

# Broadwater and West Abbey City of Busselton Flora and Vegetation Survey



Prepared for Accendo Australia



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## Executive Summary

Plantecology Consulting was commissioned by Accendo Australia on behalf of the City of Busselton to undertake a reconnaissance flora and vegetation survey of vegetation within two sites on the foreshore of Geographe Bay in the City of Busselton. One site is in the locality of Broadwater (the Broadwater site) and is approximately 3.72 ha area, and the other site is in the locality of Abbey (the West Abbey site) and is 1.38 ha in area. The survey was required as part of the City of Busselton's Coastal Sand Dune Resilience Works, which is part of the Storm Surge Risk Mitigation (SSRM) project.

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 6<sup>th</sup> and 7<sup>th</sup> March 2024. The sites were traversed on foot and a detailed record of the vegetation was undertaken at seven 100 m<sup>2</sup> sampling plots (10m x 10m quadrats), selected to adequately sample the flora within a stand. Three plots were placed in the Broadwater site and four in the West Abbey site. Plots were positioned to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of the NW corner of a plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking inward to the quadrat. All vascular plant species were recorded and an estimate of the percentage cover was made for each species.

A total of 23 native and 20 non-native (exotic) taxa was recorded within the site, representing 23 families and 41 genera. The dominant families containing mostly native taxa were Poaceae (3 native taxa and 7 exotic taxa) and Cyperaceae (3 native taxa).

Three native plant associations were identified across both sites:

### *Spinifex hirsutus* grassland

Open grassland of *Spinifex hirsutus*, *\*Pelargonium capitatum* and *\*Trachyandra divaricata* with scattered *Acacia cochlearis* on cream to grey sands.

This association occupies the seaward side of the foredunes.

### *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland

Open shrubland of *Leucopogon parviflorus*, *Acacia cochlearis* and *Melaleuca lanceolata* over herbland of *\*Pelargonium capitatum*, *\*Lagurus ovatus* and *Acanthocarpus preissii* on cream to grey sands.

This association occupies the top and rear slopes of the foredunes.

### *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland

Sedgeland of *Lepidosperma gladiatum* and *Ficinia nodosa* with emergent *Santalum acuminatum*.

This association occupies the swales behind the foredunes.

The site is also traversed by access paths and drains. The drains are vegetated in part by a sedgeland of *Bolobochoenus caldwellii* and *\*Rumex crispus* (Plate 8). This vegetation is a response to the installation of drainage across the beach and is not a naturally occurring type.

The vegetation condition of the site is rated as 'Degraded' for the *Spinifex hirsutus* grassland and adjacent parts of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland. The understorey in the 'Degraded' areas is quite sparse and, although *Spinifex hirsutus* is common, it is dominated by exotic taxa such as *\*Pelargonium capitatum*, *\*Lagurus ovatus*, *\*Trachyandra divaricata*, *\*Carpobrotus edulis* and *\*Euphorbia paralias*. Aside from tracks and drains which are rated as 'Completely Degraded', the remainder of the site is rated as 'Good'. The *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland and most of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland have retained their basic structure, but all strata have been impacted by disturbance. Much of the understorey of the *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland has been invaded by buffalo grass (*\*Stenotaphrum secundatum*) and the ground and shrub layers of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland are less dense than would be expected in undisturbed vegetation.



The results of the cluster analysis were assigned most sites to a group from FCT S13 'Northern *Olearia axillaris*, *Scaevola crassifolia* shrublands' and FCT S14 '*Spinifex longifolius* grassland and low shrublands'. Plot 3 was most clearly assigned to FCT S14, while all others apart from Plot 1 fused with a group consisting mostly of S13 plots. Plot 1 fused with a disrupted group consisting of plots from FCTs 29a, 30a1, S11, S12, 16 and S07. It is not possible to determine a FCT for Plot 1. Neither FCT S13 nor FCT S14 are listed as communities of conservation concern.

No Threatened or Priority Flora pursuant to either the Biodiversity Conservation Act (2016) or the EPBC Act (1999) were recorded during the survey.

Twenty of the taxa recorded during the survey are exotics (weeds). None are Declared Pests under the Biosecurity and Agriculture Management Act 2007, with restrictions on their sale or movement.



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## 1 Introduction

Plantecology Consulting was commissioned by Accendo Australia on behalf of the City of Busselton to undertake a reconnaissance flora and vegetation survey of vegetation within two sites on the foreshore of Geographe Bay in the City of Busselton (Figure 1). One site is in the locality of Broadwater (the Broadwater site) and is approximately 3.72 ha area, and the other site is in the locality of Abbey (the West Abbey site) and is 1.38 ha in area.

The survey was required as part of the City of Busselton's Coastal Sand Dune Resilience Works, which is part of the Storm Surge Risk Mitigation (SSRM) project.

### 1.1 Existing Environment

The sites are located west of Busselton on the Swan Coastal Plain within the primary coastal dune zone of Geographe Bay, with residential areas to the south. The Broadwater site is located approximately 4 km west of the centre of Busselton, with the Abbey site approximately 4 km west of the Broadwater site.

The sites are fully accessible by the public and are dissected by walk trails and drains. The vegetation within the sites is quite disturbed with the understorey currently vegetated by a mix of native and exotic species. Being located on the primary coastal dunes, the sites are subject to the usual erosion and accretion processes of coastal beaches.

### 1.2 Climate

The Geographe Bay area experiences a dry Mediterranean climate of hot dry summers and cool wet winters. Long-term climatic averages indicate the site is located in an area of moderate to high rainfall, receiving 658 mm on average annually (data for Busselton Aero, station number 9603, the nearest currently reporting station; Bureau of Meteorology 2024) with the majority of rainfall received between May and August. The area experiences rainfall on an average of 83 days per year. Mean maximum temperatures range from 16.9 °C in July to 30.3 °C in January. Mean minimum temperatures range from 7.0 °C in July, to 14.7 °C in February.

### 1.3 Soils

The Atlas of Australian Soils maps the soils for the site as Map Unit A13, which are coastal dune formations backed by deposits of inlets and estuaries. The main soils are calcareous sands (Natural Resource Information Centre 1991). On a finer scale, Tille and Lantzke (1990) places the survey area within the Quindalup South Qf2 phase, which comprises relict foredunes and gently undulating plain with uniform calcareous sands. Either description is consistent with that observed within the survey sites.

### 1.4 Conservation Significant Flora

Under the Biodiversity Conservation Act 2016 ('BC Act'), the Minister for the Environment produces a gazetted list of Threatened Flora under three categories: Critically Endangered, Endangered and Vulnerable. The Department of Biodiversity, Conservation and Attractions (DBCA) also produces a list of Priority Flora that have not been assigned statutory protection under the BC Act but may be under some degree of threat (DBCA 2023a). The DBCA recognises four Priority Flora levels. The definitions for each category of Threatened and Priority Flora are shown in Appendix E.

As well as protection under State legislation, selected flora are also afforded statutory protection at a Federal level pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act provides for the protection of Threatened species, pursuant to Schedule 1 of the

Act, and are defined as “Critically Endangered”, “Endangered”, “Vulnerable” or “Conservation Dependent” under Section 179. Definitions of these categories are shown in Appendix E. Any action likely to have a significant impact on a species listed under the EPBC Act requires approval from the Commonwealth Minister for the Environment.

Searches of the State databases (Reference Number: 56-0224) identified 82 conservation significant taxa with the potential to occur within the site (Table 1). Those records within approximately 10 km of the site are shown in Figure 2. Of the identified taxa, 19 are listed as Threatened under the BC Act, of which six are orchids. *Caladenia busselliana* (Bussell’s Spider Orchid) occurs in winter-wet swamps and flowers from September to October. *Caladenia huegelii* (Grand Spider Orchid) occurs in low-lying grey or brown sands and clayey loams. It flowers between September and October. *Caladenia procera* (Carbanup King Spider Orchid) occurs in alluvial flats of clay loams beneath jarrah, marri and peppermint woodlands and flowers between September and October. *Caladenia viridescens* (Dunsborough Spider Orchid) occurs loams and grey sands of marri and peppermint woodlands and flowers from September to October. *Drakaea elastica* (Glossy-leafed Hammer Orchid) occurs in damp *Kunzea glabrescens* or banksia woodland. It flowers between September and October. *Drakaea micrantha* (Dwarf Hammer Orchid) occurs in white-grey sand and flowers from September to October.

The primary dune habitat within the sites is not suitable for any of the Threatened flora identified in the database searches.

## 1.5 Conservation Significant Communities

The DBCA defines an ecological community as “a naturally occurring assemblage that occurs in a particular type of habitat” (DBCA 2023b). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC). Definitions of the categories of Threatened and Priority Ecological Communities are given in Appendix E.

As well as protection under State legislation, selected ecological communities are also afforded statutory protection at a Federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as “Critically Endangered”, “Endangered” or “Vulnerable” under Section 182. Similar to flora listed under the EPBC Act, any action likely to have a significant impact on a TEC listed under the EPBC Act requires Commonwealth approval.

Five terrestrial TECs endorsed under State legislation are recorded as occurring within 25 km of the site:

- SCP10b – ‘Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)’, listed as Critically Endangered under State legislation and as Endangered pursuant to the EPBC Act;
- SCP 02 – ‘Southern wet shrublands, Swan Coastal Plain’, listed as Critically Endangered under State legislation;
- SCP 1b – ‘*Corymbia calophylla* woodlands on heavy soils of the southern SCP’, listed as Endangered under State legislation;
- SCP 9 - Dense shrublands on clay flats’, listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act; and
- Swan Coastal Plain 7 – ‘Herb rich saline shrublands in clay pans’, listed as Endangered under State legislation and Critically Endangered pursuant to the EPBC Act.



**Table 1: Threatened and Priority Flora potentially occurring within the survey area based on database searches. (VU = Vulnerable; EN = Endangered; CR = Critically Endangered; T = Threatened; 1 - 4 = Priority Flora Category)**

Taxon	DBCRA Ranking	EPBC Act Category	Flowering Period
<i>Acacia flagelliformis</i>	4		Jul-Sep
<i>Acacia lateriticola</i> var. <i>Glabrous</i> variant (B.R. Maslin 6765)	3		-
<i>Acacia semitrullata</i>	4		Jun-Aug
<i>Amanita walpolei</i>	2		-
<i>Amperea micrantha</i>	2		Sep-Oct
<i>Andersonia barbata</i>	2		Aug-Nov
<i>Angianthus drummondii</i>	3		Oct, Nov
<i>Aponogeton hexatepalus</i>	4		Aug-Sep
<i>Austrostipa bronweniae</i>	T		Oct-Nov
<i>Banksia biterax</i>	3		May, Jul-Oct
<i>Banksia meisneri</i> subsp. <i>ascendens</i>	4		Apr-Aug
<i>Banksia nivea</i> subsp. <i>uliginosa</i>	T	EN	Aug-Sep
<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T	VU	Jul-Aug
<i>Blennospora doliiformis</i>	3		Oct-Nov
<i>Boronia capitata</i> subsp. <i>gracilis</i>	3		Jun-Aug
<i>Boronia tetragona</i>	3		Oct-Dec
<i>Caladenia busselliana</i>	T	EN	Sep-Oct
<i>Caladenia huegelii</i>	T	EN	Aug-Oct
<i>Caladenia procera</i>	T	CR	Spe-Oct
<i>Caladenia viridescens</i>	T	EN	Sep-Oct
<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	4		Sep-Dec
<i>Calystegia sepium</i> subsp. <i>roseata</i>	2		Oct-Dec
<i>Cardamine paucijuga</i>	2		Aug-Nov
<i>Chamelaucium erythrochlorum</i>	4		Nov-Feb
<i>Chamelaucium roycei</i>	T	VU	Aug - Nov
<i>Chordifex gracilior</i>	3		Sep-Oct
<i>Chorizema carinatum</i>	3		Oct-Nov
<i>Cyanothamnus tenuis</i>	4		-
<i>Cyathochaeta teretifolia</i>	3		-
<i>Dampiera triloba</i>	3		Aug-Dec
<i>Daviesia elongata</i>	T		Sep, Dec-Feb
<i>Dillwynia</i> sp. <i>Capel</i> (P.A. Jurjevich 1771)	3		Sept-Oct
<i>Drakaea elastica</i>	T	EN	Oct-Nov
<i>Drakaea micrantha</i>	T	VU	Sep-Oct
<i>Drosera occidentalis</i>	4		Oct-Dec
<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	3		-
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	4		-
<i>Franklandia triaristata</i>	4		Aug-Oct
<i>Gastrolobium argyrotichum</i>	T	CR	Dec
<i>Gastrolobium</i> sp. <i>Yoongarillup</i> (S.Dilkes s.n. 1/9/1969)	1		Oct
<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	3		Aug-Nov
<i>Grevillea bronweniae</i>	3		-

Taxon	DBCA Ranking	EPBC Act Category	Flowering Period
<i>Grevillea manglesioides</i> subsp. <i>ferricola</i>	3		Jul-Dec
<i>Hakea oldfieldii</i>	3		Sep
<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	3		Jun, Sep-Dec
<i>Jacksonia gracillima</i>	3		Oct-Nov
<i>Johnsonia inconspicua</i>	3		Nov
<i>Lambertia echinata</i> subsp. <i>occidentalis</i>	T	EN	Oct-Dec
<i>Lambertia orbifolia</i> subsp. <i>vespera</i>	T		Jan-Dec
<i>Lasiopetalum laxiflorum</i>	3		Oct-Nov
<i>Lasiopetalum membranaceum</i>	3		Oct-Nov
<i>Leptomeria furtiva</i>	2		Jan, Aug-Oct
<i>Lepyrodia extensa</i>	2		-
<i>Lepyrodia heleocharoides</i>	3		Dec
<i>Leucopogon</i> sp. Busselton (D. Cooper 243)	2		Aug-Sep
<i>Loxocarya magna</i>	3		-
<i>Meionectes tenuifolia</i>	3		Nov-Dec
<i>Montia australasica</i>	2		Oct-Nov
<i>Morelotia australiensis</i>	T	VU	Dec
<i>Myriophyllum echinatum</i>	3		Oct-Nov
<i>Netrostylis</i> sp. Blackwood River (A.R. Annels 3043)	3		-
<i>Olearia strigosa</i>	3		Dec - May
<i>Ornduffia submersa</i>	4		Sep-Oct
<i>Pimelea ciliata</i> subsp. <i>longituba</i>	3		Sep-Nov
<i>Puccinellia vassica</i>	1		Nov
<i>Pultenaea pinifolia</i>	3		Oct
<i>Schoenus benthamii</i>	3		Oct-Nov
<i>Schoenus natans</i>	4		Aug-Nov
<i>Schoenus pennisetis</i>	3		Aug-Sep
<i>Schoenus</i> sp. Jindong (R.D. Royce 2485)	1		Oct-Nov
<i>Stachystemon exilis</i>	1		Oct-Nov
<i>Stylidium leeuwinense</i>	4		Feb-May
<i>Stylidium longitubum</i>	4		Nov
<i>Stylidium roseonatum</i>	3		Oct
<i>Synaphea hians</i>	3		Sep-Oct
<i>Synaphea petiolaris</i> subsp. <i>simplex</i>	3		Sep-Oct
<i>Thysanotus glaucus</i>	4		Nov-Feb
<i>Verticordia attenuata</i>	3		Jan
<i>Verticordia densiflora</i> var. <i>pedunculata</i>	T	EN	Dec
<i>Verticordia lehmannii</i>	4		Oct
<i>Verticordia plumosa</i> var. <i>ananeotes</i>	T	EN	Dec
<i>Verticordia plumosa</i> var. <i>vassensis</i>	T	EN	Oct

Nine other terrestrial FCTs listed as PECs are recorded as occurring within 25 km of the site:

- ‘*Eucalyptus cornuta*, *Agonis flexuosa* and *Eucalyptus decipiens* forest on deep yellow-brown siliceous sands over limestone’
- ‘*Eucalyptus patens*, *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest’ (Priority 1)
- ‘*Eucalyptus rudis* (flooded gum), *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest (near Busselton)’ (Priority 1);
- ‘Swan Coastal Plain Paluslope Wetlands’ (Priority 1);
- SCP 30b - ‘Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands’ (Priority 3);
- SCP 21b ‘Southern *Banksia attenuata* woodlands’ (Priority 3);
- ‘Subtropical and Temperate Coastal Saltmarsh’ (Priority 3);
- ‘Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP’ (Priority 3); and
- ‘Banksia dominated woodlands of the Swan Coastal Plain IBRA Region’ (Priority 3).

The ‘Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region’ and ‘Southern *Banksia attenuata* woodlands’ are listed as ‘Endangered’ by the Commonwealth under the EPBC Act. The ‘Subtropical and Temperate Coastal Saltmarsh’ is listed as Vulnerable by the Commonwealth, while the ‘Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP’ is listed as Critically Endangered.

The sites are not situated within the buffer zones of any of the known occurrences of TECs or PECs (Figure 3).

## 1.6 Vegetation Complexes

Vegetation complexes are a series of plant communities forming a regularly repeating pattern associated with a particular soil unit (Government of Western Australia 2000). The vegetation complex mapped as occurring within the site is the Quindalup Complex, which has approximately 60.6% of its original 58 780 ha pre-European extent remaining, and 8.38% of its original extent occurs on lands with some level of protection (Government of Western Australia 2017).

## 1.7 Geomorphic Wetlands

Hill et al. (1996) has mapped all wetlands of the Swan Coastal Plain using the classification system of Semeniuk (1987). This classification system is based on the geomorphic setting and hydrological processes associated with a wetland. The classification allocates individual wetlands with shared characteristics to wetland suites. Table 2 below indicates the wetland types and their geomorphic setting.

**Table2: Geomorphic Wetland Classification, adapted from Semeniuk (1987)**

	Basin	Flat	Channel	Slope
Permanently inundated	Lake	River		
Seasonally inundated	Sumpland	Floodplain	Creek	
Seasonally waterlogged	Dampland	Palusplain		Paluslope

The Hill et al. (1996) wetland mapping was digitised by the Department of Biodiversity, Conservation and Attractions (DBCA) to create the Geomorphic Wetland Swan Coastal Plain dataset (the dataset), which is managed and maintained by the DBCA. Each classified wetland listed in the dataset has a

Unique Feature Identifier (UFI), however in the case of many large wetlands that have sustained a degree of disturbance, a separate management category may be assigned to parts of the wetland in order to reflect the current values. The description and management objectives of each management category are listed in Table 3. The wetland management category is important as it categorises wetlands on their significance, based on hydrological, biological and human use features. This dynamic dataset is continually updated with site-specific wetland surveys providing new and relevant information.

The Geomorphic Wetlands of the Swan Coastal Plain (GWSCP) dataset indicates that there are no wetlands occurring within the site (Figure 4).

**Table 3: Wetland Management Categories and Objectives (Western Australian Planning Commission 2005)**

Management Category	Description of Wetland	Management Objectives
Conservation Category Wetland (CCW)	Wetlands that support high levels of attributes and functions.	To preserve wetland attributes and functions through reservation in national parks, crown reserves, state owned land and protection under environmental protection policies.
Resource Enhancement Wetland (REW)	Wetlands that have been partly modified but still support substantial functions and attributes.	To restore wetlands through maintenance and enhancement of wetland functions and attributes by protection in crown reserves, state or local government owned land and by environmental protection policies, or in private property by sustainable management.
Multiple Use Wetland (MUW)	Wetlands with few attributes, which still provide important wetland functions.	Use, development and management should be considered in the context of water, town and environmental planning through landcare.

### 1.8 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are classes or areas of native vegetation where the exemptions for clearing vegetation under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations) do not apply. ESAs may include World Heritage Areas, National Parks (including a 50 m buffer), and the known occurrences of Threatened Flora and Ecological Communities (also with a 50 m buffer). The ESAs within the local area are associated with TECs and geomorphic wetlands categorised as CCW, none of which are mapped as occurring within either site (Figure 4).

### 1.9 Regional Ecological Linkages

Ecological linkages are important conservation tools that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The movement of fauna and the exchange of genetic material between vegetation remnants improves the viability of those remnants by allowing greater access to breeding partners, food sources, refuge from disturbances such as fire and maintains the genetic diversity of plant communities and populations (Molloy *et al.* 2009).





The remnant vegetation within the site is not adjacent to a regional axis line and has not been assigned a proximity value in the SW Regional Ecological Linkage report (Figure 5).

### **1.10 Purpose**

The purpose of the survey was to assess the botanical values within the sites by:

- Undertaking a reconnaissance flora and vegetation survey in accordance with the Environmental Protection Authority's (EPA) Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (2016).
- Identifying the presence of any Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs);
- Undertaking a systematic search for all vascular plant taxa present; and
- Recording the locations and numbers present of any Threatened Flora and Priority Flora identified at the time of the field survey.

## 2 Methods

### 2.1 Field Survey

A field survey of the site was undertaken by a botanist from Plantecology Consulting on the 6<sup>th</sup> and 7<sup>th</sup> March 2024. The sites were traversed on foot and a detailed record of the vegetation was undertaken at seven 100 m<sup>2</sup> sampling plots (10m x 10m quadrats), selected to adequately sample the flora within a stand. Three plots were placed in the Broadwater site (Figure 6a) and four in the West Abbey site (Figure 6b). Plots were positioned to sample a representative and homogeneous area (i.e. not located in transitional areas between communities). The location of the NW corner of a plot was recorded with a hand-held GPS unit and a photograph of the plot taken looking inward to the quadrat. All vascular plant species were recorded and an estimate of the percentage cover was made for each species.

Environmental data recorded included topographic position, aspect, slope, soil colour and texture class, rock outcropping, litter cover as well as the degree of disturbance and an estimate of the time since the last fire event. The condition of the vegetation of the site was assessed to assist in determining the conservation values of the site. The vegetation condition was rated according to Keighery (1994), a vegetation condition scale commonly used in the metropolitan and southwest regions. The categories are listed and defined in Table 4. Data on the vegetation structure was also recorded and included the height of the three main strata and the dominant species within each stratum. The vegetation structural description follows that of the National Vegetation Information System (Thackway et al. 2006).

**Table 4: Vegetation Condition Scale (Keighery 1994)**

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
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.

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with requirements of the Western Australian Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys. Taxonomic determinations were made using reference material at the Western Australian State Herbarium. Taxa names utilise the current terminologies from the Western Australian Herbarium

(1998-). Family names utilise the revised phylogeny of the Angiosperm Phylogeny Group - APGIII Western Australian Herbarium (1998-).

## **2.2 Data Analysis**

To place the vegetation of the site in a regional context and determine its conservation significance, the plot data was analysed against the dataset of Keighery et al. (2012). This dataset was preferred as the Gibson et al. (1994) survey did not survey the foredunes. The Keighery et al. (2012) dataset is a compilation of data from a number of floristic studies and extended the Gibson et al. (1994) dataset. The composite dataset used in this analysis was that curated on the NatureMap website as of 2015.

The species nomenclature of the datasets was updated to be consistent with current usage. Where original names could not be matched clearly to the updated usage, those taxa were removed from the analysis. Intraspecies ranks were raised to species level when no matching rank had been used in the original datasets. Taxa that could not be identified to species level were removed.

The floristic data from the sites was transformed to presence/absence and was added to the matrix one plot a time to remove any effect of spatial correlation between the new plots. The new data from the current survey was added to the Keighery et al. (2012) dataset and the new dataset was then analysed calculating the Bray-Curtis distance coefficient (or resemblance measure) and the flexible beta linkage method (beta = -0.1). Assignment of the Broadwater and West Abbey plots was to the nearest distinct group by inspection of the resulting dendrogram. All analyses were undertaken using R packages cluster (Maechler et al. 2022), Vegclust (De Cáceres et al. 2010), labdsv (Roberts 2019) and Vegan (Oksanen et al. 2020).

## **2.3 Survey Limitations**

Various factors can limit the effectiveness of a vegetation survey. Pursuant to EPA Technical Guidance: Flora and Vegetation Survey for Environmental Impact Assessment (EPA 2016), these factors have been identified and their potential impact on the effectiveness of the survey has been assessed (Table 5).

The survey was undertaken in March 2024 and would likely not have intercepted the flowering period of most taxa of conservation concern with the potential to occur within the site, in particular the Threatened annual and geophytic taxa. The minimum and maximum temperatures over the preceding spring and summer period were approximately 2°C above average. Rainfall during the same period was significantly below average, with less than 1 mm recorded in month of November through February. A survey in late summer and autumn would not be expected to observe many annual species nor the flowering of perennial species, the drier than usual period may have also adversely affected the assessment of vegetation condition.

**Table 5: Potential limitations affecting the vegetation survey.**

Potential limitations	Constraint	Comment
Availability of contextual information	No	Sufficient regional and local information was available to place the survey site in its environmental context.
Competency and experience of the botanists	No	The survey was undertaken by botanists with a comprehensive knowledge of South West vegetation, with at least 20 years' experience in vegetation surveys in Western Australia.
Seasonality	Major	The rainfall over the spring and summer period was well below average. Minimum and maximum temperatures were around 2°C above average.
Adequate coverage and intensity of survey	No	The survey area was traversed on foot. It is considered the survey quadrats and mapping points provided adequate coverage of the site.
Proportion of Flora identified	No	As the survey area is small, it is estimated that the majority of taxa present within the site at the time of the survey were observable.
Disturbance	Yes	The vegetation is accessible to the public and is highly trafficked, with past disturbance apparent from the presence of weeds.
Resources	No	Adequate resources were available to conduct the survey.
Access restrictions	No	All parts of the site were accessible.



## 3 Results

### 3.1 Flora

#### 3.1.1 Floristic Summary

A total of 23 native and 20 non-native (exotic) taxa was recorded within the site, representing 23 families and 41 genera. The dominant families containing mostly native taxa were Poaceae (3 native taxa and 7 exotic taxa) and Cyperaceae (3 native taxa). For a complete species list and the individual site data refer to Appendix A and Appendix B, respectively.

#### 3.1.2 Conservation Significant Flora

No Threatened or Priority Flora pursuant to either the Biodiversity Conservation Act (2016) or the EPBC Act (1999) were recorded during the survey.

### 3.2 Vegetation

#### 3.2.1 Plant Associations

Three native plant associations were identified across both sites (Figures 6a and 6b):

##### *Spinifex hirsutus* grassland (Plates 1:3)

Open grassland of *Spinifex hirsutus*, *\*Pelargonium capitatum* and *\*Trachyandra divaricata* with scattered *Acacia cochlearis* on cream to grey sands.

This association occupies the seaward side of the foredunes.

##### *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland (Plates 4 and 5)

Open shrubland of *Leucopogon parviflorus*, *Acacia cochlearis* and *Melaleuca lanceolata* over herbland of *\*Pelargonium capitatum*, *\*Lagurus ovatus* and *Acanthocarpus preissii* on cream to grey sands.

This association occupies the top and rear slopes of the foredunes.

##### *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland (Plates 6 and 7)

Sedgeland of *Lepidosperma gladiatum* and *Ficinia nodosa* with emergent *Santalum acuminatum*.

This association occupies the swales behind the foredunes.

The site is also traversed by access paths and drains. The drains are vegetated in part by a sedgeland of *Bolobochoenus caldwellii* and *\*Rumex crispus* (Plate 8). This vegetation is a response to the installation of drainage across the beach and is not a naturally occurring type.

#### 3.2.2 Vegetation Condition

The vegetation condition of the site is rated as 'Degraded' for the *Spinifex hirsutus* grassland and adjacent parts of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland. The understorey in the 'Degraded' areas is quite sparse and, although *Spinifex hirsutus* is common, it is dominated by exotic taxa such as *\*Pelargonium capitatum*, *\*Lagurus ovatus*, *\*Trachyandra divaricata*, *\*Carpobrotus edulis* and *\*Euphorbia paralias*.

Aside from tracks and drains which are rated as 'Completely Degraded', the remainder of the site is rated as 'Good'. The *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland and most of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland have retained their basic structure, but all strata have been impacted by disturbance. Much of the understorey of the *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland has been invaded by buffalo grass (*\*Stenotaphrum secundatum*) and the ground and shrub layers of the *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland are less dense than would be expected in undisturbed vegetation.



### 3.2.3 Conservation Significant Communities

The results of the cluster analysis were assigned most sites to a group from FCT S13 'Northern *Olearia axillaris*, *Scaevola crassifolia* shrublands' and FCT S14 '*Spinifex longifolius* grassland and low shrublands' (Figure 8). Plot 3 was most clearly assigned to FCT S14, while all others apart from Plot 1 fused with a group consisting mostly of S13 plots. Plot 1 fused with a disrupted group consisting of plots from FCTs 29a, 30a1, S11, S12, 16 and S07. It is not possible to determine a FCT for Plot 1.

Neither FCT S13 nor FCT S14 are listed as communities of conservation concern.

### 3.3 Weeds

Twenty of the taxa recorded during the survey are exotics (weeds). None are Declared Pests under the Biosecurity and Agriculture Management Act 2007, with restrictions on their sale or movement.

## 4 Discussion

The vegetation structure within the Broadwater site is rated as being in 'Degraded' condition. The area is accessible to the public and is likely heavily trafficked. The area retains remnant populations of *Spinifex hirsutus* but most taxa present are exotics. The primary vegetation zone supporting the *Spinifex hirsutus* grassland and seaward slope of the foredunes in the West Abbey site are similarly in a 'Degraded' condition. The tops and rear slopes of the foredunes, as well as the swales, in the West Abbey site are rated as being in 'Good' condition. This is due to the retention of a basic structure of emergent trees and shrubs and a ground layer dominated by sedges. The ground layer, however, has dense infestations of exotic taxa such as *\*Stenotaphrum secundatum* (buffalo grass) and *\*Pelargonium capitatum*. The 'Good' condition areas are unlikely to recover spontaneously recover their original structure without active rehabilitation efforts.

No Threatened or Priority Flora were recorded within the site, nor is the vegetation representative of any Threatened Ecological Communities. Although the reconnaissance survey was undertaken outside the optimal flowering season, it is unlikely that any of the conservation significant flora identified in the database searches would occur in the primary coastal dune habitat.

The data analysis assigned the Broadwater and West Abbey plots to either FCT S13 'Northern *Olearia axillaris*, *Scaevola crassifolia* shrublands' or FCT S14 '*Spinifex longifolius* grassland and low shrublands'. The *Spinifex hirsutus* grassland is most likely part of FCT 14 and the *Leucopogon parviflorus* - *Acacia cochlearis* open shrubland and the *Lepidosperma gladiatum* - *Ficinia nodosa* sedgeland are most likely part of FCT S13. The Quindalup Dunes were under sampled in the Gibson et al. (1994) survey of the Swan Coastal Plain (Webb et al. 2009), and FCTs S13 and S14 have been described from the Perth Metropolitan Area. Coastal dune habitats in southwestern Australia support a similar range of flora and it is likely that the assignments to FCTs S13 and S14 are valid. Neither FCT is considered to be of conservation significance.

Neither the Broadwater or West Abbey site are part of a regional ecological linkage.

## 5 Summary

The dune vegetation within the sites at Broadwater and West Abbey are rated as being in either 'Degraded' or 'Good', with a significant presence of exotic (weed) taxa and continual anthropogenic disturbances. No conservation significant flora or communities were identified within either of the sites. None of the weed species recorded are Declared Plants.

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## **Figures**

**Figure 1: Locality Plan Broadwater and Abbey Beach Flora Survey**

**Figure 2: Conservation Significant Flora from the Local Region**

**Figure 3: Conservation Significant Communities with Potential to Occur within the Site**

**Figure 4: Geomorphic Wetlands**

**Figure 5: Regional Ecological Linkages**

**Figure 6: Plant Communities**

**Figure 7: Vegetation Condition**

**Figure 8: Partial Dendrograms of Sampling Plot Assignments to the Keighery et al. (2012) Dataset**





50 New Cross Rd Kingsley WA 6026

Scale: 1:30 000  
 Basemap Source: Google Satellite  
 Hybrid  
 Datum: GDA2020  
 Projection: EPSG 7850

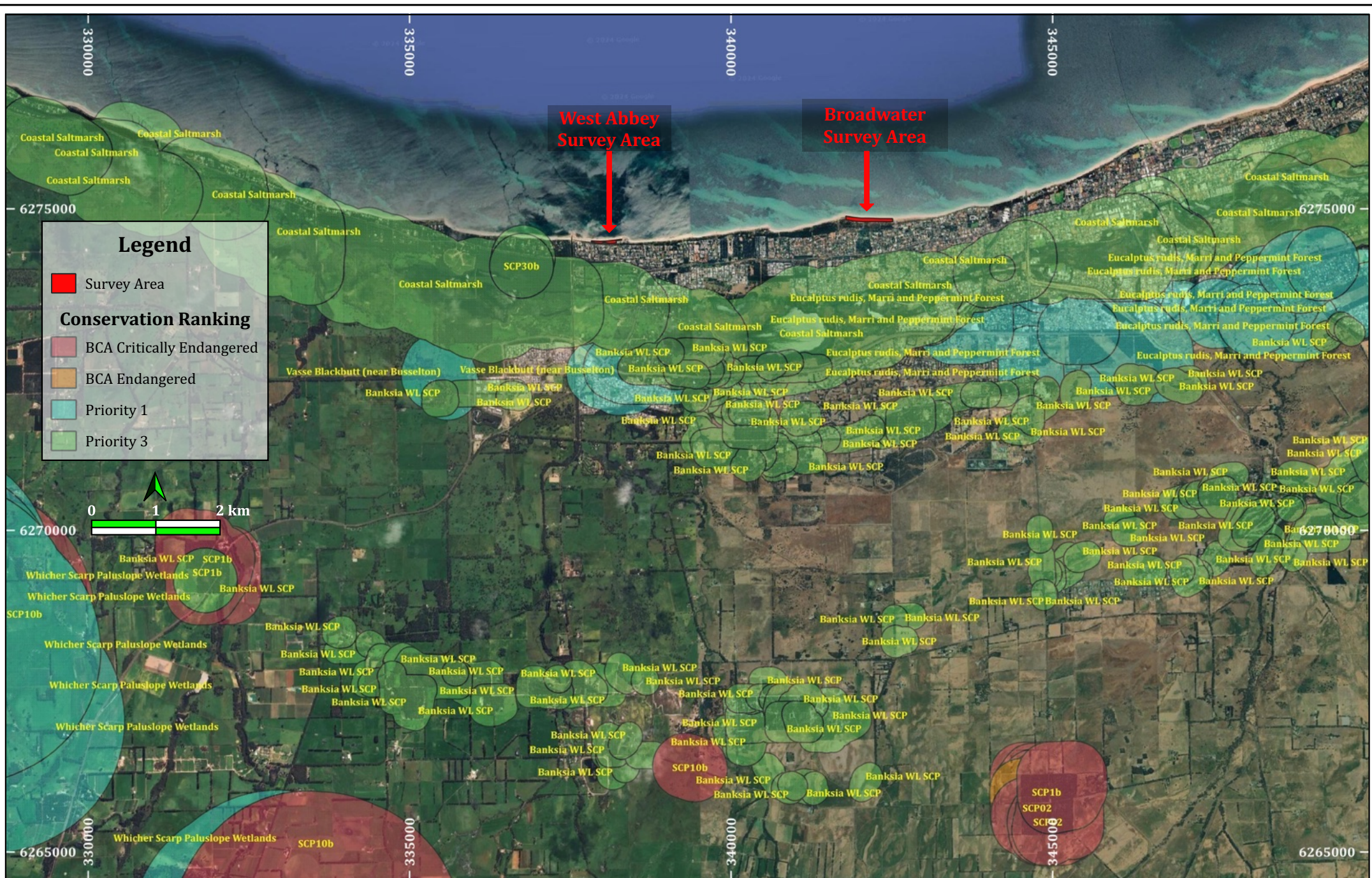
Client: City of Busselton  
 Project: Storm Surge Mitigation Flora Survey  
 Location: Geographe Bay, Busselton  
 Author: S.T.S. Chalwell  
 Drawn: S.T.S. Chalwell

**Figure 1:  
 Locality Plan**













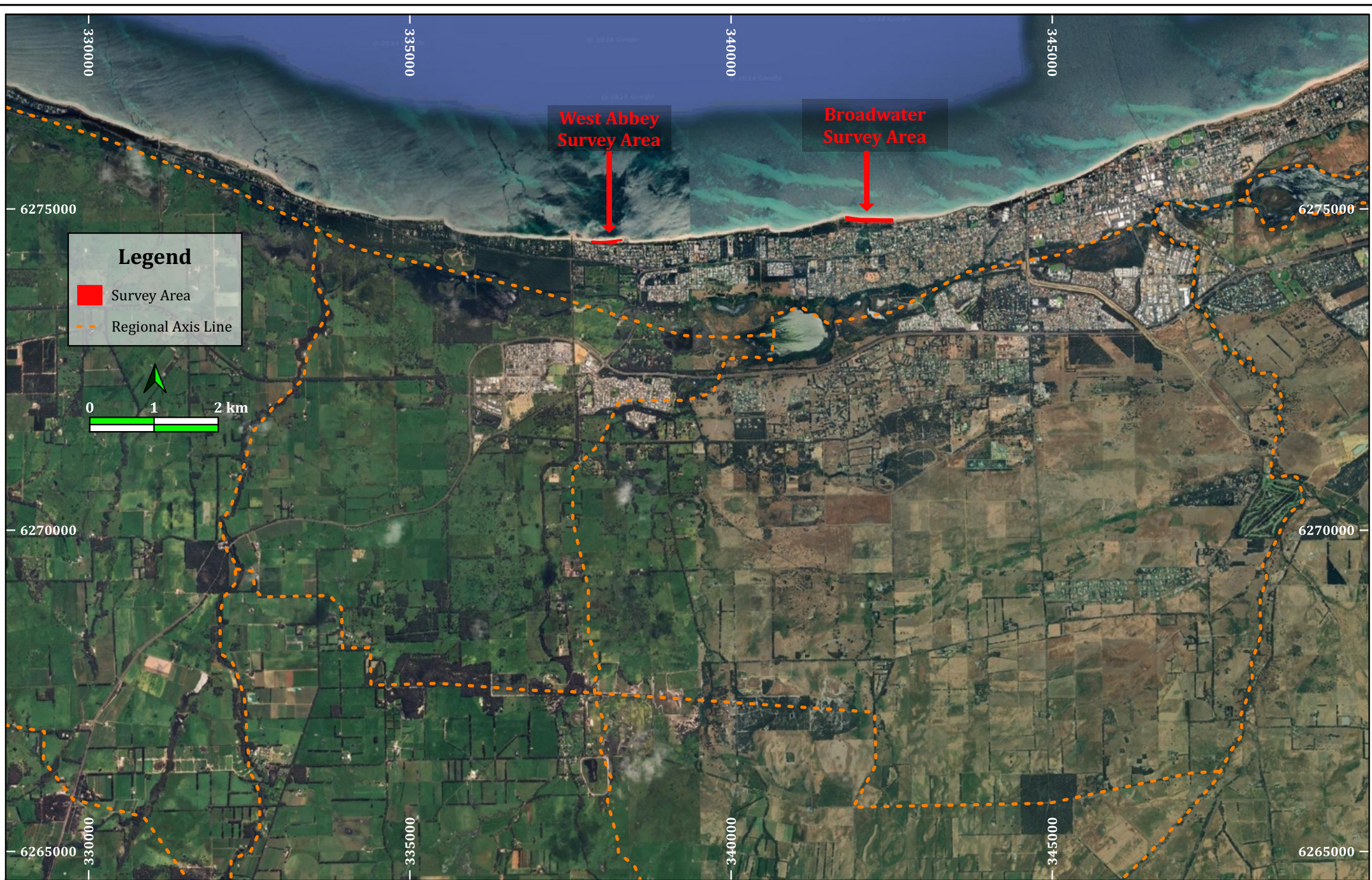
**Legend**

- Survey Area
- Enviromentally Sensitive Areas

**Management Category**

- CCW
- REW
- MUW









**Legend**

- Survey Area
- Sampling plots

**Plant Communities**

- Spinifex hirsutus grassland
- Drains and tracks







**Legend**

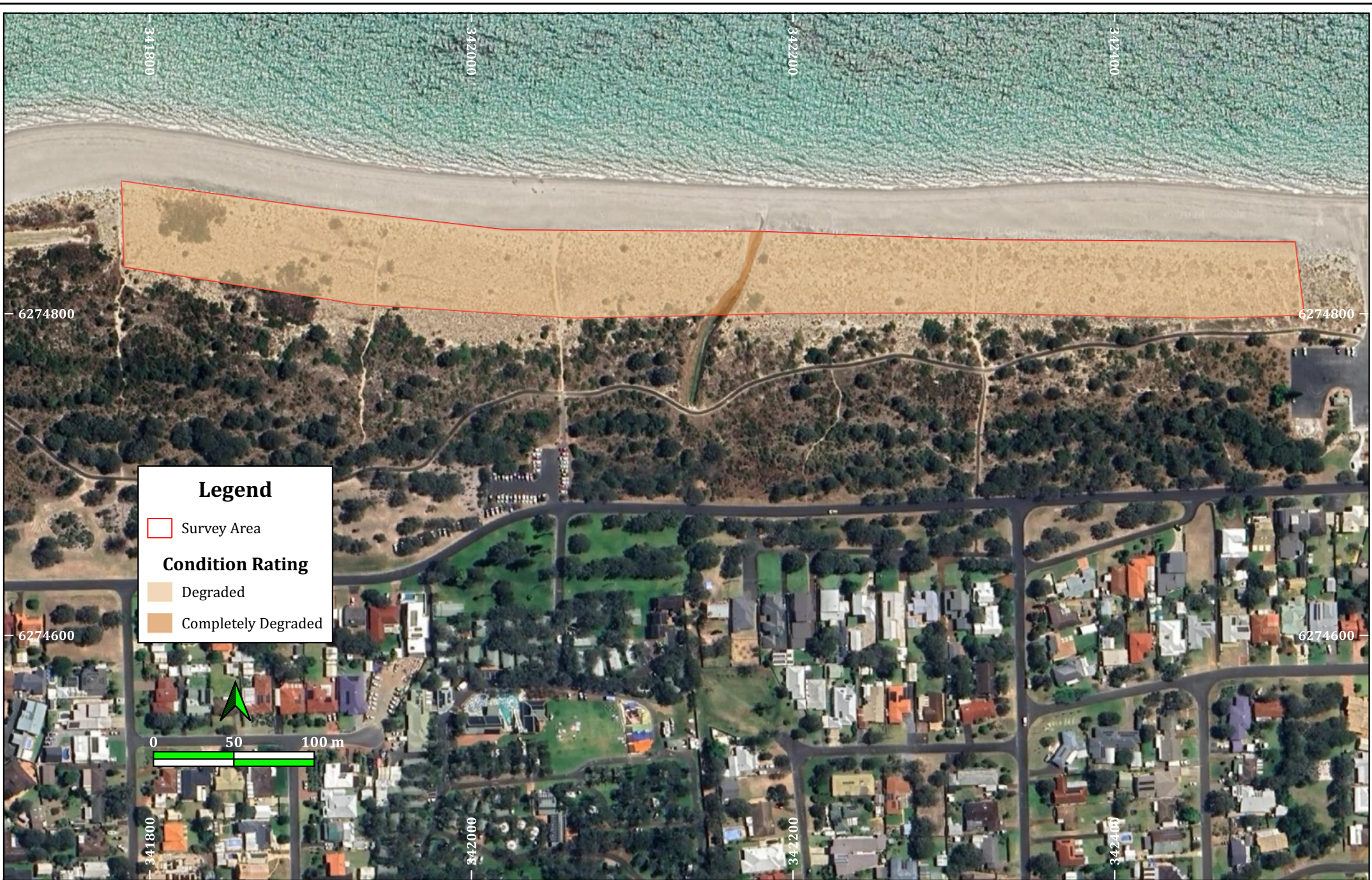
Survey Area  
 Sampling plots

**Plant Communities**


Spinifex hirsutus grassland  
 Leucopogon parviflorus - Acacia cochlearis open shrubland  
 Lepidosperma gladiatum - Ficinia nodosa sedgeland  
 Drains and tracks









**Legend**

 Survey Area

**Condition Rating**

 Degraded

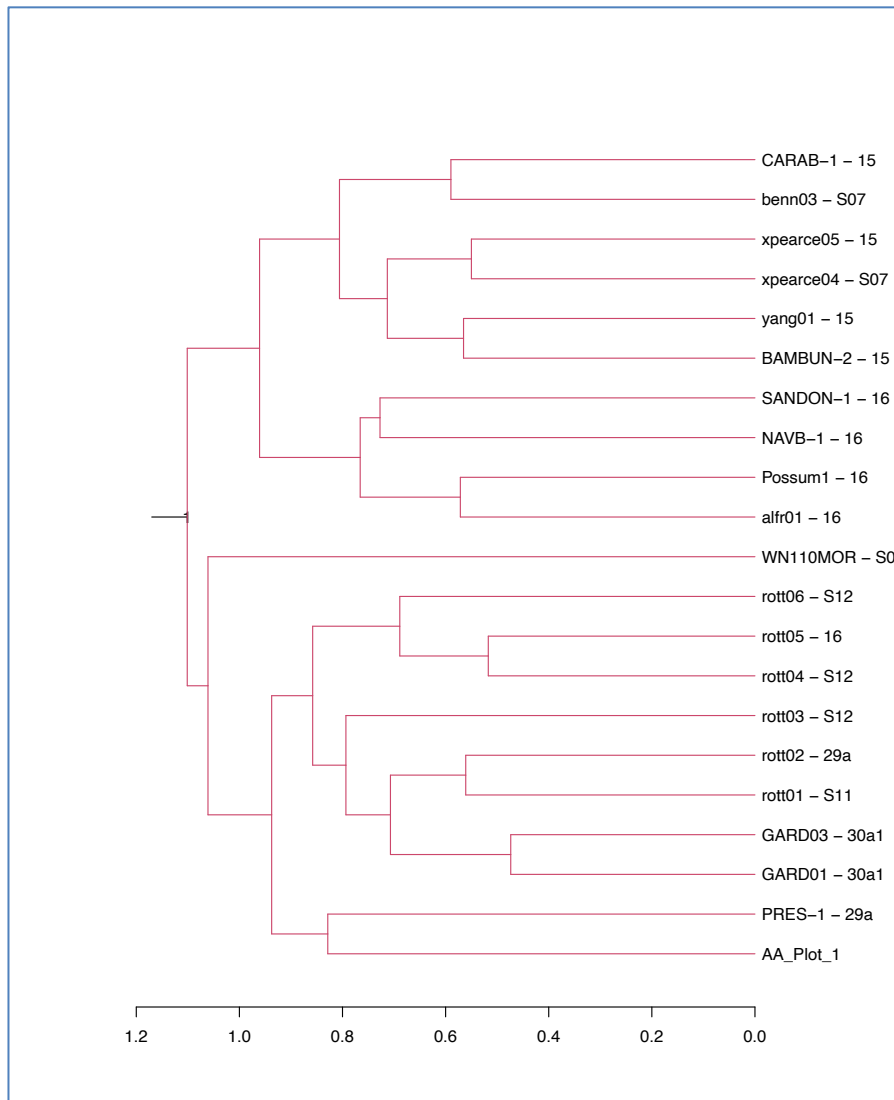
 Completely Degraded





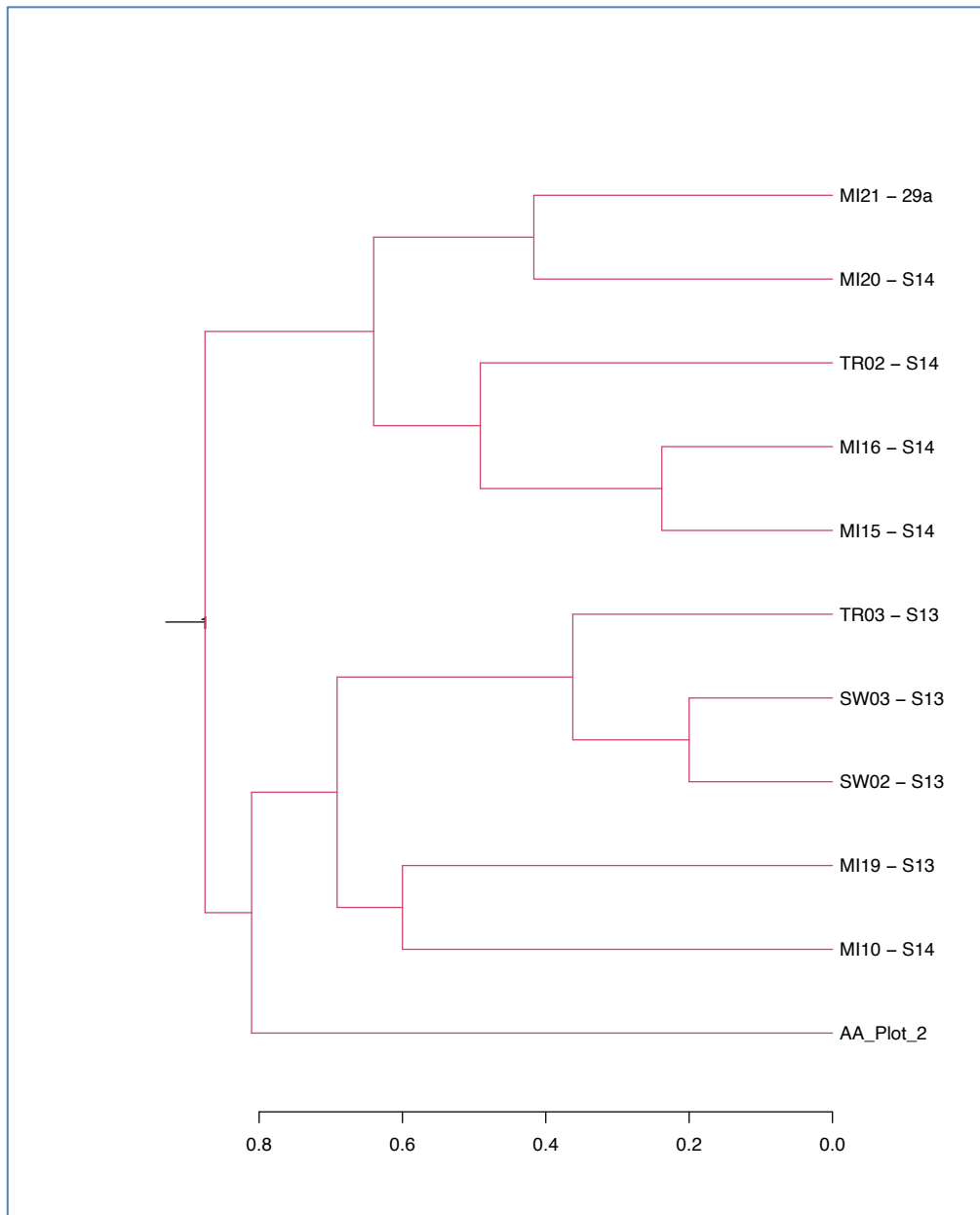




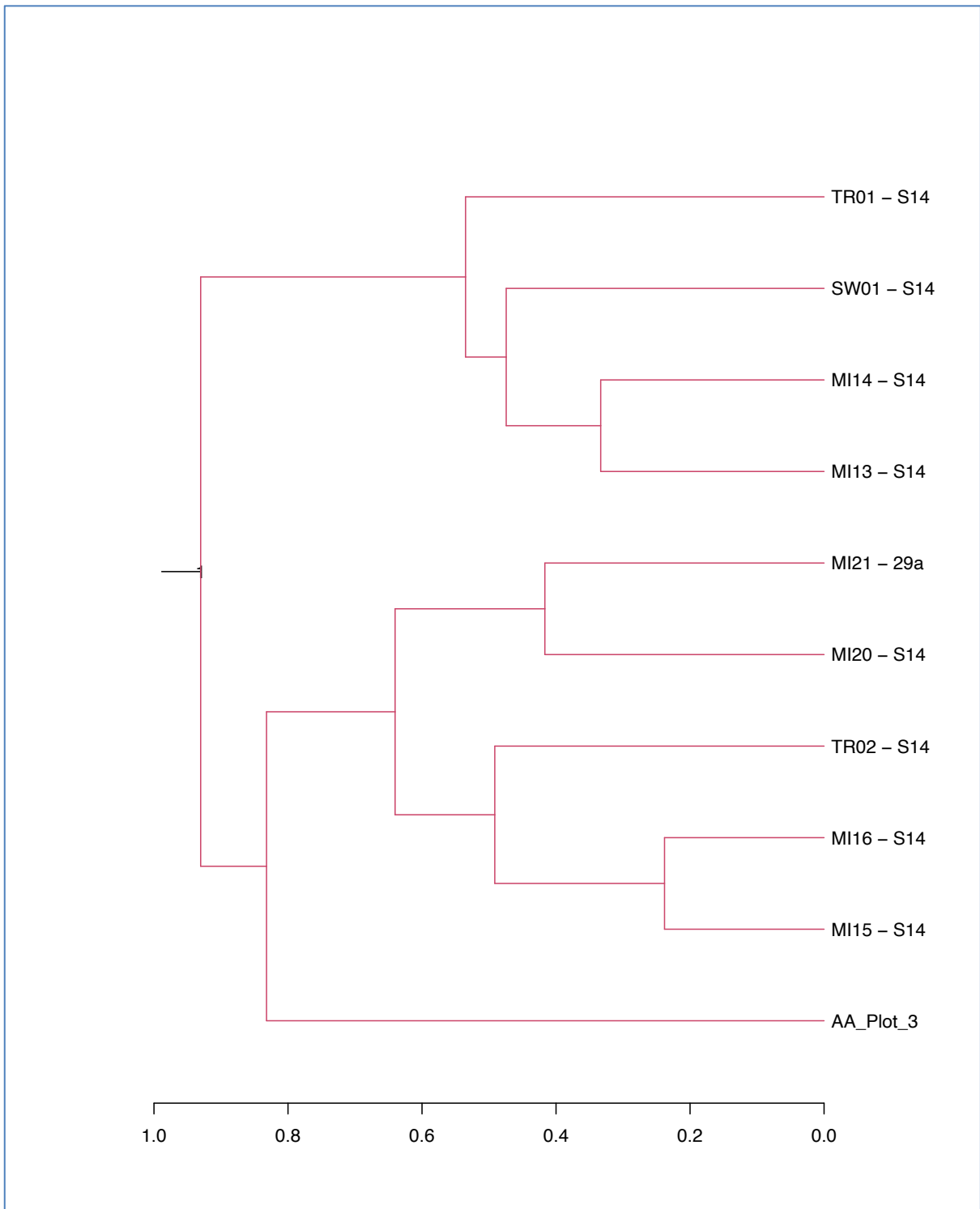


**Figure 8a: Partial dendrogram of the assignment of Plot 1 to the Swan Coastal Plain floristic community types.**

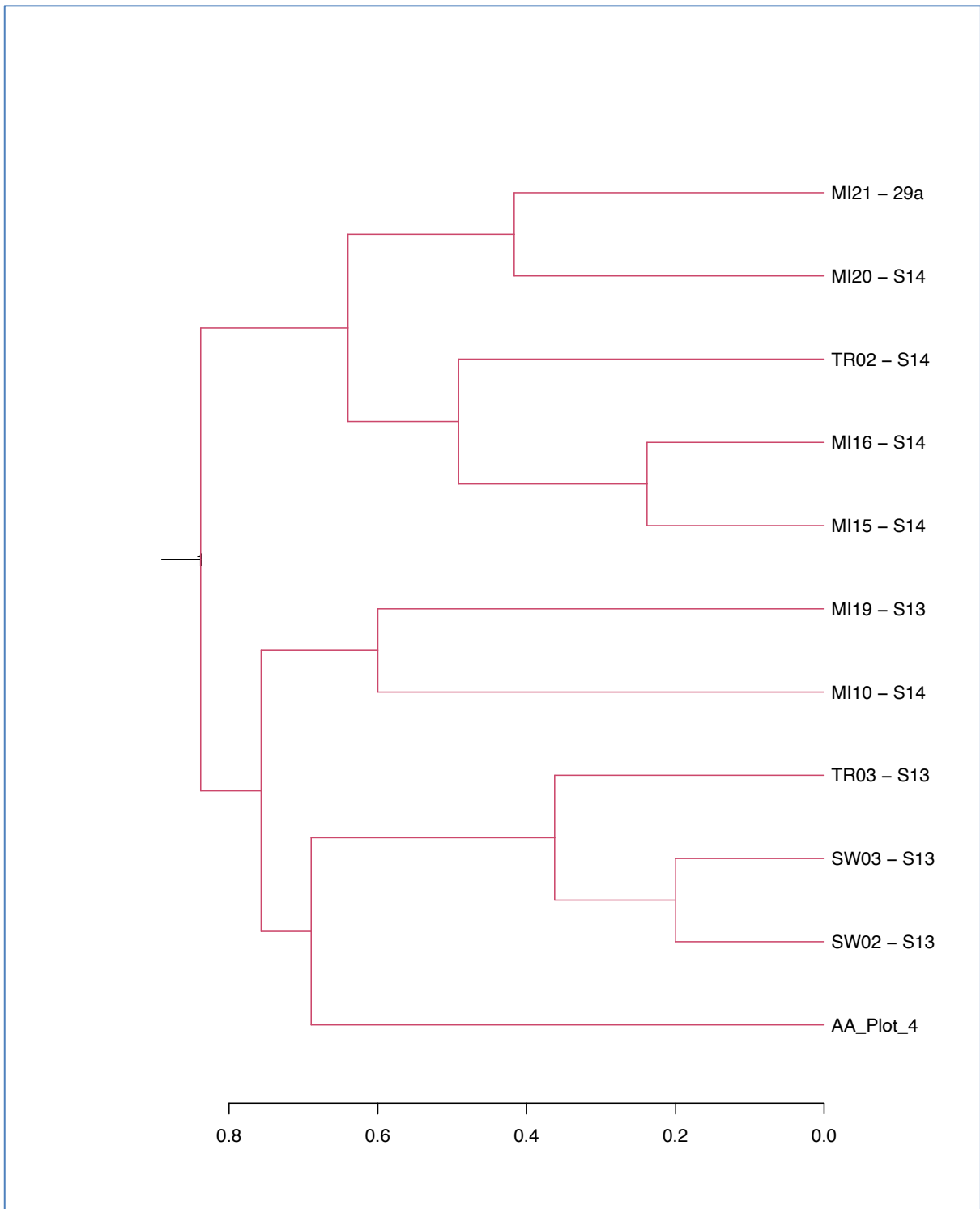




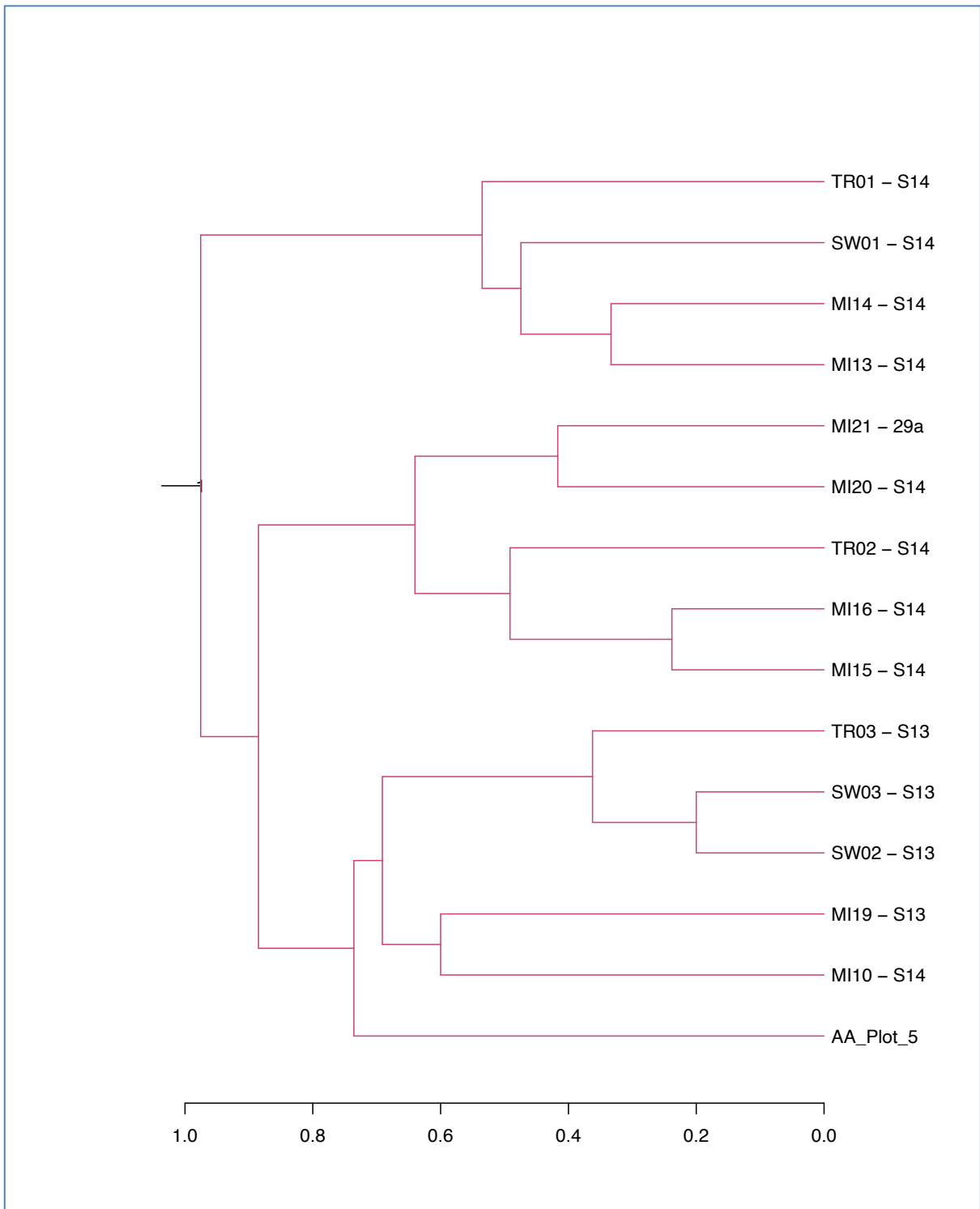
**Figure 8b: Partial dendrogram of the assignment of Plot 2 to the Swan Coastal Plain floristic community types.**



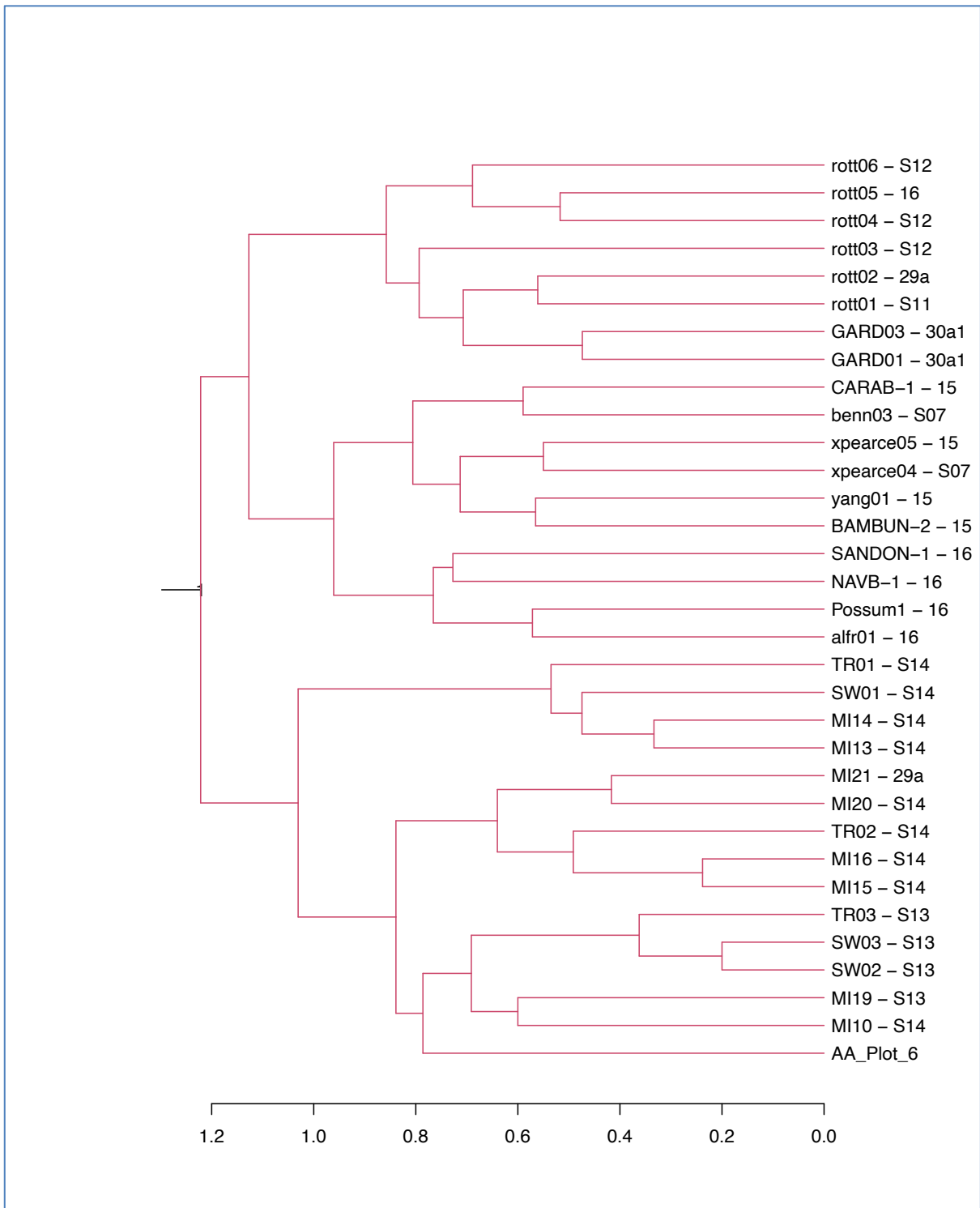
**Figure 8c: Partial dendrogram of the assignment of Plot 3 to the Swan Coastal Plain floristic community types.**



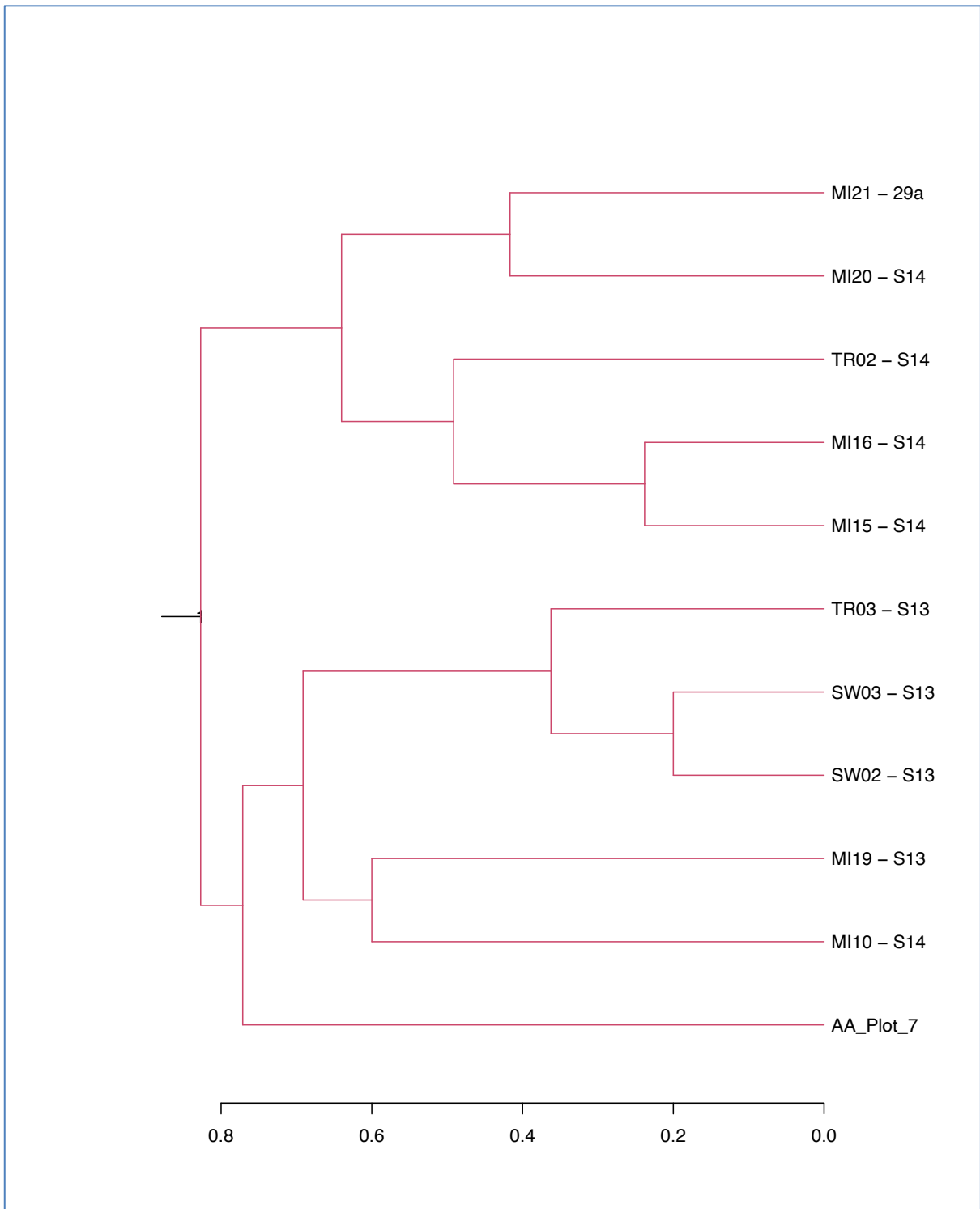
**Figure 8d: Partial dendrogram of the assignment of Plot 4 to the Swan Coastal Plain floristic community types.**



**Figure 8e: Partial dendrogram of the assignment of Plot 5 to the Swan Coastal Plain floristic community types.**



**Figure 8f: Partial dendrogram of the assignment of Plot 6 to the Swan Coastal Plain floristic community types.**



**Figure 8g: Partial dendrogram of the assignment of Plot 7 to the Swan Coastal Plain floristic community types.**





## **Plates**



**Plate 1: View of sampling Plot 1: *Spinifex hirsutus* grassland in 'Degraded' condition.**



**Plate 2: View of sampling Plot 2: *Spinifex hirsutus* grassland in 'Degraded' condition.**





**Plate 3: View of sampling Plot 3: *Spinifex hirsutus* grassland in 'Degraded' condition.**



**Plate 4: View of sampling Plot 4: *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland in 'Good condition.'**





**Plate 5: View of sampling Plot 5: *Leucopogon parviflorus* – *Acacia cochlearis* open shrubland in 'Good' condition.**



**Plate 6: View of sampling Plot 6: *Lepidosperma gladiatum* – *Ficinia nodosa* sedgeland in 'Good' condition.**





**Plate 7: View of sampling Plot 7: *Lepidosperma gladiatum* - *Ficinia nodosa* sedgeland in 'Good' condition.**



**Plate 8: View of *Bolobochoenus caldwelii* and *\*Rumex crispus* sedgeland in a constructed drain in 'Completely Degraded' condition.**



## **Appendix A**

**List of flora recorded within the survey area, including opportunistically observed taxa.**

NB: \* indicates introduced flora



<b>Family</b>	<b>Taxon</b>
<b>Lauraceae</b>	<i>Cassytha racemosa</i> forma <i>racemosa</i>
<b>Iridaceae</b>	* <i>Romulea rosea</i>
<b>Asparagaceae</b>	<i>Acanthocarpus preissii</i>
<b>Asphodelaceae</b>	* <i>Trachyandra divaricata</i>
<b>Cyperaceae</b>	<i>Bolboschoenus caldwellii</i> <i>Ficinia nodosa</i> <i>Lepidosperma gladiatum</i>
<b>Poaceae</b>	* <i>Ammophila arenaria</i> subsp. <i>arenaria</i> * <i>Avena barbata</i> * <i>Bromus diandrus</i> * <i>Ehrharta longiflora</i> * <i>Lagurus ovatus</i> <i>Poa poiformis</i> <i>Spinifex hirsutus</i> <i>Sporobolus virginicus</i> * <i>Stenotaphrum secundatum</i> * <i>Vulpia myuros</i>
<b>Crassulaceae</b>	<i>Crassula colorata</i> var. <i>colorata</i>
<b>Fabaceae</b>	<i>Acacia cochlearis</i> <i>Acacia saligna</i>
<b>Rhamnaceae</b>	<i>Spyridium globulosum</i>
<b>Euphorbiaceae</b>	* <i>Euphorbia paralias</i>
<b>Geraniaceae</b>	* <i>Pelargonium capitatum</i>
<b>Onagraceae</b>	* <i>Oenothera mollissima</i>
<b>Myrtaceae</b>	<i>Agonis flexuosa</i> <i>Melaleuca lanceolata</i>
<b>Brassicaceae</b>	* <i>Cakile maritima</i>
<b>Santalaceae</b>	<i>Exocarpos sparteus</i> <i>Santalum acuminatum</i>
<b>Polygonaceae</b>	* <i>Rumex crispus</i>
<b>Chenopodiaceae</b>	<i>Atriplex cinerea</i> <i>Rhagodia baccata</i> subsp. <i>baccata</i>
<b>Aizoaceae</b>	* <i>Carpobrotus edulis</i> * <i>Tetragonia decumbens</i>
<b>Ericaceae</b>	<i>Leucopogon parviflorus</i>
<b>Orobanchaceae</b>	* <i>Orobanche minor</i>
<b>Goodeniaceae</b>	<i>Scaevola crassifolia</i>
<b>Asteraceae</b>	* <i>Arctotis stoechadifolia</i> * <i>Conyza bonariensis</i> * <i>Gazania linearis</i> <i>Olearia axillaris</i> <i>Olearia rudis</i>
<b>Apiaceae</b>	<i>Centella asiatica</i>



## **Appendix B**

**Site x species matrix of flora recorded within plots in the survey area.**

Taxon	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
<i>Acacia cochlearis</i>		5		3			
<i>Acacia saligna</i>				0.5			
<i>Acanthocarpus preissii</i>				2			
<i>Ammophila arenaria</i> subsp. <i>arenaria</i>		0.1	0.3				
<i>Atriplex cinerea</i>					1		
<i>Avena barbata</i>	0.1	0.1					
<i>Bromus diandrus</i>	0.2	0.3			0.1		
<i>Carpobrotus edulis</i>			0.1		3		
<i>Cassytha racemosa</i> forma <i>racemosa</i>	0.5	4					1
<i>Centella asiatica</i>						0.5	
<i>Crassula colorata</i>							0.1
<i>Ehrharta longiflora</i>							0.1
<i>Euphorbia paralias</i>	0.2	0.1	0.1		0.1		
<i>Ficinia nodosa</i>				0.3		15	35
<i>Lagurus ovatus</i>	0.5	0.5	0.2	2	0.1		0.3
<i>Lepidosperma gladiatum</i>		3		1	0.3	20	10
<i>Leucopogon parviflorus</i>				30			0.5
<i>Melaleuca lanceolata</i>					7		
<i>Oenothera mollissima</i>	0.3	0.2	0.2				
<i>Olearia rudis</i>				0.1		1	
<i>Orobanche minor</i>							0.1
<i>Pelargonium capitatum</i>	1	0.5	3	3		0.2	6
<i>Poa poiformis</i>						0.3	0.1
<i>Rhagodia baccata</i> subsp. <i>baccata</i>						1	1
<i>Romulea rosea</i>	0.1	0.1	0.1		0.1		
<i>Santalum acuminatum</i>					1		
<i>Scaevola crassifolia</i>					1		
<i>Spinifex hirsutus</i>	4	1	2		2		
<i>Sporobolus virginicus</i>	0.1	0.2			5		0.5
<i>Spyridium globulosum</i>				2			0.2
<i>Stenotaphrum secundatum</i>						35	
<i>Tetragonia decumbens</i>				0.2	5		
<i>Trachyandra divaricata</i>	0.3	0.3	4		0.3		0.3
<i>Vulpia myuros</i>	0.1		0.2				



## **Appendix C**

### **Sampling plot environmental data**

Site Name	Latitude	Longitude	SiteType	Date	Plot Shape	Plot size (m <sup>2</sup> )	Topography
Plot_1	-33.654782	115.30095	Quadrat	6/3/2024	Square	100	Flat
Plot_2	-33.654782	115.297063	Quadrat	6/3/2024	Square	100	Flat
Plot_3	-33.654483	115.29442	Quadrat	6/3/2024	Square	100	Flat
Plot_4	-33.657068	115.254893	Quadrat	7/3/2024	Square	100	Flat
Plot_5	-33.657158	115.251725	Quadrat	7/3/2024	Square	100	Flat
Plot_6	-33.657298	115.252393	Quadrat	7/3/2024	Square	100	Flat
Plot_7	-33.657229	115.254637	Quadrat	7/3/2024	Square	100	Flat

Site Name	Relief	Slope (°)	Aspect	Soil Colour	Soil Depth (cm)	Texture	Fire Interval (yrs)
Plot_1	LP	0-5		Cream	>50 cm	Sand	>3 years
Plot_2	LP	0-5		Cream	>50 cm	Sand	>3 years
Plot_3	LP	0-5		Cream	>50 cm	Sand	>3 years
Plot_4	LP	0-5		Cream	>50 cm	Sand	>3 years
Plot_5	LP	0-5		Cream	>50 cm	Sand	>3 years
Plot_6	LP	0-5		Grey	>50 cm	Sand	>3 years
Plot_7	LP	0-5		Cream	>50 cm	Sand	>3 years

Site Name	Gravel Cover (%)	Gravel Size (mm)	Outcrop %	Rock Type	Disturbance Level	Vegetation Condition
Plot_1					High	Degraded
Plot_2					High	Degraded
Plot_3					High	Degraded
Plot_4					High	Good
Plot_5					High	Degraded
Plot_6					High	Good
Plot_7					High	Good

Site Name	Strata 1 Cover (%)	Strata 2 Cover (%)	Strata 3 Cover (%)	Strata 1 Structure	Strata 2 Structure	Strata 3 Structure	Strata 1 Dominants	Strata 2 Dominants	Strata 3 Dominants
Plot_1			10-30%			Tussock grass			<i>Spinifex hirsutus</i> , <i>Pelargonium capitatum</i> , <i>Lagurus ovatus</i>
Plot_2		2-10%	2-10%		Shrubs 1-2 m	Sedges		<i>Acacia cochlearis</i>	<i>Lepidosperma gladiatum</i>
Plot_3			2-10%			Tussock grass			<i>Spinifex hirsutus</i> , <i>Pelargonium capitatum</i> , <i>Trachyandra divaricata</i>
Plot_4		30-70%	2-10%		Shrubs 1-2 m	Herbs		<i>Acacia cochlearis</i> , <i>Leucopogon parviflorus</i> , <i>Acacia saligna</i>	<i>Pelargonium capitatum</i> , <i>Lagurus ovatus</i> , <i>Acanthocarpus preissii</i>
Plot_5		2-10%	10-30%		Shrubs 1-2 m	Herbs		<i>Melaleuca lanceolata</i> , <i>Santalum acuminatum</i>	<i>Tetragonia decumbens</i> , <i>Atriplex cinerea</i> , <i>Sporobolus virginicus</i>
Plot_6		2-10%	70-100%		Shrubs >2 m	Sedges		<i>Santalum acuminatum</i>	<i>Lepidosperma gladiatum</i> , <i>Ficinia nodosa</i> , <i>Stenotaphrum secundatum</i>
Plot_7		<2%	30-70%		Shrubs <1 m	Sedges		<i>Acacia cochlearis</i>	<i>Lepidosperma gladiatum</i> , <i>Ficinia nodosa</i>



## **Appendix D**

### **EPBC Protected Matters Search Results**



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: 07-Apr-2024

[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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar)</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	1
<a href="#">Listed Threatened Ecological Communities:</a>	5
<a href="#">Listed Threatened Species:</a>	76
<a href="#">Listed Migratory Species:</a>	53

## 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.

<a href="#">Commonwealth Lands:</a>	8
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	78
<a href="#">Whales and Other Cetaceans:</a>	13
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	2
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	15
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Nationally Important Wetlands:</a>	1
<a href="#">EPBC Act Referrals:</a>	55
<a href="#">Key Ecological Features (Marine):</a>	2
<a href="#">Biologically Important Areas:</a>	7
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None

# Details

## Matters of National Environmental Significance

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

Ramsar Site Name	Proximity	Buffer Status
<a href="#">Vasse-wonnerup system</a>	Within 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
Commonwealth Marine Areas (EPBC Act)	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
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Clay Pans of the Swan Coastal Plain</a>	Critically Endangered	Community likely to occur within area	In buffer area only
<a href="#">Empodisma peatlands of southwestern Australia</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Subtropical and Temperate Coastal Saltmarsh</a>	Vulnerable	Community likely to occur within area	In buffer area only
<a href="#">Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community</a>	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
<b>BIRD</b>			
<a href="#">Anous tenuirostris melanops</a>	Vulnerable	Species or species habitat may occur within area	In feature area
Australian Lesser Noddy [26000]			

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Ardenna grisea</a> Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Halobaena caerulea</a> Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Limosa lapponica menzbieri</a> Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Phaethon rubricauda westralis</a> Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Zanda baudinii listed as Calyptorhynchus baudinii</a> Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Zanda latirostris listed as Calyptorhynchus latirostris</a> Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
<b>CRUSTACEAN</b>			
<a href="#">Engaewa pseudoreducta</a> Margaret River Burrowing Crayfish [82674]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Engaewa reducta</a> Dunsborough Burrowing Crayfish [82675]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
<b>FISH</b>			
<a href="#">Nannatherina balstoni</a> Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<a href="#">Thunnus maccoyii</a> Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
<b>MAMMAL</b>			
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Breeding known to occur within area	In feature area
<b>OTHER</b>			
<a href="#">Westralunio carteri</a> Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<b>PLANT</b>			
<a href="#">Banksia mimica</a> Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Banksia nivea subsp. uliginosa</a> Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area	In buffer area only



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Banksia squarrosa subsp. argillacea</a> Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Brachyscias verecundus</a> Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Caladenia busselliana</a> Bussell's Spider-orchid [24369]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Caladenia huegelii</a> King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Caladenia procera</a> Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Caladenia viridescens</a> Dunsborough Spider-orchid [56776]	Endangered	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Chamelaucium sp. S coastal plain (R.D.Royce 4872)</a> Royce's Waxflower [87814]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Daviesia elongata subsp. elongata</a> Long-leaved Daviesia [64883]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Drakaea elastica</a> Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Drakaea micrantha</a> Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Gastrolobium papilio</a> Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Grevillea brachystylis subsp. grandis</a> Large-flowered Short-styled Grevillea [85001]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Grevillea elongata</a> Ironstone Grevillea [64578]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Lambertia echinata subsp. occidentalis</a> Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Morelotia australiensis listed as Tetraria australiensis</a> Southern Tetraria [92784]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<a href="#">Petrophile latericola</a> Laterite Petrophile [64532]	Endangered	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Synaphea sp. Fairbridge Farm (D.Papenfus 696)</a> Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Verticordia densiflora var. pedunculata</a> Long-stalked Featherflower [55689]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Verticordia plumosa var. ananeotes</a> Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Verticordia plumosa var. vassensis</a> Vasse Featherflower [55804]	Endangered	Species or species habitat known to occur within area	In buffer area only
<b>REPTILE</b>			
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

## SHARK

<a href="#">Carcharias taurus (west coast population)</a> Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Galeorhinus galeus</a> 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
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Sphyrna lewini</a> Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

## Listed Migratory Species

[ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>Migratory Marine Birds</b>			
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Ardena carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
<a href="#">Ardena grisea</a> Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Hydroprogne caspia</a> Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Onychoprion anaethetus</a> Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Phoebetria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
<b>Migratory Marine Species</b>			
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Caperea marginata</a> Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Eubalaena australis as Balaena glacialis australis</a> Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Congregation or aggregation known to occur within area	In feature area
<a href="#">Mobula alfredi as Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In feature area
<a href="#">Mobula birostris as Manta birostris</a> Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
<b>Migratory Terrestrial Species</b>			
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
<b>Migratory Wetlands Species</b>			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Calidris subminuta</a> Long-toed Stint [861]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Tringa stagnatilis</a> 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
Unknown		
Commonwealth Land - [50388]	WA	In buffer area only
Commonwealth Land - [50389]	WA	In buffer area only
Commonwealth Land - [50387]	WA	In buffer area only
Commonwealth Land - [51105]	WA	In feature area
Commonwealth Land - [51487]	WA	In buffer area only
Commonwealth Land - [50390]	WA	In buffer area only
Commonwealth Land - [51488]	WA	In buffer area only
Commonwealth Land - [50268]	WA	In buffer area only

### Listed Marine Species

[ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Anous tenuirostris melanops</a> Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Ardenna carneipes as Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
<a href="#">Ardenna grisea as Puffinus griseus</a> Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Calidris subminuta</a> Long-toed Stint [861]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Charadrius mongolus</a> 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
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
<a href="#">Halobaena caerulea</a> Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Himantopus himantopus</a> Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Hydroprogne caspia as Sterna caspia</a> Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Larus pacificus</a> Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area	In buffer area only
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Onychoprion anaethetus as Sterna anaethetus</a> Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Phoebetria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Puffinus assimilis</a> Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Recurvirostra novaehollandiae</a> Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Stercorarius antarcticus as Catharacta skua</a> Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Thinornis cucullatus as Thinornis rubricollis</a> Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In buffer area only
<b>Fish</b>			
<a href="#">Acentronura australe</a> Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
<a href="#">Campichthys galei</a> Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
<a href="#">Heraldia nocturna</a> Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus angustus</a> Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus breviceps</a> Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus subelongatus</a> West Australian Seahorse [66722]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Histiogamphelus cristatus</a> Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
<a href="#">Lissocampus caudalis</a> Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
<a href="#">Lissocampus fatiloquus</a> Prophet's Pipefish [66250]		Species or species habitat may occur within area	In feature area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
<a href="#">Maroubra perserrata</a> Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
<a href="#">Mitotichthys meraculus</a> Western Crested Pipefish [66259]		Species or species habitat may occur within area	In feature area
<a href="#">Nannocampus subosseus</a> Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area
<a href="#">Phycodurus eques</a> Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
<a href="#">Phyllopteryx taeniolatus</a> Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
<a href="#">Pugnaso curtirostris</a> Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus lettiensis</a> Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Stigmatopora argus</a> Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
<a href="#">Stigmatopora nigra</a> Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
<a href="#">Urocampus carinirostris</a> Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
<a href="#">Vanacampus margaritifer</a> Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
<a href="#">Vanacampus phillipi</a> Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
<a href="#">Vanacampus poecilolaemus</a> Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
<b>Mammal</b>			
<a href="#">Arctocephalus forsteri</a> Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In feature area
<b>Reptile</b>			
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

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

Current Scientific Name	Status	Type of Presence	Buffer Status
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#### Mammal

<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area	In feature area
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<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
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<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
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<a href="#">Caperea marginata</a> Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area
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<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
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<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
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<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
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<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
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<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Congregation or aggregation known to occur within area	In feature area
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Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Australian Marine Parks		<a href="#">[ Resource Information ]</a>	
Park Name	Zone & IUCN Categories	Buffer Status	
Geographe	Habitat Protection Zone (IUCN IV)	In buffer area only	
Geographe	Multiple Use Zone (IUCN VI)	In buffer area only	

## Extra Information

State and Territory Reserves			<a href="#">[ Resource Information ]</a>
Protected Area Name	Reserve Type	State	Buffer Status
Broadwater	Nature Reserve	WA	In buffer area only
Locke	Nature Reserve	WA	In buffer area only
Ngari Capes	Marine Park	WA	In feature area
NTWA Bushland covenant (0173)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0178)	Conservation Covenant	WA	In buffer area only
Sabina	Nature Reserve	WA	In buffer area only
Unnamed WA25836	Nature Reserve	WA	In buffer area only
Unnamed WA26620	Nature Reserve	WA	In buffer area only
Unnamed WA41568	Nature Reserve	WA	In buffer area only
Unnamed WA41597	Nature Reserve	WA	In buffer area only
Unnamed WA42879	Nature Reserve	WA	In buffer area only



Protected Area Name	Reserve Type	State	Buffer Status
Unnamed WA48837	Nature Reserve	WA	In buffer area only
Unnamed WA49385	Nature Reserve	WA	In buffer area only
Unnamed WA50017	Nature Reserve	WA	In buffer area only
Unnamed WA50270	5(1)(h) Reserve	WA	In buffer area only

## Regional Forest Agreements

[ [Resource Information](#) ]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
<a href="#">South West WA RFA</a>	Western Australia	In buffer area only

## Nationally Important Wetlands

[ [Resource Information](#) ]

Wetland Name	State	Buffer Status
<a href="#">Vasse-Wonnerup Wetland System</a>	WA	In buffer area only

## EPBC Act Referrals

[ [Resource Information](#) ]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<a href="#">Installation of additional potable water tank</a>	2023/09518		Assessment	In feature area

## Controlled action

<a href="#">Aerial Application of Lavicide to Vasse-Wonnerup Wetlands</a>	2010/5593	Controlled Action	Post-Approval	In buffer area only
<a href="#">Busselton Foreshore Redevelopment from West Street to Ford Road</a>	2013/6830	Controlled Action	Post-Approval	In buffer area only
<a href="#">Cape View Resort at Lot 190 Little Colin Street</a>	2006/3070	Controlled Action	Post-Approval	In feature area
<a href="#">Dawson Beach Estate Stage 2</a>	2005/2153	Controlled Action	Post-Approval	In feature area
<a href="#">Development Guide Plan for 46 ha Residential Subdivision</a>	2008/4102	Controlled Action	Post-Approval	In buffer area only
<a href="#">Development of Busselton Health Campus</a>	2011/6011	Controlled Action	Post-Approval	In buffer area only
<a href="#">Develop Trails and a Wetlands Demonstration Site and Centre</a>	2008/4439	Controlled Action	Post-Approval	In buffer area only
<a href="#">Eastern Link Project, Busselton WA</a>	2018/8155	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Controlled action</b>				
<a href="#">Lennox Weir Removal, 12kms west Busselton</a>	2021/8915	Controlled Action	Assessment Approach	In buffer area only
<a href="#">Lower Vasse River Sediment Removal</a>	2021/9051	Controlled Action	Post-Approval	In buffer area only
<a href="#">Old Broadwater Farm Estate Subdivision - Stage 3</a>	2009/5231	Controlled Action	Post-Approval	In buffer area only
<a href="#">Peppermint Park Residential Subdivision - Stage 5</a>	2008/4028	Controlled Action	Post-Approval	In buffer area only
<a href="#">Residential/Industrial subdivision, Lot 18, Vasse Highway, Shire of Busselton</a>	2006/3208	Controlled Action	Post-Approval	In buffer area only
<a href="#">Residential Development</a>	2007/3463	Controlled Action	Post-Approval	In buffer area only
<a href="#">Residential Development, Lot 3 &amp; 4 Dorsett Street</a>	2006/2774	Controlled Action	Completed	In buffer area only
<a href="#">Residential development Lot 3, 500 Bussell Highway, WA</a>	2013/7098	Controlled Action	Post-Approval	In buffer area only
<a href="#">Residential development Lots 8 &amp; 9 King Street</a>	2006/2787	Controlled Action	Completed	In buffer area only
<a href="#">Residential subdivision, Lot 501 Vasse Hwy, Yalyalup, WA</a>	2018/8244	Controlled Action	Post-Approval	In buffer area only
<a href="#">retirement units &amp; aged care facility development</a>	2007/3533	Controlled Action	Post-Approval	In feature area
<a href="#">Shark Hazard Mitigation Drum Line Program, WA</a>	2014/7174	Controlled Action	Completed	In buffer area only
<a href="#">Three Turning Pockets West of Busselton Townsite</a>	2002/846	Controlled Action	Post-Approval	In feature area
<a href="#">Tourism Villa Facility Development</a>	2008/4025	Controlled Action	Post-Approval	In feature area
<a href="#">Upgrade of Ford Road</a>	2005/2113	Controlled Action	Completed	In buffer area only
<a href="#">Urban development, multiple lots Northerly Street, Vasse, WA</a>	2019/8494	Controlled Action	Assessment Approach	In buffer area only
<a href="#">Vasse Diversion Drain Upgrade</a>	2017/7932	Controlled Action	Post-Approval	In buffer area only
<a href="#">Yarragadee Water Supply Development</a>	2005/2073	Controlled Action	Completed	In buffer area only

**Not controlled action**

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Not controlled action</b>				
<a href="#">25 Lot Residential Subdivision</a>	2009/4830	Not Controlled Action	Completed	In buffer area only
<a href="#">Aerial application of mosquito larvicides to Vasse Wonnerup Wetlands, WA</a>	2016/7780	Not Controlled Action	Completed	In buffer area only
<a href="#">Busselton-Margaret River Regional Airport Development Project, WA</a>	2016/7675	Not Controlled Action	Completed	In buffer area only
<a href="#">Busselton to Flinders Bay Rails to Trails Project, WA</a>	2013/6835	Not Controlled Action	Completed	In buffer area only
<a href="#">Busselton to Margaret River Transmission Line</a>	2008/3964	Not Controlled Action	Completed	In buffer area only
<a href="#">Causeway Bridge Duplication, Busselton, WA</a>	2018/8309	Not Controlled Action	Completed	In buffer area only
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area
<a href="#">INDIGO Central Submarine Telecommunications Cable</a>	2017/8127	Not Controlled Action	Completed	In feature area
<a href="#">Redevelopment of Lots 3 &amp; 4, Kent Street</a>	2007/3243	Not Controlled Action	Completed	In buffer area only
<a href="#">Residential &amp; Light Industrial Development, Vasse WA</a>	2013/6932	Not Controlled Action	Completed	In buffer area only
<a href="#">Residential development, Lot 42, Farmhouse Court, Bovell, WA</a>	2014/7195	Not Controlled Action	Completed	In buffer area only
<a href="#">Rezoning of Lot 31, 80-lot Residential Subdivision</a>	2008/4680	Not Controlled Action	Completed	In buffer area only
<a href="#">Vasse Hotel and Supermarket Redevelopment</a>	2001/288	Not Controlled Action	Completed	In buffer area only
<b>Not controlled action (particular manner)</b>				
<a href="#">Aerial Application of Larvicide</a>	2010/5490	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Aerial Mosquito Spraying Vasse-Wonnerup System</a>	2005/1952	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Ambergate North Residential Development</a>	2009/4802	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only



Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Not controlled action (particular manner)</b>				
<a href="#">Australian Underwater Discovery Centre</a>	2021/9019	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Country Road Estate - Final Stage Development</a>	2006/3095	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Extension of existing mains water supply pipeline</a>	2009/4686	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">INDIGO Marine Cable Route Survey (INDIGO)</a>	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
<a href="#">Monaghan's Roundabout Project - Intersection of Bussell Highway and Caves Road, Shire of Busselton</a>	2007/3515	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
<a href="#">Novacare Lifestyle Village</a>	2001/311	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">South Busselton Primary School</a>	2001/290	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Subdivision and development of residential dwelling on part Lot 1, Bussell Highw</a>	2006/3023	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Waterloo to Busselton 132kV Transmission Line</a>	2002/816	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<b>Referral decision</b>				
<a href="#">Ambergate North Residential Community (4896 lots)</a>	2008/4617	Referral Decision	Completed	In buffer area only
<a href="#">Riverbank and Country Road Estates Lot 43 Bussell Highway</a>	2005/2367	Referral Decision	Completed	In buffer area only
<a href="#">Water quality improvement trial, Lower Vasse River, Busselton, WA</a>	2013/6975	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
<a href="#">Commonwealth marine environment within and adjacent to Geographe Bay</a>	South-west	In buffer area only
<a href="#">Western rock lobster</a>	South-west	In buffer area only

## Biologically Important Areas

[ [Resource Information](#) ]

Scientific Name	Behaviour	Presence	Buffer Status
<b>Seabirds</b>			
<a href="#">Ardenna pacifica</a> Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In feature area
<a href="#">Larus pacificus</a> Pacific Gull [811]	Foraging (in high numbers)	Former Range	In buffer area only
<a href="#">Onychoprion anaethetus</a> Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In feature area
<a href="#">Puffinus assimilis tunneyi</a> Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In feature area
<b>Whales</b>			
<a href="#">Balaenoptera musculus brevicauda</a> Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
<a href="#">Balaenoptera musculus brevicauda</a> Pygmy Blue Whale [81317]	Migration	Known to occur	In feature area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Migration (south)	Known to occur	In feature area

# Caveat

## 1 PURPOSE

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

The report contains the mapped locations of:

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

## 2 DISCLAIMER

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

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

## 3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

## 4 LIMITATIONS

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

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

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

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

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

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



# Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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## **Appendix E**

### **Definitions of Threatened and Priority Flora and Communities**



## Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species\* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. Conservation codes have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018*.

### **T Threatened species – Schedules 1-4**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

- **Threatened fauna** is that subset of ‘Specially Protected Fauna’ listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.
- **Threatened flora** is that subset of ‘Rare Flora’ listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

### **CR Critically endangered species**

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

### **EN Endangered species**

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

### **VU Vulnerable species**

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife*

*Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

**EX Presumed extinct species**

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

**EW Extinct in the wild species**

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

**Specially protected species**

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

**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; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**CD Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**OS Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

**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 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.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

**Priority 1: 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, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

## **Priority 2: 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, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

## **Priority 3: 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. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

## **Priority 4: Rare, Near Threatened and other species in need of monitoring**

- (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
- (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
- (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

\*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

## **Western Australian Ecological Communities**

### **Threatened Ecological Communities**

The BC Act provides for the statutory listing of threatened ecological communities (TECs) by the Minister.

### **Presumed Totally Destroyed (PD)**

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.



### **Critically Endangered (CR)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

### **Endangered (EN)**

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

### **Vulnerable (VU)**

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

### **Priority Ecological Communities**

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

#### **Priority One: Poorly-known ecological communities**

Ecological communities that are known from very few occurrences with a very restricted distribution (generally  $\leq 5$  occurrences or a total area of  $\leq 100$ ha).

Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

### **Priority Two: Poorly-known ecological communities**

Communities that are known from few occurrences with a restricted distribution (generally  $\leq 10$  occurrences or a total area of  $\leq 200$ ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

### **Priority Three: Poorly known ecological communities**

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
- (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;
- (iii) munities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

### **Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.**

- (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.
- (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

### **Priority Five: Conservation Dependent ecological communities**

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

# Commonwealth of Australia Conservation Codes

## Threatened Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

### **Extinct**

A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

### **Extinct in the wild**

A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:

- a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
- b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

### **Critically endangered**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

### **Endangered**

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

### **Vulnerable**

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

### **Conservation dependent**

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

- a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or
- b) the following subparagraphs are satisfied:
  - i. the species is a species of fish;

- ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
- iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;
- iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

### **Threatened Ecological Communities**

Threatened Ecological communities under the EPBC Act are listed in three categories.

#### **Critically endangered**

If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).

#### **Endangered**

If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).

#### **Vulnerable**

If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).



**Categories of Threatened Species pursuant to the Environment Protection and Biodiversity Conservation Act 1999**

<b>EPBC Act Category</b>	<b>Department of Environment and Energy Definition</b>
<b>Extinct</b>	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
<b>Extinct in the wild</b>	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:
	(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
<b>Critically endangered</b>	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>Endangered</b>	A native species is eligible to be included in the endangered category at a particular time if, at that time
	(a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
<b>Vulnerable</b>	A native species is eligible to be included in the vulnerable category at a particular time if, at that time:
	(a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
<b>Conservation dependent</b>	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

# CONSERVATION CATEGORY DEFINITIONS

## for Western Australian Ecological Communities

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### GENERAL DEFINITIONS

An **ecological community** is a naturally occurring assemblage of organisms that occurs in a particular habitat, as defined in the *Biodiversity Conservation Act 2016* (BC Act). Ecological communities may comprise various life forms including plants, animals and microorganisms.

Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) means an ecological community that is listed under section 27(1) of the BC Act as a critically endangered, endangered or vulnerable ecological community, or is a rediscovered ecological community to be regarded as a threatened ecological community under section 33 of the BC Act.

An **assemblage** is a defined group of biological entities.

**Habitat**, as defined in the BC Act, means the biophysical medium or media —

- a) occupied (continuously, periodically or occasionally) by an organism or group of organisms, or
- b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

An **occurrence** is a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres with, for example: a different ecological community, a sealed road, a building, a water body (for terrestrial communities), or a terrestrial body (for aquatic communities). There is no minimum size of an occurrence of a threatened or priority ecological community. By ensuring that every discrete occurrence is recognised and recorded, future changes in status can be readily monitored.

**Adequately surveyed** is defined as an ecological community that has been searched for thoroughly in most likely habitats, by relevant experts.

**Community structure** is defined as the spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage. For example, the vegetation structure (e.g., *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs) or the trophic structure in a faunal assemblage (e.g., dominance by feeders on detritus as distinct from feeders on live plants).

To **modify** an occurrence of an ecological community, as defined in section 44 of the BC Act, means to take action that results in —

- (a) the modification of the occurrence of the threatened ecological community to such an extent that the occurrence is unlikely to recover —
  - (i) its species composition or structure; or
  - (ii) its species composition and structure; or
- (b) the destruction of the occurrence of the threatened ecological community.

**Destruction** of an occurrence of an ecological community means modification such that reestablishment of ecological processes, species composition or community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention.

Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Refer to the document [Guidance note – Modification of an occurrence of a threatened ecological community](#) for more information on what constitutes modification and how to determine whether an action is likely to modify an occurrence of a threatened ecological community.

**Threatening process** means a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community, as defined under the BC Act. Examples of some of the continuing threatening processes in Western Australia include: vegetation clearance; competition and land degradation by introduced fauna; dieback caused by the root-rot fungus (*Phytophthora cinnamomi*); competition and displacement of native plants by introduced flora; hydrological changes (declining groundwater levels); drying climate, fire regimes that cause declines in biodiversity; direct human exploitation and disturbance of ecological communities.

**Restoration** is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

**Rehabilitation** is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

## LISTED ECOLOGICAL COMMUNITIES

Assessment of the conservation status of ecological communities is carried out in accordance with the BC Act listing criteria and the requirements of [Ministerial Guideline Number 1](#) and [Ministerial Guideline Number 4](#) that adopt the use of the International Union for Conservation of Nature (IUCN) [Red List of Ecosystems Categories and Criteria](#).

### CO Collapsed ecological communities

An ecological community listed by order of the Minister as collapsed under section 31(1) of the BC Act. As determined by criteria set out in section 32 of the BC Act, an ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —

- (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or
- (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —
  - (i) its species composition or structure; or
  - (ii) its species composition and structure.

### CR Critically endangered ecological communities

A threatened ecological community listed in the category of critically endangered under section 27(1)(a) of the BC Act, as determined by criteria set out in section 28 of the BC Act and the ministerial guidelines. A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- ‘Assemblages of the organic springs and mound springs of the Mandora Marsh area’ is listed as a critically endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- ‘Assemblages of the organic springs and mound springs of the Mandora Marsh area’ is listed as critically endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: CR.

### EN Endangered ecological communities

A threatened ecological community listed in the category of endangered ecological community under section 27(1)(b) of the BC Act, as determined by criteria set out in section 29 of the BC Act and the ministerial guidelines. A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- ‘Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al.* (1994))’ is listed as an endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- ‘Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al.* (1994))’ is listed as endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: EN.

## VU Vulnerable ecological communities

A threatened ecological community listed in the category of vulnerable ecological community under section 27(1)(c) of the BC Act, as determined by criteria set out in section 30 of the BC Act and the ministerial guidelines. A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Calothamnus graniticus subsp. graniticus heaths on south west coastal granites' is listed as a vulnerable threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Calothamnus graniticus subsp. graniticus heaths on south west coastal granites' is listed as vulnerable under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: VU.

## PRIORITY ECOLOGICAL COMMUNITIES

Priority is not a listing category under the BC Act. The Priority Ecological Communities list is maintained by the department and is published on the department's website.

All fauna and flora that may be present in an ecological community are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when these species occur in an ecological community that is not listed as threatened, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Possible threatened ecological communities that do not meet survey criteria or are not adequately defined to enable listing are added to the department's [Priority Ecological Communities for Western Australia list](#) under priority 1, 2 or 3. Ecological communities that are adequately known and not threatened but rare, near threatened, or have recently been removed from the threatened list are placed in priority 4. Conservation dependent ecological communities are placed in priority 5.

### P1 Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution

Ecological communities that are known from very few occurrences with a very restricted distribution (generally  $\leq 5$  occurrences or a total area of  $\leq 100$ ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g., within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Examples of use:

- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as a Priority 1 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as Priority 1 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P1.

### P2 Priority 2: Poorly known ecological communities – few occurrences, restricted distribution

Communities that are known from few occurrences with a restricted distribution (generally  $\leq 10$  occurrences or a total area of  $\leq 200$ ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Examples of use:

- 'Aquatic invertebrate communities of peat swamps' is listed as a Priority 2 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Aquatic invertebrate communities of peat swamps' is listed as Priority 2 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P2.



### **P3 Priority 3: Poorly known ecological communities – inadequately surveyed or not well defined**

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them. This category includes three sub-categories:

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.
- (ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years).
- (iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change, etc.

Examples of use:

- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as a Priority 3(iii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as Priority 3(iii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P3(iii).

### **P4 Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list**

Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring.

- (i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category.
- (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Examples of use:

- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as a Priority 4(ii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as Priority 4(ii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table: column heading: DBCA, row text: P4(ii).

### **P5 Priority 5: Conservation dependent ecological communities**

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

**Categories of Threatened Communities pursuant to the Environment Protection and Biodiversity Conservation Act 1999**

Category	Definition
<b>Critically Endangered</b>	(1) An ecological community is eligible to be included in the <b><i>critically endangered</i></b> category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>Endangered</b>	(2) An ecological community is eligible to be included in the <b><i>endangered</i></b> category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered; and</li> <li>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</li> </ul>
<b>Vulnerable</b>	(3) An ecological community is eligible to be included in the <b><i>vulnerable</i></b> category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered nor endangered; and</li> <li>(b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</li> </ul>