Appendix K

Aquatic ecology assessment

White Bay 6 Marine Park - Modification 5 to MP06-0037

Aquatic Ecology Assessment

Prepared on behalf of EMM Consulting Pty Ltd
5 September 2016
Final Report

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SUMMARY

Ocean Environmental was engaged by EMM Consulting to undertake a marine habitat survey and impact assessment for a modification (modification 5) to major project approval MP06-0037 to allow for, amongst other things, the construction of an additional floating finger pontoon (approximately 30 m long x 3 m wide) to allow for reorientation of berthed vessels. No dredging or excavation of marine sediments will be associated with the proposed works. This report provides the results of a field survey and aquatic environmental assessment undertaken and considers matters listed under Sections 21 and 63 of the Sydney Harbour REP where applicable.

Various intertidal and subtidal habitats were present at the study site including an intertidal rocky area created by a rock revetment at the site, subtidal rocky areas also created by the rock revetment (some of which were inhabited by dense macroalgae beds), intertidal and subtidal surfaces of floating pontoons and piles and un-vegetated subtidal seafloor. No mangroves, saltmarsh or seagrass were present in the study area, nor have they been mapped by NSW DPI in close proximity to the site. Marine macroalgae was present and has the potential to be impacted if appropriate mitigation measures are not adopted during construction.

There are a number of threatened and / or protected marine species listed under the FM Act 1994, TSC Act 1995 and EPBC Act 1999 that have the potential to occur in the study area. The ones with the highest chance of occurring are syngnathids (i.e. seahorses and pipefishes), black rock cod and little penguins. However, assessments of significance indicated that none of these species will be significantly impacted by the proposed works. In addition, they were not detected during the field survey.

Potential direct and indirect impacts on the marine environment associated with the proposed works include noise impacts, impacts on water quality associated with suspended sediments / turbidity and pollution and minor direct / indirect impacts on existing marine habitats and associated marine fauna. No risks associated with acid sulfate soils are expected as no dredging or excavation will occur at the site.

Overall, it is considered that the potential impacts on the marine environment of construction and operation described in this report will be minor and temporary and can be mitigated or managed effectively if the measures suggested within this report are adopted.

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1. INTRODUCTION

A modification (modification 5) to major project approval MP06-0037 for the White Bay 6 Marine Park, to allow for, amongst other things, the construction of an additional floating finger pontoon (approximately 30 m long x 3 m wide) to allow for reorientation of berthed vessels, is proposed. This report provides the results of an aquatic ecology field survey and environmental assessment undertaken for the proposed works.

1.1 Study Location

The study site is located within White Bay, Sydney Harbour. The location of the site and the extent of the survey area are shown in Figure 1.1.

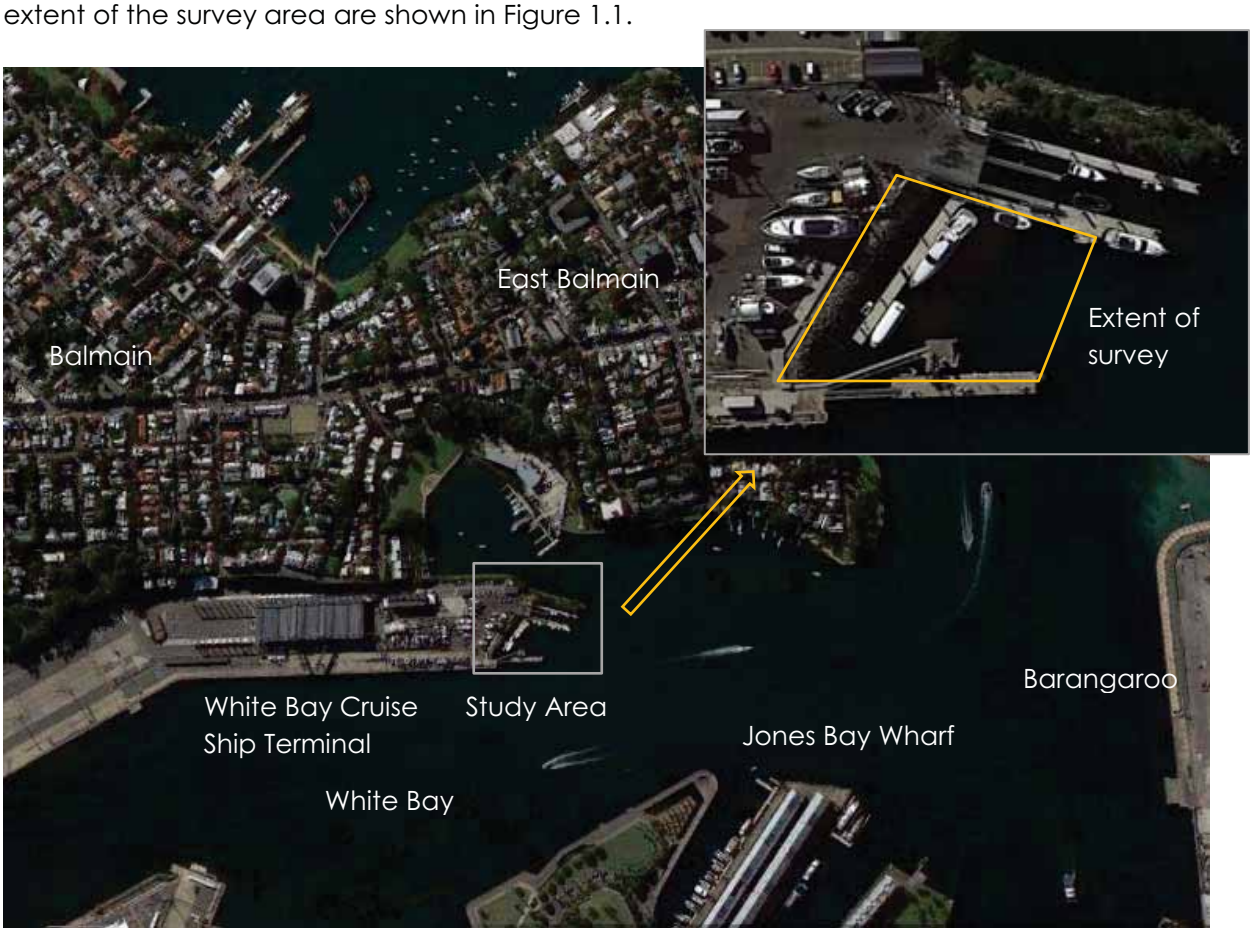


Figure 1.1 Location of the study site and extent of survey area.

1.2 Existing Facilities

Existing waterway facilities at the site include a floating marina with three main arms (pontoons); two of which are located in an approximate west to east configuration, one located in a north to south configuration and a refuelling wharf (Figure 1.2).

Existing north-south marina pontoon to which the proposed finger wharf will be attached.

Refuelling wharf (left) and one of the west-east facing pontoons (right).

Figure 1.2 Existing waterway facilities at the site.

1.3 Proposed Development

The proposed modification includes, amongst other things, an additional floating 'finger' pontoon (approx. 30 m long x 3 m wide) and pile attached to the existing marina (i.e. to the north-south facing pontoon) (Figure 1.3). The proposed pontoon is considered to be minor in nature compared to the existing structures at the site and its sole purpose is to allow for the reorientation of berthed vessels. The new pontoon will not affect the existing use or capacity of the site.

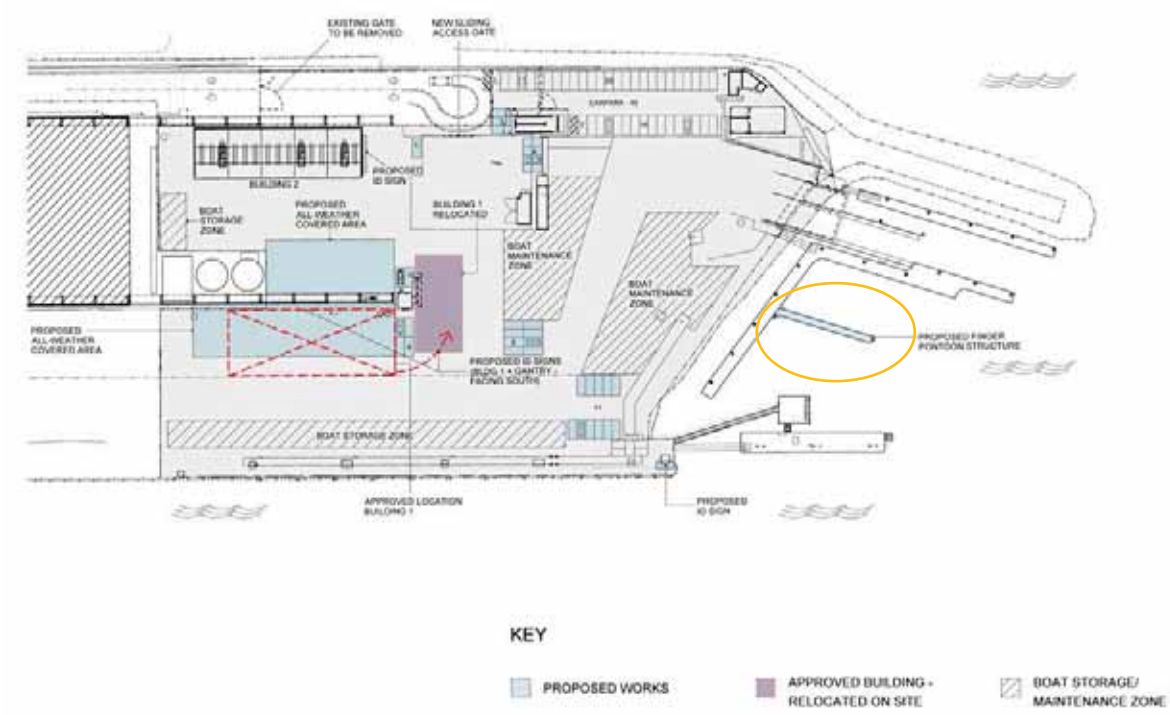


Figure 1.3 Proposed finger pontoon (circled in yellow) (figure: EMM Consulting Pty Ltd).

Justification for Proposed Development

The existing main north-south pontoon is at 90-degrees to the prevailing wash from vessel traffic in the main channel and is also 90-degrees to the prevailing fetch across the widest component of the channel, between the site and Jones Street wharf to the south. The combination of these two issues causes significant wash and wave effect to this pontoon resulting in vessels not being able to be moored safely and securely in a 'side to' manner, as originally envisaged. This poses a safety risk to staff and customers boarding and embarking vessels as the vertical rise and fall can be up to 400 mm. Movement of this scale is also causing damage to both the pontoon and vessels as well as increasing the possibility of vessels breaking their mooring lines. The proposed finger pontoon will allow vessels to be berthed stern against the pontoon 'Mediterranean style' with the bow directly into the prevailing wash and fetch. This will virtually minimise any wash and fetch effects.

1.4 Scope of Works

Ocean Environmental was engaged to undertake an aquatic ecology survey and impact assessment for the construction and operation of the proposed finger pontoon. The objective of the study was to determine the nature of existing aquatic habitats in the immediate vicinity of the proposed development footprint, in particular to map any aquatic vegetation at the site, and to determine the potential environmental impacts of the proposal on these. The report also considers the matters listed under Section 21 and 63 of the Sydney Harbour Regional Environment Plan where applicable to this report.

2. STUDY METHODS

2.1 Review of Existing Ecological Data

2.1.1 Sydney Harbour Ecology

A brief review of the aquatic ecology of Sydney Harbour, including the potential occurrence of threatened and protected fauna listed under the New South Wales (NSW) *Fisheries Management* (FM) *Act* 1994, NSW *Threatened Species Conservation* (TSC) *Act* 1995 and Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) *Act* 1999 is provided.

2.1.2 Threatened and Protected Species

The potential for State and Commonwealth threatened and protected aquatic species, as listed under the NSW FM Act 1994, NSW TSC Act 1995 and EPBC Act 1999, to occur in the study area was determined by undertaking online database searches of the following:

- Schedules 4 to 6 of the NSW FM Act 1994 (for species listed under the FM Act 1994) http://www.legislation.nsw.gov.au/xref/inforce/?xref=Type%3Dact%20AND%20Year%3D1994%20AND%20no%3D38&nohits=y (see **Appendix 1**)
- NSW National Parks and Wildlife Service (NPWS) Atlas of NSW Wildlife (BioNet) (for species listed under the TSC Act 1995) (a search area of 10 km radius around the study site is automatically selected by this database) http://www.bionet.nsw.gov.au/ (see **Appendix 2**)
- Department of Sustainability, Environment, Water, Populations and Communities (DSEWPC) Protected Matters Search Tool (for species listed under the EPBC Act 1999) (a search area of 10 km radius around the study site was manually selected) http://www.environment.gov.au/epbc/pmst/index.html (see **Appendix 3**)

For those species considered to have the potential to occur at the study site and be affected by the proposed development, an *Assessment of Significance* was undertaken under the relevant Act in accordance with the guidelines below.

- The NSW FM Act 1994 "Threatened Species Assessment Guidelines – Assessment of Significance": http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/226536/Threatened-Species-Guidelines.pdf
- The NSW TSC Act 1995 "Threatened Species Assessment Guidelines – Assessment of Significance": http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
- The Commonwealth EPBC Act 1999 "Matters of National Environmental Significance – Significant Impact Guidelines": http://www.environment.gov.au/epbc/publications/pubs/nes-guidelines.pdf

2.1.3 Estuarine Vegetation Mapping (NSW DPI)

All aquatic vegetation (including mangroves, saltmarsh, seagrass and seaweeds) on public water, land and foreshores is protected under the NSW FM Act 1994. Harming or removal of marine vegetation is generally only permissible by permit. Prior to the field survey, mapping of aquatic estuarine vegetation undertaken by NSW DPI was referred to, specifically Port Jackson (Map 1). This map is based on aerial photography from 2000 which was ground truthed in field surveys undertaken in 2002/2003. The map can be found online at http://www.dpi.nsw.gov.au/research/areas/aquatic-ecosystems/estuarine-habitats-maps/IINSW_EstMac_map39a.pdf (**Appendix 4**).

2.1.4 Wetlands Protection Area (Harbour REP)

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Harbour REP) includes a range of matters for consideration by consent authorities assessing development within the Foreshores and Waterways Area of the Plan. The Harbour REP includes provisions relating to wetlands protection. The Harbour REP Wetlands Protection Area Maps were referred to, specifically Map #4 (provided in **Appendix 5**). The map can be found online at http://www.planning.nsw.gov.au/~/media/Files/DPE/Maps/map-wetlands-protection-area-sheet-4-of-16-map-2005.ashx

2.1.5 Acid Sulfate Soils Risk Mapping

Areas that potentially contain acid sulfate soils have been mapped for the NSW coastline at a scale of 1:25,000 (NSW Government Department of Environment and Heritage 2013); http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm. The risk maps show the probability of acid sulfate soil occurring, the estimated depth to acid sulfate soil, and the environmental risk associated with disturbing the soil. The Acid Sulfate Soil Risk Map #90 (Prospect / Parramatta River) was referred to and is provided in **Appendix 6**.

2.2 Aquatic Ecology Field Survey

A field survey to document aquatic habitats and fauna at the site was undertaken on 20th August 2016. Conditions on the day were fine and sunny with light winds. Air temperatures ranged from 10°C to 16°C and the water temperature was approximately 18°C. Underwater visibility was poor but typical for the area at ~ 1-2 m depending on location at the site.

The field survey followed the *NSW Maritime Marine Habitat Survey Guidelines* (2010). These provide a framework for assessing impacts of development in the marine environment. A marine habitat survey is required when applying for Land Owner's Consent or development under Part 5 of the *Environment Planning and Assessment (EP&A) Act* 1979. It is also required where a proposed structure or activity has the potential to impact on marine habitat.

The guidelines require the following information to be obtained:

- The existence of aquatic vegetation within a minimum 20 m of the proposal.

- Details of the survey area and sampling method.
- Photographs of the sampling area.
- Description of dominant habitats and species in the intertidal and subtidal zones, including the incidence of threatened species.
- Direct and indirect impacts on marine habitat both during and after construction.
- Proposed mitigation measures both during and after construction.

The aquatic ecology survey at the site was undertaken using SCUBA throughout the area shown in Figure 1.1. Underwater video of the site was collected using a Canon HD video camera with underwater housing. This was later analysed and still images captured.

3. RESULTS

3.1 Review of Existing Ecological Data

3.1.1 Sydney Harbour Ecology

Sydney Harbour is a drowned river valley with depths of up to 45 m. The estuary has three main branches; Middle Harbour to the north and the Parramatta and Lane Cove Rivers extending south, then westward. The estuary is approximately 30 km long, with a surface area of about 50 km^2. The estuary is highly modified. Over 50% of the foreshore has been armoured and 90% of the catchment is urbanised or industrialised. Despite this, it supports a wide array of marine habitats including sandy beaches, intertidal rocky shores, subtidal reefs and soft sediment habitats (SIMS 2015). Significant areas of marine vegetation can be found. Seagrass and macroalgae are common in the outer harbour, with mangrove and saltmarsh in the upper reaches of the waterway (Adam et al. 1985; McLoughlin 2000).

These marine habitats support a highly diverse biota. Over 127 taxa are known from intertidal rocky shores. Lower shores are characterised by foliose macroalgae and habitat forming invertebrate species such as the polychaete *Galeolaria caespitosa* and solitary ascidian *Pyura stolonifera*. The mid shore is characterised by oysters (e.g. Sydney rock oysters, *Saccostrea glomerata*), limpets, barnacles and encrusting algae (SIMS 2015). Subtidal soft sediment habitats which dominate the harbour floor support diverse assemblages of benthic infauna including polychaete worms, amphipods, crustaceans, ascidians, cnidarians, brittle stars, bivalves and gastropods (WorleyParsons 2009, 2010, 2015). The Australian Museum database records 308 species of worms, 118 echinoderms, 1375 molluscs and 672 crustaceans from soft bottom benthic communities. Artificial structures such as seawalls, piles, jetties and floating structures also provide significant areas of hard substratum for the attachment of sessile marine biota (e.g. sponges, ascidians and macroalgae) and associated mobile species including fish, syngnathids and crustaceans (Connell & Glasby 1999; Glasby 1999).

Nearly 600 species of fish are known from the waterway and over 60% of these are found in subtidal reef habitats (Australian Museum 2014; SIMS 2015). Common species include yellow fin bream (*Acanthopagrus australis*), tarwhine (*Rhabdosargus sarba*), snapper (*Chrysophrys auratus*), mullet, dusky flathead (*Platycephalus fuscus*), sand whiting (*Sillago ciliate*), leatherjackets (Family: Monocanthidae), luderick (*Girella tricuspidata*) and largetooth flounder (*Pseudorhombus arsius*) (Cardno Ecology Lab 2009). Schooling species such as yellowtail scad (*Trachurus novaezelandiae*) and Australian mado (*Atypichthys strigatus*) are also commonly found around artificial structures (Australian Museum 2014).

3.1.2 Threatened Species Assessment

Threatened species search results for the study area are provided in **Appendix 1** (FM Act 1994), **Appendix 2** (TSC Act 1995) and **Appendix 3** (EPBC Act 1999). The NSW FM Act 1994, NSW TSC Act 1995 and Commonwealth EPBC Act 1999 list a number of threatened and / or

protected species which are known to occur or have the potential to occur in the study area as listed in the sections below.

NSW FISHERIES MANAGEMENT ACT 1994

Listed below are species listed under various schedules of the FM Act 1994 with the potential to occur in the study area.

Schedule 4: Endangered Species, Populations and Ecological Communities

Species listed under Schedule 4 of the FM Act 1994 with the potential to occur in the study area include the following:

- Scalloped hammerhead shark (*Sphyrna lewini*) – endangered species
- Southern bluefin tuna (*Thunnus maccoyii*) – endangered species
- Strapweed (*Posidonia australis*) Sydney Harbour population – endangered populations
- Marine worm (*Hadrachaeta aspeta*) – species presumed extinct
- Green sawfish (*Pristis zijsron*) – species presumed extinct
- Bennetts seaweed (*Vanvoorstia bennettiana*) – species presumed extinct

Schedule 4A: Critically Endangered Species and Ecological Communities

Species listed under Schedule 4A of the *FM Act* 1994 with the potential to occur in the study area include the following:

- Grey nurse shark (*Carcharius taurus*) – critically endangered species
- Marine slug (*Smeagol hilaris*) – critically endangered species
- Marine brown algae (*Nereia lophocladia*) – critically endangered species

Schedule 5: Vulnerable Species and Ecological Communities

Species listed under Schedule 5 of the *FM Act* 1994 with the potential to occur in the study area include the following:

- Great white shark (*Carcharodon carcharias*) – vulnerable species
- Black cod (*Epinephelus daemelii*) – vulnerable species
- Great hammerhead shark (*Sphyrna mokarran*) – vulnerable species

Schedule 6: Key Threatening Processes

No key threatening processes listed under Schedule 6 of the *FM Act* 1994 are associated with the current proposal.

Considering the known habitats and conservation status of each of the species listed above, the only species which are considered to have a moderate chance of occurring at the study

site are strapweed (*P. australis*) and black cod (*E. daemelii*). Neither of these species were identified during the field survey.

Assessments of Significance

The FM Act 1994 specifies a set of seven factors which must be considered in assessing the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats. These factors are collectively referred to as the 'seven-part test'. An Assessment of Significance under the FM Act 1994 was undertaken for both strapweed and black cod (Table 3.1). The assessment indicated that no significant impacts on these species are expected to occur as a result of the proposed works.

Table 3.1 Assessments of significance for strapweed and black cod.

Seven Part Test	Strapweed	Black Cod
a. In the case of threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at the risk of extinction.	No	No
b. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	No	No
c. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at the risk of extinction.	No	No
d. In relation to the habitat of a threatened species, population or ecological community: i) The extent to which habitat is likely to be removed or modified as a result of the action proposed. ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action. iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	No	No
e. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	No	No
f. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	Yes	Yes
g. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	No	No
Significant Impact Expected to Occur?	**No**	**No**

THREATENED SPECIES CONSERVATION ACT 1995

Marine species listed under the TSC Act 1995 which have been reported to occur within a 10 km radius of the study site, their conservation status and likelihood of occurrence at the site are listed in Table 3.2.

Table 3.2 Species listed under the TSC Act 1995 with the potential to occur at the study site.

Common Name	Scientific Name	Status*	Likelihood of Occurrence**
Leatherback Turtle	*Dermochelys coriacea*	E1, P	Low
Little Penguin	*Eudyptula minor*	P	Moderate
New Zealand Fur-seal	*Arctocephalus forsteri*	V, P	Low
Australian Fur-seal	*Arctocephalus pusillus doriferus*	V, P	Low
Unidentified Fur-seal	*Arctocephalus sp.*	P	Low
Unidentified Seal	*Seal sp.*	P	Low
Leopard Seal	*Hydrurga leptonyx*	P	Low
Southern Elephant Seal	*Mirounga leonina*	P	Low
Southern Right Whale	*Eubalaena australis*	E1, P	Low
Common Dolphin	*Delphinus delphis*	P	Low
Bottlenose Dolphin	*Tursiops truncatus*	P	Low

* Conservation status: P = protected, V = vulnerable, E1 = endangered, E2 = endangered population.

** Determined using known habitat data.

Of the species listed above the little penguin is the only species with a moderate chance of occurring in the study area. The little penguin is the only penguin species that breeds on the Australian mainland. The only known mainland breeding colony in NSW is in a secluded cove in the Manly area of Sydney Harbour. This colony has been declared an endangered population and areas of penguin habitat around Manly have been declared 'critical habitat' and are mapped under the Sydney REP 2005 (refer to **Appendix 7**). While no areas of Little Penguin critical habitat occur within the study area, these birds often utilise waters throughout the harbour. No little penguins were identified at the site during the field survey.

Assessment of Significance

An *Assessment of Significance* under the TSC Act 1995 was undertaken for the little penguin (Table 3.3). The results of this assessment indicated that no significant impacts are expected to occur on this species as a result of the proposed pontoon installation.

Table 3.3 Assessment of significance under the TSC Act 1995.

Seven Part Test	Little Penguin
a. In the case of threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at the risk of extinction.	No
b. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	No
c. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at the risk of extinction.	No
d. In relation to the habitat of a threatened species, population or ecological community: i) The extent to which habitat is likely to be removed or modified as a result of the action proposed. ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action. iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	No
e. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	No
f. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	Yes
g. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	No
Significant Impact Expected to Occur?	**No**

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The EPBC Act Protected Matters Search lists 84 threatened species (including both terrestrial and marine plants and animals), 76 listed migratory species, 100 listed marine species and 14 whales and other cetaceans, which are known to occur, or have the potential to occur, in the study area (i.e. within a 10 km radius of the study site). These numbers include a large number of marine and migratory marine birds, which are not considered to have the potential to be impacted by the proposal, and are not included within the tables and assessment of significance below.

All threatened and listed marine species (excluding marine birds) under the *EPBC Act* 1999 with the potential to occur in the study area, and their conservation status, are listed in Table 3.4. This table also provides a likelihood of occurrence which is determined by the database.

Table 3.4 Species listed under the EPBC Act 1999 with the potential to occur at the study site.

Common Name	Scientific Name	Status*	Likelihood of Occurrence**
Black Rock Cod	*Epinephelus daemelii*	V	Species or species habitat likely to occur within area.
Yellow-bellied Seasnake	*Pelamis platurus*	L	Species or species habitat may occur within area.
Loggerhead Turtle	*Caretta caretta*	E, M, L	Species or species habitat **known to occur** within area.
Green Turtle	*Chelonia mydas*	V, M, L	Foraging, feeding or related behaviour **known to occur** within area.
Leatherback Turtle	*Dermochelys coriacea*	E, M, L	Foraging, feeding or related behaviour **known to occur** within area.
Hawksbill Turtle	*Eretmochelys imbricate*	V, M, L	Species or species habitat **known to occur** within area.
Flatback Turtle	*Natador depressus*	V, M, L	Foraging, feeding or related behaviour **known to occur** within area.
Grey Nurse Shark (east coast pop.)	*Carcharias Taurus*	CE	Species or species habitat **known to occur** within area.
Great White Shark	*Carcharodon carcharius*	V, M	Species or species habitat **known to occur** within area.
Porbeagle Shark	*Lamna nasus*	M	Species or species habitat likely to occur within area.
Whale Shark	*Rhincodon typus*	V, M	Species or species habitat may occur within area.
Bryde's Whale	*Balaenoptera edeni*	M, W	Species or species habitat may occur within area.
Blue Whale	*Balaenoptera musculus*	E, M, W	Species or species habitat may occur within area.
Southern Right Whale	*Eubalaena australis*	E, M, W	Species or species habitat **known to occur** within area.
Humpback Whale	*Megaptera novaeangliae*	V, M, W	Species or species habitat **known to occur** within area.
Pygmy Right Whale	*Caperea marginata*	M, W	Species or species habitat may occur within area.
Killer Whale (Orca)	*Orcinus orca*	M, W	Species or species habitat may occur within area
Minke Whale	*Balaenoptera acutorostrata*	W	Species or species habitat may occur within area
Dusky Dolphin	*Lagenorhynchus obscurus*	M, W	Species or species habitat may occur within area.
Common Dolphin	*Delphinus delphis*	W	Species or species habitat may occur within area.
Spotted Dolphin	*Stenella attenuata*	W	Species or species habitat may occur within area.

Indian Ocean Bottlenose Dolphin	*Tursiops aduncus*	W	Species or species habitat likely to occur within area.
Bottlenose Dolphin	*Tursiops truncates s. str.*	W	Species or species habitat may occur within area.
Indo Pacific Humpback Dolphin	*Sousa chinensis*	M	Species or species habitat likely to occur within area.
Risso's Dolphin	*Grampus griseus*	W	Species or species habitat may occur within area.
New Zealand Fur Seal	*Arctocephalus forsteri*	L	Species or species habitat may occur within area.
Australian Fur Seal	*Arctocephalus pusillus*	L	Species or species habitat may occur within area.
Giant Manta Ray	*Manta birostris*	M	Species or species habitat may occur within area.
Reef Manta Ray	*Manta alfredi*	M	Species or species habitat **known to occur** within area.
Dugong	*Dugong dugon*	M, L	Species or species habitat may occur within area.
Syngnathids	*22 various spp.*	L	Species or species habitat may occur within area.

* Conservation status: V = vulnerable, E = endangered, CE = critically endangered, M = migratory marine species, L = listed marine species, W = whales and other cetaceans.
** Determined by the database.

The Protected Matters Search reports that "species, species habitat, foraging, feeding or related behaviour" is "known to occur" within the study area for the marine turtle species listed (i.e. loggerhead turtle, green turtle, leatherback turtle, hawksbill turtle, flatback turtle), the grey nurse shark, great white shark, Southern right whale, humpback whale and reef manta ray. There is also available habitat at the study site for rock cod and syngnathids (seahorses, pipefishes and weedy and leafy sea dragons). Syngnathids occur in a range of habitats and are particularly well known in shallow inshore waters (including estuaries and seagrass areas) and around artificial structures (such as pylons, jetties and seawalls). During the field survey inspection of the artificial structures and seagrass area for syngnathids was made and none were recorded.

Although classed as "known to occur" it is unlikely that most of the species listed above would be found at the study site. Available habitat in the search area (i.e. 10 km radius which includes oceanic waters) is the most likely reason these species have been listed. No marine turtles were observed and it is unlikely they would occur here. Additionally, the site does not provide suitable habitat for grey nurse sharks, great white sharks or reef manta rays and it is very unlikely that whales would occur this far into the harbour.

Assessments of Significance

Assessments of Significance under the *EPBC Act* 1999 for each of these species were undertaken and are provided in Table 3.5. The results of these assessments indicated that no significant impacts are expected to occur as a result of the proposed works.

3.1.3 Estuarine Vegetation Mapping (NSW DPI)

No aquatic vegetation has been mapped at the study site by NSW DPI (Figure 3.1). An area of *Halophila* seagrass has been mapped to the north of the site in a small bay on the southern shore of Balmain East. This seagrass will not be impacted by the proposal in any way. No other seagrass, mangroves or saltmarsh have been mapped in the area. The original estuarine vegetation map is provided in **Appendix 4**.

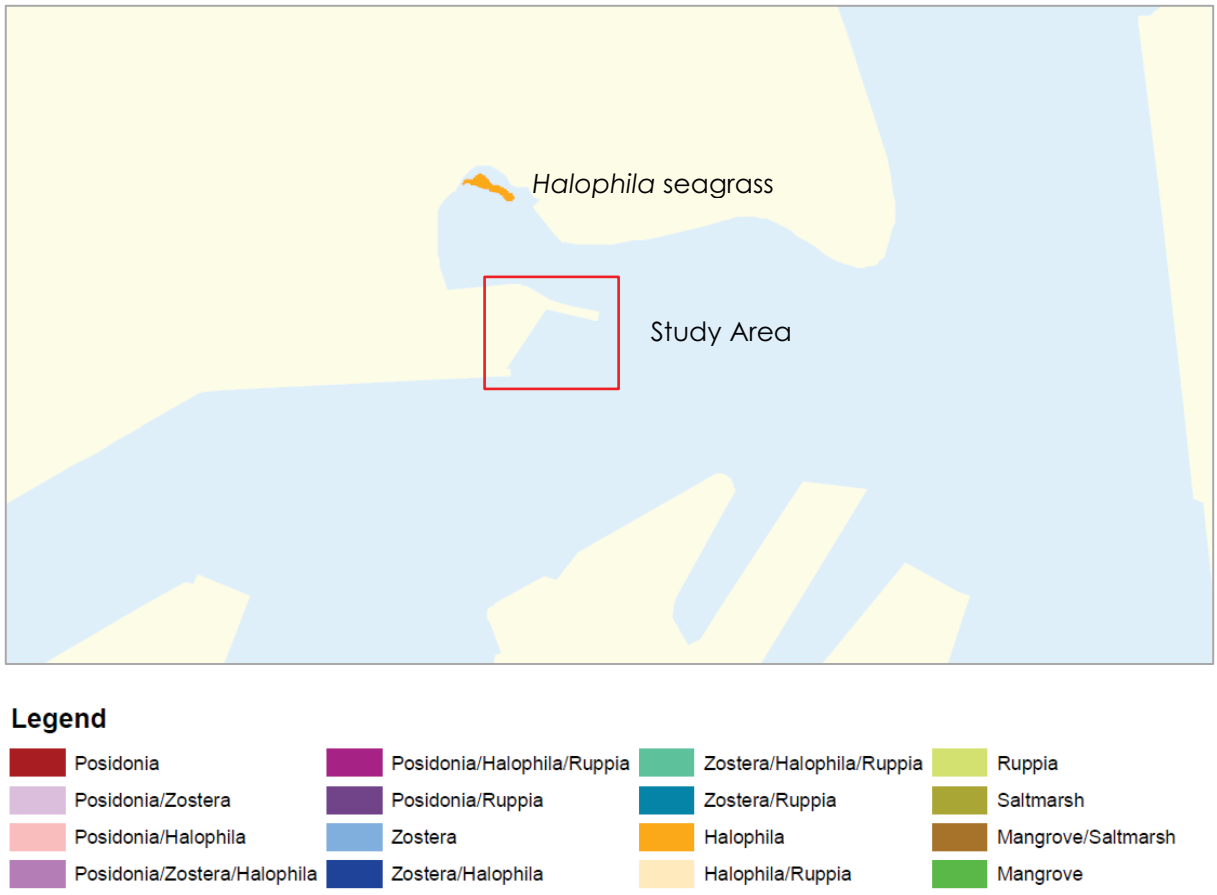


Figure 3.1 Excerpt from the NSW DPI estuarine vegetation map #39 showing the location of the study site.

3.1.4 Wetlands Protection Area (Harbour REP)

Wetlands are described by NSW DPI (2005) as depressions that are inundated permanently or temporarily with water. Wetlands include a wide range of habitats including estuarine lakes and lagoons, mangrove and saltmarsh swamps, dune swamps and lagoons, upland lakes, lagoons and swamps, coastal floodplain forest, swamps and lagoons (NSW DPI 2005).

The Harbour REP 2005 Wetlands Protection Area Map #4 (provided in **Appendix 5**) shows that the study site is not located in a Wetlands Protection Area (DIPNIAR 2005). An excerpt from this map showing the location of the study site is shown in Figure 3.2.

Figure 3.2 Excerpt from the Wetlands Protection Area Map #4 showing the location of the study site.

3.1.5 Acid Sulfate Soils Risk Mapping

Acid Sulfate Soil Risk Maps predict the distribution of acid sulfate soils based on assessment of the geomorphic environment. Typical landforms associated with acid sulfate soils include bottom sediments associated with lakes, lagoons, tidal creeks, rivers and estuaries.

Acid Sulfate Soil Risk Map #90 (Prospect/Parramatta River)(provided in **Appendix 6**) indicates that there is a "*high probability of acid sulfate soils occurring below water level in the bottom sediments*" of most of Sydney Harbour, including at the study site (i.e. areas denoted by purple in the excerpt shown below in Figure 3.3). The Risk Map states that there is a "severe environmental risk if bottom sediments are disturbed by activities such as dredging".

No dredging or excavation of marine sediments is proposed as part of the construction of the finger pontoon. Therefore, no risks associated with acid sulfate soils are expected to occur.

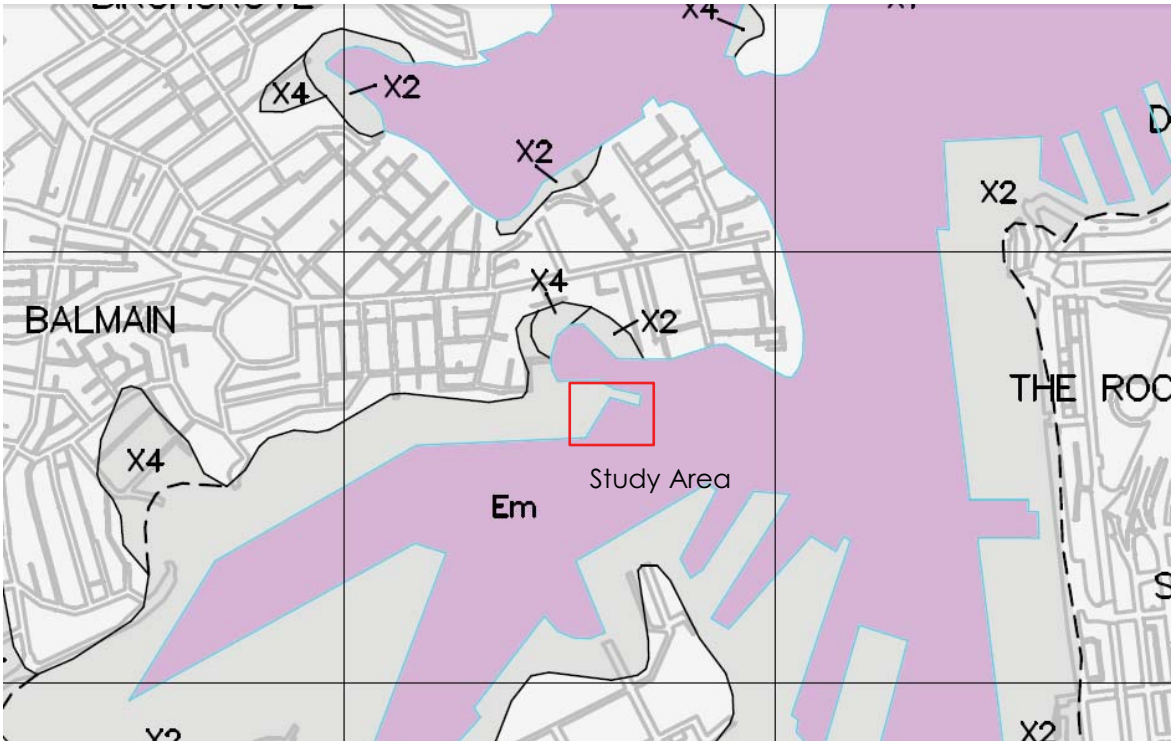


Figure 3.3 Excerpt from the Acid Sulfate Soil Risk Map #90 showing the location of the study site.

3.2 Marine Habitat Field Survey

Various intertidal and subtidal habitats were present at the study site, the majority of which were artificial habitats created by the existing wharf structures (e.g. surfaces of the floating pontoons and piles) and the rock revetment along the western shoreline of the site (creating intertidal and subtidal rocky habitat). Dense areas of marine macroalgae were found on the subtidal rocky areas associated with the rock revetment and along its base in inshore areas. These macroalgae beds extended seawards (east) approximately to the inner side of the north-south floating pontoon. Subtidal rocky habitat with no macroalgae growth was found underneath the existing pontoons, seawards of the rock revetment. Un-vegetated soft sediment seabed covered the majority of the seafloor within the study area, east of the existing north-south facing pontoon and extending out into White Bay. No seagrass, mangroves or saltmarsh were present at the study site. The general location of the seabed habitats at the site are shown in Figure 3.4. These are described further with images provided in the following sections.

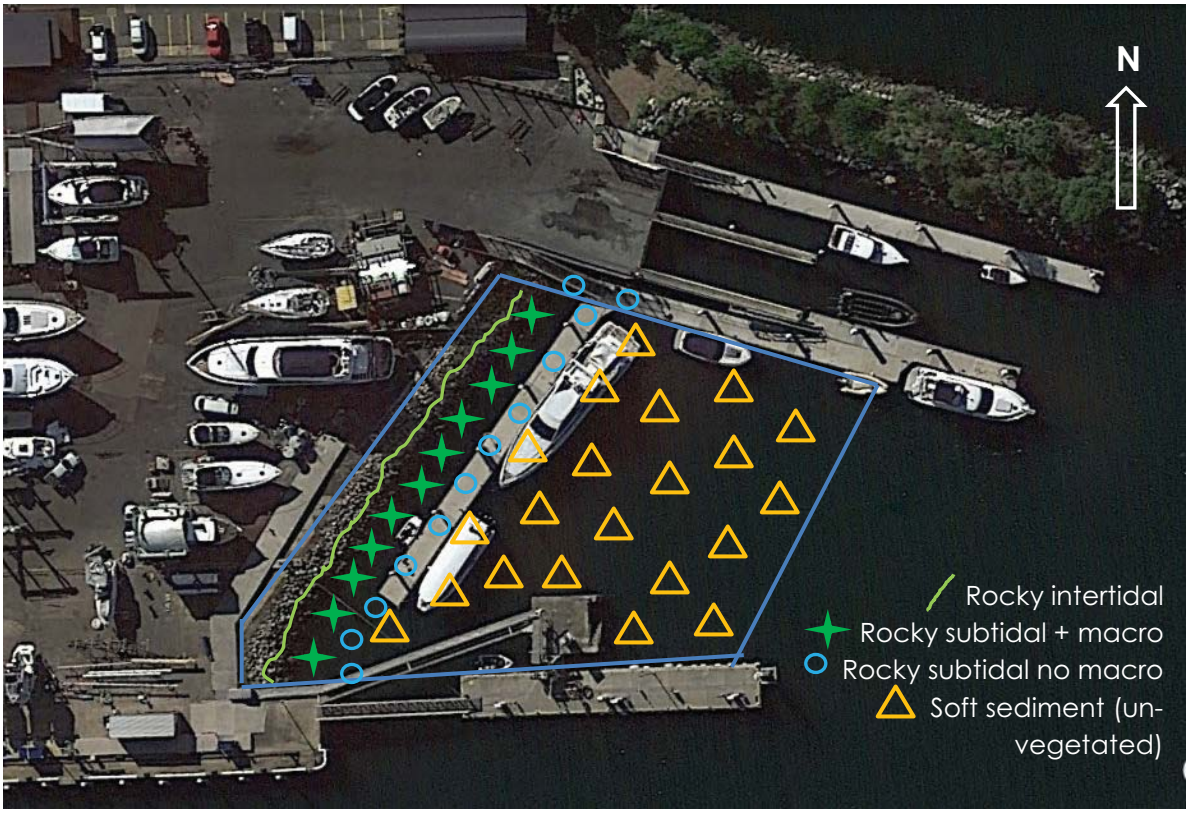


Figure 3.4 Distribution of marine habitats in the study area.

3.2.1 Rocky Intertidal (Rock Revetment)

A rocky intertidal area created by the rock revetment (artificial structure) on the western shore of the study area behind the existing north-south facing floating pontoon occurs at the site. No native riparian or aquatic vegetation (e.g. mangroves or saltmarsh) were present in this area, with the only plants present being small exotic shrub and herb species. The

intertidal zone of the rock revetment was inhabited by small limpets, Sydney rock oysters (*Saccostrea glomerata*) and encrusted with filamentous green algae. Images of the intertidal rock revetment and associated flora and fauna are shown in Figure 3.5.

Rock revetment behind the existing north-south floating pontoon

Filamentous green algae and Sydney rock oysters were present in the intertidal zone.

Exotic plant species were found growing along the riparian zone of the rock revetment.

Figure 3.5 Rocky intertidal area formed by the rock revetment.

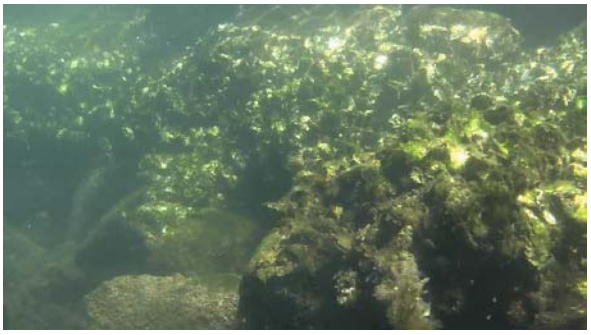
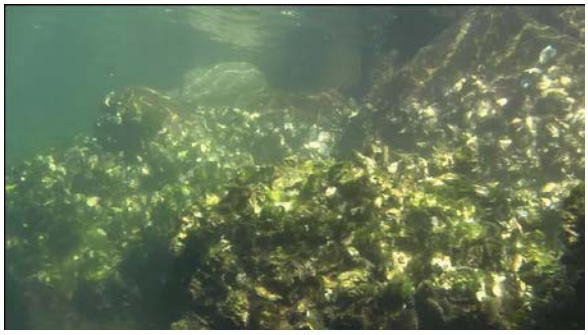
3.2.2 Rocky Subtidal (Rock Revetment and Seawall)

The rock revetment and small seawall near the refuelling wharf at the site also provide areas of subtidal rocky habitat. The transition zone between the intertidal and subtidal was inhabited by Sydney rock oysters (*S. glomerata*), filamentous green algae and solitary ascidians (*Pyura stolonifera*). The subtidal zone seaward of this was inhabited by diverse and dense beds of marine macroalgae. The dominant habitat forming species present included the large brown macroalgae *Ecklonia radiata* (kelp), *Sargassum sp*. and *Phyllospora sp.* Filamentous algae and smaller understorey species of red, brown and green varieties were also found covering the rocky substrate such as *Codium sp*., *Padina sp*., *Pterocladia capillacea, Lobophora sp., Dilophus sp.* and *Ulva sp.* (Figure 3.6).

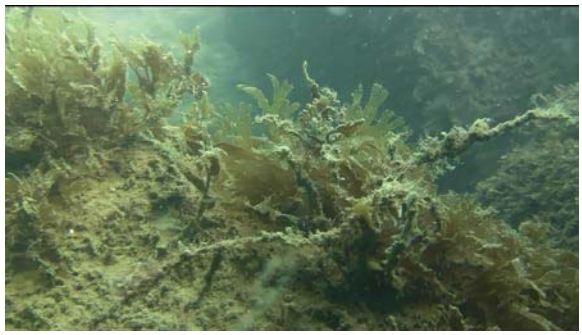
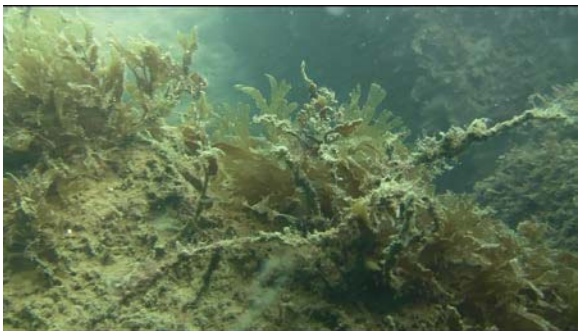
There was considerable sedimentation found on much of the macroalgae in this area, particularly in the deeper areas nearer to the soft sediment. This is presumably due to the effects of boat wash (e.g. from large commercial vessels using this area of the harbour), smaller boating activity on the existing wharf (e.g. through propeller wash) and natural tide / current activity remobilising sediments from the nearby soft sediment seafloor.

The subtidal macroalgae beds extended along the length of the western foreshore and seaward to the inner edge of the north-south facing pontoon (approximately). Around this area the seafloor transitioned to soft sediment with occasional boulders and smaller rocks that were covered in fine filamentous algae and other encrusting organisms such as bryozoans and sponges (Figure 3.7).

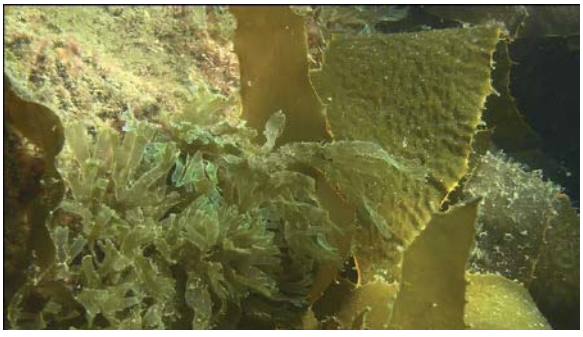
Fish fauna was common amongst the rocky subtidal areas of the site (refer to Section 3.2.6).

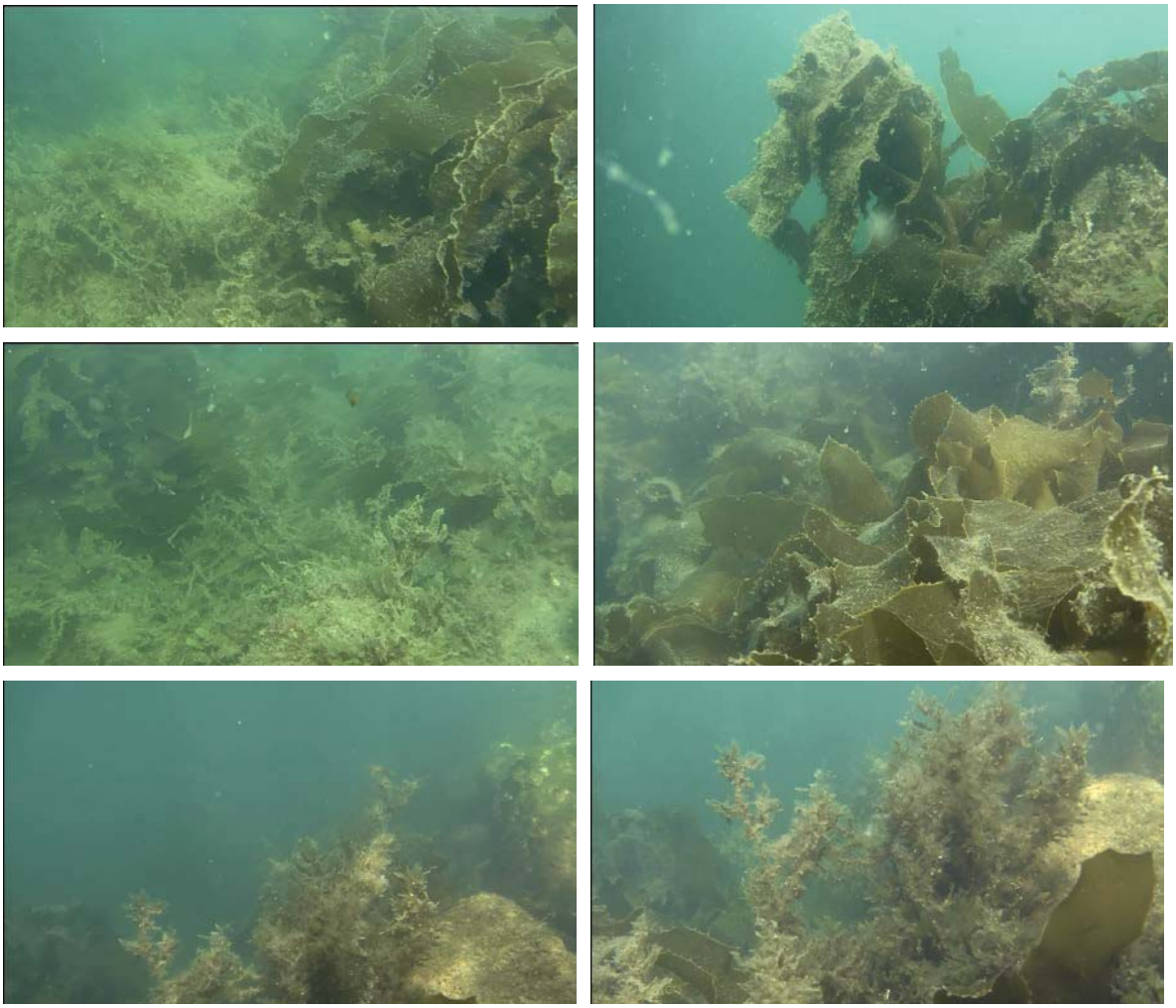



Transition between rocky intertidal and rocky subtidal zone.





A wide variety of marine macroalgae was found in the subtidal rocky area created by the rock revetment.

Transition between the macroalgae dominated seafloor and un-vegetated rocky subtidal area showing occasional kelp plants and a high level of siltation.

Figure 3.6 Subtidal rocky seafloor near the shoreline dominated by macroalgae.

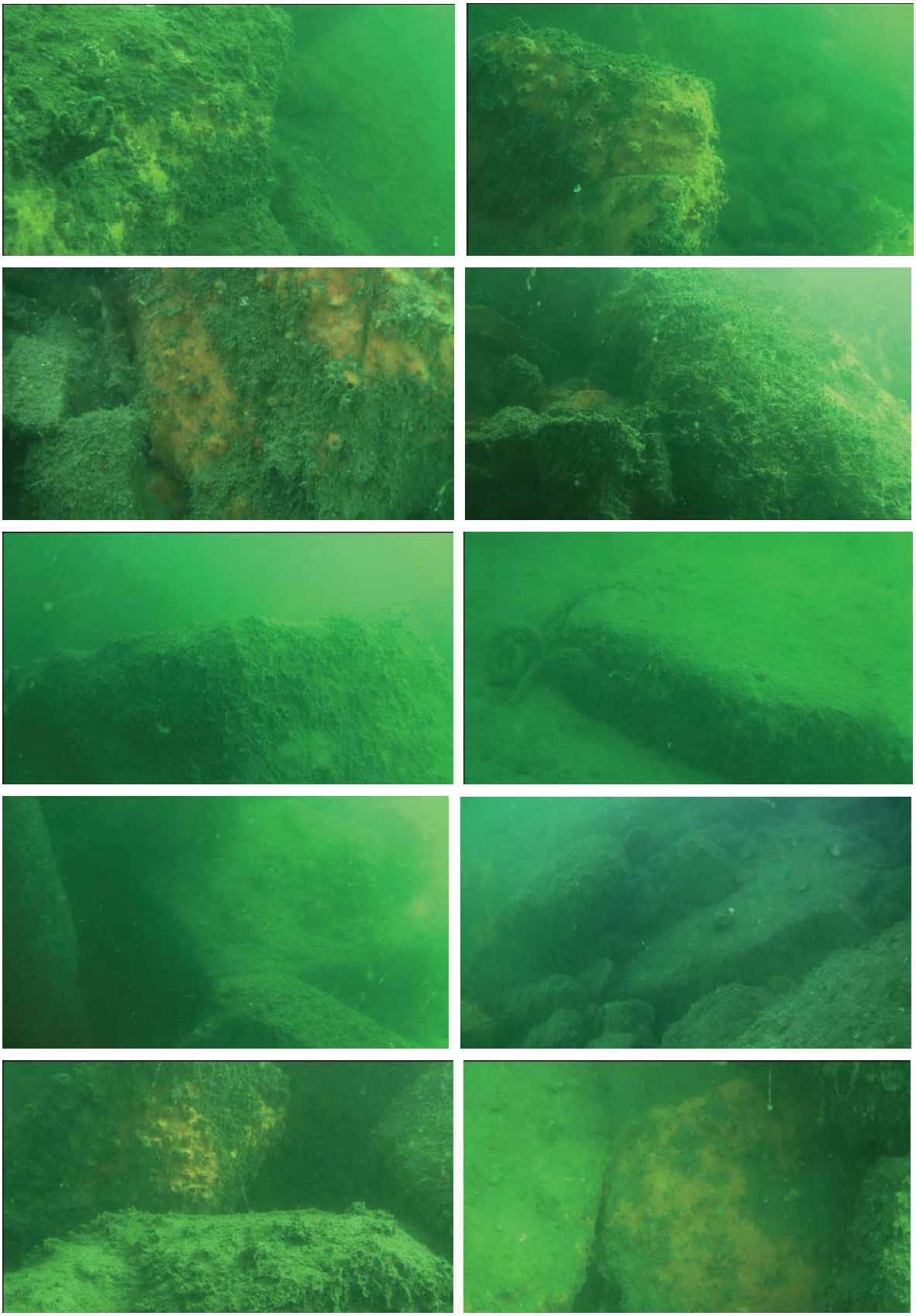


Figure 3.7 Subtidal rocky seafloor with no macroalgae. Encrusting organisms were present.

A small vertical seawall located near to the refuelling wharf also provides hard rocky substrate. Clear zonation of marine organisms was seen here, with small limpets occurring in the upper splash zone, a dense band of rock oysters below this in the intertidal, beneath which a band of the solitary ascidian *Pyura stolonifera* occurred. Below these organisms kelp (*E. radiata*) and smaller marine macroalgae were present. Filamentous algae grew on the wall closer to the seafloor. Images are shown in Figure 3.8.

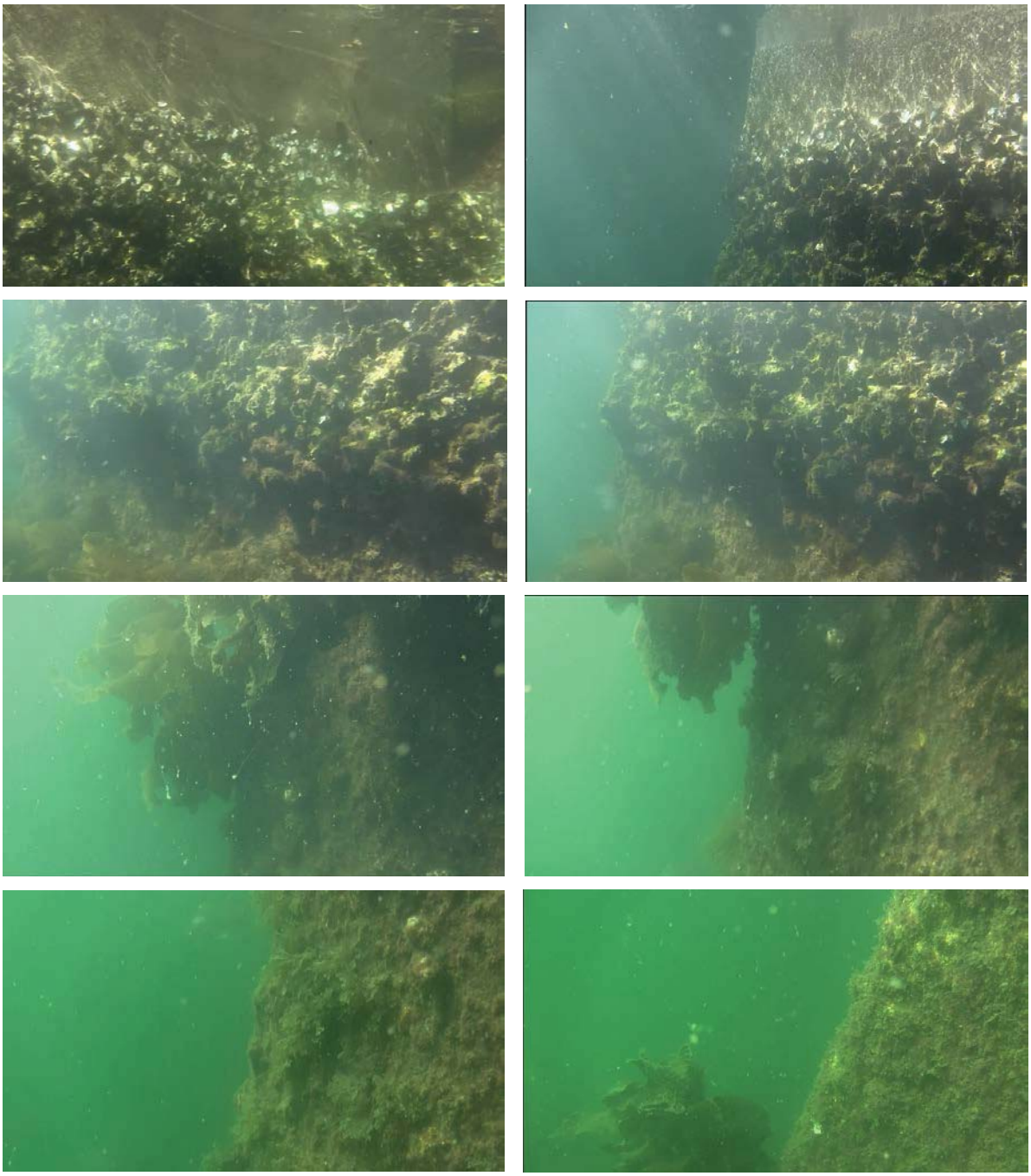
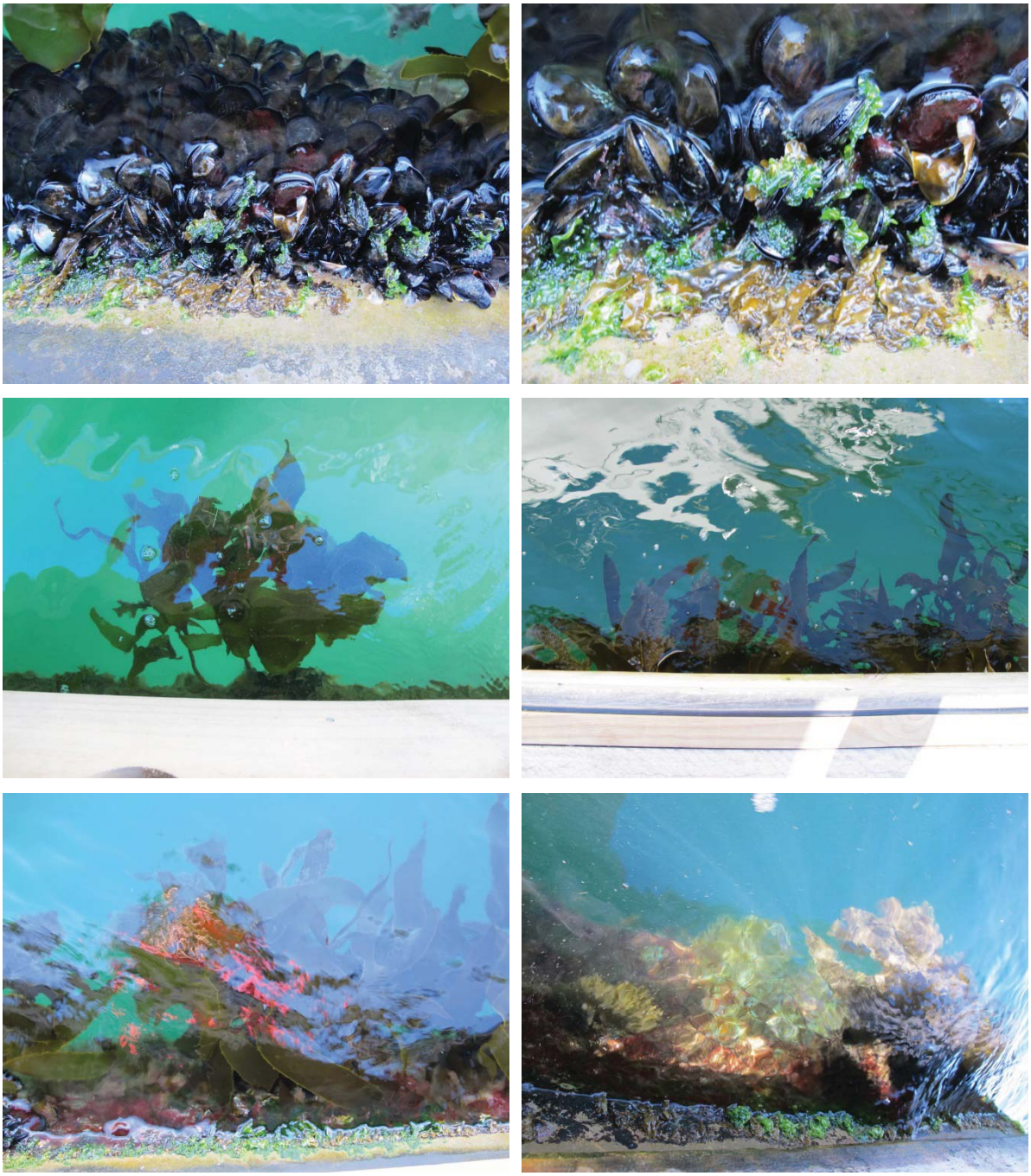


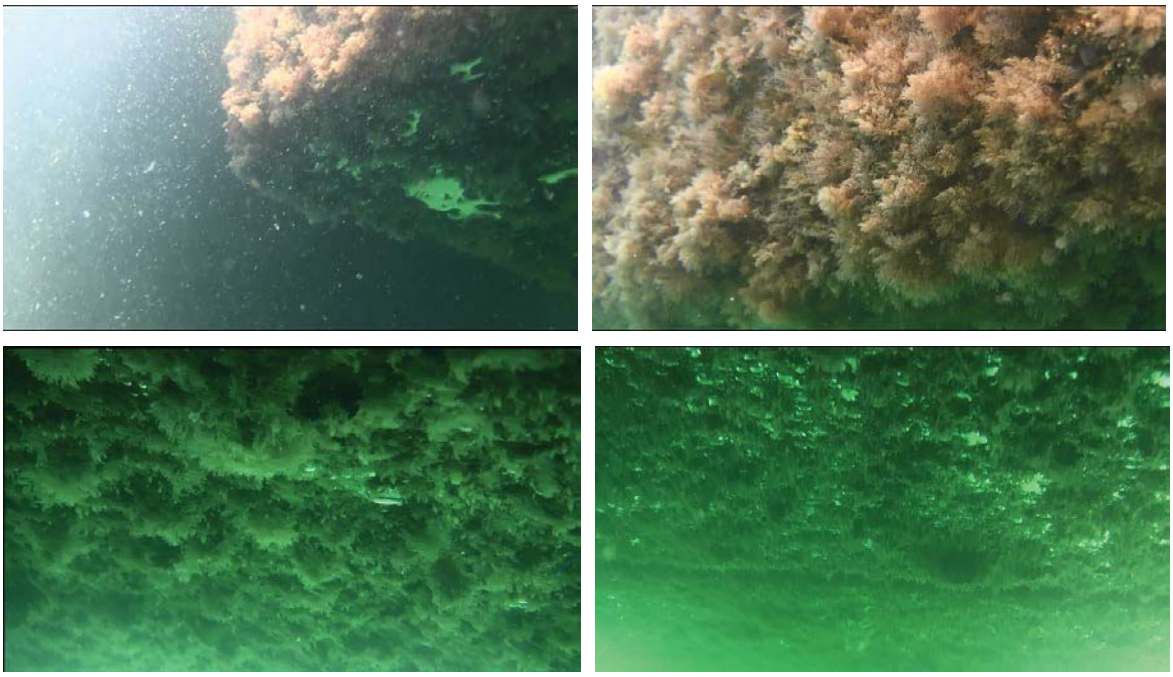
Figure 3.8 Seawall showing zonation of marine organisms.

3.2.3 Floating Pontoons

The floating pontoons present at the site provide hard substrate habitat, both intertidal (on the sides of pontoons) and subtidal (on the sides and underneath the pontoons). The intertidal zones of the floating pontoons supported dense accumulations of bivalves (e.g. mussels) and small green algae (e.g. *Ulva sp.*). *Ecklonia sp.* was also found attached to the sides of the pontoons along with an array of other small green, red and brown algae (including *Ulva sp.*, *Codium sp.*, coralline and iridescent red algae). Images are shown in Figure 3.9.



The sides of floating pontoons showing accumulations of mussels and a variety of small green, red and brown algae, along with the larger Ecklonia sp.



The undersides of floating pontoons were dominated by filamentous algae, microalgae and colonial ascidians.

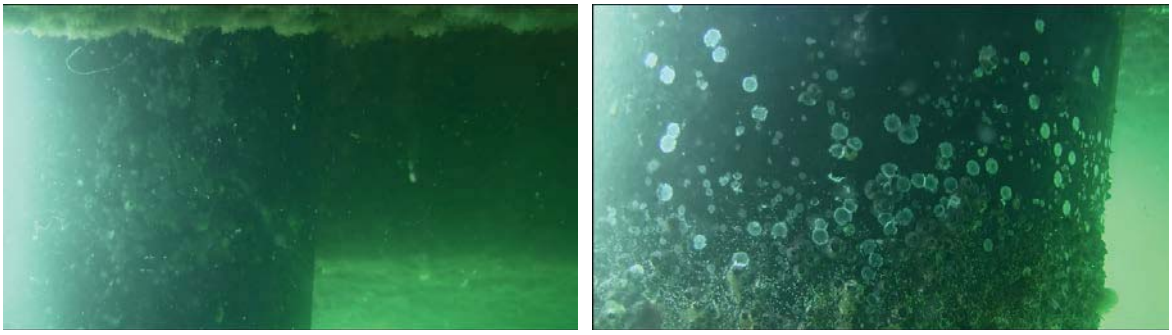
Figure 3.9 Marine growth on the floating pontoons.

3.2.4 Jetty Piles

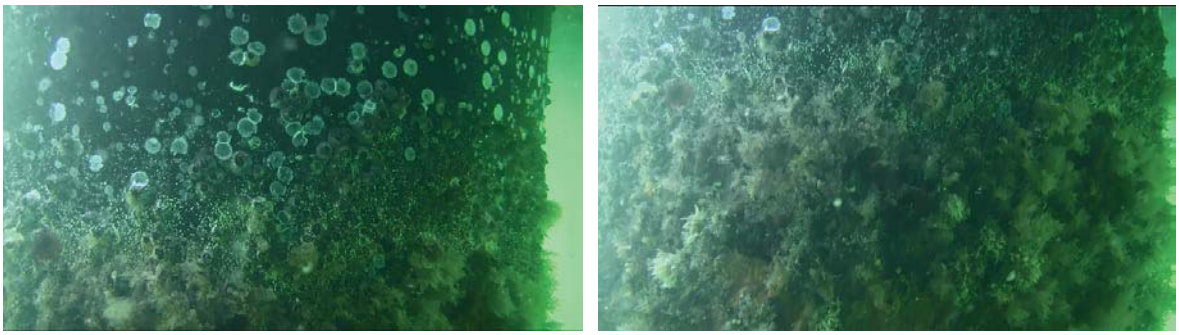
The wooden and HDPE piles in the study area, which were located underneath the existing wharves and floating pontoons, provide a hard substrate for the attachment of a wide array of marine flora and fauna. The upper levels of piles located underneath the wharves tended to be inhabited by rock oysters in the intertidal zone, directly underneath which a band of kelp (*E. radiata*) and other macroalgae species were generally found. These oyster and macroalgae areas tended to be absent from piles which were not exposed to sunlight located underneath the floating pontoons. These more shaded piles tended to have a greater number of small barnacles in this upper zone. Moving towards the seabed, encrusting marine organisms dominated the pile assemblages including bryozoans, ascidians and sponges. Occasional hydroids and small cnidarians (anemones) were also observed in

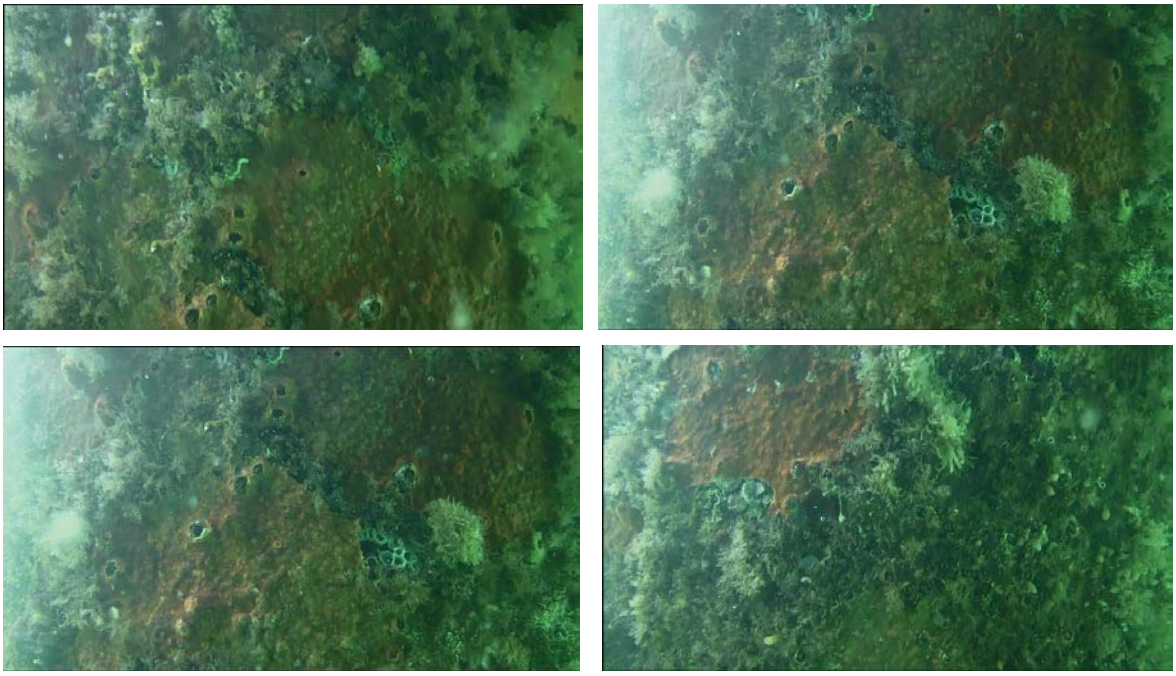
these lower areas. These organisms were seen to be more prevalent on the HDPE piles than the wooden piles. Wooden piles tended to support more macro and microalgae growth. Near to the seabed, encrusting marine fauna were replaced with a fine layer of microalgae. Images of the various marine growth on piles in the study area are shown in Figure 3.10.

The top of HDPE piles located underneath the wharves with rock oysters and Ecklonia sp.

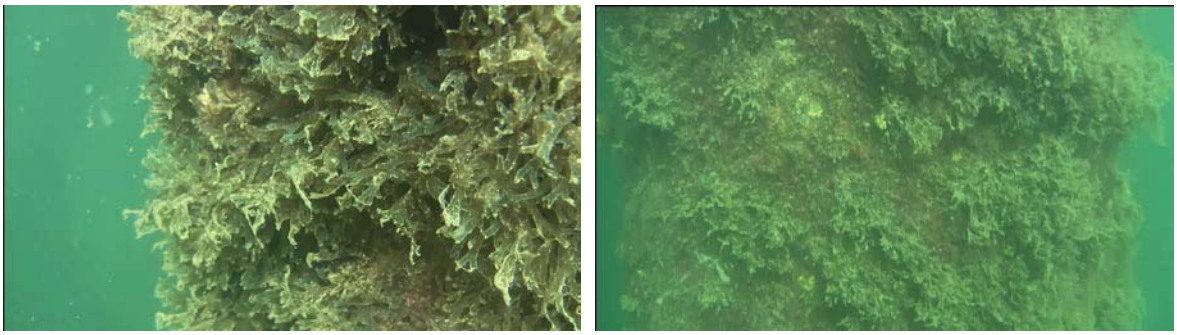


The top of piles located underneath the floating pontoons lacked the macroalgae and oysters present under the wharves and were dominated by small barnacles and microalgae.

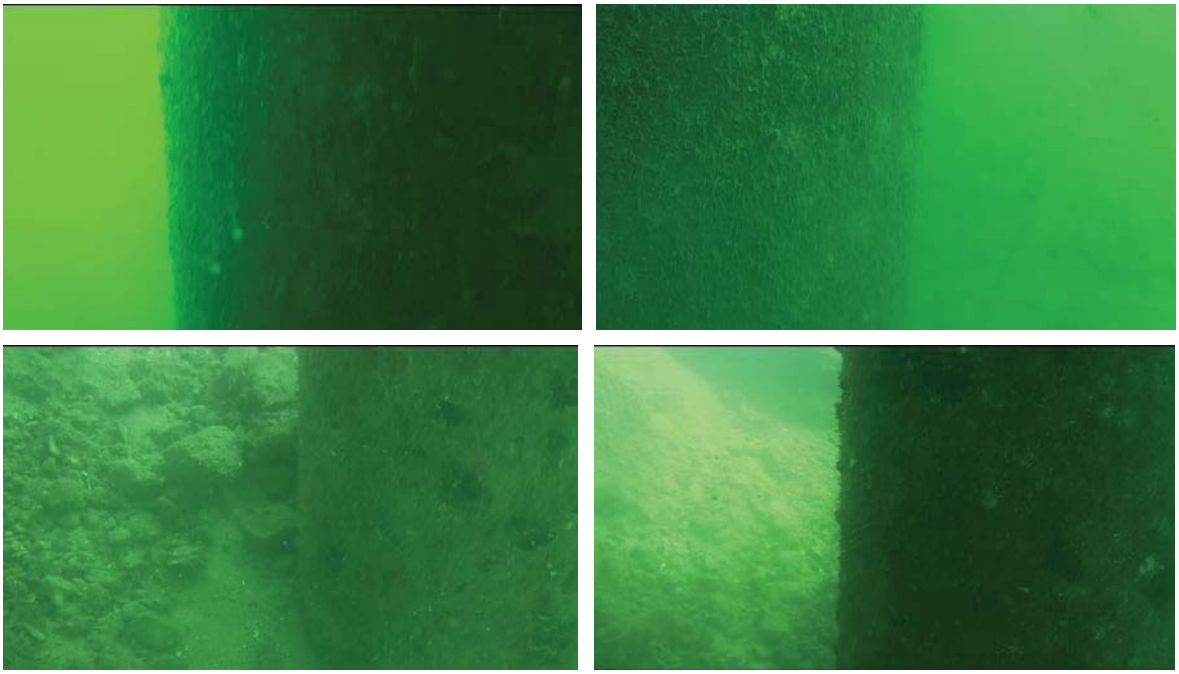




A wide variety of encrusting marine organisms including bryozoans, sponges, ascidians and microalgae were present on the mid levels of the HDPE piles.



Wooden piles tended to have more algae cover and less cover of encrusting marine fauna.

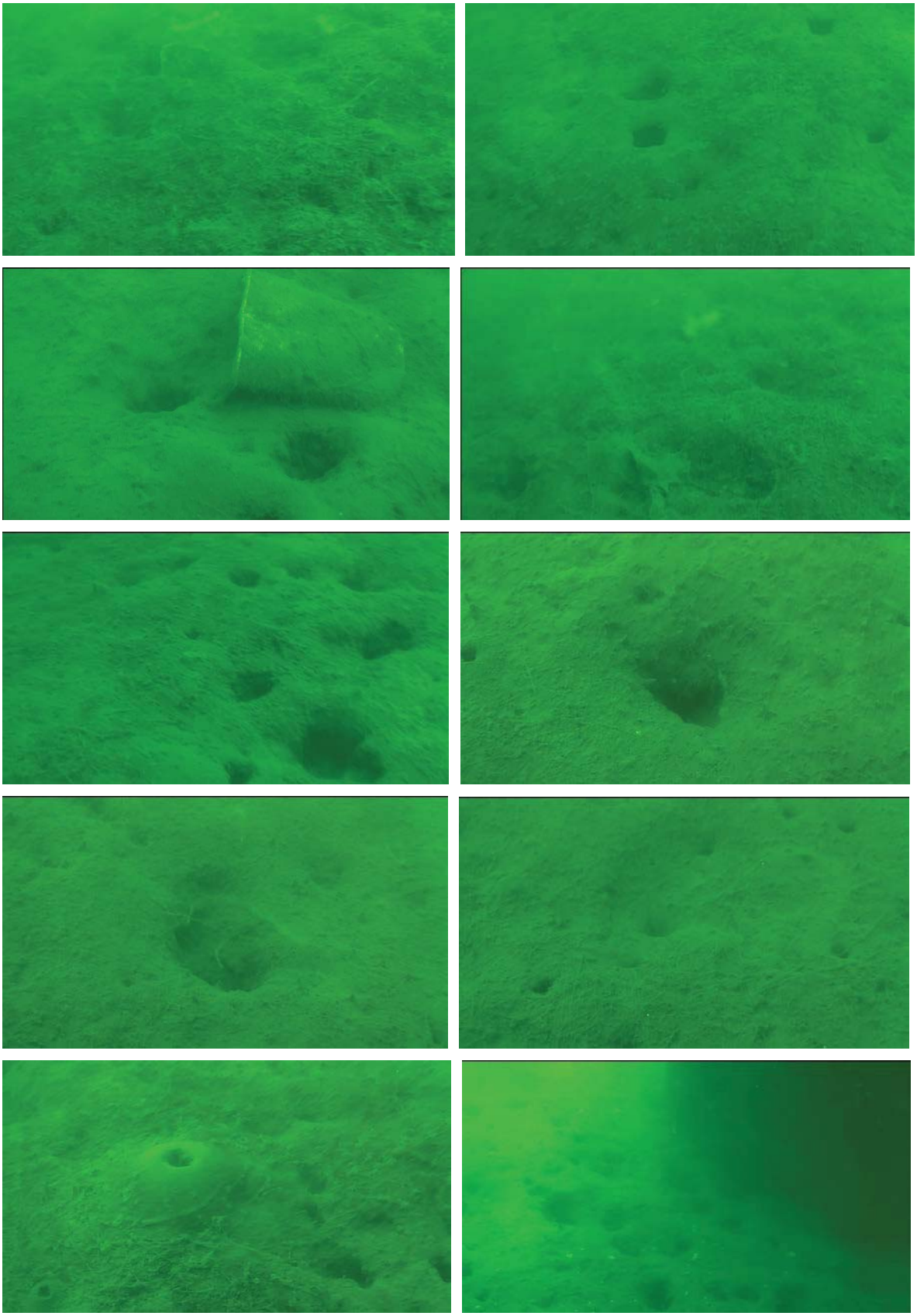


The lower areas of piles near the seabed were coated in a fine layer of microalgae and other encrusting organisms tended to be absent.

Figure 3.10 Marine growth on piles in the study area.

3.2.5 Soft Sediment Seafloor

The majority of the seafloor within the study area, including all of the seafloor underneath the footprint of the proposed finger pontoon, consisted of soft sediments which were un-vegetated (i.e. no seagrass or macroalgae were present in this area). The level of bioturbation of the seabed at the site was quite significant, with a high number of burrows of various sizes apparent, an indication that a wide range of mobile and burrowing benthic invertebrates utilise this subtidal habitat e.g. crustaceans, polychaetes, bivalves. One echinoderm (sea star) was seen on the seafloor during the survey however no other mobile invertebrates were witnessed. Fish fauna (e.g. bream) were also seen to utilise this soft sediment area, as with other areas of habitat at the site. The soft sediment seafloor became rocky on approach to the shoreline, approximately in line with the existing north-south floating pontoon. The proposed works are expected to have little impact on the marine ecology of this area. Images of the soft sediment seafloor at the site are provided in Figure 3.11.



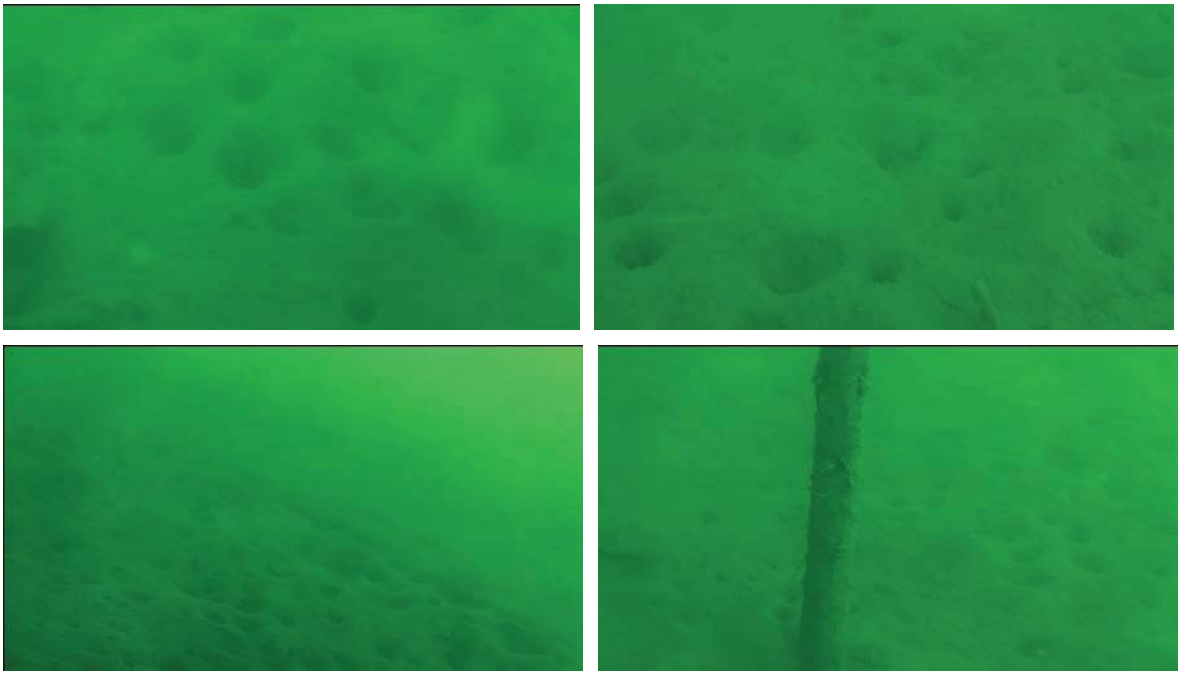


Figure 3.11 Soft sediment seafloor habitat in the study area.

3.2.6 Mobile Fauna

Mobile marine fauna seen during the field surveys included a variety of fish species, mainly around the subtidal rocky areas and jetty piles (e.g. leatherjackets, bream, groper and cardinal fish) and a single echinoderm on the soft sediment seafloor. No threatened or protected marine fauna which have the potential to occur at the site (e.g. syngnathids or rock cod) were seen during the survey. Images of some fish fauna seen during the surveys are provided in Figure 3.12.

Figure 3.12 Various fish fauna seen during the surveys.

4. POTENTIAL IMPACTS & MITIGATION

Potential impacts to marine habitats associated with the proposed construction and operation of the proposed finger pontoon are not expected to be significant. No dredging at the site is proposed and the site is already used for the berthing of vessels. The proposed structure will be a relatively small addition to the existing structures and will not change the usage of the site. Potential impacts associated with construction will generally be associated with installation of the new floating pontoon, piling activities and the use of construction vessels. Operational impacts will be minimal considering that the proposed structure is not going to change the current use of the site. These impacts and measures to mitigate these impacts are summarised in the sections below.

4.1 Noise

POTENTIAL IMPACTS

- There are likely to be short term noise impacts during the proposed works. These will include vessel and equipment engine noise and impact or high frequency pulse noise from piling. These have the potential to affect the behaviour of mobile marine biota, especially fish, birds and marine mammals. If present in the study area during construction these animals will likely avoid or leave the area.
- Considering that Sydney Harbour is subjected to regular underwater noise from both commercial and recreational vessels, the current use off the site, proximity to the White Bay Cruise Ship terminal and the relatively small scale of the proposed development, it is not expected that the short term noise impacts from the proposed construction and piling would be significant.

MITIGATION MEASURES

- Noise should be managed in accordance with the Office of Environment and Heritage (OEH) Interim Construction Noise Guideline 2009.
- Contractors should adopt the most efficient piling methods for the type of sediment present at the site to reduce the duration of noise impacts at the site.

4.2 Generation of Waste & Water Pollution

POTENTIAL IMPACTS

- Construction activities have the potential to generate general waste (e.g. food packaging from contractors), waste items associated with the pontoon being installed and there is also the potential for fuel and / or oil leaks from construction equipment and vessels. These can create water pollution and cause harm to marine vertebrates (e.g. shorebirds, fish and mammals).
- Ingestion and / or entanglement of marine fauna in marine debris is listed as a Key Threatening Process under the NSW TSC Act 1995 and the EPBC Act 1999. While the

potential for marine mammals to occur in the area is quite low (but possible), shorebirds and fish which are most likely to occur at the site are under risk from incorrect disposal of waste and water pollution if not managed correctly.

- Disturbance of marine sediments through installation of new piles may result in localised and short term increases in turbidity. Due to the water depths at the site vessel activities are unlikely to do so. If not contained, turbidity increases may result in short term reductions in light penetration, which, if sustained, can impact light requiring marine vegetation present at the site (e.g. macroalgae growing in rocky subtidal along the foreshore and attached to artificial structures at the site) and filter feeding organisms (e.g. sponges and ascidians attached to artificial structures). No seagrass is present at the site so seagrass does not have the potential to be harmed through disturbance of marine sediments.

MITIGATION MEASURES

- All equipment used should be well maintained to reduce the likelihood of fuel / oil leaks and spills so to reduce impacts on water quality and marina fauna.
- Oil spill response kits should be onsite during the works.
- All general waste generated should be contained and disposed of appropriately.
- All waste associated with installation of the new pontoon structure should be disposed of offsite – nothing should be left on the seafloor.
- A floating boom and silt curtain and / or sleeves around piles should be used to contain the spread of suspended marine sediments during piling works and to mitigate potential impacts of increased turbidity on macroalgae and sessile fauna at the site. A silt curtain will be particularly useful to divide the construction area from the inshore macroalgae bed and could be installed on the outer side of the existing north-south facing pontoon.

4.3 Direct Damage to Marine Habitats & Vegetation

POTENTIAL IMPACTS

- There will be a direct but extremely minor and short term impact of piling on the un-vegetated subtidal soft sediment habitat and associated marine infauna and mobile marina fauna utilising this habitat. Bioturbation of the seafloor indicated that a range of crustaceans, polychaetes and other burrowing organisms may reside within the sediments. Any direct harm to these benthic infauna caused through piling is not considered to be significant considering the very small footprint of the piling works and the fact that similar habitat occurs in most of the local waterway.
- Larger mobile fauna including crabs and rays that may utilise the soft bottom habitat at the site may also be disturbed or temporarily displaced.
- The new pontoon structure and piles will not cause any shading of marine vegetation at the site as they will be located over an area of un-vegetated soft sediment.
- The new pontoon structure will create new artificial habitat at the site consisting of an additional 90 m^2 + of wetted surface area for the attachment of sessile marine fauna and marine macroalgae which would be used by mobile species for shelter and feeding. The

assemblages likely to occur with time will likely resemble those reported on existing artificial structures (i.e. pontoons and piles) at the site during the current survey.
- Construction vessels have the potential to disturb the seabed and associated benthic fauna through anchoring, dragging in shallow areas (unlikely due to current water depths at the site), impacts of engines and potential pollution.

MITIGATION MEASURES

- Any anchoring of construction vessels should occur in areas of un-vegetated soft sediment (i.e. should not occur over macroalgae beds).
- A silt curtain and floating boom and/or sleeves around piles should be used during piling activities to protect areas of marine vegetation (i.e. macroalgae beds) from impacts of suspended sediments as much as practicably possible. These should be kept in place until any suspended sediment has fully settled.
- By reducing pollution and water quality impacts as per the recommendations listed in the previous sections, damage to marine habitat will also be minimised.

4.4 Impacts on Marine Fauna

POTENTIAL IMPACTS

- Short term avoidance of the area due to noise impacts.
- Ingestion or entanglement in debris from construction or general waste.
- Direct impacts on benthic marine infauna through piling activities.
- Creation of additional artificial habitat at the site.

MITIGATION MEASURES

- Silencers on engines and machinery should be used where possible.
- All general waste and construction waste should be contained and disposed of appropriately. No waste should be allowed to enter the waterway or be left on the seafloor.
- Contractors should stay alert to and/or be made aware of the presence of marina fauna. If any large mobile marine fauna (e.g. turtles, mammals) are present at the study site during construction, works should cease until they have left the area.

4.5 Acid Sulfate Soils

POTENTIAL IMPACTS

- Potential acid sulfate soils (PASS) pose an environmental risk if disturbed by activities such as dredging or excavation. On exposure to air, PASS oxidise and produce sulphuric acid. This can result in the acidification of sediments. Runoff and leachate from ASS can adversely impact aquatic communities.
- No dredging or excavation of marine sediments is proposed so no impacts associated with ASS are predicted to occur.

MITIGATION MEASURES

- Not required.

4.6 Monitoring During and After Construction

During construction works, in particular piling, areas outside the silt curtain should be monitored by eye to ensure that any suspended sediment is being contained and that no tears are present in the curtain. Care should especially be taken to ensure that turbidity levels do not increase over the inshore macroalgae beds. All care should be taken to avoid impacts to water quality. If any spills of fuel or oil occur from any equipment at the site all work shall cease while the spill is remediated. Due to the small footprint of proposed works and minor impact that the proposed works are expected to have on the local marine environment, monitoring after construction is considered unnecessary.

5. CONSIDERATION OF S21 AND S63 OF THE SYDNEY REGIONAL EMNVIRONMENT PLAN

5.1 21 - Biodiversity, Ecology and Environment Protection

The matters to be taken into consideration in relation to biodiversity, ecology and environment protection are as follows:

(a) development should have a neutral or beneficial effect on the quality of water entering the waterways,

Only minor and localised water quality impacts (e.g. increased turbidity) from the installation of the finger pontoon are expected. With adoption of appropriate mitigation measures any potential water quality impacts can be managed effectively and there will be a neutral effect on water quality.

(b) development should protect and enhance terrestrial and aquatic species, populations and ecological communities and, in particular, should avoid physical damage and shading of aquatic vegetation (such as seagrass, saltmarsh and algal and mangrove communities).

No terrestrial flora or fauna species will be affected by the construction or operation of the finger pontoon. The only terrestrial vegetation present in the study area is exotic / weed species growing on the rock revetment. Only minor and short term impacts on aquatic fauna will occur. These are not considered to be significant and can be mitigated effectively. Some minor impacts on marine macroalgae present along the western foreshore of the study area and on piles may occur and will be avoided where possible with the implementation of measures in Section 4. No impacts on seagrass, mangroves or saltmarsh will occur as they are not present at the site.

(c) development should promote ecological connectivity between neighbouring areas of aquatic vegetation (such as seagrass, saltmarsh and algal and mangrove communities).

No impacts on ecological connectivity between neighbouring areas of aquatic vegetation will occur. Measures will be adopted to avoid impacts to macroalgae.

(d) development should avoid indirect impacts on aquatic vegetation (such as changes to flow, current and wave action and changes to water quality) as a result of increased access.

The construction of the proposed finger pontoon will not change the current use of the site and there will be no increased access as a result of the current proposal.

(e) development should protect and reinstate natural intertidal foreshore areas, natural landforms and native vegetation.

No natural intertidal foreshore areas or landforms will be affected as they do not occur in the study area. The footprint of the finger pontoon will be over subtidal soft sediment marine habitat which is devoid of marine vegetation.

(f) development should retain, rehabilitate and restore riparian land.

No impacts on riparian land will occur from the proposed development.

(g) development on land adjoining wetlands should maintain and enhance the ecological integrity of the wetlands and, where possible, should provide a vegetative buffer to protect the wetlands.

Not applicable to the current development.

(h) the cumulative environmental impact of development.

The expected environmental impact of the current proposal will be minor, temporary and insignificant. In addition, all potential impacts can be managed or mitigated effectively. Therefore no cumulative impacts of the proposed floating pontoon with other developments are expected.

(i) whether sediments in the waterway adjacent to the development are contaminated, and what means will minimise their disturbance.

Sediment contamination was not covered as part of the current study. However, as no dredging or excavation of sediments is proposed there will be very little potential for any contaminants to be remobilised (i.e. only through piling). Mitigation measures will be adopted to prevent the spread of any resuspended sediments during the demolition and construction process.

5.2 63 - Matters for consideration

The matters to be taken into consideration in relation to any development are as follows:

(a) the development should have a neutral or beneficial effect on the quality of water entering the waterways.

Only minor and localised water quality impacts (e.g. increased turbidity) are expected. With adoption of appropriate mitigation measures any potential water quality impacts can be managed effectively and there will be a neutral effect on local water quality.

(b) the environmental effects of the development, including effects on:

(i) the growth of native plant communities,

Potential impacts on aquatic vegetation (macroalgae only) and mitigation measures to avoid or reduce these are described in Section 4.3. No significant impacts on native plant communities will occur. All impacts will be minor, localised and temporary and can be mitigated effectively.

(ii) the survival of native wildlife populations,

Potential impacts on native wildlife (fauna) and mitigation measures to avoid or reduce these are described in Section 4.4. No significant impacts on native wildlife will occur. All impacts will be minor, localised and temporary and can be mitigated effectively. The proposal will not threaten the survival of any native wildlife populations.

(iii) the provision and quality of habitats for both indigenous and migratory species,

Any impacts on the quality of local aquatic habitats which may be used by indigenous and/or migratory species will be extremely minor, localised and temporary. No significant impacts on native fauna, including threatened or protected species and their habitats will occur as a result of the proposed works. Additional artificial habitat will be introduced at the site through the construction of the new floating pontoon which will become colonised with aquatic flora and fauna and which may be used by syngnathids (protected under the FM Act 1994) and other fish species.

(iv) the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding areas, including salinity and water quality and whether the wetland ecosystems are groundwater dependent.

Not applicable. Surface and groundwater will not be affected by the current proposal.

(c) whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment.

Yes – management and mitigation measures for all potential environmental impacts have been proposed and are considered to be adequate to protect the environment. With the adoption of the mitigation measures described for the various potential impacts in Section 4 any impacts are likely to be minor, short term and insignificant.

(d) whether carrying out the development would be consistent with the principles set out in The NSW Wetlands Management Policy (as published in March 1996 by the then Department of Land and Water Conservation).

Yes. Aquatic vegetation (i.e. macroalgae) at the site will be protected through the implementation of measures described in Section 4.3.

(e) whether the development adequately preserves and enhances local native vegetation,

Yes. Potential impacts on native aquatic vegetation (macroalgae only) and mitigation measures to avoid or reduce these are described in Section 4.3. No significant impacts on

native aquatic plant communities will occur. All impacts will be minor, localised and temporary and can be mitigated effectively. No impacts on native terrestrial vegetation will result from the proposed works.

(f) whether the development application adequately demonstrates:

(i) how the direct and indirect impacts of the development will preserve and enhance wetlands, and

Yes. Refer to Section 4.3.

(ii) how the development will preserve and enhance the continuity and integrity of the wetlands, and

Yes. Refer to Section 4.3.

(iii) how soil erosion and siltation will be minimised both while the development is being carried out and after it is completed, and

Yes. Refer to mitigation measures outlined in Section 4.2 and 4.3.

(iv) how appropriate on-site measures are to be implemented to ensure that the intertidal zone is kept free from pollutants arising from the development, and

Yes. Refer to mitigation measures outlined in Section 4.2.

(v) that the nutrient levels in the wetlands do not increase as a consequence of the development, and

There will be no increase in nutrient levels as a result of the activity and development.

(vi) that stands of vegetation (both terrestrial and aquatic) are protected or rehabilitated, and

No terrestrial vegetation will be affected by the proposed development. Impacts to aquatic vegetation will be minimal and can largely be mitigated as per Section 4.3. No seagrass, mangroves or saltmarsh will be affected.

(vii) that the development minimises physical damage to aquatic ecological communities, and

Mitigation measures will be adopted to minimise any impacts on aquatic ecological communities at the site as per Section 4.3.

(viii) that the development does not cause physical damage to aquatic ecological communities,

Mitigation measures will be adopted to ensure that the development does not cause physical damage to aquatic habitats at the site as per Section 4.3.

(g) whether conditions should be imposed on the carrying out of the development requiring the carrying out of works to preserve or enhance the value of any surrounding wetlands.

Adoption of the management / mitigation measures described in Section 4 of this document will be sufficient to preserve or enhance the value of surrounding wetlands (i.e. aquatic vegetation at the site).

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Appendix 1 – NSW FM Act 1994 Search Results

New South Wales Consolidated Acts

FISHERIES MANAGEMENT ACT 1994 - SCHEDULE 4

SCHEDULE 4 – Endangered species, populations and ecological communities

(Section 220C)

Part 1 - Endangered species

Fish

Archaeophya adamsi Fraser, 1959	Adam's Emerald Dragonfly
Austrocordulia leonardi	Sydney Hawk Dragonfly
* Maccullochella ikei Rowland	Eastern Freshwater Cod
* Maccullochella macquariensis (Cuvier)	Trout Cod
*Macquaria australasica (Cuvier, 1830)	Macquarie Perch
Mogurnda adspersa (Castelnau, 1878)	Southern Purplespotted Gudgeon, Purple Spotted Gudgeon
Nannoperca australis Günther, 1861	Southern Pygmy Perch
* Nannoperca oxleyana Whitley	Oxleyan Pygmy Perch
* Prototroctes maraena (Günther, 1864)	Australian Grayling
Sphyrna lewini (Griffith & Smith, 1834)	Scalloped Hammerhead Shark
Thunnus maccoyii	Southern Bluefin Tuna

Marine vegetation

Part 2 - Endangered populations

Fish

Ambassis agassizii Steindachner, 1866, Agassiz's glassfish, olive perchlet, western New South Wales population
Craterocephalus amniculus (Crowley and Ivanstoff, 1990), Darling River Hardyhead, Hunter River population
Gadopsis marmoratus, river blackfish, Snowy River population
Tandanus tandanus (Mitchell, 1838), freshwater catfish, eel tailed catfish, Murray-Darling Basin population

Marine vegetation

* Posidonia australis Hook. f. (1858), seagrass, Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations

Part 3 - Endangered ecological communities

Aquatic ecological community in the natural drainage system of the lower Murray River catchment (as described in the recommendation of the Fisheries Scientific Committee to list the ecological community)

Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River (described in the recommendation of the Fisheries Scientific Committee to list that aquatic ecological community, as the area covered by that recommendation)

Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River (described in the recommendation of the Fisheries Scientific Committee to list that aquatic ecological community, as the area covered by that recommendation)

Aquatic ecological community in the catchment of the Snowy River in NSW (as described in the final determination of the Fisheries Scientific Committee to list that aquatic ecological community)

Part 4 - Species presumed extinct

Fish

Hadrachaeta aspeta Hutchings, 1977	Marine Worm
*Pristis zijsron Bleeker, 1851	Green Sawfish
Metaprotella haswelliana Mayer, 1882	Haswells Caprellid

Marine vegetation

* Vanvoorstia bennettiana (Harvey) Papenfuss (1956)	Bennetts Seaweed

New South Wales Consolidated Acts

FISHERIES MANAGEMENT ACT 1994 - SCHEDULE 4A

SCHEDULE 4A – Critically endangered species and ecological communities

(Section 220C)

Part 1 - Critically endangered species

Fish

* Carcharias taurus Rafinesque, 1810	Greynurse Shark
*Craterocephalus fluviatilis (McCulloch, 1913)	Murray Hardyhead
Euastacus dharawalus (Morgan, 1997)	Fitzroy Falls Spiny Crayfish
Galaxias rostratus	Flathead Galaxias
Smeagol hilaris Tillier & Ponder, 1992	Marine Slug

Marine vegetation

Nereia lophocladia J. Agardh (1897)	Marine Brown Alga

Part 2 - Critically endangered ecological communities

New South Wales Consolidated Acts

FISHERIES MANAGEMENT ACT 1994 - SCHEDULE 5

SCHEDULE 5 – Vulnerable species and ecological communities

(Section 220C)

Part 1 - Vulnerable species

Fish

Austropetalia tonyana (Theischinger, 1995)	Alpine Redspot Dragonfly
Bidyanus bidyanus (Mitchell, 1838)	Silver Perch
Branchinella buchananensis Geddes, 1981	Buchanans Fairy Shrimp
* Carcharodon carcharias (Linnaeus, 1758)	White Shark, Great White Shark
Epinephelus daemelii (Günther, 1876)	Black Rockcod, Black Cod
Euastacus armatus (von Martens 1866)	Murray Crayfish
Microrchestia bousfieldi Lowry & Peart, 2010	Bousfields Marsh-hopper
Sphyrna mokarran Ruppell, 1837	Great Hammerhead Shark

Marine vegetation

Part 2 - Vulnerable ecological communities

New South Wales Consolidated Acts

FISHERIES MANAGEMENT ACT 1994 - SCHEDULE 6

SCHEDULE 6 – Key threatening processes

(Section 220C)

Degradation of native riparian vegetation along New South Wales water courses

Hook and line fishing in areas important for the survival of threatened fish species

Human-caused climate change

Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams

Introduction of fish to waters within a river catchment outside their natural range

Introduction of non-indigenous fish and marine vegetation to the coastal waters of New South Wales

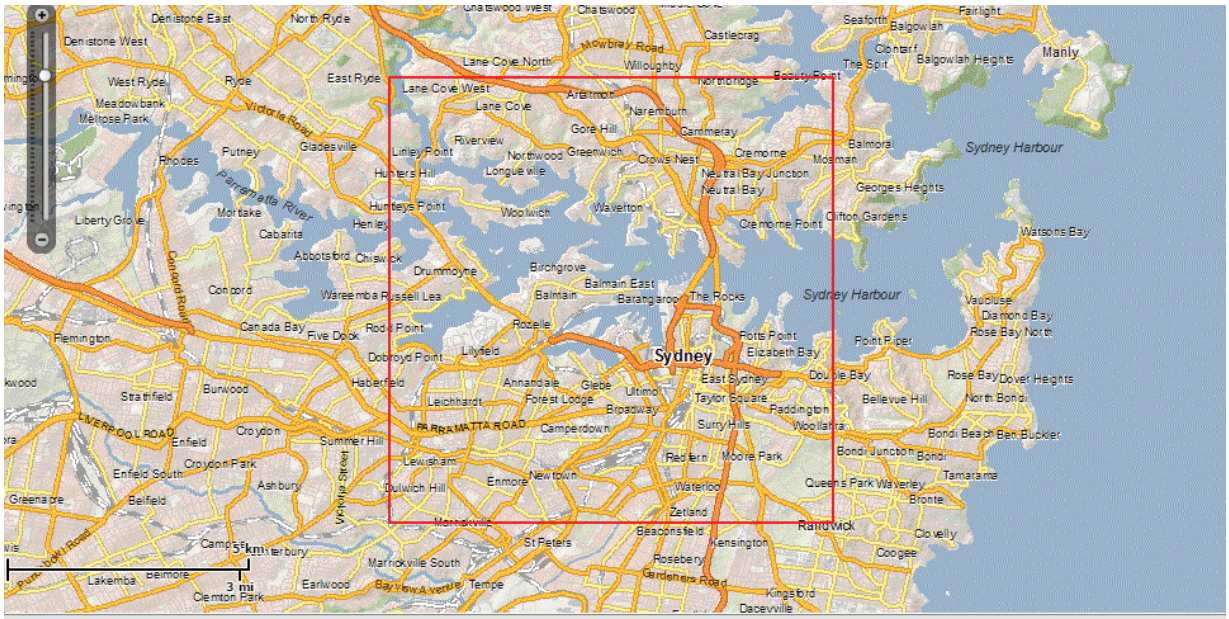
Removal of large woody debris from New South Wales rivers and streams

The current shark meshing program in New South Wales waters

Appendix 2 – NSW TSC Act 1995 Search Results

Threatened Fauna listed under the *TSC Act* 1995

Atlas of NSW Wildlife Search undertaken on 12 August 2016.



Map Extent

Decimal Degree

North: -33.81
West: 151.14
East: 151.24
South: -33.91

Show Extent

Use Extent

Use your mouse to define an area of interest on the map, or type the Geographic coordinates into the North, East, South and West fields to define a bounding box. Note that all coordinates are to be entered in GDA94 datum, for a minimum area of 0.1 degrees by 0.1 degrees (approximately 10km by 10km). If you define a search area which is less than the minimum, the coordinates will be expanded by default. After selecting your area of interest, click on the **Use Extent** button to confirm your selection and close the map window.

If you have Projected coordinates (Zone, Easting, Northing) Click here for assistance to convert to Geographics.

Aquatic Species

Common Name	Species Name	NSW Status	Comm. Status	Records
Leatherback Turtle	*Dermochelys coriacea*	E1,P	E	1
Little Penguin	*Eudyptula minor*	P		58
New Zealand Fur-seal	*Arctocephalus forsteri*	V,P		2
Australian Fur-seal	*Arctocephalus pusillus doriferus*	V,P		5
Unidentified Fur-seal	*Arctocephalus sp.*	P		1
Unidentified Seal	*Seal sp.*	P		1
Leopard Seal	*Hydrurga leptonyx*	P		6
Southern Elephant Seal	*Mirounga leonina*	P		1
Southern Right Whale	*Eubalaena australis*	E1,P	E	1
Common Dolphin	*Delphinus delphis*	P		4
Bottlenose Dolphin	*Tursiops truncatus*	P		1

Conservation status: P = protected, V = vulnerable, E1 = endangered, E2 = endangered population.

Appendix 3 – EPBC Act 1999 Search Results

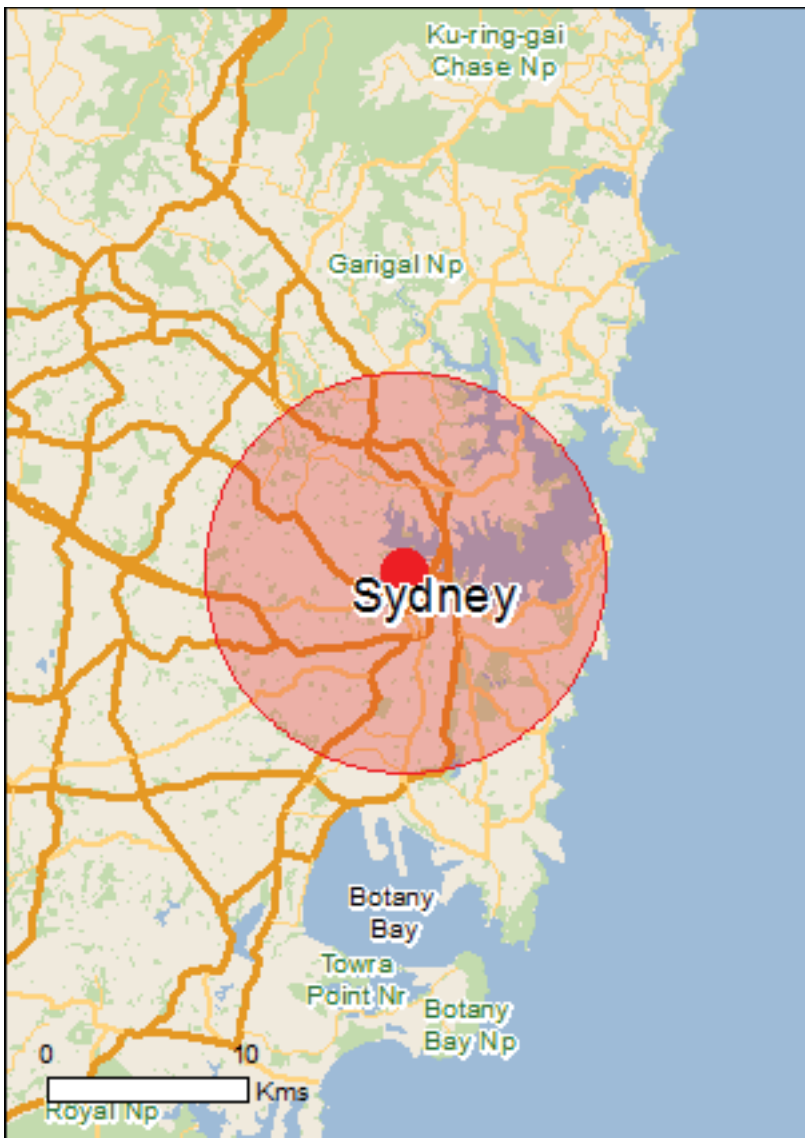
EPBC Act Protected Matters Report

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

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.

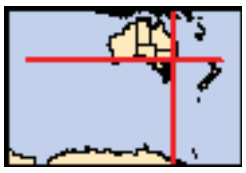
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 12/08/16 17:02:39



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 10.0Km



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:	6
National Heritage Places:	8
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	84
Listed Migratory Species:	76

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:	55
Commonwealth Heritage Places:	70
Listed Marine Species:	100
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	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:	6
Regional Forest Agreements:	None
Invasive Species:	50
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

World Heritage Properties [Resource Information]

Name	State	Status
Australian Convict Sites (Cockatoo Island Convict Site Buffer Zone)	NSW	Buffer zone
Australian Convict Sites (Hyde Park Barracks Buffer Zone)	NSW	Buffer zone
Sydney Opera House - Buffer Zone	NSW	Buffer zone
Australian Convict Sites (Cockatoo Island Convict Site)	NSW	Declared property
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
Cockatoo Island	NSW	Listed place
First Government House Site	NSW	Listed place
Hyde Park Barracks	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

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 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
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
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered	Community likely to 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		

		within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour 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 (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely 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

[Numenius madagascariensis](#) Eastern Curlew [847]	Critically Endangered	Foraging, feeding or related behaviour 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	Breeding likely to occur within area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
[Thalassarche cauta cauta](#) Shy Albatross, Tasmanian 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
[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
Fish		
[Epinephelus daemelii](#) Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat

Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may 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
Isoodon obesulus obesulus		
Southern Brown Bandicoot (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 may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Other		
Pommerhelix duralensis		
Dural Land Snail [85268]	Endangered	Species or species habitat likely 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 known to occur within area
Acacia terminalis subsp. terminalis		

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 likely to occur within area
Deyeuxia appressa [7438]	Endangered	Species or species habitat likely to 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
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to 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
Microtis angusii Angus's Onion Orchid [64530]	Endangered	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may 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 marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat known to occur within area

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 within area
Carcharodon carcharias		
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		
Apus pacificus		
Fork-tailed Swift [678]		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 epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

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
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	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		
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
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area

Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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
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 may 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]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area

Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Foraging, feeding or related behaviour known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Foraging, feeding or related behaviour known to occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area

Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		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]		Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis Eastern Curlew [847]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Pluvialis squatarola Grey Plover [865]		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]		Foraging, feeding or related behaviour known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area

Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Broadcasting Commission
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 Scientific & Industrial Research Organisation
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Reserve Bank of Australia
Commonwealth Land - Telstra Corporation Limited
Defence - 21 CONST REGT - HABERFIELD DEPOT
Defence - COCKATOO ISLAND DOCKYARD
Defence - DEFENCE PLAZA SYDNEY
Defence - DEGAUSSING RANGE
Defence - DSTO PYRMONT - (SEE SITE 1177)
Defence - FLEET BASE WHARVES
Defence - FOREST LODGE (SYDNEY) TRG DEP
Defence - GARDEN ISLAND
Defence - GLADESVILLE TRAINING DEPOT
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 - LEICHHARDT STORES DEPOT
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA
Defence - MARITIME HEADQUARTERS
Defence - MATERIAL RESEARCH LAB
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
Defence - RANDWICK FRENCHMANS TRG
Defence - SPECTACLE ISLAND
Defence - SYDNEY UNIVERSITY REGIMENT - DARLINGTON
Defence - TRESCO
Defence - VICTORIA BARRACKS - PADDINGTON
Defence - WILLOUGHBY TRG DEP
Defence - WOOLLOOMOOLOO CARPARK

Battery B42	NSW	Listed place
Battery for Five Guns	NSW	Listed place
Biloela Group	NSW	Listed place
Bondi Beach Post Office	NSW	Listed place
Botany 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
Cockatoo Island Industrial Conservation Area	NSW	Listed place
Commonwealth Avenue Defence Housing	NSW	Listed place
Customs Marine Centre	NSW	Listed place
Defence site - Georges Heights and Middle Head	NSW	Listed place
Factory	NSW	Listed place
Fitzroy Dock	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 Group	NSW	Listed place
Marine Biological Station (former)	NSW	Listed place
Marrickville Post Office	NSW	Listed place
Mess Hall (former)	NSW	Listed place
Military Guard Room	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 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
Power House / Pump House	NSW	Listed place
Prison Barracks Precinct	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
Shark Point Battery	NSW	Listed place
Snapper Island	NSW	Listed place
Spectacle Island Explosives Complex	NSW	Listed place
Sutherland Dock	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
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]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Foraging, feeding or related behaviour known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Foraging, feeding or related behaviour known to occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii		

		within area
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
[Cuculus saturatus](#) Oriental Cuckoo, Himalayan Cuckoo [710]		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 (sensu stricto)](#) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea exulans (sensu lato)](#) Wandering Albatross [1073]	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
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour known to occur within area
[Gallinago megala](#) Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
[Gallinago stenura](#) Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Heteroscelus brevipes](#) Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
[Heteroscelus incanus](#) Wandering Tattler [59547]		Species or species habitat known to occur within area
[Himantopus himantopus](#) Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat known to occur within area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat

Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
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 [847]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
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]		Foraging, feeding or related behaviour known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat

Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area
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]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area

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 may 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 paegnius Rough-snout Ghost Pipefish [68425]	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 [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
Stigmatopora olivacea a pipefish [74966]	Species or species habitat may occur within area

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
Mammals		
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 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
Caperea marginata		

Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may 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
Lane Cove	NSW
Parramatta River	NSW
Sydney Harbour	NSW
Wallumatta	NSW
Wolli Creek	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

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
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 likely 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

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 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

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 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
Protasparagus densiflorus	
Asparagus Fern, Plume Asparagus [5015]	Species or species habitat likely to occur within area
Protasparagus plumosus	
Climbing Asparagus-fern, Ferny Asparagus [11747]	Species or species habitat likely to 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

Nationally Important Wetlands	[Resource Information]
Name	State
Botany Wetlands	NSW

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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

-33.86067 151.19413

-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
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix 4 – NSW DPI Estuarine Vegetation Mapping

Seaforth

Middle Harbour

Lane Cove

Mosman

North Sydney

Appendix 5 – Wetlands Protection Area Map

HENLEY
HUNTERS HILL
WAVERTON
COCKATOO ISLAND
Five Dock Bay
SPECTACLE ISLAND
CHISWICK
DRUMMOYNE
BIRCHGROVE
GOAT ISLAND
SNAPPER ISLAND
ABBOTSFORD
WAREEMBA
RUSSELL LEA
BALMAIN
BALMAIN EAST
Cove
Iron
RODD ISLAND
ROZELLE
RODD POINT
Johnsons Bay
FIVE DOCK
PYRMONT
LILYFIELD
HABERFIELD
ANNANDALE
GLEBE
ULTIMO
LEICHHARDT
FOREST LODGE
ASHFIELD

Department of
Infrastructure, Planning and Natural Resources

Legend

- Local Government Area
- Foreshores and Waterways Area Boundary
- Wetlands Protection Area

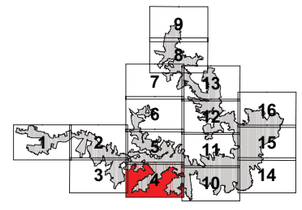
ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979

SYDNEY REGIONAL ENVIRONMENTAL PLAN (SYDNEY HARBOUR CATCHMENT) 2005 WETLANDS PROTECTION AREA MAP

N

Scale 1 : 15 000

0 62.5 125 250 375 500
Metres



Sheet Index

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Department file No.	.....
Planning Officer:	O. Klein
Manager G.I.S.	P. Hartley
County:	Cumberland
Parish:	Various
L.G.A.	Various
Date:	28:02:2005
Locality:	Various
Catalogue.	.....

Appendix 6 – Acid Sulphate Soils Risk Mapping

NORTH RYDE
DENISTONE
DENISTONE WEST
WEST RYDE
RYDE
EAST RYDE
LANE COVE WEST
MEADOWBANK
PARRAMATTA RIVER
Victoria Road
Epping Road
PUTNEY
GLADESVILLE
HUNTERS HILL
LINLEY POINT
TENNYSON
LONGUEVILLE
RHODES
HOMEBUSH BAY
CONCORD WEST
MORTLAKE
CABARITA
HUNTLEYS POINT
WOOLWICH
CONCORD
ABBOTSFORD
CHISWICK
DRUMMOYNE
RUSSELL LEA
HOMEBUSH WEST
Concord Road
Western
Ap2
Ap4
Ep1
Ei0
Eu1
Em
X0
X1
X2
X4

Appendix 7 – Little Penguin Critical Habitat Map

Table 3.5 Assessments of significance under the *EPBC Act* 1999.

	Loggerh-ead Turtle	Leatherb-ack Turtle	Hawksbill Turtle	Flatback Turtle	Green Turtle	Great White Shark	Grey Nurse Shark	Syngnat-hids	Rock Cod	Southern right whale	Hump-back Whale
1. Lead to a long term decrease in the size of a population.	No	No	No	No	No	No	No	No	No	No	No
2. Reduce the area of occupancy of a species.	No	No	No	No	No	No	No	No	No	No	No
3. Fragment an existing population into two or more populations.	No	No	No	No	No	No	No	No	No	No	No
4. Adversely impact habitat critical to the survival of the species.	No	No	No	No	No	No	No	No	No	No	No
5. Disrupt the breeding cycle of the population.	No	No	No	No	No	No	No	No	No	No	No
6. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that a species is likely to decline.	No	No	No	No	No	No	No	No	No	No	No
7. Result in invasive species that are harmful to an endangered species becoming established in the endangered species habitat.	No	No	No	No	No	No	No	No	No	No	No
8. Interfere with the recovery of a species.	No	No	No	No	No	No	No	No	No	No	No
Significant Impact Expected to Occur?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**