



Natural Area
CONSULTING MANAGEMENT SERVICES

Shire of Northampton

Detailed Flora and Vegetation Survey

Little Bay Road, Northampton

Natural Area Holdings Pty Ltd
Whadjuk Country
57 Boulder Road, Malaga, WA, 6090
Ph: (08) 9249 7634
info@naturalarea.com.au
www.naturalarea.com.au



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Executive Summary

Natural Area Consulting Management Services (Natural Area) has been commissioned by the Shire of Northampton (the Shire) to conduct a detailed spring flora survey to provide supporting information for a Clearing Permit (Purpose Permit) Application (CPPA) for submission to the Department of Water and Environmental Regulation (DWER). Surveys were conducted for the proposed clearing of vegetation to extend Little Bay Road. Works included a detailed flora and vegetation survey and a declared rare and priority flora (DRF) search.

The survey aimed to determine:

- flora species (native and introduced) present
- the extent and boundaries of vegetation type and condition
- the location of declared rare or priority flora, fauna and/or ecological communities if present.

The flora and vegetation survey within site confirmed:

- a total of 70 flora species present from 32 families
- a total of 27 introduced (weeds) and 43 native flora species
- no priority or threatened flora species were found during the survey
- one vegetation type was present within the survey area, Mixed Coastal Shrubland
- vegetation condition across the site ranged from Completely Degraded to Very Good, with majority of the site (36.8%) in Good condition.

An assessment of the proposed clearing area was made against the 10 clearing principles and was determined that the proposal maybe at variance with one of the principles. The survey site lies within a registered Aboriginal Site (number 17164) which is described as Artefacts/Scatter, Shell and Water source; the presence of this site within the proposed clearing area will need to be taken into account and any specific requirements around clearing investigated.

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1.0 Introduction

The Shire of Northampton (the Shire) is proposing the clearing of a road reserve to extend Little Bay Road, Horrocks WA. As part of the development process, the Shire has commissioned Natural Area Consulting Management Services (Natural Area) to undertake a detailed spring flora survey to provide supporting information for a clearing permit application to the Department of Water and Environment Regulation (DWER).

1.1 Location

The survey site is within the Shire of Northampton and is a proposed extension of Little Bay Road which covers an area of approximately 3.66 ha. The survey site is approximately 2.35 km NNW of Horrocks town site (Figure 1). The survey site does not occur within an environmentally sensitive area (Department of Water and Environmental Regulation 2022).

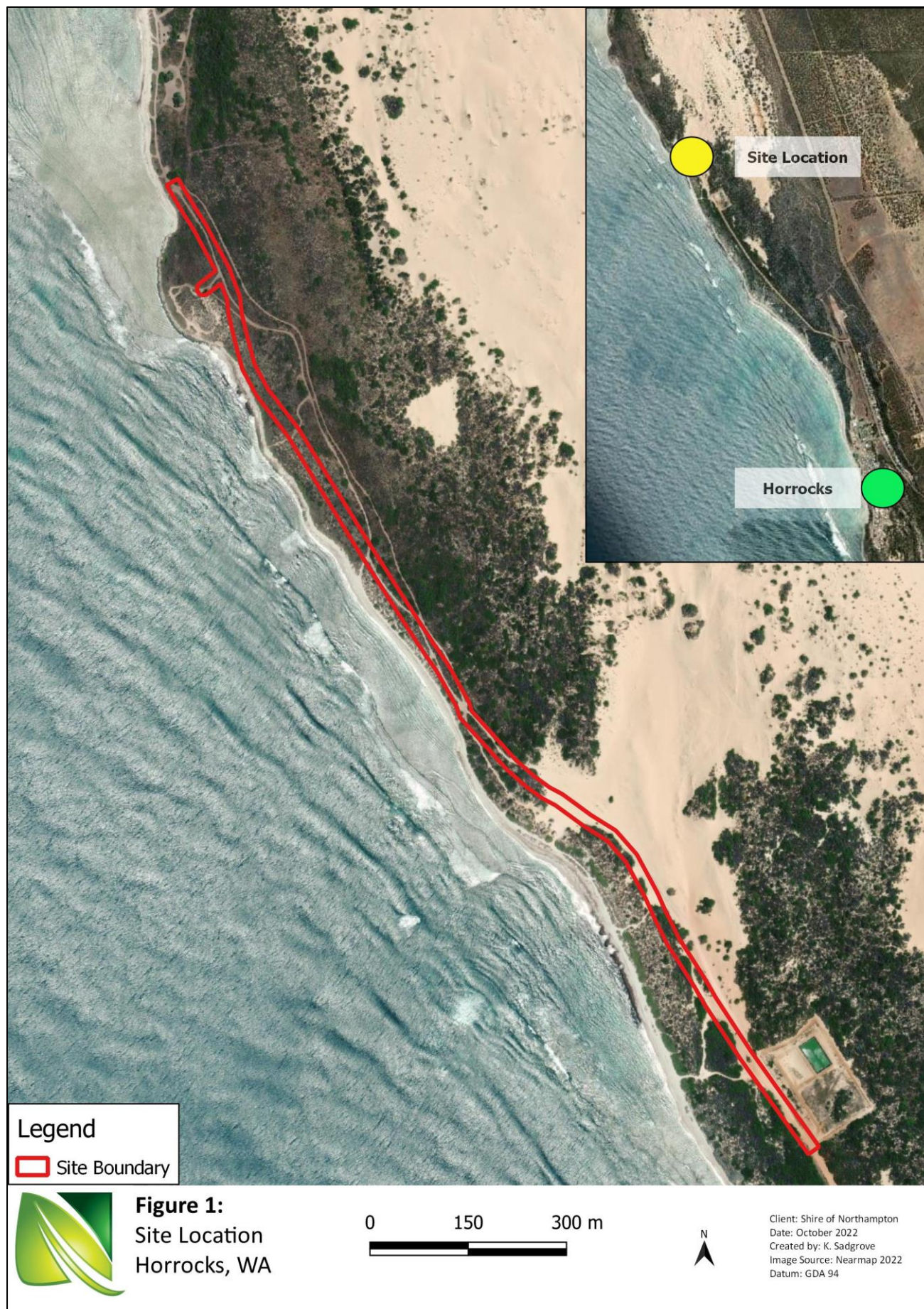
1.2 Scope

Activities undertaken by Natural Area included:

- desktop assessment activities to determine flora species, declared rare and priority listed species (DRF) and ecological communities with the potential to be present within the nominated area, including requests for DBCA database searches for flora and ecological communities
- detailed flora survey to be conducted in spring 2022 that will include the installation of quadrats based on the number of vegetation types present. Flora survey activities will be carried out in accordance with *EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (2016)
- reporting outcomes of the assessment activities.

1.3 Objectives

The main objective of the survey is to collect sufficient data to support an application for a Clearing Permit for submission to DWER, as required by clearing provisions under the Environmental Protection Act 1986 (WA) (EP Act) and Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA) (Regulations).



2.0 Site Characteristics

The characteristics of a site have a strong bearing on the flora, vegetation, and ecological communities present. Key characteristics of the Little Bay Road extension site are outlined in this section.

2.1 Regional Context

The site is located within the Geraldton Hills IBRA subregion, within the Geraldton Sandplains region (Department of Primary Industries and Regional Development, 2022). The Geraldton Hills subregion incorporates the southern end of the Carnarvon Basin and northern end of the Perth Basin and contains sandplains, alluvial plains, and coastal limestones (Desmond and Chant, 2001). Sandplains comprise of *Banksia* and *Actinostrobus*, alluvial plains contain *Eucalyptus loxophleba* woodlands, and *acacia* scrubs and proteaceous heath on limestones (Desmond and Chant, 2001).

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 (2022); Geraldton Town WA, site number 008050, 2022 the region has an average:

- rainfall of 444.9 mm pa, with rain falling predominantly between May and August
- maximum temperature ranging from 19.8 °C in winter to 29.7 °C in summer, with a maximum recorded temperature of 46.4 °C
- minimum temperatures ranging from 10.5 °C in winter to 18.8 °C in summer, with a minimum recorded temperature of 0.9 °C
- predominant wind directions include morning easterlies and westerly sea breezes during the summer months, with an average wind speed of 15.4 km/h and gusts of more than 100 km/h.

2.3 Topography and Soils

Using the NRInfo Portal one soil type occurs within the survey site, Quindalup North 1 Subsystem (Department of Primary Industries and Regional Development (DPIRD), 2022). This soil type is described as coastal dune system with no fixed drainage. Topography of the site ranges from 0 m Australian Height Datum (AHD) in the west and gently rises to 18 m AHD to the north east (DPIRD, 2022) (Figure 2 and 3).

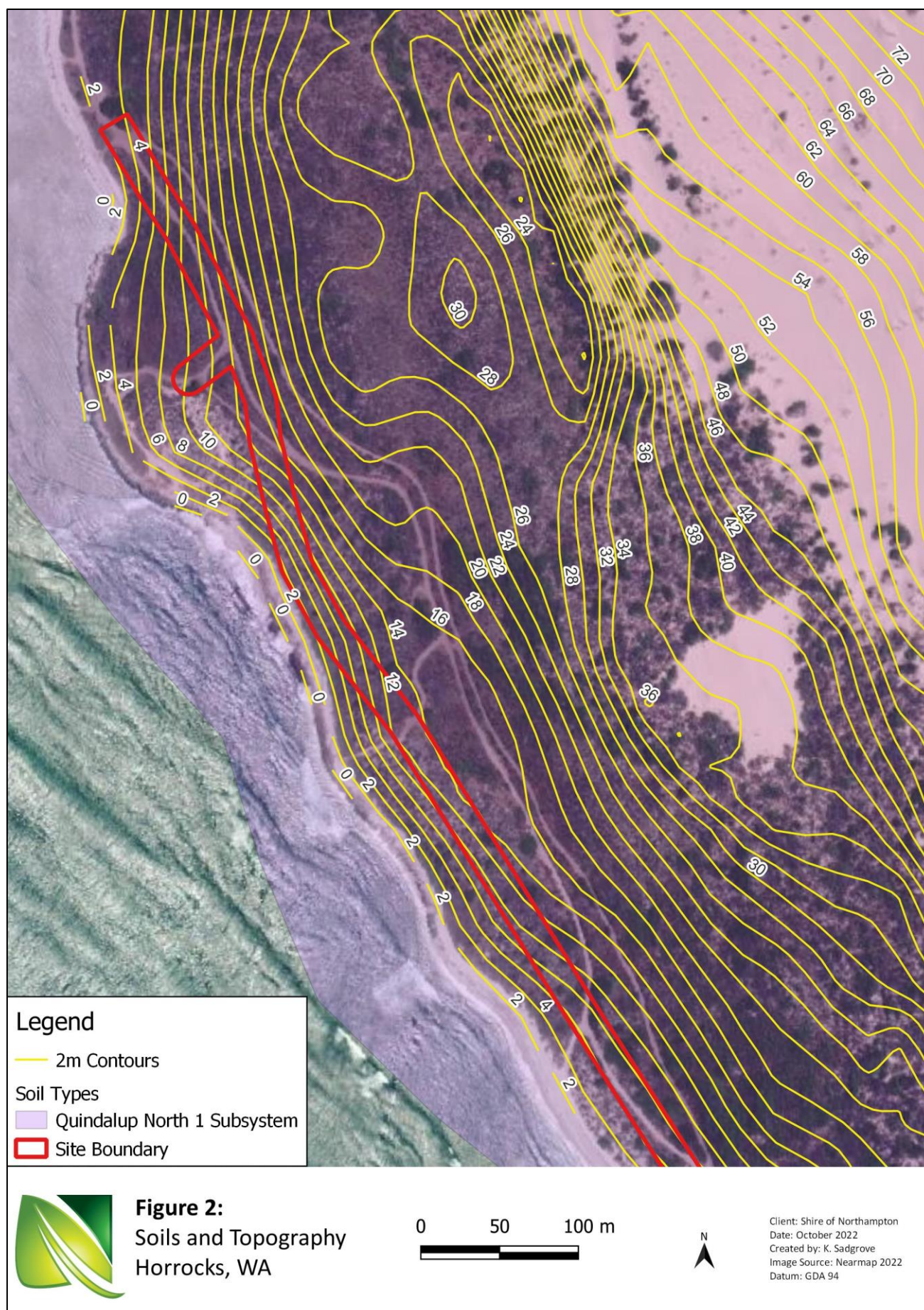
2.4 Vegetation Complex

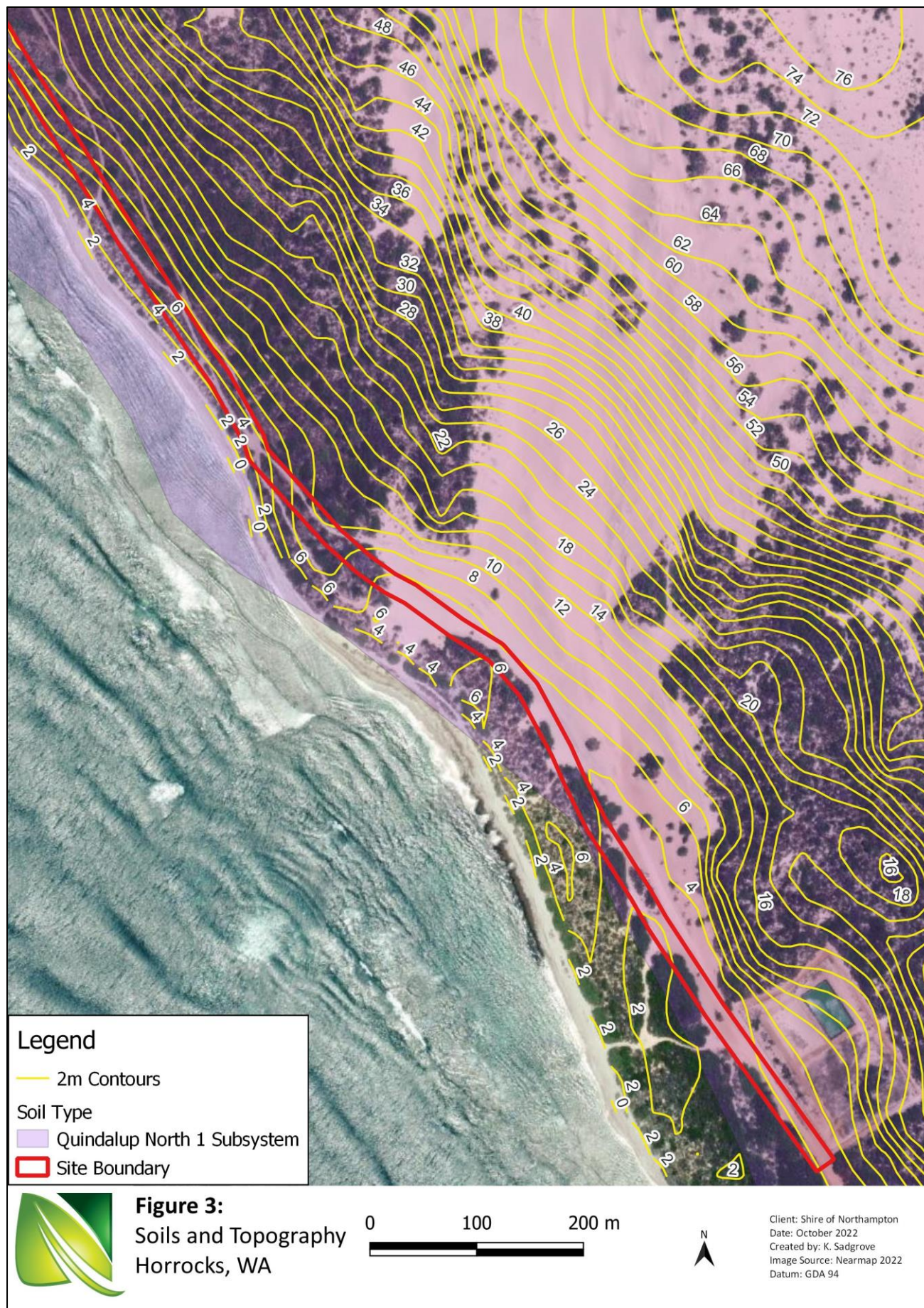
One vegetation association is present within the site, Greenough 129 which is described as Dune Sand. The pre-European extent of this vegetation association remaining is:

- 92.77% within the Geraldton Hills region
- 87.39% within the Shire of Northampton (Government of Western Australia, 2019).

2.5 Heritage Values

The survey site lies with a registered Aboriginal Site (number 17164) which is described as Artefacts/Scatter, Shell and Water source (Department of Planning Lands and Heritage 2022).





3.0 Methodology

3.1 Desktop and Literature Review

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

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

The following databases were accessed to obtain relevant information:

- NatureMap (Department of Biodiversity, Conservation and Attractions (DBCA), 2022)
- Protected Matters Search Tool (Department of the Agriculture, Water and Environment (DAWE), 2022) (Appendix 1)
- FloraBase (Department of Biodiversity, Conservation and Attractions, 2022a)
- Threatened and priority flora and ecological community database searches (Department of Biodiversity, Conservation and Attractions, 2022b).

Summary sheets of threatened flora potentially occurring in the area were created for quick reference in the field and are provided in Appendix 2. Conservation code definitions for the State and Commonwealth are provided in Appendix 3.

3.2 On-ground Flora Survey

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

Natural Area botanists Kylie Sadgrove and Karri Grant conducted the survey between the 6th and 8th of September 2022, with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- setting out a total of five 10 x 10 m quadrats across the one vegetation type present (Figure 4)
- photographing each quadrat in the north-west corner and recording GPS coordinates using GDA94 datum (Figure 4)
- recording landscape characteristics including soil types/colour, aspect, slope, surface rock, topography and drainage using a modified recording sheets based on the NAIA templates developed for the Perth Biodiversity Project
- identification of flora species present by walking the site, including targeting declared rare and priority species indicated as potentially present during desktop assessments
- recording vegetation type including dominant over, middle and understorey species (Table 1) and condition using the scale attributed to Keighery (Table 2) (Government of Western Australia, 2000)
- the use of GPS to map significant species and boundaries of differing vegetation type and condition.



3.2.1 Vegetation Type

The vegetation type was determined using the structural classes described in *Bush Forever Volume 2* (Government of Western Australia, 2000), and records dominant over, middle and understorey species. A description of the various structural classes is provided in Table 1.

Table 1: Vegetation structural classes

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

Source: Government of Western Australia, 2000

3.2.2 Vegetation Condition

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

Table 2: Vegetation condition ratings

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

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

Source: EPA, 2016

3.3 Limitations

Table 3 details the limitations associated with the survey.

Table 3: Flora survey limitations

Potential Limitation	Limitation	Comments
Availability of contextual information	Nil	Online database information was readily available to provide broad contextual knowledge for the area. A search of the DBCA threatened and priority databases for flora and ecological communities was also provided for the areas with a 30 km buffer.
Competency/experience of team	Nil	The team has extensive experience at conducting targeted, reconnaissance and detailed flora surveys and is competent in taxonomic identification and assessment of vegetation. With Kylie Sadgrove having over 5 years experience and Karri Grant over 3 years experience conducting flora and vegetation surveys.
Proportion of flora recorded/collected, any identification issues	Minor	A total of 70 flora species were identified within the survey site. All species apart from one were able to be identified to species level. Due to the lack of diagnostic features such as flowers and seed one species, <i>Atriplex</i> sp. was only able to be identified to the genus level. This is considered a minor limitation as no threatened or priority <i>Atriplex</i> species occur within the immediate region of the survey and it does not physically resemble the one potential species within the IBRA region identified on FloraBase.
Survey effort and extent	Nil	Survey conducted was a detailed flora and vegetation survey involving the sampling of five quadrats placed out

Potential Limitation	Limitation	Comments
		across the site in the one vegetation type present. The survey effort was considered adequate as the site was surveyed over a period of 2 days.
Access restrictions	Nil	No access restriction were encountered during the survey.
Survey timing	Nil	The survey was undertaken during the optimal timing for the bioregion being spring in accordance with the EPA Technical Guidance document for flora surveys.
Disturbances	Minor	No disturbances such as fire or weather events were noted within the survey area. Parts of the survey area consisted of existing 4wd tracks and roads and as such a certain level of disturbance is associated with this. This level disturbance was considered to be minimal due to the historic use of these tracks.

4.0 Flora Survey Results

4.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 82 conservation significant species to occur within 10 km of the survey area (Table 5). NatureMap indicated 43 conservation significant flora species listed under the *Biodiversity Conservation Act 2016* (WA), as potentially occurring within 10 km radius of the site (Department of Biodiversity Conservation and Attractions, 2022). A review of the Protected Matters Search Tool (PMST) (Department of Agriculture, Water, and the Environment, 2022) indicated 21 significant flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site (Appendix 1).

A review of the DBCA (2022c) threatened and priority flora database indicated 72 threatened or priority species have been recorded within 30 km of the site. Of the conservation significant species potentially found in the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 38 of these species (Table 4, indicated by green rows). Conservation code descriptions are provided in Appendix 3.

Table 4: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Acacia guinetii</i>	P4			X
<i>Acacia latipes</i> subsp. <i>licina</i>	P3	X		X
<i>Acacia megacephala</i>	P3			X
<i>Acacia pelophila</i>	P1	X		X
<i>Acacia ridleyana</i>	P3			X
<i>Androcalva bivillosa</i>	CR/T		X	
<i>Anthocercis intricata</i>	P3	X		X
<i>Anthotroche myoporoides</i>	P3			X
<i>Balladonia aervoides</i>	P3			X
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	P3	X		X
<i>Blackallia nudiflora</i>	P3	X		X
<i>Caladenia barbarella</i>	EN		X	
<i>Caladenia bryceana</i> subsp. <i>cracens</i>	EN/V	X	X	X
<i>Caladenia elegans</i>	EN/CR	X	X	X
<i>Caladenia hoffmanii</i>	EN	X	X	X
<i>Calytrix harvestiana</i>	P3	X		X
<i>Calytrix pimeleoides</i>	P3			X

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Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Chamelaucium</i> sp. Coolcalalaya	P1	X		X
<i>Chorizema humile</i>	EN		X	
<i>Comesperma rhadinocarpum</i>	P3			X
<i>Conostylis dielsii</i> subsp. <i>Teres</i>	EN		X	
<i>Conostylis micrantha</i>	EN		X	
<i>Desmocladius glomeratus</i>	P2			X
<i>Diuris drummondii</i>	VU		X	X
<i>Diuris recurva</i>	P4	X		X
<i>Drakaea concolor</i>	V	X	X	X
<i>Drummondita ericoides</i>	VU/EN		X	X
<i>Enekbatus bounites</i>	P2			X
<i>Eremophila brevifolia</i>	P2	X		X
<i>Eremophila microtheca</i>	P4			X
<i>Eucalyptus blaxellii</i>	P4	X		X
<i>Eucalyptus cuprea</i>	EN	X	X	X
<i>Eucalyptus ebbanoensis</i> subsp. <i>photina</i>	P4			X
<i>Frankenia confusa</i>	P4			X
<i>Frankenia glomerata</i>	P4			X
<i>Gastrolobium hamulosum</i>	EN		X	
<i>Gastrolobium propinquum</i>	P3	X		X
<i>Geleznovia</i> sp. <i>Binnu</i>	P3			X
<i>Grevillea bracteosa</i> subsp. <i>howatharra</i>	CE		X	X
<i>Grevillea christineae</i>	EN		X	
<i>Grevillea leptopoda</i>	P3	X		X
<i>Grevillea triloba</i>	P3			X
<i>Guichenotia quasicalva</i>	P2	X		X
<i>Hemigenia pimeleifolia</i>	P2	X		X
<i>Homalocalyx chapmanii</i>	P2			X
<i>Hypocalymma angustifolium</i> subsp. <i>Hutt River</i>	EN	X	X	X
<i>Lasiopetalum oldfieldii</i>	P3	X		X
<i>Lepidosperma</i> sp. <i>Moresby Range</i>	P1			X
<i>Leucopogon borealis</i>	P2			X

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Leucopogon marginatus/Styphelia marginata</i>	EN		X	
<i>Leucopogon psammophilus</i>	P1	X		X
<i>Leucopogon sp. Howatharra</i>	P2			X
<i>Leucopogon sp. Moresby Range</i>	P3	X		X
<i>Leucopogon sp. Port Gregory</i>	P1	X		X
<i>Liparophyllum congestiflorum</i>	P4	X		X
<i>Melaleuca huttensis</i>	P3	X		X
<i>Micromyrtus collina</i>	P1	X		X
<i>Olearia adpressa</i>	P1	X		X
<i>Ozothamnus vespertinus</i>	P1	X		X
<i>Paracaleana dixonii</i>	EN		X	
<i>Prostanthera scutata</i>	P2	X		X
<i>Pterostylis sinuata</i>	CR/EN	X	X	X
<i>Ptilotus chortophytus</i>	P1	X		X
<i>Rhodanthe sp. Yuna</i>	P3	X		X
<i>Scaevola kallophylla</i>	P4	X		X
<i>Scaevola oldfieldii</i>	P3	X		X
<i>Schoenus badius</i>	P2			X
<i>Serichonus gracilipes</i>	P3	X		X
<i>Stachystemon nematophorus</i>	p4/V	X	X	X
<i>Stylidium drummondianum</i>	P3			X
<i>Styphelia cernua</i>	P2			X
<i>Styphelia inopinata</i>	P1	X		X
<i>Teucrium sp. Hutt River</i>	P1	X		X
<i>Thryptomene stapfii</i>	P3			X
<i>Trithuria australis</i>	P4	X		X
<i>Verticordia chrysostachys</i> var. <i>pallida</i>	P3			X
<i>Verticordia densiflora</i> var. <i>roseostella</i>	P3	X		X
<i>Verticordia dichroma</i> var. <i>dichroma</i>	P3			X
<i>Verticordia dichroma</i> var. <i>syntoma</i>	P3			X
<i>Verticordia penicillaris</i>	P4			X
<i>Vittadinia cervicalis</i> var. <i>occidentalis</i>	P1	X		X

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Wurmbea tubulosa</i>	VU/EN	X	X	X

4.1.1 Threatened and Priority Ecological Communities

A review of the PMST report identified no listed Threatened Ecological Communities (TECs) that could potentially occur within 10 km of the site (Department of Agriculture, Water, and the Environment, 2022), with no Priority or TEC recorded within the site according to DBCA database searches (DBCA 2022c).

4.2 Flora Survey Results

4.2.1 Flora

A total of 70 flora species (taxa) were recorded from 32 families during the field survey, including 27 introduced (weeds) and 43 native species. The most species rich family was Poaceae (Grasses) followed by Asteraceae (Daisies) and Chenopodiaceae. One species could not be identified to species level, only to the genus of *Atriplex*. No threatened or priority *Atriplex* species occur within the immediate region of the survey and it does not physically resemble the one potential species within the IBRA region identified on FloraBase. This species is therefore not considered to be a significant species. Examples of native flora species are shown in Figure 5 and introduced (weed) species in Figure 6. A complete flora species list is provided in Appendix 5.

One declared pest and weed of national significance (WoNS), Athel Tree (**Tamarix aphylla*) were identified just outside of the survey boundary to the east of the site. The locations of this WoNS is shown in Appendix 6. Declared pests are listed on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management Act 2007* (WA) (DPIRD, 2022a). This classification requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (DPIRD 2022a).



Tetragonia implexicoma (Bower Spinach)



Calandrinia polyandra (Parakeelya)



Clematis linearifolia



Eremophila glabra (Tar Bush)



Nicotiana rotundifolia (Round-leaved Tobacco)



Carpobrotus virescens (Coastal Pigface)

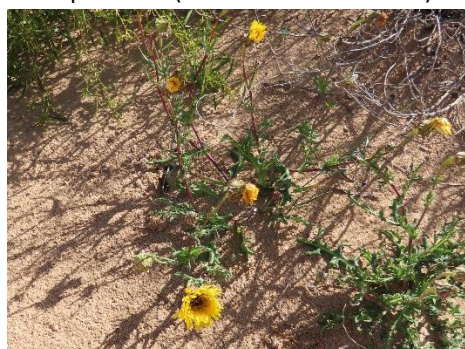
Figure 5: Examples of native flora species recorded



Cape Weed (**Arctotheca calendula*)



Iceplant (**Mesembryanthemum crystallinum*)



False Sowthistle (**Reichardia tingitana*)



Fountain Grass (**Cenchrus setaceus*)

Figure 6: Examples of introduced flora species recorded

4.2.2 Vegetation Type

One vegetation type was present within the survey site, Mixed Coastal Shrubland. This vegetation type is characterised by mixed middle storey of native shrubs dominated by *Scaevola crassifolia*, *Acacia rostellifera* and *Olearia axillaris* over an understorey of *Tetragonia implexicoma*, *Carpobrotus virescens* and other native herbs and grasses.



Figure 7: Example of the Mixed Coastal Shrubland present within the survey site

4.2.3 Vegetation Condition

Vegetation condition on site ranged from Completely Degraded to Very Good (Table 5, Figure 8 and 9). Areas that were classified as Completely Degraded consisted of existing vehicle 4wd tracks which were present throughout the site.

Table 5: Vegetation condition within the survey site

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	0	0.96	1.35	0.055	1.3	3.66
Area (%)	0	0	26.2	36.8	1.5	35.5	100

4.2.4 Threatened and Priority Communities

No threatened or priority ecological communities were identified during the 2022 survey.





5.0 Implications of Results

5.1 Flora and Vegetation

Natural Area's September survey recorded a total of 70 flora species (taxa) from 32 families, which includes 27 (38.6%) introduced (weed) species and 43 (61.4%) native species. One vegetation type was present across the entire surveyed site; Mixed Coastal Shrubland. Vegetation condition across the site ranged from Completely Degraded to Very Good, with the majority of the site in Good (36.8%) and Very Good (26.2%) condition. The areas classified as Completely Degraded are areas which consist of existing 4wd tracks and roads and as such are devoid of native vegetation.

One species could not be identified to species level, only to the genus of *Atriplex*. No threatened or priority *Atriplex* species occur within the immediate region of the survey and it does not physically resemble the one potential species within the IBRA region identified on FloraBase. This species is therefore not considered to be a significant species

One declared pest which are also Weeds of National Significance (WoNS) was present within close proximity to the surveyed site, Athel Tree (**Tamarix aphylla*). The *Biosecurity and Agriculture Management Act 2007* requires the landowner/land manager to control the population of these pests within their land.

5.2 Significant Flora

No threatened or priority flora species were identified during the September 2022 survey. The DBCA searches did not identify any threatened or priority species within the site boundary (DBCA 2022c).

5.3 Threatened Ecological Communities

Results of the DBCA database search did not identify any priority or threatened ecological communities occurring within the site boundary or within close proximity (DBCA 2022c), the PMST report also did not identify any occurring within the survey site (Department of Agriculture, Water, and the Environment, 2022). During the September 2022 survey no priority or threatened ecological communities were identified to occur within the site.

5.4 Clearing Principle Assessment

An assessment of information obtained during the 2022 survey has been made against the Western Australian clearing principles. It is suggested that the clearing application may be at variance to one of the ten clearing principles (Table 17).

The survey site lies with a registered Aboriginal Site (number 17164) which is describes as Artefacts/Scatter, Shell and Water source, the presence of this site within the proposed clearing area will need to be taken into account and any requirements around the proposed clearing investigated.

Table 6: Assessment against clearing principles

Clearing Principle	Comment
<p>A Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> during the September 2022 survey a total of 70 flora species were recorded of which 27 (38.6%) were introduced and 43 (61.4%) one vegetation type was present, Mixed Coastal Shrubland the majority of the site is in Good (36.8%) and Very Good (26.2%) condition no conservation significant flora was identified within the proposed clearing area.
<p>B Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.</p>	<p>The proposed clearing area may be at variance with this principle:</p> <ul style="list-style-type: none"> a fauna survey was not conducted during the survey conducted by Natural Area in September 2022.
<p>C Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> during the September 2022 survey by Natural Area botanists, no conservation significant flora was identified within the proposed clearing area.
<p>D Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> during the September 2022 survey, no threatened ecological community was identified as occurring within the proposed clearing area desktop searches using PMST (Department of Agriculture, Water, and the Environment, 2022) and DBCA database search (DBCA 2022c) did not identify any threatened ecological community occurring within the proposed clearing area.
<p>E Native vegetation should not be cleared if it is significant as a remnant</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> the proposed clearing area occurs within coastal vegetation to the north of Horrocks, WA with portions of the site occurring along a existing 4wd track

Clearing Principle	Comment
<p>of native vegetation in an area that has been extensively cleared.</p>	<ul style="list-style-type: none"> the site occurs within the Greenough 129 vegetation association with the remaining vegetation stated within this area as: <ul style="list-style-type: none"> 92.77% within the Geraldton Hills region 87.39% within the Shire of Northampton (Government of Western Australia, 2019).
<p>F Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> no watercourse or wetland was observed within the area during the 2022 survey by Natural Area the proposed clearing area is adjacent to and follows the coastline in Horrocks to Little Bay.
<p>G Native Vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</p>	<p>The area to be cleared is not likely to be at variance with this principle as it is not expected to cause further land degradation.</p>
<p>H Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> the proposed clearing is not considered likely to have an impact on nearby conservation areas or surrounding vegetation portions of the site occur along an existing 4wd track.
<p>I Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> clearing is not expected to cause deterioration in the quality of surface or underground water no surface water was observed during the 2022 survey.
<p>J Native vegetation should not be cleared if clearing the vegetation is</p>	<p>The proposed clearing area is not likely to be at variance with this principle:</p> <ul style="list-style-type: none"> portions of the proposed clearing area follow an existing 4wd track and is not considered to exacerbate the incidence of flooding.

Clearing Principle	Comment
likely to cause, or exacerbate, the incidence of flooding.	<ul style="list-style-type: none">road design is expected to manage and account for rainfall events.

6.0 References

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- Government of Western Australia. (2000). *Bush Forever* (Vol. 2). Perth, W.A: Department of Environmental Protection.

Appendix 1: PMST Report 10 km



EPBC Act Protected Matters Report

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

Report created: 28-Jul-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	59
Listed Migratory Species:	51

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

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 Lands:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	76
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	None
Key Ecological Features (Marine):	2
Biologically Important Areas:	8
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[Resource Information]

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

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

Listed Threatened Species

[Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
PLANT			
Androcalva bivillosa Stragglng Androcalva [87807]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia barbarella Small Dragon Orchid, Common Dragon Orchid [68686]	Endangered	Species or species habitat may occur within area	In buffer area only
Caladenia bryceana subsp. cracens Northern Dwarf Spider-orchid [64556]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caladenia elegans Elegant Spider-orchid [56775]	Endangered	Species or species habitat known to occur within area	In feature area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat known to occur within area	In feature area
Chorizema humile Prostrate Flame Pea [32573]	Endangered	Species or species habitat may occur within area	In buffer area only
Conostylis dielsii subsp. teres Irwin's Conostylis [3614]	Endangered	Species or species habitat may occur within area	In buffer area only
Conostylis micrantha Small-flowered Conostylis [17635]	Endangered	Species or species habitat may occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Drakaea concolor Kneeling Hammer-orchid [56777]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Drummondita ericoides Morseby Range Drummondita [9193]	Endangered	Species or species habitat known to occur within area	In feature area
Eucalyptus cuprea Mallee Box [56773]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gastrolobium hamulosum Hook-point Poison [9212]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea bracteosa subsp. howatharra [85002]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat may occur within area	In buffer area only
Hypocalymma angustifolium subsp. Hutt River (S.Patrick 2982) [85023]	Endangered	Species or species habitat known to occur within area	In buffer area only
Leucopogon marginatus Thick-margined Leucopogon [12527]	Endangered	Species or species habitat may occur within area	In buffer area only
Paracaleana dixonii Sandplain Duck Orchid [86882]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterostylis sinuata Northampton Midget Greenhood, Western Swan Greenhood [84991]	Endangered	Species or species habitat known to occur within area	In buffer area only
Stachystemon nematophorus Three-flowered Stachystemon [81447]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Wurmbea tubulosa Long-flowered Nancy [12739]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
SPIDER			
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In buffer area only
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]		
The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.		
Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51102]	WA	In buffer area only
Commonwealth Land - [51479]	WA	In buffer area only
Commonwealth Land - [51988]	WA	In buffer area only
Commonwealth Land - [51101]	WA	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In feature area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Fish			
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In feature area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area	In feature area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In feature area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
Reptile			
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Disteira kingii Spectacled Seasnake [1123]	Vulnerable	Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]		Foraging, feeding or related behaviour known to occur within area	In feature area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans		[Resource Information]	
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]	Endangered	Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]		Species or species habitat likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]		Species or species habitat likely to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Chilimony	Nature Reserve	WA	In buffer area only
Nilligarri	Nature Reserve	WA	In buffer area only
Oakabella	Nature Reserve	WA	In buffer area only
Ogilvie	Nature Reserve	WA	In buffer area only
Port Gregory	NRS Addition - Gazettal in Progress	WA	In buffer area only
Unnamed WA06547	Nature Reserve	WA	In buffer area only

Nationally Important Wetlands			[Resource Information]
Wetland Name		State	Buffer Status
Hutt Lagoon System		WA	In buffer area only

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

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

Name	Region	Buffer Status
Western rock lobster	South-west	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			

Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In feature area
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In feature area
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Known to occur	In feature area
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In feature area

Seals

Neophoca cinerea Australian Sea Lion [22]	Foraging (male)	Likely to occur	In buffer area only
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Whales

Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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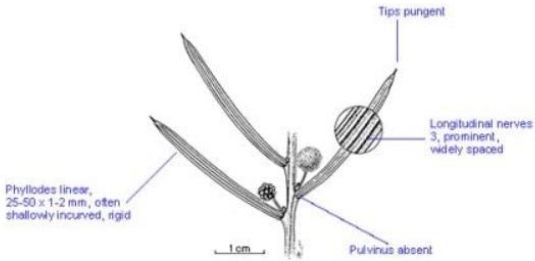
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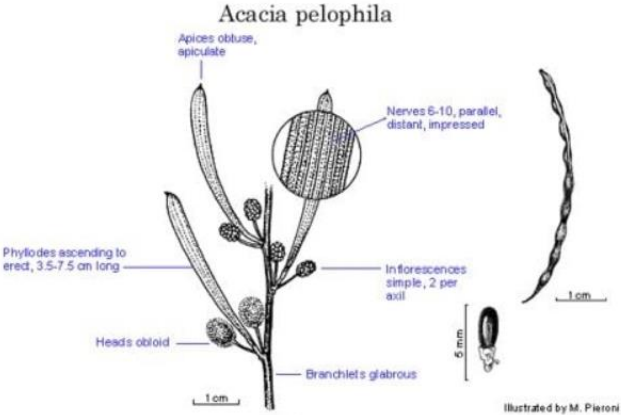
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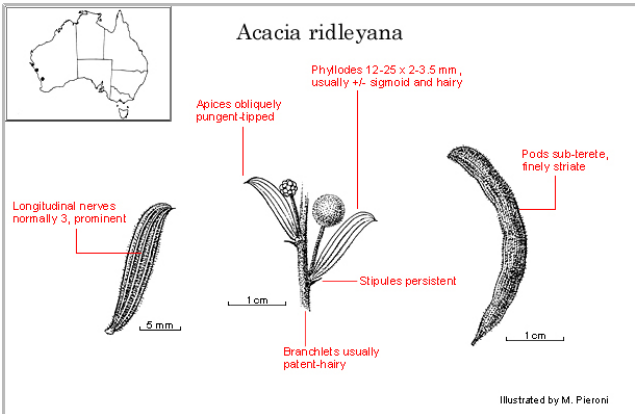
Canberra City ACT 2601 Australia

+61 2 6274 1111



Appendix 2: Significant Species


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Acacia guinetii</i></p> <p>Photos: S.D. Hopper & M. Hancock</p>	Guinet's Wattle	Spreading to straggling or erect & spindly shrub, 0.3-2(-2.5) m high.	Fl. yellow, Jun to Sep.	Rocky loam, lateritic gravelly soils. Stony hills.	P4	Unlikely
<p><i>Acacia latipes subsp. licina</i></p> 		Pungent shrub, 0.4-1.2 m high.	Fl. yellow, Jun to Sep,	White sand, granitic soils. Limestone hills, sandplains.	P3	Likely



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Acacia megacephala</i></p> <p>Photos: A.D. Crawford & S.J. Patrick</p>		Erect, often spindly, spinose shrub, 0.9-2 m high.	Fl. yellow, Jul to Sep.	White/yellow sand. Sandplains.	P3	Possible
<p><i>Acacia pelophila</i></p>  <p>Illustrated by M. Pieroni</p>		Dense, spreading shrub, 0.9-2 m high.	Fl. yellow, Jul to Aug.	Clay. Saline creeklines.	P1	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<p><i>Acacia ridleyana</i></p> 		Spreading, sprawling shrub, 0.2-0.9 m high, 0.5-2 m wide.	Fl. yellow, Aug to Dec.	Grey or yellow/brown sand, gravelly clay, granitic loam.	P3	Unlikely
<p><i>Androcalva bivillosa</i></p>		Growing in reddish-brown or yellow sand and gravel on flats and slopes and also in orange brown clayey-sand on recently disturbed road verges. Associated species include Acacia and Allocasuarina spp., Callitris arenarius, Grevillea candelabroides, G. eriostachya, Jacksonia sp. and Melaleuca cordata.	July-Oct		CR/T	Unlikely


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Anthocercis intricata</i></p> <p>Photos: S.J. Patrick & M. Kealley</p>		Dense, spinescent shrub, 0.9-3 m high.	Fl. white-cream, Jun to Sep.	Sand or loam over limestone. Consolidated sand dunes.	P3	Likely
 <p><i>Anthrotroche myoporoides</i></p> <p>Photo: K.R. Thiele</p>	Myoporum-like Anthotroche	Erect, rounded, often intricately branched shrub, 0.6-3 m high.	Fl. white-cream-green, Aug to Nov or Jan.	Yellow or red sand. Sandplains.	P3	Likely



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Balladonia aervoides</i>	Woolly Beauty-heads				P3	Possible
 <p><i>Beyeria cinerea</i> subsp. <i>cinerea</i> Photos: G. Cockerton & M. Kealley</p>					P3	Likely
 <p><i>Blackallia nudiflora</i> Photos: M. Kealley & S.J. Patrick</p>	Wedge-leaved Cryptandra	Shrub, 0.3-1 m high, often with spinescent branchlets.		Clay or sandy clay with granite. On hills or breakaways, plains.	P3	Possible



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Caladenia barbarella</i> Photo: A.P. Brown</p>	Small Dragon Orchid	Tuberous, perennial, herb, 0.08-0.25 m high.	Fl. green, Aug to Sep.	Shallow, grey, dark brown, sandy clayey loam. Rocky ledges, alongside seasonal creeklines, in winter-wet depression s.	T	Unlikely







Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Caladenia bryceana</i> subsp. <i>cracens</i> Photos: I. & M. Greeve & S.D. Hopper</p>	Northern Dwarf Spider-orchid	Tuberous, perennial, herb, 0.03-0.08 m high.	Fl. green-yellow, Aug to Sep.	Sand over limestone. South of Kalbarri in low heath on limestone hills; north in winter-moist flats.	T	Likely
 <p><i>Caladenia elegans</i> Photos: A.P. Brown, S.D. Hopper & S. Patrick</p>	Elegant Spider-orchid	Tuberous, perennial, herb, 0.2-0.3 m high.	Fl. yellow, Jul to Aug.	Clayey loam. Winter-wet clay flats.	T	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Caladenia hoffmanii</i></p> <p>Photos: A.P. Brown, S.D. Hopper & S.J. Patrick</p>		Tuberous, perennial, herb, 0.13-0.3 m high.	Fl. green & yellow & red, Aug to Oct.	Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	T	Unlikely
 <p><i>Calytrix harvestiana</i></p> <p>Photos: S.J. Patrick</p>		Shrub, 0.3-0.7 m high.	Fl. purple-pink/violet, Sep to Dec.	White or yellow sand. Flats.	P2	Likely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Calytrix pimeleoides</i></p> <p>Photos: M. Kealley</p>		Loose, erect shrub, 0.5-1.6 m high.	Fl. cream & yellow, Aug to Oct.	Grey or yellow-brown sand, laterite. Sandplains, flats, hills, outcrops.	P3	Unlikely
<i>Chamelaucium</i> sp. Coolcalalaya					P1	Unlikely
 <p><i>Chorizema humile</i></p> <p>Photos: A. Doley & D. Papenfus</p>	Prostrate Flame Pea	Sprawling, prostrate or decumbent shrub.	Fl. yellow & red/brown, Jul to Sep.	Sandy clay or loam. Plains.	T	Unlikely
<i>Comesperma rhadinocarpum</i>		Slender-fruited Comesperma	Perennial, herb.	Fl. blue, Oct to Nov.	P3	Likely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Conostylis dielsii</i> subsp. <i>teres</i> Photos: A.D. Crawford & S.D. Hopper</p>		Shortly rhizomatous, tufted perennial, grass-like or herb, 0.13-0.33 m high, leaves terete.	Fl. cream-yellow, Jul to Aug.	White, grey or yellow sand, gravel. Low open woodland.	T	Unlikely
 <p><i>Conostylis micrantha</i> Photos: R. Evans, S.J. Patrick & L. Sweedman</p>	Small-flowered Conostylis	Rhizomatous, tufted perennial, grass-like or herb, 0.13-0.24 m high.	Fl. yellow-cream/red, Jul to Aug.	White or grey sand. Sandplains.	T	Unlikely
<i>Desmocladius glomeratus</i>		Rhizomatous, densely tufted perennial, herb (sedge-like), ca 0.4 m high.	Fl. Aug to Oct.	Deep sand over laterite. Dry heath.	P2	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Diuris drummondii</i></p> <p>Photos: A. P. Brown and I & M Greeve</p>	Tall Donkey Orchid					Unlikely
 <p><i>Diuris recurva</i></p> <p>Photos: I. & M. Greeve & S.J. Patrick</p>		Tuberous, perennial, herb, 0.2-0.3 m high.	Fl. yellow & brown, Jul to Aug.	Loam. Winter-wet areas.	P4	Unlikely


Picture		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 			Tuberous, perennial, herb, 0.25-0.3 m high.	Fl. red & yellow, Aug to Sep.	Sand.	T	Likely
 		Morseby Range Drummondita	Divaricately branched shrub, 0.3-1 m high.	Fl. yellow & white & violet/purple, Sep to Oct.	Rocky places.	T	Unlikely



Drakaea concolor



Photos: I. & M. Greeve



Drummondita ericoides



Photos: S.D. Hopper & S.F. Patrick



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Enekbatus bounites</i>		Spreading shrub, to 0.3 m high.		Clay over sandstone. Hilltops.		Unlikely
 <p><i>Eremophila brevifolia</i></p> <p>Photos: A.P. Brown & J.D. Start</p>	Spotted Eremophila	Erect, spindly shrub, 0.9-2(-3.6) m high.	Fl. white-pink-blue, Jul to Sep.		P2	Likely


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Eremophila microtheca</i></p> <p>Photos: S. Patrick, S.D. Hopper & A.D. Crawford</p>	Heath-like Eremophila	Erect shrub, 0.7-1.6 m high.	Fl. blue-purple, Aug to Sep.	Sandy clay. Winter wet flats, saline flats, sandplains.	P4	Unlikely
 <p><i>Eucalyptus blaxellii</i></p> <p>Photos: A.P. Brown, A.D. Crawford & S.J. Patrick</p>	Howatharra Mallee	(Mallee), 1-4 m high, bark smooth.	Fl. white-cream, Aug to Nov.	Grey sand, clay. Rocky hillsides, creek flats.	P4	Likely


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Eucalyptus cuprea</i></p> <p>Photos: A.P. Brown & S.F. Patrick</p>	Mallee Box	(Mallee), 2.5-5 m high, bark rough to 1.5 m, box-type.	Fl. white, Aug to Nov.	Shallow soils over granite.	T	Unlikely
 <p><i>Eucalyptus ebanoensis</i> subsp. <i>photina</i></p> <p>Photos: A.D. Crawford</p>	Glossy-leaved Sandplain Mallee	(Mallee), 2-6 m high, adult leaves glossy.	Fl. white-cream, Sep to Dec or Jan to Mar.	Sandy clay, red sand. Lateritic breakaways, sandplains.	P4	Unlikely


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Frankenia confusa</i></p> <p>Photos: G. Byrne & D. M. Porter</p>		Low, diffuse shrub, to 0.75 m high, to 0.75 wide.	Fl. pink, Sep.	Wet pale brown sand, brown clay, grey soil. Banks of rivers & waterholes, river floodplains.	P4	Unlikely
<i>Frankenia glomerata</i>	Cluster Head Frankenia	Prostrate shrub.	Fl. pink-white, Nov.	White sand.	P4	Likely
 <p><i>Gastrolobium hamulosum</i></p> <p>Photos: J.A. Cochrane, A.D. Crawford & S.D. Hopper</p>	Hook-point Poison	Low shrub, 0.2-0.45 m high.	Fl. yellow&orange &red&purple, Aug to Oct.	Sandy, often gravelly soils or clay. Flats, slopes, ridges.	T	Unlikely




Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Gastrolobium propinquum</i></p> <p>Photos: S.J. Patrick</p>	Hutt River Poison	Low, bushy shrub, to 1(-1.8) m high.	Fl. Orange & yellow & red, Jun to Sep.	Clay, clay-loam or sandy clay soils, granite, shale. Hills, flats, drainage lines, winter-wet areas.	P3	Possible
<i>Geleznovia sp. Binu</i>					P3	Possible
<i>Grevillea bracteosa subsp. howatharra</i>					T	Unlikely
 <p><i>Grevillea christineae</i></p> <p>Photos: S.F. Patrick</p>	Christine's Grevillea	Erect, wiry shrub, 0.5-0.6 m high.	Fl. white-cream, Aug to Sep.	Clay loam, sandy clay, often moist.	T	Unlikely



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Grevillea leptopoda</i></p> <p>Photos: D. & B. Bellairs & A. Crawford</p>		Spreading to erect shrub, 0.6-1.5 m high.	Fl. white-cream, Aug to Sep.	Loam & lateritic gravel, sand, clay.	P3	Unlikely
 <p><i>Grevillea triloba</i></p> <p>Photos: P. G. Armstrong & S.J. Patrick</p>		Diffuse or spreading shrub, (0.4-)0.9-1.5(-2.5) m high.	Fl. white/pink-white, Jun to Oct.	Sandy loam on sandstone or limestone, lateritic soils.	P3	Possible


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Guichenotia quasicalva</i> Photos: S.J. Patrick</p>		Erect, compact shrub, to 0.5 m high.	Fl. blue-purple, Sep to Oct.	Sandy clay over laterite. Drainage line.	P2	Unlikely
<i>Hemigenia pimeleifolia</i>					P2	Possible
<i>Homalocalyx chapmanii</i>		Shrub, 0.2-0.5 m high.	Fl. red-pink-purple, Sep to Oct.	Yellow or grey/brown sand. Undulating plains, weathered granite.	P2	Unlikely
<i>Hypocalymma angustifolium</i> subsp. <i>Hutt River</i> (S. Patrick 2982)					T	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Lasiopetalum oldfieldii</i></p> <p>Photos: M. Henderson</p>		Shrub, 0.2-1(-1.5) m high.	Fl. pink/white, Apr or Aug to Nov.	White, grey or yellow sand, gravel, laterite. Sandplains, rises.	P3	Likely
<i>Lepidosperma</i> sp. Moresby Range					P1	Unlikely
<i>Leucopogon borealis</i>		Erect, lignotuberous shrub, to about 1.2 m high.		Rocky sandy loam over sandstone. Rangelands	P2	Unlikely
<i>Styphelia marginata</i> (syn. <i>Leucopogon marginatus</i>)		Thick-margined Leucopogon		.	T	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
						
	<i>Leucopogon psammophilus</i>	Shrub, ca 0.45 m high.		Breakaway s.	P1	Unlikely
	<i>Leucopogon sp. Howatharra</i>	Compact, dense shrub, to 0.6 m high.	Fl. white, Jun.	Brown sandy loam. Mid-slopes of valley.	P2	Unlikely
	<i>Leucopogon sp. Moresby Range</i>	Shrub, to 1 m high.	Fl. white, Jun to Jul.	Brown sandy loam, gravel, sandstone. Middle slopes of	P3	Unlikely



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
				valleys, steep rocky hillsides, ridges, roadverges.		
<i>Leucopogon sp. Port Gregory</i>					P1	Unlikely
<i>Liparophyllum congestiflorum</i>					P4	Likely
  <i>Melaleuca huttensis</i>	 Photos: G. Byrne & M. Kealley	Upright shrub, to 3 m high, bark gnarled, white to grey.	Fl. cream-yellow, Jun to Jul or Sep.	Light yellow or beige sand. Lower slopes of undulating plains, sandplains.	P3	Likely
<i>Micromyrtus collina</i>					P1	Unlikely
<i>Olearia adpressa</i>		Northampton Daisy Bush			P1	Possible
<i>Ozothamnus vespertinus</i>					P1	Possible

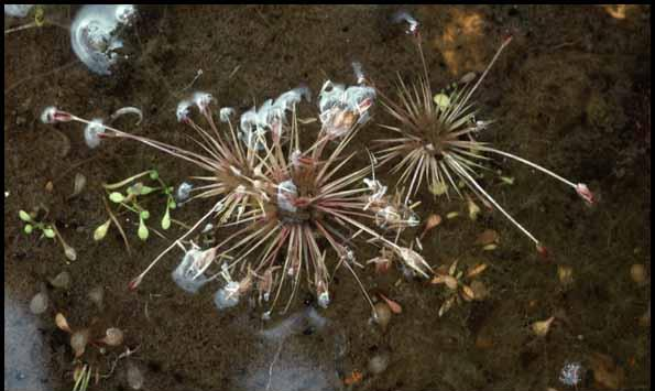

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Paracaleana dixonii</i></p> <p>Photos: G. Brockman, A.P. Brown & I. & M. Greeve</p>	Sandplain Duck Orchid	Tuberous, perennial, herb, 0.09-0.2 m high.	Fl. yellow-brown, Oct to Dec or Jan.	Grey sand over granite.	T	Unlikely
 <p><i>Prostanthera scutata</i></p> <p>Photos: C.A. Gardner</p>		Erect, compact shrub, 0.2-0.3 m high.	Fl. blue-violet, Oct or Dec or Jan.	Gravelly sand.	P2	Likely
<i>Pterostylis sinuate</i>	Northampton Midget Greenhood,				T	Unlikely


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
	Western Swan Greenhood					
<i>Ptilotus chortophytus</i>					P1	Possible
<i>Rhodanthe sp. Yuna</i>					P3	Possible
 <p><i>Scaevola kalsophylla</i></p> <p>Photos: M. Hancock & M. Kealley</p>		Erect, compact shrub, to 1 m high.	Fl. white, May or Aug to Dec.	Sandy soils over limestone. Coastal plain.	P4	Likely



Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Scaevola oldfieldii</i></p> <p>Photos: G. Byrne & S.J. Patrick</p>		Erect shrub, to 2.3 m high.	Fl. white, Aug to Dec.	Sand, loam, clay. Near rivers.		Possible
<i>Schoenus badius</i>		Slender annual, grass-like or herb (sedge), 0.05-0.12 m high.	Fl. brown-green, Sep to Oct.	Grey sand. Moist areas.	P2	Possible


Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Serichonus gracilipes</i></p> <p>Photos: B.L. Rye</p>		Evergreen shrub, 0.2-0.7 m high.		Red sandy clay over granite, brown sandy clay loam with laterite gravel, yellow-brown sandy loam over sandstone. Rock crevices, rocky gullies, margins of summits and basal slopes of mesas, near rock outcrops.	P3	Unlikely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Stachystemon nematophorus</i></p> <p>Photo: D. & B. Bellairs</p>		Woody, dense shrub, to 1.2 m high.		Dry sand, sandy gravel over laterite, sandstone. Exposed rocky sites, disturbed ground.	P4	Possible
 <p><i>Stylidium drummondianum</i></p> <p>Photos: J. Wege</p>		Rosetted perennial, herb, 0.05-0.22 m high, Leaves narrowly oblanceolate, 0.5-3 cm long, 0.8-2 mm wide, apex mucronate, margin hyaline and serrulate, glabrous. Scape hoary.	Inflorescence paniculate. Fl. pink, Aug to Oct.	Sand or clayey sand over laterite. Upper hillslopes, breakaways . Low heath, mallee shrubland.	P3	Possible, but unlikely
<i>Styphelia cernua</i>					P2	Possible
<i>Styphelia inopinata</i>					P1	Possible

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Teucrium</i> sp. Hutt River (W.H. Butler 54)					P1	Possible
<i>Thryptomene stapfii</i>					P3	Unlikely
					P4	Likely
<i>Trithuria australis</i> Photo: G.J. Keighery						
		Erect to spreading shrub, 0.6-2 m high.		Fl. yellow/cream, Sep to Dec or Jan.	Yellow sand. Sandplains, sand dunes.	P3 Possible
<i>Verticordia chrysostachys</i> var. <i>pallida</i> Photos: G. Byrne & E.A. George						

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Verticordia densiflora</i> var. <i>roseostella</i></p> <p>Photos: E.A. George</p>		Open shrub, 0.4-1.3 m high.	Fl. pink-white, Sep to Dec.	Sandy gravelly soils.	P3	Likely
 <p><i>Verticordia dichroma</i> var. <i>dichroma</i></p> <p>Photos: S.J.Patrick & D.M. Porter</p>		Erect, spindly or spreading shrub, 0.3-3 m high.	Fl. yellow & orange & red, Oct to Dec.	Yellow sand. Sandplains.	P3	Likely

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Verticordia dichroma</i> subsp. <i>syntoma</i> Photos: E.A. George</p>		Shrub, 0.4-1.7 m high.	Fl. yellow & orange & red, Oct to Nov.	Yellow or red sand. Sandplains.	P3	Unlikely
 <p><i>Verticordia penicillaris</i> Photos: G. Byrne & E.A. George</p>		Low spreading shrub, 0.15-0.3 m high, to 1 m wide.	Fl. cream-yellow, Sep to Oct.	Shallow gritty soils. Granite outcrops.	P4	Unlikely
<i>Vittadinia cervicalis</i> var. <i>occidentalis</i>		Annual, herb, more than 0.3 m high.	Fl. white-purple-blue, Aug to Sep.			Possible

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <p><i>Wurmbea tubulosa</i></p> <p>Photos: S.F. Patrick & P. Roberts</p>	Long-flowered Nancy	Cormous, perennial, herb, 0.01-0.03 m high, dioecious or sometimes andromonoecious.	Fl. white-pink, Jun to Aug.	Clay, loam. River banks, seasonally-wet places.	T	Unlikely

*Photo sources: Florabase and <https://apps.lucidcentral.org/wattle/>

Appendix 3: Conservation Codes

Western Australia

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

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


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

Commonwealth

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

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

Appendix 4: Quadrat Data

Quadrat No.:	Q1	
Survey Date:	07/08/2022	
Personnel:	KS, KG	
Latitude:	-28.350204	
Longitude:	114.408367	
Topography:	Mid Slope	
Aspect:	Northwest	
Slope:	1-3%	
Soil:	Brown Sand	
Gravel:	0%	
Rock:	0%	
Leaf Litter:	0%	
Bare Ground:	2%	
Drainage:	Well	
Condition:	Very Good	

Notes: Mixed Coastal Shrubland

Species	Height (m)	Cover (%)
<i>*Arctotheca calendula</i>	0.2	0.3
<i>*Bromus diandrus</i>	0.3	0.5
<i>*Ehrharta longiflora</i>	0.4	3
<i>*Phalaris minor</i>	0.2	0.1
<i>*Reichardia tingitana</i>	0.3	2
<i>*Sonchus asper</i>	0.3	1
<i>Acacia rostellifera</i>	0.4	10
<i>Acanthocarpus preissii</i>	0.2	3
<i>Austrostipa nitida</i>	0.5	2
<i>Calandrinia polyandra</i>	0.2	0.1
<i>Carpobrotus virescens</i>	0.2	20
<i>Euphorbia tannensis</i>	0.3	0.3
<i>Lysiandra calycina</i>	0.4	0.5
<i>Mesembryanthemum crystallinum</i>	0.1	0.1
<i>Nicotiana rotundifolia</i>	0.2	0.1

Shire of Northampton
Detailed Flora and Vegetation Survey

Species	Height (m)	Cover (%)
<i>Olearia axillaris</i>	0.5	40
<i>Ptilotus villosiflorus</i>	0.3	1
<i>Scaevola crassifolia</i>	0.4	1
<i>Senecio pinnatifolius</i>	0.2	1
<i>Spinifex longifolius</i>	0.3	0.2
<i>Tetragonia implexicoma</i>	0.2	20
<i>Threlkeldia diffusa</i>	0.1	60
<i>Thysanotus manglesianus</i>	0.1	0.1

Note: *denotes introduced species.


Quadrat No.:	Q2
Survey Date:	07/08/2022
Personnel:	KS, KG
Latitude:	-28.352102
Longitude:	114.409354
Topography:	Mid Slope
Aspect:	Southwest
Slope:	3-5%
Soil:	Brown Sand
Gravel:	0%
Rock:	0%
Leaf Litter:	0%
Bare Ground:	2%
Drainage:	Well
Condition:	Very Good



Notes: Mixed Coastal Shrubland

Species	Height (m)	Cover (%)
<i>*Chenopodium murale</i>	0.1	0.1
<i>*Crassula alata</i>	0.1	1
<i>*Ehrharta calycina</i>	0.4	0.2
<i>*Phalaris minor</i>	0.2	0.1
<i>*Reichardia tingitana</i>	0.3	0.2
<i>*Sonchus asper</i>	0.2	0.5
<i>Acacia rostellifera</i>	0.1	0.1
<i>Acanthocarpus preissii</i>	0.4	4
<i>Calandrinia polyandra</i>	0.1	1
<i>Carpobrotus virescens</i>	0.2	30
<i>Diplolaena grandiflora</i>	0.5	0.5
<i>Lomandra micrantha</i>	0.3	20
<i>Olearia axillaris</i>	0.5	5
<i>Ptilotus strilingii</i>	0.2	1
<i>Rhagodia baccata</i>	0.3	0.5
<i>Scaevola crassifolia</i>	0.5	5
<i>Senecio pinnatifolius</i>	0.2	0.1

Species	Height (m)	Cover (%)
<i>Tetragonia implexicoma</i>	0.2	30
<i>Threlkeldia diffusa</i>	0.2	8
<i>Westringia dampieri</i>	0.5	2

Quadrat No.:	Q3	
Survey Date:	07/08/2022	
Personnel:	KS, KG	
Latitude:	-28.354025	
Longitude:	114.410433	
Topography:	Mid Slope	
Aspect:	West	
Slope:	3-5%	
Soil:	Orange Brown Sand	
Gravel:	0%	
Rock:	0%	
Leaf Litter:	1%	
Bare Ground:	5%	
Drainage:	Well	
Condition:	Good	

Notes: Mixed Coastal Shrubland

Species	Height (m)	Cover (%)
<i>*Crassula alata</i>	0.1	0.1
<i>*Ehrharta calycina</i>	0.5	0.5
<i>Acanthocarpus preissii</i>	0.3	20
<i>Calandrinia polyandra</i>	0.2	1
<i>Carpobrotus virescens</i>	0.3	10
<i>Cassytha racemosa</i>	0.3	0.5
<i>Lomandra micrantha</i>	0.3	0.5
<i>Myoporum insulare</i>	0.5	0.1
<i>Olearia axillaris</i>	0.5	20
<i>Rhagodia baccata</i>	0.5	2
<i>Scaevola crassifolia</i>	0.5	40
<i>Senecio pinnatifolius</i>	0.2	2
<i>Tetragonia implexicoma</i>	0.3	5
<i>Threlkeldia diffusa</i>	0.2	5


Quadrat No.:	Q4
Survey Date:	07/08/2022
Personnel:	KS, KG
Latitude:	-28.362444
Longitude:	114.416991
Topography:	Mid Slope
Aspect:	West
Slope:	1-3%
Soil:	Orange Sand
Gravel:	0%
Rock:	0%
Leaf Litter:	0%
Bare Ground:	10%
Drainage:	Well
Condition:	Degraded



Notes: Mixed Coastal Shrubland

Species	Height (m)	Cover (%)
<i>*Arctotheca calendula</i>	0.2	2
<i>*Brassica tournefortii</i>	0.2	0.1
<i>*Chenopodium murale</i>	0.5	0.5
<i>*Crassula alata</i>	0.1	0.2
<i>*Cynodon dactylon</i>	0.2	1
<i>*Ehrharta longiflora</i>	0.5	30
<i>*Limonium sinuatum</i>	0.3	0.1
<i>*Lysimachia arvensis</i>	0.2	0.2
<i>*Mesembryanthemum crystallinum</i>	0.3	20
<i>*Reichardia tingitana</i>	0.2	1
<i>*Sonchus asper</i>	0.2	0.5
<i>Acacia rostellifera</i>	1	20
<i>Atriplex sp.</i>	0.1	0.1
<i>Carpobrotus virescens</i>	0.2	15
<i>Olearia axillaris</i>	0.1	0.5
<i>Rhagodia baccata</i>	0.5	2
<i>Salsola australis</i>	0.3	0.5

Species	Height (m)	Cover (%)
<i>Solanum symonii</i>	1	3
<i>Sporobolus virginicus</i>	0.1	0.2
<i>Threlkeldia diffusa</i>	0.2	5

Quadrat No.:	Q5	
Survey Date:	07/08/2022	
Personnel:	KS, KG	
Latitude:	-28.357827	
Longitude:	114.413090	
Topography:	Dune Swell	
Aspect:	Northwest	
Slope:	3-5%	
Soil:	Light Brown Sand	
Gravel:	0%	
Rock:	0%	
Leaf Litter:	0%	
Bare Ground:	10%	
Drainage:	Well	
Condition:	Good	

Notes: Mixed Coastal Shrubland

Species	Height (m)	Cover (%)
<i>*Arctotheca calendula</i>	0.1	0.1
<i>*Ehrharta calycina</i>	0.4	1
<i>*Sonchus asper</i>	0.2	0.1
<i>Atriplex sp.</i>	0.3	0.1
<i>Calandrinia polyandra</i>	0.3	0.2
<i>Carpobrotus virescens</i>	0.3	10
<i>Clematis linearifolia</i>	0.5	1
<i>Muehlenbeckia adpressa</i>	0.5	1
<i>Myoporum insulare</i>	1	15
<i>Olearia axillaris</i>	1	1
<i>Rhagodia baccata</i>	0.3	1
<i>Scaevola crassifolia</i>	0.4	0.5
<i>Spinifex longifolius</i>	0.5	20
<i>Tetragonia implexicoma</i>	0.3	15
<i>Threlkeldia diffusa</i>	0.2	15

Appendix 5: Species List

The complete flora list for the site is provided in the table below with flora listed by species. *Denotes introduced species.

Family	Species Name	Common Name
Asteraceae	* <i>Arctotheca calendula</i>	Cape Weed
Poaceae	* <i>Avena barbata</i>	Bearded Oat
Brassicaceae	* <i>Brassica tournefortii</i>	Mediterranean Turnip
Poaceae	* <i>Bromus diandrus</i>	Great Brome
Poaceae	* <i>Cenchrus setaceus</i>	Fountain Grass
Chenopodiaceae	* <i>Chenopodium murale</i>	
Crassulaceae	* <i>Crassula alata</i>	
Convolvulaceae	* <i>Cuscuta epithymum</i>	Lesser Dodder
Poaceae	* <i>Cynodon dactylon</i>	Couch
Poaceae	* <i>Ehrharta calycina</i>	Perennial Veldt Grass
Poaceae	* <i>Ehrharta longiflora</i>	Annual Veldt Grass
Myrtaceae	* <i>Eucalyptus utilis</i>	Coastal Moort
Euphorbiaceae	* <i>Euphorbia maculata</i>	
Asteraceae	* <i>Lactuca serriola</i>	Prickly Lettuce
Plumbaginaceae	* <i>Limonium sinuatum</i>	
Primulaceae	* <i>Lysimachia arvensis</i>	Pimpernel
Myrtaceae	* <i>Melaleuca nesophila</i>	Mindiyed
Aizoaceae	* <i>Mesembryanthemum crystallinum</i>	Iceplant
Onagraceae	* <i>Oenothera drummondii</i>	Beach Evening Primrose
Poaceae	* <i>Phalaris minor</i>	Lesser Canary Grass
Asteraceae	* <i>Reichardia tingitana</i>	False Sowthistle
Solanaceae	* <i>Solanum nigrum</i>	Black Berry Nightshade
Asteraceae	* <i>Sonchus asper</i>	Rough Sowthistle
Tamaricaceae	* <i>Tamarix aphylla</i>	Athel Tree
Aizoaceae	* <i>Tetragonia decumbens</i>	Sea Spinach
Lamiaceae	* <i>Vitex trifolia</i> subsp. <i>purpurea</i>	
Fabaceae	<i>Acacia rostellifera</i>	Summer-scented Wattle
Fabaceae	<i>Acacia saligna</i>	Orange Wattle
Asparagaceae	<i>Acanthocarpus preissii</i>	

Family	Species Name	Common Name
Asteraceae	<i>Angianthus cunninghamii</i>	Coast Angianthus
Chenopodiaceae	<i>Atriplex cinerea</i>	Grey Saltbush
Chenopodiaceae	<i>Atriplex</i> sp.	
Poaceae	<i>Austrostipa elegantissima</i>	
Poaceae	<i>Austrostipa nitida</i>	
Poaceae	<i>Bromus diandrus</i>	Great Brome
Calandrinia	<i>Calandrinia polyandra</i>	Parakeelya
Aizoaceae	<i>Carpobrotus virescens</i>	Coastal Pigface
Lauraceae	<i>Cassytha racemosa</i>	Dodder Laurel
Ranunculaceae	<i>Clematis linearifolia</i>	
Rutaceae	<i>Diplolaena grandiflora</i>	Wild Rose
Scrophulariaceae	<i>Eremophila glabra</i>	Tar Bush
Euphorbiaceae	<i>Euphorbia tannensis</i>	
Cyperaceae	<i>Ficinia nodosa</i>	Knotted Club Rush
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass
Asparagaceae	<i>Lomandra micrantha</i>	
Fabaceae	<i>Lotus australis</i>	
Phyllanthaceae	<i>Lysiandra calycina</i>	False Boronia
Aizoaceae	<i>Mesembryanthemum crystallinum</i>	Iceplant
Polygonaceae	<i>Muehlenbeckia adpressa</i>	Climbing Lignum
Scrophulariaceae	<i>Myoporum insulare</i>	Blueberry Tree
Solanaceae	<i>Nicotiana rotundifolia</i>	Round-leaved Tobacco
Nitrariaceae	<i>Nitraria billardierei</i>	Nitre Bush
Asteraceae	<i>Olearia axillaris</i>	Coastal Daisybush
Rubiaceae	<i>Opercularia vaginata</i>	Dog Weed
Thymelaeaceae	<i>Pimelea microcephala</i>	Shrubby Riceflower
Amaranthaceae	<i>Ptilotus strilingii</i>	Stirling's Mulla Mulla
Amaranthaceae	<i>Ptilotus villosiflorus</i>	
Chenopodiaceae	<i>Rhagodia baccata</i>	Berry Saltbush
Chenopodiaceae	<i>Salsola australis</i>	
Santalaceae	<i>Santalum acuminatum</i>	Quandong
Goodeniaceae	<i>Scaevola crassifolia</i>	Thick-leaved Fan-flower

Family	Species Name	Common Name
Asteraceae	<i>Senecio pinnatifolius</i>	
Solanaceae	<i>Solanum symonii</i>	
Poaceae	<i>Spinifex longifolius</i>	Beach Spinifex
Poaceae	<i>Sporobolus virginicus</i>	Marine Couch
Aizoaceae	<i>Tetragonia implexicoma</i>	Bower Spinach
Chenopodiaceae	<i>Threlkeldia diffusa</i>	Coast Bonefruit
Asparagaceae	<i>Thysanotus manglesianus</i>	Fringed Lily
Lamiaceae	<i>Westringia dampieri</i>	

Appendix 6: WoNS Location

