



Borrello Family

Level 2 Flora Survey

– Lot 902 Flynn Drive Neerabup

D1 – 17 October 2019

Natural Area Holdings Pty Ltd
99C Lord Street, Whiteman, WA, 6076
Ph: (08) 9209 2767
info@naturalarea.com.au
www.naturalarea.com.au



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Executive Summary

Natural Area Consulting Management Services (Natural Area) was commissioned by Mr Mark Borrello on behalf of the Borrello family to undertake a Level 2 flora survey at Lot 902 Flynn Road Neerabup within the City of Wanneroo to inform the proposed removal of the Bush Forever listing of the site. Level 1 reconnaissance flora and fauna surveys were undertaken by Natural Area in 2018, with the 2019 spring survey being a more detailed level 2 flora survey that included the installation of three 10 x 10 m quadrats within the single vegetation type present at the site. The site is:

- approximately 22 ha
- 30 km north of the Perth central business district
- designated as a portion of Bush Forever Site 295.

The level 2 flora and vegetation survey at Lot 902 Flynn Drive confirmed:

- the presence of 196 flora species from 52 families
- 42 (21.4%) weed and 154 (78.6%) native species
- no priority or threatened flora species listed under State or Commonwealth legislation
- vegetation condition ranged from Degraded to Excellent, with the majority of the site (69.6%) being in Excellent condition with little to no change since the 2018 spring flora survey
- one vegetation type was identified on site, namely the Banksia and Jarrah Woodland, this is consistent with the description of the floristic community type SCP 28 Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands, which is associated with the threatened ecological community Banksia Woodlands on the Swan Coastal Plain listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth); this community does not have a listing at a state level under the *Biodiversity Conservation Act 2016* (WA).

The fauna surveys at Lot 902 Flynn Drive recorded:

- the presence of 15 bird, three mammal and five reptile species, with one additional bird and one additional reptile recorded in 2019
- the presence of the Priority 4 listed Quenda diggings
- the presence of endangered Carnaby's Cockatoo habitat and foraging species, with six hollows large enough to be utilised for nesting by this species and six potential roosting trees
- limited evidence of use by Carnaby's or other endangered black cockatoos in the form of feeding was noted, and no signs of roosting or nesting was evident on site
- presence of the Rainbow Bee-eater, which is protected under International Agreement (Cwlth).

While Lot 902 supports a diverse array of flora and is largely in Excellent condition, the absence of declared rare and/or priority listed (conservation significant) flora species along with the limited presence of conservation significant fauna species suggests that the vegetation within Lot 902 is not a preferred feeding, roosting or nesting location for endangered black cockatoo species, with no new evidence of feeding observed in 2019. It is also likely that the bandicoots present on site are a small population only due to the small size of the site and the absence of habitat in wetter areas or in proximity to watercourses. Lot 902 is close to several large remnant bushland areas, suggesting that its importance as an ecological linkage is also limited.

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1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was commissioned by Mr Mark Borrello on behalf of the Borrello family to undertake a Level 2 flora fauna survey within Lot 902 Flynn Road Neerabup, located within the City of Wanneroo to inform the proposed removal of the Bush Forever listing of the site. The site is approximately 22 ha of remnant bushland located 30 km north of the Perth central business district and is designated as Bush Forever Site 295. Outcomes of this survey will supplement the previous survey undertaken by Natural Area in spring 2018.

1.1 Scope

Activities undertaken by Natural Area personnel included:

- desktop database searches to identify likely flora and fauna species present at the site, including any conservation significant species and ecological communities
- review of the previous 2018 level 1 flora and fauna survey to inform on-ground works
- a site assessment including the installation of three quadrats per vegetation community, confirmation of vegetation type and condition and a site assessment to compile a species list
- recording opportunistic sightings of fauna or evidence of fauna within the Lot
- reporting survey outcomes.



2.0 Site Characteristics

The area is a 22 ha remnant bushland area located on Flynn Drive, adjacent to the Wanneroo Golf Course (east), private property (north and west), and the Banksia Grove residential subdivision (south) (Map 1). The area is located approximately 30 km north of the Perth CBD, and is currently designated as Bush Forever Site 295

2.1 Regional Context

According to Interim Biogeographical Regionalisation of Australia (IBRA) description, Neerabup is located in the Perth Swan Coastal Plain subregion (SW02). This area is characterised by Banksia woodlands in sandy soils and paperbark in swampy areas (Mitchell, Williams & Desmond, 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 (Perth Airport, Station ID 009021, 2019):

- average rainfall is 765.3 mm pa, with the majority falling between May and September
- average maximum temperature ranges from 18 °C in winter to 31.9 °C in summer, with the highest recorded maximum being 46.7 °C
- average minimum temperatures range from 8.0 °C in winter to 17.5 °C in summer, with the lowest recorded minimum being -1.3 °C
- predominant wind directions include morning easterlies and westerly sea breezes during summer months, with an average wind speed of 16.6 km/h and gusts of more than 100 km/h.

2.3 Vegetation Complex

The vegetation complex associated with the site is the Karrakatta Complex – Central and South, which is characterised by open tuart-jarrah-marri forest, with common species including *Banksia attenuata*, *Banksia menziesii*, *Jacksonia sternbergiana*, *Acacia cyclops*, *Acacia saligna*, and *Grevillea thelemanniana* (Hedde, Loneragan and Havel, 1980).

2.4 Topography and soils

Topography across the site ranges from 70 m AHD in the south, decreasing to 60 m AHD to the north and east. According to the NRInfo Portal (DPIRD, 2019), one soil type is present, namely the 211Sp-Ky Karrakatta Sand Yellow Phase, which is described as low hilly to gently undulating terrain, with yellow sand over limestone.

2.5 Bush Forever Listing

Lot 902 Flynn Drive is a component of Bush Forever Site 295 (Map 1). Lot 902 is located within this centre of the Bush Forever Site, with other components located to the north, and south-west of the Lot (Map 1).

Listing information for Bush Forever Site 295 (Government of Western Australia, 2000) indicates:

- the presence of a priority 3 listed native bee (*Hylaeus globuliferus*)
- inclusion was associated with a negotiated planning solution
- it is considered to be representative of ecological communities

- protection of wetland, estuarine fringing and coastal vegetation.

According to the owner's representative, Mr Frank Borrello (2018), a survey undertaken for the rare native bee failed to find evidence of its presence despite the availability of preferred feeding species *Adenanthos cygnorum* and *Banksia attenuata*.

3.0 Methodology

3.1 Desktop and Literature Review

The desktop survey for the flora survey included reviewing online databases to determine preliminary site characteristics, including:

- Natural Resource Info (NRInfo) to determine soil types
- NatureMap (5 km buffer) to indicate the flora and fauna species (native and introduced) that could potentially occur (Appendix 1)
- Protected Matters Search Tool (5 km buffer) to determine if any matters of national environmental significance were likely (Appendix 2)
- FloraBase to review the likelihood of significant flora listed as potentially present
- West Australian Local Government Association (WALGA) Environmental Planning Tool to determine if Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Quenda (*Isoodon fusciventer*) habitat could occur or is confirmed to occur on site.

The 2018 summary of conservation significant species listed in the NatureMap and PMST searches was reviewed with no adjustments ahead of the on-ground assessment activities.

3.2 On-ground Assessment

The flora and vegetation survey was carried out in accordance with *EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2016), and included a desktop review of literature and databases.

3.2.1 Field Assessment

Natural Area botanists Sharon Hynes and Tshering Chekey undertook the on-ground level 2 flora survey on 06 September 2019, with activities including:

- setting up three (10 m x 10 m) quadrats in the single vegetation type present
- recording GPS coordinates in the north-west corner of each quadrat using GDA94 datum
- recording landscape characteristics including soil types and colour, aspect, slope, presence of surface rock, topography and drainage using a 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 vegetation type and condition using the scale attributed to Keighery (Government of Western Australia, 2000)
- presence of significant flora
- for each flora species in the quadrats, the following was recorded:
 - percentage cover and height
 - habit and life form.

3.2.2 Flora Species

Flora species (native and introduced) were recorded on observation within each quadrat and when the remainder of the site was traversed, with a list of potential declared rare or priority flora species used to guide targeted searches for those species.

3.2.3 Vegetation condition

Vegetation condition was assessed using the rating scale attributed to Keighery in Bush Forever Volume 2 (Government of Western Australia, 2000) (Table 1).

Table 1: Vegetation condition ratings

Category	Description
1 Pristine	Pristine or nearly so, no obvious signs of disturbance.
2 Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3 Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4 Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
5 Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
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: Government of Western Australia, 2000)

3.2.4 Vegetation Type

The vegetation type was determined using the structural classes described in Bush Forever Volume 2 (Government of Western Australia, 2000), and records dominant over storey, middle and understory species (Table 2).

Table 2: Vegetation structural classes

Life Form/ Height Class	Canopy Percentage Cover			
	100 – 70%	70 – 30%	30 - 10%	10 – 2 %
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland
Trees 10 – 30 m	Closed forest	Open forest	Woodland	Open woodland
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland
Tree Mallee	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee
Shrub Mallee	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee

Life Form/ Height Class	Canopy Percentage Cover			
	100 – 70%	70 – 30%	30 - 10%	10 – 2 %
Shrubs over 2 m	Closed tall scrub	Tall open scrub	Tall shrubland	Tall open shrubland
Shrubs 1 – 2 m	Closed heath	Open heath	Shrubland	Open shrubland
Shrubs under 1 m	Closed low heath	Open low heath	Low shrubland	Low open shrubland
Grasses	Closed grassland	Grassland	Open grassland	Very open grassland
Herbs	Closed herbland	Herbland	Open herbland	Very open herbland
Sedges	Closed sedgeland	Sedgeland	Open sedgeland	Very open sedgeland

(Source: Government of Western Australia, 2000)

3.3 Statistical analysis

Statistical analysis using PRIMER was undertaken to determine the floristic community types present on site by comparing them to the Gibson *et al.* dataset (1994) from *A Floristic Survey of the Southern Swan Coastal Plain*. The Gibson *et al.* (1994) study included surveys of the plant communities within the Swan Coastal Plain, with 509 sites (quadrats) established and floristic data used to define the major regional community types (Government of Western Australia, 2000). The community types assigned by this dataset are commonly used in literature to describe conservation significant communities.

Taxa names from Gibson *et al.* (1994) that were no longer current were updated to match current taxa names. Quadrat data collected in the field was converted to present/absence (PA) data and added to the Gibson *et al.* (1994) dataset. A PA matrix was created and inputted into the statistical analysis package PRIMER (version 7) and resemblance matrices created to determine the similarities in species composition between quadrats. A hierarchical cluster analysis was performed and dendrograms plotted to visually ascertain the similarities between quadrats. This analysis gives the similarity between quadrats species composition as a percentage. As this information does not take into account species abundance within community types, only species diversity, the five most similar quadrats are assessed, and the most suitable community type is determined using the descriptions of dominant species outlined in Gibson *et al.* (1994).

3.4 Limitations

The survey was carried out in early spring, an optimal time for assessing flora on the Swan Coastal Plain. Despite this, several limitations associated with survey activities remain, including:

- not all flora species present at a site flower each year
- individual plants may have been missed as they were outside the area traversed
- some species flower outside the spring season, with some finished flowering and others yet to flower.

4.0 Flora Survey Results

4.1 Literature Review

The NatureMap Species Report indicated the potential for 94 dicotyledons and 63 monocotyledons (DBCA, 2019a; Appendix 1). Of these, 13 are listed as conservation significant under the *Biodiversity Conservation Act 2016* (WA) (Table 3). A review of Protected Matters Search Tool (PMST) (DEE, 2019a) indicated 12 species listed as matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 5 km radius of the site.

The list of the conservation significant flora that may occur within the site was compiled into a summary sheet ahead of the 2018 survey was reviewed to confirm there were no adjustments required. The list included photographs (where available), descriptions, preferred habitat, and a comment as to their likelihood of being present within the site, with no changes to the 2018 document required (Appendix 3). Of the 25 conservation significant species outlined by NatureMap and PMST, eight were identified as having the potential to occur within the site (Table 3).

The PMST also indicated the likely presence of two threatened ecological communities (TECs), namely Banksia Woodlands of the Swan Coastal Plain and Tuart (*Eucalyptus gomphocephala*) Woodland and Forests of the Swan Coastal Plain. Based on a previous site visit it was inferred that the Banksia Woodlands of the Swan Coastal Plain TEC is present within the site.

Table 3: Conservation significant species that may occur within the site.

Species Name	Cons. Code	NatureMap	PMST	Likely to occur on site?
<i>Acacia benthamii</i>	P2	X		Yes, soils suitable
<i>Andersonia gracilis</i>	EN/T		X	No, soil and habitat unsuitable
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	VU/T		X	No, soil and habitat unsuitable
<i>Caladenia huegelii</i>	EN/T		X	No, soil unsuitable
<i>Calectasia elegans</i>	P2	X		Unknown, no information
<i>Cyathochaeta teretifolia</i>	P3	X		No, soil and habitat unsuitable
<i>Diuris micrantha</i>	VU/T		X	No, soil and habitat unsuitable
<i>Diuris purdiei</i>	EN/T		X	No, soil and habitat unsuitable
<i>Drakaea elastica</i>	EN/T		X	No, soil and habitat unsuitable
<i>Drakaea micrantha</i>	VU/T		X	No, soil and habitat unsuitable
<i>Drosera patens</i>	P1	X		No, soil and habitat unsuitable

Species Name	Cons. Code	NatureMap	PMST	Likely to occur on site?
<i>Drosera x sidjamesii</i>	P1	X		No, soil and habitat unsuitable
<i>Eleocharis keigheryi</i>	VU/T		X	No, soil and habitat unsuitable
<i>Eucalyptus argutifolia</i>	T	X		Yes, soil and habitat suitable
<i>Grevillea curviloba</i> subsp. <i>incurva</i>	EN/T		X	No, soil and habitat unsuitable
<i>Jacksonia sericea</i>	P4	X		Yes, soils and habitat suitable
<i>Lepidosperma rostratum</i>	EN/T		X	No, soil and habitat unsuitable
<i>Melaleuca</i> sp. Wanneroo	EN/T		X	Yes, soils and habitat suitable
<i>Poranthera moorokatta</i>	P2	X		No, soil not suitable
<i>Stenanthemum sublineare</i>	P2	X		No, soil and habitat unsuitable
<i>Stylidium longitubum</i>	P4	X		No, soil and habitat unsuitable
<i>Stylidium maritimum</i>	P3	X		Yes, soils and habitat suitable
<i>Styphelia filifolia</i>	P3	X		Yes, habitat suitable
<i>Thelymitra dedmaniarum</i>	EN/T		X	No, soil and habitat unsuitable
<i>Tripterococcus</i> sp. <i>Brachylobus</i>	P4	X		Unknown, no information

4.2 Flora Survey

The survey recorded 196 species from 52 families with an additional 14 flora species recorded during the 2019 survey. The combine flora list from 2018 and 2019 included:

- two cycads (palms)
- 125 dicotyledons
- 69 monocotyledons
- 154 (78.6%) were native
- 42 (21.4%) were non-native (weeds)
- none were listed as conservation significant flora.

Examples of flora species present are provided in Figure 1, a combined 2018/2019 species list in Appendix 4, and quadrat data is in Appendix 5.



Caladenia vulgata



Banksia dallaneyi
(Couch Honeypot)



Caladenia arenicola



Elythranthera brunonis
(Purple Enamel Orchid)



Philotheca spicata
(Pepper and Salt)



Hibbertia racemosa
(Stalked Guinea Flower)

Figure 1: Flora species recorded during the survey

4.3 Vegetation Type

One vegetation type was present across the site, namely Banksia and Jarrah Woodland comprised of *Banksia attenuata*, *Banksia menziesii* and *Eucalyptus marginata* Woodland over *Xanthorrhoea preissiana* and *Hibbertia hypericoides* mixed Shrubland and a mixed dense understorey that included *Mesomelaena pseudostygia*, *Patersonia occidentalis* and *Desmocladus flexuosus* (Figure 2).



Figure 2: Banksia and Jarrah Woodland within Lot 902 Flynn Drive

4.3.1 Floristic Community Statistical Analysis

A resemblance matrix was created using the survey data from Lot 902 and comparing it with the Gibson *et al.* (1994) dataset, with results shown in Table 4. The community types assigned to the vegetation type on site were based on the quadrat similarity matrix results and assessment of the flora structure and native species present. There were similarities to community types SCP20a, SCP21a, SCP23a and SCP28 with all having over 40% similarity in species composition to the quadrats on site. However, the vegetation structure was more consistent with SCP28 Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands due to the *Eucalyptus marginata* being a codominant overstorey species on site and because the site occurs on Spearwood soils.

Table 4: Neerabup quadrat comparison to *Gibson et al.* (1994) dataset

Quadrat	Veg Type Classified	Most Similar Quadrats (Gibson <i>et al.</i>)	Community Type of Gibson quadrats	Community Type assigned to Veg Type	
Q01	Banksia Woodland	KOON-1 (43.1%)	20a	21a, 23a or 28 Vegetation structure and composition more consistent with community 28 due the dominance of <i>Eucalyptus marginata</i> and the soil type on site.	
		GOLF-1 (42.5%)	20a		
		NEER-3 (41.7%)	28		
		SHENT-1 (41.7%)	28		
		AUSTRA-1 (40.8%)	21a		
		hurst03 (48.6%)	23a		
		WIRR-2 (48.3%)	23a		
Q02	Banksia Woodland	HARRY-5 (47.4%)	21a		
		KING-2 (46.8%)	28		
		AUSTRA-1 (45.8%)	21a		
		Q03	Banksia Woodland	KING-2 (47.2%)	28
				hurst03 (45.5%)	23a
WAND-1 (44.2%)	23a				
Q03	Banksia Woodland	card7 (42.9%)	21a		
		WARI-2 (42.4%)	28		

4.3.2 Assessment Against EPBC Act 1999 Banksia Woodland Listing Information

The survey confirmed the presence of the threatened ecological community Banksia Woodlands of the Swan Coastal Plain listed as endangered under the *EPBC Act 1999*, with the entire site covered by this vegetation community. The minimum patch size for referral for vegetation community in Excellent condition is 0.5 ha. When reviewed against the EPBC listing criteria for this community type, its condition and patch size mean that any proposed development will have a significant impact, and that a referral to the Department of the Environment and Energy will be required. Other considerations according to the listing advice for this site included:

- large size and/or large area to boundary ratio – due to the large patch size there is a large area/boundary ratio, making the site less exposed and more resilient to edge effects such as weed invasion.
- Evidence of recruitment of key native plant species following disturbance – historically cleared areas have naturally regenerated on site.

- Faunal habitat as indicated by patches that meet diversity of habitat requirements, and that contribute to movement corridors – Quenda, signs of foraging by black cockatoos as well as a range of species that were not conservation significant were observed within the lot. Fauna diversity was not assessed. Although this area makes up part of Bush Forever site 295 and does act as a corridor between the northern and south-western portions.
- High species richness – variety of native species and a high number of native fauna species were observed on site.
- Presence of listed threatened species or key functional species such as key pollinators and dispersal animals – conservation significant fauna such as the Quenda and signs of Carnaby’s Cockatoo were observed.
- A Scarcity of weeds and feral animals or opportunities to manage them efficiently – minimal weeds were noted throughout the majority of the site, with some areas of high grass cover at the southern end in the more disturbed areas around the periphery of vegetation. Little evidence of feral fauna was noted with rabbit diggings, tracks and scats observed.
- Absence or limited symptoms of dieback – one small area may have been impacted by dieback but was not assessed; the majority of the site showed no symptoms of dieback.
- Connectivity to other native vegetation remnants or restorations works – this Lot makes up a portion of Bush Forever Site 295 to the north, south-west and north-east and remnant vegetation to the south and west and the site may act as a corridor between these areas.
- Linear roads often act as important connections – the site is not a linear road site, so is not applicable.
- Occurrence of the patch is
 - in an area where this TEC has been most heavily cleared – this TEC was upgraded to threatened under the EPBC Act 1999 as there is only 10% of its original extent remaining on the Swan Coastal Plain due to clearing for urban expansion
 - of a sub community that is recognised as conservation significant by the WA Government – this ecological community is not listed as priority or threatened under the *Biodiversity Conservation Act 2016* (WA)
 - at the end of the range of the TEC – the Lot is not situated towards the end of the range of this TEC.

The vegetation within the Lot was compared to the key diagnostic characteristics of Banksia Woodlands on the Swan Coastal Plain (Table 5) and compared to typical species found within this ecological community (Table 8).

Table 5: Comparison of vegetation in Lot 123 Mortimer Rd to the TEC listing advice

Key Diagnostic Characteristics (KDC)		Does the vegetation at Lot 123 Mortimer Road fit this KDC?
Local and physical environment	Swan coastal Plain IBRA bioregion	Yes
Soils and Landforms	Well Drained, low nutrient soils, particularly on Bassendean and Spearwood Sands	Yes, located in Spearwood Soil System
Structure	Distinctive upper sclerophyllous layer of low trees dominated by <i>Banksias</i>	Yes, dominant overstory species were <i>Banksia</i> species outlined

Key Diagnostic Characteristics (KDC)	Does the vegetation at Lot 123 Mortimer Road fit this KDC?
Emergent tall <i>Eucalyptus</i> or <i>Allocasuarina</i> may be present	Yes, <i>Eucalyptus marginata</i> was a codominant overstorey species
Composition	Yes, both species dominant
Canopy dominated by <i>B. attenuata</i> and/or <i>B. menziesii</i> (although other <i>Banksias</i> can be dominant)	
Patch must include one of the following diagnostic species:	Yes, both <i>Banksia attenuata</i> and <i>B. menziesii</i> dominant
<ul style="list-style-type: none"> - <i>Banksia attenuata</i> - <i>B. menziesii</i> - <i>B. prionotes</i> - <i>B. illicifolia</i> 	
If present emergent tree layer often includes <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , or less commonly <i>E. gomphocephala</i>	Yes, <i>Eucalyptus marginata</i> was present
Other trees of a medium height that may be present, and may be codominant with the <i>Banksia</i> species include	Yes, medium height tree species present:
<ul style="list-style-type: none"> - <i>Eucalyptus todtiana</i> - <i>Nuytsia floribunda</i> - <i>Allocasuarina fraseriana</i> - <i>Callitris arenaria</i> - <i>Callitris pyramidalis</i> - <i>Xylomelum occidentale</i> 	
Very high diversity of understory species that vary from patch to patch. See the description above and vegetation types that relate to <i>Banksia</i> Woodlands (Gibson <i>et al</i> 1994)	All understory species listed in the conservation advice were located within the site.

The species composition for the vegetation community of *Banksia* Woodland on site has majority of the understory and middle story species listed for this community in the listing advice (Table 6).

Table 6: Species listed for *Banksia* Woodlands of the Swan Coastal Plain

Species in listing information	Layer	Presence at Lot 902 Flynn Drive
<i>Adenanthos cygnorum</i>	Lower	Y
<i>Allocasuarina fraseriana</i>	Medium	Y
<i>Allocasuarina humilis</i>	Lower	Y
<i>Amphipogon turbinatus</i>	Ground	N
<i>Banksia attenuata</i>	Upper	Y

Species in listing information	Layer	Presence at Lot 902 Flynn Drive
<i>Banksia burdettii</i>	Medium	No, outside of natural range
<i>Banksia ilicifolia</i>	Upper	No, usually near wetlands
<i>Banksia littoralis</i>	Upper	No, usually near wetlands
<i>Banksia menziesii</i>	Upper	Y
<i>Banksia prionotes</i>	Upper	No, soil type not suitable
<i>Bossiaea eriocarpa</i>	Lower	Y
<i>Burchardia congesta</i>	Ground	Y
<i>Caladenia spp.</i>	Ground	Y
<i>Callitris arenaria</i>	Medium	No, outside of natural range
<i>Callitris pyramidalis</i>	Medium	No, drainage unsuitable
<i>Conostephium pendulum</i>	Lower	Y
<i>Corymbia calophylla</i>	Upper	No, usually near damplands
<i>Dasypogon bromeliifolius</i>	Ground	Y
<i>Daviesia spp.</i>	Lower	Y
<i>Desmocladius flexuosus</i>	Ground	Y
<i>Drosera erythrorhiza</i>	Ground	Y
<i>Eremaea pauciflora</i>	Lower	Y
<i>Eucalyptus gomphocephala</i>	Upper	No, soil type not suitable
<i>Eucalyptus marginata</i>	Upper	Y
<i>Eucalyptus todtiana</i>	Medium	Y
<i>Gompholobium tomentosum</i>	Lower	Y
<i>Hibbertia hypericoides</i>	Lower	Y
<i>Hypolaena exsulca</i>	Lower	Y
<i>Jacksonia spp.</i>	Lower	Y
<i>Kunzea glabrescens</i>	Lower	Y
<i>Lepidosperma squamatum</i>	Ground	No
<i>Lomandra hermaphrodita</i>	Ground	Y
<i>Lyginia barbata</i>	Ground	Y
<i>Lyginia imberbis</i>	Ground	Y
<i>Mesomelaena pseudostygia</i>	Ground	Y
<i>Nuytsia floribunda</i>	Medium	Y
<i>Patersonia occidentalis</i>	Ground	Y
<i>Petrophile linearis</i>	Lower	Y
<i>Philothea spicata</i>	Lower	Y
<i>Phlebocarya ciliata</i>	Lower	Y
<i>Podolepis spp.</i>	Ground	No
<i>Stirlingia latifolia</i>	Lower	Y
<i>Stylidium brunonianum</i>	Ground	No

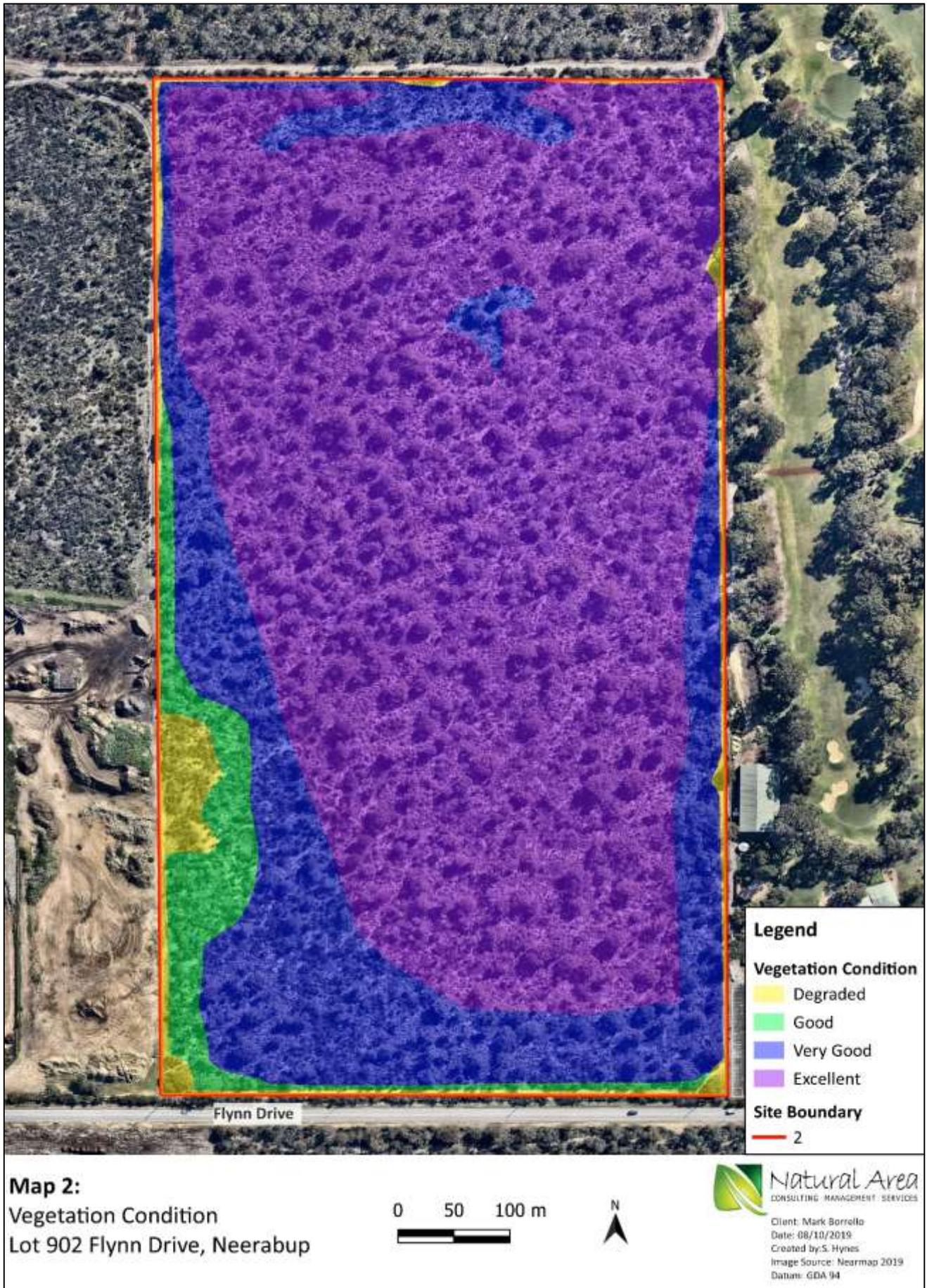
Species in listing information	Layer	Presence at Lot 902 Flynn Drive
<i>Stylidium piliferum</i>	Ground	Y
<i>Trachymene pilosa</i>	Ground	Y
<i>Xanthorrhoea preissii</i>	Lower	Y
<i>Xanthosia huegelii</i>	Ground	Y
<i>Xylomelum occidentale</i>	Medium	No, usually near damplands

4.4 Vegetation Condition

Vegetation condition across the site ranged from Degraded to Excellent, with the majority being in Excellent condition (Table 7; Map 2). Degraded areas occurred along the firebreaks around the perimeter of the vegetation and in an historically cleared area to the south-west of the site.

Table 7: Vegetation condition

Vegetation Condition	Excellent	Very Good	Good	Degraded	Completely Degraded	Totals
Area (ha)	15.15	4.97	1.03	0.63	0	21.78
Area (%)	69.6	22.8	4.7	2.9	0	100



5.0 Fauna Survey Results

5.1 Literature Review Results

The NatureMap Report (2019, Appendix 1) identified the potential for 94 bird species, eight mammals, and 26 reptiles. The potential for 11 conservation significant species listed under the *Biodiversity Conservation Act 2016 (WA)* and/or the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* was indicated (Table 8); note that marine species have not been included.

Table 8: Potential conservation significant species

Species	Common Name	BCA	EPBC
<i>Calyptorhynchus banksia naso</i>	Forest Red-tailed Black Cockatoo	T	VU
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	T	EN
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	T	VU
<i>Falco peregrinus</i>	Peregrine Falcon	S	
<i>Hylaeus globuliferus</i>	Woolybush Bee	P3	
<i>Isoodon obesulus fusciventer</i>	Southern Brown Bandicoot, Quenda	P4	
<i>Leioproctus contrarius</i>	A Short-tongued Bee	P3	
<i>Leipoa ocellata</i>	Malleefowl	T	VU
<i>Merops ornatus</i>	Rainbow Bee-eater		IA
<i>Motacilla cinerea</i>	Grey Wagtail	IA	IA
<i>Notamacropus irma</i>	Western Brush Wallaby	P4	

5.2 Fauna Results

A Level 1 fauna survey was carried out in conjunction with the 2019 flora survey, with opportunistic sightings of species recorded on direct observation or on the basis of indirect indicators of their presence such as tracks, scats, dens, burrows and calls. A total of 15 birds, three mammals and five reptiles were recorded during the 2018 and 2019 spring surveys, with one additional bird and one additional reptile recorded for 2019 (Table 9). Examples of species sighted during the surveys are provided in Figure 3.

Three conservation significant species were recorded during 2018 including, the endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*), the Rainbow Bee-eater (*Merops ornata*) protected under international agreement and the Priority 4 listed Quenda (*Isoodon fusciventer*); these were not recorded during the 2019 surveys. Nesting, roosting and foraging habitat for the Carnaby's Cockatoo was noted during the site assessment during both 2018 and 2019 surveys (Map 3). The black cockatoo habitat included six potential nesting trees with hollows and six potential roosting trees that could be utilised; there were no indicators of use in the form of scratchings around the hollow entrance or the presence of guano. No new locations of recent foraging evidence was recorded during the 2019 survey. No new locations of Quenda diggings were recorded during the 2019 fauna survey.

Table 9: Fauna species

Species	Common Name	Evidence	2018	2019
Birds				
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Sighted	X	
<i>Anthochaera carunculata</i>	Red Wattle Bird	Sighted	X	X
<i>Platycercus zonarius</i>	Australia Ringneck	Sighted	X	X
<i>Cacatua roseicapilla</i>	Galah	sighted		X
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	Feeding	X	
<i>Cracticus tibicen</i>	Australian Magpie	Sighted	X	X
<i>Lichmera indistincta</i>	Brown Honeyeater	Sighted, calls	X	X
<i>Merops ornatus</i>	Rainbow Bee-eater	Calls	X	
<i>Pachycephala rufiventris</i>	Rufous Whistler	Sighted, calls	X	X
<i>Petroica boodang campbelli</i>	Scarlet Robin	Sighted	X	
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Sighted	X	X
<i>Rhipidura albiscapa</i>	Grey Fantail	Sighted	X	X
<i>Rhipidura leucophrys</i>	Willie Wagtail	Sighted	X	X
<i>*Streptopelia senegalensis</i>	Laughing Dove	Sighted	X	X
<i>Zosterops lateralis</i>	Silvereye	Sighted	X	
Mammals				
<i>Isoodon fusciventer</i>	Quenda, Southern Brown Bandicoot	Diggings	X	
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	Sighted, tracks, scats	X	X
<i>*Oryctolagus cuniculus</i>	European Rabbit	Scats, tracks, diggings	X	X
Reptiles				
<i>Cryptoblepharus buchananii</i>	Snake-eyed Skink	Sighted	X	X
<i>Ctenotus sp.</i>		Sighted	X	
<i>Lerista elegans</i>	Elegant Slider	Sighted	X	
<i>Lialis burtonis</i>	Burtons Legless Lizard	Sighted	X	
<i>Tiliqua rugosa rugosa</i>	Bobtail	Sighted		X

* denotes introduced species



Yellow-rumped Thornbill

Scarlet Robin

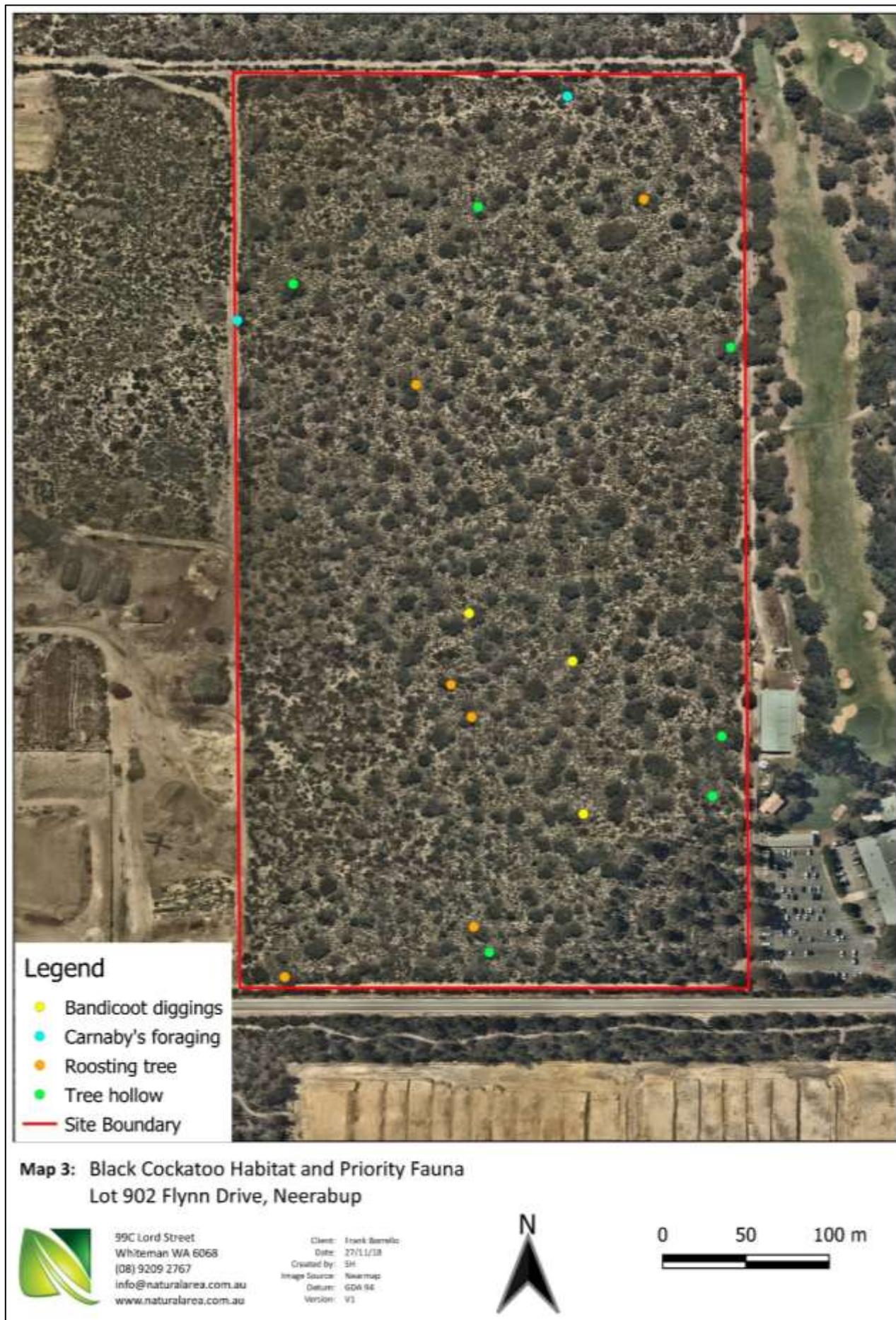
Western Grey Kangaroo

Acanthiza chrysorrhoa (2018)

Petroica multicolour campbelli (2018)

Macropus fuliginosus (2019)

Figure 3: Examples of fauna sighted during the 2018 and 2019 surveys



6.0 Implications of Results

6.1 Flora

Lot 902 Flynn Drive is an area of remnant Banksia Woodland listed as a component of Bush Forever Site 295 in Neerabup, within the City of Wanneroo. The site has a high level of flora diversity, with the 2018 and 2019 spring surveys recording 196 species, of which 2 were cycads (palms), 125 were dicotyledons, 69 were monocotyledons. Of these, 154 (78.6%) were native and 42 (21.4%) were non-native species. No declared rare or priority flora listed as being conservation significant under the *Biodiversity Conservation Act 2016* (WA) or those listed as matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) were recorded. Vegetation condition ranged from Degraded to Excellent, with the majority of the site (69.6%) being in Excellent condition.

6.2 Threatened Ecological Community

Statistical analysis of the quadrat data showed that the quadrats on site had over 40% similarity to SCP20a, SCP21a, SCP23a and SCP28 which are all associated with the threatened ecological community Banksia Woodland of the Swan Coastal Plain listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cwlth). The vegetation on site has been assigned as floristic community type SCP 28 Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands due to *Eucalyptus marginata* being a codominant overstorey species on site and because the community occurs on Spearwood Dunes. Community type SCP28 is considered endangered under the *EPBC Act 1999* (Cwlth), however it has no priority or threatened listing for Western Australia under the *Biodiversity Conservation Act 2016* (WA).

6.3 Significant Fauna

The level 1 fauna surveys from 2018 and 2019 confirmed the presence of 15 birds, three mammals, and five reptiles. Of these, the following are listed as conservation significant species under the *Biodiversity Conservation Act 2016* (WA) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth):

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*, T (WA), EN (Cwlth))
- Rainbow Bee-eater (*Merops ornatus*, IA (Cwlth))
- Quenda (*Isoodon fusciventer*, P4 (WA)).

While there was habitat that would support use by endangered black cockatoo species, such as the Carnaby's Cockatoo (*Calyptorhynchus latirostris*), evidence of feeding was noted in two locations near the western and northern boundaries in 2018 and none was noted during 2019. Six habitat trees with a diameter at breast height (DBH) of more than 500 mm were recorded as potential roosting trees, and a further six were potential roosting trees with hollows present; none showed evidence of use by endangered black cockatoos in the form of the scratching around hollows and/or droppings. This evidence suggests that Lot 902 is not currently being utilised by black cockatoos for roosting or nesting, and it may not be an important (significant) feeding area for these species despite the presence of suitable habitat. As the site is in close proximity to several other remnant bushland areas that would (or does) support these species, any loss of vegetation from Lot 902 is unlikely to be critical to their ongoing survival.

The Rainbow Bee-eater (*Merops ornatus*) is a migratory bird that prefers bare, sandy areas for nesting, with its presence in Lot 902 likely to be associated with transient feeding or roosting. The proximity of other remnant bushland and cleared areas nearby where nesting could occur means that any loss of vegetation from the site is unlikely to be significant.

According to the Department of Environment and Conservation (2012), the Quenda (*Isoodon fusciventer*):

- prefers scrubby vegetation in wetter areas or in proximity to watercourses
- adult males have a home range of 2 – 7 ha
- adult females have a home range of 1 – 3 ha.

This suggests that the population within Lot 902 is likely to be a small one given the absence of watercourses and wetter areas, along with the small size (22 ha) of the site. As urban development occurs within Banksia Grove to the south, the cat population in the immediate area is increasing, with individuals beginning to roam within Lot 902, and thus are a potential threat to the Quenda.

While Lot 902 supports a diverse array of flora and is largely in Excellent condition, the absence of declared rare and/or priority listed (conservation significant) flora species along with the limited presence of conservation significant fauna species suggests that the vegetation within Lot 902 is not a preferred feeding, roosting or nesting location for endangered bird species. It is also likely that the bandicoots present on site are a small population only due to the small size of the site and the absence of habitat in wetter areas or in proximity to watercourses. Lot 902 is close to several large remnant bushland areas, suggesting that its importance as an ecological linkage is also limited. The presence of the threatened ecological community Banksia Woodlands on the Swan Coastal Plain onsite exceeds current guidelines for significance under the EPBC Act 1999 (Cwlth) (DSEWPaC, 2012).

7.0 References

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Appendix 1: NatureMap Species Report

NatureMap Species Report

Created By Guest user on 28/08/2019

Current Names Only Yes
 Core Datasets Only Yes
 Method 'By Circle'
 Centre 115° 48' 42" E, 31° 40' 57" S
 Buffer 5km
 Group By Species Group

Species Group	Species	Records
Amphibian	5	22
Bird	94	764
Dicotyledon	127	165
Fungus	1	5
Invertebrate	19	31
Mammal	8	15
Monocotyledon	63	91
Reptile	26	70
TOTAL	343	1163

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Amphibian				
1.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
2.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
3.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			
4.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
5.	25420 <i>Myobatrachus gouldii</i> (Turtle Frog)			
Bird				
6.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
7.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
8.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
9.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
10.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
11.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
12.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
13.	24282 <i>Accipiter fasciatus</i> subsp. <i>fasciatus</i> (Brown Goshawk)			
14.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
15.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
16.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
17.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
18.	25554 <i>Apus pacificus</i> (Fork-tailed Swift, Pacific Swift)		IA	
19.	41324 <i>Ardea modesta</i> (great egret, white egret)			
20.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
21.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
22.	<i>Barnardius zonarius</i>			
23.	24319 <i>Biziura lobata</i> (Musk Duck)			
24.	25715 <i>Cacatua roseicapilla</i> (Galah)			
25.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
26.	24727 <i>Cacatua sanguinea</i> subsp. <i>westralensis</i> (Little Corella)			
27.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
28.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
29.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
30.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
31.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
32.	<i>Chroicocephalus novaehollandiae</i>			
33.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
34.	24613 <i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
35.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
36.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
37.	25592 <i>Corvus coronoides</i> (Australian Raven)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
38.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
39.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
40.	24422 <i>Cracticus tibicen</i> subsp. <i>dorsalis</i> (White-backed Magpie)			
41.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
42.	24424 <i>Cracticus torquatus</i> subsp. <i>torquatus</i> (Grey Butcherbird)			
43.	24322 <i>Cygnus atratus</i> (Black Swan)			
44.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
45.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
46.	<i>Egretta garzetta</i>			
47.	<i>Egretta novaehollandiae</i>			
48.	<i>Eolophus roseicapillus</i>			
49.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
50.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
51.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
52.	25623 <i>Falco longipennis</i> (Australian Hobby)			
53.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
54.	25727 <i>Fulica atra</i> (Eurasian Coot)			
55.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
56.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
57.	47962 <i>Glyciphila melanops</i> (Tawny-crowned Honeyeater)			
58.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
59.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
60.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
61.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
62.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
63.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
64.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
65.	<i>Lophoictinia isura</i>			
66.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
67.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
68.	24552 <i>Malurus splendens</i> subsp. <i>splendens</i> (Splendid Fairy-wren)			
69.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
70.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
71.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
72.	25693 <i>Microeca fascians</i> (Jacky Winter)			
73.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
74.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
75.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
76.	24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
77.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
78.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
79.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
80.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
81.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
82.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
83.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
84.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
85.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
86.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
87.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
88.	<i>Purpureicephalus spurius</i>			
89.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
90.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
91.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
92.	30948 <i>Smicronis brevirostris</i> (Weebill)			
93.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
94.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
95.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
96.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
97.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
98.	25723 <i>Trichoglossus haematodus</i> (Rainbow Lorikeet)			
99.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Dicotyledon

100.	3237 <i>Acacia benthamii</i>		P2	
101.	3374 <i>Acacia huegelii</i>			
102.	3409 <i>Acacia lasiocarpa</i> (Panjang)			
103.	30032 <i>Acacia saligna</i> subsp. <i>saligna</i>			
104.	3541 <i>Acacia sessilis</i>			
105.	6205 <i>Actinotus leucocephalus</i> (Flannel Flower)			
106.	1728 <i>Allocasuarina fraseriana</i> (Sheoak, Kondil)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
107.	6311 <i>Andersonia heterophylla</i>			
108.	12724 <i>Anthotium junciforme</i>			
109.	20283 <i>Astartea scoparia</i> (Common Astartea)			
110.	6331 <i>Astroloma microcalyx</i> (Native Cranberry)			
111.	5382 <i>Beaufortia elegans</i> (Elegant Beaufortia)			
112.	7046 <i>Bellardia trixago</i> (Bellardia)	Y		
113.	11381 <i>Boronia ramosa</i> subsp. <i>anethifolia</i>			
114.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
115.	2993 <i>Brassica fruticulosa</i> (Twiggy Turnip)	Y		
116.	3000 <i>Brassica tournefortii</i> (Mediterranean Turnip)	Y		
117.	2848 <i>Calandrinia corrigioloides</i> (Strap Purslane)			
118.	5429 <i>Calothamnus sanguineus</i> (Silky-leaved Blood flower, Pindak)			
119.	5460 <i>Calytrix fraseri</i> (Pink Summer Calytrix)			
120.	2951 <i>Cassytha flava</i> (Dodder Laurel)			
121.	2957 <i>Cassytha racemosa</i> (Dodder Laurel)			
122.	2889 <i>Cerastium glomeratum</i> (Mouse Ear Chickweed)	Y		
123.	4552 <i>Comesperma confertum</i>			
124.	15511 <i>Conospermum boreale</i>			
125.	1876 <i>Conospermum incurvum</i> (Plume Smokebush)			
126.	1885 <i>Conospermum triplinervium</i> (Tree Smokebush)			
127.	6347 <i>Conostephium minus</i> (Pink-tipped Pearl flower)			
128.	6348 <i>Conostephium pendulum</i> (Pearl Flower)			
129.	17104 <i>Corymbia calophylla</i> (Marri)			
130.	11563 <i>Crassula colorata</i> var. <i>colorata</i>			
131.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
132.	4746 <i>Diplopeltis huegelii</i>			
133.	48751 <i>Drosera drummondii</i>			
134.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
135.	48710 <i>Drosera micrantha</i>			
136.	3118 <i>Drosera pallida</i> (Pale Rainbow)			
137.	31233 <i>Drosera patens</i>		P1	
138.	30712 <i>Drosera x sidjamesii</i>		P1	
139.	14104 <i>Eremaea pauciflora</i> var. <i>pauciflora</i>			
140.	13091 <i>Eucalyptus argutifolia</i> (Wabling Hill Mallee)		T	
141.	5615 <i>Eucalyptus decipiens</i> (Limestone Marlock, Moit)			
142.	13541 <i>Eucalyptus petrensis</i>			
143.	7323 <i>Galium murale</i> (Small Goosegrass)	Y		
144.	20473 <i>Gastrobium ebracteolatum</i>			
145.	16311 <i>Gazania linearis</i>	Y		
146.	6143 <i>Glischrocaryon aureum</i> (Common Popflower)			
147.	6161 <i>Gonocarpus pithyoides</i>			
148.	2175 <i>Hakea lissocarpha</i> (Honey Bush)			
149.	2214 <i>Hakea trifurcata</i> (Two-leaf Hakea)			
150.	3961 <i>Hardenbergia comptoniana</i> (Native Wisteria)			
151.	3016 <i>Heliophila pusilla</i>	Y		
152.	6838 <i>Hemiandra linearis</i> (Speckled Snakebush)			
153.	6839 <i>Hemiandra pungens</i> (Snakebush)			
154.	5112 <i>Hibbertia aurea</i>			
155.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
156.	45534 <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>			
157.	5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
158.	43280 <i>Hibbertia sericosepala</i>			
159.	48381 <i>Hibbertia striata</i>			
160.	6222 <i>Homalosciadium homalocarpum</i>			
161.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
162.	12741 <i>Hyalosperma cotula</i>			
163.	5216 <i>Hybanthus calycinus</i> (Wild Violet)			
164.	6232 <i>Hydrocotyle hispidula</i>			
165.	5825 <i>Hypocalymma robustum</i> (Swan River Myrtle)			
166.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
167.	4010 <i>Jacksonia floribunda</i> (Holly Pea)			
168.	4027 <i>Jacksonia sericea</i> (Waldjumi)		P4	
169.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
170.	2344 <i>Leptomeria empetriformis</i>			
171.	5850 <i>Leptospermum laevigatum</i> (Coast Teatree)	Y		
172.	6374 <i>Leucopogon conostephioides</i>			
173.	6427 <i>Leucopogon parviflorus</i> (Coast Beard-heath)			
174.	40803 <i>Leucopogon squarrosus</i> subsp. <i>squarrosus</i>			
175.	6456 <i>Lysinema ciliatum</i> (Curry Flower)			
176.	5920 <i>Melaleuca huegelii</i> (Chenille Honeymyrtle)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
177.	13271 <i>Melaleuca huegelii</i> subsp. <i>huegelii</i>			
178.	5964 <i>Melaleuca seriata</i>			
179.	18598 <i>Melaleuca systema</i>			
180.	5983 <i>Melaleuca trichophylla</i>			
181.	8106 <i>Millotia tenuifolia</i> (Soft Millotia)			
182.	6192 <i>Myriophyllum drummondii</i>			
183.	6199 <i>Myriophyllum tillaeoides</i>			
184.	32716 <i>Olearia lehmanniana</i>			
185.	18255 <i>Opercularia vaginata</i> (Dog Weed)			
186.	36177 <i>Ornduffia albiflora</i>			
187.	2273 <i>Persoonia saccata</i> (Snottygobble)			
188.	2309 <i>Petrophile serruriae</i>			
189.	18529 <i>Philothea spicata</i> (Pepper and Salt)			
190.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
191.	5243 <i>Pimelea ferruginea</i>			
192.	8177 <i>Podolepis lessonii</i>			
193.	8183 <i>Podotheca chrysantha</i> (Yellow Podotheca)			
194.	42022 <i>Poranthera moorokatta</i>		P2	
195.	8195 <i>Quinetia urvillei</i>			
196.	3061 <i>Raphanus raphanistrum</i> (Wild Radish)	Y		
197.	13312 <i>Rhodanthe pyrethrum</i>			
198.	6929 <i>Salvia verbenaca</i> (Wild Sage)	Y		
199.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
200.	4207 <i>Sphaerolobium medium</i>			
201.	4713 <i>Stachystemon axillaris</i> (Leafy Stachystemon)			
202.	4733 <i>Stackhousia monogyna</i>			
203.	2918 <i>Stellaria media</i> (Chickweed)	Y		
204.	19704 <i>Stenanthemum sublineare</i>		P2	
205.	25831 <i>Stylidium araeophyllum</i> (Stilt Walker)			
206.	7709 <i>Stylidium crosscephalum</i> (Posy Triggerplant)			
207.	7716 <i>Stylidium diuroides</i> (Donkey Triggerplant)			
208.	7717 <i>Stylidium divaricatum</i> (Daddy-long-legs)			
209.	7745 <i>Stylidium junceum</i> (Reed Triggerplant)			
210.	7756 <i>Stylidium longitubum</i> (Jumping Jacks)		P4	
211.	13127 <i>Stylidium maritimum</i>		P3	
212.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
213.	20521 <i>Stylidium rigidulum</i>			
214.	7798 <i>Stylidium schoenoides</i> (Cow Kicks)			
215.	7806 <i>Stylidium utricularioides</i> (Pink Fan Triggerplant)			
216.	48297 <i>Styphelia filifolia</i>		P3	
217.	4256 <i>Templetonia retusa</i> (Cockies Tongues)			
218.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
219.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
220.	44444 <i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)		P4	
221.	1141 <i>Trithuria submersa</i>			
222.	8254 <i>Urospermum picroides</i> (False Hawkbit)	Y		
223.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
224.	38388 <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	Y		
225.	6101 <i>Verticordia nitens</i> (Morrison Featherflower, Kodjeningara)			
226.	7389 <i>Wahlenbergia preissii</i>			

Fungus

227. *Phytophthora cinnamomi*

Invertebrate

228. *Aname mainae*

229. *Araneus senicaudatus*

230. *Austracantha minax*

231. *Australomimetes ovidi*

232. *Eriophora biapicata*

233. 33977 *Hylaeus globuliferus* (woolybush bee)

234. *Isopeda leishmanni*

235. *Lampona cylindrata*

236. *Latrodectus hasseltii*

237. 33982 *Leioproctus contrarius* (a short-tongued bee)

238. *Maratus pavonis*

239. *Nephila edulis*

240. *Oecobius navus*

241. *Ommatoiulus moreletii*

242. *Oratemnus curtus*

243. *Pholcus phalangoides*

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
244.	33992 <i>Synemon gratioosa</i> (Graceful Sunmoth)		P4	
245.	<i>Venator immansueta</i>			
246.	<i>Venatrix pullastra</i>			
Mammal				
247.	24041 <i>Felis catus</i> (Cat)	Y		
248.	48588 <i>Isodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
249.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
250.	24223 <i>Mus musculus</i> (House Mouse)	Y		
251.	48022 <i>Notamacropus irma</i> (Western Brush Wallaby)		P4	
252.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
253.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
254.	24167 <i>Tarsipes rostratus</i> (Honey Possum, Noolbenger)			
Monocotyledon				
255.	184 <i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
256.	200 <i>Amphipogon turbinatus</i>			
257.	11434 <i>Anigozanthos humilis</i> subsp. <i>humilis</i>			
258.	17234 <i>Austrostipa compressa</i>			
259.	231 <i>Avellinia michelii</i>	Y		
260.	740 <i>Baumea arthrophylla</i>			
261.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
262.	11038 <i>Caladenia bicallata</i>			
263.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
264.	1595 <i>Caladenia hirta</i> (Sugar Candy Orchid)			
265.	45757 <i>Calectasia elegans</i> (Elegant Tinsel Lily)		P2	
266.	1162 <i>Cartonema philydroides</i>			
267.	1131 <i>Centrolepis inconspicua</i>			
268.	1132 <i>Centrolepis mutica</i>			
269.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
270.	11299 <i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>			
271.	17833 <i>Chordifex microcodon</i>			
272.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
273.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
274.	11552 <i>Conostylis aculeata</i> subsp. <i>bromelioides</i>			
275.	11513 <i>Conostylis aculeata</i> subsp. <i>cygnorum</i>			
276.	1423 <i>Conostylis aurea</i> (Golden Conostylis)			
277.	11870 <i>Conostylis teretifolia</i> subsp. <i>teretifolia</i>			
278.	16245 <i>Cyathochaeta teretifolia</i>		P3	
279.	10916 <i>Cyrtostylis huegelii</i>			
280.	11049 <i>Diuris corymbosa</i>			
281.	347 <i>Ehrharta calycina</i> (Perennial Veldt Grass)	Y		
282.	1643 <i>Elythranthera brunonis</i> (Purple Enamel Orchid)			
283.	1645 <i>Epiblema grandiflorum</i> (Babe-in-a-cradle)			
284.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
285.	1520 <i>Gladiolus caryophyllaceus</i> (Wild Gladiolus)	Y		
286.	439 <i>Hemarthria uncinata</i> (Matgrass)			
287.	1070 <i>Hypolaena exsulca</i>			
288.	921 <i>Isolepis producta</i>			
289.	20019 <i>Lachnagrostis filiformis</i>			
290.	467 <i>Lagurus ovatus</i> (Hare's Tail Grass)	Y		
291.	1309 <i>Laxmannia squarrosa</i>			
292.	925 <i>Lepidosperma angustatum</i>			
293.	945 <i>Lepidosperma squamatum</i>			
294.	1080 <i>Leptocarpus scariosus</i>			
295.	1090 <i>Lepyrodia muirii</i>			
296.	1228 <i>Lomandra hermaphrodita</i>			
297.	1231 <i>Lomandra maritima</i>			
298.	1239 <i>Lomandra preissii</i>			
299.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
300.	955 <i>Mesomelaena pseudostygia</i>			
301.	<i>Pterostylis</i> aff. <i>nana</i>			
302.	17267 <i>Pterostylis brevisepala</i>			
303.	12217 <i>Pterostylis sanguinea</i>			
304.	1556 <i>Romulea rosea</i> (Guildford Grass)	Y		
305.	40426 <i>Rytidosperma occidentale</i>			
306.	973 <i>Schoenus asperocarpus</i> (Poison Sedge)			
307.	982 <i>Schoenus clandestinus</i>			
308.	985 <i>Schoenus discifer</i>			
309.	992 <i>Schoenus grandiflorus</i> (Large Flowered Bogrush)			
310.	1018 <i>Schoenus subfascicularis</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
311.	1023 <i>Schoenus tenellus</i>			
312.	1036 <i>Tetragia octandra</i>			
313.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
314.	1357 <i>Thysanotus thyrsoides</i>			
315.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
316.	724 <i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		
317.	1256 <i>Xanthorrhoea preissii</i> (Grass tree, Palga)			
Reptile				
318.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
319.	42381 <i>Brachyuropis semifasciatus</i> (Southern Shovel-nosed Snake)			
320.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
321.	24918 <i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
322.	30893 <i>Cryptoblepharus buchananii</i>			
323.	30899 <i>Ctenophorus adelaidensis</i> (Southern Heath Dragon, Western Heath Dragon)			
324.	25027 <i>Ctenotus australis</i>			
325.	25039 <i>Ctenotus fallens</i>			
326.	25087 <i>Cyclodomorphus celatus</i> (Western Slender Blue-tongue)			
327.	24999 <i>Delma grayii</i>			
328.	25296 <i>Demansia psammophis</i> subsp. <i>reticulata</i> (Yellow-faced Whipsnake)			
329.	25100 <i>Egernia napoleonis</i>			
330.	25119 <i>Hemiergis quadrilineata</i>			
331.	25133 <i>Lerista elegans</i>			
332.	25165 <i>Lerista praepedita</i>			
333.	25005 <i>Lialis burtonis</i>			
334.	25184 <i>Menetia greyii</i>			
335.	25191 <i>Morethia lineocellata</i>			
336.	25192 <i>Morethia obscura</i>			
337.	25252 <i>Notechis scutatus</i> (Tiger Snake)			
338.	25511 <i>Pseudonaja affinis</i> (Dugite)			
339.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
340.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
341.	24943 <i>Strophurus spinigerus</i> subsp. <i>inornatus</i>			
342.	25207 <i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			
343.	24983 <i>Underwoodisaurus milii</i> (Barking Gecko)			

Conservation Codes

T - Rare or likely to become extinct
 X - Presumed extinct
 IA - Protected under international agreement
 S - Other specially protected fauna
 1 - Priority 1
 2 - Priority 2
 3 - Priority 3
 4 - Priority 4
 5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix 2: Protected Matters Search Tool Report (PMST)



EPBC Act Protected Matters Report

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

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 28/08/19 10:17:23

[Summary](#)

[Details](#)

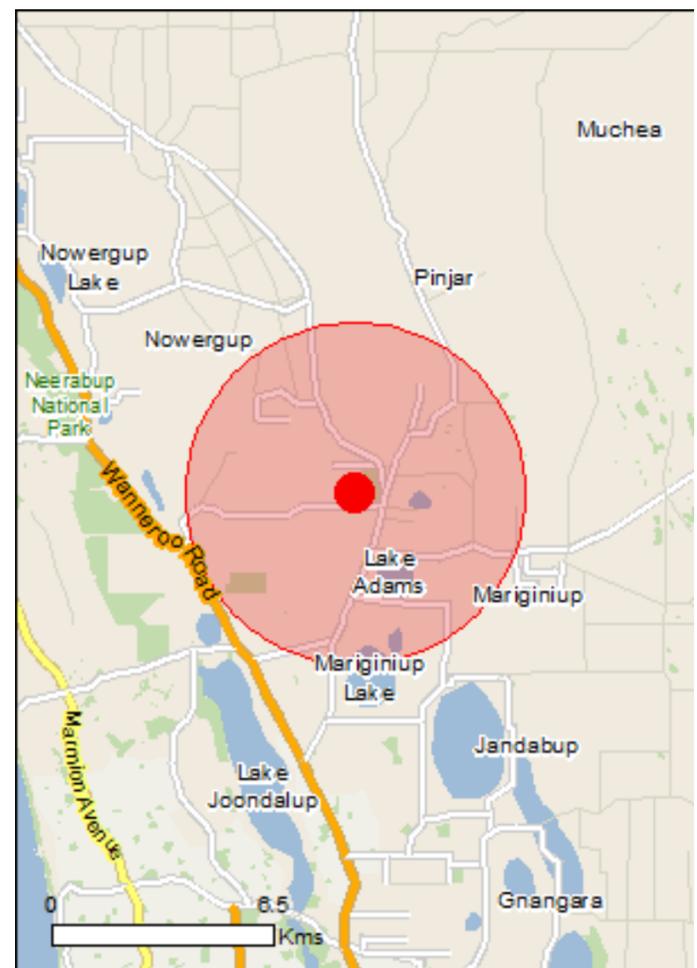
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

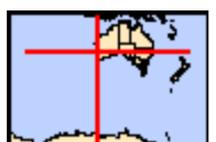
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	24
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Insects		
Hesperocolletes douglasi Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat likely to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
Melaleuca sp. Wanneroo (G.J. Keighery 16705) [89456]	Endangered	Species or species habitat may occur within area
Thelymitra dedmaniarum Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [\[Resource Information \]](#)

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species

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

Other Matters Protected by the EPBC Act

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

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

Name
Commonwealth Land -

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

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [\[Resource Information \]](#)

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

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

Name	Status	Type of Presence
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Passer montanus</i> Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Streptopelia senegalensis</i> Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Funambulus pennantii</i> Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus norvegicus</i> Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Asparagus aethiopicus</i> Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
<i>Asparagus asparagoides</i> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
<i>Brachiaria mutica</i> Para Grass [5879]		Species or species habitat may occur within

Name	Status	Type of Presence area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.68254 115.8117

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.

Appendix 3: Conservation Significant Flora Summary

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Acacia benthamii</i> Photo: B.R. Maslin</p>	<i>Acacia benthamii</i>	Shrub, ca 1 m high. Fl. yellow	Aug to Sep.	Sand. Typically on limestone breakaways.	P2	Y	Soil type suitable.

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Andersonia gracilis</i> Photos: K. Atkins & M. Hislop</p>	<p><i>Andersonia gracilis</i> (Slender Andersonia)</p>	<p>Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple</p>	<p>Sep to Nov.</p>	<p>White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.</p>	<p>T/EN</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>
 <p><i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> Photo: B. & B. Wells</p>	<p><i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> (Dwarf Green Kangaroo Paw)</p>	<p>Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. green/yellow-green.</p>	<p>August to September.</p>	<p>Grey sand, clay loam. Winter-wet depressions</p>	<p>T/VU</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Caladenia huegelii</i> Photos: I. & M. Greese & J.L. Robson</p>	<i>Caladenia huegelii</i> (Grand Spider Orchid)	Tuberous, perennial herb, 0.25 – 0.6m high. Green, cream and red flowers.	September to October.	Grey or brown sand, clay loam.	T/EN	N	Soil types not suitable.
Not available	<i>Calectasia elegans</i> (Elegant Tinsel Lily)	None available	None available	None available	P2	Y	No information, however other species of <i>Calectasia</i> found in Banksia Woodlands
Not available	<i>Cyathochaeta teretifolia</i>	Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown.		Grey sand, sandy clay. Swamps, creek edges.	P3	N	Soil and habitat type not suitable.

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Diuris micrantha</i> Photos: A.P. Brown, I. & M. Greeve & B. Jackson</p>	<p><i>Diuris micrantha</i> (Dwarf Bee-orchid)</p>	<p>Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown.</p>	<p>September to October.</p>	<p>Brown loamy clay. Winter-wet swamps, in shallow water.</p>	<p>T/VU</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>
 <p><i>Diuris purdiei</i> Photos: I. & M. Greeve & S.D. Hopper</p>	<p><i>Diuris purdiei</i> (Purdie's Donkey Orchid)</p>	<p>Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow</p>	<p>September to October.</p>	<p>Grey-black sand, moist. Winter-wet swamps.</p>	<p>T/EN</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>

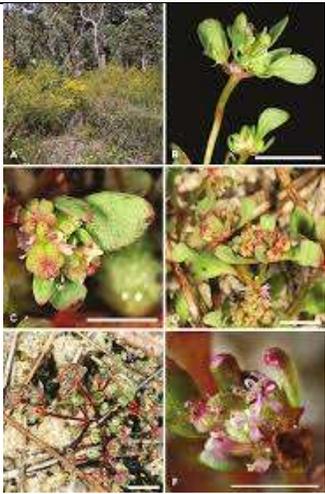
Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Drakaea elastica</i> Photos: A. Brown & S.D. Hopper</p>	<p><i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)</p>	<p>Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow.</p>	<p>October to November.</p>	<p>White or grey sand. Low-lying situations adjoining winter-wet swamps</p>	<p>T/EN</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>
 <p><i>Drakaea micrantha</i> Photos: S.D. Hopper, A.P. Devora & L. & M. Griese</p>	<p><i>Drakaea micrantha</i> (Dwarf Hammer Orchid)</p>	<p>Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow.</p>	<p>September to October.</p>	<p>White-grey sand.</p>	<p>Vu</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>
<p>Not available</p>	<p><i>Drosera patens</i></p>	<p>Fibrous-rooted, rosetted perennial, herb, to</p>	<p>Dec or Feb</p>	<p>Sandy soils. Margins of winter-wet depressions, swamps and lakes.</p>	<p>P1</p>	<p>N</p>	<p>Soil and habitat type not suitable.</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		0.05 m high. Fl. white.					
Not available	<i>Drosera x sidjamesii</i>	Fibrous-rooted perennial, herb, to 0.06 m high. Fl. green-pink.	Nov to Dec or Jan to Mar.	Peaty sand. Along lake margins, close to winter high-water line.	P1	N	Soil and habitat type not suitable.
	Eleocharis keigheryi (Keighery's Eleocharis)	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green.	August to November.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	T/VU	N	Soil and habitat type not suitable.

Eleocharis keigheryi
Photo: G.J. Keighery

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Eucalyptus argutifolia</i> Photos: A.D. Crawford, S.D. Hopper & J.L. Robson</p>	<p><i>Eucalyptus argutifolia</i> (Wabbling Hill Mallee)</p>	<p>(Mallee), 1.5-4 m high, bark smooth. Fl. white,</p>	<p>Mar to Apr.</p>	<p>Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.</p>	<p>T/VU</p>	<p>Y</p>	<p>Soil and habitat type may be suitable</p>
 <p><i>Grevillea curviloba</i> subsp. <i>incurva</i> Photo: A.D. Crawford</p>	<p><i>Grevillea curviloba</i> subsp. <i>incurva</i> (Narrow curved-leaf Grevillea)</p>	<p>Prostrate to erect shrub, 0.1-2.5 m high. Fl. white-cream</p>	<p>Aug to Sep</p>	<p>Sand, sandy loam. Winter-wet heath.</p>	<p>T/EN</p>	<p>N</p>	<p>Soil type and habitat unsuitable</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Jacksonia sericea</i> Photo: I.R. Dixon</p>	<p><i>Jacksonia sericea</i> (Waldjumi)</p>	<p>Low spreading shrub, to 0.6 m high. Fl. orange</p>	<p>Dec or Jan to Feb</p>	<p>Calcareous & sandy soils.</p>	<p>P4</p>	<p>Y</p>	<p>Soil type and habitat suitable</p>
	<p><i>Lepidosperma rostratum</i> (Beaked Lepidosperma)</p>	<p>Rhizomatous, tufted perennial, grass-like or herb (sedge), 0.5 m high. Fl. brown.</p>		<p>Peaty sand, clay.</p>	<p>T/EN</p>	<p>N</p>	<p>Soil and habitat type not suitable</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	<p><i>Melaleuca sp.</i> <i>Wanneroo</i></p>	<p>None available</p>	<p>None available</p>	<p>None available</p>	<p>T/EN</p>	<p>Y</p>	<p>Occurs on sand over limestone</p>
	<p><i>Poranthera moorokatta</i></p>	<p>Monecious, erect annual 16 – 47 mm, leaves shortly petiolate, widely spaced, flowers in dense terminal umbel-like racemes</p>	<p>Sept – Nov</p>	<p>White silica sands, mixed grey and white sand with scattered leaf litter</p>	<p>P2</p>	<p>N</p>	<p>Known from two populations associated with Banksia Woodlands in Kings Park and Ellenbrook; soil type not suitable</p>
<p>Not available</p>	<p><i>Stenanthemum sublineare</i></p>	<p>Erect shrub, to 0.1 m high. Fl. green</p>	<p>Oct to Dec</p>	<p>Littered white sand. Coastal plain.</p>	<p>P2</p>	<p>N</p>	<p>Habitat and soil type not suitable</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
 <p><i>Stylidium longitubum</i> Photo: M. Hislop and P.G. Armstrong</p>	<p><i>Stylidium longitubum</i> (Jumping Jacks)</p>	<p>Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink</p>	<p>Oct to Dec</p>	<p>Sandy clay, clay. Seasonal wetlands.</p>	<p>P4</p>	<p>N</p>	<p>Habitat and soil type not suitable</p>
 <p><i>Stylidium maritimum</i> Photo: K.C. Richardson</p>	<p><i>Stylidium maritimum</i></p>	<p>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</p>	<p>Sep to Nov</p>	<p>Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.</p>	<p>P3</p>	<p>Y</p>	<p>Soil type and habitat may be suitable</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	<p><i>Styphelia filifolia</i></p>	<p>mature leaves. Scape glandular throughout. Inflorescence paniculate. Fl. white/purple</p> <p>Erect shrubs to c. 90 cm high and 70 cm wide. Long, narrow leaf profile, pendulous inflorescences</p>	<p>March – May</p>	<p>Sandy soils of the coastal plain, usually in Banksia or Jarrah woodlands and low-lying situations</p>	<p>P3</p>	<p>Y</p>	<p>Habitat may be suitable</p>

Picture	Species	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	<i>Thelymitra dedmaniarum</i>	Tuberous, perennial, herb, to 0.8 m high. Fl. yellow	Nov to Dec or Jan	Granite.	T/EN	N	Soil type unsuitable
Not available	<i>Tripterococcus sp. Brachylobus</i>	None available	None available	None available	P4	Unknown	Unable to assess, no information.

Sources:

- Descriptions: FloraBase, Department of Biodiversity, Conservation and Attractions, 2019;
- Photos: FloraBase, Department of Biodiversity, Conservation and Attractions, 2018; Natural Area Consulting Management Services

Appendix 4: Flora Species

The combined flora species list from the 2018 and 2019 surveys is provided in the table below and is sorted by species. *Denotes introduced species (weeds).

Family	Species	Common Name	Additional species 2019
Fabaceae	<i>Acacia alata</i>	Winged Wattle	X
Fabaceae	<i>Acacia applanata</i>		
Fabaceae	<i>Acacia huegelii</i>		
Fabaceae	* <i>Acacia iteaphylla</i>	Flinders Range Wattle	
Fabaceae	* <i>Acacia longifolia</i>	Sydney Golden Wattle	
Fabaceae	<i>Acacia pulchella</i>	Prickly Moses	
Fabaceae	<i>Acacia pulchella</i> var. <i>pulchella</i>		
Fabaceae	<i>Acacia saligna</i>	Orange Wattle	
Proteaceae	<i>Adenanthos cygnorum</i>	Common Woolly bush	
Agapanthaceae	* <i>Agapanthus praecox</i>	Agapanthus	
Restionaceae	<i>Alexgeorgea nitens</i>		
Casuarinaceae	<i>Allocasuarina fraseriana</i>	Sheoak	
Casuarinaceae	<i>Allocasuarina humilis</i>	Dwarf Sheoak	
Haemodoraceae	<i>Anigozanthos humilis</i>	Catspaw	
Haemodoraceae	<i>Anigozanthos manglesii</i>	Mangles Kangaroo Paw	
Asteraceae	* <i>Arctotheca calendula</i>	Cape Weed	
Asparagaceae	* <i>Asparagus asparagoides</i>	Bridal Creeper	
Poaceae	<i>Austrostipa compressa</i>		
Poaceae	* <i>Avena barbata</i>	Bearded Oat	
Iridaceae	* <i>Babiana angustifolia</i>	Baboon Flower	
Proteaceae	<i>Banksia attenuata</i>	Slender Banksia	
Proteaceae	<i>Banksia dallanneyi</i>	Couch Honeypot	
Proteaceae	<i>Banksia menziesii</i>	Firewood Banksia	
Myrtaceae	<i>Beaufortia elegans</i>	Elegant Beaufortia	X
Fabaceae	<i>Bossiaea eriocarpa</i>	Common Brown Pea	
Ericaceae	<i>Brachyloma preissii</i>	Globe Heath	
Brassicaceae	* <i>Brassica tournefortii</i>	Mediterranean Turnip	
Poaceae	* <i>Briza maxima</i>	Blowfly Grass	
Poaceae	* <i>Bromus diandrus</i>	Great Brome	
Poaceae	* <i>Bromus hordeaceus</i>	Soft Brome	
Colchicaceae	<i>Burchardia congesta</i>	Milkmaids	
Hemerocallidaceae	<i>Caesia occidentalis</i>		

Family	Species	Common Name	Additional species 2019
Orchidaceae	<i>Caladenia arenicola</i>	Spider Orchid	X
Orchidaceae	<i>Caladenia flava</i>	Cowslip Orchid	
Orchidaceae	<i>Caladenia latifolia</i>	Pink Fairy Orchid	
Orchidaceae	<i>Caladenia vulgata</i>		X
Montiaceae	<i>Calandrinia liniflora</i>	Parakeelya	
Dasypogonaceae	<i>Calectasia narragara</i>		
Myrtaceae	<i>Calothamnus sanguineus</i>	Silky-leaved Blood Flower	
Myrtaceae	<i>Calytrix angulata</i>	Yellow Starflower	
Myrtaceae	<i>Calytrix flavescens</i>	Summer Starflower	
Aizoaceae	* <i>Carpobrotus edulis</i>	Hottentot Fig	
Lauraceae	<i>Cassytha</i> sp.		
Centrolepidaceae	<i>Centrolepis drummondiana</i>		
Restionaceae	<i>Chordifex sinuosus</i>		
Polygalaceae	<i>Comesperma calymega</i>	Blue-spike Milkwort	
Proteaceae	<i>Conospermum incurvum</i>	Plume Smokebush	
Proteaceae	<i>Conospermum stoechadis</i>	Common Smokebush	
Ericaceae	<i>Conostephium pendulum</i>	Pearl Flower	
Ericaceae	<i>Conostephium preissii</i>		
Haemodoraceae	<i>Conostylis aculeata</i>	Prickly Conostylis	
Haemodoraceae	<i>Conostylis candicans</i> subsp. <i>calcicola</i>		
Haemodoraceae	<i>Conostylis juncea</i>		
Haemodoraceae	<i>Conostylis setigera</i>	Bristly Cottonhead	
Crassulaceae	<i>Crassula colorata</i>	Dense Stonecrop	
Goodeniaceae	<i>Dampiera linearis</i>	Common Dampiera	
Dasypogonaceae	<i>Dasypogon bromeliifolius</i>	Pineapple Bush	
Apiaceae	<i>Daucus glochidiatus</i>	Australian Carrot	X
Fabaceae	<i>Daviesia decurrens</i>	Prickly Bitter-pea	
Fabaceae	<i>Daviesia divaricata</i>	Marno	
Fabaceae	<i>Daviesia nudiflora</i>		
Fabaceae	<i>Daviesia triflora</i>		
Restionaceae	<i>Desmocladus fasciculatus</i>		
Restionaceae	<i>Desmocladus flexuosus</i>		
Hemerocallidaceae	<i>Dianella revoluta</i>	Blueberry Lily	
Droseraceae	<i>Drosera erythrorhiza</i>	Red Ink Sundew	
Droseraceae	<i>Drosera macrantha</i>		X
Droseraceae	<i>Drosera menziesii</i>		X
Poaceae	* <i>Ehrharta calycina</i>	Perennial Veldt Grass	

Family	Species	Common Name	Additional species 2019
Poaceae	<i>*Ehrharta longiflora</i>	Annual Veldt Grass	
Orchidaceae	<i>Elythranthera brunonis</i>	Purple Enamel Orchid	X
Myrtaceae	<i>Eremaea pauciflora</i>		
Orchidaceae	<i>Eriochilus</i> sp.	Bunny Orchid	
Geraniaceae	<i>*Erodium botrys</i>	Long Storksbill	
Myrtaceae	<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	Jarrah	
Myrtaceae	<i>Eucalyptus todtiana</i>	Coastal Blackbutt	
Euphorbiaceae	<i>*Euphorbia pepus</i>	Petty Spurge	
Iridaceae	<i>*Freesia alba x lechenaultii</i>	Freesia	
Fabaceae	<i>Gastrolobium capitatum</i>		
Iridaceae	<i>*Gladiolus caryophyllaceus</i>	Wild Gladiolus	
Fabaceae	<i>Gompholobium tomentosum</i>	Hairy Yellow Pea	
Haloragaceae	<i>Gonocarpus pithyoides</i>		
Haemodoraceae	<i>Haemodorum paniculatum</i>	Mardja	
Haemodoraceae	<i>Haemodorum spicatum</i>	Mardja	
Proteaceae	<i>Hakea ruscifolia</i>	Candle Hakea	
Fabaceae	<i>Hardenbergia comptoniana</i>	Native Wisteria	
Brassicaceae	<i>*Heliophila pusilla</i>		
Lamiaceae	<i>Hemiandra linearis</i>	Speckled Snakebush	
Lamiaceae	<i>Hemiandra pungens</i>	Snakebush	
Dilleniaceae	<i>Hibbertia huegelii</i>		
Dilleniaceae	<i>Hibbertia hypericoides</i>	Yellow Buttercups	
Dilleniaceae	<i>Hibbertia racemosa</i>	Stalked Guinea Flower	
Fabaceae	<i>Hovea pungens</i>	Devil's Pins	
Fabaceae	<i>Hovea trisperma</i>	Common Hovea	
Violaceae	<i>Hybanthus calycinus</i>	Wild Violet	
Myrtaceae	<i>Hypocalymma robustum</i>	Swan River Myrtle	
Asteraceae	<i>*Hypochaeris glabra</i>	Smooth Cats-ear	
Asteraceae	<i>*Hypochaeris radicata</i>	Flat Weed	
Restionaceae	<i>Hypolaena exsulca</i>		
Cyperaceae	<i>Isolepis marginata</i>	Coarse Club-rush	
Fabaceae	<i>Isotropis cuneifolia</i>	Granny Bonnets	
Fabaceae	<i>Jacksonia floribunda</i>	Holly Pea	
Fabaceae	<i>Jacksonia furcellata</i>	Grey Stinkwood	
Fabaceae	<i>Jacksonia sternbergiana</i>	Stinkwood	
Fabaceae	<i>Kennedia prostrata</i>	Scarlet Runner	
Myrtaceae	<i>Kunzea glabrescens</i>	Spearwood	

Family	Species	Common Name	Additional species 2019
Asteraceae	<i>Lagenophora huegelii</i>		
Goodeniaceae	<i>Lechenaultia floribunda</i>	Free-flowering Leschenaultia	
Cyperaceae	<i>Lepidosperma scabrum</i>		
Myrtaceae	<i>Leptospermum erubescens</i>	Roadside Teatree	
Myrtaceae	* <i>Leptospermum laevigatum</i>	Coast Teatree	
Myrtaceae	<i>Leptospermum spinescens</i>		X
Ericaceae	<i>Leucopogon conostephioides</i>		
Ericaceae	<i>Leucopogon polymorphus</i>		
Stylidiaceae	<i>Levenhookia stipitata</i>	Common Stylewort	
Asparagaceae	<i>Lomandra caespitosa</i>	Tufted Mat Rush	
Asparagaceae	<i>Lomandra hermaphrodita</i>		
Asparagaceae	<i>Lomandra nigricans</i>		
Asparagaceae	<i>Lomandra preissii</i>		
Asparagaceae	<i>Lomandra sericea</i>	Silky Mat Rush	
Asparagaceae	<i>Lomandra suaveolens</i>		
Restionaceae	<i>Loxocarya ciliata</i>		X
Anarthriaceae	<i>Lyginia barbata</i>		
Anarthriaceae	<i>Lyginia imberbis</i>		
Primulaceae	* <i>Lysimachia arvensis</i>	Pimpernel	
Macarthuriaceae	<i>Macarthuria australis</i>		
Zamiaceae	<i>Macrozamia fraseri</i>		
Zamiaceae	<i>Macrozamia riedlei</i>	Zamia Palm	
Myrtaceae	<i>Melaleuca trichophylla</i>		
Fabaceae	* <i>Melilotus indicus</i>		
Cyperaceae	<i>Mesomelaena pseudostygia</i>		
Cyperaceae	<i>Mesomelaena stygia</i>		
Orchidaceae	<i>Microtis media</i>	Tall Mignonette Orchid	
Loranthaceae	<i>Nuytsia floribunda</i>	Christmas Tree	
Rubiaceae	<i>Opercularia vaginata</i>	Dog Weed	
Asteraceae	* <i>Osteospermum ecklonis</i>	African veldt Daisy	
Oxalidaceae	* <i>Oxalis glabra</i>		
Oxalidaceae	* <i>Oxalis pes-caprae</i>	Soursob	
Iridaceae	<i>Patersonia occidentalis</i>	Purple Flag	
Geraniaceae	* <i>Pelargonium capitatum</i>	Rose Pelargonium	
Poaceae	* <i>Pentameris airoides</i>	False Hairgrass	
Proteaceae	<i>Persoonia saccata</i>	Snottygobble	
Proteaceae	<i>Petrophile linearis</i>	Pixie Mops	

Family	Species	Common Name	Additional species 2019
Proteaceae	<i>Petrophile macrostachya</i>		
Caryophyllaceae	* <i>Petrorhagia dubia</i>		
Rutaceae	<i>Philotheca spicata</i>	Pepper and Salt	
Haemodoraceae	<i>Phlebocarya ciliata</i>		
Loganiaceae	<i>Phyllangium paradoxum</i>		
Thymelaeaceae	<i>Pimelea sulphurea</i>	Yellow Banjine	
Asteraceae	<i>Podotheca angustifolia</i>	Sticky Longheads	
Asteraceae	<i>Podotheca gnaphalioides</i>	Golden Long-heads	
Phyllanthaceae	<i>Poranthera microphylla</i>	Small Poranthera	
Orchidaceae	<i>Pterostylis recurva</i>	Jug Orchid	
Orchidaceae	<i>Pterostylis</i> sp.	Greenhood Orchid	
Amaranthaceae	<i>Ptilotus polystachyus</i>	Prince of Wales Feather	
Asteraceae	<i>Quinetia urvillei</i>		X
Myrtaceae	<i>Regelia inops</i>		
Iridaceae	* <i>Romulea rosea</i>	Guildford Grass	
Goodeniaceae	<i>Scaevola crassifolia</i>	Thick-leaved Fan-flower	
Goodeniaceae	<i>Scaevola repens</i>		
Cyperaceae	<i>Schoenus curvifolius</i>		
Myrtaceae	<i>Scholtzia involucreta</i>	Spiked Scholtzia	
Caryophyllaceae	* <i>Silene gallica</i>	French Catchfly	
Solanaceae	* <i>Solanum nigrum</i>	Black Berry Nightshade	
Asteraceae	* <i>Sonchus oleraceus</i>	Common Sowthistle	
Asparagaceae	<i>Sowerbaea laxiflora</i>	Purple Tassels	X
Rhamnaceae	<i>Spyridium globulosum</i>	Basket Bush	
Proteaceae	<i>Stirlingia latifolia</i>	Blueboy	
Stylidiaceae	<i>Stylidium androsaceum</i>	Book Triggerplant	
Stylidiaceae	<i>Stylidium neurophyllum</i>	Coastal Plain Triggerplant	
Stylidiaceae	<i>Stylidium piliferum</i>	Common Butterfly Triggerplant	
Stylidiaceae	<i>Stylidium repens</i>	Matted Triggerplant	
Stylidiaceae	<i>Stylidium schoenoides</i>	Cow Kicks	
Proteaceae	<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>		
Cyperaceae	<i>Tetraria octandra</i>		
Orchidaceae	<i>Thelymitra macrophylla</i>		
Asparagaceae	<i>Thysanotus manglesianus</i>	Fringed Lily	
Asparagaceae	<i>Thysanotus patersonii</i>		
Asparagaceae	<i>Thysanotus sparteus</i>		

Family	Species	Common Name	Additional species 2019
Asparagaceae	<i>Thysanotus thyrsoideus</i>		X
Araliaceae	<i>Trachymene pilosa</i>	Native Parsnip	
Hemerocallidaceae	<i>Tricoryne elatior</i>	Yellow Autumn Lily	
Fabaceae	* <i>Trifolium arvense</i>	Hare's Foot Clover	
Fabaceae	* <i>Trifolium campestre</i>	Hop Clover	
Fabaceae	* <i>Trifolium hirtum</i>	Rose Clover	
Asteraceae	* <i>Urospermum picroides</i>	False Hawkbit	
Asteraceae	* <i>Ursinia anthemoides</i>	Ursinia	
Asteraceae	* <i>Verbesina encelioides</i>	Crownbeard	
Myrtaceae	<i>Verticordia nitens</i>	Morrison Featherflower	
Poaceae	* <i>Vulpia myuros</i>	Rat's Tail Fescue	
Campanulaceae	* <i>Wahlenbergia capensis</i>	Cape Bluebell	
Campanulaceae	<i>Wahlenbergia preissii</i>		
Asteraceae	<i>Waitzia suaveolens</i> var. <i>suaveolens</i>		
Xanthorrhoeaceae	<i>Xanthorrhoea brunonis</i>		
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	Grass tree	
Apiaceae	<i>Xanthosia huegelii</i>		X

Appendix 5: Quadrat Data

Quadrat No.: 1
Survey Date: 06/09/2019
Personnel: Sharon Hynes,
Tshering Chekey
GPS -31.68502
Coordinates: 115.811159
Location: Lot 902 Flynn Dr
Landform: Lower Slope
Aspect & Slope: South-east
0-3%
Soil: Grey Sand
Leaf Litter: 30%
Bare Ground: 3%
Condition: Excellent
Notes: Banksia and Jarrah
Woodland



Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Acacia applanata</i>	0.1	0.2	* <i>Briza maxima</i>	0.5	0.1
<i>Acacia huegelii</i>	0.1	0.5	* <i>Ehrharta calycina</i>	0.1	0.5
<i>Alexgeorgea nitens</i>	0.1	0.1	* <i>Gladiolus caryophyllaceus</i>	0.1	0.2
<i>Banksia menziesii</i>	6	5	* <i>Hypochaeris glabra</i>	0.1	0.1
<i>Bossiaea eriocarpa</i>	1	0.1	* <i>Ursinia anthemoides</i>	1	0.1
<i>Burchardia congesta</i>	0.1	0.5			
<i>Caladenia arenicola</i>	0.1	0.2			
<i>Caladenia flava</i>	0.5	0.1			
<i>Calectasia narragara</i>	0.1	0.1			
<i>Calytrix flavescens</i>	2	0.1			
<i>Chordifex sinuosus</i>	2	0.5			
<i>Conostephium pendulum</i>	0.1	0.1			
<i>Conostylis aculeata</i>	0.1	0.1			
<i>Conostylis candicans</i> subsp. <i>calicicola</i>	0.1	0.1			
<i>Conostylis setigera</i>	0.1	0.3			
<i>Dampiera linearis</i>	0.1	0.3			
<i>Daucus glochidiatus</i>	0.1	0.1			
<i>Daviesia divaricata</i>	1	0.5			
<i>Desmocladius flexuosus</i>	5	0.1			
<i>Drosera erythrorhiza</i>	0.5	0.1			
<i>Drosera menziesii</i>	0.1	0.3			
<i>Eucalyptus marginata</i>	25	4			

Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Gastrolobium capitatum</i>	0.5	0.5			
<i>Hibbertia huegelii</i>	0.1	0.5			
<i>Hibbertia hypericoides</i>	30	0.5			
<i>Hibbertia racemosa</i>	0.5	0.5			
<i>Hovea pungens</i>	0.1	0.1			
<i>Hovea trisperma</i>	0.5	0.5			
<i>Hybanthus calycinus</i>	0.1	0.2			
<i>Jacksonia floribunda</i>	2	2			
<i>Kennedia prostrata</i>	0.1	0.1			
<i>Lepidosperma scabrum</i>	0.1	0.5			
<i>Lomandra hermaphrodita</i>	0.1	0.1			
<i>Lomandra nigricans</i>	0.1	0.1			
<i>Lomandra preissii</i>	1	0.5			
<i>Lyginia imberbis</i>	1	0.6			
<i>Mesomelaena pseudostygia</i>	2	0.5			
<i>Patersonia occidentalis</i>	0.1	0.5			
<i>Petrophile linearis</i>	0.5	0.5			
<i>Podotrochea gnaphalioides</i>	0.1	0.1			
<i>Pterostylis</i> sp.	0.1	0.1			
<i>Stirlingia latifolia</i>	1	0.5			
<i>Thysanotus thyrsoideus</i>	0.1	0.3			
<i>Trachymene pilosa</i>	0.1	0.1			
<i>Xanthorrhoea preissii</i>	5	1.5			
<i>Xanthosia huegelii</i>	0.1	0.1			

Quadrat 2
No.:
Survey Date: 06/09/2019
Personnel: Sharon Hynes,
 Tshering Chekey
GPS -31.68344
Coordinates: 115.81184
Location: Lot 902 Flynn Dr
Landform: Mid Slope
Aspect & East
Slope: 3-5%
Soil: Grey/brown sand
Leaf Litter: 5%
Bare 8%
Ground:
Condition: Excellent
Notes: Banksia and
 Allocasuarina Woodlands



Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Acacia alata</i>	0.1	0.1	* <i>Ehrharta calycina</i>	0.5	0.1
<i>Acacia applanata</i>	0.1	0.2	* <i>Gladiolus caryophyllaceus</i>	0.1	1
<i>Acacia huegelii</i>	0.5	0.5	* <i>Hypochaeris glabra</i>	1	0.1
<i>Adenanthos cygnorum</i>	10	3	* <i>Ursinia anthemoides</i>	1	0.1
<i>Alexgeorgea nitens</i>	3.5	1			
<i>Allocasuarina fraseriana</i>	4	8			
<i>Banksia attenuata</i>	15	6			
<i>Banksia dallanneyi</i>	1	0.2			
<i>Bossiaea eriocarpa</i>	0.1	0.5			
<i>Burchardia congesta</i>	0.1	0.1			
<i>Caladenia flava</i>	0.1	0.1			
<i>Conostephium pendulum</i>	0.5	0.1			
<i>Conostylis aculeata</i>	0.1	0.1			
<i>Conostylis juncea</i>	0.1	0.1			
<i>Dasyopogon bromeliifolius</i>	0.5	0.3			
<i>Daviesia nudiflora</i>	2	1			
<i>Daviesia triflora</i>	0.5	0.5			
<i>Desmocladius flexuosus</i>	0.5	0.1			
<i>Drosera erythrorhiza</i>	2	0.1			
<i>Eriochilus</i> sp.	0.1	0.1			
<i>Hibbertia hypericoides</i>	30	0.5			
<i>Hibbertia racemosa</i>	0.5	0.1			
<i>Hypocalymma robustum</i>	0.5	0.5			

Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Kennedia prostrata</i>	0.1	0.2			
<i>Lomandra hermaphrodita</i>	0.1	0.1			
<i>Lomandra nigricans</i>	0.1	0.5			
<i>Lomandra preissii</i>	1	0.5			
<i>Loxocarya ciliata</i>	0.5	0.3			
<i>Mesomelaena pseudostygia</i>	3	0.5			
<i>Patersonia occidentalis</i>	0.1	0.5			
<i>Petrophile linearis</i>	0.5	0.3			
<i>Phlebocarya ciliata</i>	0.1	0.1			
<i>Quinetia urvillei</i>	0.1	0.1			
<i>Stirlingia latifolia</i>	0.5	0.5			
<i>Stylidium piliferum</i>	0.1	0.1			
<i>Tetraria octandra</i>	0.1	0.1			
<i>Thysanotus manglesianus</i>	0.5	0.5			
<i>Trachymene pilosa</i>	0.1	0.1			
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	0.1	0.1			
<i>Xanthorrhoea preissii</i>	12	1.5			

Quadrat No.: 3
Survey Date: 06/09/2019
Personnel: Sharon Hynes,
 Tshering Chekey
GPS -31.67960
Coordinates: 115.81084
Location: Lot 902 Flynn Dr
Aspect & North-west
Slope: 0-3%
Soil: Grey sand
Leaf Litter: 7%
Bare Ground: 1%
Condition: Excellent
Notes: Banksia woodlands



Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Acacia pulchella</i> var. <i>pulchella</i>	0.1	0.1	* <i>Bromus diandrus</i>	0.1	0.1
<i>Banksia attenuata</i>	40	5	* <i>Briza maxima</i>	0.5	0.1
<i>Banksia dallaneyi</i>	0.1	0.1	* <i>Ehrharta calycina</i>	0.1	0.1
<i>Bossiaea eriocarpa</i>	0.5	0.5	* <i>Gladiolus caryophyllaceus</i>	0.1	0.5
<i>Burchardia congesta</i>	0.1	0.5	* <i>Hypochaeris glabra</i>	0.1	0.1
<i>Caladenia arenicola</i>	0.1	0.1	* <i>Ursinia anthemoides</i>	0.1	0.1
<i>Caladenia flava</i>	0.1	0.1			
<i>Calothamnus sanguineus</i>	0.5	0.5			
<i>Calytrix flavescens</i>	0.5	0.1			
<i>Cassytha</i> sp. (sterile)	0.1	0.5			
<i>Conostephium pendulum</i>	0.1	0.5			
<i>Conostylis aculeata</i>	0.1	0.2			
<i>Conostylis setigera</i>	0.5	0.1			
<i>Dasypogon bromeliifolius</i>	2	0.5			
<i>Daviesia triflora</i>	0.5	0.5			
<i>Desmocladius flexuosus</i>	0.5	0.1			
<i>Drosera erythrorhiza</i>	2	0.1			
<i>Drosera macrantha</i>	0.1	0.1			
<i>Elythranthera brunonis</i>	0.1	0.1			
<i>Eremaea pauciflora</i>	0.5	1			
<i>Eucalyptus todtiana</i>	5	6			
<i>Gastrolobium capitatum</i>	0.1	0.1			
<i>Gompholobium tomentosum</i>	0.5	0.5			
<i>Hakea ruscifolia</i>	0.5	0.5			
<i>Hibbertia hypericoides</i>	70	0.5			
<i>Hovea trisperma</i>	0.1	0.5			
<i>Hybanthus calycinus</i>	0.1	0.1			

Native Species	%	Height (m)	Invasive Species	%	Height (m)
<i>Hypocalymma robustum</i>	2	0.5			
<i>Lechenaultia floribunda</i>	0.1	0.1			
<i>Lepidosperma scabrum</i>	0.1	1			
<i>Lomandra caespitosa</i>	0.1	0.1			
<i>Lomandra hermaphrodita</i>	0.1	0.1			
<i>Lomandra nigricans</i>	0.1	0.1			
<i>Lomandra preissii</i>	0.5	0.3			
<i>Lomandra sericea</i>	0.1	0.5			
<i>Lyginia imberbis</i>	1	0.5			
<i>Mesomelaena pseudostygia</i>	0.1	0.5			
<i>Nuytsia floribunda</i>	1	4			
<i>Patersonia occidentalis</i>	0.5	0.5			
<i>Podotheca gnaphalioides</i>	0.1	0.1			
<i>Schoenus curvifolius</i>	0.1	0.1			
<i>Scholtzia involucrata</i>	2	0.5			
<i>Sowerbaea laxiflora</i>	0.5	0.2			
<i>Stirlingia latifolia</i>	1	0.5			
<i>Stylidium neurophyllum</i>	0.1	0.1			
<i>Thysanotus sparteus</i>	0.5	1			
<i>Thysanotus thyrsoideus</i>	0.1	0.5			
<i>Trachymene pilosa</i>	0.1	0.1			
<i>Waitzia suaveolens</i> var. <i>suaveolens</i>	0.1	0.1			
<i>Xanthorrhoea preissii</i>	5	1			