THREATENED SPECIES ASSESSMENT REPORT

2 MACPHERSON STREET
WARRIEWOOD

AUGUST 2019
REF: 9094 V4

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VERSION 4
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Conacher Consulting Pty Ltd

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PREFACE

This Threatened Species Assessment Report has been prepared by *Conacher Consulting* to identify the flora and fauna characteristics of land for a proposed development within 2 Macpherson Street, Warriewood.

This report provides an assessment of the proposed impacts to biodiversity in accordance with the *Biodiversity Conservation Act* (2016) and the *Environment Protection and Biodiversity Conservation Act* (1999).

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Conacher Consulting has been engaged to prepare a Threatened Species Assessment Report for a proposed development within 2 Macpherson Street, Warriewood.

This report has been prepared to determine whether the proposed development is likely to significantly affect threatened species in accordance with Part 7 of the *Biodiversity Conservation Act (2016)*.

This Report also provides an assessment of whether the proposal is likely to constitute a controlled action and require a referral under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

Previous Threatened Species Assessment Reports have been prepared by *Conacher Consulting* (July 2016; January 2018; December 2018). This fourth version provides updated assessments in accordance with the current biodiversity legislation and database search results for a new development application. A previous Flora and Fauna Assessment was also prepared for the subject site by Total Earth Care (TEC) (2016). This report utilises the results of the previous surveys and assessments undertaken for the site by TEC (2016) and provides details of additional surveys and assessments undertaken by Conacher Consulting.

1.2 SITE CHARACTERISTICS

The planning and cadastral details of the subject site are provided in Table 1.1.

TABLE 1.1
SITE DETAILS

Location (Subject site)	Lot 25 Section C DP 5464, 2 Macpherson Street, Warriewood.
Area	Approximately 2.2 hectares
Local Government Area	Northern Beaches
Existing Land Use	Vacant Land (previous nursery)

1.3 PROPOSED DEVELOPMENT

The subject site is located within the Warriewood Valley Urban Release Area. The proposed development is for a community title subdivision and associated infrastructure. The civil works required have been assessed and approved under a separate previous development application. As part of the development riparian corridor rehabilitation works will be undertaken.

A Riparian Corridor Vegetation Management Plan has been prepared for the future management of the riparian areas of the site by *Conacher Consulting* (2019).

Detailed plans of the proposed development have been provided as separate documentation to this report.

1.4 *BIODIVERSITY CONSERVATION ACT* (2016) SIGNIFICANT IMPACT DETERMINATION

The matters identified in Section 7 of the *BC Act* (2016) have been assessed in this Report 2 to determine whether the proposed development is likely to significantly affect threatened species. The information and assessments provided within this Report have identified that the proposed development is not likely to significantly affect threatened species and the application for development consent is not required to be accompanied by a Biodiversity Development Assessment Report. These matters are summarised in Table 1.2.

TABLE 1.2 CONSIDERATION OF WHETHER THE PROPOSAL IS LIKELY TO SIGNIFICANTLY AFFECT THREATENED SPECIES		
BC Act (2016) Reference	**Matter for Consideration**	**Consideration**
7.2 1 (1)(a)	Is the proposed development likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3?	No, refer to Section 4.2 of this Report.
7.2 1 (1)(b)	Does the proposed development exceed the biodiversity offsets scheme threshold?	No, the extent of native vegetation clearing is under the 0.25ha threshold and land within the biodiversity values map will not be impacted by the proposal. Refer to Figure 1.1.
7.2 1 (1)(c)	Is the proposed development to be carried out in a declared area of outstanding biodiversity value?	No.

Minimum Lot Size	-	<1ha
Area Clearing Threshold	-	0.25ha
Area of Native Vegetation Clearing Proposed	-	0.17ha
Impact on Biodiversity Values Map	-	No
Biodiversity Development Assessment Report Required	-	No

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* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © Nearmap (2018) Air Photo Date: 02/11/2018

Figure 1.1
Biodiversity Offset Scheme Threshold Assessment
Macpherson Street Warriewood

SECTION 2

FLORA CHARACTERISTICS

2.1 THREATENED FLORA SPECIES

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2019) was undertaken to identify records of threatened flora species located within 10 km of the site. This allowed for a specific search for threatened flora to be undertaken to determine if any threatened flora species are present within the subject site. Details on threatened flora species as listed in Schedules 1 and 2 of the Threatened Species Conservation Act within 10km of the site are provided in Table 2.1.

TABLE 2.1
ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA

Name	BC Act	EP&BC Act	Habitat Requirements	Comments
Acacia bynoeana	E	V	Heath and dry sclerophyll open forest on infertile well drained sand and sandy clay soils, often with ironstone gravels. Associated with disturbed areas such as roadsides (NSW NPWS 1999).	No suitable habitat present.
Acacia terminalis subsp. terminalis	E	E	Coastal scrub and dry sclerophyll woodland on sandy soils in near-coastal areas from the northern shores of Sydney Harbour S to Botany Bay.	No suitable habitat present.
Asterolasia elegans	E	E	Sheltered moist sclerophyll forests on Hawkesbury sandstone on mid- to lower slopes and valleys.	No suitable habitat present.
Boronia umbellata	V	V	Wet open gully forest.	No suitable habitat present.
Callistemon linearifolius	V	-	Sclerophyll Forest in moist gullies on coast and adjacent ranges (Fairley and Moore 1995).	No suitable habitat present.
Chamaesyce psammogeton	E	-	Coastal dunes (NSW OEH 2019).	No suitable habitat present.
Cryptostylis hunteriana	V	V	Moist sandy soil in heath and sedgeland and coastal forest communities of Scribbly Gum, Bloodwood, Brown Stringy Bark and Smooth-barked Apple in moist to dry clay loam (Bell 2001).	No suitable habitat present.
Darwinia biflora	V	V	Open forest and shrubland habitats where shale-capped ridges intergrade with Hawkesbury Sandstone, predominantly within the Kuring-Gai, Hornsby, Baulkham Hills and Ryde LGAs (NSW DEC 2004).	No suitable habitat present.
Darwinia peduncularis	V	-	Grows on sandy, well drained, low nutrient soil over sandstone (NSW OEH).	No suitable habitat present.
Epacris purpurascens var. purpurascens	V	-	Moist habitats with strong shale influence (NSW OEH 2019).	No suitable habitat present.
Eucalyptus camfieldii	V	V	Coastal shrub heath at exposed sandy locations over Hawkesbury Sandstone (NSW OEH 2019).	No suitable habitat present.

TABLE 2.1 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**BC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Eucalyptus nicholii	V	V	Grassy or sclerophyll woodland on shallow relatively infertile soils on shales and slates on the New England Tableland.	No suitable habitat present.
Eucalyptus scoparia	E	V	Well drained granitic hilltops as scattered individuals in open forest and woodland from QLD to the New England Tableland (NSW OEH 2019).	No suitable habitat present.
Genoplesium baueri	E	E	Sparse sclerophyll forest and moss gardens over sandstone. Flowers from December to March (NSW Scientific Committee 2012).	No suitable habitat present.
Grammitis stenophylla	E	-	Moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest.	No suitable habitat present.
Grevillea caleyi	CE	E	Open forest to woodland habitats on clayey soil of lateritic sandstone ridgetops.	No suitable habitat present.
Grevillea shiressii	V	V	Shrub 2-5 m high. Flowers mainly spring. Grows along creek banks in wet sclerophyll forest in sandy soil on Hawkesbury sandstone.	No suitable habitat present.
Haloragodendron lucasii	E	E	Sheltered gullies often at the base of rock faces with fern understorey (Fairley and Moore 1989).	No suitable habitat present.
Hibbertia puberula	E	-	Open woodland and low heath on sandy soil or rarely clay. Occurs near Sydney and Morton National Park (Toelken & Miller 2012).	No suitable habitat present.
Hibbertia superans	E	-	Sandstone ridgetops often near the shale / sandstone boundary in both open woodland and heathland, particularly open disturbed areas (NSW OEH 2019).	No suitable habitat present.
Isotoma fluviatilis subsp. fluviatilis	-	Ext	Grows in damp habitats on the Cumberland Plain, known from only two adjacent sites at Erskine Park (NSW OEH 2019).	No suitable habitat present.
Kunzea rupestris	V	V	Shallow depressions on large flat sandstone rock outcrops in short to tall shrubland or heathland habitats.	No suitable habitat present.
Lasiopetalum joyceae	V	V	Heath on lateritic to shale ridgetops on the Hornsby Plateau south of the Hawkesbury River.	No suitable habitat present.
Leptospermum deanei	V	V	Woodland on lower slopes or near creeks on sandy alluvial or sandy soils.	No suitable habitat present.
Melaleuca deanei	V	V	Flat broad ridgetops and saddles in Coastal Sandstone Ridgetop Woodland vegetation (NSW DECCW 2010).	No suitable habitat present.
Microtis angusii	E	E	Known from a single population at Ingleside on modified lateritic ridgetop soils in highly disturbed habitat (NSW OEH 2019).	No suitable habitat present.

TABLE 2.1 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**BC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Persoonia hirsuta	E	E	Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone (NSW OEH 2019).	No suitable habitat present.
Persoonia mollis subsp. maxima	E	E	Open forest and creek side scrub on sheltered hillsides, moist gullies and flood prone areas along creeks on sandy soils.	No suitable habitat present.
Pimelea curviflora var. curviflora	V	V	Shale/lateritic soils over sandstone and Shale/Sandstone transition soils on ridgetops and upper slopes amongst woodlands.	No suitable habitat present.
Prostanthera densa	V	V	Open forests and shrubland on coastal headlands and near coastal ranges chiefly on sandstone.	No suitable habitat present.
Prostanthera marifolia	CE	CE	Sclerophyll forest and woodland, usually near the coast, on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses. Only known from the Sydney suburb of Seaforth.	No suitable habitat present.
Rhodamnia rubescens	CE	-	Rainforest and moist forest habitats.	No suitable habitat present.
Senecio spathulatus	E	-	Frontal coastal dune habitats (NSW OEH 2019).	No suitable habitat present.
Syzygium paniculatum	E	V	Subtropical and littoral rainforest on sandy soil (Fairley and Moore 1995).	No suitable habitat present.
Tetratheca glandulosa	V	-	Strongly associated with areas of shale-sandstone transition habitat (NSW OEH 2019).	No suitable habitat present.
Ext = Extinct P. Ext = Presumed Extinct CE = Critically Endangered E = Endangered V = Vulnerable Species				

No threatened flora species were observed within the subject site during surveys.

The habitats present are in highly disturbed condition and it is considered that they are not likely to be suitable for locally occurring threatened flora species.

2.2 THREATENED FLORA POPULATIONS & ECOLOGICAL COMMUNITIES

2.2.1 Threatened Flora Populations

There are no threatened flora populations currently listed as occurring in the local government area.

2.2.2 Threatened Ecological Communities

Details regarding the habitat attributes and indicative species for the threatened ecological communities known to be present in the local government area are provided in Table 2.2.

TABLE 2.2 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**BC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	VEC	**Geology / Soils:** Estuarine mud flats. **Topography:** Intertidal zone on the shores of estuaries and lagoons. **Characteristic Species:** *Sarcocornia quinqueflora, Sporobolus virginicus, Juncus krausii and Baumea juncea*.	No suitable habitat present.
Coastal Upland Swamp in the Sydney Basin Bioregion	EEC	EEC	**Geology / Soils:** Periodically waterlogged acidic soils on Hawkesbury Sandstone. **Topography:** Impermeable sandstone plateaus in the headwater valleys of streams and on sandstone benches with abundant moisture seepage. **Characteristic Species:** Highly diverse and variable, includes scrubs, heaths, sedgelands and fernlands.	No suitable habitat present.
Duffys Forest Ecological Community in the Sydney Basin Bioregion	EEC	-	**Geology / Soils:** Hawkesbury sandstone geology, in association with laterite soils and soils derived from shale and laminite lenses. **Topography**: Ridge tops, plateaus, upper slopes and occasionally mid slopes. **Characteristic Species**: *Eucalyptus sieberi, E. capitellata, E. haemastoma, Angophora costata* and *Corymbia gummifera.*	No suitable habitat present.
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Silts, muds or humic loams. **Topography:** Depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. **Characteristic Species:** Composition is variable and dependent on water regime. May include amphibious grasses and sedges, emergent floating herbs and emergent tall sedges and floating and submerged aquatic herbs.	No suitable habitat present.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	CEEC	**Geology / Soils:** Sand dunes and on soils derived from underlying rocks **Topography:** Located near the seaoin coastal dunes, headland or riparian habitats. **Characteristic Species:** Comprises the *Cupaniopsis anacardioides - Acmena* spp. alliance of Floyd (1990).	No suitable habitat present.

TABLE 2.2 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**BC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Silts, clay-loams and sandy loams. **Topography:** Periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. **Characteristic Species:** Eucalypt canopy with species belonging to the genus Angophora or the sections Exsertaria or Transversaria of the genus Eucalyptus. Has low abundance of *E. robusta*, Casuarina and Melaleuca species and a groundcover of soft-leaved forbs and grasses.	No suitable habitat present.
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	EEC	**Geology / Soils:** Waterlogged or periodically inundated grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline. **Topography:** Flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. **Characteristic Species:** *Casuarina glauca.*	Suitable habitat present, observed during surveys.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Waterlogged or periodically inundated humic clay loams and sandy loams. **Topography:** Alluvial flats and drainage lines associated with coastal floodplains. **Characteristic Species:** *Eucalyptus robusta, E. longifolia, E. botryoides, Melaleuca quinquenervia* and *M. ericifolia.*	No suitable habitat present.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	EEC	-	**Geology / Soils:** Generally on the Warriewood and Tuggerah Soil Landscapes. **Topography:** Freshwater swamps in swales and depressions on sand dunes and low nutrient sandplain sites in coastal areas. **Characteristic Species:** *Eleocharis sphacelata, Baumea juncea, B. rubiginosa, B. articulata, Gahnia sieberiana, Ludwigia peploides* and *Persicaria* sp.	No suitable habitat present.
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Found on a range of substrates including old sand dunes above cliffs and on basalt headlands, and less frequently on sandstone. **Topography:** Seacliffs and coastal headlands. **Characteristic Species:** *Themeda australis.*	No suitable habitat present.
Key to *BC Act* and *EP&BC Act* Status CEEC = Critically Endangered Ecological Community EEC = Endangered Ecological Community VEC = Vulnerable Ecological Community				

A highly disturbed variant of the Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (SOFF) endangered ecological community (EEC) was observed within the subject site during surveys.

The SOFF EEC is mapped in Figure 2.1 and assessed in Section 4 and Appendix 1 of this report.

2.3 VEGETATION SURVEY METHODOLOGY

To determine the likely and actual occurrence of flora species and plant communities on the subject site, field survey work was undertaken to supplement literature reviews and previous flora surveys of the area. The methods utilised for the flora survey are outlined as follows.

Literature Review

- A review of available literature for the area was undertaken to obtain reference material and background information for this study. These documents are listed in the References section of this Report.

- A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2019) was undertaken to identify records of threatened flora species located within 10 km of the site. This enabled the preparation of a predictive list of threatened flora species that could possibly occur within the habitats found on the site.

Aerial Photograph Interpretation

- Aerial photographs were utilised to identify the extent of vegetation with respect to the site and surrounding areas.

Field Surveys

Previous Flora Surveys

- A previous flora inventory survey of the subject site was undertaken by TEC (2016) on 29 October 2014. The site was surveys by the completion of random meander searches.

Current Flora Surveys

- A field survey which consisted foot traverses within vegetated areas was conducted according to Cropper (1993) to identify the occurrence of flora species and the extent and location of vegetation communities present across the subject site.

- Flora surveys were undertaken generally in accordance with the requirements and methodologies of DEC (2004).

- Current flora surveys were undertaken on 8 June 2017 (1.5hrs) and 4 December 2018 (1.5hrs). The surveys consisted of traverses across the site which were undertaken to map the native vegetation present, search for threatened flora species and identify and record flora species present.

- Due to the highly disturbed condition of the site and ongoing history of disturbances the vegetation present, formal plot and transect surveys were deemed not suitable as part of the site flora survey program.

- Specimens of plants not readily identified in the field were collected for identification.

- Specimens of plants tentatively identified as threatened species are sent to the Sydney Royal Botanic Gardens for confirmation of the identification.

- All vascular plants were identified using keys, nomenclature and information in The Royal Botanic Gardens and Domain Trust (2019) and Richardson *et al*., (2016). Wherever they were known, changes to nomenclature and classification have been incorporated into the results.

Vegetation Community Nomenclature

- Native vegetation communities were classified according to the plant community types provided in the Bionet Vegetation Classification (NSW OEH 2019).

- Corresponding units of available vegetation mapping have been identified where available.

- Corresponding Endangered Ecological Communities listed on both the *BC Act* (2016) and *EP&BC Act* (1999) are also provided if relevant.

Searches for Cryptic Flora Species

The subject site is highly disturbed and it is considered that no suitable habitat is present for seasonally flowering cryptic threatened fauna species. It is considered that additional searches for cryptic threatened flora species are not necessary.

2.4 FLORA SPECIES AND PLANT COMMUNITY TYPE DESCRIPTIONS

The site contains one plant community type, Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion (SOFF EEC). The other areas of the site consist of Cleared Land and Exotic Vegetation.

The following plant community description is provided below and a detailed list of flora species observed within the subject site is provided in Table 2.3. The flora species listed in Table 2.3 include species observed from previous and current surveys, some of the species listed may no longer be present due to the demolition of the nursery on the site. The locations of the plant community present are shown in Figure 2.1.

No threatened flora species were observed within the subject site during surveys.

PCT 1232 SWAMP OAK FLOODPLAIN SWAMP FOREST, SYDNEY BASIN BIOREGION AND SOUTH EAST CORNER BIOREGION (SOFF EEC)

Structure:

Upper Stratum:	To 3-20 metres high, with 30-70% Projected Foliage Cover (PFC).
Mid Stratum:	To 6 metres high, with 30% PFC.
Lower Stratum:	To 1 metre high, with 50% PFC.

Floristics:
(Characteristic Species)

Upper Stratum:	*Casuarina glauca, Eucalyptus robusta, Melaleuca quinquenervia, Melaleuca linearifolia.*
Mid Stratum:	*Casuarina glauca* (regrowth), *Lantana camara, Erythrina crista-galli* and *Cestrum parqui.*
Lower Stratum:	*Arundo donax, Ageratina adenophora, Ludwigia peruviana* and *Ipomoea indica.*
Exotics:	*Ficus* spp., *Lantana camara, Monstera deliciosa, Arundo donax, Ageratina adenophora, Senna pendula var. glabrata, Ipomoea indica, Erythrina crista-galli* and *Ludwigia peruviana.*

Variation:
Within the site this plant community predominantly consists of highly disturbed areas of land which contain remnant native trees interspersed with exotic vegetation. The distribution of the dominant native species is variable.

Disturbance:
This vegetation type occurs are mostly remnant trees and shrubs around the edges of the site in drainage line areas. High levels of weed invasion, historical soil modification and historical clearing have occurred.

Weed Invasion:
Weed invasion is high in in areas mapped as this plant community type.

Location and Distribution:
Disturbed Swamp Oak Forest occurs around the perimeter of the site and as regrowth patches within the central sections of the site. This vegetation type occupies approximately 0.17 hectares of the subject site.

Classification:
The Swamp Sclerophyll Forest on Coastal Floodplain EEC was previously mapped more broadly across the site by TEC (2016), however further investigations have identified that the native vegetation present occurs over a more restricted area and is dominated by *Casuarina glauca* (Swamp Oak) with only low levels of sclerophyll species such as *Eucalyptus robusta* (Swamp Mahogany).

It is considered that the vegetation present corresponds to a highly disturbed / regrowth variant of the Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC.

This vegetation also corresponds to Plant Community Type 1232 Swamp Oak Floodplain Swamp Forest, Sydney Basin Bioregion and South East Corner Bioregion.

Photo 1. PCT 1232 Swamp Oak Floodplain Swamp Forest, Sydney Basin Bioregion and South East Corner Bioregion.

CLEARED LAND / EXOTIC VEGETATION

Areas of Cleared Land / Exotic Vegetation are composed of exotic flora species including *Ficus benjamina, Ficus elastica, Erythrina x sykesii* and *Salix babylonica, Lantana camara, Erythrina crista-galli, Senna pendula var. glabrata, Arundo donax Cestrum parqui, Arundo donax, Modiola caroliniana, Conyza bonariensis, Phytolacca octandra, Sida rhombifolia, Verbena bonariensis, Rumex obtusifolius, Cyperus eragrostis, Ageratina adenophora* and *Ipomoea indica.* These areas occupy approximately 1.86 hectares of the site.

Photo 2. Cleared Land / Exotic Vegetation.

TABLE 2.3
FLORA SPECIES OBSERVED

Family Name	Scientific Name	Common Name
Trees		
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Fabaceae (Faboideae)	*Erythrina crista-galli**	Cockspur Coral Tree
	*Erythrina x sykesii**	Coral Tree
Moraceae	*Ficus benjamina**	Weeping Fig
	*Ficus elastica**	Rubber Fig
	Ficus microcarpa var. *hillii**	
	Ficus rubiginosa	Port Jackson Fig
	*Morus alba**	White Mulberry
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Platanaceae	*Platanus x hispanica 'Acerifolia'**	London Plane Tree
Salicaceae	*Salix babylonica**	Weeping Willow
Ulmaceae	*Ulmus parvifolia**	Chinese Elm
Shrubs		
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart
	*Ricinus communis**	Castor Oil Plant
Fabaceae (Caesalpinioideae)	*Senna pendula var. glabrata**	
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark
	Melaleuca quinquenervia	Broad-leaved Paperbark
Oleaceae	*Ligustrum sinense**	Small-leaved Privet

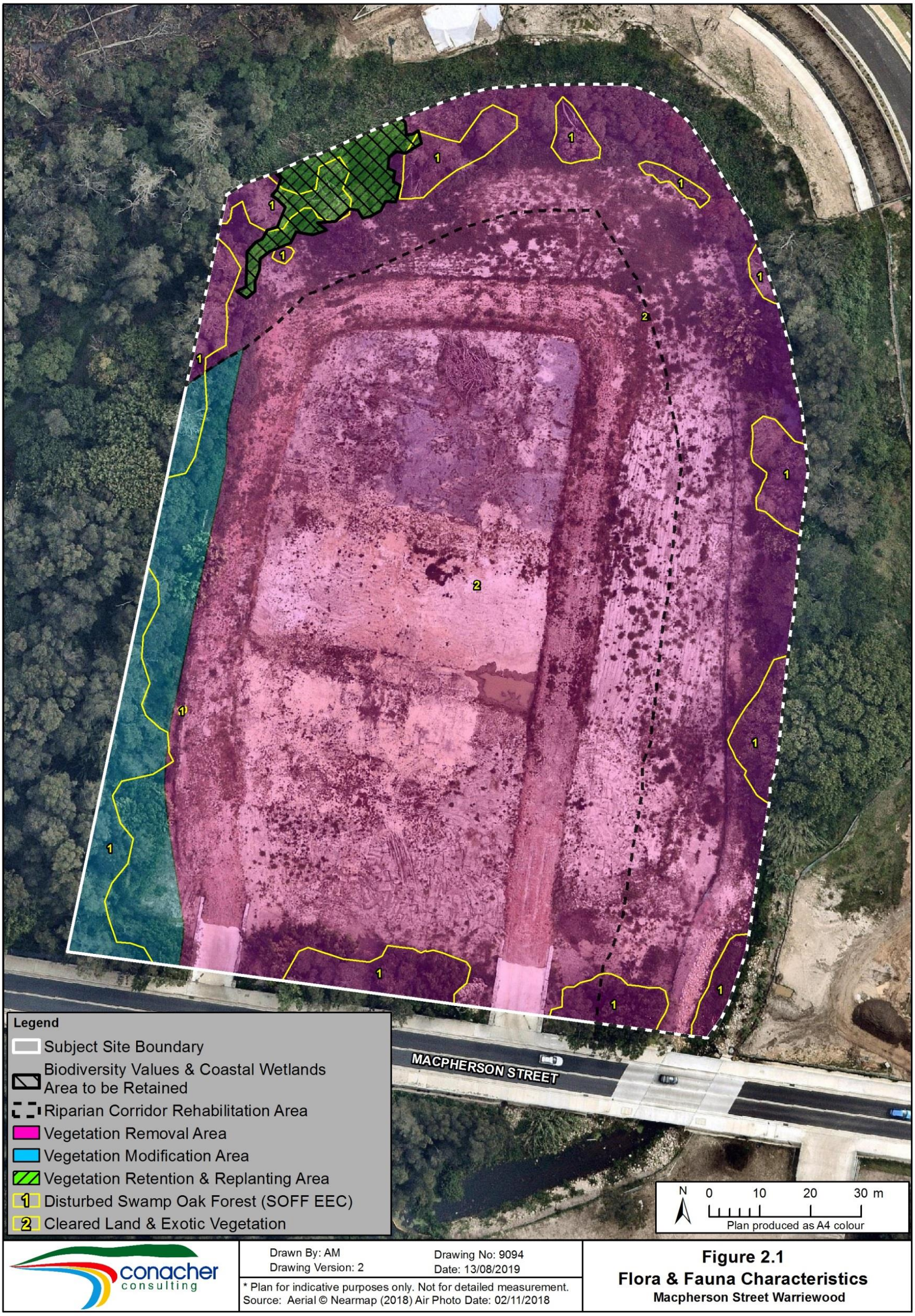
TABLE 2.3 FLORA SPECIES OBSERVED		
Onagraceae	*Ludwigia peruviana**	
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Poaceae	*Arundo donax**	Giant Reed
Verbenaceae	*Lantana camara**	Lantana
Zingiberaceae	*Hedychium coronarium**	
Groundcovers		
Apiaceae	*Hydrocotyle sibthorpioides*	A Pennywort
Araceae	*Alocasia brisbanensis*	
	*Monstera deliciosa**	Fruit Salad Plant
	Xanthosoma violaceum	Chinese Taro
	*Zantedeschia aethiopica**	Arum Lily
Asteraceae	*Ageratina adenophora**	Crofton Weed
	*Ageratum houstonianum**	
	*Bidens pilosa**	Cobbler's Pegs
	*Cirsium vulgare**	Spear Thistle
	*Conyza bonariensis**	Flaxleaf Fleabane
	*Conyza sumatrensis**	Tall fleabane
	*Sonchus oleraceus**	Common Sowthistle
Caryophyllaceae	*Cerastium glomeratum**	Mouse-ear Chickweed
	*Herniaria glabra**	
	*Stellaria media**	Common Chickweed
Commelinaceae	*Tradescantia fluminensis**	Trad
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
	Cyperus sanguinolentus	
	Fimbristylis dichotoma	Common Fringe-sedge
Fabaceae (Faboideae)	*Trifolium repens**	White Clover
	*Vicia sativa subsp. nigra**	Narrow-leaved Vetch
Haloragaceae	*Myriophyllum aquaticum**	Parrots Feather
Iridaceae	*Crocosmia x crocosmiiflora**	Montbretia
Liliaceae	*Lilium formosanum**	Formosan Lily
	*Liriope muscari**	big blue lilyturf
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Malvaceae	*Malva linnaei**	Cretan Hollyhock
	*Modiola caroliniana**	Red-flowered Mallow
	*Sida rhombifolia**	
Phyllanthaceae	*Phyllanthus tenellus**	Hen and Chicken
Phytolaccaceae	*Phytolacca octandra**	Inkweed
Poaceae	*Andropogon virginicus**	Whisky Grass
	*Cortaderia selloana**	Pampas Grass
	*Ehrharta erecta**	Panic Veldt-grass
	*Eleusine tristachya**	Goose Grass
	*Paspalum dilatatum**	Paspalum
	Phragmites australis	Common Reed
	*Poa annua**	Winter Grass
Polygonaceae	*Persicaria decipiens*	
	Persicaria hydropiper	Water Pepper
	Persicaria strigosa	
	*Rumex obtusifolius**	Broadleaf Dock
Solanaceae	*Cestrum parqui**	Green Cestrum
	*Solanum nigrum**	Black-berry Nightshade
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi
Verbenaceae	*Verbena bonariensis**	Purpletop

TABLE 2.3 FLORA SPECIES OBSERVED		
Violaceae	*Viola hederacea*	
Climbers		
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern
	*Asparagus asparagoides**	Bridal Creeper
Basellaceae	*Anredera cordifolia**	Madeira Vine
Convolvulaceae	*Ipomoea indica**	Morning Glory
Species name ^{TS} = Threatened Species		* = Introduced Species

2.5 LOCATION AND DISTRIBUTION OF ADJOINING AND CONTIGUOUS HABITATS

An inspection of the available aerial imagery for the local area, review of available vegetation mapping (NSW OEH 2013) and field surveys were undertaken to determine the extent and composition of vegetation within the subject site and immediately surrounding vicinity.

The subject site is surrounded by existing development to the north and cleared land to the east and south. The native vegetation within the subject site is interspersed with exotic species and is contiguous with the vegetation present on the adjoining allotment to the west of the site, however habitat connectivity is present through the subject site is limited by the highly disturbed condition of the habitats present.


1
2
MACPHERSON STREET
Legend
Subject Site Boundary
Biodiversity Values & Coastal Wetlands Area to be Retained
Riparian Corridor Rehabilitation Area
Vegetation Removal Area
Vegetation Modification Area
Vegetation Retention & Replanting Area
1 Disturbed Swamp Oak Forest (SOFF EEC)
2 Cleared Land & Exotic Vegetation
N
0 10 20 30 m
Plan produced as A4 colour
conacher consulting
Drawn By: AM
Drawing Version: 2
Drawing No: 9094
Date: 13/08/2019
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © Nearmap (2018) Air Photo Date: 02/11/2018
Figure 2.1
Flora & Fauna Characteristics
Macpherson Street Warriewood

SECTION 3

FAUNA AND FAUNA HABITATS

3.1 THREATENED FAUNA SPECIES

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2019) was conducted for threatened fauna species recorded within 10km of the subject site. This revealed a number of threatened species that have been recorded in the area. Details on threatened fauna species as listed in Schedule 1 and 2 of the BC Act (2016) with a known or possible occurrence within the local area are provided in Table 3.1. Species which exclusively inhabit marine, estuarine and beach environments have been omitted due to a lack of suitable habitat within the study area.

TABLE 3.1
THREATENED FAUNA SPECIES OF THE AREA

Common Name Scientific Name	BC Act	EP&BC Act	Preferred Habitat	Comments
Green and Golden Bell Frog *Litoria aurea*	E	V	Breeds in shallow (<1m) ponds or slowly moving waterways particularly areas which undergo disturbance regimes such as fluctuating water flow or inflow of saline water with both areas of open water and dense low vegetation (NSW NPWS 1999).	No suitable habitat present.
Red-crowned Toadlet *Pseudophryne australis*	V	-	Grass, debris and rock outcrops near ephemeral watercourses on sandstone (NSW OEH 2019).	No suitable habitat present.
Giant Burrowing Frog	V	V	Small slowly flowing water courses, soaks and swamps which traverse plateaus and broad upland gullies (NSW NPWS 2001).	No suitable habitat present.
Rosenberg's Goanna *Varanus rosenbergi*	V	-	Woodlands, dry open forests and heathland habitats on Hawkesbury sandstone. Shelters in burrows, hollow logs, rock crevices and outcrops (Cogger 2000).	No suitable habitat present.
Superb Fruit-Dove *Ptilinopus superbus*	V	-	Rainforests, adjacent mangroves, wet sclerophyll eucalypt forests, scrublands with native fruits (Higgins and Davies 1996).	No suitable habitat present.
Wompoo Fruit-Dove *Ptilinopus magnificus*	V	-	Large undisturbed patches of rainforest, adjacent moist eucalypt forests and isolated remnant trees feeding on fruit (Higgins and Davies 1996).	No suitable habitat present.
Rose-crowned Fruit-Dove *Ptilinopus regina*	V	-	Occurs in dense rainforests with a substantial understorey where it feeds entirely on fruit (Higgins and Davies 1996).	No suitable habitat present.
Australian Painted Snipe *Rostratula australis*	E	E	Murray-Darling basin and inland Australia within areas containing marshes and freshwater wetlands with swampy vegetation.	No suitable habitat present.
Bush Stone-curlew *Burhinus grallarius*	E	-	Open forests, savannah woodlands, dune scrub, savannah and mangrove fringes (Marchant and Higgins 1993).	Suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**BC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Australasian Bittern *Botaurus poiciloptilus*	E	E	Shallow freshwater or brackish wetlands with tall dense vegetation.	Suitable habitat present.
Black Bittern *Ixobrychus flavicollis*	V	-	Permanent freshwater wetlands with tall, dense vegetation (Lindsey 1992).	Suitable habitat present.
Square-tailed Kite *Lophoictinia isura*	V	-	Coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and Mallee that are rich in passerine birds.	Suitable habitat present.
Little Eagle *Hieraaetus morphnoides*	V	-	Various habitats including woodland, open forest, partially cleared areas, along watercourses and around wetlands (Marchant and Higgins 1993).	Suitable habitat present.
Eastern Osprey *Pandion cristatus*	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding.	No suitable habitat present.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	V	-	Coastal areas and inland rivers and wetlands. Nests in large emergent eucalypts (Marchant and Higgins 1993).	Suitable habitat present.
Little Lorikeet *Glossopsitta pusilla*	V	-	Forests and woodlands feeding mostly on nectar and pollen particularly in profusely-flowering eucalypts (Courtney and Debus 2006).	Suitable habitat present.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	V	-	Open forests with *Allocasuarina* species and hollows for nesting (Higgins 1999).	Suitable habitat present.
Gang-gang Cockatoo *Callocephalon fimbriatum*	V	-	Open forests, woodlands, and urban areas (Higgins 1999).	Suitable habitat present.
Powerful Owl *Ninox strenua*	V	-	Mature forests containing large hollows for breeding & densely vegetated gullies for roosting (Higgins 1999).	Suitable foraging habitat present.
Masked Owl Tyto novaehollandiae	V	-	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting (Higgins 1999).	Suitable foraging habitat present.
Sooty Owl *Tyto tenebricosa*	V	-	Tall, dense, wet forests containing trees with very large hollows for roosting and breeding (Higgins 1999).	No suitable habitat present.
Barking Owl *Ninox connivens*	V	-	Woodlands, open forests and partially cleared land where prey is available. Nests in tree hollows (Higgins 1999).	Suitable foraging habitat present.
Turquoise Parrot *Neophema pulchella*	V	-	Coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands (Higgins 1999).	No suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**BC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Swift Parrot *Lathamus discolor*	E	CE	NSW eucalypt forests and woodlands with winter flowering eucalypts between March and October (Saunders and Tzaros 2011).	Suitable habitat present.
Scarlet Robin *Petroica boodang*	V	-	Dry eucalypt forest and woodlands during breeding season, dispersing during autumn–winter into open habitats including urban areas (Higgins and Peter 2002).	Suitable habitat present.
Eastern Bristlebird *Dasyornis brachypterus*	E	E	Coastal woodland, dense scrub and heath, often near taller forest (Higgins and Peter 2002).	No suitable habitat present.
Regent Honeyeater *Anthochaera phrygia*	CE	CE	Box-Ironbark dry open forest and woodland and riparian River Sheoak forests. Also Coastal Swamp Forest and Spotted Gum Forest during winter. May occasionally forage within planted or remnant eucalypts (Higgins e*t al.*, 2001).	Suitable habitat present.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	V	-	Inhabits a variety of habitats including forest, woodland, shrubland, heath and disturbed environments. Widespread species which inhabits inland and coastal areas (NSW OEH 2019).	Suitable habitat present.
Varied Sittella *Daphoenositta chrysoptera*	V	-	Open eucalypt woodlands forests and scrubs. May also forage within planted rough-barked trees (Higgins and Peter 2002).	Suitable habitat present.
Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*	V	-	Found in woodlands containing box-ironbark associations and River Red Gums, also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence (Higgins *et al*., 2001).	No suitable habitat present.
Fork-tailed Swift *Apus pacificus*	-	V	Almost exclusively aerial species.	Suitable habitat present.
Eastern Pygmy-possum *Cercartetus nanus*	V	-	Occurs in sandstone heath and adjoining rainforest habitats. (Turner and Ward 1995).	No suitable habitat present.
Spotted-tailed Quoll *Dasyurus maculatus*	V	E	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Shelters in hollow-bearing trees, fallen logs, small caves and rock crevices (NSW NPWS 1999).	No suitable habitat present.
New Holland Mouse *Pseudomys novaehollandiae*	-	V	Within NSW occurs in a variety of structural vegetation types including heathland and woodland, dry sclerophyll forest with a dense shrub layer and on vegetated sand dunes (Wilson and Laidlaw 2003).	No suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**BC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Southern Brown Bandicoot (eastern) *Isoodon obesulus obesulus*	E	E	Open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland with thick ground cover for shelter south of the Hawkesbury River (NSW OEH 2019).	No suitable habitat present.
Squirrel Glider *Petaurus norfolcensis*	V	-	Box-Ironbark and River Red Gum forest west of the Great Dividing Range and coastal forest with heath understorey. Shelters in tree hollows (Suckling 1995).	No suitable habitat present.
Koala *Phascolarctos cinereus*	V	V	Wet & dry eucalypt forest on high nutrient soils containing preferred feed trees (Reed *at al*., 1991).	No suitable habitat present.
Greater Glider *Petauroides volans*	-	V	Inhabits eucalypt forests and shelters in large hollow sections of eucalypt trees.	No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Roosts in trees in gullies, riparian habitats and urban areas (Tidemann 1995).	Suitable habitat present. Observed within subject site by TEC (2016).
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	V	-	Wet and dry sclerophyll forest, open woodland, shrubland, mallee, grassland and desert. Roosts in tree hollows (Churchill 2008).	Suitable habitat present.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	V	-	Wet sclerophyll forest, open forest, rainforest and coastal mallee. Roosts in hollow trunks of eucalypts, caves and man-made structures (Churchill 2008).	Suitable habitat present.
Eastern Freetail-bat *Mormopterus norfolkensis*	V	-	Eucalypt forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man-made structures (Churchill 2008).	Suitable habitat present.
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies (Churchill 2008).	Suitable habitat present.
Little Bentwing-bat *Miniopterus australis*	V	-	Coastal forests, vine thickets and adjoining cleared areas. Roosts in caves, tree hollows and man-made structures (Churchill 2008).	Suitable habitat present. Observed within subject site by TEC (2016).

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**BC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	V	-	Coastal forests, vine thickets and adjoining cleared areas. Roosts in caves and man-made structures (Churchill 2008).	Suitable habitat present. Observed within subject site by TEC (2016).
Southern Myotis *Myotis macropus*	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water (Churchill 2008).	Suitable habitat present.
Greater Broad-nosed Bat *Scoteanax rueppellii*	V	-	Moist gullies in mature coastal forest, rainforest, open woodland, sclerophyll forest and cleared areas with remnant trees. Roosts in tree hollows, under bark and in man-made structures (Churchill 2008).	Suitable habitat present.
CE = Critically Endangered Species Ext. = Presumed Extinct Species V = Vulnerable Species E = Endangered Species				

The following threatened fauna species were observed within the subject site during surveys:

- Grey-headed Flying-fox (*Pteropus poliocephalus)*;
- Little Bentwing-bat (*Miniopterus australis)*; and
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis).*

These species were observed during previous surveys undertaken by TEC (2016).

The threatened fauna species which are considered to have suitable habitat within the subject have been assessed in Section 4 of this Report.

3.2 THREATENED FAUNA POPULATIONS

The following endangered fauna populations occur within the Northern Beaches local government area:

- Koala Population, Pittwater Local Government Area; and
- Squirrel Glider Population, Barrenjoey Peninsula.

These species were not observed on the subject site and do not have suitable habitat present. It is therefore considered that no endangered flora population is present on the subject site.

3.3 FAUNA HABITATS

The site contains Disturbed Swamp Oak Floodplain Swamp Forest and Cleared Land /Exotic Vegetation. Disturbed fauna habitats are present throughout the site, these include:

- Flower, nectar and seed producing trees and shrubs (endemic and planted specimens);
- Exotic vegetation;
- Cleared areas; and
- Disturbed watercourse habitats.

No hollow bearing trees were recorded during the site surveys.

Amphibians
The watercourse habitats provide potential foraging and breeding habitats for amphibian species, however the site and upstream catchment areas are urbanised and highly disturbed.

Reptiles
The site contains disturbed arboreal and terrestrial foraging and shelter habitats for reptile species, no areas of rock outcropping are present.

Birds
The flower, nectar, fruit and seed producing native regrowth and exotic tree and shrub species present provide a seasonal foraging resource for bird species. The ground layer vegetation also provides disturbed and modified areas of foraging habitat for locally occurring bird species.

Mammals
The flower, nectar, fruit and seed producing tree and shrub species provide a seasonal foraging resource for arboreal mammals and bat species. Disturbed understorey habitats are present and provide open foraging areas.

3.4 FAUNA SURVEY METHODOLOGY

In order to detect the possible occurrence of threatened fauna species specific methods targeting these species were employed.

Literature Review

- Review of local resource documents;

- A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2019) was undertaken to identify records of threatened fauna species located within 10 km of the site. This enabled the preparation of a predictive list of threatened fauna species that could possibly occur within the habitats found on the site.

Previous Fauna Surveys
Previous fauna surveys of the site were completed by TEC (2016). Surveys over one day and two nights were completed on 29Th and 30th October 2014.

The previous diurnal survey undertaken involved observations and call detection of animal activity, habitat identification and searches for indirect evidence of fauna. Previous nocturnal surveys undertaken by TEC (2016) involved spotlighting, call playback for amphibians and mammals and ultrasonic bat call recording.

Current Fauna Surveys
The surveys undertaken were generally in accordance with the methodologies outlined by DEC (2004). The subject site is predominantly cleared with small areas of highly disturbed remnant and regrowth native vegetation and no hollow bearing trees. Due to the highly disturbed condition of the site, surveys were limited to 1.5 hrs of diurnal survey on 8 June 2017 and 1.5hrs of diurnal survey on 4 December 2018.

The following methods were utilised:
- Targeted diurnal reptile and amphibian searches;
- Diurnal bird surveys;
- Diurnal mammal surveys;
- Koala habitat assessment;
- Habitat searches and assessment
- Opportunistic observations during the completion of method specific fauna surveys; and
- Hollow bearing tree survey.

3.5 FAUNA OBSERVED

The fauna species observed within the subject site are listed in Table 3.2. The threatened fauna species, Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat were observed within the subject site during surveys undertaken by TEC (2016). All fauna species observed are considered relatively common within the local area.

TABLE 3.2
FAUNA SPECIES OBSERVED

Common Name	Scientific Name	TEC (2016) Surveys	Current Surveys
Amphibians			
Common Eastern Froglet	*Crinia signifera*	W	W
Eastern Dwarf Tree Frog	*Litoria fallax*	W	
Peron's Tree Frog	*Litoria peronii*	W	
Reptiles			
Dark-flecked Garden Sunskink	*Lampropholis delicata*		O
Birds			
Crested Pigeon	*Ocyphaps lophotes*		O
Masked Lapwing	*Vanellus miles*	W	W
Rainbow Lorikeet	*Trichoglossus haematodus*	O	OW
Sulphur-crested Cockatoo	*Cacatua galerita*	W	OW
Laughing Kookaburra	*Dacelo novaeguineae*	O	W
Eastern Whipbird	*Psophodes olivaceus*	O	W
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		OW
Superb Fairy-wren	*Malurus cyaneus*		OW
Lewin's Honeyeater	*Meliphaga lewinii*		OW
Yellow-faced Honeyeater	*Lichenostomus chrysops*		W
Noisy Miner	*Manorina melanocephala*	O	OW
Red Wattlebird	*Anthochaera carunculata*	W	
Red-browed Finch	*Neochmia temporalis*		OW
Grey Shrike-thrush	*Colluricincla harmonica*		OW
Pied Currawong	*Strepera graculina*	O	
Australian Magpie	*Cracticus tibicen*	W	OW
Little Wattlebird	*Anthochaera chrysoptera*		OW
Common Myna*	*Sturnus tristis*		O
House Sparrow*	*Passer domesticus*		OW
Red-whiskered Bulbul*	*Pycnonotus jocosus*		OW
Common Starling*	*Sturnus vulgaris*		OW
Mammals			
Common Brushtail Possum	*Trichosurus vulpecula*	O	
Black Rat *	*Rattus rattus*	O	
Rabbit *	*Oryctolagus cuniculus*		P
Dog *	*Canis lupus familiaris*		O
Large Forest Bat	*Vespadelus darlingtoni*	U	
Grey-headed Flying-fox TS	*Pteropus poliocephalus*	O	
White-striped Freetail-bat	*Tadarida australis*	U	
Little Bentwing-bat TS	*Miniopterus australis*	U	
Gould's Wattled Bat	*Chalinolobus gouldii*	U	
Eastern Bentwing-bat TS	*Miniopterus schreibersii oceanensis*	U	

Key to Observation Type

O – Observed W - Heard P - Scat
OW - Observed and Heard Call U - Ultrasonic Recording

Note: * indicates introduced species. TS indicates threatened species.

SECTION 4

ASSESSMENTS AND CONCLUSIONS

4.1 ENVIRONMENTAL PROTECTION & BIODIVERSITY CONSERVATION ACT (1999) ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act*, (1999) requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals systems for actions that have a significant impact on matters of National Environment Significance (NES). These may include:

- Wetlands protected by international treaty (the Ramsar Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Australian Government Department of the Environment and Energy (DoEE).

The following assessment in accordance with the EP&BC Act Policy Statement 1.1 *Significant Impact Guidelines* (DoE 2013) is provided:

i. Are there any Matters of National Environmental Significance located in the area of the proposed action?

A search of the Protected Matters Search Tool (DoEE 2019) was conducted for EPBC Listed threatened and migratory species recorded within 5 km of the subject site.

Suitable habitat is present for the following nationally listed threatened or migratory species recorded from the Protected Matters Search (DoEE 2019) which occur or which may occur within 5 km of the subject site:

Threatened Species

- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Heleioporus australiacus*)
- Fork-tailed Swift (*Apus pacificus*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Large-eared Pied-bat (*Chalinolobus dwyeri*).

The nationally listed threatened species, Grey-headed Flying-fox was observed during surveys.

Migratory Species

- Oriental Cuckoo (*Cucuclus optatus*)
- White-throated Needletail (*Hirundapus caudacutus*)
- Fork-tailed Swift (*Apus pacificus*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Spectacled Monarch (Monarcha trivirgatus)
- Satin Flycatcher (*Myiagra cyanoleuca*)
- Rufous Fantail (*Rhipidura rufifrons*)

No nationally listed migratory species were observed within the subject site during surveys.

Threatened Ecological Communities
No nationally listed threatened ecological communities are present within the subject site.

The Swamp Oak Floodplain Swamp Forest, Sydney Basin Bioregion and South East Corner Bioregion plant community mapped in Figure 2.1 contains species characteristic of the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland endangered ecological community listed under the EPBC Act (1999).

The plant community does not correspond to this EEC listed under the *EPBC Act* as it does not meet the requirement for classification as condition categories A, B or C due to the small patch size (<2ha) and lack of native understorey vegetation (<20%).

ii. Considering the proposed action at its broadest scope, is there potential for impacts on Matters of National Environmental Significance?

The proposal will require the removal or modification of approximately 0.17 hectares of highly disturbed habitats.

These areas provide suitable foraging habitat for nationally listed locally occurring threatened and migratory species.

iii. Are there any proposed measures to avoid or reduce impacts on Matters of National Environmental Significance?

The proposed development will result in an improvement in the riparian vegetation present through implementation of the Vegetation Management Plan prepared by Conacher Consulting (2019).

iv. Are any impacts of the proposed action on Matters of National Environmental Significance likely to be significant impacts?

No, the proposal is not likely to have a significant impact on a matter of National Environmental Significance.

A detailed assessment in accordance with AGDE (2013) Significant Impact Guidelines has been provided for the Grey-headed Flying-fox, in Appendix 1 of this report. The assessment completed has determined that the proposal is not likely to have a significant impact on the Grey-headed Flying-fox.

The following additional assessments are provided as follows for nationally listed threatened species and ecological communities and nationally listed migratory species which were not observed during surveys with suitable habitat present within the subject site.

Nationally Listed Threatened Species
Vulnerable Listed Threatened Species
With regard to nationally listed vulnerable species with suitable habitat present, it is considered that the proposal is not likely to:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a threatened species becoming established in the threatened species' habitat;
- introduce disease that may cause a species to decline; or
- interfere with the recovery of the species.

The following reasons are provided:

- No locally occurring nationally listed vulnerable species were observed within the subject site during surveys;

Endangered and Critically Endangered Listed Threatened Species

With regard to nationally listed endangered and critically endangered species with suitable habitat present, it is considered that the proposal is not likely to:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

The following reasons are provided:

- No nationally listed endangered or critically endangered species were observed within the subject site during surveys.

Nationally Listed Migratory Species

With regard to nationally listed migratory species it is considered that the proposal is not likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The following reasons are provided:

- The subject site does not contain important habitat for a nationally listed migratory species;
- The area of proposed habitat loss is relatively small in area; and
- No nationally listed migratory species have been recorded within the subject site during surveys.

Nationally Listed Threatened Ecological Communities

It is considered that the proposal is not likely to have a significant impact on nationally listed endangered or critically ecological communities as the proposal is not likely to:

- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to the listed ecological community, to become established, or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

The following reasons are provided:

- The vegetation within the subject site does not correspond to a nationally listed endangered or critically endangered ecological community.

CONCLUSION

It is considered that the proposed action is not likely to have a significant impact on nationally listed threatened or migratory species or nationally listed threatened ecological communities.

4.2 BIODIVERSITY CONSERVATION ACT (2016) – TEST OF SIGNIFICANCE

The following Threatened Species Test of Significance has been undertaken for those threatened species, populations and ecological communities observed during surveys or identified has having suitable habitat contained within the subject site.

The following Test of Significance has been completed in accordance with Section 7.3 of the *Biodiversity Conservation Act* (2016) to determine whether the proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. This Assessment has been completed in accordance with the Threatened Species Test of Significance Guidelines (NSW OEH 2018).

a) In the case of a 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 risk of extinction,

Bush Stone-curlew (*Burhinus grallarius*)

The Bush Stone-curlew occurs in open woodland with fallen branches, leaf-litter, sparse grass, timber along dry watercourses, sand plains with spinifex and mallee, sandy scrub near beaches, mangrove-fringes, country golf courses, timber remnants on roadsides, plantations and urban areas (Marchant and Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Australasian Bittern (*Botaurus poiciloptilus*)

This species inhabits shallow freshwater and brackish wetlands, ponds and streams, favouring those with tall dense beds of sedges, reeds or rushes (Marchant and Higgins 1998).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Black Bittern (*Ixobrychus flavicollis*)
This species primarily inhabits permanent freshwater and estuarine wetlands, ponds and streams with tall dense vegetation. It also utilises adjacent habitats of flooded grassland, forest, woodland, rainforest and mangroves (Lindsey 1992).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Square-tailed Kite (*Lophoictinia isura*)
The Square-tailed Kite inhabits the coastal forested and wooded lands of tropical and temperate Australia. The Square-tailed Kite is a specialist hunter of passerines, especially honeyeaters, and insects in the tree canopy, picking most prey items from the outer foliage (Marchant & Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Little Eagle (*Hieraaetus morphnoides*)
This species forages in a variety of habitats including woodland open forest, partially cleared areas, along watercourses and around wetlands, avoiding large areas of dense forest. This species nests in mature living trees in open forest, woodland and remnant areas including farmland and areas close to urban development (Marchant and Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

White-bellied Sea-Eagle (*Haliaeetus leucogaster)*
This species occupies home ranges of up to 100km2 and is widespread along most of the coastline areas of Australia and occasionally inland in association with rivers and wetlands. Nests are typically constructed in large emergent eucalypts (Marchant and Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Little Lorikeet (*Glossopsitta pusilla*)
Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes (Courtney & Debus 2006).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
The Glossy Black-Cockatoo inhabits woodlands and open sclerophyll forests dominated by or with a middle stratum of Allocasuarina. They choose trees with larger cone crops, concentrating foraging in trees with a high ratio of total seed weight to cone weight. They breed in hollow trees or stumps usually in Eucalypts (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Gang-gang Cockatoo (*Callocephalon fimbriatum*)
The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south–eastern New South Wales and Victoria. This species utilises eucalypt forests and exotic trees, and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent

and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Powerful Owl (*Ninox strenua*)
The Powerful Owl breeds in open or closed sclerophyll forests and woodlands, including wet sclerophyll forest and dry sclerophyll forest and woodlands. They nest in hollows in large old trees; usually living Eucalyptus, within or below canopy in stumps or broken-off trunks. Powerful Owls are sedentary within home ranges of about 1,000 hectares within open eucalypt, casuarina or Callitris pine forest and woodlands, though they often roost in denser vegetation, including rainforest or exotic pine plantations. Powerful Owls feed mainly on medium-sized arboreal marsupials (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Masked Owl (*Tyto novaehollandiae*)
The Masked Owl is widespread through forests and woodlands. The Masked Owl is known to utilise forest margins and isolated stands of trees within agricultural land. This species is often found in heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained. The Masked Owl is dependent upon hollow bearing trees all year round requiring old mature trees with large hollows for breeding and as diurnal roosting sites (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Barking Owl (*Ninox connivens*)
The Barking Owl utilises dry sclerophyll forests and woodlands of tropical, temperate and semi-arid zones, particularly those associated with watercourses, wetlands and forest edges. Nests in large hollows in live eucalypts, often near open country (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.
The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Swift Parrot (*Lathamus discolor*)
This species feeds mainly on nectar and lerp from eucalypt flowers, particularly Blue Gum (Eucalyptus globulus). On the mainland, the Swift Parrot congregates where winter flowering species such as Yellow Gum, Red Ironbark, Mugga Ironbark, Box Gums and Swamp Gum. This species also occurs within Blackbutt, Forest Red Gum, Swamp Mahogany and Spotted Gum dominated communities along the coast. The Swift Parrot is a migratory species that breeds in Tasmania and its offshore islands in summer. In late March almost the entire population migrates to mainland Australia spreading from Victoria through to central and coastal NSW and south east Queensland (Saunders and Tzaros 2011).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Scarlet Robin (*Petroica boodang*)
This species inhabits mainly dry eucalypt forest and woodlands with open shrubby and grassy understorey on ridges and slopes during the spring-summer breeding season, dispersing during autumn–winter into open habitats including urban areas (Higgins and Peter 2002).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Regent Honeyeater (*Xanthomyza phrygia*)
The Regent Honeyeater inhabits mostly dry eucalypt woodlands and forests dominated by box ironbark eucalypts; on inland slopes of Great Divide, especially associations in moister more fertile sites, along creeks, broad river valleys and on lower slopes of foothills. Nectar is the principle food but sugary exudates from insects are also used. The Regent Honeyeater is known to breed along the western Slopes of the Great Dividing Range in New South Wales (Higgins *et al*., 2001).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
This species inhabits a variety of habitats including forest, woodland, shrubland, heath and disturbed environments. Widespread species which inhabits inland and coastal areas (OEH 2019).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Varied Sittella (*Daphoenositta chrysoptera*)
This species inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland (Higgins & Peter 2002).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Grey-headed Flying-fox (*Pteropus poliocephalus*)
Grey-headed Flying-foxes roost in camps during the day, which may contain tens of thousands of individuals, and then disperse to surrounding areas to forage at night. This species inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and urbanised and agricultural areas. Camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy. Camps may also be formed in urban parkland areas (Tidemann 1995).

This species was observed foraging within the site during previous surveys completed by TEC (2016). No roost or camp sites for this species have been observed. The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)
The Yellow-bellied Sheathtail-bat inhabits a wide variety of habitats from wet and dry sclerophyll forest, to open woodland, shrubland, mallee, grassland and desert. They fly fast and straight usually over the canopy, and lower over open spaces and at forest edges. This

species roosts in large tree hollows (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
The Eastern False Pipistrelle inhabits wet sclerophyll forest, open forest, rainforest and coastal mallee. They generally prefer tall and wet forests where the trees are more than 20 metres high and the understorey is dense. This species predominantly roosts in hollow trunks of eucalypts, however have also been reported to roost in caves and old buildings (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Eastern Freetail Bat (*Mormopterus norfolkensis*)
The Eastern Freetail-bat utilises dry eucalypt forest and woodland on the coastal side of the Great Dividing Range. They show a preference for open spaces in woodland or forest, and are more active in the upper slopes of forest areas rather than in riparian zones. They also forage over large waterways. This species roosts in hollow trees (usually in hollow spouts), under exfoliating bark and in various man-made structures (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Large-eared Pied Bat (*Chalinolobus dwyeri*)
In the Sydney Basin this species is most commonly recorded in areas of high fertility soils in wet sclerophyll forest along the edges of sandstone escarpments. This species is also recorded in dry sclerophyll forest and woodlands, sub-alpine woodland, at the edges of rainforest, Callitris forest and within sandstone outcrop country. Large-eared Pied Bats roost in clusters in fairy martin nests and on the ceilings of caves, crevices in cliffs and mines in twilight areas (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Little Bentwing-bat (*Miniopterus australis*)
The Little Bentwing-bat forages below the canopy within well-timbered areas including rainforest, vine thicket, wet and dry melaleuca swamps and coastal forests. This species is a cave dweller with individuals congregating during the summer months in maternity colonies and disperse during the winter. Other roost sites used by this species include abandoned mines, tunnels, stormwater drains and occasionally in buildings, banana trees and tree hollows (Churchill 2008).

This species was observed foraging within the site during previous surveys completed by TEC (2016). No suitable roost or breeding sites for this species have been observed within the study area. The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase extent and/or improvement in the condition of habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
Preferred habitats for this species include rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. The Eastern Bentwing-bat forages high in forested areas from just above canopy height to many times canopy height. In more open areas such as grasslands, flight may be within a few metres of the ground. Eastern Bentwing-bats are cave dwellers, but will also roost in man-made structures such as road culverts and mines (Churchill 2008).

This species was observed foraging within the site during previous surveys completed by TEC (2016). No suitable roost or breeding sites for this species have been observed within the study area. The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase extent and/or improvement in the condition of habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Southern Myotis (*Myotis macropus*)
The Large-footed Myotis has a strong association with streams and permanent waterways, most commonly within vegetated areas at lower elevations and in flat undulating country. This species forages over water for small insects, fish and invertebrates and have a preference for large pools rather than flowing streams. Roost habitats for this species are near water and include caves, tree hollows, abandoned fairy martin nests, among vegetation, in clumps of Pandanus, and man-made structures including under bridges, in mines, tunnels, road culverts and stormwater drains (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however,

this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

Greater Broad-nosed Bat (*Scoteanax rueppellii*)
A wide variety of habitats are utilised by this species including moist gullies in mature coastal forest, rainforest, open woodland, Melaleuca swamp woodland, wet and dry sclerophyll forest, cleared areas with remnant trees and tree-lined creeks in open areas. The Greater Broad-nosed Bat forages about 5m from the edge of isolated trees, forest remnants or along forest crowns with a slow direct flight pattern. This species is known to roost in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark, as well as in man-made structures including roofs of old buildings (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site; however, this species was not observed within the subject site during surveys.

The proposal will result in the removal of 0.17 ha of highly disturbed foraging habitat for this species. The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of suitable habitat present for this species.

It is considered that the action proposed is not 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 risk of extinction.

b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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, or

A highly disturbed variant of the Swamp Oak Floodplain Forest (SOFF) EEC was observed during surveys. The following assessment considerations are provided:

- The SOFF EEC occupies approximately 0.21 hectares within the site and includes several small and highly disturbed and weed infested patches;
- The proposed development is likely to result in the removal of approximately 0.12 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.05 hectares of SOFF EEC within an Asset Protection Zone area. The total disturbance area will be 0.17 ha;
- Vegetation modification works for the proposed Asset Protection Zone are to be limited to the removal of exotic vegetation;
- Approximately 0.04 hectares of the SOFF EEC will be retained, and replanting of the riparian corridor area of the site is proposed; and
- There are larger areas of this EEC located offsite within the locality which will not be affected by the proposal, these offsite areas are mapped by the OEH (2016).

It is therefore considered that the proposed development is not likely to have an adverse effect on the extent of an 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 risk of extinction.

A highly disturbed variant of the Swamp Oak Floodplain Forest (SOFF) EEC was observed during surveys. The following assessment considerations are provided:

- The SOFF EEC occupies approximately 0.21 hectares within the site and includes several small and highly disturbed and weed infested patches;
- The proposed development is likely to result in the removal of approximately 0.12 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.05 hectares of SOFF EEC within an Asset Protection Zone area;
- Vegetation modification works for the proposed Asset Protection Zone are to be limited to the removal of exotic vegetation;
- Approximately 0.04 hectares of the SOFF EEC will be retained, and replanting of the riparian corridor area of the site is proposed; and
- There are larger areas of this EEC located offsite within the locality which will not be affected by the proposal, these offsite areas are mapped by the OEH (2016).

It is therefore considered that the proposed action is not likely to substantially and adversely modify the composition of an ecological community such that its local occurrence is likely to be placed at risk of extinction.

c) In relation to the habitat of a threatened species or ecological community:

i. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The proposed development is likely to result in the removal of approximately 0.12 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.05 hectares of SOFF EEC within an Asset Protection Zone area;

Vegetation modification works for the proposed Asset Protection Zone are to be limited to the removal of exotic vegetation;

Approximately 0.04 hectares of the SOFF EEC will be retained, and replanting of the riparian corridor area of the site is proposed over an area of approximately 0.68ha.

ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The subject site is surrounded by existing development to the north and cleared land to the east and south. The native vegetation within the subject site is interspersed with exotic species and is contiguous with the vegetation present on the adjoining allotment to the west of the site, however habitat connectivity is present through the subject site is limited by the highly disturbed condition of the habitats present.

The proposal will result in the replanting of native vegetation within the proposed riparian corridor area of the site which is likely to result in an overall increase in the extent and improvement in the condition of habitat and connectivity present.

It is therefore considered that the proposal is not likely to result in an area of habitat becoming fragmented or isolated from other areas of habitat.

iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The habitats within the subject site to be removed and modified are of low quality, are highly disturbed and are considered not likely to provide important connectivity for locally occurring threatened biodiversity.

It is therefore concluded that the habitats within the site are not likely to be of significant importance to the long-term survival of the threatened species, populations or ecological community within the locality.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The subject site has not been listed as a declared area of outstanding biodiversity value. The proposed works are considered not likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly) and suitable environmental safeguards will be implemented.

e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process,

The proposal is likely to increase the impact of the key threatening processes 'Clearing of native vegetation' and 'Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands'.

The proposal will include the remediation and rehabilitation of the outer riparian corridor of the site, which will mitigation the impacts of these key threatening processes. It is considered that the proposal is unlikely to increase the operation of this key threatening process to the extent that a significant effect on threatened biodiversity will occur.

CONCLUSIONS

Based on the ecological surveys completed and assessment undertaken above it is concluded that:

i. The threatened species Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat, were observed during surveys;

ii. The Swamp Oak Floodplain Forest endangered ecological community was observed during surveys;

iii. This Test of Significance has concluded that the proposed development is not likely to have a significant effect on threatened species, ecological communities or their habitats;

4.3 STATE ENVIRONMENTAL PLANNING POLICIES

SEPP Coastal Management (2018)

The north-western section of the site contains a mapped "Coastal Wetlands" area and most of the site is mapped within the "Proximity Area for Coastal Wetlands". The approximate location of this area is shown in Figure 2.1.

The mapped "Coastal Wetlands" area is located outside of the area of proposed development. The area will be subject to environmental protection works, however no native vegetation clearing or other works or development is proposed within this area which would require the proposal to be classified as designated development.

The proposed development works within the mapped “Proximity area for Coastal Wetlands” include appropriate environmental protection works associated with the rehabilitation of Narrabeen Creek, this will ensure that the proposal will not significantly impact on:

- The biophysical, hydrological or ecological integrity of the adjacent coastal wetland; or
- The quantity and quality of surface and ground water flows to and from the adjacent wetland.

SEPP 44 - Koala Habitat Assessment

The subject site was assessed for activity by Koalas using the following methods:

i. A search of the BioNet Atlas of NSW Wildlife (NSW OEH 2019) was undertaken to identify records of Koalas in the area;

ii. The site was surveyed on foot with any species of Koala food trees being inspected for signs of Koala usage. Trees were inspected and identified for presence of Koalas, scratch and claw marks on the trunk and scats around the base of each tree. The proportion of any trees showing signs of Koala use was calculated for the whole of the site. Additionally the location and density of droppings if found were documented. Koalas were also targeted during spotlight surveys;

iii. Identification and assessment of the density of tree species listed as Koala food trees in State Environmental Planning Policy No. 44 - Koala Habitat Protection was undertaken across the site as outlined in Table 4.1.

TABLE 4.1
SEPP-44 KOALA FEED TREE SPECIES

Scientific Name	Common Name	Observed On Site	Percentage within survey plots
Eucalyptus tereticornis	Forest Red Gum	No	0%
Eucalyptus microcorys	Tallowwood	No	0%
Eucalyptus punctata	Grey Gum	No	0%
Eucalyptus viminalis	Ribbon or Manna Gum	No	0%
Eucalyptus camaldulensis	River Red Gum	No	0%
Eucalyptus haemastoma	Broad-leaved Scribbly Gum	No	0%
Eucalyptus signata	Scribbly Gum	No	0%
Eucalyptus albens	White Box	No	0%
Eucalyptus populnea	Bimble Box or Poplar Box	No	0%
Eucalyptus robusta	Swamp Mahogany	Yes	<15%

The Koala food tree species, *Eucalyptus robusta* as listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) were observed within the subject site. The site does not contain areas of vegetation where these trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Therefore the site does not contain potential koala habitat as defined by SEPP 44.

No Koalas were observed during the fauna survey and no evidence of Koala habitation, such as scats, claw and scratch marks, were located on the site. Therefore the subject site is considered to not form core koala habitat as defined by SEPP 44.

4.4 SPECIFIC LOCAL GOVERNMENT AREA REQUIREMENTS AND ASSESSMENTS

No additional specific local government area requirements or assessments relevant to this report have been identified.

4.5 CONCLUSIONS

Based on the detailed field survey and information provided in this report it is concluded that:

i. No threatened flora species were observed during surveys;

ii. The threatened fauna species Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat, were observed during surveys;

iii. The Swamp Oak Floodplain Forest endangered ecological community was observed during surveys;

iv. A referral to the Australian Government Department of the Environment is considered unnecessary;

v. The proposed development is not likely to significantly affect threatened species, in accordance with Section 7.2 of the Biodiversity Conservation Act (2016); and

vi. A Biodiversity Development Assessment Report is not required for the proposed development.

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APPENDIX 1

EPBC ACT SIGNIFICANCE ASSESSMENT & PROTECTED MATTERS SEARCH RESULTS

ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT (1999)
SIGNIFICANCE ASSESSMENT

A1.1 INTRODUCTION

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats listed under the *EPBC Act* (1999), the matter needs to be referred to the Australian Government, Department of the Environment (DOE).

A copy of the Protected Matters Search (DoEE 2019) completed for the site is provided as Attachment 1 to this Appendix.

The nationally listed vulnerable threatened species, Grey-headed Flying-fox, was observed during surveys.

The following significant impact assessment is provided for this species.

Part A - Important Population Assessment
A 'population of a species' is defined under the *EPBC Act* as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion.

For the purposes of assessment of a vulnerable species under the *EPBC Act* (1999) an assessment as to whether the species comprises an important population is required. An *"important population"* is one that is necessary for a species' long-term survival and recovery. Questions (in bold) to determine whether a population is an *"important population"* are as follows.

1. Whether the population has been identified within a recovery plan

The Grey-headed Flying-fox Draft National Recovery Plan (DECCW 2009) does not identify any important populations of this species.

2. Whether the population constitutes a key source population either for breeding or dispersal

The site contains suitable foraging habitat for this species, which is utilised on occasion. No roost or camp sites for this species are present within the site. The site of the proposed action does not contain a key source population for breeding or dispersal.

3. Whether the population constitutes a population necessary for maintaining genetic diversity

The site contains suitable foraging habitat for this species, which is utilised on occasion. No roost or camp sites for this species are present within the site. The study area and subject site do not contain a population that is necessary for maintaining genetic diversity.

4. Whether the population is near the limit of the species range

The Grey-headed Flying-fox is known to occupy the coastal lowlands and slopes of south-eastern Australia from Bundaberg to Geelong and are usually found at altitudes < 200 m. Areas of repeated occupation extend inland to the tablelands and western slopes in northern New South Wales and the tablelands in southern Queensland. Sightings in inland areas of southern New South Wales and Victoria are uncommon. There are rare records of individuals or small groups west to Adelaide, north to Gladstone and south to Flinders Island (DECCW 2009). The site of the proposed action is not near the limit of this species range.

Important Population Assessment Conclusion
From the above information and details it is considered that the individuals of this species observed foraging within the subject site are not:

- Identified in a recovery plan for this species;
- A key source population for breeding or dispersal;
- A population necessary for maintaining genetic diversity; or
- A population which is near this species range.

Therefore it is considered that the threatened species observed does not satisfy the criteria of an important population as identified by the DOE (2013).

Notwithstanding the above conclusions if the precautionary approach is adopted, further consideration as to whether the proposed action is likely to have a significant impact on this species needs to assess the significant impact criteria (DOE 2013) for a vulnerable species.

Part B - Significant Impact Assessment
Criteria identified within the EPBC Act Policy Statement 1.1 *Significant Impact Guidelines* (Department of the Environment 2013), have been addressed below to determine whether there is a real chance or possibility that the proposed action is likely to have a significant impact on, Grey-headed Flying-fox, a threatened flora species listed as vulnerable under the *EPBC Act* (1999).

Questions (**in bold**) to determine whether the proposal is likely to have a significant impact on this species have been addressed as follows.

An action is likely to have a significant impact on a vulnerable listed threatened species if there is a real chance or possibility that it will:

1. **Lead to a long-term decrease in the size of an important population of a species.**

   This species is likely to continue to utilised the retained habitats within the subject site and adjoining areas. The proposal is not likely to have a direct impact on the size of the population of this species.

2. **Reduce the area of occupancy of an important population;**

   This species is likely to continue to utilised the retained habitats within the subject site and adjoining areas. It is considered that the proposal is not likely to reduce the area of occupancy of an important population of this species.

3. **Fragment an existing important population into two or more populations;**

   This species is likely to continue to utilised the retained habitats within the subject site and adjoining areas. It is therefore considered that the proposal is not a type of development which is likely to fragment an existing important population of this species into two or more populations.

4. **Adversely affect habitat critical to the survival of a species;**

   It is considered that the study area does not contain habitat critical to the survival of this species and the proposal is therefore not likely to adversely affect habitat critical to the survival of this species.

5. **Disrupt the breeding cycle of an important population;**

   This species is likely to continue to utilised the retained habitats within the subject site and adjoining areas. It is considered that the proposal is not likely to disrupt the breeding cycle of an important population of this species.

6. **Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**

This species is likely to continue to utilised the retained habitats within the subject site and adjoining areas. It is considered that the proposal is not likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.

7. Result in invasive species that are harmful to a threatened species becoming established in the threatened species' habitat;

It is considered that the proposal is not a type of development which is likely to result in invasive species that are harmful to this species becoming established in habitat for this species.

8. Introduce disease that may cause a species to decline; or

It is considered that the proposed action and the proposal is not a type of development likely to introduce disease that may cause this species to decline.

9. Interfere with the recovery of the species.

This species is likely to continue to utilised the retained and rehabilitated habitats within the subject site and adjoining areas. It is considered that the proposed action and the proposal is not likely to interfere with the recovery of this species.

Conclusion
It is considered that the proposed action is not likely to have a significant impact on this species or its habitats and a referral to the DOEE is not necessary.

APPENDIX 1 ATTACHMENT 1 - EPBC ACT PROTECTED MATTERS SEARCH

Australian Government
Department of the Environment and Energy

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.

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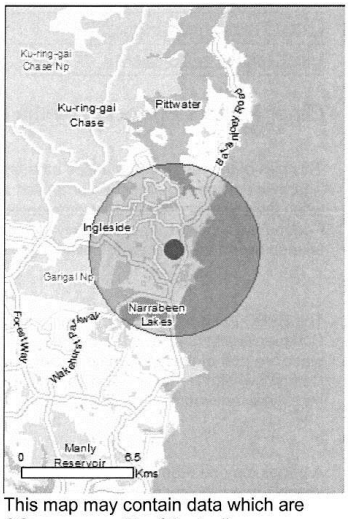

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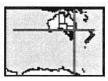

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	85
Listed Migratory Species:	57

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:	6
Commonwealth Heritage Places:	None
Listed Marine Species:	78
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	47
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties [Resource Information]

Name	State	Status
Natural		
Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	NSW	Listed place

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
	Endangered	Community likely to occur within area
	Critically Endangered	Community likely to occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
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

Name	Status	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat known 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

Name	Status	Type of Presence
		habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, 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
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat 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
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
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 known to occur within area

Name	Status	Type of Presence
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 likely to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
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 may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia terminalis subsp. terminalis MS		
Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat likely to occur within area
Asterolasia elegans		
[56780]	Endangered	Species or species habitat known to 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
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Darwinia biflora		
[14619]	Vulnerable	Species or species habitat may occur within area
Eucalyptus camfieldii		
Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat known to occur within area
Grevillea caleyi Caley's Grevillea [9683]	Critically Endangered	Species or species habitat known to occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area
Kunzea rupestris [8798]	Vulnerable	Species or species habitat likely to occur within area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Microtis angusii Angus's Onion Orchid [64530]	Endangered	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat may occur within area
Prostanthera marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Name	Status	Type of Presence
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 White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence 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
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 may 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 may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Director of War Service Homes

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 likely to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur

Name	Threatened	Type of Presence 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
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
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 likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely 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 known to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat likely to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
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

Name	Threatened	Type of Presence 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 Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat 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

Name	Status	Type of Presence
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
Ku-ring-gai Chase	NSW

Invasive Species [Resource Information]

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

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

Name	Status	Type of Presence
		habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur 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

Name	Status	Type of Presence
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.68881 151.29901

Acknowledgements

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-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

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

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

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