City of Mandurah

Yalgorup Spring Environmental Assessment

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Acknowledgement of Country

Ngala kaaditj Noongar moort keyen kaadak nidja boodja.
Natural Area acknowledges the Traditional Owners of the lands on which we operate, and recognises their continuing connection to lands, waters and communities.

Disclaimer

System Certifications

Environmental management system registered to ISO 14001:2015
Quality management system registered to ISO 9001:2015
Occupational health and safety management system registered to ISO 45001:2018

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Executive Summary

Natural Area Consulting Management Services (Natural Area) was contracted by the City of Mandurah to undertake an environmental assessment along a road reserve. The environment assessment consisted of a flora survey, fauna survey, and a black cockatoo habitat assessment to provide an indication of the environmental values present on site. The City of Mandurah (the City) is aiming to develop environmentally sustainable trails, attractions and accommodation within Yalgorup National Park for an eco-tourism project. The existing road reserve is unused and the City wishes to construct an alignment that would provide suitable road access to the national park. The results from the assessment determine the environmental values on site and the impact of clearing on the broader landscape.

The environmental assessment determined:

- a total of 61 flora species (taxa) were recorded from 28 families during the field survey, comprised of 31 introduced (weeds) and 30 native species
- four declared pests and Weed of National Significance (WoNS) were identified within the survey site, including Bridal creeper (**Asparagus asparagoides*), **Solanum linnaeanum*, Narrowleaf Cottonbush (**Gomphocarpus fruticosus*) and **Cuscuta campestris*
- a total of 10 fauna species from 10 families were recorded during the field survey.
- two conservation significant fauna species were present within the survey site, *Zanda* sp. and Western Ringtail Possums (*Pseudocheirus occidentalis*)
- one vegetation type was present across the survey area, *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland
- the survey area meets the diagnostic characteristics and biotic thresholds for the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain, threatened ecological community.
- the vegetation condition across the survey area ranged from completely degraded to good
- suitable roosting, foraging, and breeding habitat for black cockatoos were present across the survey area, with eight hollows suitable for breeding.

An assessment of the proposed clearing of the site against the 10 native vegetation clearing principles suggests that this action may be at variance with 5 principles (B, D, G, H, and I).

The site provides habitat connectivity for Western Ringtail Possums (*Pseudocheirus occidentalis*), large trees that provide arboreal habitat should be retained to allow the movement of Western Ringtail Possums within their habitat. It is recommended that the road alignment is designed to avoid the impact to the habitat trees. A tree hollow check is recommended to be undertaken prior to the removal of trees to ensure that there are no fauna species present.

One of the potential conservation significant species, *Caladenia speciosa,* did not have above ground characteristics presenting at the time of the survey, a targeted flora survey would be required to be undertaken during the optimal flower and growth periods during September to October to determine its presence. Investigation to determine the cause of stress of the Tuarts across the site is recommended to be undertaken to be able to develop accurate mitigation strategies to mitigate the impact to surrounding vegetation. The removal and control of declared pests and Weeds of National Significance is to be undertaken prior to any works to prevent the spread of these species. It is recommended to develop management plans to mitigate clearing runoff and direct impacts to the environment from clearing.

Contents

1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was contracted by the City of Mandurah to undertake an environmental assessment along a road reserve. The environment assessment consisted of a flora survey, fauna survey, and a black cockatoo habitat assessment to provide an indication of the environmental values present on site. The City of Mandurah (the City) is aiming to develop environmentally sustainable trails, attractions and accommodation within Yalgorup National Park for an eco-tourism project. The existing road reserve is unused and the City wishes to construct an alignment that would provide suitable road access to the national park. The results from the assessment determine the environmental values on site and the impact of clearing on the broader landscape.

1.1 Location

The survey area is 4.12 ha across an existing road reserve located along Quail Road, Bouvard in the City of Mandurah (Figure 1). The survey area is approximately 20 km south of Mandurah town centre. The survey area is within an environmentally sensitive area (ID 10527) (Department of Water, Environment and Regulation (DWER), 2021), and is adjacent to the Class A reserve Yalgorup National Park (Department of Biodiversity Conservation and Attractions (DBCA), 2024a)


Mandurah
Survey Area
Yalgorup National Park
Yalgorup National Park
Yalgorup National Park
Legend
Survey Area
Figure 1:
Site Location
Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020
0
100
200 m
N

2.0 Site Characteristics

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

2.1 Regional Context

The site is located within the Swan Coastal Plain (SWA02) IBRA subregion (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2023). This region is a low lying coastal plain covered with woodlands (Mitchell *et al.,* 2002). This subregion is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperback in swamp areas (Mitchell *et al.,* 2002).

2.2 Climate

The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (2024); Mandurah, site number 009977, 2024, the region has an average:

- rainfall of 608.3 mm pa, with rain falling predominantly between May and August
- maximum temperatures ranging from 17.6 °C in winter to 29.8 °C in summer, with a maximum recorded temperature of 42 °C
- minimum temperatures ranging from 10.9 °C in winter to 19.4 °C in summer, with a minimum recorded temperature of 4.4 °C.

2.3 Topography and Soils

Across the survey area two soil types were identified on site, the Spearwood S4a Phase and Vasse V6 Phase (Department of Primary Industries and Regional Development (DPIRD), 2022). The site ranges from 2 m Australian Height Datum (AHD) in the southern corner and gently rises to 10 m AHD in the north (DPRID, 2019a). (Table 1 and Figure 2).

Table 1: Soil types across the site

Name	Symbol	Description
Spearwood 4a Phase	211Sp	Flat to gently undulating sandplain with deep, pale and sometimes bleached, sands with yellow-brown subsoils.
Vasse V6 Phase	211Va_V6	Upper level sandy terrace and gently undulating beach ridges with deep grey or bleached pale brown siliceous sands overlying soft shelly limestone.

2.4 Vegetation Complex

One vegetation complex exists within the site boundary, the Yoongarillup Complex. It is described by H*eddle, Loneragan, & Havel* (1980) as a woodland to tall woodland of *Eucalyptus gomphocephala* (Tuart) with *Agonis flexuosa* in the second storey. Less consistently an open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). South of Bunbury is characterized by *Eucalyptus*

rudis (Flooded Gum)-*Melaleuca* species open forests (Heddle *et al.* 1980). The pre-European extent of this vegetation complex remaining is:

- 35.81 % within the Swan Coastal Plain
- 47 % within the City of Mandurah (Government of Western Australia, 2019).

The site intersects with one pre-European Vegetation described by Beard *et al.* (2013) as Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*) and Wandoo (*Eucalyptus wandoo*) southwest woodland (DPIRD, 2019b).

2.5 Black Cockatoo Habitat

There is the potential for the three threatened black cockatoos and their habitat to occur on site, including the Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and the Baudin's Black Cockatoo (*Zanda baudinii*) listed as Vulnerable. All are listed as Threatened under the *Biodiversity Conservation Act 2016* (WA) (BC Act). According to NationalMap the survey site occurs within an area classified as:

- Carnaby's Cockatoo Areas requiring investigation as feeding habitat in the Jarrah Forest IBRA Region (Department of Biodiversity, Conservation and Attractions (DBCA), 2018a)
- Carnaby's Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA region (DBCA, 2018b).

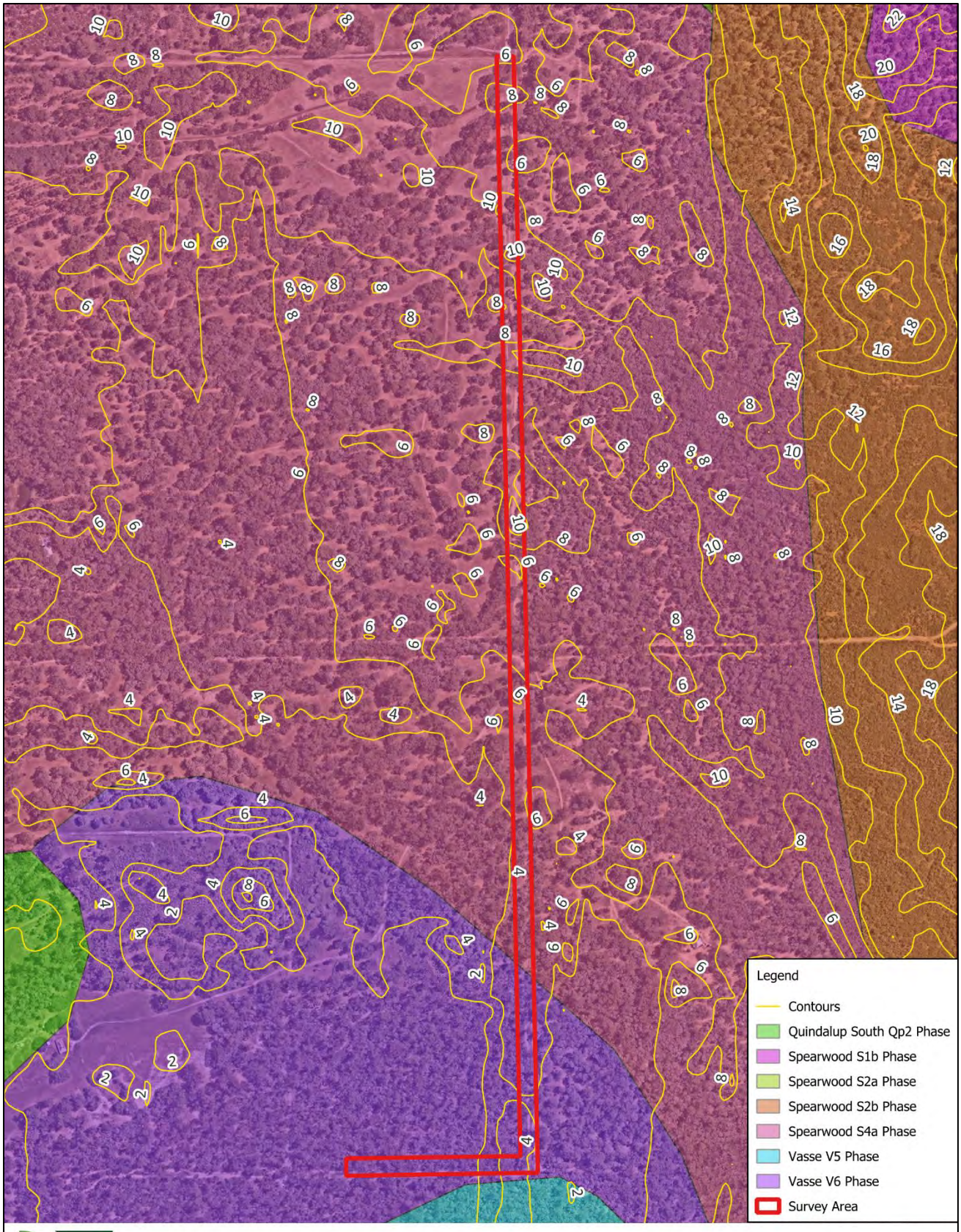

Figure 2:
Soil and Topography

Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020

3.0 Methodology

3.1 Desktop and Literature Review

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

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

The following databases were accessed to obtain relevant information:

- NatureMap (DBCA, 2024b)
- Protected Matters Search Tool (PMST) (DCCEEW, 2024) (Appendix 1)
- FloraBase (WA Herbarium, 2024)
- Threatened and priority flora database searches (DBCA, 2023a)
- Threatened and priority fauna database searches (DBCA, 2023b)
- Threatened and priority ecological community database searches (DBCA, 2023c)

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

3.2 On-ground Flora Survey

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

Natural Area environmental scientists undertook the survey on November 24, 2023, with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- setting out a total of three 10 x 10 m quadrats across the one vegetation types present (Figure 3)
- photographing each quadrat in the north-west corner and recording GPS coordinates using GDA2020 Zone 50 datum
- recording landscape characteristics including soil types/colour, aspect, slope, surface rock, topography and drainage using Natural Area's modified recording sheets based on the NAIA templates developed for the Perth Biodiversity Project
- determining leaf litter depth, percentage cover, and percentage of bare ground
- recording percentage cover, height, number alive/dead stems and life form for each flora species in the quadrats
- marking locations of any conservation significant flora, declared pests (DP) and/or Weeds of National Significance (WoNS) identified
- recording vegetation type including dominant over, middle and understorey species and condition using the scale attributed to Keighery (Table 2)

- the use of GPS to map significant species and boundaries of differing vegetation type and condition
- recording evidence of disturbance, such as fire.

3.2.1 Vegetation Type

The vegetation type was determined using the structural classes described in NVIS Level V (Executive Steering Committee for Australian Vegetation Information ESCAVI 2003 and records dominant over, middle and understorey species.

3.2.2 Vegetation Condition

Vegetation condition was assessed using the rating scale attributed to Keighery in *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016) (Table 2). Table 2 provides a description of the rating scale.

Table 2: Vegetation condition ratings

Category		Description
1	Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
3	Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds, partial clearing, dieback and grazing.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6	Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: EPA, 2016

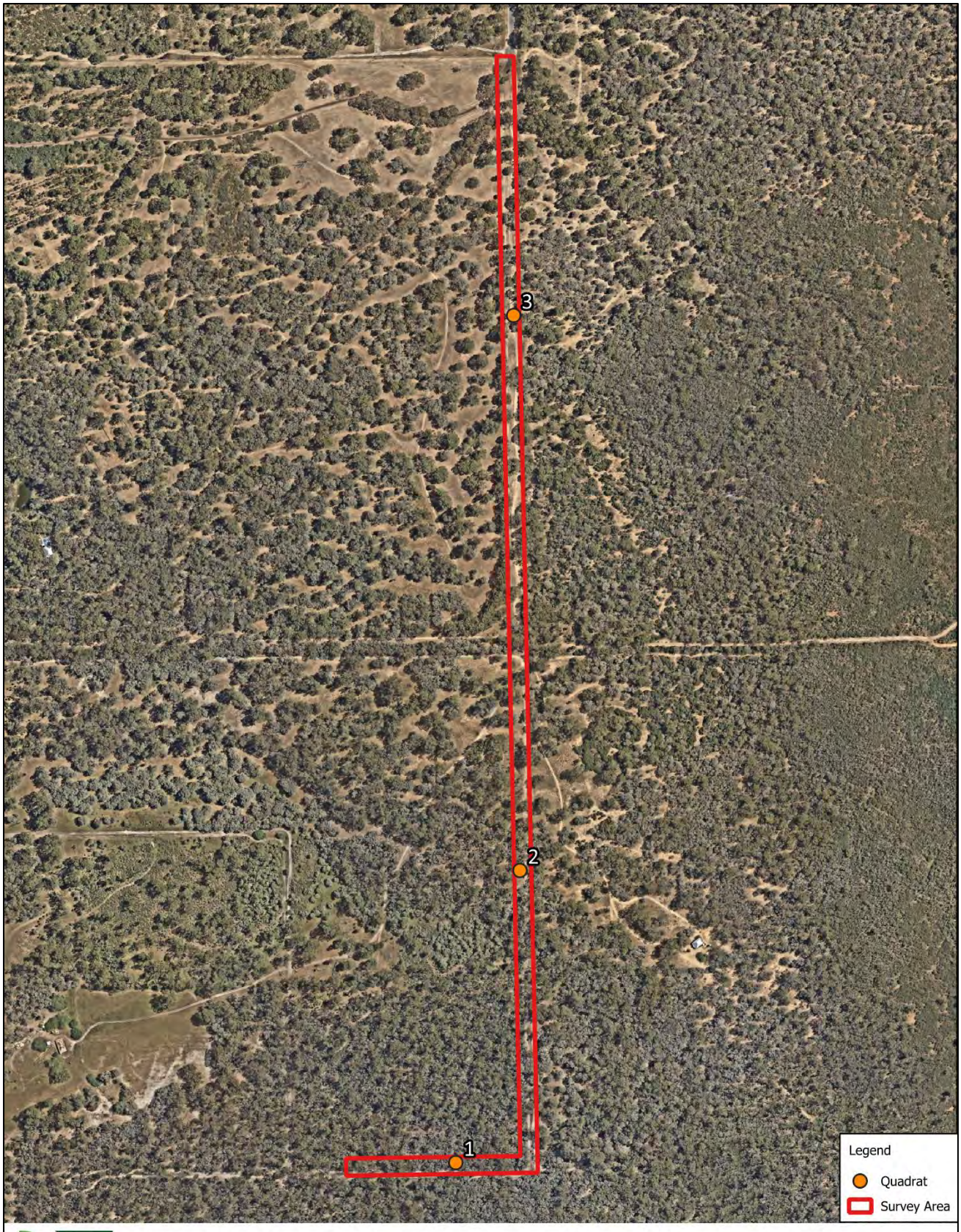

Figure 3:
Quadrat Locations

3.3 On-ground Fauna Survey

The fauna survey was completed in accordance with a Basic Fauna Survey as outlined in the *Technical Guidance, Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020). Natural Area environmental scientists traversed the site on November 24, 2023, and undertook this survey in conjunction with other survey activities. A basic survey is defined as a low-intensity survey, which gathers broad fauna and habitat information including opportunistic fauna observations (EPA, 2020). The fauna survey included recording opportunistic sightings of fauna species while traversing the survey area, along with recording evidence of their presence in the form of:

- scats
- tracks
- diggings
- burrows, dens and warrens
- runnels (vegetative tunnels)
- calls.

3.4 Black Cockatoo Habitat Assessment

A black cockatoo habitat assessment was conducted in accordance with *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo* (Department of Agriculture, Water, and the Environment (DAWE), 2022).

Natural Area environmental scientists undertook the survey between November 24, 2023, with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- traversing the whole site in a systematic grid search
- recording the location and evidence of breeding, roosting and foraging activities (e.g. chew marks, feathers, scats)
- marking the GPS locations of each habitat tree with a diameter at breast height (DBH) ≥ 500 mm
- recording the height, DBH, health, and species of each habitat tree
- recording evidence of hollows, including size, type, and location within the tree
- recording foraging habitat, vegetation type, and condition.

The black cockatoo foraging quality scoring tool (DAWE, 2022) was applied to the survey area to determine the quality of black cockatoo foraging habitat. This scoring tool assigns a habitat score between one and 10, with a score of 10 representing the maximum possible score and very high-quality foraging habitat. Contextual adjustors (attributes that improve or reduce functionality of foraging habitat) such as tree species composition, distances from known breeding and roosting sites, distance from other foraging habitat, evidence of feeding debris, and presence of disease e.g. *Phytophthora* spp. or Marri canker were used to evaluate habitat quality. The scoring tool template is provided in Table 3.

Table 3: Foraging quality scoring tool template

Starting Score		**Baudin's Cockatoo**	**Carnaby's Cockatoo**	**Forest Red-tailed Black-Cockatoo**
10		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as Banksia spp. (including Dryandra spp.), Hakea spp. and Grevillea spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. This tool only applies to sites equal to or larger than 1 hectare in size.
Attribute	**Sub-tractions**	**Context adjustor (attributes reducing functionality of foraging habitat)**		
Foraging potential	-2	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.
Connectivity	-2	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.
Proximity to breeding	-2	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.
Proximity to roosting	-1	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.
Impact from significant plant disease	-1	Subtract 1 if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50 % of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50 % of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50 % of the preferred food plants present.
Total score		Enter Score	Enter Score	Enter Score
Appraisal		To support your habitat score, you should provide an overall appraisal of the habitat on the impact site and within 20 km of the impact area to clearly explain and justify the score. It should include discussion on the foraging habitat's proximity to other resources (e.g. exact distance to proximate resources), frequency of use of proximate sites, the degree of evidence and description of vegetation type and condition.		

Source: DAWE, 2022

3.5 Limitations

The limitation associated with the survey are presented in Table 4.

Table 4: Survey limitations

Potential Limitation	Degree of Limitation	Comments
Availability of contextual information	None	Regional and local contextual information was readily available for the site.
Competency / experience of team	None	Survey activities were undertaken by experienced environmental scientists who have extensive experience undertaking detailed flora surveys, fauna surveys and black cockatoo habitat assessments within the Swan Coastal Plain.
Proportion of flora recorded/collected, any identification issues	None	A total of 61 flora species (taxa) were recorded from 28 families during the field survey, comprised of 31 introduced (weeds) and 30 native species. All species were able to be identified to species level.
Survey effort and extent	None	A detailed flora survey was undertaken across the survey boundary and all of the site was able to be traversed over the course of one day.
Access restrictions	None	There were no access restrictions across the survey area.
Survey timing	Minor	The survey was undertaken during spring which is the optimal season for flora surveys within the Swan Coastal Plain subregion. Whilst the survey was undertaken during flowering season, some species may flower earlier or later in the season and therefore may not be able to be identified. Of the 11 conservation significant flora species identified in the desktop survey as being likely to occur within the survey area, five have flowering periods outside of the survey period. Two of these species would not have had above ground characteristics presenting during the time of the survey.
Disturbances	None	No recent disturbances which may have had an impact on survey results (e.g. fire, recent clearing or floods) were identified during the survey.

4.0 Flora Survey Results

4.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 35 conservation significant species to occur within 10 km of the survey area (Table 5). NatureMap indicated 28 conservation significant flora species listed under the BC Act or by the Western Australian Herbarium (1998-), as potentially occurring within 10 km radius of the site (DBCA, 2024b). A review of the PMST (DCCEEW, 2024) indicated 11 significant flora species listed under the EPBC Act as potentially occurring within a 10 km radius of the site (Appendix 2).

A review of the DBCA (2023a) threatened and priority flora database indicated 27 threatened or priority species have been recorded within 10 km of the site. Of the conservation significant species potentially found in the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 11 (highlighted green) of these species (Table 5).

Table 5: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons Code	NatureMap	PMST	DBCA
Andersonia gracilis	T / EN		X	
Caladenia huegelii	T / CR	X	X	X
Caladenia speciosa	4	X		X
Caladenia swartsiorum	2	X		X
Chamaescilla gibsonii	3	X		X
Conostylis pauciflora subsp. *pauciflora*	4	X		X
Craspedia sp. *Waterloo* (G.J. Keighery 13724)	2	X		X
Dillwynia dillwynioides	3	X		X
Diuris drummondii	T / VU		X	
Diuris micrantha	T / VU		X	
Diuris purdiei	T / EN	X	X	X
Drakaea elastica	T / CR	X	X	X
Eleocharis keigheryi	T / VU		X	
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)	3	X		X
Eryngium pinnatifidum subsp. *Umbraphilum* (G.J. Keighery 13967)	2	X		X
Eucalyptus argutifolia	T / VU	X	X	X
Eucalyptus foecunda subsp. *foecunda*	4	X		X
Hakea oligoneura	2	X		X
Hibbertia leptotheca	3	X		X
Lasiopetalum membranaceum	3	X		X

Species Name	Cons Code	NatureMap	PMST	DBCA
Lyginia excelsa	2	X		
Meionectes tenuifolia	3	X		X
Myriophyllum echinatum	3	X		X
Ornduffia submersa	4	X		X
Platysace ramosissima	3	X		X
Pterostylis frenchii	2	X		X
Rumex drummondii	4	X		X
Sphaerolobium calcicola	3	X		X
Stylidium longitubum	4	X		X
Stylidium maritimum	3	X		X
Stylidium paludicola	3	X		X
Synaphea sp. *Fairbridge Farm* (D.Papenfus 696)	T / CR		X	
Synaphea sp. *Serpentine* (G.R.Brand 103)	T / CR		X	
Synaphea stenoloba	T / EN		X	
Tripterococcus sp. *Brachylobus* (A.S. George 14234)	4	X		X

4.1.1 Threatened and Priority Ecological Communities

A review of the PMST report identified four listed threatened ecological communities that could potentially occur within 10 km of the site (Table 6).

Table 6: Potential Threatened Ecological Communities across the site

Name	Status	Presence
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	Critically Endangered	Community may occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)	Critically Endangered	Community known to occur within area

Source: DCCEEW, 2024.

4.2 Flora Survey Results

4.2.1 Vegetation Types

One vegetation type was recorded across the survey area, *Eucalyptus gomphocephala and Agonis flexuosa* woodland. This vegetation type was a woodland of *Eucalyptus gomphocephala* and *Agonis flexuosa* over *Xanthorrhoea preissii* over mixed native and non-native herbs and grasses. The vegetation type is presented in Figure 4.

Figure 4: Example of the vegetation type, *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland, present across the survey area.

4.2.2 Vegetation Condition

Vegetation condition on site ranged from completely degraded to good (Table 7, Figure 5). The vegetation across the site has evidence of historic clearing along an unused track. The completely degraded vegetation to the north of the site has a higher abundance of weed and lower structural integrity compared to the good vegetation represented in the south of the site.

Table 7: Vegetation condition across the site

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0.00	0.00	0.00	1.45	0.36	2.31	4.12
Area (%)	0	0	0	35	9	56	100

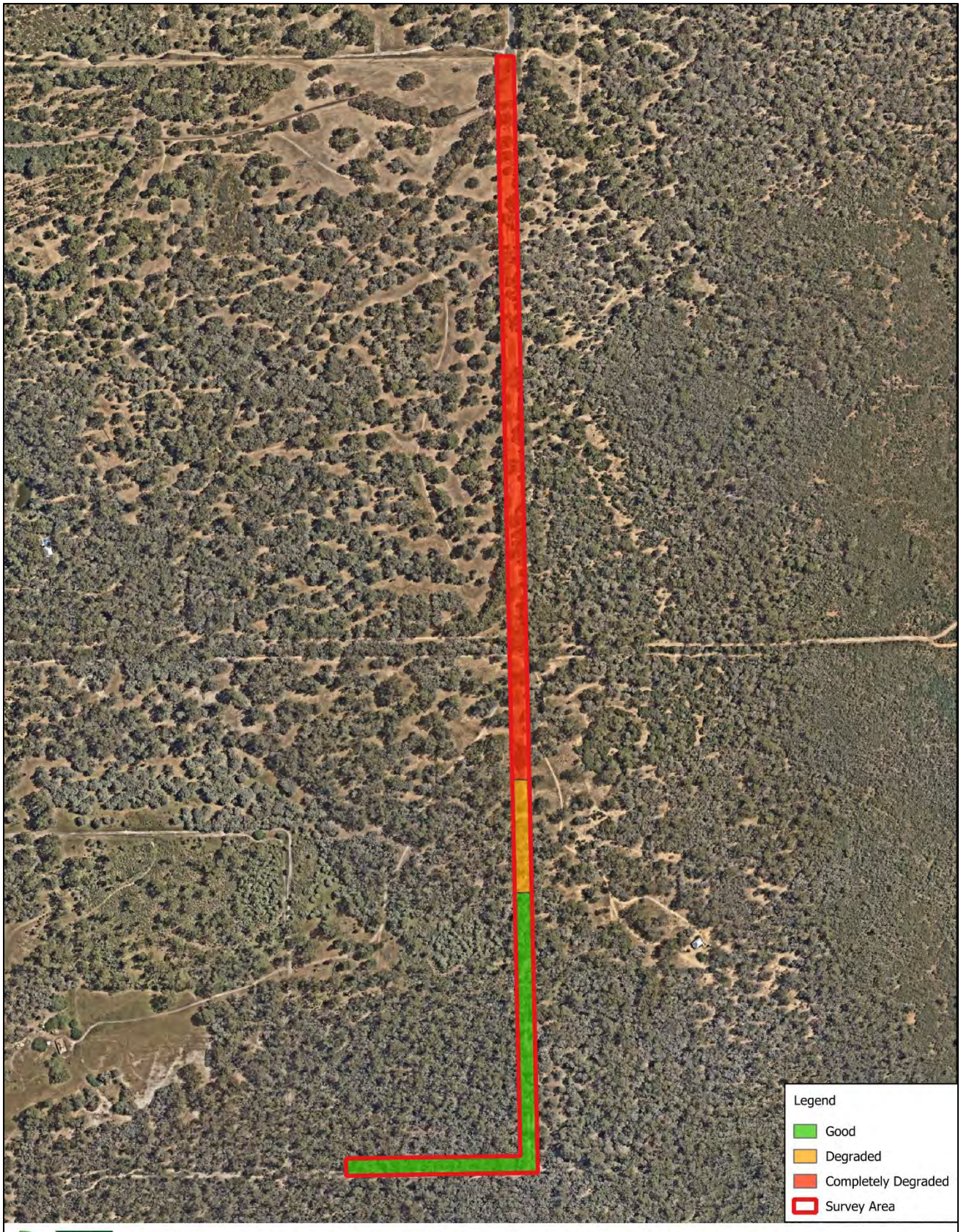

Figure 5:
Vegetation Condition

Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020

4.2.3 Flora

A total of 61 flora species (taxa) were recorded from 28 families during the field survey, comprised of 31 introduced (weeds) and 30 native species. Examples of native flora species are shown in Figure 6 and weed species in Figure 7. A complete flora species list is provided in Appendix 4. Four declared pests (DP) and Weed of National Significance (WoNS) were identified within the survey site, including Bridal creeper (**Asparagus asparagoides (DP/WoNS*)), **Solanum linnaeanum* (DP), Narrowleaf Cottonbush (**Gomphocarpus fruticosus (DP)*) and **Cuscuta campestris* (DP). The locations of declared pests and Weeds of National Significance displayed in Figure 8. A complete species list is provided in Appendix 4 and quadrat data is provided in Appendix 5.

Lobelia tenuior (Slender Lobelia)

Asteridea pulverulenta (Common Bristle Daisy)

Xanthorrhoea preissii (Grass tree)

Acacia pulchella (Prickly Moses)

Figure 6: Examples of native flora species recorded.

**Cuscuta campestris* (DP)

Slender Thistle (**Carduus pycnocephalus*)

Figure 7: Examples of introduced flora species recorded.

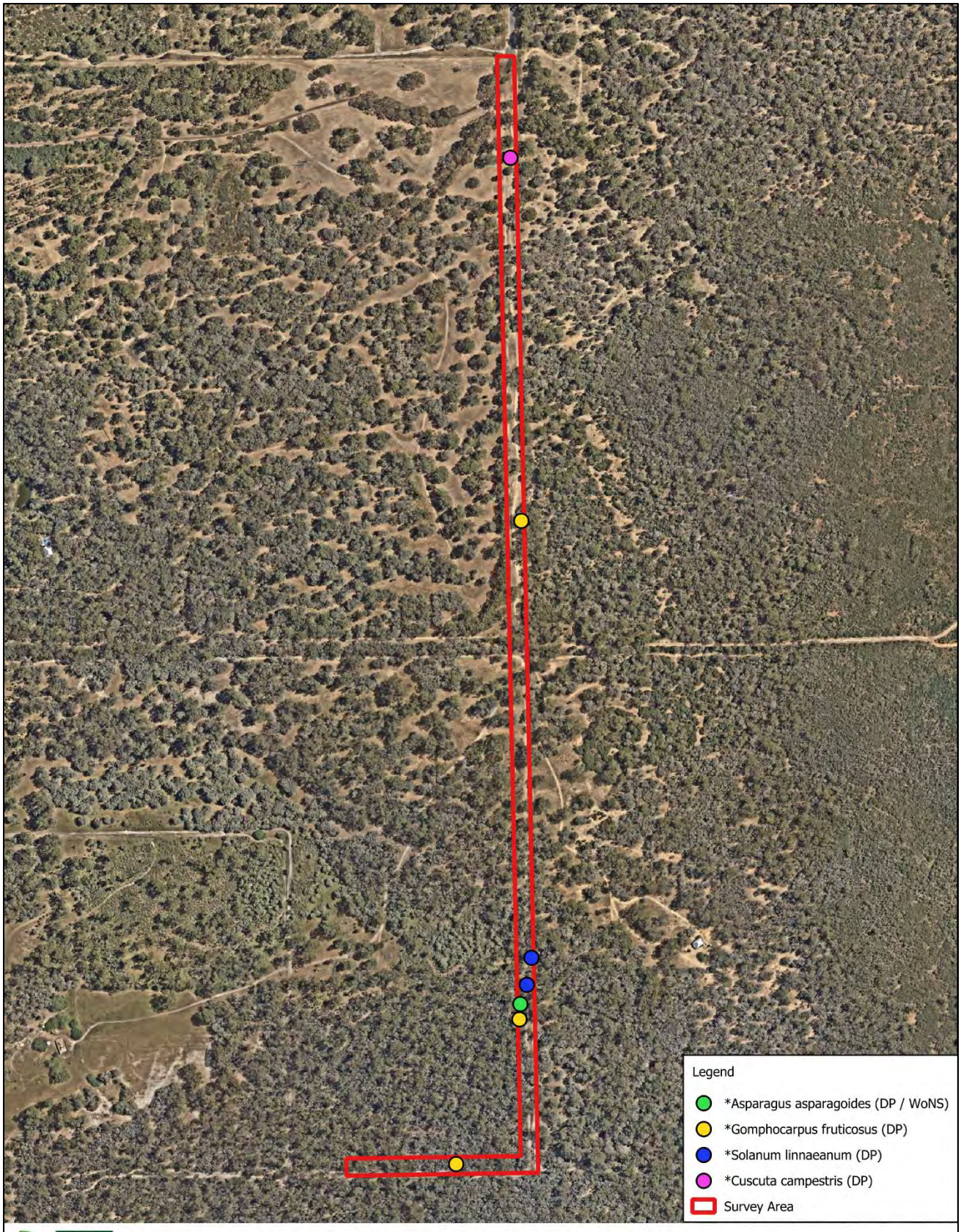

Figure 8:
Declared Pests and WoNS

Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020

4.2.4 Threatened and Priority Communities

The Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community has characteristics represented within this site in line with the Approved Conservation Advice (incorporating listing advice) for the Tuart *(Eucalyptus gomphocephala)* woodlands of the Swan Coastal Plain Ecological Community (DAWE, 2019) (Table 8).

The *Eucalyptus gomphocephala* woodland patch across the site is over 2 ha in size (4.12 ha). The 10-m x 10 m quadrats within the *Eucalyptus gomphocephala* patch ranged from 12 native understorey species in the good vegetation condition area to two native understorey species in the completely degraded to degraded vegetation condition. The quadrat containing 12 native understorey species meets the very high condition category biotic threshold, therefore the patch is considered to be part of the ecological community (Table 9). The component of the *Eucalyptus gomphocephala* woodland patch within the survey area which meets the very high condition category is 1.45 ha.

The *Eucalyptus gomphocephala* woodland vegetation type was evident in the surrounding vegetation of the survey area, this vegetation is likely to be the continuation of the *Eucalyptus gomphocephala* ecological community.

Table 8: Key diagnostic characteristics of Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain

Key Diagnostic Characteristics	Meets/Does not Meet	Site Specifics
Occurs in the Swan Coastal Plain Bioregion, Western Australia	Meets diagnostic characteristics	Site occurs in the Swan Coastal Plain Bioregion
Primarily occurs on the Spearwood and Quindalup dune systems but can also occur on the Bassendean dunes and Pinjarra Plain. It can occur on the banks of rivers and wetlands	Meets diagnostic characteristics	Occurs on the Spearwood dune systems.
The presence of at least two living, established (DBH ≥15 cm) Tuart trees within the upper canopy, with a gap of ≤60 m between the canopy edges of adjacent Tuart trees	Meets diagnostic characteristics	More than two Tuart trees were present
The presence of an understorey of native species, often modified by disturbance	Meets diagnostic characteristics	A native understorey is present in across sections of the vegetation. Evidence of disturbance is present
A patch size of at least 0.5 ha	Meets diagnostic characteristics	Patch is at least 0.5 ha

Table 9: Condition and Biotic Thresholds of Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain

Condition	Biotic Thresholds (must meet one)	Patch size	
		≥2 ha <5 ha	≥0.5 ha <2 ha
Very High	≥80 % of all understorey vegetation cover is native At least 12 native understorey species per 0.01 ha (10 m x 10 m plot or equivalent sample unit)	Part of the protected ecological community	Part of the protected ecological community
High	≥60 % of all understorey vegetation cover is native At least 8 native understorey species per 0.01 ha (10 m x 10 m plot or equivalent sample unit)	Part of the protected ecological community	AND has an important landscape role (≤100 m to native vegetation) OR has a habitat role (≥2 very large trees per 0.5 ha) OR shows regeneration (≥15 seedlings and/or saplings per 0.5 ha) Part of the protected ecological community
Moderate	≥50 % of all understorey vegetation cover is native At least 4 native understorey species per 0.01 ha (10 m x 10 m plot or equivalent sample unit)	AND That either: have an important landscape role (≤100 m to native vegetation)* OR have a habitat role (≥2 very large trees per 0.5 ha)* OR show regeneration (≥15 seedlings and/or saplings per 0.5 ha)* Part of the protected ecological community	Not part of the protected ecological community (but may be a focus for local protection or restoration)
Poor	<50 % of all understorey vegetation cover is native# Less than 4 native understorey species per 0.01 ha (10 m x 10 m plot or equivalent sample unit)	Not part of the protected ecological community	Not part of the protected ecological community

5.0 Fauna Survey Results

5.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 78 conservation significant fauna species to occur within 10 km of the survey area (Table 10). NatureMap indicated 46 conservation significant species listed under the BC Act as potentially occurring within a 10 km radius of the site (DBCA, 2023b) (Appendix 1). The PMST indicated 50 threatened species listed under the EPBC Act as potentially occurring within a 10 km radius of the site (DCCEEW, 2024) (Appendix 1). A review of the DBCA threatened and priority fauna species database indicated the potential for 46 conservation significant fauna species to occur within a 10 km radius of the site (DBCA, 2023b).

Both abiotic (soil, climate) as well as biotic (food resources, predator pressure) will determine the suitability of habitats for specific fauna assemblages, based on their ecological requirements. Evaluating the site locality, existing conditions and known home ranges. Natural Area determined that the following 10 species (highlighted green in Table 10) have the potential to be present within the survey site.

Table 10: Threatened and Priority fauna species listed by NatureMap, PMST and DBCA

Species Name	Lifeform	Cons Code	NatureMap	PMST	DBCA
Anous tenuirostris melanops	BIRD	T / VU		X	
Ardenna grisea	BIRD	T / VU		X	
Arenaria interpres	BIRD	MI	X	X	X
Balaenoptera musculus	MAMMAL	T / EN		X	
Botaurus poiciloptilus	BIRD	T / EN		X	
Calidris acuminata	BIRD	MI	X	X	X
Calidris alba	BIRD	MI	X		X
Calidris canutus	BIRD	T / EN	X	X	X
Calidris ferruginea	BIRD	T / CR	X	X	X
Calidris melanotos	BIRD	MI	X		X
Calidris ruficollis	BIRD	MI	X		X
Calidris subminuta	BIRD	MI	X		X
Calidris tenuirostris	BIRD	T / CR	X	X	X
Calyptorhynchus banksii naso	BIRD	VU	X	X	X
Caretta caretta	REPTILE	T / EN		X	
Charadrius leschenaultii	BIRD	T / VU	X	X	X
Charadrius mongolus	BIRD	T / EN	X	X	X
Chelonia mydas	REPTILE	T / VU		X	

Species Name	Lifeform	Cons Code	NatureMap	PMST	DBCA
Chlidonias leucopterus	BIRD	MI	X		X
Ctenotus ora	REPTILE	P3	X		X
Dasyurus geoffroii	MAMMAL	T / VU	X	X	X
Dermochelys coriacea	REPTILE	T / EN		X	
Diomedea amsterdamensis	BIRD	T / EN		X	
Diomedea dabbenena	BIRD	T / EN		X	
Diomedea epomophora	BIRD	T / VU		X	
Diomedea exulans	BIRD	T / VU		X	
Diomedea sanfordi	BIRD	T / EN		X	
Eubalaena australis	MAMMAL	T / VU	X	X	X
Falco hypoleucos	BIRD	T / VU		X	
Falco peregrinus	BIRD	OS	X		X
Gallinago hardwickii	BIRD	MI	X		X
Halobaena caerulea	BIRD	T / VU		X	
Hydromys chrysogaster	MAMMAL	P4	X		X
Idiosoma sigillatum	INVERTEBRATE	P3	X		X
Isoodon fusciventer	MAMMAL	P4	X		X
Leipoa ocellata	BIRD	T / VU		X	
Lerista lineata	REPTILE	P3	X		X
Limicola falcinellus	BIRD	MI	X		X
Limosa lapponica	BIRD	MI	X		X
Limosa lapponica menzbieri	BIRD	T / EN		X	
Limosa limosa	BIRD	MI	X	X	X
Macronectes giganteus	BIRD	T / EN		X	
Macronectes halli	BIRD	T / VU		X	
Natator depressus	REPTILE	T / VU		X	
Neelaps calonotos	REPTILE	P3	X		X
Neophoca cinerea	MAMMAL	T / EN		X	
Numenius madagascariensis	BIRD	T / CR		X	
Numenius minutus	BIRD	MI	X		X
Numenius phaeopus	BIRD	MI	X		X
Oxyura australis	BIRD	P4	X		X

Species Name	Lifeform	Cons Code	NatureMap	PMST	DBCA
Pachyptila turtur subantarctica	BIRD	T / VU		X	
Pandion haliaetus	BIRD	MI	X		X
Phaethon rubricauda westralis	BIRD	T / EN		X	
Phascogale tapoatafa wambenger	MAMMAL	CD	X	X	X
Philomachus pugnax	BIRD	MI	X	X	X
Phoebetria fusca	BIRD	T / VU		X	
Plegadis falcinellus	BIRD	MI	X		X
Pluvialis fulva	BIRD	MI	X		X
Pluvialis squatarola	BIRD	MI	X		X
Pseudocheirus occidentalis	MAMMAL	T / CR	X	X	X
Pterodroma mollis	BIRD	T / VU		X	
Rostratula australis	BIRD	T / EN		X	
Sternula nereis nereis	BIRD	T / VU		X	
Synemon gratiosa	INVERTEBRATE	P4	X		X
Thalassarche carteri	BIRD	T / VU		X	
Thalassarche cauta	BIRD	T / EN		X	
Thalassarche impavida	BIRD	T / VU		X	
Thalassarche melanophris	BIRD	T / VU		X	
Thalassarche steadi	BIRD	T / VU		X	
Thalasseus bergii	BIRD	MI	X		X
Thinornis cucullatus	BIRD	P4	X		X
Tringa glareola	BIRD	MI	X		X
Tringa nebularia	BIRD	MI	X	X	X
Tringa stagnatilis	BIRD	MI	X		X
Tyto novaehollandiae novaehollandiae	BIRD	P3	X		X
Westralunio carteri	INVERTEBRATE	T / VU	X	X	X
Zanda baudinii	BIRD	T / EN	X	X	X
Zanda latirostris	BIRD	T / EN	X	X	X

5.2 Fauna Survey Results

A total of 10 fauna species from 10 families were recorded during the field survey comprised of two introduced and eight native fauna species. One declared pest was observed on site, Rabbit (**Oryctolagus cuniculus).* Two conservation significant fauna species were observed within the survey area, Western Ringtail Possum (*Pseudocheirus occidentalis)* and *Zanda* sp. *Zanda* sp. was only able to be identified to genus level during the field survey. The Western Ringtail Possum (*Pseudocheirus occidentalis)* is recorded as Critically Endangered under the EPBC Act, this species was observed utilising a hollow within the survey area (Figure 9). The locations of conservation significant fauna species are presented in Figure 10.

The fauna habitat across the site provided a dense upper storey and diverse middle and under storey. There was evidence of refuge for fauna species across the site including leaf litter, dead wood, and areas of dense understory species. Diggings, scats, and tracks were evident throughout the survey area. The fauna species recorded during the field survey are presented in Table 11.

Figure 9: Western Ringtail Possum (*Pseudocheirus occidentalis*) utilising a hollow onsite.

Table 11: Fauna observations across the site. * denotes introduced species

Family	Species Name	Common Name
Bird		
Accipitridae	*Haliastur sphenurus*	Whistling Kite
Alcedinidae	**Dacelo novaeguineae*	Laughing Kookaburra
Artamidae	*Gymnorhina tibicen*	Australian Magpie
Cacatuidae	*Zanda sp.*	
Corvidae	*Corvus coronoides*	Australian Raven
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird
Meropidae	*Merops ornatus*	Rainbow Bee-Eater
Mammal		
Leporidae	**Oryctolagus cuniculus*	Rabbit
Macropodidae	*Macropus fuliginosus melanops*	Western Grey Kangaroo
Pseudocheiridae	*Pseudocheirus occidentalis*	Western Ringtail Possum

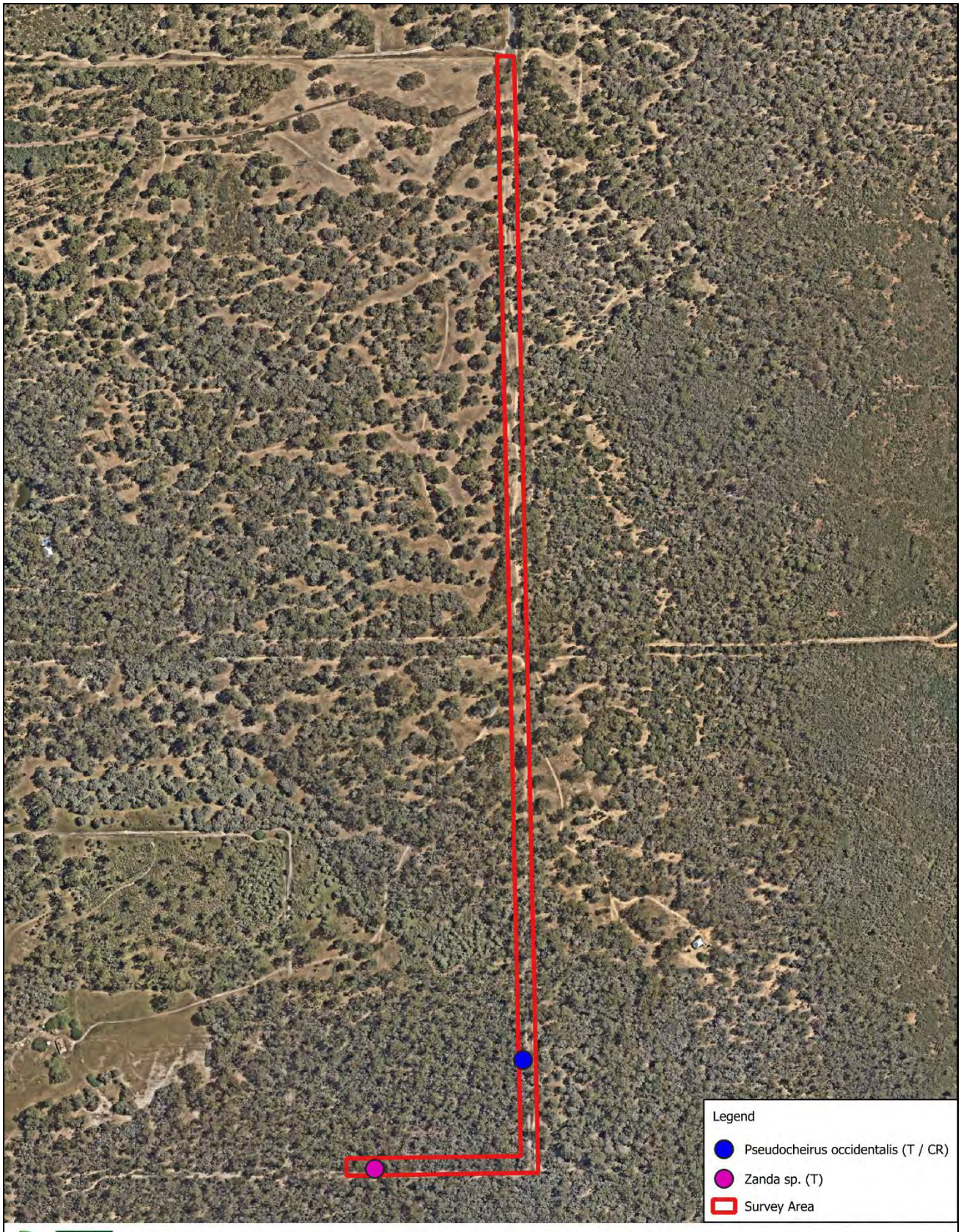

Figure 10: Conservation Significant Fauna

Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020

6.0 Black Cockatoo Habitat Assessment Results

A total of 59 trees that satisfied the Commonwealth guidelines (DAWE, 2022) for black cockatoo habitat trees (trees with DBH ≥ 500 mm) were recorded within the survey area. These trees were identified as predominately *Eucalyptus gomphocephala* (Tuart) and *Agonis flexuosa* (Peppermint). The trees observed across the survey area were predominantly in a good condition.

6.1 Foraging Habitat

The survey area contained areas of vegetation that provide primary feeding resources for black cockatoos, including *Eucalyptus gomphocephala* (Tuart), *Xanthorrhoea preissii* (Grass tree), and *Agonis flexuosa* (Peppermint). The black cockatoo foraging quality scoring tool (DAWE, 2022) was applied across the survey areas and a score of seven was assigned for the Baudin's Cockatoo, Carnaby's Cockatoo, and Red-tailed Black Cockatoo (Table 12). These scores represent areas that are considered to have high-quality native foraging habitat for black cockatoos.

Table 12: Foraging quality score for the survey area

	Baudin's Cockatoo	**Carnaby's Cockatoo**	**Forest Red tailed Black-Cockatoo**	**Appraisal**
Starting score	10	10	10	
Foraging potential	8	8	8	No evidence of foraging by the Red tailed Black Cockatoo, Carnaby's Cockatoo or Baudin's Cockatoo
Connectivity	8	8	8	Foraging habitat is present within 12 km of the survey areas
Proximity to breeding	8	8	8	Survey areas are within a known breeding area for Carnaby's Cockatoo. Survey area is present within 12 km of known Black Cockatoo Breeding Sites.
Proximity to roosting	8	8	8	Survey areas is present within 12 km of known night roost site for Black Cockatoos and Carnaby's Cockatoo (DBCA, 2018c; DBCA, 2018d).
Impact from significant plant disease	7	7	7	Across the survey area 40 % of the habitat trees were in poor condition or dead with evidence of stress. Further investigation is recommended to determine the cause and whether the factor is from significant plant disease.
Total Score	**7**	**7**	**7**	

6.2 Roosting Habitat

No evidence of roosting in the form of scats or feathers was observed within the survey area. Evening surveys were not conducted as part of this assessment, so the location of any potential roosting sites cannot be confirmed.

6.3 Breeding Habitat

The survey area contained areas of vegetation that could provide suitable breeding habitat for black cockatoos. The survey area is also within a known Carnaby's Cockatoo confirmed breeding area (DBCA, 2018b).

Of the 59 habitat trees that were recorded, 17 were observed to contain hollows, with the total number of hollows observed being 42 (Table 13 and Figure 11). The trees containing hollows were *Eucalyptus gomphocephala* (Tuart). The data for each habitat tree recorded is provided in Appendix 6 and photos in Appendix 7.

Hollows recorded had entrance diameters ranging from 50 mm to 350 mm. Black cockatoos are known to utilise hollows that have a vertical to near-vertical orientation and have an entrance diameter of at least 100 mm (Cherriman, 2022). Secondary evidence of hollow use, including rubbing and chew marks was not observed across the hollows. No other secondary evidence such as scats or feathers were observed within the survey areas.

In total eight hollows (from six trees) were considered to be potentially suitable for black cockatoos, based on their entrance diameter and orientation. As this survey was undertaken from the ground, the depth of these hollows was not recorded and therefore their suitability for breeding by black cockatoos cannot be confirmed.

Table 13: Trees with hollows present

ID	Species	DBH	Height	Hollows	Size	Orientation	Height from Ground
30	*Eucalyptus gomphocephala*	1400	15	3	15 X 15	Side	9
					30 X 30	Chimney	13
					10 X 10	Side	13
33	*Eucalyptus gomphocephala*	1060	15	2	20 X 20	Side	10
					30 X 30	Chimney	10
37	*Eucalyptus gomphocephala*	800	13	1	7 X 7	Side	11
40	*Eucalyptus gomphocephala*	1130	10	1	5 X 5	Side	6
43	*Eucalyptus gomphocephala*	630	12	1	10 X 7	Side	7
45	*Eucalyptus gomphocephala*	1140	13	2	5 X 5	Side	10
					5 X 5	Side	8
48	*Eucalyptus gomphocephala*	1160	15	1	7 X 7	Side	8

ID	Species	DBH	Height	Hollows	Size	Orientation	Height from Ground
54	*Eucalyptus gomphocephala*	1940	15	2	30 X 30	Chimney	12
					20 X20	Side	9
8	*Eucalyptus gomphocephala*	1140	13	8	20 X 20	Side	8
					20 X 20	Side	
					5 X 5	Side	8
					10 X 10	Chimney	9
					10 X 10	Chimney	9
					10 X 10	Chimney	9
					35 X 35	Side	8
					5 X 5	Side	8
12	*Eucalyptus gomphocephala*	1710	15	2	5 X 5	Side	9
					5 X 5	Side	9
9	*Eucalyptus gomphocephala*	1490	15	2	5 X 5	Side	14
					5 X 5	Chimney	14
29	*Eucalyptus gomphocephala*	1120	12	4	20 X 20	Chimney	8
					20 X 20	Side	8
					5 X 5	Side	8
					10 X 10	Side	8
31	*Eucalyptus gomphocephala*	810	12	4	5 X 5	Side	7
					7 X 7	Side	9
					10 X 10	Chimney	8
					15 X 10	Side	8
34	*Eucalyptus gomphocephala*	1310	15	2	10 X 10	Side	10
					5 X 5	Side	10
38	*Eucalyptus gomphocephala*	1420	16	3	7 X 7	Side	7
					5 X 5	Side	10
					10 X 10	Side	10
39	*Eucalyptus gomphocephala*	860	13	2	5 X 5	Side	6
					5 X 5	Side	6
4	*Eucalyptus gomphocephala*	1340	12	2	20 X 20	Side	6
					10 X 10	Side	7

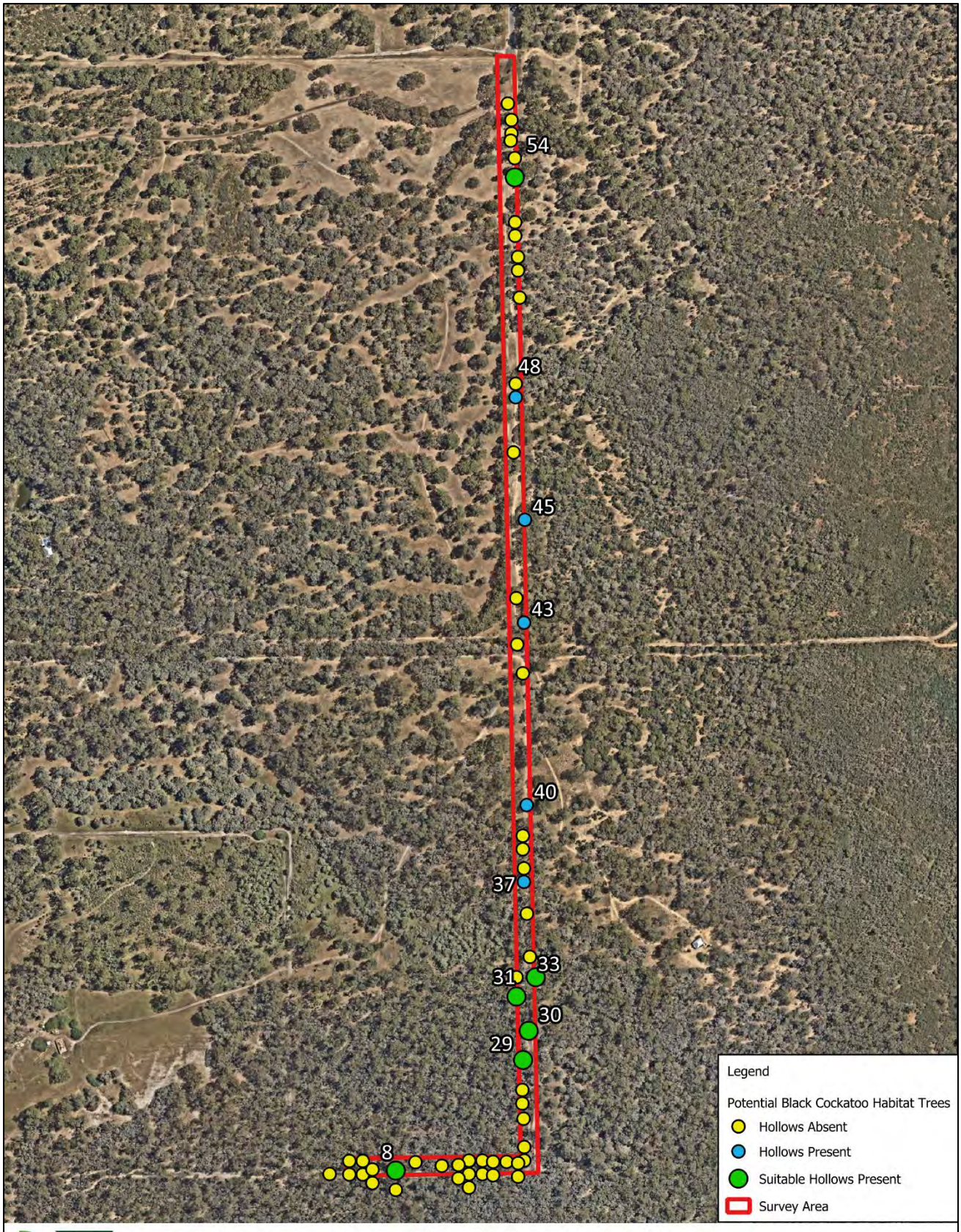

Figure 11: Potential Black Cockatoo Habitat

Client: City of Mandurah
Date: 26/02/2024
Created by: Z. Stoney
Image Source: Nearmap, 2023
Datum: GDA 2020

7.0 Implications of Results

7.1 Flora and Vegetation

A total of 61 flora species were identified, this comprised of 31 (51 %) introduced (weeds) and 30 (49 %) native species. The survey area contained one vegetation type, *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland.

The vegetation condition across the survey area ranged from completely degraded to good. The survey area was primarily composed of areas regarded as completely degraded (56 %) which has evidence of historic clearing for the unused track. The survey area regarded as good (35 %) has evidence of some impact but still retains structural integrity and contains a few aggressive weeds.

Four declared pests were identified within the survey site, including Bridal creeper (**Asparagus asparagoides)*, **Solanum linnaeanum*, Narrowleaf Cottonbush (**Gomphocarpus fruticosus*) and **Cuscuta campestris*. Bridal creeper (**Asparagus asparagoides*) is also known as a Weed of National Significance. Declared pests are listed on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management Act 2007* (WA). This classification requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (DPIRD, 2019c). It is recommended that the control of these species be undertaken prior to any potential future works within the site to prevent the spread of these species.

7.2 Significant Flora

No threatened or priority flora were recorded across the survey area. Of the 10 conservation significant flora to potentially reside within the survey boundary:

- A total of 9 are perennial herb, shrub, or sedge species for which other characteristics would be present to enable identification to a minimum of genus level. However, flowers may be required for species level identification.
    - One of these perennial herb, shrub or sedge species is an orchid which only presents identifying features above ground during their flowering period.
- One is an annual tuberous species, *Pterostylis frenchii*, which exhibits peak flowering and growth periods around November, during the time of the survey.

The survey was conducted in season during spring to ensure the presence of diagnostic characteristics of most species to be present for identification. During the survey, six of the potential conservation significant flora species are known to have flowering periods within the survey period. No species recorded during the survey had characteristics that align with the conservation significant perennial herbs, shrubs, or sedges. The likelihood of the presence of conservation significant flora within the survey area is low with the survey area exhibiting evidence of historic clearing of the understorey along with high weed loads across some sections.

The orchid species not presenting at the time of the survey, *Caladenia speciosa*, would require a targeted flora survey to be undertaken to determine its presence. The target survey for this species is recommended to be undertaken during the optimal flowering and growth periods from September to October. *Caladenia speciosa* is typically found in Tuart woodlands or Banksia woodlands with scattered Jarrah on white, grey or

black sands (Hopper & Brown, 2001). The nearest recorded *Caladenia speciosa* is within seven kilometres of the site.

7.3 Threatened Ecological Communities

The Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community was represented across the site. The vegetation in the southern section of the survey site met the criteria for very high condition threshold, whilst the vegetation in the northern section of the survey had more evidence of disturbance across the site.

Tuarts in the adjacent Yalgorup National Park has experienced a decline in Tuarts in 1990s where it was estimated that over 80 % of mature trees died (Wentzel, 2010). The cause of the decline was suspected to be a variety of factions including insect damage, hydrological change, increased alkalinity and salinity, loss of beneficial mycorrhizal fungi, and infection by pathogens (including *Phytophthora spp*. or *Mycosphaerella cryptica)* (Longman & Keighery, 2002; Tuart Response Group, 2002; Wentzel, 2010). Of the Tuart trees present across the survey area 40 % were dead or in poor condition, trees in poor condition had evidence of stress observed during the field survey. It is recommended to determine the cause of stress across the survey site prior to any works to develop mitigation strategies to reduce further impacts to the ecological community.

7.4 Fauna

The survey area provided suitable fauna habitat for small reptiles, mammals, and amphibian species. The southern section of the area provided more suitable habitat than the northern section of the area. This is due to the lack of native middle and understorey structural layers in the northern section. The survey area is directly adjacent to Yalgorup National Park, which would provide additional suitable fauna habitat including foraging resources, a water source, and shelter. Two conservation significant fauna species were observed on site Western Ringtail Possum (*Pseudocheirus occidentalis*) and *Zanda sp.*

A Western Ringtail Possum (*Pseudocheirus occidentalis*) was observed during the field survey, utilising the tree hollows within the survey area. The fauna habitat present on site includes a consist canopy of *Agonis flexuosa* (Peppermint) which is a preferred foraging species of Western Ringtail Possum (Department of Parts and Wildlife (DPaW), 2017). The canopy of *Agonis flexuosa* extends outside of the survey boundary into the adjacent vegetation. Canopy continuity is essential for Western Ringtail Possums (*Pseudocheirus occidentalis*) as they are predominantly arboreal, requiring a dense overstorey for movement throughout their home range (DPaW, 2017).

The current key threatening process listed in Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan that relate to the clearing of this area include habitat loss and fragmentation, competition for tree hollows, and habitat tree decline (DPaW, 2017). Western Ringtail Possums (*Pseudocheirus occidentalis*) are impacted by habitat loss and fragmentation reduces canopy continuity and limits the ability of the species to move and disperse between habitat patches. The availability of resources and suitable possum habitat has decreased due to tree removal, patch clearing and burning of remnants. This decrease in available resources and suitable habitat has increased the competition for tree hollows, including competition with other possum species, such as the Common Brushtail Possum (*Trichosurus vulpecula*).

Habitat tree decline can be attributed to several environmental factors including pathogens, insects, hydrological changes, nutrient enrichment, and climatic changes. *Eucalyptus gomphocephala* (Tuart) decline is recorded at Yalgorup National Park (adjacent to the survey area) and if the impact of the environmental factors continue it may increase the decline of *Eucalyptus gomphocephala* (Tuart) (DPaW, 2017).

The clearing of the survey area is likely to impact Western Ringtail Possums (*Pseudocheirus occidentalis*) meeting or facilitating the listed key threatening processing, habitat loss and fragmentation, competition for tree hollows, and habitat tree decline. Western Ringtail Possum (*Pseudocheirus occidentalis*) habitat is critical to the survival of populations and where possible should be retained to ensure the continuation of the population.

7.5 Black Cockatoo Habitat

7.5.1 Foraging Habitat

Evidence of foraging was not observed underneath the surveyed trees. Black cockatoos are known to utilise three of the species on site for feeding; *Agonis flexuosa*, *Eucalyptus gomphocephala*, and *Xanthorrhoea preissii* (DAWE, 2022; Department of Environment and Conservation (DEC), 2011). Further foraging habitat is likely to be present in the areas adjacent to the site boundary which exhibit a continuation of the *Eucalyptus gomphocephala* woodland. The foraging scoring tool determined that the habitat across the survey area provides high-quality native foraging habitat for black cockatoos.

7.5.2 Roosting Habitat

Evening surveys were not conducted as part of this assessment, consequently roosting activity was not directly observed. No secondary evidence (e.g. droppings, feathers) of black cockatoo roosting was identified within the survey area.

The trees are considered suitable for black cockatoo roosting due to their location and surrounding landscape characteristics. Black cockatoos generally roost in tall trees in or near riparian environments or other permanent water sources (Baudin's Cockatoos and Carnaby's Cockatoos) or on the edges of forests (Forest Red-tailed Black Cockatoos) (DAWE, 2022). Roost sites for all three species typically occur within 2 km of a watering source (DAWE, 2022).

7.5.3 Breeding Habitat

The survey area is determined to provide suitable breeding habitat for black cockatoos. On site eight hollows (from six trees) satisfy the requirements of a black cockatoo habitat tree. The survey area is within a known Carnaby's Cockatoo confirmed breeding area. Each hollow current use was not assessed during this survey as the survey was undertaken on ground.

It is recommended the road alignment is developed to around the habitat trees to retain the habitat trees with hollows where possible. A tree hollow check is recommended to be undertaken prior to the removal of trees to ensure that there are no fauna species present.

7.6 Assessment Against Clearing Principles

An assessment of the proposed clearing of the site against the 10 native vegetation clearing principles suggests that this action may be at variance with 5 principles (B, D, G, H, and I). Assessment of all clearing principles is provided in Table 14.

Table 14: Native vegetation clearing principles and assessment

Clearing Principle		Comment
A	Native vegetation should not be cleared if it comprises a high level of biological diversity.	The proposed area is unlikely to be at variance with this principle: ▪ A total of 61 flora species were identified, this comprised of 31 (51 %) introduced (weeds) and 30 (49 %) native species. ▪ No threatened or priority flora species were recorded within the survey boundary. ▪ The survey area contained one vegetation type, *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland. ▪ The vegetation condition ranged from completely degraded to good. ▪ Occurs within an environmentally sensitive area recorded as a TEC (DWER, 2021). ▪ Does not reside within a bush forever site (Department of Planning, Land and Heritage (DPLH), 2019). ▪ Does not occur within an ecological linkage (Molloy *et al*., 2009).
B	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The proposed area may be at variance with this principle: ▪ A total of 10 fauna species, comprising of predominantly native birds and three mammals were recorded within the survey area. ▪ Suitable habitat was identified within the site for native fauna species, providing adequate areas for refuge. The habitat in the adjacent areas to the northern survey area is likely to provide additional suitable habitat. ▪ Two conservation significant fauna were sighted within the survey boundary, *Zanda* sp. and Western Ringtail Possum (*Pseudocheirus occidentalis*). ▪ A Western Ringtail Possum (*Pseudocheirus occidentalis*) was observed onside utilising a tree hollow. The vegetation present on site provided suitable habitat for Western Ringtail Possum (*Pseudocheirus occidentalis*). ▪ The survey area provides adequate habitat for roosting, foraging and breeding habitat for black cockatoos. In total eight hollows (from six trees) were considered potentially suitable for black cockatoos, based on their entrance diameter, and orientation.
C	Native vegetation should not be cleared if it	The proposed area is unlikely to be at variance with this principle: ▪ No threatened or priority flora species were recorded within the survey boundary.

Clearing Principle		Comment
	includes, or is necessary for the continued existence of, rare flora.	▪ There is a low likelihood of conservation significant flora residing within the survey area due to the evidence of historic clearing and high weed loads in the northern section of the site. ▪ Of the 11 conservation significant flora to potentially reside within the survey boundary: - A total of 10 are perennial herb, shrub, or sedge species. - One is an annual tuberous species, *Pterostylis frenchii*, has peak flowering and growth periods are around November, during the time of the survey. - One of the perennial herb, shrub or sedge species is an orchid which only present identifying features above ground during their flowering period. *Caladenia speciosa* peak flowering and growth periods are from September to October. ▪ No species recorded during the survey had characteristics that align with the conservation significant perennial herbs, shrubs, or sedges.
D	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	The proposed area may be at variance with this principle: ▪ The survey area contains vegetation that meets the diagnostic criteria and the threshold criteria of the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community. Additionally, a visual assessment of the surrounding areas regards the patch to continue outside of the site boundaries.
E	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The proposed area is unlikely to be at variance with this principle: ▪ The survey area is located within Yoongarillup Complex. Within the Swan Coastal Plain, there is 35.81 % of the Yoongarillup Complex remaining and 47 % remaining within the City of Mandurah.
F	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a	The proposed area is unlikely to be at variance with this principle: ▪ No watercourses or wetlands were identified directly within the survey area. ▪ The survey area is located near a RAMSAR Site. The Peel-Yalgorup System is within 400 metres of the proposed area. ▪ The proposed area does not intersect with any surface hydrology lines (Geoscience Australia, 2015).

Clearing Principle		Comment
	watercourse or wetland.	
G	Native Vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed area may be at variance with this principle: ▪ <3% of map unit has a moderate to high hazard of land instability risk (DPIRD, 2023a). ▪ Majority of the survey area is H2 for wind erosion risk followed by M1 (DPIRD, 2023b), where: - H2: > 70 % of map unit has a high to extreme wind erosion risk - M1: 10-30 % of map unit has a high to extreme wind erosion risk. ▪ Majority of the survey area is M1 for subsurface acidification risk followed by H2 (DPIRD, 2023c), where: - H2: > 70 % of map unit has a high subsurface acidification risk or is presently acid. - M1: 10-30 % of map unit has a high subsurface acidification risk or is presently acid. ▪ <3 % of map unit has a moderate to high salinity risk or is presently saline (DPIRD, 2023d) ▪ The survey area contains and is adjacent to native vegetation extents. ▪ The clearing of the survey area will have direct impact on the vegetation units within the survey area and will have indirect impacts on the surrounding vegetation. ▪ The clearing of areas regarded as completely degraded or degraded will have a lesser impact to land degradation. ▪ The clearing of areas regarded as good will likely increase land degradation.
H	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The proposed area may be at variance with this principle: ▪ The proposed clearing is likely to impact the environmental values nearby, particularly the areas regarded as the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community. ▪ The proposed clearing area is directly adjacent to DBCA legislated lands and waters, with the Class A reserve Yalgorup National Park recorded to the southern, western and northern boundary.
I	Native vegetation should not be cleared if the	The proposed area may be at variance with this principle: ▪ Majority of the survey area is M1 for subsurface acidification risk followed by H2 (DPIRD, 2023c), where:

Clearing Principle		Comment
	clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	- H2: > 70 % of map unit has a high subsurface acidification risk or is presently acid. - M1: 10-30 % of map unit has a high subsurface acidification risk or is presently acid. ▪ <3 % of map unit has a moderate to high salinity risk or is presently saline (DPIRD, 2023d). ▪ The removal of the vegetation within the survey area may contribute to an increased infiltration and surface water run-off. ▪ There is the potential for the clearing of the site to impact water quality through road run-off and machinery spills/contamination. ▪ Contamination through road run-off and machinery are able to be mitigated during the clearing process. The development of a management plan and strategy is recommended to aid with the mitigation of any water quality impacts.
J	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The proposed area is unlikely to be at variance with this principle: ▪ <3 % of map unit has a moderate to high flood risk (DPIRD, 2023e). ▪ There is the potential for an increase in water run-off as a result of the loss of large, established trees during clearing. If the trees are retained it is not expected to have a significant impact in increasing the risk of flooding. ▪ The development of a management plan and strategy is recommended to assist with the management of surface water on site.

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Appendix 1: PMST Report 10 km

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: 22-Feb-2024

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	67
Listed Migratory Species:	67

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	94
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	12
Regional Forest Agreements:	None
Nationally Important Wetlands:	3
EPBC Act Referrals:	30
Key Ecological Features (Marine):	2
Biologically Important Areas:	11
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

Ramsar Site Name	Proximity	Buffer Status
Peel-yalgorup system	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
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area	In buffer area only
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	Critically Endangered	Community may occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)	Critically Endangered	Community known to occur within area	In feature area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche steadi](#)			
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Tringa nebularia](#)			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
[Zanda baudinii listed as Calyptorhynchus baudinii](#)			
Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Species or species habitat known to occur within area	In feature area
[Zanda latirostris listed as Calyptorhynchus latirostris](#)			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
[Thunnus maccoyii](#)			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
[Balaenoptera musculus](#)			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Dasyurus geoffroii](#)			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Eubalaena australis](#)			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
[Neophoca cinerea](#)			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
[Pseudocheirus occidentalis](#)			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area	In feature area
OTHER			
[Westralunio carteri](#)			
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area	In buffer area only
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In feature area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In buffer area only
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area	In feature area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Synaphea sp. Serpentine (G.R.Brand 103) [86879]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Synaphea stenoloba			
Dwellingup Synaphea [66311]	Endangered	Species or species habitat likely to occur within area	In buffer area only
REPTILE			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
Carcharias taurus (west coast population)			
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In feature area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area	In feature area

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 - [50401]	WA	In buffer area only
Commonwealth Land - [50404]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus			
Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Anous tenuirostris melanops			
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Arenaria interpres			
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Stercorarius antarcticus as Catharacta skua Brown Skua [85039]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
[Tringa totanus](#) Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area	In feature area
Fish			
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In buffer area only
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area	In buffer area only
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
[Hippocampus angustus](#) Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In buffer area only
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In buffer area only
[Hippocampus subelongatus](#) West Australian Seahorse [66722]		Species or species habitat may occur within area	In buffer area only
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In buffer area only
[Lissocampus caudalis](#) Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In buffer area only
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In buffer area only
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In buffer area only
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In buffer area only
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In buffer area only
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In buffer area only
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Hydrophis kingii as Disteira kingii](#) Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Whales and Other Cetaceans [Resource Information]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata			
Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Caperea marginata			
Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Delphinus delphis			
Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis			
Southern Right Whale [40]	Endangered	Breeding known to occur within area	In buffer area only
Grampus griseus			
Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca			
Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Austin Bay	Nature Reserve	WA	In buffer area only
Kooljerrenup	Nature Reserve	WA	In buffer area only
Lake McLarty	Nature Reserve	WA	In buffer area only
Lake Mealup	Nature Reserve	WA	In buffer area only
McLarty	Nature Reserve	WA	In buffer area only
Mealup Point	Nature Reserve	WA	In buffer area only
NTWA Bushland covenant (0070)	Conservation Covenant	WA	In buffer area only
Unnamed WA44977	Nature Reserve	WA	In buffer area only
Unnamed WA44978	Nature Reserve	WA	In buffer area only
Unnamed WA51943	5(1)(h) Reserve	WA	In buffer area only
Unnamed WA51944	5(1)(h) Reserve	WA	In buffer area only
Yalgorup	National Park	WA	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Lake McLarty System	WA	In buffer area only
Peel-Harvey Estuary	WA	In buffer area only
Yalgorup Lakes System	WA	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construction of New Perth Bunbury Highway project	2005/2193	Controlled Action	Post-Approval	In buffer area only
Leeuwin Offshore Wind Farm	2022/9160	Controlled Action	Assessment Approach	In buffer area only
Neighbourhood Shopping Centre and Mixed Business Centre, Ocean Road, Dawesville	2006/3155	Controlled Action	Post-Approval	In buffer area only
Peel's Retreat Estate - Residential development	2006/3063	Controlled Action	Post-Approval	In buffer area only
Point Grey Marina Project	2010/5515	Controlled Action	Post-Approval	In buffer area only
Point Grey Residential Development - Terrestrial Component	2011/5825	Controlled Action	Post-Approval	In buffer area only
Proposed excavation and earthworks at existing quarry, prior to subdivision	2008/4562	Controlled Action	Completed	In buffer area only
Residential development, Lots 21 and 100 Southern Estuary Road, Herron, WA	2017/8135	Controlled Action	Completed	In buffer area only
Rural Subdivision of a 975.2ha property	2004/1635	Controlled Action	Completed	In buffer area only
Sand and Limestone Excavation Quarry	2008/4229	Controlled Action	Post-Approval	In buffer area only
Subdivision Lot 1 Dawesville Rd	2005/2394	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Bushfire Mitigation Works - City of Mandurah	2020/8674	Not Controlled Action	Completed	In buffer area only
Clear Lot 503, 54 Ocean Road Dawesville, WA	2014/7375	Not Controlled Action	Completed	In buffer area only
Earthworks and Excavation of Lots 2, 13 & 22 Old Coast Road	2009/5101	Not Controlled Action	Completed	In buffer area only
Eastport canal estate development stage 5	2007/3737	Not Controlled Action	Completed	In buffer area only
Establishment of a National Lifestyle Village	2011/6081	Not Controlled Action	Completed	In buffer area only
Extension of Existing Limestone Quarry at Lot 5 Old Coast Road	2006/2831	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Florida Estate Residential Subdivision Development Stage 13	2011/6045	Not Controlled Action	Completed	In buffer area only
Florida North residential development, Lot 9008, Ocean Road, Dawesville, WA	2015/7462	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Point Grey Entrance Road	2011/5807	Not Controlled Action	Completed	In buffer area only
Rural Residential Development Lot 7 Dunkeld Drive, Herron, WA	2014/7340	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Coodanup residential development	2006/3073	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Diversion of Surface Water into Lake Mealup	2010/5467	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Extension and Renewal of Existing Sand Quarry	2008/4326	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Lots 1-5 Bluerise Cove & Lots 801 & 124 Pleasant Grove Rezoning and Subdivision	2008/4295	Referral Decision	Completed	In buffer area only
Residential Subdivision Lot 801 Pleasant Grove Circle, Falcon, WA	2012/6507	Referral Decision	Referral Publication	In buffer area only

Key Ecological Features [Resource Information]

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

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

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna carneipes			
Flesh-footed Shearwater [82404]	Aggregation	Known to occur	In buffer area only
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In buffer area only
Eudyptula minor			
Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In buffer area only
Hydroprogne caspia			
Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In buffer area only
Onychoprion anaethetus			
Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi			
Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Sterna dougallii			
Roseate Tern [817]	Foraging	Known to occur	In feature area
Sternula nereis			
Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In buffer area only
Whales			
Balaenoptera musculus brevicauda			
Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In buffer area only

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-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 2: Conservation Codes

Western Australia

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

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

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

Commonwealth

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

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

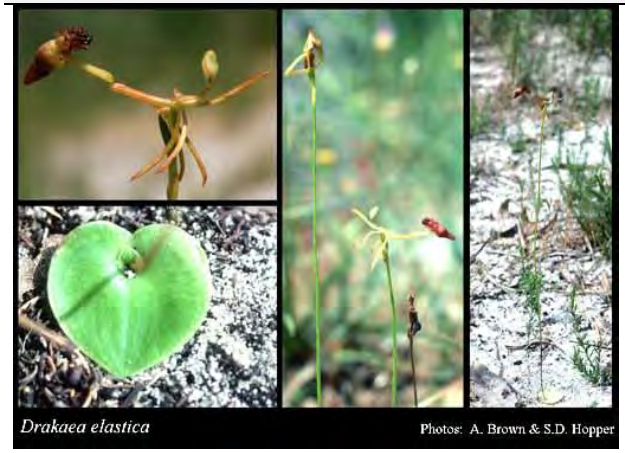
Appendix 3: Significant Species

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Andersonia gracilis*		Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple.	Sep to Nov.	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	T / VU	N	Habitat type unsuitable.
 *Caladenia huegelii*	Grand Spider Orchid	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red.	Sep to Oct.	Grey or brown sand, clay loam.	T / CR	N	Habitat type unsuitable

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Caladenia speciosa*	Sandplain White Spider Orchid	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white-pink	Sep to Oct.	White, grey or black sand.	4	Y	Habitat type suitable
Caladenia swartsiorum	Island Point Spider Orchid				2	N	Habitat type unsuitable.
Chamaescilla gibsonii		Clumped tuberous, herb. Fl. Blue.	Sep.	Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	3	N	Habitat type unsuitable.
Conostylis pauciflora subsp. *pauciflora*		Rhizomatous, stoloniferous perennial, grass-like or herb, 0.1-0.35 m high. Fl. yellow	Aug to Oct.	Grey sand, limestone. Hillslopes, consolidated dunes.	4	Y	Habitat type suitable

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
Craspedia sp. *Waterloo* (G.J. Keighery 13724)					2	N	Habitat type unsuitable.
Dillwynia dillwynioides		Decumbent or erect, slender shrub, 0.3-1.2 m high. Fl. red & yellow/orange.	Aug to Dec.	Sandy soils. Winter-wet depressions.	3	N	Habitat type unsuitable.
 *Diuris drummondii*	Tall Donkey Orchid	Tuberous, perennial, herb, 0.5-1.05 m high. Fl. Yellow.	Nov to Dec or Jan.	Low-lying depressions, swamps.	T / VU	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Diuris micrantha*	Dwarf Bee Orchid	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown	Sep to Oct.	Brown loamy clay. Winter-wet swamps, in shallow water.	T / VU	N	Habitat type unsuitable.
 *Diuris purdiei*	Purdie's Donkey Orchid	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. Yellow.	Sep to Oct.	Grey-black sand, moist. Winter-wet swamps.	T / EN	N	Habitat type unsuitable.

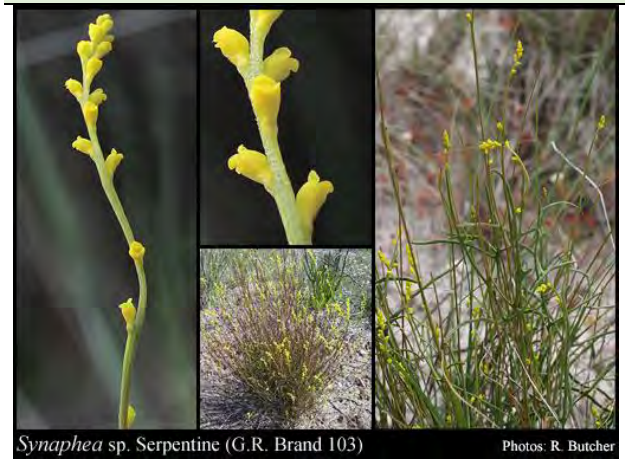
Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Drakaea elastica*	Glossy-leaved Hammer Orchid	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow.	Oct to Nov.	White or grey sand. Low-lying situations adjoining winter-wet swamps.	T / EN	N	Habitat type unsuitable.
 *Eleocharis keigheryi*		Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. Green.	Aug to Nov.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	T / VU	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)					3	N	Habitat type unsuitable.
Eryngium pinnatifidum subsp. *Umbraphilum* (G.J. Keighery 13967)					3	N	Habitat type unsuitable.
 *Eucalyptus argutifolia*	Wabling Hill Mallee	(Mallee), 1.5-4 m high, bark smooth. Fl. white	Mar to Apr.	Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	T / VU	Y	Habitat type suitable
Eucalyptus foecunda subsp. foecunda	Fremantle Mallee				4	Y	Habitat type suitable
Hakea oligoneura					2	Y	Habitat type suitable
Hibbertia leptotheca					3	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
Lasiopetalum membranaceum		Multi-stemmed shrub, 0.2-1 m high. Fl. pink-blue-purple.	Sep to Dec.	Sand over limestone.	3	Y	Habitat type suitable
Lyginia excelsa		Dioecious rhizomatous, erect, tufted herb, 0.6-1.5 m high, rhizomes on surface.	Mar to Nov.	Sand. Dry heath & Banksia woodland.	2	N	Habitat type unsuitable.
Meionectes tenuifolia					3	N	Habitat type unsuitable.
Myriophyllum echinatum		Erect annual, herb, 0.02-0.03 m high. Fl. Red.	Nov.	Clay. Winter-wet flats.	3	N	Habitat type unsuitable.
Ornduffia submersa					4	N	Habitat type unsuitable.
Platysace ramosissima		Perennial, herb, to 0.3 m high. Fl. white-cream.	Oct to Nov.	Sandy soils.	3	Y	Habitat type suitable
Pterostylis frenchii	Tuart Rufous Greenhood	Tuberous, herb, to 0.35 m high, with rosette leaves.		Calcareous sand with limestone, laterite. Flatlands and gentle slopes.	2	Y	Habitat type suitable
Rumex drummondii		Erect perennial, herb, 0.6-0.9 m high.		Winter-wet disturbed areas.	4	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Sphaerolobium calcicola*		Slender, multi-stemmed, scandent or erect shrub, to 1.5 m high. Fl. orange-red	Jun or Sep to Nov.	White-grey-brown sand, sandy clay over limestone, black peaty sandy clay. Tall dunes, winter-wet flats, interdunal swamps, low-lying areas.	3	N	Habitat type unsuitable.
 *Stylidium longitubum*	Jumping Jacks	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink.	Oct to Dec.	Sandy clay, clay. Seasonal wetlands.	4	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Stylidium maritimum*	Coastal Triggerplant	Caespitose perennial, herb, 0.3-0.7 m high, Leaves tufted, linear to narrowly oblanceolate, 10-40 cm long, 1-5.5 mm wide, apex acute to mucronate, margin involute, glabrous. Membraneous scale leaves present at base of mature leaves. Scape glandular throughout. Inflorescence paniculate. Fl. white/purple	Sep to Nov.	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.	3	N	Habitat type unsuitable.
Stylidium paludicola		Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink.	Oct to Dec.	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	3	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Synaphea* sp. *Fairbridge Farm* (D.Papenfus 696)		Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Fl. yellow	Oct.	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	T / CR	Y	Habitat type suitable
 *Synaphea* sp. *Serpentine* (G.R.Brand 103)					T / CR	N	Habitat type unsuitable.

Species Name	Common Name	Description	Flowering Period	Habitat Type	Cons code	Likelihood (Y/N)	Comment
 *Synaphea stenoloba*		Caespitose shrub, 0.3-0.45 m high. Fl. yellow	Aug to Oct.	Sandy or sandy clay soils. Winter-wet flats, granite.	T / EN	N	Habitat type unsuitable.
Tripterococcus sp. *Brachylobus* (A.S. George 14234)					4	Y	Habitat type suitable

Appendix 4: Species List

The complete flora list for the site is provided in the table below with flora listed by family. *Denotes introduced species and species highlighted in red are listed as a declared pest or Weed of National Significance (WoNS).

Family	Species Name	Common Name
Apocynaceae	**Gomphocarpus fruticosus*	Narrowleaf Cottonbush
Araliaceae	*Trachymene coerulea*	Blue Lace Flower
Araliaceae	*Trachymene pilosa*	Native Parsnip
Asparagaceae	**Asparagus asparagoides*	Bridal Creeper
Asparagaceae	*Acanthocarpus preissii*	
Asparagaceae	*Thysanotus manglesianus*	Mangles' Fringed Lily
Asphodelaceae	**Trachyandra divaricata*	
Asteraceae	**Carduus pycnocephalus*	Slender Thistle
Asteraceae	**Hypochaeris glabra*	Smooth Cats-ear
Asteraceae	**Sonchus asper*	Rough Sowthistle
Asteraceae	**Sonchus oleraceus*	Common Sowthistle
Asteraceae	*Asteridea pulverulenta*	Common Bristle Daisy
Asteraceae	*Waitzia nitida*	
Campanulaceae	*Lobelia tenuior*	Slender Lobelia
Convolvulaceae	**Cuscuta campestris*	
Convolvulaceae	*Dichondra repens*	Kidney Weed
Cyperaceae	*Gahnia trifida*	Coast Saw-sedge
Cyperaceae	*Lepidosperma squamatum*	
Dilleniaceae	*Hibbertia cuneiformis*	Cutleaf Hibbertia
Ericaceae	*Styphelia propinqua*	
Euphorbiaceae	**Euphorbia peplus*	Petty Spurge
Fabaceae	*Templetonia retusa*	Cockies Tongues
Fabaceae	**Lotus subbiflorus*	
Fabaceae	**Trifolium arvense*	Hare's Foot Clover
Fabaceae	**Trifolium campestre*	Hop Clover
Fabaceae	*Acacia pulchella*	Prickly Moses
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle

Family	Species Name	Common Name
Fabaceae	*Hardenbergia comptoniana*	Native Wisteria
Gentianaceae	**Centaurium tenuiflorum*	
Geraniaceae	**Geranium molle*	Dove's Foot Cranesbill
Iridaceae	**Romulea rosea*	Guildford Grass
Juncaceae	*Juncus kraussii*	Sea Rush
Loranthaceae	*Amyema miquelii*	Stalked Mistletoe
Myrtaceae	*Agonis flexuosa*	Peppermint
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark
Myrtaceae	**Corymbia citriodora*	
Myrtaceae	*Eucalyptus gomphocephala*	Tuart
Orobanchaceae	**Bellardia trixago*	Bellardia
Oxalidaceae	*Oxalis perennans*	Native Oxalis
Phyllanthaceae	*Lysiandra calycina*	False Boronia
Poaceae	**Hordeum leporinum*	Barley Grass
Poaceae	**Aira caryophyllea*	Silvery Hairgrass
Poaceae	**Avena barbata*	Bearded Oat
Poaceae	**Briza maxima*	Blowfly Grass
Poaceae	**Bromus diandrus*	Great Brome
Poaceae	**Cynodon dactylon*	Couch
Poaceae	**Ehrharta longiflora*	Annual Veldt Grass
Poaceae	**Lagurus ovatus*	Hare's Tail Grass
Poaceae	**Lolium rigidum*	Wimmera Ryegrass
Poaceae	**Vulpia myuros*	Rat's Tail Fescue
Primulaceae	**Lysimachia arvensis*	Pimpernel
Ranunculaceae	*Clematis linearifolia*	Slender Clematis
Ranunculaceae	*Clematis pubescens*	Common Clematis
Restionaceae	*Desmocladus flexuosus*	
Solanaceae	**Physalis peruviana*	Cape Gooseberry
Solanaceae	**Solanum linnaeanum*	
Solanaceae	**Solanum nigrum*	Black Berry Nightshade
Solanaceae	*Solanum symonii*	
Xanthorrhoeaceae	*Xanthorrhoea brunonis*	

Family	Species Name	Common Name
Xanthorrhoeaceae	*Xanthorrhoea preissii*	Grass tree
Zamiaceae	*Macrozamia riedlei*	Zamia

Appendix 5: Quadrat Data

Quadrat No.:	**1**
Survey Date:	22/11/2023
Personnel:	KE, TC
Latitude:	-32.710273
Longitude:	115.638677
Topography:	Gentle slope
Aspect:	South
Slope:	1 %
Soil:	Brown clay loam
Gravel:	0%
Rock:	0%
Leaf Litter:	50%
Bare Ground:	1%
Drainage:	Well
Condition:	Good

Notes: *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland.

Species	**Cover (%)**	**Height (m)**
**Avena barbata*	<.1	0.40
**Briza maxima*	<.1	0.20
**Bromus diandrus*	0.20	0.10
**Ehrharta longiflora*	1.00	0.10
**Euphorbia peplus*	0.50	0.10
**Gomphocarpus fruticosus*	0.10	0.40
**Lagurus ovatus*	0.10	0.10
**Lotus subbiflorus*	0.10	0.20
**Lysimachia arvensis*	1.00	0.10
**Sonchus oleraceus*	<0.1	0.10
**Trachyandra divaricata*	0.30	0.20
**Trifolium campestre*	0.10	0.10
Agonis flexuosa	80.00	7.00
Clematis pubescens	30.00	2.00

Species	Cover (%)	Height (m)
Dichondra repens	0.20	0.40
Eucalyptus gomphocephala	80.00	15.00
Hardenbergia comptoniana	2.00	2.00
Oxalis perennans	0.10	0.10
Styphelia propinqua	0.30	0.30
Templetonia retusa	1.50	2.00
Thysanotus manglesianus	1.00	1.00
Trachymene coerulea	1.00	0.30
Trachymene pilosa	0.20	0.10
Xanthorrhoea brunonis	1.00	1.00
Xanthorrhoea preissii	2.00	1.00

Note: *denotes introduced species.

Quadrat No.:	**2**
Survey Date:	24/11/2023
Personnel:	KE, TC
Latitude:	-32.706685
Longitude:	115.639667
Topography:	Flat
Aspect:	N / A
Slope:	0%
Soil:	Grey sand
Gravel:	0%
Rock:	0%
Leaf Litter:	20%
Bare Ground:	0%
Drainage:	Well
Condition:	Degraded

Notes: *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland.

Species	**Cover (%)**	**Height (m)**
**Bromus diandrus*	0.10	0.10
**Ehrharta longiflora*	<0.1	0.10
**Euphorbia peplus*	1.00	0.10
**Hypochaeris glabra*	0.20	0.20
**Lotus subbiflorus*	0.20	0.20
**Lysimachia arvensis*	40.00	0.10
**Sonchus asper*	0.20	0.10
**Sonchus oleraceus*	<0.1	0.10
**Trachyandra divaricata*	50.00	0.10
**Trifolium campestre*	2.00	0.10
Agonis flexuosa	70.00	7.00
Eucalyptus gomphocephala	80.00	15.00
Hardenbergia comptoniana	1.00	1.00

Note: *denotes introduced species.

Quadrat No.:	**3**
Survey Date:	24/11/2023
Personnel:	KE, TC
Latitude:	-32.699849
Longitude:	115.639680
Topography:	Gentle slope
Aspect:	West
Slope:	1%
Soil:	Dark brown sand
Gravel:	0%
Rock:	0%
Leaf Litter:	70%
Bare Ground:	2%
Drainage:	Well
Condition:	Completely Degraded

Notes: *Eucalyptus gomphocephala* and *Agonis flexuosa* woodland.

Species	**Cover (%)**	**Height (m)**
**Aira caryophyllea*	0.10	0.10
**Ehrharta longiflora*	0.50	0.10
**Euphorbia peplus*	0.20	0.10
**Lotus subbiflorus*	0.50	0.10
**Lysimachia arvensis*	5.00	0.10
**Romulea rosea*	0.10	0.10
**Trachyandra divaricata*	10.00	0.10
**Trifolium arvense*	1.00	0.10
**Trifolium campestre*	5.00	0.10
**Vulpia myuros*	0.50	0.10
Acanthocarpus preissii	0.10	0.10
Eucalyptus gomphocephala	50.00	9.00
Macrozamia riedlei	0.50	0.30

Note: *denotes introduced species.

Appendix 6: Black Cockatoo Habitat Trees

ID	Species	Condition	Hollows	Suitable Hollows	DBH	Height	Latitude	Longitude
1	*Eucalyptus gomphocephala*	Dead	Absent	No	580	12	115.636832	-32.710393
2	*Eucalyptus gomphocephala*	Dead	Absent	No	800	12	115.637107	-32.710382
3	*Agonis flexuosa*	Dead	Absent	No	640	10	115.637188	-32.710207
4	*Eucalyptus gomphocephala*	Dead	Present	Present	1340	12	115.637218	-32.710326
5	*Agonis flexuosa*	Dead	Absent	No	670	12	115.637358	-32.710363
6	*Eucalyptus gomphocephala*	Dead	Absent	No	670	13	115.637446	-32.710398
7	*Agonis flexuosa*	Good	Absent	No	710	10	115.637467	-32.710291
8	*Eucalyptus gomphocephala*	Good	Present	Present	1140	13	115.637711	-32.710333
9	*Eucalyptus gomphocephala*	Good	Present	Present	1490	15	115.637882	-32.710389
10	*Agonis flexuosa*	Good	Absent	No	800	7	115.638084	-32.710261
11	*Agonis flexuosa*	Good	Absent	No	780	8	115.638468	-32.71031
12	*Eucalyptus gomphocephala*	Good	Present	Present	1710	15	115.638714	-32.710346
13	*Eucalyptus gomphocephala*	Good	Absent	No	770	15	115.638706	-32.710257
14	*Agonis flexuosa*	Good	Absent	No	890	12	115.638885	-32.710371
15	*Agonis flexuosa*	Good	Absent	No	840	12	115.63899	-32.710413
16	*Agonis flexuosa*	Good	Absent	No	1150	12	115.638923	-32.710245
17	*Eucalyptus gomphocephala*	Good	Absent	No	560	14	115.638924	-32.710245
18	*Agonis flexuosa*	Good	Absent	No	530	9	115.639084	-32.710396
19	*Agonis flexuosa*	Good	Absent	No	730	9	115.639248	-32.710399
20	*Eucalyptus gomphocephala*	Good	Absent	No	740	12	115.639316	-32.710376
21	*Eucalyptus gomphocephala*	Good	Absent	No	1110	15	115.639373	-32.710282
22	*Agonis flexuosa*	Good	Absent	No	810	9	115.639536	-32.710299
23	*Agonis flexuosa*	Good	Absent	No	610	10	115.639623	-32.71028
24	*Agonis flexuosa*	Good	Absent	No	570	10	115.639685	-32.710141
25	*Agonis flexuosa*	Good	Absent	No	620	9	115.63966	-32.710042
26	*Agonis flexuosa*	Good	Absent	No	600	10	115.639668	-32.709742
27	*Agonis flexuosa*	Good	Absent	No	670	10	115.639606	-32.709376
28	*Agonis flexuosa*	Good	Absent	No	510	10	115.639704	-32.709401
29	*Eucalyptus gomphocephala*	Good	Present	Present	1120	12	115.639671	-32.709019

ID	Species	Condition	Hollows	Suitable Hollows	DBH	Height	Latitude	Longitude
30	*Eucalyptus gomphocephala*	Good	Present	Present	1400	15	115.639758	-32.708661
31	*Eucalyptus gomphocephala*	Good	Present	Present	810	12	115.639723	-32.708197
32	*Eucalyptus gomphocephala*	Good	Absent	No	820	12	115.639713	-32.708126
33	*Eucalyptus gomphocephala*	Good	Present	Present	1060	15	115.639752	-32.708035
34	*Eucalyptus gomphocephala*	Good	Present	Present	1310	15	115.63979	-32.70775
35	*Eucalyptus gomphocephala*	Good	Absent	No	1060	15	115.639754	-32.707218
36	*Eucalyptus gomphocephala*	Good	Absent	No	550	12	115.639735	-32.706675
37	*Eucalyptus gomphocephala*	Good	Present	Present	800	13	115.639703	-32.706644
38	*Eucalyptus gomphocephala*	Good	Present	Present	1420	16	115.639662	-32.706328
39	*Eucalyptus gomphocephala*	Good	Present	Present	860	13	115.639756	-32.706188
40	*Eucalyptus gomphocephala*	Good	Present	Present	1130	10	115.639771	-32.70588
41	*Eucalyptus gomphocephala*	Good	Absent	No	1180	15	115.63974	-32.704258
42	*Eucalyptus gomphocephala*	Poor	Absent	No	1150	16	115.639663	-32.703901
43	*Eucalyptus gomphocephala*	Poor	Present	Present	630	12	115.639767	-32.703633
44	*Eucalyptus gomphocephala*	Poor	Absent	No	770	13	115.639659	-32.703331
45	*Eucalyptus gomphocephala*	Poor	Present	Present	1140	13	115.639798	-32.702367
46	*Eucalyptus gomphocephala*	Poor	Absent	No	700	10	115.639647	-32.701536
47	*Eucalyptus gomphocephala*	Poor	Absent	No	690	10	115.639761	-32.700739
48	*Eucalyptus gomphocephala*	Poor	Present	Present	1160	15	115.639619	-32.700641
49	*Eucalyptus gomphocephala*	Poor	Absent	No	950	15	115.639764	-32.69963
50	*Agonis flexuosa*	Poor	Absent	No	770	10	115.639724	-32.69909
51	*Agonis flexuosa*	Poor	Absent	No	1750	9	115.63977	-32.699168
52	*Agonis flexuosa*	Poor	Absent	No	530	8	115.639694	-32.69875
53	*Agonis flexuosa*	Poor	Absent	No	740	9	115.639731	-32.698652
54	*Eucalyptus gomphocephala*	Poor	Present	Present	1940	15	115.639743	-32.697947
55	*Eucalyptus gomphocephala*	Poor	Absent	No	650	12	115.639695	-32.697875
56	*Eucalyptus gomphocephala*	Poor	Absent	No	670	12	115.639662	-32.697696
57	*Eucalyptus gomphocephala*	Poor	Absent	No	1080	15	115.639746	-32.697446
58	*Eucalyptus gomphocephala*	Poor	Absent	No	1430	15	115.639609	-32.697436
59	*Eucalyptus gomphocephala*	Poor	Absent	No	630	12	115.639628	-32.697238

Appendix 7: Black Cockatoo Habitat Trees – Photos

Tree ID	Photo
4	
8	
9	

Tree ID	Photo
12	
29	
30	

Tree ID	Photo
31	
33	
34	

Tree ID	Photo
37	
38	
39	

Tree ID	Photo
40	
43	
45	

Tree ID	Photo
48	
54