



Sydney Water Corporation

Vaucluse Diamond Bay - Concept Design Marine Environment Assessment

May 2020

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1. Project Context

1.1 Proposed Works

In November 2018, the NSW Government announced its commitment to address the flow of untreated wastewater from three ocean outfalls at Vaucluse and Diamond Bay. To address this issue, Sydney Water proposes to construct and operate sewerage infrastructure facilities at Vaucluse and Diamond Bay (the project), which will transfer untreated wastewater through the newly constructed pumping stations and wastewater network to the Bondi Wastewater Treatment Plant for treatment, mitigating the associated risks to water quality and public health.

The project will include the construction and operation of the following key components:

- Sewage pumping station at Parsley Bay, Vaucluse (SP1216)
- Sewage pumping station at Eastern Avenue Reserve, Dover Heights (SP1217)
- Wastewater mains connecting the pumping stations to the existing outfalls and network.

The two sewage pumping stations at Parsley Bay and Eastern Avenue Reserve would be constructed below ground level. The wastewater mains would be constructed by a mix of open trenching and trenchless methods such as horizontal directional drilling or micro tunnelling.

During normal operation, the project will transfer untreated wastewater through the wastewater network to the Bondi Wastewater Treatment Plant for treatment. During wet weather, when the catchment is at full capacity, wastewater may continue to flow through ocean outfalls.

It is anticipated that the proposed works will take place exclusively in the hardstand area and no works will be undertaken in the marine environment.

1.2 Marine Environmental Assessment Scope

Sydney Water has engaged GHD Pty Ltd to prepare a Marine Environment Assessment to survey the existing environment (Figure 1-1) of Parsley Bay to inform project design, including the avoidance of impact to key biodiversity values.

This Marine Assessment Report includes the following:

- Characterisation of the existing environment and biodiversity values including flora and fauna known or likely to occur within the Study area. This included a summary of results of legislative database and literature searches.
- Mapping of relative features of the Study area from field data and desktop data combined, including known distributions of seagrass, seahorse populations and other key biodiversity values relevant to the works.
- Identification of potential environmental hazards.
- Concluding statement regarding potential impacts to Parsley Bay.



Figure 1-1 Parsley Bay Study Area

1.3 Assessment Approach

1.3.1 Desktop Assessment

A desktop assessment was undertaken to identify and collate existing information on the known or predicted environmental values within the Study area and wider region (10 km buffer zone). Searches were conducted for values protected by the EPBC, FM and BC Act. Background information was reviewed from the following sources:

- **BioNet** – the NSW Office of Environment and Heritage (OEH) BioNet was used to identify state significant matters protected under the FM Act and BC Act, including threatened ecological communities, flora and fauna.
- **Key Fish Habitat Maps** – the NSW Department of Primary Industries (DPI) Key Fish Habitat map for Parsley Bay was used to identify watercourses with fish habitat of environmental values within and around the Study area.
- **Seagrass Maps** – the NSW DPI Seagrass maps for Sydney Harbour was used to identify areas of mapped seagrass communities within and around Parsley Bay.
- **Protected Matters Search Tool** – the Commonwealth Department of Environment and Energy (DoEE) Protected Matters Search Tool was used to identify Matters of National Environmental Significance (MNES) protected under the EPBC Act that have the potential to occur within the vicinity of the Study area. The search extent encompassed the Survey area together with a 10 km buffer. Full PMST results can be found in Appendix A.
- **Relevant Previous Studies** – GHD requested any previous relevant studies undertaken in Parsley Bay from Sydney Institute of Marine Science (SIMS), University of Sydney and Woollahra Municipal Council (Council).

1.3.2 Field Survey

To support the desktop assessment in describing the environmental values within and surrounding the Study area, two GHD scientists undertook a field survey to identify marine values on 28th November and 11th December 2019. The survey employed a number of assessment techniques, including:

- Desktop assessment identified the shark net was the primary location likely to support syngnathids. The survey was therefore designed to characterise suitability of habitat and detect the species if possible. This was done via towed and drop camera survey on the beach side of the shark net comprised of two horizontal transect lines along the surface and bottom depths (towed camera) of the shark net and five (5) vertical transect lines (drop camera) from the surface to the bottom of the net to capture depth driven habitat gradient.
- Four (4) belt transect lines along the longitudinal eastern and western banks of the bay using towed underwater camera on snorkel.
- Two (2) line transects in the along the width of the Bay from the eastern to western bank using towed underwater camera on snorkel.
- Drop camera survey at the two (2) intended pile locations. A 360° around the wharf captured the habitat where the pile is likely to be driven.

Transect lines can be found in Figure 1-2.

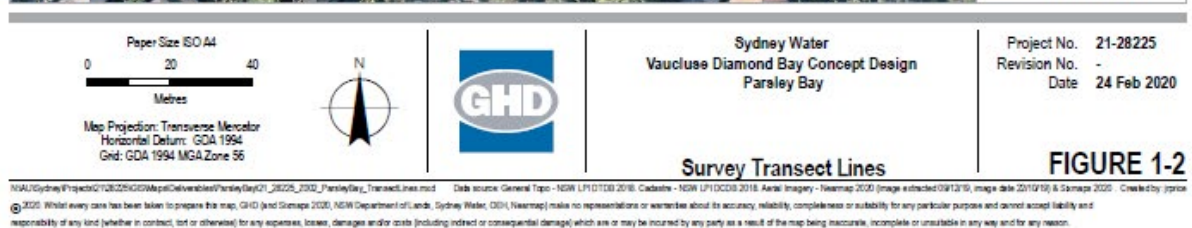


Figure 1-2 Survey Transect Lines

2. Legislative and Policy Environment

2.1 Commonwealth Legislation

2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The purpose of the EPBC Act is to provide a framework for protection of the Australian environment, including its biodiversity and its natural and culturally significant places. Actions deemed likely to cause a significant impact on MNES or the environment of Commonwealth land must undergo an assessment and approval process under the Act. An action includes a proposal, a development, an undertaking, an activity or series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' or a significant impact to the environment of Commonwealth land (even if taken outside Commonwealth land) is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for the Environment. EPBC Act listed threatened species, populations and ecological communities likely to occur were identified (Section 3).

2.2 New South Wales State Legislation

2.2.1 *Fisheries Management Act 1994*

The FM Act aims to conserve, develop and share the fishery resources of the state for the benefit of present and future generations. It provides legal status for aquatic and marine biota of conservation significance in NSW (including fish species and ecological communities), and makes provision for the protection of key fish habitat, marine vegetation, and fish passage by regulating developments and activities through obtaining permits and/or undertaking consultation with the NSW Department of Primary Industry (DPI). Schedule 4, 4A and 5 of the FM Act provides lists of critically endangered, endangered and vulnerable species, populations and ecological communities occurring in NSW. Those of relevance to the Project have been identified and assessed under the FM Act assessment criteria for likelihood of occurrence within the Study area (Section 3).

2.2.2 *Biodiversity Conservation Act 2016*

The BC Act aims to conserve biodiversity at a bioregional and state scale and lists a number of threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened flora, fauna and their habitats. Schedule 1 of the BC Act provides lists of critically endangered, endangered, vulnerable species and populations occurring in NSW. Those species of relevance to the Project have been identified and assessed under the BC Act assessment criteria for likelihood of occurrence within the Study area (Section 3).

2.3 Regional Environment Plan (REP)

2.3.1 *Sydney REP (Sydney Harbour Catchment) 2005*

The Regional Environment Plan (REP) (Sydney Harbour Catchment) 2005 aims to strike a balance between a prosperous harbour, maintaining a health and sustainable waterway environment and promoting recreational access to the foreshore and waterways (Woollahra Municipal Council, 2019). Importantly, the REP outlines Matters for Consideration (Division 2 s21) pertaining to 'Biodiversity, Ecology and Environment Protection' which are relevant for this Project.

3. Existing Environment

3.1 Physical Environment

Parsley Bay is a narrow inlet in the outer reaches of Sydney Harbour estuary and is largely protected by two small sandstone headlands to the east and west of its entrance, mitigating strong wave energy and wind driven swell. Parsley Bay is characterised by calm conditions and is quite shallow, gently sloping to the centre of the Bay, with a periodically occurring small sand wedge on the western shoreline boundary (Figure 3-1). The tidal range during field days was approximately 1.7 m and 1.4 m, respectively. During low tides, water pools in rock crevices exposing intertidal rocky reef environments.

NSW Beach Watch water quality program monitors 132 swimming locations across Sydney, Hunter and Illawarra region as well as 95 swimming locations in partnership with local councils. More broadly, the water quality and ecosystem health of NSW marine and coastal environment, including Parsley Bay is considered good (EPA, 2015). Most of NSW's coastal, estuarine and marine systems are modified and continue to come under increasing pressure from development infringing on aquatic environments. NSW marine and coastal environments are characterised by high biodiversity due to their wide ranging oceanic, shoreline and estuarine habitats combined with the strong influence of both subtropical and temperate currents (EPA, 2015).





Figure 3-1 Parsley Bay Aerials –Study Area Highlighted

3.2 State Protected Areas

Parsley Bay Reserve sits immediately behind Parsley Bay beach. The Study area covered by this assessment is wholly marine, and terrestrial protected areas are not addressed in this Report. See Biodiversity Assessment for terrestrial assessments.

The Study area lies within a Key Fish Habitat (KFH) area that encompasses the waters of Sydney Harbour in its entirety. There are no marine protected areas in the vicinity of the Study area. The nearest aquatic reserve is the North Harbour Aquatic Reserve, approximately 3.8 km north northeast (NNE). The closest Marine Park is Jervis Bay Marine Park, located approximately 200 km south of Parsley Bay.

3.3 Marine Habitats

The Study area is characterised by expanses of coarse grained sandy sediments, with rocky reef and macroalgae beds bordering the sandstone cliffs that line the Bay on the eastern and western boundaries. The Bay also supports seagrass meadows and a number of marine species. Each of the habitat types is discussed below.

3.3.1 Benthic Environment

The benthic environment of the Study area is largely comprised by coarse grain silty sands (in reverse order of dominance) characterised by heavy infaunal burrowing activity (Figure 3-2). Leaf detritus material, including seagrass (*P.australis*) wrack was concentrated in inshore areas, carried by tides. Shell fragments overlaid sediments at the deeper end of the Bay near the shark net. Sporadically occurring sponges, ascidians and soft corals were observed on the boundary transects T1-4.

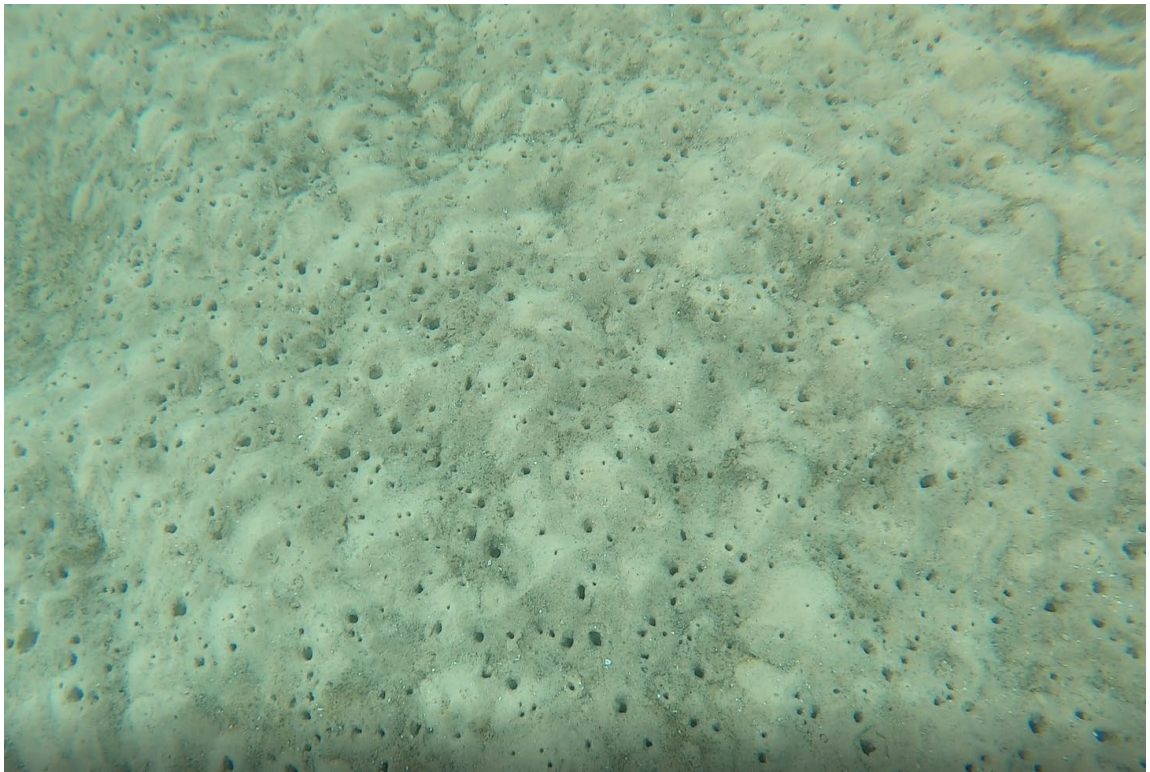


Figure 3-2 Infaunal Burrows - T8

3.3.2 Seagrass Beds

Seagrasses are highly productive marine habitats that play a critical role for ecosystem function, are habitat forming macrophytes, and are sensitive to impacts from coastal development if not appropriately managed. Australia is home to substantial seagrass meadows, with an estimated 51,000 km² of seagrass along its coastline, with 159 km² of that occurring in NSW (OEH, 2017). Three species of seagrass occur in Sydney Harbour estuary, being *Halophila ovalis*, *Zostera capricorni* and *Posidonia australis*. While all seagrasses in NSW are protected, *P. australis* is also a Threatened Ecological Community (TEC), listed as endangered under the EPBC Act.

Aggregated patches of *H.ovalis* (Figure 3-3) and *Z. capricorni* (Figure 3-4) were observed in the Study area, often both species occurring within the same patch. Patches sizes varied from a few shoot clumps among kelp to approximately 30 – 50 m². Seagrass patch size is seasonal, often varying throughout the year, dying back in winter and expanding and flowering in spring. Given the timing of the surveys, the patch sizes mapped are not considered to represent the maximum footprint of seagrasses that occur in the Bay. Desktop mapping (Figure 3-5) provides further indication of seagrass density in the Bay.

Generally epiphyte load (algae/protozoan recruitment) on seagrass leaves was minimal (<20 %) to moderate (~50 % coverage). Moderate epiphyte load was noted only on seagrass patches at the midpoint of T7. Overall, seagrass was considered healthy and in good condition.

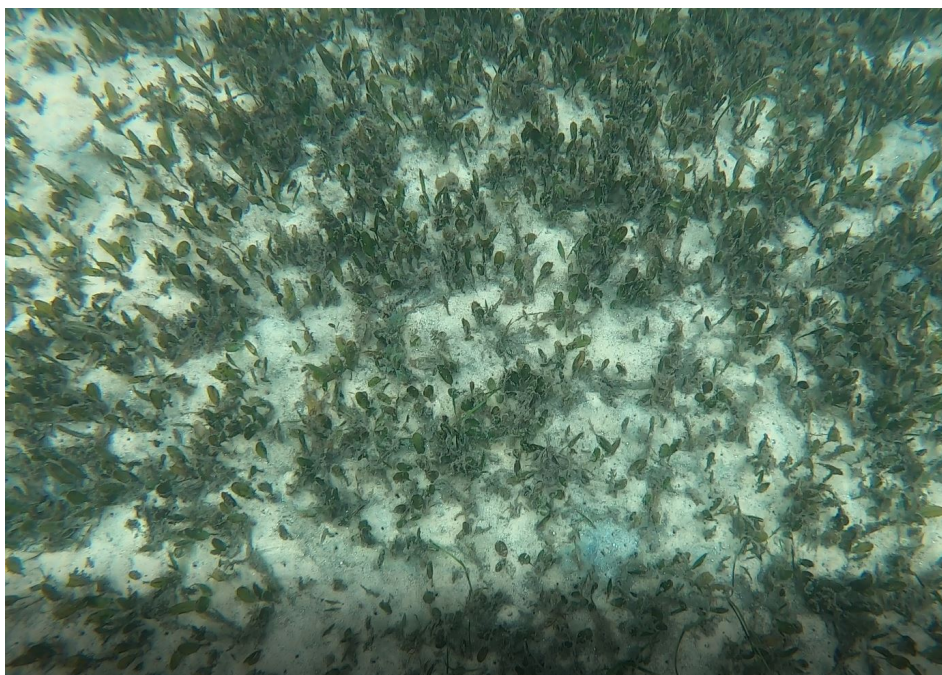


Figure 3-3 *Halophila ovalis* – Mid Point T7

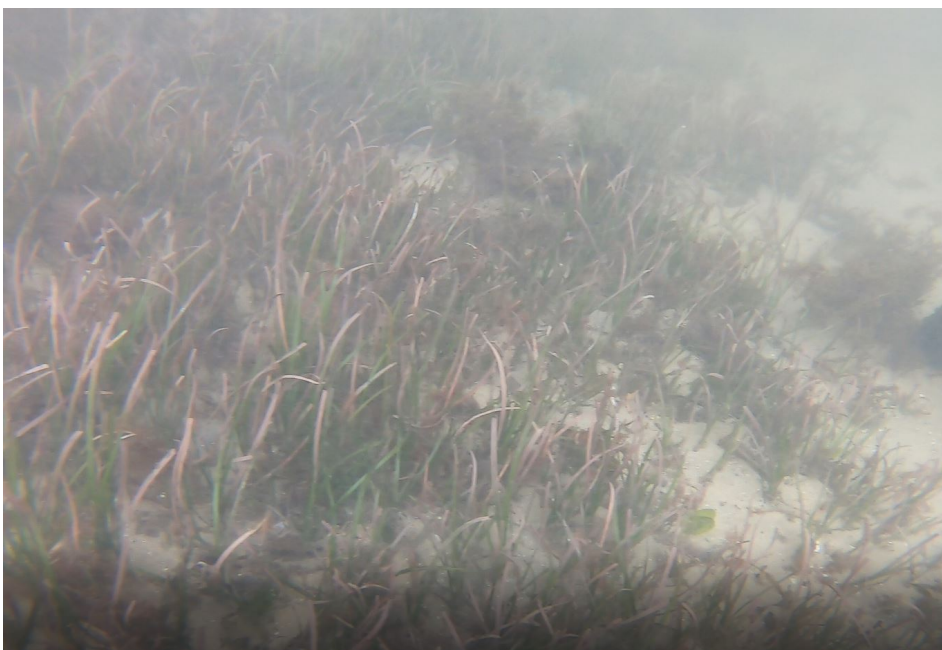


Figure 3-4 *Zostera capricorni* – Eastern Side T7

P. australis was identified through database searches and mapped as **likely to occur** (Table 3-1) in the Study area (Figure 3-5), however the species was not able to be located during the field survey in the mapped location. Nonetheless, *P. australis* wrack was observed on the shore possibly indicating its nearby presence at patches mapped just outside the Study area.

Table 3-1 Threatened Ecological Community

Listed Threatened Ecological Communities	EPBC Status	Type of Presence
<i>Posidonia australis</i> seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur

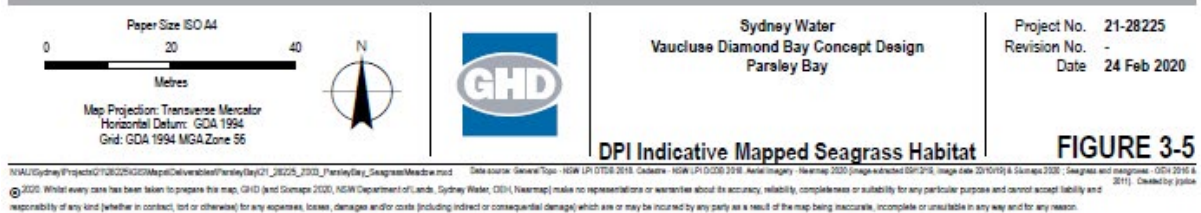
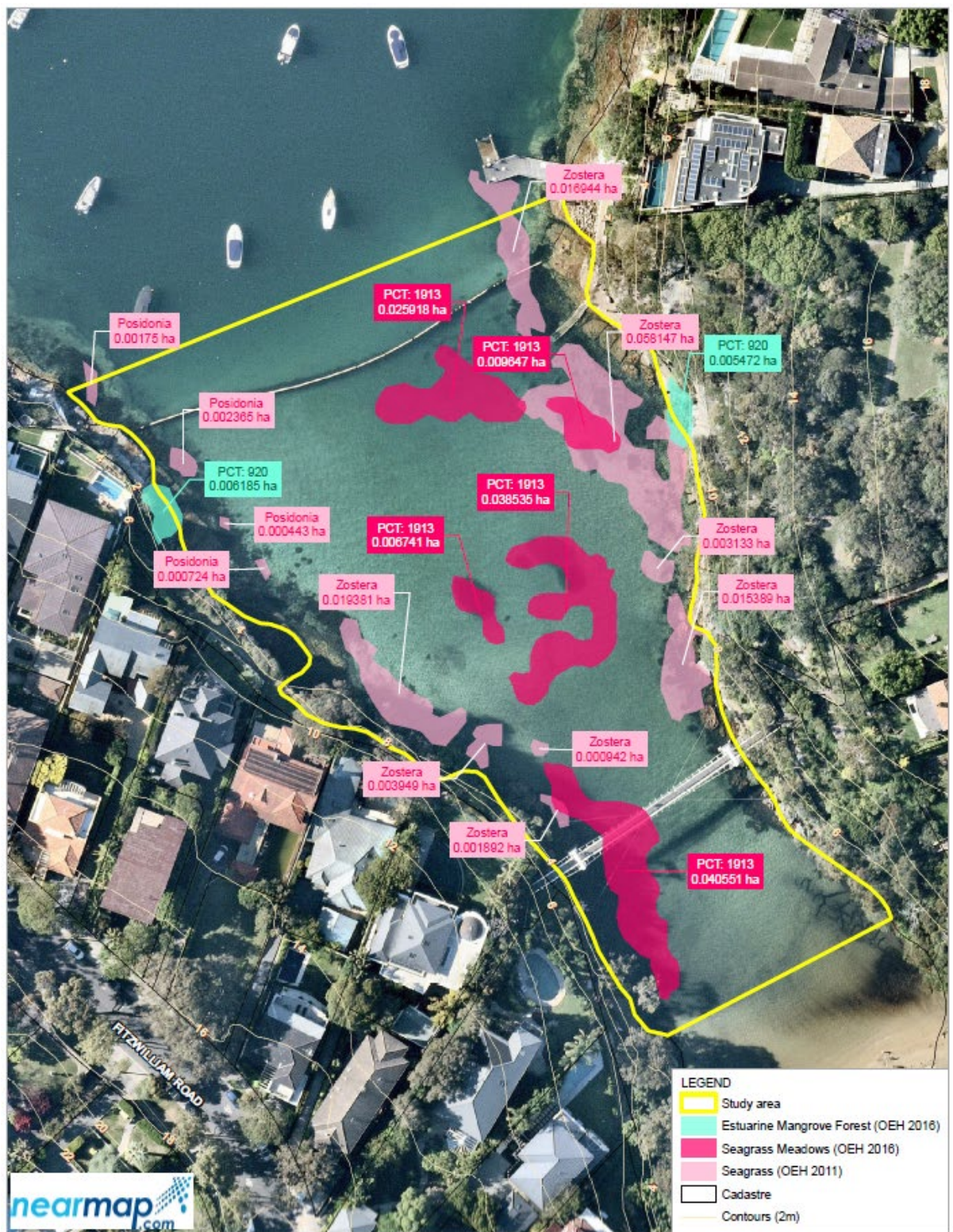


Figure 3-5 DPI Indicative Mapped Seagrass Habitat



Figure 3-6 Field Verified Habitats

3.3.3 Macroalgae Beds

Kelp, from Macroalgae order Laminariales, are dominate habitat formers throughout the world's subtidal rocky reef habitats, including Sydney Harbour (Johnston *et al*, 2015). Macroalgae are significant contributors to marine life, producing 50 – 75 % of the earth's oxygen and uptaking 25 % of carbon dioxide (Miller, 2011). Macroalgae is a considerably fragile habitat that is easily impacted by anthropogenic activities including the development of foreshore structures and siltation. Indirectly, macroalgae is also significantly impacted by shading (Miller, 2011).

Large macroalgae beds lined the eastern and western banks of the bay and was the dominant habitat formation type identified during the survey. There is a significant macroalgae bed located in the area formed between the eastern extent of the shark net and the stairway entrance near the wharf in the upper right corner of the Study area (Figure 3-6). The bottom of the shark net is also colonised by a large macroalgae bed extending a minimum of 2 m landward (Figure 3-7) out from the base of the net along the approximately 80 m stretch of the shark net. The *E.radiata* is growing through excess shark net material that sits on the sea floor.

A number of algal species were identified during the field survey including, *Ecklonia radiata* (Figure 3-7) which was canopy forming and *Sargassum* spp., *Caulerpa* sp. (Figure 3-8) and *Codium* sp. (Figure 3-9).



Figure 3-7 *Ecklonia radiata* - Base of Shark Net (growing through excess net accumulated on sea floor)



Figure 3-8 *Caulerpa filiformis* (centre) with *Corallina officinalis* (top) - T8



Figure 3-9 *Codium fragile* - T7

3.3.4 Subtidal Rocky Reef and Intertidal Rocky Shore

Rocky reef habitats support a range of species and are highly diverse habitats. The eastern and western banks of Parsley Bay habitat includes subtidal rocky reefs and intertidal rocky shores (Figure 3-10). They are frequently colonised by various limpets, Sydney rock oyster (*Saccostrea glomerata*), encrusting algae, sea lettuce (*Ulva lactuca*) and various ascidians and sponges.

Subtidal rocky reef platforms, crevices and caves provided suitable and ideal habitat for the Black Rockcod mapped to occur in the area. The species was not identified during the field survey. A number of adult snapper (*Lutjanidae sp*) and bream (*Acanthopagrus sp*) were observed during the field survey and several yellowfin leather jackets (*Meuschenia trachylepis*) (Figure 3-11). A number of other species were observed on the rocky reefs, or associated kelp (Figure 3-12).

The rocky reef was heavily grazed in places (mostly in the area between the shark net and the wharf just outside the Study area, by *Heliocidaris sp* and *Centrostephanus sp*.



Figure 3-10 Rocky Reef Ledge Habitat in the Study area – T1



Figure 3-11 Yellowfin Leatherjacket (*Meuschenia trachylepis*)

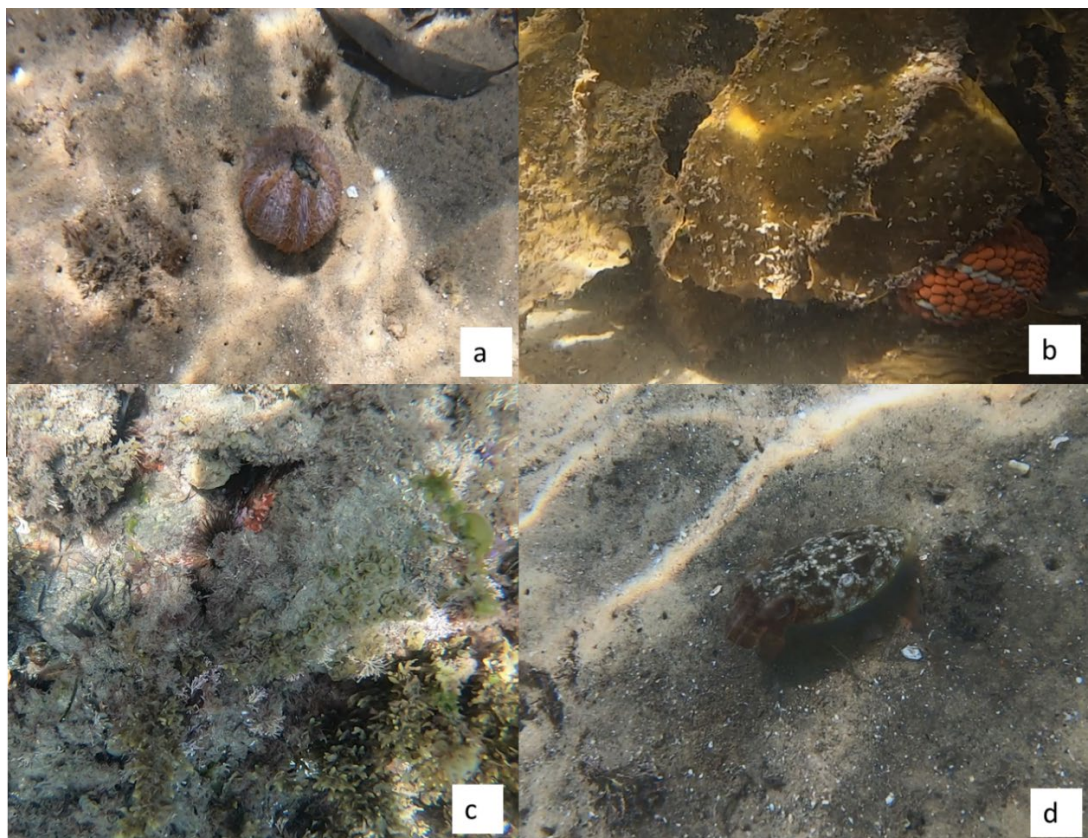


Figure 3-12 Other species on Rocky Reefs – a) Pored sea urchin (*Holopneustes porosissimus*), b) Football anemone (*Phlyctenactis tuberculosa*), c) Nudibranch (Nudibranchia), Oyster Thief (*Colpomenia sinuosa*), Greville (*Padina fraseri*) and Forkweed (*Dictyota dichotoma*) and d) Cuttlefish (*Sepia sp.*).

3.3.5 Shark Net

A swimmer protection shark mesh net (gillnet) extending the width of the Bay is in-situ in Parsley Bay, on the southern side of the wharf located just outside of the study area in the north eastern portion. The net has been in place since 1931 and is removed by Council during winter for maintenance. The last removal date is unknown. However, given the extensive recruitment on the net, particularly at depth, it is unlikely that the net was removed during the 2019 winter season.

The shark net provides ideal habitat for syngnathids (seahorses and pipefish) which are listed and protected under Commonwealth and State legislation. Whilst no syngnathids were observed during the survey, it is likely that several species, including the Endangered White's Seahorse, use the shark net for habitat. A survey in 2016 undertaken by divers in 2016, found 16 White's Seahorses residing on the net (ABC, 2016). Further, recent information obtained from Council indicated a full search in October 2017 and partial search in February 2018 found 62 and 22 White's Seahorse individuals, respectively.

Despite not locating any on the day of survey, through adopting a risk based approach, it is prudent to consider syngnathids, including White's Seahorse present in the Study area.

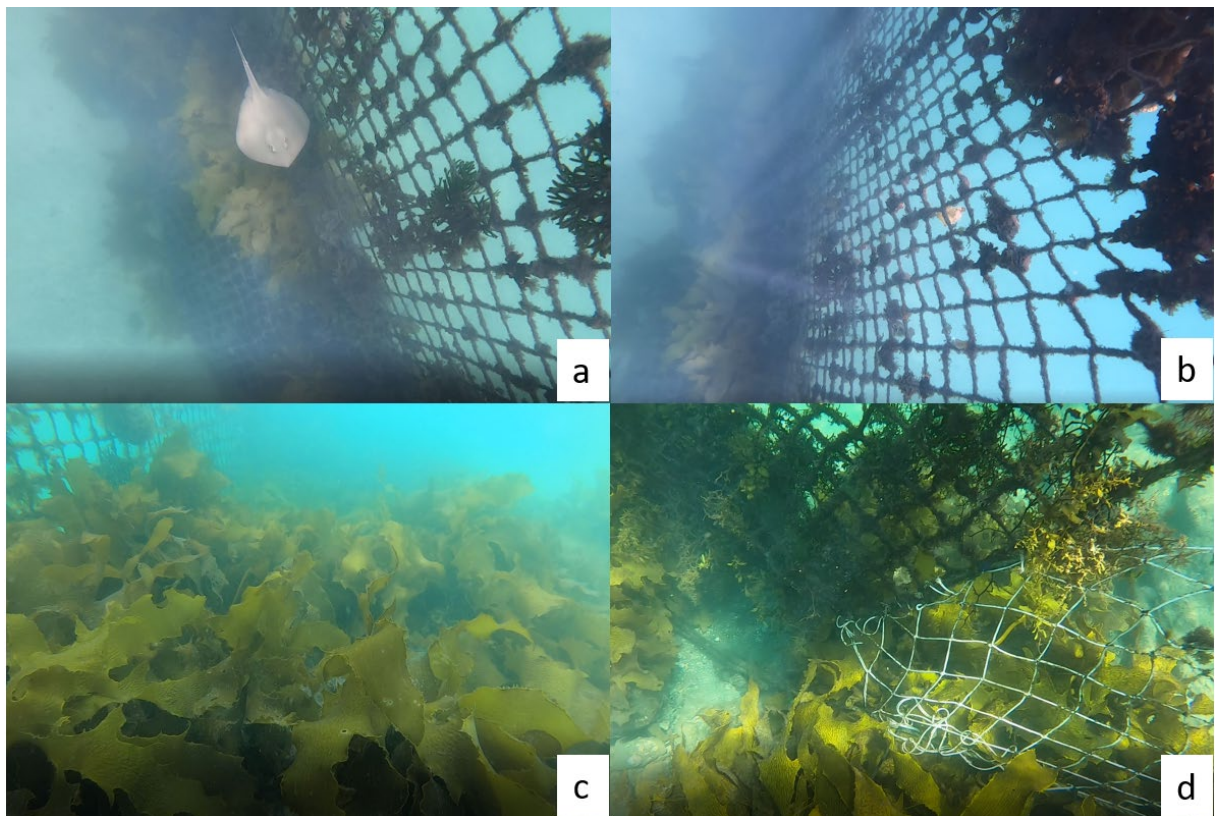


Figure 3-13 Shark Net Habitat a) Ray Mid Point T5, B) epibiota growth on surface of net, c) *E. radiata* at base of shark net, d) new attachment to the eastern corner of the net.

3.3.6 Key Fish Habitat

DPI assesses habitat sensitivity as defined by the importance of the habitat to fish.¹ survival and the habitat ability to withstand disturbance. All of Sydney Harbour is mapped as KFH

¹ Fish in this context, as defined under the Fisheries Management Act 1994, refers to all aquatic invertebrates.

(Figure 3-14). KFH is delineated by sensitivity, being Type 1 (Highly sensitive), Type 2 (moderately sensitive) and Type 3 (Minimally sensitive) (DPI, 2013).

In consideration of 'Table 1 – Key Fish Habitat and associated sensitivity classification scheme' within the DPI Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update), it is determined that Parsley Bay is Type 1 KFH, given the presence of *Zostera* and *Haolphila* seagrasses in patches greater than 5 m², the presence of *Ecklonia* and suitable threatened species habitat (*Hippocampus whitei* - White's Seahorse).

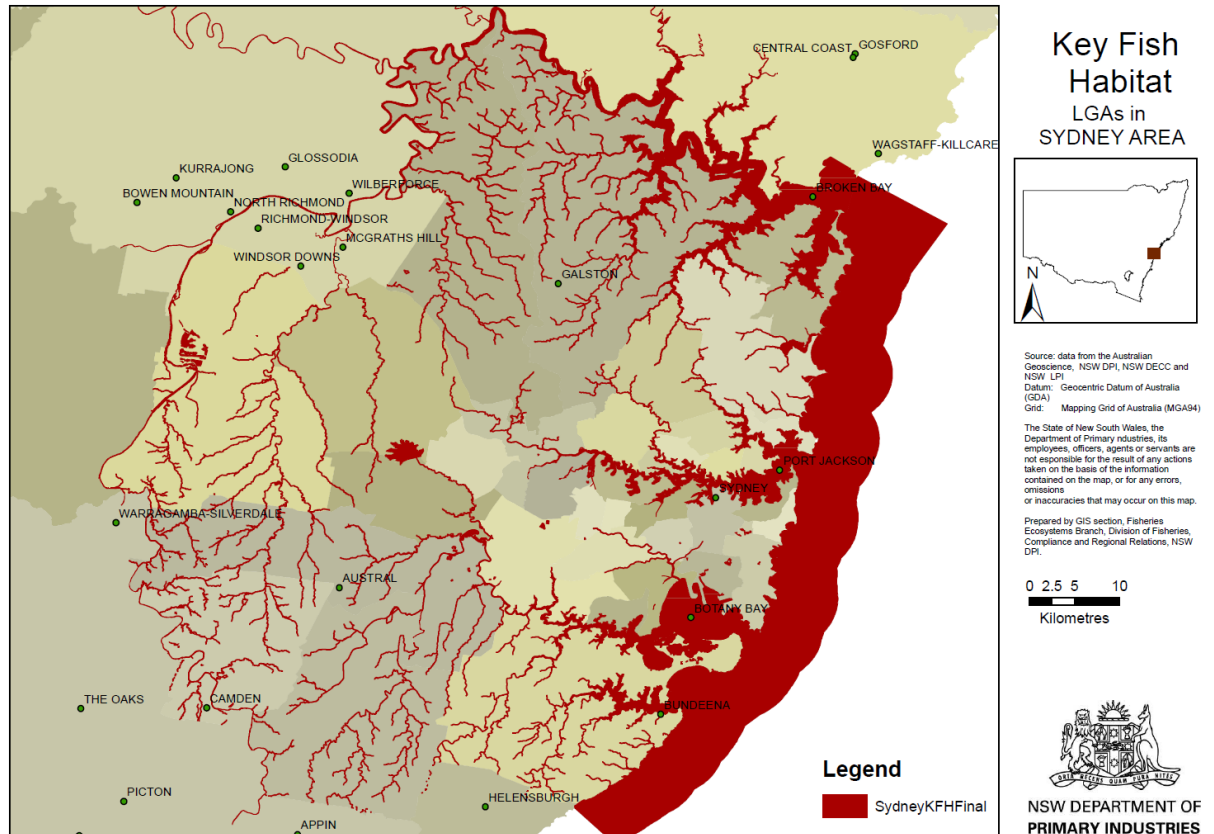


Figure 3-14 Key Fish Habitat

3.4 Marine Fauna

An assessment was conducted to determine the likelihood of occurrence for all conservation significant species under the EPBC Act, FM Act and BC Act, with relevance to the Study area. The likelihood of occurrence assessment was based on a review of species distributions (through desktop assessments, including the standard 10 km buffer) and habitat requirements, historical records for the region, and the results of habitat assessments and field surveys undertaken within the Study area. The likelihood of occurrence ranking was based on the framework outlined in Table 3-2. For the purposes of this likelihood of occurrence assessment, 'area' refers to Study area + 10 km boundary.

A number of species identified by the desktop searches with potential to occur in the Study area are not considered relevant to this assessment given that the scope of this assessment is marine and lies within the sub-tidal shallow marine environment of Parsley Bay, and airspace immediately above the Bay. Threatened and migratory terrestrial species were omitted from further consideration.

Table 3-2 Likelihood of Occurrence Definitions

Likelihood of Occurrence	Definition
Likely to occur	Species have been recorded in the desktop search extent or previous studies within the Study area AND potentially suitable habitat is present within the Study area.
May occur	Mapped species' distributions incorporates the Study area AND potentially suitable habitat occurs within the surrounding area.
Unlikely to occur	Species has not been recorded in the region AND/OR current known distribution does not encompass the Study area AND/OR suitable habitat is generally lacking from the area.

The following sections detail the likelihood of occurrence assessments and rankings for each relevant species identified in the desktop searches against the relevant legislation, including life history and habitat information, which was used to inform the assessments. The classification key of each threatened species under Commonwealth and NSW State legislation is provided in Table 3-3.

Table 3-3 Threatened Species Listing Key

Code	Description	Definition
Commonwealth Legislation – EPBC Act 1999		
C	CAMBA	China-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Australia and the Government of the People's Republic of China for the protection of Migratory Birds and their Environment (Subdivision A of Division 1 of Part 5, Commonwealth EPBC Act 1999).
CE	Critically Endangered	Refers to a native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).
E	Endangered	Refers to a native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (Subdivision A of Division 2 of Part 13, Commonwealth EPBC Act 1999).
J	JAMBA	Japan-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (Subdivision A of Division 1 of Part 5, Commonwealth EPBC Act 1999).
K	ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement: Refers to species listed in the Bilateral Agreement between the Government of Australia and the Government of the Republic of Korea for the protection of Migratory Birds and their Environment (Subdivision A of Division 1 of Part 5, Commonwealth EPBC Act 1999).
V	Vulnerable	Refers to a native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a

Code	Description	Definition
		high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (Subdivision A of Division 1 of Part 13, Commonwealth EPBC Act 1999).
New South Wales Legislation – <i>Biodiversity Conservation Act 2016</i>		
P	Protected	Refers to fauna listed in Schedule 5 of the BC Act 2016.
P 13	Protected Native Plants	Refers to flora listed in Schedule 6 of the BC Act 2016.
V	Vulnerable	Refers to fauna and flora species that are likely to become endangered unless the circumstances & factors threatening its survival or evolutionary development cease to operate (Schedule 1, part 3, BC Act 2016).
E1	Endangered	Refers to fauna and flora species that are likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary developments cease to operate; or, numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction; or, it might already be extinct, but it is not presumed extinct (Schedule 1, part 2, BC Act 2016).
E2	Endangered Population	Refers to a population where, in the opinion of the Scientific Committee, its numbers have been reduced to such a critical level, or its habitat has been so drastically reduced, that it is in immediate danger of extinction and it is not a population of a species already listed in Schedule 1, and: (a) it is disjunct and at or near the limit of its geographic range, or (b) it is or is likely to be genetically distinct, or (c) it is otherwise of significant conservation value. (Schedule 1, part 2, BC Act 2016).
E4	Extinct	Refers to fauna and flora species that have not been located in nature during the preceding 50 years despite searching of known and likely habitats of that period (Schedule 3, part 1, BC Act 2016).
E4A	Critically Endangered Species	Refers to a species that is eligible to be listed as a critically endangered species if, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with criteria prescribed by the regulations. (Schedule 1, part 1, BC Act 2016).

3.4.1 Marine Birds

The desktop searches identified 30 species of listed threatened marine and migratory birds that were mapped to occur within 10 km of the Study area. Of these, in consideration of the desktop results and an appreciation of the site, ten (10) were considered as **'likely to occur'**. These comprised:

1. Six (6) threatened species under the EPBC/BC Act
2. Four (4) migratory marine birds under the EPBC Act.

Table 3-4 Likelihood of Occurrence for Listed Threatened and Migratory Marine Bird Species – 10 km buffer zone

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Threatened Species					
<i>Ardenna grisea</i> (Sooty Shearwater)	C, J Migratory		P	This species typical foraging habitat is in open sub-tropical, sub-Antarctic and Antarctic waters, with occasional foraging inshore during unfavourable offshore conditions (DoEE, 2019). Breeding habitat for this species is typically on New Zealand mainland and sub-tropical and sub-Antarctic islands where the species utilises burrows or rock crevices on coastal slopes, ridges and cliffs. Dense vegetation is avoided. This species migrates from breeding grounds in New Zealand, southern Australia north and is likely to fly through the Pacific off the Australian Coast.	Species or species habitat may occur within area
<i>Apus pacificus</i> (Fork-tailed Swift)	C, J, K Migratory		P	Almost exclusively aerial and occurring mostly inland on plains, foothills and coastal areas. The species is often occurring around cliffs and beaches and over islands and offshore (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Calidris ferruginea</i> (Curlew Sandpiper)	CE C, J, K			This species occurs primarily on intertidal mudflats in sheltered coastal areas, such as estuaries, inlets, bays and lagoons. The species is known to also occur inland. Roosting generally occurs on bare dry shingle, shell or sand beaches (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Calidris tenuirostris</i> (Great Knot)	CE C, J, K			This species occurs in patches around the Australian coastline, however is now absent from the South Coast where it used to be a regular visitor (DoEE, 2019). This species is most often encountered in northern Australia. The habitat this species refers includes coastal habitats, with large intertidal mudflats and sand flats, including inlets, bays, harbours, estuaries and lagoons (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Charadris leschenaultia</i> (Greater Sand Plover)	V C, J, K			This species occurs in patches around the Australian coastline, but is mainly found in north-western Australia (DoEE, 2019). In non-breeding grounds the species is almost entirely coastally associated, preferring sheltered sandy beaches, inshore reefs, sand cays on coral reefs (DoEE, 2019).	Species or species habitat may occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Charadrius mongolus</i> (Lesser Sand Plover)	E C, J, K			This species occurs in patches around the Australian coastline, mainly occurring in northern and eastern Australia, some eastern parts of the Gulf of Carpentaria, Cape York and in islands off Torres Strait. In NSW, internationally important sites include Hunter River estuary, Tuggerah Lakes and Clarence River estuary. This species prefers coastal littoral and estuarine environments, inhabiting large intertidal sand flats in sheltered bays, harbours and estuaries, sandy open beaches and coral reefs. On its breeding grounds, the species is known to occur in alpine valleys (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Dasyornis brachypterus</i> (Eastern Bristlebird)	E			This species occurs in a range of habitats, however is considered rare. The species occurs in three disjunct local coastal populations, one being the QLD/NSW border, Illawarra and Jervis Bay and one in the NSW/VIC border (DoEE, 2019)	Species or species habitat unlikely to occur within area
<i>Diomedea antipodensis</i> (Antipodean Albatross)	V Migratory			This species is marine, pelagic and aerial. This species of albatross nests in open and patchy vegetation, avoiding steep coastal slopes or tall vegetation (DoEE, 2019). Endemic to New Zealand, however is known to forage in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman sea and notably off the coast of NSW (DoEE, 2019).	Foraging, feeding or related behaviour may occur within area
<i>Diomedea exulans</i> (Wandering Albatross)	E, J		E1, P	This oceanic species undertakes extensive circum-polar migrations. Breeding areas are confined to Antarctic and sub-Antarctic islands in the Atlantic Ocean, Indian Ocean and waters off the southern coast of New Zealand. There are a number of wandering albatross that migrate during the non-breeding season to the coastal waters off Wollongong, south of Sydney (Nicholls and Robertson, 2002). Juveniles migrate from their natal grounds to the subtropical Indian Ocean and Tasman Sea (DoEE, 2019).	Foraging, feeding or related behaviour may occur within area
<i>Diomedea epomophora</i> (Southern Royal Albatross)	V Migratory			Endemic to New Zealand, however is known to forage in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman sea and notably off the coast of NSW (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Diomedea sanfordi</i> (Northern Royal Albatross)	E Migratory				Foraging, feeding or related behaviour unlikely to occur within area
<i>Esacus magnirostris</i> (Beach Stone-Curlew)			E4, P	Found exclusively along the coast, this species forages in intertidal zones on beaches, estuaries, islands, flats, banks and spits of sand, mud, gravel or rock or among mangroves (OEH, 2019).	Species or species habitat likely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Eudyptula minor</i> (Little Penguin)			E2, P	The little penguin is the only penguin species that breeds on the Australian mainland. Little penguins are found along the southern coasts of Australia, from near Perth in Western Australia to around Coffs Harbour in northern NSW (OEH, 2019). Approximately 25,000 pairs nest on islands off the coast of NSW including Montague Island, Tollgate Island and Brush Island (OEH, 2019). Currently, the only known mainland breeding colony in NSW is in a secluded cove in the Manly area of Sydney Harbour (OEH, 2019). This colony has been declared an endangered population. The Manly population of <i>E. minor</i> are known to forage throughout Sydney Harbour and are likely to transit around Parsley Bay.	Foraging, feeding or related behaviour likely to occur within area
<i>Fregetta grallaris grallaria</i> (White-bellied Storm Petrel)	V			Breeding grounds for this species occurs on Lord Howe Island. Pelagic distribution is poorly understood. Species has been recorded in the Tasman Sea, Coral Sea, north of New Zealand, near-shore waters off the coast of Queensland, New South Wales and Tasmania. In non-breeding periods, this species forages over near-shore waters off coasts on the Australian continental shelf.	Species or species habitat may occur within area
<i>Grantiella picta</i> (Painted Honeyeater)	V			This species is known to occur in Queensland and New South Wales to the west of the Great Dividing Range and prefers dry open forests and woodlands (Birdlife, 2019).	Species or species habitat unlikely to occur within area
<i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle)	C		V, P	The species is distributed along the entire coastline (including offshore islands) of mainland Australia and Tasmania. Distribution also extends inland along larger waterways, particularly in eastern Australia. Prefers coastal and terrestrial wetlands in tropical and temperate of mainland Australia and its offshore islands. Must contain large areas of open water (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Haematopus fuliginosus</i> (Sooty Oystercatcher)			V, P	This species is distributed along the entire coastline of Australia, including offshore islands, but most common in the Bass Strait. Small populations of the species are known to be distributed along the NSW coastline. This species habitat preferences include rocky headlands, shorelines and exposed reefs, foraging on exposed rock or coral at low tide in search of limpets and mussels (NSW, 2017)	Species or species habitat likely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Haematopus longirostris</i> (Pied Oystercatcher)			E1, P	Pied Oystercatchers can be found scattered along the entire Australian coastline, although most common around in coastal Tasmania and Victoria. This species inhabits intertidal mud and sand flats, wetlands and coastal beaches where it feeds on bivalves, worms and crustaceans. Nests are shallow scrapes in the sand though will occasionally nest amongst salt marshes and grassy areas (NSW, 2017).	Species or species habitat likely to occur within area
<i>Hirundapus caudacutus</i> (White-throated Needletail)	V C, J, K		P	Almost exclusively aerial, it does prefer wooded, inland areas and heathland. In coastal areas they have been seen flying over mudflats and beaches. Widespread throughout eastern and south-eastern Australia. It has been recorded along all coastal regions of QLD and NSW (Barrett et al., 2003). The subspecies caudacutus leaves breeding grounds in eastern Siberia, north eastern China and Japan between August to October. They arrive in Australia via the Torres Strait during September and October. Upon arrival they move south along both sides of the Great Dividing Range in QLD and NSW. They head north again, passing through NSW in February and March (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Lathamus discolour</i> (Swift Parrot)	CE			This species breeds in tree hollows in the Blue Gum forests of south eastern Tasmania. The species occurs on inland slopes, but occasionally on the coast (DoEE, 2019).	Species or species habitat unlikely to occur within area
<i>Limosa lapponica baueri</i> (Bar-tailed Godwit)	V Migratory			This species occurs around most of the coastline of Australia (DoEE, 2019). The species migrates to Australia in August, inhabiting estuarine mudflats, beaches and mangroves (Birdlife, 2019).	Species or species habitat likely to occur within area
<i>Limosa lapponica menzbieri</i> (Northern Siberian Bar-tailed Godwit)	CE			This species occurs around most of the coastline of Australia (DoEE, 2019). The species migrates to Australia in August, inhabiting estuarine mudflats, beaches and mangroves (Birdlife, 2019).	Species or species habitat likely to occur within area
<i>Macronectes giganteus</i> (Southern Giant Petrel)	E Migratory		E1, P	This oceanic species has a circumpolar pelagic range from Antarctica to approximately 20° S. During summer, southern giant petrels breed on the Antarctic peninsula and the surrounding subantarctic islands although frequently visit the coast of NSW when foraging for squid, krill and fish. Males are known to feed on animal carcasses from fishing vessels or on land (DoEE, 2019).	Species or species habitat may occur within area
<i>Macronectes halli</i> (Northern Giant Petrel)	V Migratory			This species is marine and oceanic associated, occurring mainly in sub-Antarctic waters however with a range extending to subtropical waters mainly between winter and spring, including the Australian mainland and during this period are commonly seen offshore and within inshore waters from Fremantle to Sydney (DoEE, 2019).	Species or species habitat may occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Neophema chrysogaster</i> (Orange-bellied Parrot)	CE Migratory			This species is a ground dwelling bird migrating between breeding and non-breeding habitats. Breeding occurs in south west Tasmania in summer and in winter migrate to south eastern Australian coastlines (DoEE, 2019). The species prefers coastal and sub-coastal areas (Birdlife, 2019).	Species or species habitat may occur within area
<i>Numenius madagascariensis</i> (Eastern Curlew)	CE Migratory			This species occurs across most of the coastline of Australia, arriving in August from its migration from Russia and north-eastern China. The species prefers intertidal mudflats. The species exhibits high avoidance behaviour and will take flight over small disturbances.	Species or species habitat may occur within area
<i>Pachyptila turtur subantarctica</i> (Fairy Prion (Southern))	V			This species breeds in two locations in Australia, including Macquarie Island and Bishop and Clerk Islands. Nesting for the species occurs in burrows between rocks or low lying vegetation. This species hunts from aerial predation on species on the ocean surface and sub surface (DoEE, 2019).	Species or species habitat may occur within area
<i>Pandion cristatus</i> (Eastern Osprey)			V, P, 3	The eastern osprey is a medium sized, fish-eating raptor found along most of the Australian coastline, excluding only Tasmania and Victoria. They are common along the east coast, especially on rocky shorelines, islands, reefs and estuaries and known to occasionally range inland along rivers. This species preys upon fish and nests are usually within 1 km of the sea.	Species or species habitat may occur within area
<i>Phoebastria fusca</i> (Sooty Albatross)	V Migratory		V, P	This species is a marine and pelagic species, distributed on islands in the southern Indian and Atlantic Oceans, foraging out of 30° S between southern NSW and Argentina (DoEE, 2019). The species has been observed foraging in inshore waters in Southern Australia, but is a rare occurrence and while probably migrant to Australia, being mostly in autumn and winter months along the eastern border (DoEE, 2019).	Species or species habitat may occur within area
<i>Pterodroma leucoptera</i> (Gould's Petrel)	E		V, P	This species is a marine pelagic species, spending much of its time at sea coming to land only to breed. This Australian subspecies breeds and roosts on two islands off the NSW coast, being Cabbage Tree Island and Boondelbah Island (DoEE, 2019).	Species or species habitat unlikely to occur within area
<i>Pterodroma neglecta</i> (Kermadec Petrel (Western))	V		V	This species is a pelagic sea bird, occurring in tropical, subtropical and temperate waters of the Pacific Ocean. This species breeds on Lord Howe Island and Philip Island. Pelagic distribution is poorly known and occasionally reaches the eastern coast of mainland Australia (QLD and NSW) (DoEE, 2019).	Foraging, feeding or related behaviour may occur within area
<i>Rostratula australis</i> (Australian Painted Snipe)	E			This species has been recorded in wetlands in all states of Australia and is most common in eastern Australia, where its records are scattered across Queensland, New South Wales, Victoria and South Australia. This species generally inhabits shallow freshwater wetlands (DoEE, 2019).	Species or species habitat unlikely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Sternula albifrons</i> (Little Tern)	C, J, K Migratory		E1, P	Small, marine tern. Occurring along most of Australia's coastline from Broome in north-west WA, across north Australia and down to Adelaide in south Australia. However it is relatively rare from Victoria to Adelaide. Breeding colonies in QLD have not been used recently, it more commonly breeds along the NSW coastline (Garnett and Crowley 2000). Nonbreeding range of this subpopulation is poorly known DoEE, 2019). They forage and nest in sheltered coastal environments such as estuaries, river mouths, bays and harbours. A subpopulation of Asian migrants spend the northern non-breeding season (austral spring-summer) In Australia and leaves for their northern breeding grounds in March/April (DoEE, 2019). The east subpopulation is migratory, breeding in October-December and leaving colonies February-April. Birds return to their breeding sites in August-September (DoEE, 2019).	Species or species habitat may occur within area
<i>Sternula nereis nereis</i> (Australian Fairy Tern)	V			This species occurs along the coast of Tasmania, South Australia, Victoria and Western Australia. A population in NSW was historically known to occur, however it is unknown whether the bird occurs in NSW still. This species prefers sandy beaches that are well sheltered, spits and banks (DoEE, 2019).	Species or species habitat unlikely to occur within area
<i>Thalassarche bulleri</i> (Buller's Albatross)	V Migratory			This species are marine and pelagic, inhabiting sub-tropical and subantarctic waters of the Southern Pacific Ocean (DoEE, 2019). In Australian waters, this species can be observed inshore, offshore and in pelagic waters. Breeding occurs in New Zealand waters (DoEE, 2019).	Species or species habitat may occur within area
<i>Thalassarche cauta</i> (Shy Albatross)	V Migratory		V, P	Occurs in Australian waters below 25 °S, but is most frequently observed off southeast Australia and Tasmania. This species occurs more frequently inshore than offshore. Breeding areas occur in the Bass Strait and off southern Tasmania. Although endemic to Australia, this species does undertake migrations throughout the southern oceans, from Africa through to South America. Juveniles can migrate as far north as southern QLD and waters off south-west WA (DoEE, 2019).	Foraging, feeding or related behaviour may occur within area
<i>Thalassarche eremita</i> (Chatham Albatross)	E Migratory			This species is a marine species, with foraging range in coastal waters off eastern and southern New Zealand and Tasmania (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Thalassarche impavida</i> (Campbell Albatross)	V Migratory			This species occurs in Antarctic and subantarctic waters and within areas of the subtropical South Pacific Ocean. This species visits Australia as non-breeders and can be seen foraging over offshore waters of Tasmania, Victoria and New Zealand (DoEE, 2019).	Species or species habitat unlikely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Thalassarche melanophris</i> (Black-browed Albatross)	V Migratory		V, P	This species occurs in Antarctic, subantarctic and temperate marine waters and occasionally enters the tropics. The population migrate northward at the cessation of breeding, and the species is common in the non-breeding periods at the continental shelf and shelf break of South Australia, Victoria, Tasmania and NSW (DoEE, 2019).	Species or species habitat unlikely to occur within area
<i>Thalassarche salvini</i> (Salvin's Albatross)	V Migratory			This species is a non-breeding visitor to Australian waters, residing in subantarctic and subtropical waters and foraging also in southern Pacific Ocean. This species nests on gently sloping ledges and summits, usually with little vegetation and soil (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Thalassarche steadi</i> (White-capped Albatross)	V Migratory			This species is a marine bird occurring in subantarctic and subtropical waters, and is common off the coast of south-east Australia throughout the year. The habitat preferences of this species are not well known, but are known to occur both inshore and offshore and enter harbours and bays. This species nests on sloping vegetation (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Thinornis rubricollis rubricollis</i> (Hooded Plover (Eastern))	V			This species preferred habitat includes wide beaches which are backed by dunes and seaweed. The species nests above the high water mark on flat beaches and sparsely vegetated dunes (DoEE, 2019).	Species or species habitat likely to occur within area
Migratory Species (not already listed above)					
<i>Anous stolidus</i> (Common Noddy)	Migratory			In Australian waters, this species occurs mainly offshore in Queensland waters, but also along most of the eastern border of Australia. During breeding season, this species occurs on or nearby to islands, rocky islets and cliffs. Foraging occurs in waters close to the nest. Nesting may take place in low lying vegetation, such as bushes or salt bush. During non-breeding periods, this species is pelagic (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Ardenna carneipes</i> (Fork-tailed Swift)	Migratory			This species typically forages and moves over continental shelves and slopes and occasionally inshore waters (Bird Life International, 2017). Mainly occurs (and breeds) off southern Australia; however the waters off NSW to QLD is listed as a biologically important area for foraging for this species. The shearwater migrates between breeding colonies in the southern Indian and south-western Pacific Oceans west to South Africa, north to the Arabian Sea, Maldives and Sri Lanka, and north-west to the Pacific Ocean. The birds depart Lord Howe Island at the completion of the breeding season (late August to mid-May) (DoEE, 2019).	Foraging, feeding or related behaviour likely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Calonectris leucomelas</i> (Streaked Shearwater)	Migratory			A marine, pelagic shearwater. Distributed throughout the northwest Pacific Ocean, with breeding areas along the coast and/or islands of China, Japan, North Korea, South Korea and Russia. Recorded in NSW (DoEE, 2019; Marchant and Higgins, 1990). Undertakes migrations to warmer waters during winter, typically to Vietnam, the Philippines, New Guinea and Australia (Marchant and Higgins, 1990; Takahashi et al., 2008; Yamamoto et al., 2010).	Species or species habitat unlikely to occur within area
<i>Fregata ariel</i> (Lesser Frigatebird)	Migratory			A marine, pelagic and inshore bird. Breeds on small, remote tropical and sub-tropical islands, mangroves or shrubs. It is found throughout the Indian Ocean, western and central Pacific Ocean and off Brazil in the Atlantic Ocean. It resides along the north west Australia coast from Exmouth across to eastern Australia down to Sydney (DoEE, 2019). Migration information is poorly documented; however it is believed to migrate from Indonesia to Australia. It is suggested they breed throughout the year and transit between Islands regularly (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Fregata minor</i> (Great Frigatebird)	Migratory			This species inhabits open, tropical oceanic waters and neighbouring offshore, oceanic nesting islands. The species occurs between 25 °N and 25 °S (ADW, 2002).	Species or species habitat may occur within area

3.4.1 Fish

The desktop searches identified 20 species of listed threatened marine fish that were mapped to occur within 10 km of the Study area. Of these, two (2) species were considered as **'likely to occur'**. Both of these species are listed as threatened under the FM Act. One of the species is classed as a 'Listed Marine species' under the EPBC Act and the other is listed as threatened under the EPBC Act.

All species within Syngnathidae, Solenostomidae and Pegasidae families are protected under the FM Act and are classified as 'Listed Marine Species' under the EPBC Act.

Table 3-5 Likelihood of Occurrence for Listed Fish Species – 10 km buffer zone

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Threatened Species					
<i>Epinephelus daemeli</i> (Black Rockcod)	V	V		The species is found throughout the southwest Pacific, from southern QLD to northern waters of the Bass Strait. Juveniles inhabit estuarine systems while larger specimens are found around rocky reefs and shelves. Black Rockcod demonstrate high site fidelity, with individuals of the species often occupying an individual cave for most of their adult life (DoEE, 2019). Suitable habitat exists within the Sydney Harbour region and rocky reefs which forms the core habitat for this species are located inside the Study area.	Species or species habitat likely to occur
<i>Hippocampus whitei</i> (White's Seahorse)	M	E		This species occurs at depths from 1 – 15 m and utilises a range of natural and artificial habitats. Preference is given to complex habitats that provide less predation risk through affording better protection and more available food sources. The species exhibits strong site fidelity; a study of tagged males over a 6000 m ² study area for up to 56 months recorded no movement of individuals between sites. Individuals were not known to move far, with the furthest distance measured at 70 m. Individuals also exhibit strong micro scale site fidelity, staying on the same holdfast with their prehensile tail for up to 17 months (FSC, 2019). This species received a final determination of 'Endangered' under the FM Act in July 2019 and has been recorded previously on the shark net in the Study area.	Species or species habitat likely to occur within area This species is known to occur within Parsley Bay on the shark net
<i>Prototroctes maraena</i> (Australian Grayling)	V			This species occurs in rivers and streams on the eastern side of the Great Dividing Range, from Sydney southwards to the Otway Ranges in Victoria. The species is found in fresh and brackish waters of coastal lagoons. The species is diadromous, spending part of its lifecycle in freshwater environments and part of at least its larval and or juvenile stages in coastal systems. Adults inhabit freshwater environments, with cool and clear waters and over gravel substrate (DoEE, 2019).	Species or species habitat may occur

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Marine Species					
<i>Solenostomidae,</i> <i>Syngnathidae,</i> <i>Pegasidae</i> Syngnathids	M	P		Distributed along the east coast of Australia, these species are found on tropical inshore reefs and temperate waters over shallow sand flats among sparse low plant growth and in algae beds and are associated with rocky reefs. Further, these species are associated with sponge gardens, vertical rock walls and artificial structures such as wrecks and shark nets (DoEE, 2019).	Species or species habitat likely to occur within area
<i>Species may include:</i>	<i>Acentronura tentaculata</i> (Shortpouch Pygmy Pipehorse), <i>Festucalex cinctus</i> (Girdled Pipefish), <i>Filicampus tigris</i> (Tiger Pipefish), <i>Heraldia nocturna</i> (Upside-Down Pipefish), <i>Histiogamphelus briggsii</i> (Crested Pipefish), <i>Hippichthys penicillus</i> (Big-belly Seahorse), <i>Lissocampus runa</i> (Javelin Pipefish), <i>Maroubra perserrata</i> (Sawtooth Pipefish), <i>Notiocampus ruber</i> (Red Pipefish), <i>Solegnathus spinosissimus</i> (Spiny Pipehorse), <i>Stigmatopora argus</i> (Spotted Pipefish), <i>Stigmatopora nigra</i> (Widebody Pipefish), <i>Syngnathoides biaculeatus</i> (Double ended pipefish), <i>Trachyrhamphus bicoarctatus</i> (Bentstick Pipefish), <i>Urocampus carinirostris</i> (Hairy Pipefish), <i>Vanacampus margaritifer</i> (Mother of Pearl Pipefish), <i>Phyllopteryx taeniolatus</i> (Weedy/ Common Seadragon).				

3.4.1 Marine Mammals

The desktop searches identified 14 species of listed threatened marine and migratory mammals that were mapped to occur within 10 km of the Study area. Of these, no species were considered as 'likely to occur'.

Table 3-6 Likelihood of Occurrence for Listed Threatened Marine Mammal Species – 10 km buffer zone

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Threatened Species					
<i>Arctocephalus forsteri</i> (New Zealand Fur Seal)	Migratory		V, P	Occurs in Australian coastal waters and offshore islands of South and Western Australia as well as southern Tasmania (IUCN, 2018). Small populations are also present along the southern NSW coast, particularly on Montague Island but also other isolated areas to north of Sydney (NSW OEH, 2018b).	Species or species habitat may occur within the area
<i>Arctocephalus pusillus doriferus</i> (Australian Fur Seal)	Migratory		V, P	Preference for rocky parts of islands and foraging occurs in oceanic waters of the continental shelf. There are 10 established breeding colonies, all restricted to the Bass Strait with six occurring in VIC and four in Tasmania. In NSW, the species can be found at Montague Island (DoEE, 2019).	Species or species habitat may occur within the area
<i>Balaenoptera borealis</i> (Sei Whale)	V			An infrequent visitor to Australian waters and commonly confused with the Bryde's Whale, nonetheless Australian Antarctic waters serve important feeding grounds for Sei whales. Breeding occurs in tropical and subtropical waters (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Balaenoptera physalus</i> (Blue Whale)	E Migratory			Two subspecies exist in Australia, including the Pygmy blue and Antarctic (true) blue. This species habitat is variable, with the Antarctic blue remaining at higher latitudes and migrating to lower altitudes for feeding, breeding and calving in the Australian summer. In contrast, the Pygmy blue range is wide ranging, expanding through the Indian Ocean with individuals moving between Australia and Indonesia (DoEE, 2019).	Species or species habitat may occur within the area
<i>Balaenoptera physalus</i> (Fin Whale)	V Migratory			The Australian Antarctic waters are vital feeding grounds for fin whales. No known mating or caving areas occur in Australian waters. The species has wide geographic distribution, in both hemispheres between latitudes 20 – 75 ° S and is common in temperate waters, the Arctic Ocean and the Southern Ocean. This species prefers steep bathymetry (DoEE, 2019).	Foraging, feeding or related behaviour unlikely to occur within area
<i>Eubalaena australis</i> (Southern Right Whale)	E Migratory		E1, P	Very limited information exists on the feeding habitat of this species in Australian waters, however most feeding is considered deeper offshore ranging from subantarctic to south of 60 °S. This species prefers nearshore shallow water for calving and breeding (DoEE, 2019).	Species or species habitat unlikely to occur within area

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
<i>Dugong dugon</i> (Dugong)	Migratory		E1, P	The dugong is a large herbivorous marine mammal. It is closely associated with seagrass meadows and is typically found along the coastline of northern Australia (DoEE, 2019), becoming less common south of the QLD/NSW border. This species migrates in response to the changing availability of suitable seagrasses, or in response to water temperature (Marsh et al., 2002). Known to undertake long-distance migration/dispersal events (DoEE, 2019).	Species or species habitat may occur within area
<i>Megaptera novaeangliae</i> (Humpback Whale)	V Migratory		V, P	The east Australian humpback population of whales migrates in close proximity to the coast on their way to their winter breeding areas. Migration progressively moves offshore as their northward migration continues. Breeding for the east coast population happens at two key areas off the Queensland coast, including Mackay and Gladstone (DoEE, 2019).	Species or species habitat unlikely to occur within area
Migratory Species (not already listed above)					
<i>Balaenoptera edeni</i> (Bryde's Whale)	Migratory			This species is found all year round in waters between 40 °S and 40 °N. No specific feeding or breeding grounds have been determined in Australia.	Species or species habitat may occur within the area
<i>Caperea marginate</i> (Pygmy Right Whale)	Migratory			This species occurs in temperate and subtropical waters to a depth of 1400 m in open water habitats. The species has been recorded in areas of upwelling. There is limited information of their preferred habitat, however are known to refer water between 5 and 20 °S (DoEE, 2019).	Foraging, feeding or related behaviour may occur within area
<i>Lagenorhynchus obscurus</i> (Dusky Dolphin)	Migratory			Known from only 13 reports since 1828, with two sightings in the early 1980s. Occur across southern Australia from WA to Tasmania. Due to a lack of records, distribution and population size is poorly understood. Occurs mostly in temperate and sub-Antarctic waters, mainly preferring inshore waters but can also be pelagic. Movement patterns are poorly understood, however presence of this species in New Zealand and Argentina increase in summer months (DoEE, 2019).	Species or species habitat unlikely to occur within area
<i>Orcinus orca</i> (Killer Whale)	Migratory			This species refers oceanic, pelagic and neritic marine environments in both warm and cold waters. It is more common in cold waters, often observed on continental slopes and on the shelf. The habitat preference of this species is wide and likely linked to behavioural requirements and movement of prey (DoEE, 2019).	Species or species habitat may occur within area
<i>Sousa chinensis</i> (Indo-Pacific Humpback Dolphin)	Migratory			Humpback dolphins are known to occur along the northern Australian coastline, as far down the east coast as Sydney. This species primarily occurs in shallow and protected habitats, including estuaries, rivers, shallow bays and inshore reefs (DoEE, 2019). Humpback dolphins do not undertake large scale seasonal migrations, however seasonal changes in abundance occurs (DoEE, 2019).	Species or species habitat may occur within area

3.4.1 Marine Reptiles

The desktop searches identified five (5) species of listed threatened marine reptiles that were mapped to occur within 10 km of the Study area. Of these, four (4) were considered as ‘**likely to occur**’. These comprised four (4) threatened species under the EPBC/BC Act.

Table 3-7 Likelihood of Occurrence for Listed Threatened Marine Reptile Species – 10 km buffer zone

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Threatened Species					
<i>Caretta caretta</i> (Loggerhead turtle)	E Migratory		E1, P	Widely distributed throughout Australian coastal and offshore zones, suitable habitat includes coral reefs, rocky reefs, seagrass beds and inshore embayments (DoEE 2019). Female turtles recorded from nesting sites in south east QLD, have been observed in Australian waters off Northern Territory (NT), QLD and NSW (Limpus, 2008). In NSW, Loggerhead turtles have been recorded feeding as far south as Jervis Bay and Sydney. Suitable habitat for the species, including macroalgal and seagrass beds and rocky reef outcrops occur in the Study area.	Species or species habitat likely to occur within area
<i>Chelonia mydas</i> (Green turtle)	V Migratory		V, P	Species is distributed throughout Australian coastal warm temperate to tropical seas. Nesting occurs throughout northern Australia between December and February (DES, 2019). Following hatching, neonate and juvenile turtles remain in pelagic and offshore waters until they reach approximately 30 to 40 cm carapace length (DoEE, 2019). Adults are commonly encountered in seagrass beds and in proximity to macroalgal benthic habitats. Suitable habitat for the species, including macroalgal and seagrass beds exist in the Study area.	Foraging, feeding or related behaviour likely to occur within area
<i>Dermochelys coriacea</i> (Leatherback Turtle)	E Migratory			Circum-globally distributed in warm temperate to tropical seas for pelagic foraging. Foraging is common at high latitudes in the Southern Pacific Ocean. The species occurs in open ocean basins, making landfall to nest at known locations (DoEE, 2019).	Foraging, feeding or related behaviour likely to occur within area
<i>Eretmochelys imbricate</i> (Hawksbill Turtle)	V Migratory			Nesting for this species occurs in far north QLD, NT and WA between December and February with individuals migrating up to 2400 km between foraging areas and nesting beaches (DES, 2019). Juvenile turtles remain in pelagic and offshore waters for the first five to ten years, drifting on ocean currents.	Species or species habitat likely to occur within area
<i>Natator depressus</i> (Flatback Turtle)	V Migratory			Feeding grounds are mostly over the Australian continental shelf, extending as far south as the Tropic of Capricorn, and off eastern Indonesian waters. Migration is usually restricted to the continental shelf although there are numerous records of the species in waters off the continental shelf.	Foraging, feeding or related behaviour unlikely to occur within area

3.4.2 Sharks and Rays

The desktop searches identified six (6) species of listed threatened marine sharks and rays that were mapped to occur within 10 km of the Study area. Of these, two (2) were listed as ‘likely to occur’. Both of these species are listed threatened species under the EPBC Act.

Table 3-8 Likelihood of Occurrence for Listed Shark and Ray Species – 10 km buffer zone

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
Listed Threatened Species					
<i>Carcharias taurus</i> (Grey Nurse Shark)	CE			This species is regularly reported around south-east Australia in primarily subtropical to cool temperate waters. They commonly reside around rocky reefs and islands, sandy seabed gutters, rocky caves and sometimes surf zones and shallow bays along the coast of NSW and southern Queensland (QLD). Migratory patterns are not well known, evidence suggests migration occurs in response to water temperatures up and down the east coast.	Species or species habitat likely to occur within area (outside shark net)
<i>Caecharodon carcharias</i> (Great White Shark)	V Migratory			The species is distributed predominantly throughout temperate Australia, with individuals known to undertake migrations into subtropical and tropical waters (Bruce et al., 2005; DoEE, 2019). Great white sharks typically occur from close inshore habitats at rocky reefs and shallow coastal bays to the continental shelf (depths between 100 m to 1000 m). This species migrates along the south and east Australian coasts, moving north from April – September then moving south by early summer (Bruce et al., 2006).	Species or species habitat likely to occur within area (outside shark net)
<i>Rhincodon typus</i> (Whale Shark)	V Migratory			The species is an oceanic and coastal shark, residing in tropical to warm-temperate pelagic waters generally in waters 21 – 25 °C. In Australian waters, the whale shark is known from New South Wales, Queensland, Northern Territory, Western Australia and occasionally Victoria and South Australia, but most commonly seen in northern Western Australia, such as on Ningaloo Reef. Whale sharks are most often encountered offshore, but do visit coastal areas including lagoons of coral atolls. (DoEE, 2019).	Species or species habitat may occur within area (outside shark net)
Migratory Species (not already listed above)					
<i>Lamna nasus</i> (Mackerel Shark)	Migratory			The species inhabits oceanic waters and edges of continental shelves. Occasionally, the shark will move inshore to coastal environments, but movements are short term likely in search of an immediate food source. Given its preference for temperate, subantarctic and subarctic environments of 8 – 20 °C, in Australian waters the species occurs from southern Queensland to south west Australia. (DoEE, 2019).	Species or species habitat may occur within area
<i>Manta alfredi</i> (Reef Manta Ray)	Migratory			The species is found in all three of the world's major oceans, although most commonly encountered in the Indian Ocean and south Pacific. Key aggregation sites include: Hawaii,	Species or species habitat

Species <i>Scientific</i> (Common Name)	EPBC Act	FM Act	BC Act	Habitat Requirements	Likelihood of Occurrence
				Australia, Komodo, Maldives, Yap, Palau, Bali, and Southern Mozambique (Mantaray-World, 2014). This species is known to occur off the eastern coast of Australia.	may occur within area
<i>Manta birostris</i> (Giant Manta Ray)	Migratory			This species occurs in tropical, subtropical and temperate waters of the Atlantic, Pacific and Indian Oceans. The species preferences areas with consistent upwelling that yield productive coastlines. <i>M.birostris</i> can be found at cleaning stations on shallow reefs, seagrass beds and on sandy bottoms. (IUCN, 2019).	Species or species habitat unlikely to occur within area

4. Impact Assessment

4.1 Identification of Environmental Hazards

The project would involve construction of a sewage pumping station at Parsley Bay. The associated construction activities and ancillary activities would be primarily limited to the existing car park and adjacent open areas, and would not involve any activities in the marine environment at Parsley Bay. As such, no disturbance of the marine environment is predicted.

In the event that works were to take place in the marine environment the potential impacts would include:

- Disturbance of the seabed and beach
- Declining water quality
- Shading of seagrass beds
- Accidental release of wastes
- Loss of habitat
- Direct impact to threatened species known to reside in, or visit, the Bay.

If works were to take place in the marine environment a detailed assessment of these potential impacts would need to be undertaken. This would need to consider hazard and consequence identification related to any changes in the project activities and nomination of relevant controls and environmental offsets for managing identified risks.

5. Concluding Statement

Parsley Bay is a shallow bay, with high biodiversity values. The assessment has identified a number of environmentally significant environments, including an in-situ shark net supporting syngnathids, rocky reef habitat, macroalgae and seagrasses. In addition, a number of species were noted to reside in the bay.

As Sydney Water will not be undertaking any works in water, the project is not anticipated to impact the marine environment biodiversity values of Parsley Bay. Works will be limited to land based activities only and as such, there is unlikely to be any impact to the marine environment from planned project activities.

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Personal Communications (25 November 2019). Phone Call with Woollahra Council's Karen Harper.

Personal Communications (14 January 2020). Email Contact with Woollahra Council's Karen Harper.

Appendices

Appendix A - Protected Matters Search Tool Results



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/11/19 10:34:22

[Summary](#)

[Details](#)

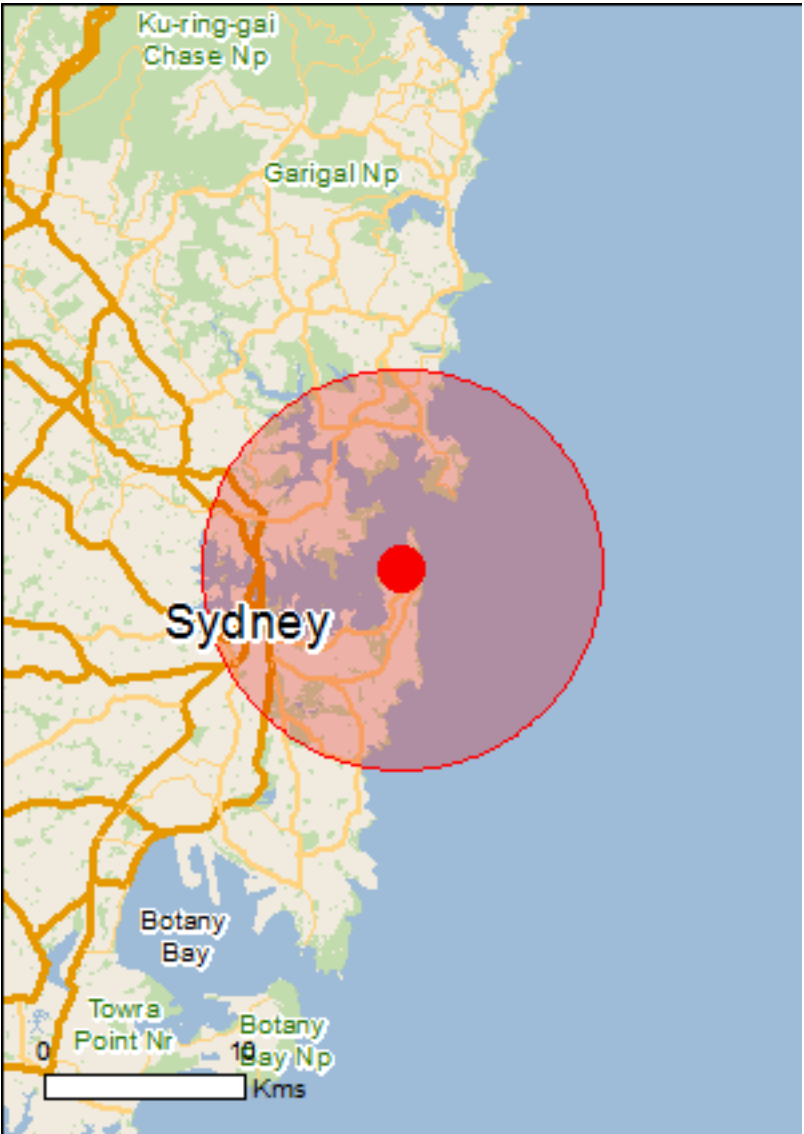
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

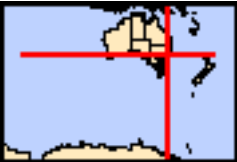
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[Buffer: 10.0Km](#)



Summary

Matters of National Environmental 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:	4
National Heritage Places:	9
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	89
Listed Migratory Species:	72

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 <http://www.environment.gov.au/heritage>

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

Commonwealth Land:	48
Commonwealth Heritage Places:	59
Listed Marine Species:	96
Whales and Other Cetaceans:	16
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	48
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Australian Convict Sites (Hyde Park Barracks Buffer Zone)	NSW	Buffer zone
Sydney Opera House - Buffer Zone	NSW	Buffer zone
Australian Convict Sites (Hyde Park Barracks)	NSW	Declared property
Sydney Opera House	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Indigenous		
Cyprus Hellene Club - Australian Hall	NSW	Listed place
Historic		
Bondi Beach	NSW	Listed place
Centennial Park	NSW	Listed place
First Government House Site	NSW	Listed place
Hyde Park Barracks	NSW	Listed place
North Head - Sydney	NSW	Listed place
Sydney Harbour Bridge	NSW	Listed place
Sydney Opera House	NSW	Listed place
Bondi Surf Pavilion	NSW	Within listed place

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Towra point nature reserve	Within 10km of Ramsar	

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 the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.		

Name
EEZ and Territorial Sea

Marine Regions	[Resource Information]
If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.	

Name
Temperate East

Listed Threatened Ecological Communities		[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.		
Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Eastern Suburbs Banksia Scrub of the Sydney Region	Endangered	Community known to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area

Name	Status	Type of Presence
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species

[[Resource Information](#)]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area
Acacia terminalis subsp. terminalis MS Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Allocasuarina portuensis Nielsen Park She-oak [21937]	Endangered	Species or species habitat known to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Darwinia biflora [14619]	Vulnerable	Species or species habitat may occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat known to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat may occur within area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat known to occur within area
Prostanthera marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat known to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within

Name	Threatened	Type of Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	area Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species

Name	Threatened	Type of Presence
Arenaria interpres Ruddy Turnstone [872]		habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Tringa brevipes Grey-tailed Tattler [851]		within area Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Broadcasting Corporation
Commonwealth Land - Australian National University
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of Defence Service Homes
Commonwealth Land - Reserve Bank of Australia
Commonwealth Land - Telstra Corporation Limited
Defence - DEFENCE PLAZA SYDNEY
Defence - DEGAUSSING RANGE
Defence - DSTO PYRMONT - (SEE SITE 1177)
Defence - ENDEAVOUR HOUSE - COOGEE
Defence - FLEET BASE WHARVES
Defence - GARDEN ISLAND
Defence - HMAS KUTTABUL (AC 30/5 Lot4 DP218946)
Defence - HMAS PENGUIN
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL
Defence - HMAS WATERHEN
Defence - HMAS WATSON
Defence - JENNER BUILDING
Defence - KENSINGTON DEPOT
Defence - KISMET/HMAS KUTTABUL-POTTS PT
Defence - LADY GOWRIE HOUSE
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA
Defence - MARITIME HEADQUARTERS
Defence - MILLER'S POINT TRAINING DEPOT
Defence - NFI CHOWDER BAY (fuel depot)
Defence - NORTH SYDNEY - HYDRO OFFICE
Defence - OXFORD ST SYDNEY
Defence - PARKVIEW BUILDING - SYDNEY
Defence - RANDWICK (CARRINGTON RD)
Defence - RANDWICK BARRACKS

Name
Defence - RANDWICK FRENCHMANS TRG
Defence - SYDNEY UNIVERSITY REGIMENT - DARLINGTON
Defence - TRAINING SHIP CONDAMINE
Defence - TRESKO
Defence - VAUCLUSE TRAINING DEPOT
Defence - VICTORIA BARRACKS - PADDINGTON
Defence - WILLOUGHBY TRG DEP
Defence - WOOLLOOMOOLOO CARPARK
Defence - ZETLAND NAVY SUPPLY CENTRE

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Admiralty House Garden and Fortifications	NSW	Listed place
Admiralty House and Lodge	NSW	Listed place
Army Cottage with return verandah	NSW	Listed place
Barracks Group HMAS Watson	NSW	Listed place
Batteries A83 and C9A	NSW	Listed place
Battery B42	NSW	Listed place
Battery for Five Guns	NSW	Listed place
Bondi Beach Post Office	NSW	Listed place
Building VB1 and Parade Ground	NSW	Listed place
Building VB2 Guard House	NSW	Listed place
Buildings 31 and 32	NSW	Listed place
Buildings MQVB16 and VB56	NSW	Listed place
Buildings VB13, 15, 16 & 17	NSW	Listed place
Buildings VB41, 45 & 53	NSW	Listed place
Buildings VB60 and VB62	NSW	Listed place
Buildings VB69, 75 & 76 including Garden	NSW	Listed place
Buildings VB83, 84, 85, 87 & 89	NSW	Listed place
Buildings VB90, 91, 91A & 92	NSW	Listed place
Chain and Anchor Store (former)	NSW	Listed place
Chowder Bay Barracks Group	NSW	Listed place
Cliff House	NSW	Listed place
Commonwealth Avenue Defence Housing	NSW	Listed place
Cottage at Macquarie Lighthouse	NSW	Listed place
Customs Marine Centre	NSW	Listed place
Defence site - Georges Heights and Middle Head	NSW	Listed place
Factory	NSW	Listed place
Garden Island Precinct	NSW	Listed place
Gazebo	NSW	Listed place
General Post Office	NSW	Listed place
Golf Clubhouse (former)	NSW	Listed place
HMAS Penguin	NSW	Listed place
Headquarters 8th Brigade Precinct	NSW	Listed place
Headquarters Training Command Precinct	NSW	Listed place
Kirribilli House	NSW	Listed place
Kirribilli House Garden & Grounds	NSW	Listed place
Macquarie Lighthouse	NSW	Listed place
Macquarie Lighthouse Group	NSW	Listed place
Macquarie Lighthouse Surrounding Wall	NSW	Listed place
Marine Biological Station (former)	NSW	Listed place
Military Road Framework - Defence Land	NSW	Listed place
Naval Store	NSW	Listed place
Navy Refuelling Depot and Caretakers House	NSW	Listed place
North Head Artillery Barracks	NSW	Listed place
North Sydney Post Office	NSW	Listed place
Office Building	NSW	Listed place
Officers Mess, HQ Training Command	NSW	Listed place
Paddington Post Office	NSW	Listed place
Pyrmont Post Office	NSW	Listed place
Reserve Bank	NSW	Listed place
Residences Group	NSW	Listed place
Rigging Shed and Chapel	NSW	Listed place
School of Musketry and Officers Mess, Randwick Army Barracks	NSW	Listed place

Name	State	Status
Shark Point Battery	NSW	Listed place
Sydney Customs House (former)	NSW	Listed place
Ten Terminal Regiment Headquarters and AusAid Training Centre	NSW	Listed place
Thirty Terminal Squadron Precinct	NSW	Listed place
Victoria Barracks Perimeter Wall and Gates	NSW	Listed place
Victoria Barracks Precinct	NSW	Listed place
Victoria Barracks Squash Courts	NSW	Listed place

Listed Marine Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat known to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area

Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]	Vulnerable	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Garigal	NSW
North Head	NSW
Sydney Harbour	NSW

Invasive Species[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence
within area		
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.84905 151.27645

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](#)
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- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
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- [-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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Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	MH	Anna Boden	On file	Andrew Chitty	On file	17/12/2019
B	MH	Kerry Neil	On file	Andrew Chitty	On file	18/12/2019
C	MH	Avanish Panikkar	On file	Andrew Chitty	On file	20/12/2019
1	MH	Anna Boden Kerry Neil	On file	Andrew Chitty	On file	25/02/2020
2	MH	Anna Boden	On file	Andrew Chitty	On file	30/03/2020
3	MH	Anna Boden Avanish Panikkar John McManus Michael Goodall	On file	Andrew Chitty	On file	11/05/2020

