

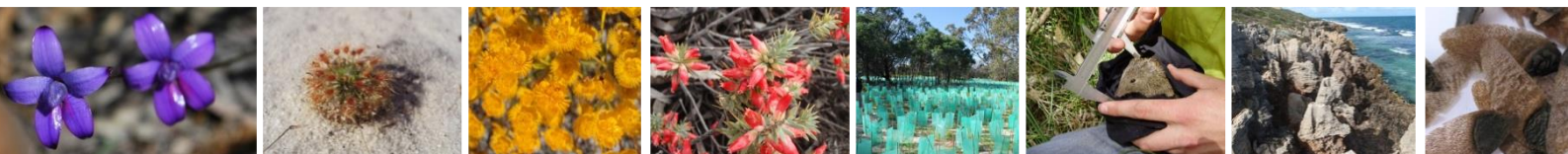


Natural Area
CONSULTING MANAGEMENT SERVICES

City of Rockingham

Safety Bay Road Roundabout and Richmond Ave Flora Survey

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Ngala kaaditj Noongar moort keyen kaadak nidja boodja.

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Executive Summary

Natural Area Consulting Management Services (Natural Area) was commissioned by the City of Rockingham (the City) to undertake a flora and vegetation survey as well as a black cockatoo habitat assessment within two areas of vegetation located within the City. The survey was undertaken to inform environmental approvals for the process of clearing for upgrades the Safety Bay Road and Mandurah Road intersection. The survey area consists of vegetation within the Safety Bay Road Roundabout and two portions of vegetation adjacent to Richmond Avenue.

The survey aimed to determine:

- flora species present (native and non-native)
- the extent and boundaries of vegetation type and condition
- the location of declared rare or priority flora, fauna and/or ecological communities
- habitat assessment for threatened black cockatoo habitat.

The flora and vegetation survey within survey areas confirmed:

- the presence of four vegetation types:
 - *Acacia cochlearis* and *Scaevola crassifolia* Closed Heath
 - *Acacia cyclops* Tall Open Shrubland
 - **Casuarina glauca* Low Closed Forest
 - #*Eucalyptus macrandra* Open Tree Mallee .
- a total of 52 flora species from 26 families
 - 33 introduced (weed) and 18 native species
- one Declared Pest, Narrowleaf Cottonbush (**Gomphocarpus fruticosus*)
- no threatened or priority flora species
- vegetation condition overall ranged from Very Good to Completely Degraded, with the entirety of the first survey area and the majority of the second survey area (65.2%) being in Degraded condition.

The black cockatoo habitat assessment within the survey areas confirmed:

- no potential Black Cockatoo habitat trees (DBH \geq 500 mm)
- one tree which may have the potential to become a Black Cockatoo habitat tree in the future (DBH \geq 300 mm), being a Tuart (*Eucalyptus gomphocephala*)
- the lack of high value foraging habitat due to the lack of preferred flora species, degraded condition of the vegetation and high levels of disturbance.

* denotes introduced species

denotes dubious species (native to Western Australia but not to this local region)

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1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was commissioned by the City of Rockingham (the City) to undertake a flora and vegetation survey as well as a targeted black cockatoo habitat assessment to portions of vegetation within the Safety Bay Road Roundabout and adjacent to Richmond Avenue, Mandurah. The survey was undertaken to inform the environmental approvals process for the purpose of clearing for upgrades to roads and footpaths.

1.1 Location

1.1.1 Safety Bay Road Roundabout

This area is located within the roundabout at the intersection of Safety Bay Road and Mandurah Road in the suburb of Warnbro, approximately 40 km south of the Perth Central Business District (CBD). The area covers approximately 0.16 ha (Figure 1). The entirety of this survey area is located within an Environmentally Sensitive Area (ESA) (Department of Water and Environmental Regulation (DWER), 2023).

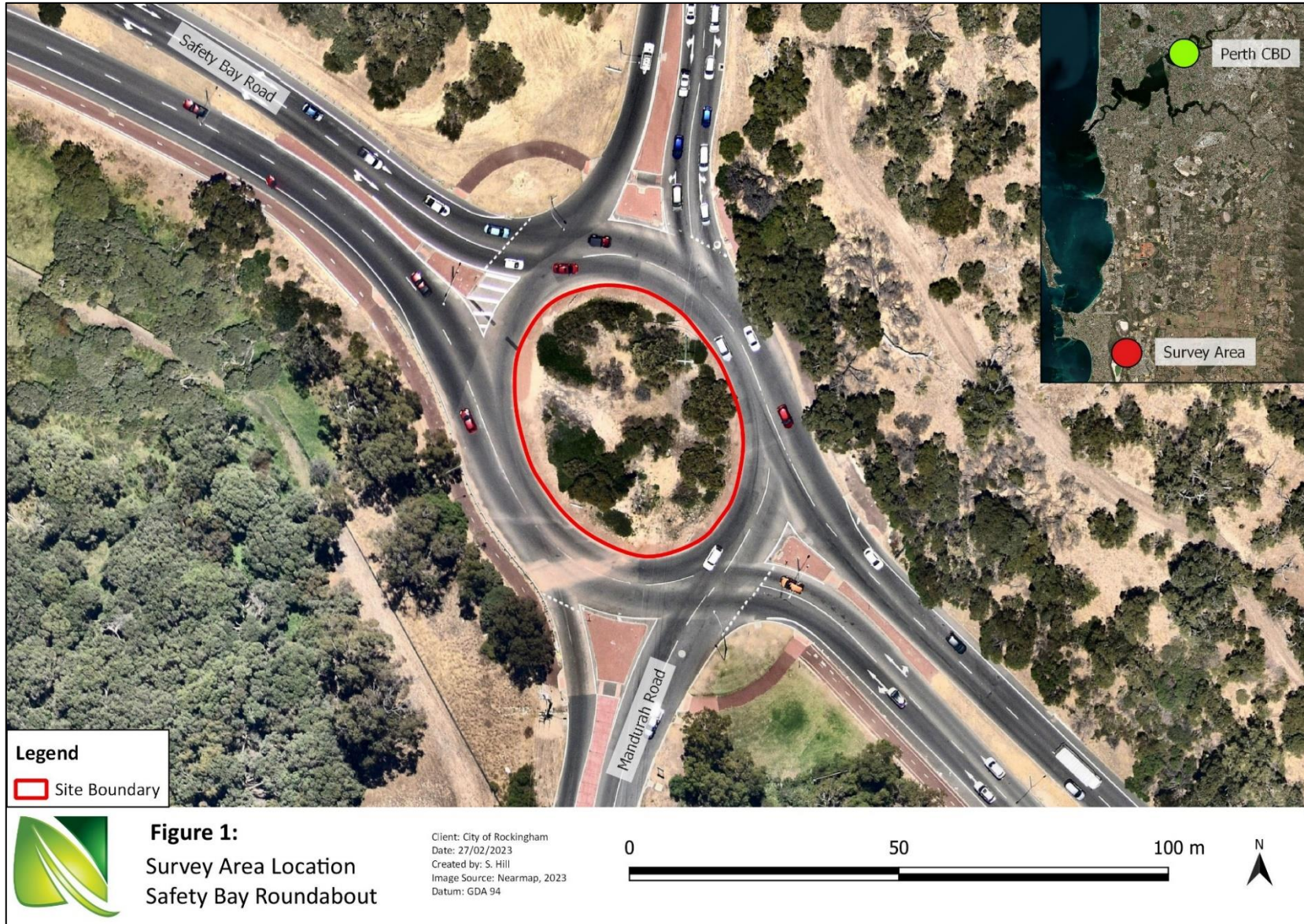
1.1.2 Richmond Avenue

This area comprises of two patches of vegetation located in close proximity to Richmond Avenue, Shoalwater, located approximately 40 km south of the Perth Central Business District (CBD) (Figure 2). The first patch is located at the eastern end of Richmond Avenue and covers an area of approximately 0.02 ha. The second patch is located adjacent to the north-eastern section of Breakaway Lane. The survey area for this patch was expanded in order to properly represent the vegetation types identified, and as a result covers a total area of approximately 0.22 ha. The entirety of both areas are located within ESA's (DWER, 2023).

1.2 Scope

The scope of the works associated with the survey included:

- an initial desktop assessment to determine environmental values and potential conservation significant flora, vegetation, and or other environmental features (such as riparian areas, wetlands) relating to the project area
- an on-ground detailed flora survey of the area to determine:
 - flora species composition (native and non-native)
 - presence of any priority or threatened flora species
 - presence and locations of any declared pests and weeds of national significance (WoNS)
 - vegetation type and condition
- identification and mapping of potential black cockatoo habitat trees and the presence of any suitable hollows
- reporting outcomes of the survey.





2.0 Site Characteristics

The characteristics of a site have a strong bearing on the flora, vegetation, fauna, and ecological communities present. Key characteristics of the survey areas are outlined in this section.

2.1 Regional Context

The survey areas are located in the western portion of the Swan Coastal Plain, within the Perth (SWA2) IBRA subregion (Department of Primary Industries and Regional Development (DPIRD), 2023a). This region is characterised by a coastal plain of low elevation, composed primarily of sands of colluvial and aeolian origin. Vegetation is predominantly Banksia and Tuart (*Eucalyptus gomphocephala*) Woodlands over sandy soils associated with dune systems, with Paperbark (*Melaleuca* spp.) in swamp and dampland areas, and Jarrah (*Eucalyptus marginata*) Woodland to the east where the Swan Coastal Plain rises (Mitchell *et al*, 2002).

2.2 Climate

The climate experienced in the area is Mediterranean, with hot, dry summers and cool, wet winters. According to the Bureau of Meteorology (2023); Garden Island WA, site number 009256, the region experiences:

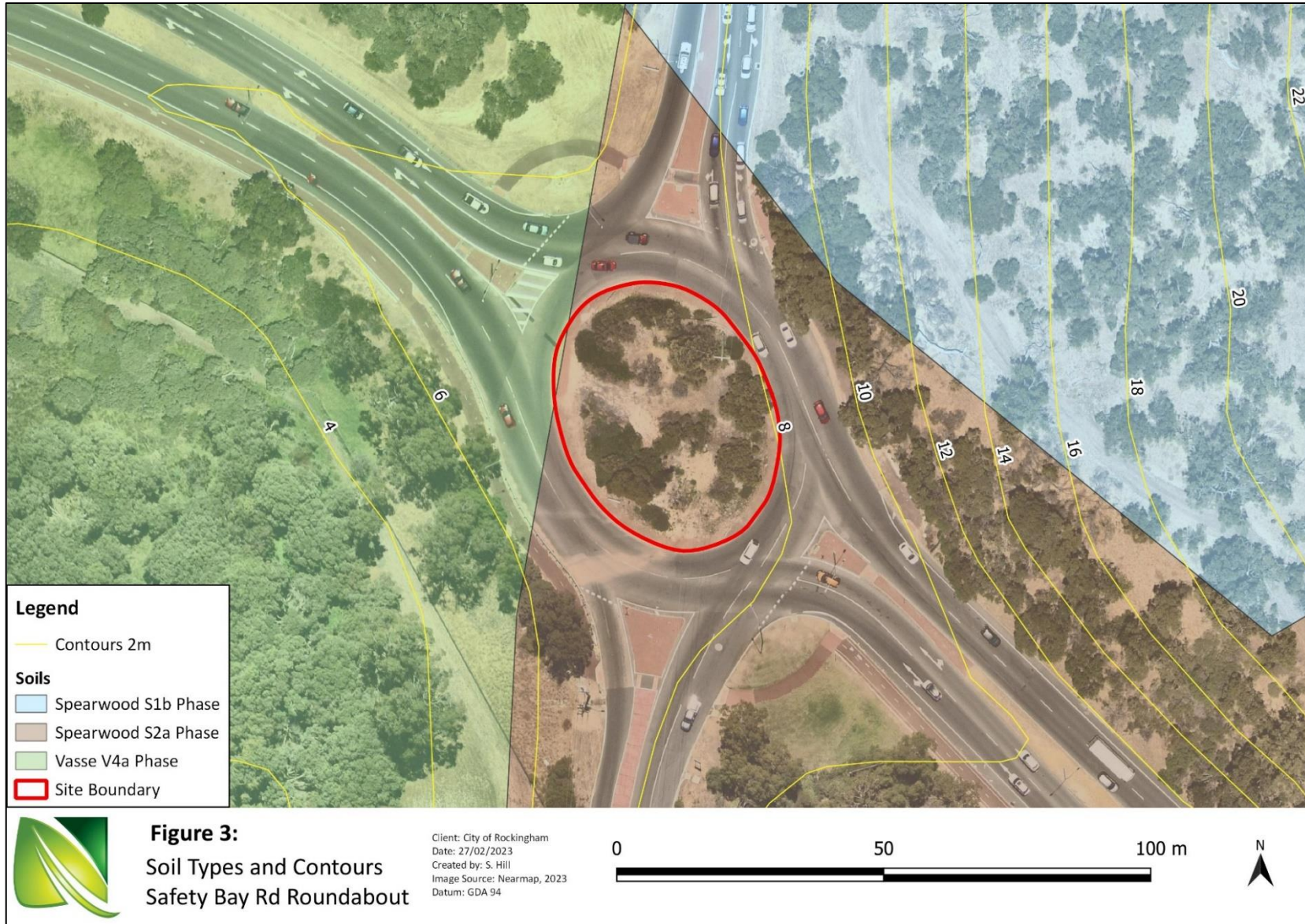
- average rainfall of 610.4 mm pa, with rain falling predominantly between May and September
- maximum temperatures ranging from 19.1 °C in winter to 28.3 °C in summer, with a maximum recorded temperature of 43.4 °C
- minimum temperatures ranging from 11.2 °C in winter to 17.4 °C in summer, with a minimum recorded temperature of 3.5 °C.

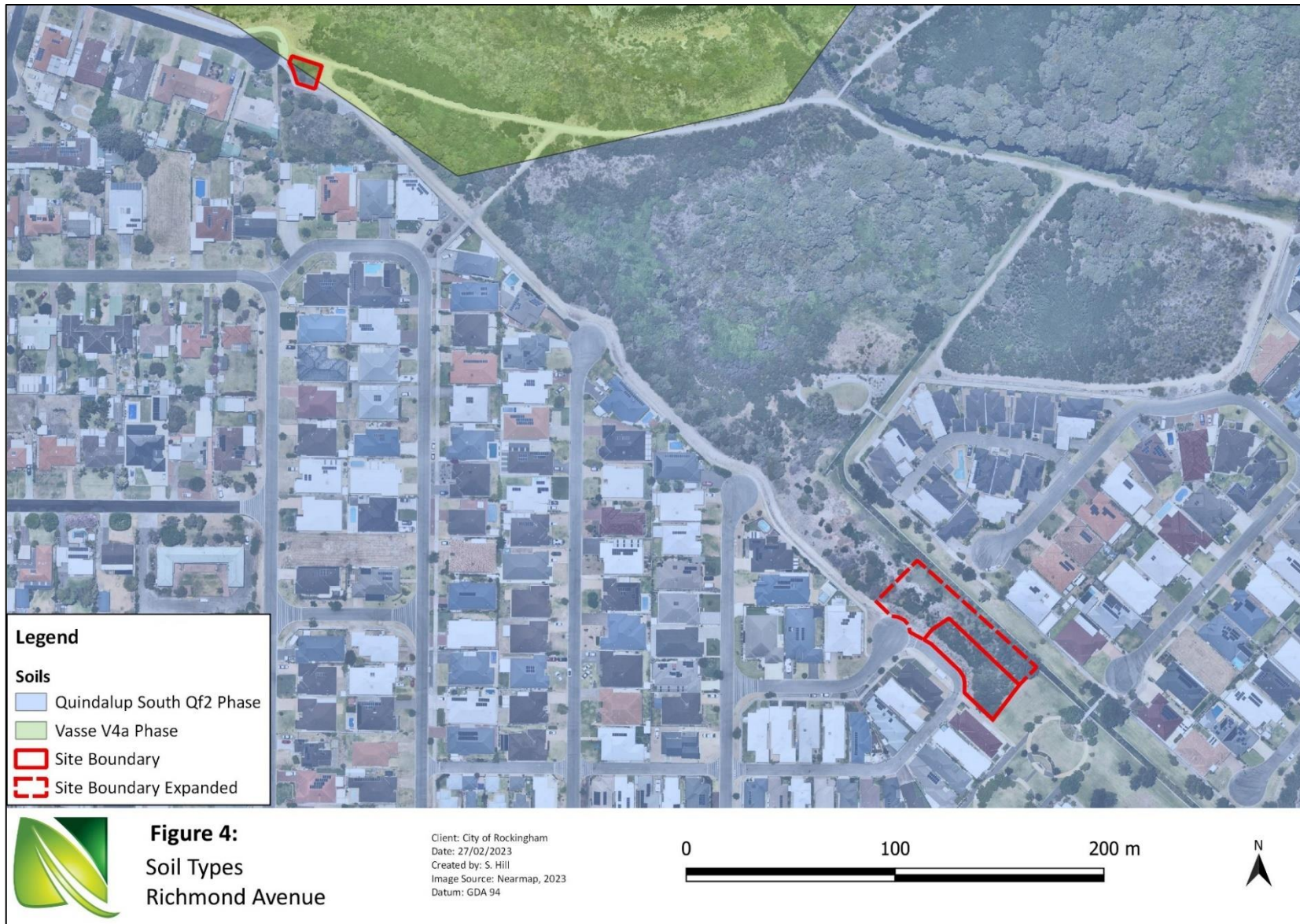
2.3 Topography and Soils

Using the NRInfo Portal, a total of three soil types were identified as present within the two sites, being the Quindalup South Qf2 Phase, the Spearwood S2a Phase and the Vasse V4a Phase (DPIRD, 2023a). Detailed descriptions of the characteristics of these soil types are outlined in Table 1. The Safety Bay Road Roundabout survey area contains predominantly the Spearwood S2a Phase, with a small area of Vasse V4a Phase located in the north-west however overlain by road verge, and lies at an Australian Height Datum (AHD) of 6 – 8 m (Figure 3). The Richmond Ave survey area contains both the Quindalup South Qf2 Phase and Vasse V4a Phase (Figure 4). No topographical information is available for this survey area.

Table 1: Soil types within the survey areas

Name	Symbol	Description
Quindalup South Qf2 Phase	211Qu__Qf2	Relict foredunes and gently undulating beach ridge plain with deep uniform calcareous sands.
Spearwood S2a Phase	211Sp__S2a	Lower slopes of dune ridge are moderately deep to deep with siliceous yellow-brown sands or pale sands with yellow-brown subsoils and minor limestone outcrops.
Vasse V4a Phase	211Va__V4a	Intermediate level terrace fringing lakes. The deep calcareous soils comprise black loams overlying brown to grey silty clay and muddy sands at depth.





2.4 Vegetation Complex

Two vegetation complexes exist within the survey areas, namely the Cottesloe Complex - Central and South, which covers the entirety of the Safety Bay Road roundabout area, and the Quindalup Complex, which covers the entirety of the Richmond Ave survey area (Table 2).

The remaining proportion of the pre-European extent of these vegetation complexes is (Government of Western Australia, 2019):

- within the Swan Coastal Plain
 - 32.16% of the Cottesloe Complex – Central and South
 - 60.49% of the Quindalup Complex
- within the City of Rockingham
 - 36.67% of the Cottesloe Complex – Central and South
 - 37.33% of the Quindalup Complex.

Table 2: Vegetation Complexes

Name	Description
Cottesloe Complex – Central and South	Primarily characterised as closed-heath vegetation location on limestone outcrops, however, also contains areas of low open-forest and <i>Banksia attenuata</i> – <i>Banksia menziesii</i> – <i>Eucalyptus tottiana</i> low woodland where sandy soils run deeper. Typical associated species include <i>Melaleuca huegelii</i> , <i>M. cardiophylla</i> , <i>Acacia heteroclita</i> , <i>Trymalium ledifolium</i> , <i>Grevillea thelemanniana</i> , <i>G. vestita</i> and <i>Jacksonia hakeoides</i> .
Quindalup Complex	Found only within coastal dune systems and categorised into two subdivisions: the strand and foredune alliance, and the mobile and stable dune alliance. Species composition is affected primarily by soil characteristics and topography, but includes <i>Atriplex isatidea</i> , <i>Leucophyta brownii</i> , <i>Carpobrotus virescens</i> and <i>Spinifex longifolius</i> in the former, and <i>Acacia cyclops</i> , <i>Anthocercis littorea</i> , <i>Lepidosperma gladiatum</i> , <i>Myoporum insulare</i> , <i>Olearia axillaris</i> , <i>Scaevola crassifolia</i> and <i>Spyridium globulosum</i> in the latter.

Source: Heddle, Loneragan, and Havel (1980)

2.5 Black Cockatoo

Neither of the survey areas are located within the known range for black cockatoo breeding or roosting (DBCA, 2023a & 2023b). However, both survey areas are located within close proximity (maximum 500 m) of areas which require investigation into their use as foraging habitat for the Carnaby’s Cockatoo (DBCA, 2023c).

2.6 Other Site Characteristics

2.6.1 Hydrology

Both survey areas are located in close proximity to a number of geomorphic wetlands. Cooloongup Lake, which is a conservation category lake, is located within 50 m of the Safety Bay Road roundabout survey area. Lake Richmond, which is also a conservation category lake, as well as conservation category wetland associated with this lake, are located within 100 m of both vegetation patches in the Richmond Ave survey area (Department of Biodiversity, Conservation and Attractions (DBCA), 2023d).

2.6.2 Heritage Values

Lake Richmond and the surrounding vegetation has been identified as both a site of European heritage value (Place Number 18483) and a registered Aboriginal heritage place (Place ID 15974) of ceremonial, camp and spiritual significance (Government of Western Australia, 2023; Department of Planning, Lands and Heritage (DPLH), 2023). The latter heritage place encompasses a portion of the Richmond Ave survey area.

3.0 Methodology

3.1 Desktop and Literature Review

The desktop survey included reviewing online databases to gather contextual knowledge and determine preliminary site characteristics including:

- likely native and non-native flora and fauna species present
- current extent of native vegetation
- general floristic community types
- likely presence of threatened or priority flora and fauna species
- likely presence of any threatened or priority ecological communities.

The following databases were accessed to obtain relevant information:

- NatureMap (DBCA, 2023e)
- Protected Matters Search Tool (Department of Climate Change, Energy, the Environment and Water (DCCEEW)), 2023) (Appendix 1)
- FloraBase (WA Herbarium, 1998-)
- Threatened and priority flora and ecological community database searches (DBCA, 2023f).

Conservation code definitions for the State and Commonwealth are provided in Appendix 3. Information relating to conservation significant species from database searches were summarised into field reference guides to aid with on-ground flora surveys which is provided in Appendix 2.

3.2 On-ground Flora Survey

The flora and vegetation survey was conducted in accordance with *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority (EPA), 2016). Samples were collected, or photographs taken of unfamiliar species to enable later identification.

Natural Area ecologists Shelley Hill and Cally Koopman undertook the flora and vegetation survey on 7 February 2023, with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- setting out a total of four relevés, with one across each vegetation type identified within a survey area
- recording landscape characteristics including soil types/colour, aspect, slope, surface rock, topography and drainage using a modified recording sheets based on the NAIA templates developed for the Perth Biodiversity Project
- determining leaf litter percentage cover, and percentage of bare ground
- recording percentage cover, height and life form for each flora species in the relevé
- recording vegetation type including dominant over, middle and understorey species (Table 3) and condition using the scale attributed to Keighery (Table 4) (Government of Western Australia, 2000)
- the use of GPS to map significant species and boundaries of differing vegetation type and condition
- recording evidence of disturbance, such as fire.

3.2.1 Vegetation Type

The vegetation type was determined using the structural classes described in *Bush Forever Volume 2* (Government of Western Australia, 2000), and records dominant over, middle and understorey species. A description of the various structural classes is provided in Table 3.

Table 3: Vegetation structural classes

Life Form/ Height Class	Canopy Percentage Cover			
	100 – 70%	70 – 30%	30 – 10%	10 – 2 %
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland
Trees 10 – 30 m	Closed forest	Open forest	Woodland	Open woodland
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland
Tree Mallee	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee
Shrub Mallee	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee
Shrubs over 2 m	Closed tall scrub	Tall open scrub	Tall shrubland	Tall open shrubland
Shrubs 1 – 2 m	Closed heath	Open heath	Shrubland	Open shrubland
Shrubs under 1 m	Closed low heath	Open low heath	Low shrubland	Low open shrubland
Grasses	Closed grassland	Grassland	Open grassland	Very open grassland
Herbs	Closed herbland	Herbland	Open herbland	Very open herbland
Sedges	Closed sedgeland	Sedgeland	Open sedgeland	Very open sedgeland

Source: Government of Western Australia, 2000

3.2.2 Vegetation Condition

Vegetation condition was assessed using the rating scale attributed to Keighery in *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016). Table 4 provides a description of the rating scale.

Table 4: Vegetation condition ratings

Category	Description
1 Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
2 Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
3 Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4 Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.

Category	Description
	Disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds, partial clearing, dieback and grazing.
5 Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6 Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: EPA, 2016

3.3 Black Cockatoo Habitat Assessment

A black cockatoo habitat assessment was undertaken in conjunction with the flora survey activities. Activities included:

- recording the location and evidence of breeding, roosting and foraging activities (e.g., chew marks, feathers, scats)
- marking the GPS locations of each habitat tree with DBH \geq 300 mm
- recording the height, health, and species of each habitat tree
- recording evidence of hollows, including size, type, and location within the tree.

3.4 Limitations

Several limitations associated with both desktop and on-ground surveys exist. Limitations are outlined in Table 5.

Table 5: Flora and fauna survey limitations

Potential Limitation	Degree of Limitation	Comments
Availability of contextual information	None	<p>Government data on regional and local contextual information was predominantly readily available for the survey area. Data from the DBCA threatened and priority flora database was not obtained for the Richmond Avenue survey area due to authorisation requirements. However, the data obtained for the Safety Bay Road Roundabout area extends to sufficiently cover the Richmond Avenue survey area and does not mark the presence of any threatened or priority flora within this area. This limitation is not considered to have affected the survey results as a number of databases were consulted in addition to the DBCA threatened and priority flora database, and no flora of conservation significance were identified during the survey.</p> <p>Additionally, topographical data was not available for the Richmond Avenue survey area. This limitation is not considered to have affected the survey results as the survey areas were relatively flat and not known to have associations with flora restricted to a particular topographic range/requirement.</p>
Competency/ experience of team	None	<p>Survey activities were undertaken by experienced ecologists who have extensive experience undertaking detailed flora and vegetation surveys and Black Cockatoo habitat assessments within the Swan Coastal Plain bioregion.</p>
Proportion of flora recorded/ collected, any identification issues	None	<p>A total of 52 flora species (taxa) were recorded from 26 families during the field survey, comprised of 33 introduced (weeds), 18 native species and one dubious species which is native to Western Australia but is not endemic to the Perth region. All species were able to be identified to species level.</p>
Survey effort and extent	Minor	<p>All surveys were undertaken over the period of a day, with all survey areas traversed in full and vegetation type/condition within the survey area being adequately surveyed.</p> <p>Quadrats were not installed within the survey areas during the detailed flora and vegetation survey due to size limitations of the individual survey areas, however a relevé was undertaken for each vegetation type identified in a survey area, during which all information collected during a quadrat survey was recorded, including:</p> <ul style="list-style-type: none"> ▪ photographs

Potential Limitation	Degree of Limitation	Comments
		<ul style="list-style-type: none"> ▪ landscape characteristics ▪ vegetation structure and dominant species ▪ vegetation condition ▪ species list, including the cover and height ▪ signs of disturbance. <p>A targeted Black Cockatoo habitat search was undertaken involving the marking of trees with a DBH \geq 300 mm and recording significant characteristics. As this was a targeted search for this species other faunal groups which may have been present within the site have not been recorded. The Black Cockatoo hollow assessment was conducted from the ground and is therefore limited to those hollows visible from ground-level. As such, not all hollows may have been observed as new growth, dense foliage and position in the landscape can hide hollows from vision. Additionally, internal hollow inspections would be required to confirm hollow characteristics such as internal hollow depth and structure and therefore their suitability to support nesting by Black Cockatoos.</p>
Access restrictions	None	Ecologists were able to traverse throughout the survey areas with no restriction.
Survey timing	Minor	The survey was undertaken during Summer, and not during Spring which is the optimal season for flora surveys within the Swan Coastal Plain bioregion. As a result, 18 of the 23 conservation significant flora species identified in the desktop survey as being likely to occur within the survey areas have flowering periods which are outside the survey timing. A further two have flowering periods which are unknown. Of these species, 12 are perennial shrub and sedge species for which identification would have been possible in the absence of flowering characters. The remaining six species are annual herbs of the family Orchidaceae, for which identifying features (flowering characteristics) would not have been present. These species were determined to be likely due to desktop survey properties, including soil and habitat type, being consistent with the requirements of each species. However, due to the level of degradation and disturbance observed within the survey areas, they are not considered to be suitable habitat for these species. Due to the history of clearing and development associated with the Safety Bay Road Roundabout survey area, it is considered highly unlikely for significant species to be present within the area as it is considered that all vegetation would have been cleared during road construction.
Disturbances	None	No recent disturbances which may have had an impact on survey results (e.g., fire, recent clearing or floods) were identified during the survey.

4.0 Flora Survey Results

4.1 Desktop Survey

4.1.1 Flora

NatureMap identified a total of 5061 flora species which could potentially occur within a 10 km radius of both survey areas including:

- 2371 dicotyledons
- 1374 monocotyledons
- 14 gymnosperms
- 7 ferns.

A desktop survey of online databases indicated the potential for a total of 29 conservation significant species to occur within 10 km of the survey areas (Table 6). NatureMap indicated 20 conservation significant flora species listed under the *Biodiversity Conservation Act 2016* (WA), as potentially occurring within 10 km radius of the survey areas (DBCA, 2023e). A review of the Protected Matters Search Tool (PMST) (DCCEEW, 2023) indicated 12 significant flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the survey areas (Appendix 1).

A review of the DBCA (2023c) threatened and priority flora database indicated 18 threatened or priority species have been recorded within 10 km of the survey areas. Of the conservation significant species potentially found in the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 12 of these species within the Safety Bay Road Roundabout (Area 1) and 21 within the Richmond Ave (Area 2) survey area (highlighted green) (Table 6). Conservation code descriptions are provided in Appendix 3.

Table 6: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons Code	NatureMap	PMST	DBCA	Survey Area
<i>Acacia benthamii</i>	2	X			1, 2
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant	1	X		X	2
<i>Acacia</i> sp. Binningup	1	X		X	
<i>Andersonia gracilis</i>	EN		X		2
<i>Aponogeton hexatepalus</i>	4	X		X	
<i>Banksia mimica</i>	EN		X		1, 2
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	3	X		X	
<i>Caladenia huegelii</i>	EN	X	X	X	1, 2
<i>Calandrinia oraria</i>	3	X		X	
<i>Cyathochaeta teretifolia</i>	3	X		X	2
<i>Dillwynia dillwynioides</i>	3	X		X	1, 2

Species Name	Cons Code	NatureMap	PMST	DBCA	Survey Area
<i>Diuris drummondii</i>	VU		X		2
<i>Diuris micrantha</i>	VU		X		2
<i>Diuris purdiei</i>	EN		X		2
<i>Dodonaea hackettiana</i>	4	X		X	1, 2
<i>Drakaea elastica</i>	EN	X	X	X	1, 2
<i>Eleocharis keigheryi</i>	VU		X		2
<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i>	4	X		X	
<i>Eucalyptus x balanites</i>	EN		X		1
<i>Jacksonia sericea</i>	4	X		X	1, 2
<i>Lachnagrostis nesomytica</i> subsp. <i>paralia</i>	P1	X			1, 2
<i>Pimelea calcicola</i>	3	X		X	1, 2
<i>Schoenus capillifolius</i>	3	X		X	2
<i>Sphaerolobium calcicola</i>	3	X		X	1, 2
<i>Stylidium ireneae</i>	4	X		X	
<i>Stylidium longitubum</i>	4	X		X	2
<i>Synaphea</i> sp. Fairbridge Farm	CR		X		1
<i>Synaphea</i> sp. Pinjarra Plain	EN		X		2
<i>Synaphea</i> sp. Serpentine	CR	X	X	X	2

4.1.2 Threatened and Priority Ecological Communities

A review of the PMST report identified eight listed Threatened Ecological Communities (TEC) that could potentially occur within 10 km of the site (DCCEEW, 2023). A review of DBCA's Threatened Communities database indicated that both survey areas are located within the known distributions of a number of these TEC's (DBCA, 2023f). A description of each TEC is provided in Table 7, which also details which survey area (if any) exists within the known distribution of this TEC.

Table 7: Potential Threatened Ecological Communities within the survey areas

Name	Status	Presence	Survey Area Within Known Distribution
Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain	Endangered	Community known to occur within area	
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	

Name	Status	Presence	Survey Area Within Known Distribution
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	
<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	
<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area	Safety Bay Roundabout, Richmond Ave
Thrombolite (microbial) community of coastal freshwater lakes of the Swan Coastal Plain (Lake Richmond)	Endangered	Community known to occur within area	Richmond Ave
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	Safety Bay Roundabout

Source: DCCEEW, 2023

4.2 Flora Survey Results

4.2.1 Vegetation Types

4.2.1.1 Safety Bay Roundabout

The Safety Bay roundabout survey area contained a single vegetation type, identified as a #*Eucalyptus macrandra* Open Tree Mallee. This was characterised by an overstorey of the mallee species #*Eucalyptus macrandra* over *Grevillea crithmifolia* and an understorey of mixed introduced grasses and herbs (Figure 5). The dominant upper storey structural species, #*Eucalyptus macrandra*, is considered to be planted within the site as this species occurs naturally within the south-coast region of WA, predominantly within the Albany to Esperance region.




Figure 5: Vegetation type within the Safety Bay Road roundabout survey area

4.2.1.2 Richmond Avenue

A total of three vegetation types were recorded within the Richmond Ave survey area, with one vegetation type occurring in the patch closest to Richmond Avenue, being an *Acacia cochlearis* and *Scaevola crassifolia* Closed Heath, and two vegetation types occurring in the patch closest to Breakaway Lane, being an *Acacia cyclops* Tall Open Shrubland and an *Allocasuarina fraseriana* Low Closed Forest. Additionally, an area of vegetation within the Richmond Avenue survey area along the fence line was recorded as a firebreak, showing evidence of previous clearing with subsequent vegetation regrowth. Vegetation types are described in Table 8 and shown in Figure 6.

denotes dubious species (native to Western Australia but not to this local region)

Table 8: Vegetation types within the Richmond Ave survey area (*denotes introduced species)

Vegetation Type	Description	Photograph
<p><i>Acacia cochlearis</i> and <i>Scaevola crassifolia</i> Closed Heath</p>	<p>A closed heath dominated by <i>Acacia cochlearis</i> and <i>Scaevola crassifolia</i> over native sedges and mixed native and introduced herbs.</p>	
<p><i>Acacia cyclops</i> Tall Open Shrubland</p>	<p>A Tall Open Shrubland of <i>Acacia cyclops</i> over <i>Rhagodia baccata</i> and an understorey comprised of introduced herbs.</p>	
<p>*<i>Casuarina glauca</i> Low Closed Forest</p>	<p>A Low Closed Forest of *<i>Casuarina glauca</i> over <i>Melaleuca huegelii</i> and <i>Rhagodia baccata</i>.</p>	

* denotes introduced species



4.2.2 Vegetation Condition

4.2.2.1 Safety Bay Roundabout

Vegetation within the Safety Bay roundabout survey area was entirely in a Degraded condition (0.16 ha). This is due to an observed high level of disturbance, including potential evidence of earthworks and vehicle access (Figure 7), as well as a high level of weed invasion. The vegetation structure within the survey area was observed to be severely altered, with the upper storey dominated by *Eucalyptus macrandra*, which is not endemic to the area and likely to have been a result of planting activity, and very reduced native species diversity within the middle- and lowerstorey vegetation.



Figure 7: Evidence of previous disturbances within the survey area, including vehicle access (left) and earthworks and grading (right)

4.2.2.2 Richmond Avenue

Vegetation within the Richmond Ave survey area ranged from Completely Degraded to Very Good condition (Table 9 and Figure 8). Vegetation within the patch closest to Richmond Ave was in Very Good condition, as a result of the high coverage of native shrub, sedge and herb species, with minimal evidence of disturbance and weed invasion. Vegetation within the patch closest to Breakaway Lane was recorded to be in predominantly Degraded condition, containing an overstorey of the invasive tree species *Casuarina glauca* and/or a species-poor understorey. The remaining area was determined to be in Completely Degraded condition, with an area adjacent to the fence line with evidence of previous clearing for firebreak maintenance and subsequent resprouting of native colonist species to form a monoculture, and an area along the drain with a high coverage of invasive grass, herb and sedge species. The Completely Degraded area located adjacent to the drain was also observed to contain the invasive tree species *Quercus robur*.

Table 9: Vegetation condition within the Richmond Ave survey area

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	0	0.01	0	0.15	0.07	0.23
Area (%)	0	0	4.3	0.0	65.2	30.4	100.0

* denotes introduced species



4.2.3 Flora

A total of 52 flora species (taxa) were recorded from 26 families during the field survey, comprised of 33 introduced (weeds), 18 native species and one dubious species which is native to Western Australia but is not endemic to the Perth region. Examples of native flora species are shown in Figure 9 and weed species in Figure 10. A complete flora species list is provided in Appendix 5.

4.2.3.1 Safety Bay Roundabout

A total of 36 species were identified within the Safety Bay roundabout survey area, comprised of 29 weeds, six native species and the one dubious species; #*Eucalyptus macrandra*. Weed species identified were primarily grasses (Poaceae), daisies (Asteraceae) and spurges (Euphorbiaceae). Native species identified were all middle- to upper storey species from a variety of families.

One Declared Pest was identified, Narrowleaf Cottonbush (**Gomphocarpus fruticosus**), which was recorded at two locations within the Safety Bay roundabout survey area (Figure 11).

4.2.3.2 Richmond Avenue

A total of 27 species were identified within the second survey area, comprised of 13 weeds and 14 native species. Weed species identified were primarily grasses (Poaceae) and daisies (Asteraceae), whilst native species identified were predominantly peas (Fabaceae) and sedges (Cyperaceae).

The **Casuarina glauca* Low Closed Forest was observed to be the least species rich of the vegetation types identified, containing only five species of which three were native. The *Acacia cochlearis* and *Scaevola crassifolia* Closed Heath and *Acacia cyclops* Tall Open Shrubland were observed to contain similar numbers of native species (seven and eight respectively), however the latter exhibited considerably higher weed species diversity and cover. The majority of the understorey identified within the *Acacia cyclops* Tall Open Shrubland were annual weed species, which were observed to be in a stage of senescence at the time of survey.

denotes dubious species (native to Western Australia but not to this local region)

* denotes introduced species



Grevillea crithmifolia



Spyridium globulosum (Basket Bush)



Lepidosperma gladiatum (Coastal Sword Sedge)



Melaleuca huegelii (Chenille Honeymyrtle)



Rhagodia baccata (Berry Saltbush)



Gahnia trifida (Coast Saw-sedge)

Figure 9: Examples of native flora species recorded



Onion Weed (**Asphodelus fistulosus*)



**Brassica oleracea*



Purslane (**Portulaca oleracea*)



Rose Pelargonium (**Pelargonium capitatum*)



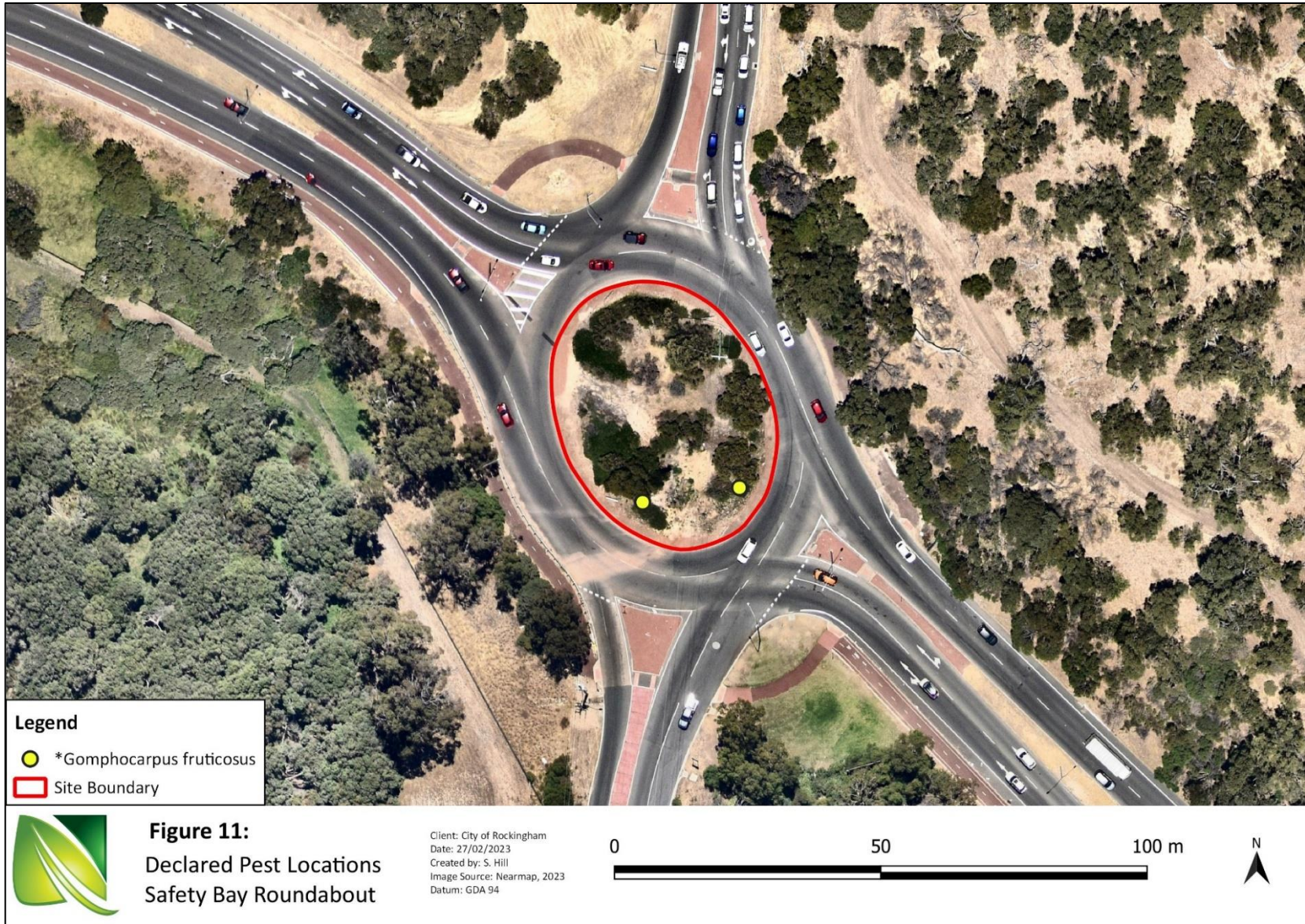
**Erigeron bonariensis*



Nut Grass (**Cyperus rotundus*)

Figure 10: Examples of introduced flora species recorded*

* denotes introduced species



4.2.4 Threatened and Priority Communities

Eight Threatened Ecological Communities (TEC's) were identified as potentially occurring within the survey areas during the desktop survey. No vegetation types identified during the field survey were consistent with the presence of any TEC's due to the lack of associated dominant species and habitat types.

4.2.5 Black Cockatoo Habitat Assessment

No trees were identified that satisfy the size requirements (diameter at breast height (DBH) \geq 500 mm) for potential Black Cockatoo habitat trees, as specified by the Commonwealth referral guidelines (Department of Agriculture, Water, and the Environment (DAWE), 2022). Three trees were identified which satisfy the Commonwealth requirements for trees which have the potential to develop hollows in the future (DBH \geq 300 mm). One of these trees was a Tuart (*Eucalyptus gomphocephala*), whilst the remaining two were the invasive, **Casuarina glauca*. No hollows were identified within any of the trees.

No direct observations of Black Cockatoo species or indirect observations of foraging were observed within either of the survey areas.

* denotes introduced species

5.0 Implications of Results

5.1 Flora and Vegetation

A total of 52 flora species (taxa) were recorded from 26 families during the field survey, comprised of 33 introduced (weeds), 18 native species and one dubious species which is native to Western Australia but is not endemic to the Perth region. On average across all vegetation types recorded, invasive species represented approximately 57.8% of species recorded. Vegetation condition across all survey areas was predominantly in a Degraded to Completely Degraded condition, however the patch located closest to Richmond Ave within the second survey area was identified to be in Very Good condition.

One Declared Pest (DP) was identified during the survey within the Safety Bay Roundabout survey area, Narrowleaf Cottonbush (**Gomphocarpus fruticosus*), for which a total of two individuals were recorded. Declared pests are listed on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management Act 2007* (WA), a classification which requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (DPIRD, 2023b). It is recommended that the control of this species be undertaken prior to any clearing activity to prevent the spread of vegetative material including seeds and rhizomes through the survey area. Additionally, Natural Area recommends the implementation of hygiene practices during clearing to prevent spread.

One species, **Quercus robur*, was observed in two locations within the expanded survey area in close proximity to the drain. These trees appeared to have been planted within the area and may be a result of unauthorised planting by local residents.

No threatened or priority flora species were identified during the summer survey.

Natural Area recommends that, following the completion of clearing and upgrade works, areas be revegetated using locally endemic species where possible. It is noted that the purpose of the clearing within the Safety Bay roundabout survey area is to increase visibility for motorists, and therefore revegetation should utilise understorey and groundcover species.

5.2 Threatened Ecological Communities

Results of the PMST report (DCCEEW, 2023) indicated the potential for eight Threatened Ecological Communities to occur within a 10 km radius of the survey areas (refer to section 4.1.2). A review of DBCA's Threatened Communities database indicated that both survey areas are located within the known distributions of a number of these TEC's (DBCA, 2023f). Vegetation types and species composition recorded during the survey do not meet that required for any of the potential TEC's.

5.3 Black Cockatoo Habitat Assessment

No trees were identified that satisfy the Commonwealth requirements (DBH \geq 500 mm) for potential Black Cockatoo habitat trees (DAWE, 2022). Three trees were identified which satisfy the Commonwealth requirements for trees which have the potential to develop hollows in the future (DBH \geq 300 mm). Only one

* denotes introduced species

of these trees was identified to be a native species, being Tuart (*Eucalyptus gomphocephala*), whilst the remaining two were the invasive **Casuarina glauca*. **Casuarina glauca* are not considered to be potential habitat trees as they do not form hollows required for nesting, and additionally do not provide feeding or roosting habitat for Black Cockatoo species (DEC, 2011). Tuart are known to be of high value for Black Cockatoo species, as they are valuable resources foraging, nesting and roosting activity (DEC, 2011). However, no hollows were identified within the tree and no evidence of foraging was observed. The Tuart observed is unlikely to provide foraging, nesting or roosting habitat due to its isolation from other suitable habitat, and location within the centre of a busy road intersection and subsequent levels of disturbance.

The survey areas are not considered to contain high value foraging resources for Black Cockatoos due to the lack of preferred flora species, degraded condition of the vegetation and high levels of disturbance.

* denotes introduced species

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Appendix 1: PMST Report 10 km



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 06-Feb-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	62
Listed Migratory Species:	63

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	224
Commonwealth Heritage Places:	1
Listed Marine Species:	96
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	11
Regional Forest Agreements:	None
Nationally Important Wetlands:	2
EPBC Act Referrals:	69
Key Ecological Features (Marine):	2
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity	Buffer Status
Becher point wetlands	Within Ramsar site	In feature area
Forrestdale and thomsons lakes	Within 10km of Ramsar site	In buffer area only
Peel-yalgorup system	10 - 20km upstream from Ramsar site	In feature area

Commonwealth Marine Area [\[Resource Information \]](#)

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

Feature Name	Buffer Status
EEZ and Territorial Sea	In buffer area only

Listed Threatened Ecological Communities [\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	In buffer area only
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status
Thrombolite (microbial) community of coastal freshwater lakes of the Swan Coastal Plain (Lake Richmond)	Endangered	Community known to occur within area	In feature area
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[[Resource Information](#)]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
FISH			
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Bettongia penicillata ogilbyi			
Woylie [66844]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat known to occur within area	In buffer area only
Pseudocheirus occidentalis			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
OTHER			
Westralunio carteri			
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			
Andersonia gracilis			
Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Banksia mimica			
Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area	In feature area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area	In feature area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy- leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area	In buffer area only
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Synaphea sp. Pinjarra Plain (A.S. George 17182) [86878]	Endangered	Species or species habitat may occur within area	In buffer area only
Synaphea sp. Serpentine (G.R. Brand 103) [86879]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only

REPTILE

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardena carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardena grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area	In buffer area only
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area	In buffer area only
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

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.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - HMAS STIRLING-ROCKINGHAM ;HMAS STIRLING - GARDEN ISLAND [50134]	WA	In buffer area only
Defence - HMAS STIRLING-ROCKINGHAM ;HMAS STIRLING - GARDEN ISLAND [50132]	WA	In buffer area only
Defence - HMAS STIRLING-ROCKINGHAM ;HMAS STIRLING - GARDEN ISLAND [50133]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - HMAS STIRLING-ROCKINGHAM ;HMAS STIRLING - GARDEN ISLAND [50117]	WA	In buffer area only
Defence - ROCKINGHAM - NAVY CPSO [50135]	WA	In buffer area only
Unknown		
Commonwealth Land - [50317]	WA	In buffer area only
Commonwealth Land - [50457]	WA	In buffer area only
Commonwealth Land - [50492]	WA	In buffer area only
Commonwealth Land - [50493]	WA	In buffer area only
Commonwealth Land - [51499]	WA	In buffer area only
Commonwealth Land - [50497]	WA	In buffer area only
Commonwealth Land - [50655]	WA	In buffer area only
Commonwealth Land - [50495]	WA	In buffer area only
Commonwealth Land - [51496]	WA	In buffer area only
Commonwealth Land - [50425]	WA	In buffer area only
Commonwealth Land - [51497]	WA	In buffer area only
Commonwealth Land - [50424]	WA	In buffer area only
Commonwealth Land - [50570]	WA	In buffer area only
Commonwealth Land - [50490]	WA	In buffer area only
Commonwealth Land - [51495]	WA	In buffer area only
Commonwealth Land - [50491]	WA	In buffer area only
Commonwealth Land - [51979]	WA	In buffer area only
Commonwealth Land - [50622]	WA	In buffer area only
Commonwealth Land - [50623]	WA	In buffer area only
Commonwealth Land - [51117]	WA	In buffer area only
Commonwealth Land - [50515]	WA	In buffer area only
Commonwealth Land - [50542]	WA	In buffer area only
Commonwealth Land - [50514]	WA	In buffer area only
Commonwealth Land - [50603]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50602]	WA	In buffer area only
Commonwealth Land - [50609]	WA	In buffer area only
Commonwealth Land - [50510]	WA	In buffer area only
Commonwealth Land - [50549]	WA	In buffer area only
Commonwealth Land - [50504]	WA	In buffer area only
Commonwealth Land - [50509]	WA	In buffer area only
Commonwealth Land - [50544]	WA	In buffer area only
Commonwealth Land - [50545]	WA	In buffer area only
Commonwealth Land - [50618]	WA	In buffer area only
Commonwealth Land - [50601]	WA	In buffer area only
Commonwealth Land - [50546]	WA	In buffer area only
Commonwealth Land - [50569]	WA	In buffer area only
Commonwealth Land - [50518]	WA	In buffer area only
Commonwealth Land - [50547]	WA	In buffer area only
Commonwealth Land - [50503]	WA	In buffer area only
Commonwealth Land - [50524]	WA	In buffer area only
Commonwealth Land - [50540]	WA	In buffer area only
Commonwealth Land - [50619]	WA	In buffer area only
Commonwealth Land - [50605]	WA	In buffer area only
Commonwealth Land - [50541]	WA	In buffer area only
Commonwealth Land - [50567]	WA	In buffer area only
Commonwealth Land - [50564]	WA	In buffer area only
Commonwealth Land - [50565]	WA	In buffer area only
Commonwealth Land - [50568]	WA	In buffer area only
Commonwealth Land - [50548]	WA	In buffer area only
Commonwealth Land - [50566]	WA	In buffer area only
Commonwealth Land - [50599]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50591]	WA	In buffer area only
Commonwealth Land - [50604]	WA	In buffer area only
Commonwealth Land - [50596]	WA	In buffer area only
Commonwealth Land - [51897]	WA	In buffer area only
Commonwealth Land - [50595]	WA	In buffer area only
Commonwealth Land - [50415]	WA	In buffer area only
Commonwealth Land - [50590]	WA	In buffer area only
Commonwealth Land - [50416]	WA	In buffer area only
Commonwealth Land - [50597]	WA	In buffer area only
Commonwealth Land - [50423]	WA	In buffer area only
Commonwealth Land - [50616]	WA	In buffer area only
Commonwealth Land - [50521]	WA	In buffer area only
Commonwealth Land - [50537]	WA	In buffer area only
Commonwealth Land - [50615]	WA	In buffer area only
Commonwealth Land - [50536]	WA	In buffer area only
Commonwealth Land - [50614]	WA	In buffer area only
Commonwealth Land - [50600]	WA	In buffer area only
Commonwealth Land - [50535]	WA	In buffer area only
Commonwealth Land - [50613]	WA	In buffer area only
Commonwealth Land - [50520]	WA	In buffer area only
Commonwealth Land - [50534]	WA	In buffer area only
Commonwealth Land - [50533]	WA	In buffer area only
Commonwealth Land - [50532]	WA	In buffer area only
Commonwealth Land - [50505]	WA	In buffer area only
Commonwealth Land - [50506]	WA	In buffer area only
Commonwealth Land - [50611]	WA	In buffer area only
Commonwealth Land - [50612]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50507]	WA	In buffer area only
Commonwealth Land - [50610]	WA	In buffer area only
Commonwealth Land - [50469]	WA	In buffer area only
Commonwealth Land - [50468]	WA	In buffer area only
Commonwealth Land - [50467]	WA	In buffer area only
Commonwealth Land - [50466]	WA	In buffer area only
Commonwealth Land - [50465]	WA	In buffer area only
Commonwealth Land - [50498]	WA	In buffer area only
Commonwealth Land - [50464]	WA	In buffer area only
Commonwealth Land - [50499]	WA	In buffer area only
Commonwealth Land - [50463]	WA	In buffer area only
Commonwealth Land - [50496]	WA	In buffer area only
Commonwealth Land - [50462]	WA	In buffer area only
Commonwealth Land - [50573]	WA	In buffer area only
Commonwealth Land - [50461]	WA	In buffer area only
Commonwealth Land - [50421]	WA	In buffer area only
Commonwealth Land - [50479]	WA	In buffer area only
Commonwealth Land - [50460]	WA	In buffer area only
Commonwealth Land - [50418]	WA	In buffer area only
Commonwealth Land - [50419]	WA	In buffer area only
Commonwealth Land - [50572]	WA	In buffer area only
Commonwealth Land - [50420]	WA	In buffer area only
Commonwealth Land - [50643]	WA	In buffer area only
Commonwealth Land - [51890]	WA	In buffer area only
Commonwealth Land - [50501]	WA	In buffer area only
Commonwealth Land - [50617]	WA	In buffer area only
Commonwealth Land - [50589]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50580]	WA	In buffer area only
Commonwealth Land - [50581]	WA	In buffer area only
Commonwealth Land - [50608]	WA	In buffer area only
Commonwealth Land - [50577]	WA	In buffer area only
Commonwealth Land - [50478]	WA	In buffer area only
Commonwealth Land - [50428]	WA	In buffer area only
Commonwealth Land - [50659]	WA	In buffer area only
Commonwealth Land - [50658]	WA	In buffer area only
Commonwealth Land - [50470]	WA	In buffer area only
Commonwealth Land - [50500]	WA	In buffer area only
Commonwealth Land - [50539]	WA	In buffer area only
Commonwealth Land - [50629]	WA	In buffer area only
Commonwealth Land - [50531]	WA	In buffer area only
Commonwealth Land - [50538]	WA	In buffer area only
Commonwealth Land - [50530]	WA	In buffer area only
Commonwealth Land - [50620]	WA	In buffer area only
Commonwealth Land - [51113]	WA	In buffer area only
Commonwealth Land - [50471]	WA	In buffer area only
Commonwealth Land - [50661]	WA	In buffer area only
Commonwealth Land - [50473]	WA	In buffer area only
Commonwealth Land - [50472]	WA	In buffer area only
Commonwealth Land - [50475]	WA	In buffer area only
Commonwealth Land - [50474]	WA	In buffer area only
Commonwealth Land - [50477]	WA	In buffer area only
Commonwealth Land - [50476]	WA	In buffer area only
Commonwealth Land - [50513]	WA	In buffer area only
Commonwealth Land - [50512]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50444]	WA	In buffer area only
Commonwealth Land - [50445]	WA	In buffer area only
Commonwealth Land - [50443]	WA	In buffer area only
Commonwealth Land - [50441]	WA	In buffer area only
Commonwealth Land - [50446]	WA	In buffer area only
Commonwealth Land - [50447]	WA	In buffer area only
Commonwealth Land - [50449]	WA	In buffer area only
Commonwealth Land - [50442]	WA	In buffer area only
Commonwealth Land - [50437]	WA	In buffer area only
Commonwealth Land - [50628]	WA	In buffer area only
Commonwealth Land - [50438]	WA	In buffer area only
Commonwealth Land - [51896]	WA	In buffer area only
Commonwealth Land - [50645]	WA	In buffer area only
Commonwealth Land - [52119]	WA	In buffer area only
Commonwealth Land - [50412]	WA	In buffer area only
Commonwealth Land - [50642]	WA	In buffer area only
Commonwealth Land - [50511]	WA	In buffer area only
Commonwealth Land - [50640]	WA	In buffer area only
Commonwealth Land - [50422]	WA	In buffer area only
Commonwealth Land - [50654]	WA	In buffer area only
Commonwealth Land - [50657]	WA	In buffer area only
Commonwealth Land - [50656]	WA	In buffer area only
Commonwealth Land - [50519]	WA	In buffer area only
Commonwealth Land - [50427]	WA	In buffer area only
Commonwealth Land - [50652]	WA	In buffer area only
Commonwealth Land - [50653]	WA	In buffer area only
Commonwealth Land - [50634]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50635]	WA	In buffer area only
Commonwealth Land - [50631]	WA	In buffer area only
Commonwealth Land - [50528]	WA	In buffer area only
Commonwealth Land - [50633]	WA	In buffer area only
Commonwealth Land - [50632]	WA	In buffer area only
Commonwealth Land - [50481]	WA	In buffer area only
Commonwealth Land - [50529]	WA	In buffer area only
Commonwealth Land - [50737]	WA	In buffer area only
Commonwealth Land - [50526]	WA	In buffer area only
Commonwealth Land - [50551]	WA	In buffer area only
Commonwealth Land - [50550]	WA	In buffer area only
Commonwealth Land - [50637]	WA	In buffer area only
Commonwealth Land - [51123]	WA	In buffer area only
Commonwealth Land - [50527]	WA	In buffer area only
Commonwealth Land - [50522]	WA	In buffer area only
Commonwealth Land - [50525]	WA	In buffer area only
Commonwealth Land - [50638]	WA	In buffer area only
Commonwealth Land - [50523]	WA	In buffer area only
Commonwealth Land - [50636]	WA	In buffer area only
Commonwealth Land - [50639]	WA	In buffer area only
Commonwealth Land - [50662]	WA	In buffer area only
Commonwealth Land - [50621]	WA	In buffer area only
Commonwealth Land - [50455]	WA	In buffer area only
Commonwealth Land - [50458]	WA	In buffer area only
Commonwealth Land - [50488]	WA	In buffer area only
Commonwealth Land - [50459]	WA	In buffer area only
Commonwealth Land - [50486]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50556]	WA	In buffer area only
Commonwealth Land - [50557]	WA	In buffer area only
Commonwealth Land - [50558]	WA	In buffer area only
Commonwealth Land - [50571]	WA	In buffer area only
Commonwealth Land - [50552]	WA	In buffer area only
Commonwealth Land - [50554]	WA	In buffer area only
Commonwealth Land - [50555]	WA	In buffer area only
Commonwealth Land - [50627]	WA	In buffer area only
Commonwealth Land - [50624]	WA	In buffer area only
Commonwealth Land - [50434]	WA	In buffer area only
Commonwealth Land - [50433]	WA	In buffer area only
Commonwealth Land - [50432]	WA	In buffer area only
Commonwealth Land - [50431]	WA	In buffer area only
Commonwealth Land - [50579]	WA	In buffer area only
Commonwealth Land - [51980]	WA	In buffer area only
Commonwealth Land - [50578]	WA	In buffer area only
Commonwealth Land - [50543]	WA	In buffer area only
Commonwealth Land - [50646]	WA	In buffer area only
Commonwealth Land - [50417]	WA	In buffer area only
Commonwealth Land - [51889]	WA	In buffer area only
Commonwealth Land - [50483]	WA	In buffer area only
Commonwealth Land - [50480]	WA	In buffer area only
Commonwealth Land - [50485]	WA	In buffer area only
Commonwealth Land - [50482]	WA	In buffer area only
Commonwealth Land - [50487]	WA	In buffer area only
Commonwealth Land - [50484]	WA	In buffer area only
Commonwealth Land - [51436]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [50456]	WA	In buffer area only
Commonwealth Land - [50454]	WA	In buffer area only
Commonwealth Land - [50453]	WA	In buffer area only
Commonwealth Land - [50452]	WA	In buffer area only
Commonwealth Land - [50451]	WA	In buffer area only
Commonwealth Land - [50450]	WA	In buffer area only

Commonwealth Heritage Places [[Resource Information](#)]

Name	State	Status	Buffer Status
Natural			
Garden Island	WA	Listed place	In buffer area only

Listed Marine Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area	In buffer area only
Larus pacificus Pacific Gull [811]		Breeding known to occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area	In buffer area only
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Fish			
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In buffer area only
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area	In buffer area only
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In buffer area only
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area	In buffer area only
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In buffer area only
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In buffer area only
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In buffer area only
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In buffer area only
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In buffer area only
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In buffer area only
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat known to occur within area	In buffer area only
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Whales and Other Cetaceans [[Resource Information](#)]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Leda	Nature Reserve	WA	In buffer area only
Penguin Island	Conservation Park	WA	In buffer area only
Port Kennedy Scientific Park	Nature Reserve	WA	In buffer area only
Shoalwater Bay Islands	Nature Reserve	WA	In buffer area only
Shoalwater Islands	Marine Park	WA	In buffer area only
Unnamed WA43903	Nature Reserve	WA	In buffer area only
Unnamed WA44004	Nature Reserve	WA	In buffer area only
Unnamed WA48968	5(1)(h) Reserve	WA	In buffer area only
Unnamed WA51658	5(1)(h) Reserve	WA	In buffer area only
Unnamed WA51784	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Unnamed WA53313	Conservation Park	WA	In buffer area only

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State	Buffer Status
Becher Point Wetlands	WA	In buffer area only
Spectacles Swamp	WA	In buffer area only

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Lot 1401 Fifty Road, Baldivis	2020/8620		Approval	In buffer area only

Controlled action

Baldivis Residential development on lots 98, 323,529 and 530	2010/5733	Controlled Action	Post-Approval	In buffer area only
Clearing of 12.8ha of native vegetation on Lots 19 and 20, Sixty Eight Road, Baldivis, WA	2016/7661	Controlled Action	Post-Approval	In buffer area only
Clearing of 18.80 ha of vegetation ahead of quarrying operations	2010/5650	Controlled Action	Completed	In buffer area only
Clearing of 22 ha vegetation to allow for the continuation of quarrying	2010/5649	Controlled Action	Post-Approval	In buffer area only
Commercial Development of Lots 12 and 13 Lodge Drive, East Rockingham, WA	2021/9069	Controlled Action	Further Information Request	In buffer area only
Construction of a Deepwater, General Container Port	2009/5178	Controlled Action	Proposed Decision	In buffer area only
Construction of New Perth Bunbury Highway project	2005/2193	Controlled Action	Post-Approval	In feature area
Development of Kwinana Quay port facility	2008/4387	Controlled Action	Completed	In buffer area only
Develop three sites into residential housing and mixed use developments, Western Australia	2013/6916	Controlled Action	Post-Approval	In buffer area only
Extend a section of Mundijong Road	2011/5971	Controlled Action	Post-Approval	In buffer area only
Industry Zone	2010/5337	Controlled Action	Post-Approval	In buffer area only
Lot 2 Corner Durrant Avenue and Sicklemore Road - Residential Development	2011/5882	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Mangles Bay Marina Based Tourist Precinct	2010/5659	Controlled Action	Post-Approval	In buffer area only
Natural Gas Pipeline Expansion	2006/2813	Controlled Action	Post-Approval	In buffer area only
Residential Development, Lot 123 Mortimer Road, Casuarina, WA	2018/8379	Controlled Action	Assessment Approach	In buffer area only
Residential development, Village of Wellard, City of Kwinana, WA	2013/6986	Controlled Action	Post-Approval	In buffer area only
Residential development of Lots 635, 739 and 740 on Deposited Plan 202751, Baldivis Road, Baldivis,	2018/8361	Controlled Action	Post-Approval	In buffer area only
Residential development of various lots	2019/8500	Controlled Action	Proposed Decision	In buffer area only
Sand extraction, Lot 810, Yangedi Rd, Hopeland, WA	2015/7429	Controlled Action	Post-Approval	In buffer area only
Sand Mining	2010/5522	Controlled Action	Completed	In buffer area only
Sand Mining 70/915 Banksia Road, Wellard, WA	2015/7438	Controlled Action	Post-Approval	In buffer area only
Spatial Property Group Ltd - Residential Development	2021/9006	Controlled Action	Assessment Approach	In buffer area only
Wellard Village Primary School development, part Lot 9074 Lambeth Circle, Wellard	2020/8732	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed	In feature area
Baldivis District Sporting Complex, Baldivis, WA	2018/8323	Not Controlled Action	Completed	In buffer area only
Clear native vegetation to undertake a residential development, Baldivis, Wa	2013/6779	Not Controlled Action	Completed	In buffer area only
Construction of Secret Harbour High School	2004/1489	Not Controlled Action	Completed	In feature area
Continuation of quarrying sand and limestone, Lot 800 Kerosene Lane, Baldivis, WA	2013/6832	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Expansion of berthing facilities at Kwinana Bulk Terminal	2006/2509	Not Controlled Action	Completed	In buffer area only
Expansion of existing Ammonium Nitrate Production Facility	2005/1941	Not Controlled Action	Completed	In buffer area only
Expansion of Lifestyle Village development, Lots 1, 3, 700 and 703 Mandurah Rd, Baldivis, WA	2016/7850	Not Controlled Action	Completed	In buffer area only
Gas-fired Power Station	2005/2213	Not Controlled Action	Completed	In buffer area only
Highschool and Primary development, Wellard, WA	2016/7639	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Karnup Sand Mining Project, Stakehill Road, Baldivis, WA	2015/7533	Not Controlled Action	Completed	In buffer area only
Kennedy Bay urban development, Port Kennedy, WA	2014/7122	Not Controlled Action	Completed	In buffer area only
Kennedy Park Estate Residential Development	2003/1044	Not Controlled Action	Completed	In feature area
Kwinana Depot Upgrade	2011/6035	Not Controlled Action	Completed	In buffer area only
Kwinana Gas-Fired Power Station	2005/2101	Not Controlled Action	Completed	In buffer area only
Lot 384 Karnup Road, Hopeland Residential Development	2020/8682	Not Controlled Action	Completed	In buffer area only
Lots 569 & 1263, Baldivis Road and Lot 21, Sixty Eight Road, Baldivis, WA	2012/6526	Not Controlled Action	Completed	In buffer area only
Montessori School Lot 11 and 700 Karnup Rd, Karnup, WA	2017/8034	Not Controlled Action	Completed	In buffer area only
Palm Beach Caravan Park Redevelopment, Rockingham, WA	2013/6853	Not Controlled Action	Completed	In buffer area only
Perth Desalination Plant 2	2019/8454	Not Controlled Action	Completed	In buffer area only
Residential development, part of Lot 601, Mandurah Road, West Baldivis, WA	2013/6871	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Residential Development, Serpentine and Baldivis Roads	2020/8700	Not Controlled Action	Completed	In buffer area only
Residential development of Lot 9501 Muzzlewood Street, Baldivis, WA	2016/7775	Not Controlled Action	Completed	In buffer area only
Residential Subdivision on Baldivis Road, Sabrina Road & Zig Zag Road	2012/6613	Not Controlled Action	Completed	In buffer area only
Residential Subdivision on Lots 921 & 922 Baldivis Road and Lot 3 Key Close, Baldivis, WA	2012/6601	Not Controlled Action	Completed	In buffer area only
Sepia Depression Ocean Outlet Landline Duplication	2012/6248	Not Controlled Action	Completed	In buffer area only
Subdivision development on Fifty Rd & Eighty Rd Baldivis	2011/6195	Not Controlled Action	Completed	In buffer area only
Wellard Farms Urban Development, Baldivis WA	2020/8634	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
CETO 6 Garden Island Project, offshore WA	2016/7635	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
CETO 6 Geophysical and Geotechnical Surveys	2014/7408	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
City of Cockburn Sporting Facilities	2005/2139	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Lake Richmond Boardwalk installation, Rockingham, WA	2013/6977	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Multipurpose development stage 1 within 340ha	2004/1913	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Wastewater Treatment Plant	2009/4970	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
3D Seismic Survey	2012/6245	Referral Decision	Completed	In buffer area only
CO2 3D Seismic Survey Vlaming Sub-Basin	2012/6343	Referral Decision	Completed	In buffer area only
Kennedy Bay Urban Development, Port Kennedy, Rockingham	2013/7022	Referral Decision	Completed	In buffer area only
Lot 877 Stakehill Road, Karnup	2021/8887	Referral Decision	Completed	In buffer area only
Lots 569 & 1263, Baldivis Road and Lot 21, Sixty Eight Road, Baldivis, WA	2012/6491	Referral Decision	Completed	In buffer area only
Mundijong Road Ext Realignment Project Baldivis WA	2011/5864	Referral Decision	Completed	In buffer area only

Key Ecological Features

[[Resource Information](#)]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	South-west	In buffer area only
Western rock lobster	South-west	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardeanna carneipes Flesh-footed Shearwater [82404]	Aggregation	Known to occur	In buffer area only
Ardeanna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In buffer area only
Eudyptula minor Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In buffer area only
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Former Range	In buffer area only
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Sterna dougallii Roseate Tern [817]	Foraging	Known to occur	In feature area
Sternula nereis Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In buffer area only
Seals			
Neophoca cinerea Australian Sea Lion [22]	Foraging (male)	Likely to occur	In buffer area only
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only
Eubalaena australis Southern Right Whale [40]	Calving buffer	Known to occur	In buffer area only
Eubalaena australis Southern Right Whale [40]	Seasonal calving habitat	Known to occur	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.


Acknowledgements



This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:



- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
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- [-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.



Appendix 2: Significant Species



Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Acacia benthami</i> Photo: B.R. Maslin</p>		Shrub, ca 1 m high. Fl. Yellow.	Aug to Sep.	Sand. Typically on limestone breakaways.	P2	Y – Areas 1, 2	Soil type consistent.
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant		Shrub, 0.4-1.5 m high. Fl. Yellow.	May or Aug.	Grey or black sand over clay. Swampy areas, winter wet lowlands.	P1	Y – Area 2	Soil type consistent.
<i>Acacia</i> sp. Binningup					P1	-	



Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Andersonia gracilis</i></p> <p>Photos: K. Atkins & M. Hislop</p>		<p>Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple.</p>	<p>Sep to Nov.</p>	<p>White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.</p>	<p>EN</p>	<p>Y – Area 2</p>	<p>Soil type consistent.</p>
 <p><i>Aponogeton hexatpalus</i></p> <p>Photos: J.L. Robson & A.P. Brown</p>	<p>Stalked Water Ribbons</p>	<p>Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green-white.</p>	<p>Jul to Oct.</p>	<p>Freshwater: ponds, rivers, claypans.</p>	<p>P4</p>	<p>N</p>	<p>Habitat type not consistent.</p>


Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Banksia mimica</i> Photos: A.P. Brown & S. Patrick</p>	<p>Summer Honeypot</p>	<p>Prostrate, lignotuberous shrub, 0.15-0.4 m high. Fl. yellow-brown.</p>	<p>Dec or Jan to Feb.</p>	<p>White or grey sand over laterite, sandy loam.</p>	<p>EN</p>	<p>Y – Areas 1, 2</p>	<p>Soil type consistent.</p>
 <p><i>Beyeria cinerea</i> subsp. <i>cinerea</i> Photos: G. Cockerton & M. Kealley</p>					<p>P3</p>	<p>-</p>	<p>No information.</p>



Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Caladenia huegelii</i> Photos: I. & M. Greeve & J.L. Robson</p>	Grand Spider Orchid	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red.	Sep to Oct.	Grey or brown sand, clay loam.	EN	Y – Areas 1, 2	Soil type consistent.
<i>Calandrinia oraria</i>					P3	-	No information.
<i>Cyathochaeta teretifolia</i>		Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown.		Grey sand, sandy clay. Swamps, creek edges.	P3	Y – Area 2	Soil type consistent.
<i>Dillwynia dillwynioides</i>		Decumbent or erect, slender shrub, 0.3-1.2 m high. Fl. red & yellow/orange.	Aug to Dec.	Sandy soils. Winter-wet depressions.	P3	Y – Areas 1, 2	Soil type consistent.



Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Diuris drummondii</i> Photos: A. P. Brown and I & M Greeve</p>	Tall Donkey Orchid	Tuberous, perennial, herb, 0.5-1.05 m high. Fl. Yellow.	Nov to Dec or Jan.	Low-lying depressions, swamps.	VU	Y – Area 2	Soil type consistent.
 <p><i>Diuris micrantha</i> Photos: A.P. Brown, I. & M. Greeve & B. Jackson</p>		Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown.	Sep to Oct.	Brown loamy clay. Winter-wet swamps, in shallow water.	VU	Y – Area 2	Soil type consistent.



Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Diuris purdiei</i> Photos: I. & M. Greeve & S.D. Hopper</p>	<p>Purdie's Donkey Orchid</p>	<p>Tuberous, perennial, herb, 0.15-0.35 m high. Fl. Yellow.</p>	<p>Sep to Oct.</p>	<p>Grey-black sand, moist. Winter-wet swamps.</p>	<p>EN</p>	<p>Y – Area 2</p>	<p>Soil type consistent.</p>
 <p><i>Dodonaea hackettiana</i> Photos: D. Bright, I.R. Dixon & S.J. Patrick</p>	<p>Hackett's Hopbush</p>	<p>Erect shrub or tree, 1-5 m high. Fl. yellow-green/red.</p>	<p>Mainly Jul to Oct.</p>	<p>Sand. Outcropping limestone.</p>	<p>P4</p>	<p>Y – Areas 1, 2</p>	<p>Soil type consistent.</p>

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Drakaea elastica</i></p> <p>Photos: A. Brown & S.D. Hopper</p>	Glossy-leaved Hammer Orchid	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow.	Oct to Nov.	White or grey sand. Low-lying situations adjoining winter-wet swamps.	EN	Y – Areas 1, 2	Soil type consistent.
 <p><i>Eleocharis keigheryi</i></p> <p>Photo: G.J. Keighery</p>		Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high.	Fl. green, Aug to Nov.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	VU	Y – Area 2	Soil type consistent.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
<i>Eucalyptus foecunda</i> subsp. <i>foecunda</i>	Fremantle Mallee	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. Green.	Aug to Nov.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	P4	-	No information.
 <p><i>Eucalyptus balanites</i></p> <p>Photos: R. Cranfield, L. Sweedman & S.D. Hopper</p>	Cadda Road Mallee	Mallee to 5m high, bark rough, flaky. Fl. White.	Oct to Dec or Jan to Feb.	Sandy soils with lateritic gravel.	EN	Y – Area 1	Soil type consistent.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Jacksonia sericea</i> Photo: I.R. Dixon</p>	Waldjumi	(Mallee), to 5 m high, bark rough, flaky. Fl. White.	Oct to Dec or Jan to Feb.	Sandy soils with lateritic gravel.	P4	Y – Areas 1, 2	Soil type consistent.
<p><i>Lachnagrostis nesomytica</i> subsp. <i>paralia</i></p>		Low spreading shrub, to 0.6 m high. Fl. Orange.	Usually Dec or Jan to Feb.	Calcareous & sandy soils.	P1	Y – Areas 1, 2	Soil type consistent.
 <p><i>Pimelea calcicola</i> Photos: I.R. Dixon</p>		Loosely tufted, weakly ascending, short-lived perennial or annual, herb (grass), to 0.5 m high. Fl. purple-green.		Calcareous sands. Coastal dunes and swales.	P3	Y – Areas 1, 2	Soil type consistent.
<p><i>Schoenus capillifolius</i></p>		Erect to spreading shrub, 0.2-1 m high. Fl. Pink.	Sep to Nov.	Sand. Coastal limestone ridges.	P3	Y – Area 2	Soil type consistent.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Sphaerolobium calcicola</i></p> <p>Photos: R. Butcher</p>		<p>Semi-aquatic tufted annual, grass-like or herb (sedge), 0.05 m high. Fl. Green.</p>	<p>Oct to Nov.</p>	<p>Brown mud. Claypans.</p>	<p>P3</p>	<p>Y – Areas 1, 2</p>	<p>Soil type consistent.</p>
 <p><i>Stylidium ireneae</i></p> <p>Photos: J. Wege</p>		<p>Slender, multi-stemmed, scandent or erect shrub, to 1.5 m high. Fl. orange-red.</p>	<p>Jun or Sep to Nov.</p>	<p>White-grey-brown sand, sandy clay over limestone, black peaty sandy clay. Tall dunes, winter-wet flats, interdunal swamps, low-lying areas.</p>	<p>P4</p>	<p>N</p>	<p>Soil type not consistent.</p>

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Stylidium longitubum</i> Photos: M. Hislop and P.G. Armstrong</p>	<p>Jumping Jacks</p>	<p>Lax perennial, herb, (0.06-)0.1-0.28 m high, Leaves oblanceolate, 0.4-2 cm long, 1-3 (-5) mm wide, apex subacute to acuminate, margin entire, glandular. Scape glandular. Inflorescence racemose. Fl. Pink.</p>	<p>Oct to Dec.</p>	<p>Sandy loam. Valleys near creek lines, woodland, often with Agonis.</p>	<p>P4</p>	<p>Y – Area 2</p>	<p>Soil type consistent.</p>
 <p><i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696) Photos: R. Butcher</p>		<p>Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink.</p>	<p>Oct to Dec.</p>	<p>Sandy clay, clay. Seasonal wetlands.</p>	<p>CR</p>	<p>Y – Area 1</p>	<p>Soil type consistent.</p>

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons. code	Likelihood (Y/N)	Comment
 <p><i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182) Photos: R. Butcher</p>		<p>Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Fl. Yellow.</p>	<p>Oct.</p>	<p>Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.</p>	<p>EN</p>	<p>Y – Area 2</p>	<p>Soil type consistent.</p>
 <p><i>Synaphea</i> sp. Serpentine (G.R. Brand 103) Photos: R. Butcher</p>		<p>Erect, clumped shrub (sub-shrub), to 0.8 m high. Fl. Yellow.</p>	<p>Sep to Nov.</p>	<p>Grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite. Flats, seasonally wet areas, railroad reserves often with wet depressions or drains.</p>	<p>CR</p>	<p>Y – Area 2</p>	<p>Soil type consistent.</p>

Appendix 3: Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct, ranked according to their level of threat using IUCN Red List criteria (Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild in the immediate future
EN	Endangered	Species considered to be facing a very high risk of extinction in the wild in the near future
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild in the medium-term future
EX	Extinct Species	Species where 'there is no reasonable doubt that the last member of the species has died (Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
EW	Extinct in the Wild	Species that are known to only survive in cultivation, in captivity, or as a naturalised population well outside its past range; and it has not been recorded in its known or expected habitat at appropriate seasons anywhere in its past range, despite surveys over a timeframe appropriate to its life cycle and form
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth (Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice)
CD	Conservation Dependent	Species of special conservation interest (conservation dependent fauna), being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened (Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice)
OS	Specially Protected	Fauna otherwise in need of special protection to ensure their conservation (Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice)
P	Priority Species	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or

Conservation Code	Name	Description
		flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
P1	Priority One	Poorly known species – Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation.
2	Priority Two	Poorly known species – Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar.
3	Priority Three	Poorly known species – Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat
4	Priority Four	Rare or near threatened and other species in need of monitoring.


(Source: Department of Biodiversity, Conservation and Attractions, 2020)

Commonwealth

Category	Description
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Species facing a very high risk of extinction in the wild in the near future
Vulnerable	Species facing a high risk of extinction in the wild in the medium term

(Source: Department of Biodiversity, Conservation and Attractions, 2019)


Appendix 4: Relevé Data

Relevé No.:	SB-R1		
Survey Date:	7/02/2023		
Personnel:	SNH CK		
Topography:	Sumpland		
Aspect:	West		
Slope:	Central depression		
Soil:	Brown sand		
Gravel:	0%		
Rock:	0%		
Leaf Litter:	30%		
Bare Ground:			
Drainage:	Well-draining		Notes: Construction rubble present
Condition:	Degraded		Vegetation type: # <i>Eucalyptus macrandra</i> Open Tree Mallee

Species	Cover (%)	Height (m)
Dominant		
# <i>Eucalyptus macrandra</i>	20.0	4.0
* <i>Avena barbata</i>	5.0	0.8
* <i>Cynodon dactylon</i>	10.0	0.2
* <i>Erigeron bonariensis</i>	5.0	1.0
* <i>Erigeron sumatrensis</i>	5.0	1.0
<i>Acacia saligna</i>	10.0	5.0
<i>Grevillea crithmifolia</i>	20.0	1.5
Other		
* <i>Asphodelus fistulosus</i>	0.5	0.2
* <i>Brassica oleracea</i>	0.1	0.2
* <i>Bromus diandrus</i>	2.0	0.3
* <i>Casuarina glauca</i>	1.0	3.0
* <i>Digitaria sanguinalis</i>	0.1	0.2
* <i>Eragrostis curvula</i>	0.5	0.8
* <i>Euphorbia peplus</i>	0.1	0.3


Species	Cover (%)	Height (m)
* <i>Euphorbia terracina</i>	0.1	0.2
* <i>Euphorbia maculata</i>	0.1	0.1
* <i>Fumaria capreolata</i>	2.0	1.0
* <i>Gomphocarpus fruticosus</i> (DP)	0.1	0.5
* <i>Juncus acutus</i>	0.1	1.0
* <i>Lagurus ovatus</i>	0.1	0.2
* <i>Lolium rigidum</i>	0.1	0.3
* <i>Melilotus indicus</i>	0.5	0.2
* <i>Oenothera drummondii</i>	1.0	0.3
* <i>Oenothera stricta</i>	0.1	0.1
* <i>Pelargonium capitatum</i>	1.0	0.4
* <i>Phalaris paradoxa</i>	0.1	0.3
* <i>Plantago lanceolata</i>	1.0	0.4
* <i>Portulaca oleracea</i>	0.2	0.2
* <i>Sisalix atropurpurea</i>	0.1	0.3
* <i>Solanum nigrum</i>	1.0	0.5
* <i>Sonchus asper</i>	0.1	0.1
* <i>Sonchus oleraceus</i>	0.1	0.1
<i>Eucalyptus gomphocephala</i>	2.0	7.0
<i>Gahnia trifida</i>	2.0	1.0
<i>Hibbertia cuneiformis</i>	2.0	1.0
<i>Spyridium globulosum</i>	2.0	1.5

Note: # denotes dubious species, *denotes introduced species.

Relevé No.:	RA-R1	
Survey Date:	7/02/2023	
Personnel:	SNH CK	
Topography:	Flat	
Aspect:	-	
Slope:	-	
Soil:	Grey sand	
Gravel:	0%	
Rock:	10%	
Leaf Litter:	0%	
Bare Ground:	1%	
Drainage:	Well-draining	Notes: Limestone throughout
Condition:	Very Good	Vegetation type: <i>Acacia cochlearis</i> and <i>Scaevola crassifolia</i> Closed Heath

Species	Cover (%)	Height (m)
Dominant		
<i>Acacia cochlearis</i>	20.0	1.5
<i>Hardenbergia comptoniana</i>	5.0	1.0
<i>Lepidosperma gladiatum</i>	10.0	1.0
<i>Scaevola crassifolia</i>	60.0	1.5
Other		
* <i>Avena barbata</i>	2.0	1.5
* <i>Bromus diandrus</i>	2.0	0.3
* <i>Erigeron bonariensis</i>	0.1	0.2
* <i>Euphorbia terracina</i>	0.1	0.6
* <i>Lactuca serriola</i>	0.1	0.7
* <i>Pelargonium capitatum</i>	5.0	0.8
<i>Acacia cyclops</i>	2.0	1.0
<i>Conostylis candicans</i>	0.1	0.4
<i>Ficinia nodosa</i>	0.1	0.6

Note: *denotes introduced species.

Relevé No.:	RA-R2	
Survey Date:	7/02/2023	
Personnel:	SNH CK	
Topography:	Flat	
Aspect:	-	
Slope:	-	
Soil:	Grey sand	
Gravel:	0%	
Rock:	0%	
Leaf Litter:	10%	
Bare Ground:	10%	
Drainage:	Well-draining	
Condition:	Degraded to Completely Degraded	

Species	Cover (%)	Height (m)
Dominant		
<i>Acacia cyclops</i>	70.0	3.0
<i>Rhagodia baccata</i>	40.0	1.5
Other		
* <i>Asphodelus fistulosus</i>	0.5	0.1
* <i>Avena barbata</i>	1.0	1.0
* <i>Bromus diandrus</i>	5.0	0.4
* <i>Cynodon dactylon</i>	5.0	0.2
* <i>Cyperus rotundus</i>	1.0	0.4
* <i>Erigeron bonariensis</i>	2.0	0.7
* <i>Euphorbia terracina</i>	1.0	0.4
* <i>Lactuca serriola</i>	3.0	0.5
* <i>Pelargonium capitatum</i>	2.0	0.4
* <i>Quercus robur</i>	0.5	0.7
* <i>Solanum nigrum</i>	0.5	0.5
* <i>Sonchus asper</i>	0.1	0.7
* <i>Verbascum virgatum</i>	0.1	0.7

Species	Cover (%)	Height (m)
<i>Acacia saligna</i>	1.0	0.5
<i>Hardenbergia comptoniana</i>	1.0	1.5
<i>Melaleuca huegelii</i>	10.0	2.0
<i>Olearia axillaris</i>	2.0	1.0
<i>Scaevola crassifolia</i>	20.0	1.5
<i>Templetonia retusa</i>	1.0	0.5

Note: *denotes introduced species.

Relevé No.:	RA-R3
Survey Date:	7/02/2023
Personnel:	SNH CK
Topography:	Flat
Aspect:	-
Slope:	-
Soil:	Brown sand
Gravel:	0%
Rock:	0%
Leaf Litter:	10%
Bare Ground:	10%
Drainage:	Well-draining
Condition:	Degraded



Vegetation type: *Casuarina glauca* Low Closed Forest

Species	Cover (%)	Height (m)
Dominant		
<i>*Casuarina glauca</i>	80.0	9.0
<i>Rhagodia baccata</i>	20.0	1.5
Other		
<i>*Cynodon dactylon</i>	1.0	0.1
<i>*Casuarina glauca</i>	80.0	9.0
<i>Bolboschoenus caldwellii</i>	0.5	0.5
<i>Melaleuca huegelii</i>	4.0	2.0
<i>Rhagodia baccata</i>	20.0	1.5

Note: *denotes introduced species.

Appendix 5: Species List

The complete flora list for the survey is provided in the table below with flora listed by species, and relevé they occurred within indicated. *Denotes introduced species and # denotes species that are native to Western Australia but not to this local region.

Family	Species	Common Name	Relevé			
			SB-R1	RA-R1	RA-R2	RA-R3
Myrtaceae	# <i>Eucalyptus macrandra</i>	Long-flowered Marlock	X			
Asphodelaceae	* <i>Asphodelus fistulosus</i>	Onion Weed	X		X	
Poaceae	* <i>Avena barbata</i>	Wild Oat	X	X	X	
Brassicaceae	* <i>Brassica oleracea</i>		X			
Poaceae	* <i>Bromus diandrus</i>	Great Brome	X	X	X	
Casuarinaceae	* <i>Casuarina glauca</i>		X			X
Poaceae	* <i>Cynodon dactylon</i>	Couch	X		X	X
Cyperaceae	* <i>Cyperus rotundus</i>	Nut Grass			X	
Poaceae	* <i>Digitaria sanguinalis</i>	Crab Grass	X			
Poaceae	* <i>Eragrostis curvula</i>	African Lovegrass	X			
Asteraceae	* <i>Erigeron bonariensis</i>		X	X	X	
Asteraceae	* <i>Erigeron sumatrensis</i>		X			
Euphorbiaceae	* <i>Euphorbia peplus</i>	Petty Spurge	X			
Euphorbiaceae	* <i>Euphorbia terracina</i>	Geraldton Carnation Weed	X	X	X	
Euphorbiaceae	* <i>Euphorbia maculata</i>		X			
Papaveraceae	* <i>Fumaria capreolata</i>	Whiteflower Fumitory	X			

Family	Species	Common Name	Relevé			
			SB-R1	RA-R1	RA-R2	RA-R3
Apocynaceae	* <i>Gomphocarpus fruticosus</i> (DP)	Narrowleaf Cottonbush	X			
Juncaceae	* <i>Juncus acutus</i>	Spiny Rush	X			
Asteraceae	* <i>Lactuca serriola</i>	Prickly Lettuce		X	X	
Poaceae	* <i>Lagurus ovatus</i>	Hare's Tail Grass	X			
Poaceae	* <i>Lolium rigidum</i>	Wimmera Ryegrass	X			
Fabaceae	* <i>Melilotus indicus</i>		X			
Onagraceae	* <i>Oenothera drummondii</i>	Beach Evening Primrose	X			
Onagraceae	* <i>Oenothera stricta</i>	Common Evening Primrose	X			
Geraniaceae	* <i>Pelargonium capitatum</i>	Rose Pelargonium	X	X	X	
Poaceae	* <i>Phalaris paradoxa</i>	Paradoxa Grass	X			
Plantaginaceae	* <i>Plantago lanceolata</i>	Ribwort Plantain	X			
Portulacaceae	* <i>Portulaca oleracea</i>	Purslane	X			
Fagaceae	* <i>Quercus robur</i>				X	
Caprifoliaceae	* <i>Sixalix atropurpurea</i>		X			
Solanaceae	* <i>Solanum nigrum</i>	Black Berry Nightshade	X		X	
Asteraceae	* <i>Sonchus asper</i>	Rough Sowthistle	X		X	
Asteraceae	* <i>Sonchus oleraceus</i>	Common Sowthistle	X			
Scrophulariaceae	* <i>Verbascum virgatum</i>	Twiggy Mullein			X	
Fabaceae	<i>Acacia cochlearis</i>	Rigid Wattle		X		

Family	Species	Common Name	Relevé			
			SB-R1	RA-R1	RA-R2	RA-R3
Fabaceae	<i>Acacia cyclops</i>	Coastal Wattle		X	X	
Fabaceae	<i>Acacia saligna</i>	Orange Wattle	X		X	
Cyperaceae	<i>Bolboschoenus caldwellii</i>	Marsh Club-rush				X
Haemodoraceae	<i>Conostylis candidans</i>	Grey Cottonhead		X		
Myrtaceae	<i>Eucalyptus gomphocephala</i>	Tuart	X			
Cyperaceae	<i>Ficinia nodosa</i>	Knotted Club Rush		X		
Cyperaceae	<i>Gahnia trifida</i>	Coast Saw-sedge	X			
Proteaceae	<i>Grevillea crithmifolia</i>		X			
Fabaceae	<i>Hardenbergia comptoniana</i>	Native Wisteria		X	X	
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	X			
Cyperaceae	<i>Lepidosperma gladiatum</i>	Coast Sword-sedge		X		
Myrtaceae	<i>Melaleuca huegelii</i>	Chenille Honeymyrtle			X	X
Asteraceae	<i>Olearia axillaris</i>	Coastal Daisybush			X	
Chenopodiaceae	<i>Rhagodia baccata</i>	Berry Saltbush			X	X
Goodeniaceae	<i>Scaevola crassifolia</i>	Thick-leaved Fan-flower		X	X	
Rhamnaceae	<i>Spyridium globulosum</i>	Basket Bush	X			
Fabaceae	<i>Templetonia retusa</i>	Cockies Tongues			X	