and Fish ***Unlikely*** There are three migratory species which overlap the Study area: the white shark, shortfin mako, and the porbeagle. The white shark is highly mobile and have a wide-ranging BIA. Given the small size of the Study area it is unlikely the Project will seriously disrupt the lifecycle of a significant proportion of this species.

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	The short fin mako is also highly mobile and has only been sighted once in the area previously, similarly it is unlikely the Project will seriously disrupt the lifecycle of this species, due to its wide-ranging migratory behaviour. The porbeagle has a generalist diet and habitat strategies which make them highly likely to successfully adapt to changing environmental conditions. Given their extensive distribution, migrations and that they have a broad temperature tolerance, it is also unlikely that this species will be significantly impacted.
	Seabirds and Shorebirds ***Unlikely*** There are 29 migratory seabird and shorebirds that overlap the Study area. Some species (shy albatross, black browed albatross, and wandering albatross) were rated moderate to high when considering likelihood of occurrence, due to the number of previous sightings and foraging behaviour in the vicinity of the Study area. However, as discussed above it is unlikely that the Project will significantly impact nesting due to its offshore location, breeding due to the location of known breeding areas, and its likely that the Study area will mostly be used for foraging and transiting during migration periods. Given the size of the Study area and the likelihood that it will not impact on seabird and shorebird species in these aspects, it is unlikely that the Project will seriously disrupt the lifecycle of a significant proportion of these species.
Critically endangered and endangered ecological communities	
Reduce the extent of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** The site of the BEZ has been found to be largely unsuitable for the occurrence of the community based on the sandy substrate and water depths. Benthic surveys of the Study area have also confirmed that lack of presence of this TEC (Marine Solutions 2024). The closest area identified as having giant kelp is Black Reef (does not meet the criteria of a TEC), approximately 1.1 km to the south of the buffer area and ~5 km south of the BEZ. Although detailed information on flora present in the offshore Study area is sparse, most macrophyte communities in the region are restricted to depths of less than 30 m. The Project is not anticipated to result in reduction of the extent of this community. In relation of changes in nutrient levels, the expected inputs of the Project to nutrient loads are not expected to have any impact on potential habitat for the community due to the large separation distance (minimum 5 km from potential habitat) and the surrounding volume of water in the oceanic environment for dilution.

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Fragment or increase fragmentation of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Adversely affect habitat critical to the survival of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Modify or destroy abiotic factors (such as water, nutrients, or soil) necessary for an ecological community's survival	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Cause a substantial change in the species composition of an occurrence of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Interfere with the recovery of an ecological community	**Giant Kelp Marine Forests of South East Australia** ***Unlikely*** As above.
Commonwealth Marine Area	
Result in a known or potential pest species becoming established in the Commonwealth marine area	***Unlikely*** The introduction of pest species in the offshore Study area could occur as a result of vessel activities and/or aquaculture infrastructure and species. The Project will use vessels that comply with legislative and standard control measures for managing hull fouling and ballast water. In addition, approved Biosecurity Management Plans will be developed to ensure the likelihood of a pest species becoming established is low.

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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 results	***Unlikely*** Some temporary environmental disturbances may occur as a result of the Project. These disturbances may cause some animals to avoid the offshore Study area. However, given its small size in relation to the extensive distributions of most species, this Project is not expected to have any adverse impact on ecosystem function or integrity within the Commonwealth Marine Area.
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	***Unlikely*** No substantial adverse effects have been identified as a result of the Project and potentially significant impacts on threatened and migratory listed species have been assessed in the previous sections. Impacts resulting from light or noise emissions, planned discharges and accidental releases, or vessels in the offshore Study area are expected to be minor, localised and temporary, and are also unlikely to affect the life cycle or spatial distribution of any threatened or migratory species.
Substantially modify air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity, social amenity or human health	***Unlikely*** Atmospheric emissions have the potential to result in localised reduction in air quality. Similarly, planned discharges and accidental releases could impact the water quality in and around the offshore Study area. These discharge volumes are expected to be small and any effects on water quality would be minor and temporary as it would rapidly dilute in the high-energy waters of Bass Strait. Therefore, the Project is not expected to result in any substantial change in air or water quality and so will not adversely impact 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.	***Unlikely*** There will be no planned discharges of organic chemicals, heavy metals, or other potentially harmful chemicals into the Commonwealth marine environment as a result of the Project. The major treatment option for fish species will be fresh water. However, praziquantel (PZQ) may be used for treating gill/blood fluke in kingfish if necessary, under a valid permit for use. Preliminary studies monitoring PZQ have found that within 3 days post-treatment, PZQ levels were below the detectable limit in water 60 m from the net pen and in all sediment samples (Ido et al. 2019). Oxytetracycline may be used in the even of bacterial infection in salmon; however, given this is a research trial it is highly unlikely. The accidental release of fuel, and other chemicals in the offshore Study area could reduce water and sediment quality. If the accidental release was substantial, it could adversely affect biodiversity and ecological integrity.

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	However, with the well-established preventative control measures and spill response procedures in place, large-scale spills are unlikely, and any impacts will be rapidly mitigated.
Have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck.	***Unlikely*** There are no known underwater heritage values in the BEZ. The closest heritage items to the BEZ are the shipwrecks, the Blythe Star, ~1.7 km west and the Meteor, ~1.7 km southwest (located within the 5 km buffer). Impacts are not expected.

4 Conclusion

The following marine MNES were identified in an EPBC Act Protected Matters Search as potentially occurring in the Study area:

- Thirty-eight (38) listed threatened species (three critically endangered, eight endangered and 27 vulnerable species, three conservation dependent)
- Forty-one (41) migratory species
- One threatened ecological community
- A Commonwealth Marine Area.

This MNES Significant Impact Assessment for the Study area did not identify any impacts associated with the Project that would have a significant adverse impact on the threatened and/or migratory species, threatened community or the Commonwealth Marine Area.

5 References

[ACAP] The Agreement on the Conservation of Albatrosses and Petrels (2020). Albatrosses and Petrels. Available at: Agreement on the Conservation of Albatrosses and Petrels - Albatrosses and Petrels (acap.aq)

Agreement on the Conservation of Albatrosses and Petrels. (2009). Species assessments: Campbell Albatross *Thalassarche impavida*. Downloaded from http://www.acap.aq on 10 December 2023.

[ALA] Atlas of Living Australia (2023). Accessed December 18, 2023, from https://www.ala.org.au/

Andrews-Goff, V., Bestley, S., Gales, N.J. et al. (2018). Humpback whale migrations to Antarctic summer foraging grounds through the southwest Pacific Ocean. Sci Rep 8, 12333 https://doi.org/10.1038/s41598-018-30748-4

Bannister, J. L. (2008). Great whales. Australian Natural History Series pp. 142. CSIRO Publishing.

Bannister, J. L. Population trend in right whales off southern Australia 1993–2010. Unpubl. Rep. Present. to Int. Whal. Comm. Work. South. right whales, 13–16 Sept. 2011, Buenos Aires, Argentina. Available at: https://iwc.int/home

Bauer B. (2011). Marine turtle occurrences in Tasmanian waters: 1846–2010. Kanunnah 4: 48–58. ISSN 1832-536X.

Berlincourt, M. & Arnould, J. (2015). Breeding short-tailed shearwaters buffer local environmental variability in south-eastern Australia by foraging in Antarctic waters. Movement Ecology. 3. 10.1186/s40462-015-0044-7.

Black, K.D. (2001). Sustainability of aquaculture. In: Black KD (ed.) Environmental impacts of aquaculture. Sheffield Academic Press, Sheffield, United Kingdom. Pp. 199–212.

Burnell, S.R. (2001). Aspects of the reproductive biology, movements and site fidelity of right whales off Australia. Journal of Cetacean Research and Management (Special Issue) 2: 89–102.

Cailliet, G.M., Cavanagh, R.D., Kulka, D.W., Stevens, J.D., Soldo, A., Clo, S., Macias, D., Baum, J., Kohin, S., Duarte, A., Holtzhausen, J.A., Acuña, E., Amorim, A. & Domingo, A. (2009). *Isurus oxyrinchus*. The IUCN Red List of Threatened Species 2009: e.T39341A10207466.

Charlton, C., Ward, R., McCauley, R. D., Brownell Jr., R. L., Salgado Kent, C. and Burnell, S. B. (2019). Southern right whale (*Eubalaena australis*), seasonal abundance and distribution at Head of Bight, South Australia. Aquatic Conserv: Mar Freshw Ecosyst. 1-3, DOI: 10.1002/aqc.3032

Cherel, Y., Waugh, S., and Hanchet, S. (1999) Albatross predation of juvenile southern blue whiting (*Micromesistius australis*) on the Campbell Plateau. New Zealand Journal of Marine and Freshwater Research 33 (3): 437-441.

[CoA] Commonwealth of Australia (2012a). Conservation Management Plan for the Southern Right Whale. A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999* 2011–2021. Australian Government, Canberra.

Curtis, T.H., Laporte, S., Cortes, E, DuBeck, G., and McCandless, C. (2016). Status review report: Porbeagle Shark (Lamna nasus). Final Report to National Marine Fisheries Service, Office of Protected Resources. February 2016. 56 pp.

[DAWE] Department of Agriculture, Water and the Environment (2020). Australian Ballast Water Management Requirements Version 8, Canberra. CC BY 3.0.

[DCCEEW] Department of Climate Change, Energy, the Environment and Water (2022). National Recovery Plan for albatrosses and petrels (2022), Commonwealth of Australia 2022 National Recovery Plan for albatrosses and petrels (2022) (dcceew.gov.au)

[DCCEEW] Department of Climate Change, Energy, the Environment and Water (2023). Australia - Species of National Environmental Significance Distributions (public grids). Accessed December 12, 2023, from https://fed.dcceew.gov.au/datasets/erin::australia-species-of-national-environmental-significance-distributions-public-grids/about

Department of Conservation. (n.d.). *Dusky dolphin*. https://www.doc.govt.nz/nature/native-animals/marine-mammals/dolphins/dusky-dolphin/

[DoE] Department of the Environment (2013). Matters of National Environmental Significance Significant Impact Guidelines 1.1. Commonwealth of Australia, Canberra.

[DoE] Department of the Environment (2015). Conservation Management Plan for the Blue Whale - A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia.

[DSEWPaC] Department of Sustainability, Environment, Water, Population and Communities (2012). Conservation Management Plan for the Southern Right Whale. A Recovery Plan under the *Environment Protection and Biodiversity Conservation Act 1999* 2011–2021, Commonwealth of Australia.

Fenwick, G. (1978). Plankton swarms and their predators at the Snares Islands. New Zealand Journal of Marine and Freshwater Research 12: 223-224.

[FRDC] Fisheries Research & Development Corporation (2024). Status of Australian Fish Stocks Reports (Species (fish.gov.au)). Accessed 08 January 2024.

Fromant, A., Schumann, N., Dann, P., Cherel, Y., & Arnould, J. P. (2020). Trophic niches of a seabird assemblage in Bass Strait, south-eastern Australia. *PeerJ*, *8*, e8700.

Fromant, A., Delord, K., Bost, C., Eizenberg, Y., H. Botha, J., A., Cherel, Y., Bustamante, P., Gardner, P., R., Brault-Favrou, M., Arnaud Lec'hvien, John P.,Y., Arnould., (2021). Impact of extreme environmental conditions: Foraging behaviour and trophic ecology responses of a diving seabird, the common diving petrel. Progress in Oceanography, 198, doi: https://doi.org/10.1016/j.pocean.2021.102676.

Gauthier, G., Milot, E., & Weimerskirch, H. (2010). Small-scale dispersal and survival in a long-lived seabird, the wandering albatross. *Journal of Animal Ecology*, *79*(4), 879-887.

Harper, P.C. (1987) Feeding behaviour and other notes on 20 species of Procellariiformes at sea. Notornis 34: 169-192.

Ido, A., Kanemaru, M and Tanioka, Y. (2019). Preliminary Monitoring of Praziquantel in Water and Sediments at a Japanese Amberjack (*Seriola quinqueradiata*) Aquaculture Site. Fishes 2019, 4, 24; doi:10.3390/fishes4020024.

James, G.D. and Stahl, J.C. 2000. Diet of southern Buller's albatross (*Diomedea bulleri bulleri*) and the importance of fishery discards during chick rearing. New Zealand Journal of Marine and Freshwater Research 34: 435-454.

Jefferson, T.A., Webber, M.A. and Pitman, R.L. (2015). Marine Mammals of the World: A Comprehensive Guide to Their Identification, 2nd ed. Elsevier, San Diego, CA. Copyright Elsevier: http://www.elsevier.com

Kaiser, M.J. (2001). Ecological effects of shellfish aquaculture. In: Black KD (ed.) Environmental impacts of aquaculture. Sheffield Academic Press, Sheffield, United Kingdom. pp. 51-75.

Kemper, C.M. (2002). Distribution of the pygmy right whale, *Caperea marginata*, in the Australasian region. Mar. Mammal. Sci. 18 (1), 99–111. Doi: 10.1111/j.1748-7692.2002.tb01021.

Kemper, C.M., Pemberton, D., Cawthorn, M., Heinrich, S., Mann, J., Würsig, B., Shaughnessy, P. and Gales, R. (2003). Aquaculture and marine mammals: co-existence or conflict? In: Gales N, Hindell M, Kirkwood R (eds.) Marine mammals: fisheries, tourism and management issues. Collingwood, VIC, CSIRO Publishing. Pp. 208-224.

Kemper, C. M., Middleton, J. F., & van Ruth, P. D. (2013). Association between pygmy right whales (*Caperea marginata*) and areas of high marine productivity off Australia and New Zealand. New Zealand Journal of Zoology, 40(2), 102–128. https://doi.org/10.1080/03014223.2012.707662

Mackay AI, Bailleul F, Carroll EL, Andrews-Goff V, Baker CS, Bannister J, et al. (2020). Satellite derived offshore migratory movements of southern right whales (*Eubalaena australis*) from Australian and New Zealand wintering grounds. PloS ONE 15(5): e0231577. https://doi.org/10.1371/journal.pone.0231577

Marine Solutions (2024). Marine Environmental Assessment of a Trial Site for a Proposed Blue Economy Zone. Prepared for the Blue Economy CRC April 2024.

Markowitz TM, Harlin AD, Wu¨rsig B, McFadden CJ (2004) Dusky dolphin foraging habitat: overlap with aquaculture in New Zeal and. Aquatic Conservation: Marine and Fresh water Ecosystems 14: 133-149. Marquez, M.R. (1990). FAO Species catalogue, vol. 2, Sea turtles of the world, Food and Agriculture Organization Fisheries Synopsis no. 125, Rome.

Marsh H., Corkeron PJ., Limpus CJ., Shaughnessy PD. And Ward T. (1995). The reptiles and mammals in Australian seas: status and management. In Zann, L and Kailola, P. The State of the Marine Environment Report for Australia: Technical Annex 1: The Marine Environment, Department of Environment, Sport and Territories, Canberra, pp 151-166.

Möller, L.M., Attard, C.R.M., Bilgmann, K., Andrews-Goff, V., Jonsen, I., Paton, D. and M.C. Double (2020). Movements and behaviour of blue whales satellite tagged in an Australian upwelling system. Sci Rep 10, 21165. https://doi.org/10.1038/s41598-020-78143-2

[MPSC] Marine Pest Sectoral Committee (2018). National biofouling management guidelines for non-trading vessels, Department of Agriculture and Water Resources, Canberra, November. CC BY 4.0. D Document modified in 2018 to meet accessibility requirements. National biofouling guidelines for non-trading vessels (marinepests.gov.au)

NOAA Fisheries. (2019, May 24). Fin Whale. NOAA. https://www.fisheries.noaa.gov/species/fin-whale

Noad, M.J., Kniest, E. and Dunlop R.A. (2019). Boom to bust? Implications for the continued rapid growth of the eastern Australian humpback whale population despite the recovery. Population Ecology 61: pp 198–209. Doi: 10.1002/1438-390X.1014

Pearson H.C., Vaughn-Hirshorn, R.L., Srinivasan, M, and Würsig, B. (2012) Avoidance of mussel farms by dusky dolphins (*Lagenorhynchus obscurus*) in New Zealand, New Zealand Journal of Marine and Freshwater Research, 46:4, 567-574, DOI: 10.1080/00288330.2012.712977.

Pirzl, R. (2008). Spatial ecology of *Eubalaena australis*: habitat selection at multiple scales Ph.D. thesis, School of Life and Environmental Sciences, Deakin University, Melbourne.

Price, C.S., Keane, E., Morin, D., Vaccaro, C., Bean, D. and Morris, Jr J.A. (2017). Protected species & marine aquaculture interactions. NOAA Technical Memorandum NOS NCCOS 211. 85 p.

Prince, P.A., Huin, N., and Weimerskirch, H. (1994) Diving depths of albatrosses. Antarctic Science 6 (3): 353-354.

Roberts, C., Stewart, A. L., Struthers, C. D., Barker, J., Kortet, S., Freeborn, M. (2015). The fishes of New Zealand. Vol. 2. Wellington, New Zealand: Te Papa Press. P. 72. ISBN 978-0-9941041-6-8. OCLC 908128805.

Sagar, P. M.; Molloy, J.; Weimerskirch, H.; Warham, J. (2000). “Temporal and age-related changes in survival rates of southern Buller’s albatrosses (*Thalassarche bulleri bulleri*) at the Snares, New Zealand, 1948 to 1997”. Auk. 117 (3): 699–708. Doi:10.1642/0004-8038(2000)117[0699:taarci]2.0.co;2

Watson, M., Westhorpe, I., Bannister, J., Harcourt, R. & Hedley, S. (2014). Australian Marine Mammal Centre Grants Program Final Report for Project 12/29: Assessment of number and distribution of southern right whales in south-east Australia. Available at: https://www.researchgate.net/publication/281307367_Status_Structure_and_Distribution_of_Southern_Right_Whales_in_Southeast_Australia__Phase_2

Würsig, B. and Gailey, G.A. (2002). Marine mammals and aquaculture: conflicts and potential resolutions. In: Stickney RR, McVay JP (eds.) Responsible marine aquaculture. New York, CAP International Press. Pp. 45-59.

Annex A PMST Report

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: 13-Nov-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	36
Listed Migratory Species:	35

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	60
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

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

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature 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	Buffer Status
BIRD			
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

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

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
REPTILE			
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
SHARK			
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area

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

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Migratory Marine Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area

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

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In feature area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche chrysostoma](#) Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Fish			
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area	In buffer area only
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vanacampus poecilolaemus			
Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri			
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus			
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Reptile			
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Balaenoptera physalus			
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Tasmania Natural Gas Project - Stage 2	2001/211	Controlled Action	Post-Approval	In feature area
Not controlled action				
Mixed use residential development (Camdale Development)	2006/2634	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Maintenance dredging of 150,000 cubic metres of sediment in Burnie Port and du	2004/1569	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Removal of Tasmanian blue gums	2004/1356	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Known to occur	In feature area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Foraging	Known to occur	In feature area
Pelagodroma marina White-faced Storm-petrel [1016]	Foraging	Known to occur	In feature area
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche bulleri Bullers Albatross [64460]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In feature area
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In feature area
Sharks			
Carcharodon carcharias White Shark [64470]	Distribution	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In feature area
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area

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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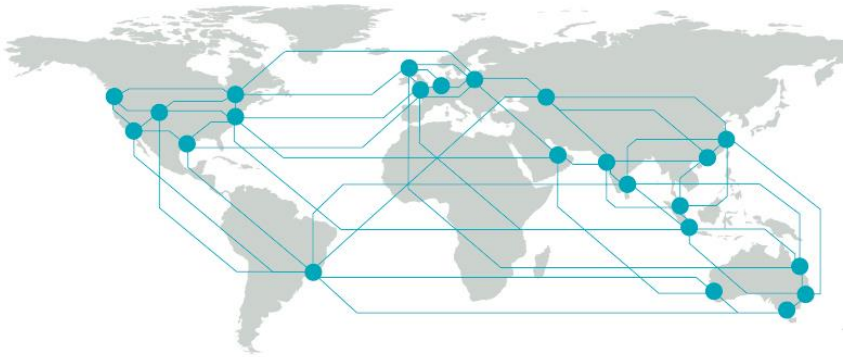

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