

# Vegetation, Flora, Fauna and Environmental Considerations Report

Shire of Esperance 2022-23 Strategic Purpose Permit  
Site G – Heywood Road, 0 - 6 SLK



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## **Acknowledgement of Country**

The Shire of Esperance acknowledges the Kapa Kurl Wudjari people of the Nyungar nation and Ngadju people who are the traditional custodians of this land and their continuing connection to land, waters and community. We pay our respect to their Elders past, present and emerging and we extend that respect to other Aboriginal Australians today.

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## LIST OF ABBREVIATIONS

**BAM Act:** Biosecurity and Agriculture Management Act 2007 (WA)  
**BC Act:** Biodiversity Conservation Act 2016 (WA)  
**BOM:** Bureau of Meteorology  
**DBCA:** Department of Biodiversity, Conservation and Attractions  
**EP Act:** Environmental Protection Act 1986 (WA)  
**EPA:** Environmental Protection Authority  
**EPBC Act:** Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)  
**IBRA:** Interim Biogeographical Regionalisation for Australia  
**IUCN:** International Union of Conservation Nature  
**LGA:** Local Government Area  
**NVIS:** National Vegetation Information System  
**PEC:** Priority Ecological Community  
**PF:** Priority Flora (Under BC Act)  
**SOE:** Shire of Esperance  
**SLK:** Straight Line Kilometres (Main Roads WA)  
**TEC:** Threatened Ecological Community  
**TF:** Threatened Flora (Under BC Act)  
**TPFL:** Threatened and Priority Flora Database (DBCA)  
**TPRF:** Threatened and Priority Flora Report Form  
**WAH:** Western Australian Herbarium (PERTH)  
**WAOL:** Western Australian Organism List

## 1 EXECUTIVE SUMMARY

The Shire of Esperance Environmental Team was commissioned by the Shire of Esperance Asset Management department to undertake a review of the flora, vegetation and fauna values on the proposed 'Heywood road - SLK 0 – 6' project in 2022-23 as part of their Strategic Purpose Permit application.

The proposed development involves the clearing of 0.157 ha of native vegetation for the purpose of road widening. To complete these works, native vegetation up to 2m from the current road footprint on both sides of the road is required to be cleared, increasing the active road footprint to 17m. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation.

The Shire of Esperance's two Environmental Scientists completed the site assessment on 'Heywood road - SLK 0 - 6' between the 10 October to 15 November, 2022.

A total of 237 vascular plant taxa, representative of 139 genera and 52 families, were recorded within 'Heywood road - SLK 0 - 6' survey area. Of these 213 were native species and 24 were introduced. The majority of taxa recorded were representative of the Myrtaceae (37 taxa), Fabaceae (30 taxa) and Proteaceae (20 taxa) families.

No threatened and six priority flora species pursuant to the Biodiversity Conservation Act (2016) and as listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were recorded within the 'Heywood road - SLK 0 - 6' survey area. No plant taxa listed as Threatened pursuant to Schedule 1 of the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 were recorded during the survey within the proposed 'Heywood road - SLK 0 - 6' survey area.

**Table 1:** Summary of Priority flora species recorded in Site G – Heywood Road - SLK 0 - 6 project area.

Species	Conservation Code	Total Locations	Total Population	Total Plants to be taken
<i>Bentleya diminuta</i>	P2	3 colonies	Not counted estimated to be thousands	50% of "thousands"
<i>Aotus</i> sp. Dundas	P2	4	238	1
<i>Acacia bartlei</i>	P3	1	10	1
<i>Persoonia scabra</i>	P3	2	7	0
<i>Goodenia laevis</i> ssp. <i>laevis</i>	P3	1	7	0
<i>Styphelia rotundifolia</i>	P3	1	327	27

The EBPC listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' Threatened Ecological Community (TEC) was present within 'Site G - Heywood road - SLK 0 – 6'. Only 0.001ha of good condition Kwongkan TEC will be cleared as part of this project.

There was also one vegetation unit that may match the State Listed Priority Ecological Community (PEC) "Swamp Yate (*Eucalyptus occidentalis*) woodland in seasonally-inundated basins". In total 0.0424892 ha of this PEC will be cleared under 'Site G – Heywood road - SLK 0 - 6' project. No other TECs or PECs were located within 'Site G - Heywood road - SLK 0 – 6'.

The vegetation may contain foraging habitat for Carnaby's Black Cockatoo, Southern Death Adder, Peregrine falcon, Malleefowl and Chudich. Impacts to all of these species from the proposed clearing is likely to be negligible.

Overall, the vegetation communities mapped and species recorded in the 'Heywood road - SLK 0 - 6' survey area were consistent with the historical mapping of Beard (1976). Both of the two vegetation communities are reasonably well conserved in the IUCN system.

Should the development of 'Heywood road - SLK 0 - 6' go ahead the following recommendations are made as a means of minimizing the impacts of infrastructure activities on the flora, vegetation and fauna values in the area:

- Minimise clearing to minimum amount required
- Avoid larger habitat trees (larger trees and trees with hollows) wherever possible;
- Maintain existing drainage systems, spoon drains and ensuring tracks and other infrastructure areas do not disrupt or divert historic water flow patterns;
- Remove and stockpile topsoil, log debris and leaf litter where possible for use in future rehabilitation programs. If possible, stockpiled topsoil should be directly replaced on disturbed areas;
- Minimise soil disturbance during clearing and practice standard vehicle hygiene to ensure introduced (exotic) species do not become established within the 'Heywood road - SLK 0 - 6' survey area;
- Monitor the site where the single *Acacia pycnantha* plant was found and removed at SLK 2.69 for new seedlings and remove these immediately; and
- Minimize all threatening processes to native vegetation.

These have been addressed in the attached Weed and Dieback plan, and provided these measures are implemented, there should be no impediments to the clearing of 'Heywood road - SLK 0 - 6'.



## 1 INTRODUCTION

The Shire of Esperance endeavors to maintain a high level of road safety, being proactive in identifying high risk road designs and progressively upgrading them. The Shire of Esperance manages the largest road network of any local government in Western Australia, encompassing a total of 4,593 km of road. The Shire of Esperance is submitting 'Heywood road - SLK 0 - 6' project as Site G under the '2022-23 Strategic Purpose Permit' (Figure 1), for the purpose of road construction.

### 1.1 Location and Scope of Project

The proposed works are located 78 km north-east of Esperance, within the Shire of Esperance managed road reserve of Heywood Road. Specifically, it is located from 0 to 6 km north of Parmango Road, at straight line kilometre (SLK) 0 to 6 Heywood Road (Main Roads 2022). A point within the proposed clearing permit area is -33.604599 S, 122.682493 E or 6281647 m N, 470546 mE (UTM Zone 51 H, GDA94).

Heywood Road is particularly narrow resulting in safety issues during harvest season. Heywood Road requires widening to maintain the safety of road users during harvest. This road is classified as a rural access road on Shire road network providing vital link to properties and other access roads in north east region of Esperance. Traffic counts showing a major impact of heavy vehicle occupied during harvesting season and it is an approved RAV route.

To complete these works, native vegetation up to 2 m from the current road footprint on both sides of the road is required to be cleared, increasing the active road footprint to 17 m. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation.



Figure 1. Location of 'Site G – Heywood Road – SLK 0 – 6'.

## 1.2 Environmental Legislation and Guidelines

The Commonwealth (federal) legislation relevant to this survey is the:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The following Western Australian (state) legislation relevant to this survey include the:

- Biodiversity Conservation Act 2016 (BC Act);
- Biodiversity Conservation Act 2016 Biodiversity Conservation (Listing of Native Species) (Flora) Order 2022
- Biodiversity Conservation Act 2016 Biodiversity Conservation (Listing of Native Species) (Fauna) Order 2022
- Biosecurity and Agriculture Management Act 2007 (BAM Act);
- Environmental Protection Act 1986 (EP Act);

Western Australian guidelines relevant to this survey are the:

- Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority [EPA] 2016);
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016);
- A guide to the assessment of applications to clear native vegetation, Under Part V Division 2 of the Environmental Protection Act 1986 (DWER, 2014)
- Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA, 2020)

International Agreements relevant to this survey are the:

- Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment 1974 (Japan-Australia Migratory Bird Agreement – JAMBA)
- Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986 (China-Australia Migratory Bird Agreement – CAMBA)
- Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds 2007 (Republic of Korea-Australia Migratory Bird Agreement – ROKAMBA)
- Convention on Wetlands of International Importance 1971 (Ramsar Convention)

## 2 OBJECTIVES

The objective of this survey was to undertake a flora, fauna and vegetation assessment of the 'Heywood road - SLK 0 - 6' survey area including:

- Undertake a desktop study of the flora, fauna and vegetation of the 'Heywood road - SLK 0 - 6' survey area, with an emphasis on threatened and priority flora, threatened and priority ecological communities (TECs and PECs) and Threatened and Priority fauna;
- Review the historical literature of the 'Heywood road - SLK 0 - 6' survey area;
- Undertake a detailed survey of the 'Heywood road - SLK 0 - 6' survey area, and collect and identify the vascular plant species present;
- Review the conservation status of the vascular plant species recorded by reference to current literature and listings by the Department of Biodiversity, Conservation and Attractions (DBCA) and plant collections held at the Western Australian State Herbarium (WAH), and listed by the Department of Climate Change, Energy, the Environment and Water under the EPBC Act;
- Define and map the vegetation communities in the 'Heywood road - SLK 0 - 6' survey area;
- Define and map the location of any threatened and priority flora located within the 'Heywood road - SLK 0 - 6' survey area;



- Define any management issues related to flora, fauna and vegetation values;
- Provide recommendations on the local and regional significance of the vegetation communities; and
- Prepare a report summarising the findings.

### 3 METHODS

#### 3.1 Desktop Assessment

A desktop assessment with a 20km buffer zone was conducted using DBCA datasets sourced under agreement for:

- WA Herbarium data (WAH) (DBCA,2022a)
- Threatened and Priority Flora Database (TPFL) (DBCA,2022c)
- DBCA's Esperance District Threatened Flora spatial dataset (DBCA,2022d)
- Threatened and Priority Ecological Communities (DBCA,2021a)
- Threatened, specially protected and priority fauna (DBCA,2022e)
- Black cockatoo roost and breeding sites (DBCA,2022f)

In addition, the EPBC Act Protected Matters Search Tool, was also checked to identify the possible occurrence of threatened and priority flora, fauna and threatened and priority ecological communities within the 'Heywood road - SLK 0 - 6' area. Search parameters were 'by polygon' and a 20 km buffer was applied to the search area; standard used in this IBRA subregion.

In addition, historical documentation and state datasets including:

- Vegetation mapping of the region, principally that of Beard (1976)
- 2020 Vegetation Extent by Statewide Pre-European mapping statistics
- Soil landscape mapping (DAFWA)
- Dieback Information Data Management System (DIDMS) (Gaia Resources)
- Shire of Esperance Weed Mapping Data
- Existing site digital orthophotos (Howick 2018)
- Atlas of Living Australia database
- Hydrographic Catchments (DWER)
- Crown Reserves (Landgate)

## 3.2 Field Survey

A detailed field assessment of the flora and vegetation of the 'Heywood road - SLK 0 - 6' survey area was undertaken by Shire of Esperance botanists, Julie Waters and Katherine Walkerden from 10-12 October 2022 in accordance with methods outlined in Technical Guidance – Flora and vegetation surveys for environmental impact assessment (EPA 2016). All botanists held valid collection licences to collect flora for scientific purposes, issued under the BC Act.

The methodology for assessing threatened and priority flora consisted of traversing by foot the entire 'Heywood road - SLK 0 - 6' survey area. The road was used as a continuous transect. Vegetation up to 5 meters from the edge of the existing road's back-slope was assessed to accurately cover the 17 m width proposed clearing permit area. Botanists used handheld Garmin GPS units loaded with the 'Heywood road - SLK 0 - 6' survey area boundary recording all species, and collecting all but the very common, well known species.

For PF or TF species identified in the desktop survey as possible to occur, scans of pressed specimens from either the WAH or local Esperance District Herbarium were taken into the field. Suitable associated habitat for TF or PF identified in the desktop study were particularly focused on, and extensively searched. If suspected or known conservation significant flora species were encountered, a specimen was collected for subsequent identification with GPS coordinates and plant numbers recorded for the population. During the survey, a field herbarium for 'Heywood road - SLK 0 - 6' was also constructed.

All species unknown in the field were collected, pressed and dressed in accordance with WAH instructions, and later identified by SOE's three Botanists, using keys, WA Herbarium's Florabase, literature and Esperance District Herbarium. Any species that were unable to be identified were submitted to the WAH for identification (and NSW Herbarium for *Lepidospermas*). Nomenclature of the species recorded is in accordance with the WAH.

Whilst surveying, a general assessment of possible ecological impacts included historical clearing, impact of fire regimes, regeneration from disturbance, waterlogging, senescence, weeds, erosion, sedimentation, invasive fauna, *Phytophthora* Dieback, and illegal dumping of rubbish.

A follow up survey was conducted on 15 November 2022 by Julie Waters and Katherine Walkerden to specifically target the counting of Priority 2 *Aotus* sp Dundas, and Priority 3 *Acacia bartlei* and map the vegetation types and condition within 'Site G – Heywood road - SLK 0 - 6'.

The vegetation communities of 'Site G – Heywood road - SLK 0 - 6' was assessed for the presence a TEC or PEC (DBCA 2018, 2022b) comparing that to descriptions in approved conservation advice for these communities.

Specifically, the site was assessed for the Environmental Protection and Biodiversity Conservation Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' TEC. The presence of Kwongkan was identified using diagnostic characteristics defined in the 'Approved Conservation Advice for Kwongkan (Commonwealth of Australia, 2014)' as;

2a) Characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (crowns measured as if they are opaque).

And/or

2b) Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated.

PEC's do not have published approved conservation advice. Comparison of the vegetation community occurred using 'Priority Ecological Communities for Western Australia, Version 33 (DBCA 2022b)' definitions. Specifically the listing

documentation for “Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia” (Appendix 14) was used to see if the site was a potential occurrence of this PEC.

Only a basic fauna survey was conducted as per EPA (2020) guidelines. Observations of fauna presence, such as call sounds, footprints and scats were noted, and the area assessed for suitability of habitat within ‘Site G – Heywood road - SLK 0 - 6’ for fauna species identified in the desktop survey. Carnaby’s Black Cockatoo (*Calyptrorhynchus latirostris*) feeding, roosting and nesting habitat was also assessed using EPBC Act referral guidelines (2022).

### 3.3 Survey Timing

According to Table 3 in the Technical Guidance – Flora and vegetation surveys for Environmental Impact Assessment (EPA 2016), the primary survey timing for the South-west and Interzone Botanical Province is Spring (September–November). As all surveys at ‘Heywood road - SLK 0 - 6’ were conducted in October and November, it falls within this period. The surveys were timed, where possible, to align with peak flowering periods of conservation significant flora with the potential to occur in the ‘Heywood road - SLK 0 - 6’ survey area.

The 2022 spring rainfall was above average, and hence spring flowering continued for an extended period in 2022.

### 3.4 Vegetation Descriptions

Vegetation community was assessed during the field survey. Broad vegetation types defined by structure and composition were recorded and described using the National Vegetation Information System (NVIS) (ESCAVI 2003) classification system.

Condition of vegetation was assessed using Table 2 of the Technical Guidance – Flora and vegetation surveys for Environmental Impact Assessment (EPA 2016) categories, as ‘Excellent’, ‘Very Good’, ‘Good’, ‘Degraded’ or ‘Completely Degraded’. This illustrates how healthy vegetation is, determined by vegetation structure, weed cover, presence of dieback, historical clearing, grazing and other signs of disturbance.

Additionally, possible environmentally sensitive areas, such as wetlands or granite, were noted. Overall, an assessment of environmental impacts to Department of Water and Environmental Regulation’s (DWER) biodiversity values were inspected and valued.

### 3.5 Survey Limitations

A general assessment was made of the survey against a range of factors that may have limited the outcomes and conclusions of this report (Table 2). Based on this assessment, the present survey has not been subject to constraints which would affect the thoroughness of the survey, and the conclusions which have been formed.

**Table 2:** Potential limitations affecting the conclusions made in this report.

Potential Survey Limitation	Impact on Current Survey
Availability of contextual information at a regional and local scale	<b>Not a limitation:</b> Reference resources such as Beard’s mapping, together with online flora and vegetation information, have provided an appropriate level of information for the current survey. The vegetation of the Esperance shire has previously been mapped by Beard (1976).
Resources (i.e. were there adequate resources to complete the survey to the required standard).	<b>Not a constraint:</b> Adequate resources were made available by Shire of Esperance to complete the surveys.
Competency/experience of team carrying	<b>Not a limitation:</b> Botanists had extensive experience working within the

surveyed	consistently worked within this bioregion for more than 15 years. Botanists were familiar with flora in the area. Any unknown or potential threatened or priority flora species were collected and identified, utilising resources available at the Western Australian Herbarium and consultation with expert taxonomists.
Proportion of flora collected and identification issues	<b>Potential limitation:</b> While many plants were in flower during the survey, a proportion of plants encountered during the survey were sterile and may impact the chance of identification of some specimens to species level. Orchid species may not emerge each year if conditions are not favourable. Although these may affect the completeness of the species list, it is not expected to have a significant effect on mapping reliability, nor on the identification of threatened and priority species in the area as the majority were perennial species. Surveys were only undertaken in one year
Effort and extent of survey	<b>Potential limitation:</b> The survey area was thoroughly covered. The threatened and priority flora search undertaken by botanists by means of foot-traverse along the entire road reserve ensured thorough coverage of the survey area. Flora that was unknown or resembled threatened or priority flora were collected, the location and habitat noted, and the number of plants estimated.
Mapping reliability	<b>Not a constraint.</b> Handheld GPS units were used for the survey, which for a majority of field conditions have an accuracy level of $\pm 5$ m.
Survey timing, rainfall, season of survey	<b>Not a limitation:</b> The EPA (2016a) recommends that flora and vegetation surveys in the South – West Botanical Province be conducted in Spring (September-November). All surveys have been conducted in October and November which falls within this period. Rainfall in 2022 was above average, and continued well into December.
Disturbances (fire/flood/clearing)	<b>Not a limitation:</b> The 'Heywood road - SLK 0 - 6' survey area exhibits minimal levels of disturbance, mainly from past gravel extraction.

## 4 DESKTOP ASSESSMENT RESULTS

### 4.1 Climate

The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers (BoM 2022). The Esperance Downs Research Station area receives an average annual rainfall of 490 mm. The Shire of Esperance received an unusually high level of rainfall in 2022 resulting in an extended flowering period.

### 4.2 Catchment

The northern part of 'Site G – Heywood road - SLK 0 – 6' is present within the Alexander River Catchment and the southern portion of 'Site G – Heywood road - SLK 0 – 6' sits within the and Munglignup Creek catchments. It is located approximately 30-37km from the coast.

### 4.3 Geology, Soils and Topography

Three geological units were identified within 'Site G – Heywood road - SLK 0 – 6', by Schoknecht et al. (2004). They are described as:

- Proterozoic granite and gneiss and associated colluvium;
- Deep tertiary sediments of the Pallinup formation overlying proterozoic granite and gneiss; and
- Thin Tertiary marine sediments over Proterozoic granite and gneiss bedrock.

Within 'Site G – Heywood road - SLK 0 – 6', there has been three soil types recorded. These include:

- Grey deep sandy duplex soils and pale deep sands with minor shallow gravel and grey non-cracking clays;
- Alkaline grey deep sandy duplex soils and grey deep sandy (gravelly) duplex soils with associated pale deep sands; and
- Alkaline grey shallow sandy duplex soils and associated calcareous loamy earths.

During the field survey, topography was observed to be dominated by gently sloping hillslopes. Using Schnoknect et al. (2004) the project topography is mapped at a fine scale, traversing three topographic areas. These include:

- Gently inclined to moderately inclined hillslopes;
- Level plain with occasional subdued sandsheets; and
- Slightly elevated (upper landscape position) gently undulating plain. Some gilgai microrelief.

#### 4.4 Regional Vegetation

The site is located at the convergence of two IBRA regions within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995). The Esperance Plains region and Recherche sub-region (Esp2) as well as the Mallee Region and Eastern Mallee (Mal01) subregion. The Esp2 subregion is described as "Proteaceae Scrub and Mallee heaths on sandplain overlying Eocene sediments, rich in endemics. Herbfields and heaths (rich in endemics) on abrupt granite and quartzite ranges that rise from the plan. Eucalyptus woodlands occur in gullies and alluvial foot-slopes. The Mal01 subregion is described as "the south-eastern of Yilgarn Craton is gently undulating, with partially occluded drainage. Mainly Mallee over Myrtaceous-Proteaceous heaths on duplex (sand over clay) soils. Melaleuca shrublands characterize alluvia, and Halosarcia low shrublands occur on saline alluvium. A mosaic of mixed Eucalypt woodlands and Mallee occur on calcareous earth plans, and sandplains overlying the Eocene Limestone strata in the east. Semi-arid (dry) and warm Mediterranean".

Beard (1973) mapped two vegetation associations (VA) within the 'Site G – Heywood road - SLK 0 - 6' area – Ridley\_516 and Esperance\_47 (Table 2). Both VA's are reasonably well conserved in the IUCN system.

**Table 3.** Vegetation associations mapped by Beard (1973) within the 'Site G – Heywood road - SLK 0 - 6', and statistics on pre-European remaining areas.

Vegetation Association		
Name	Ridley_516	Esperance_47
Description	Shrublands; mallee scrub, black marlock	Eucalyptus open mallee shrubland
Pre-European extent in IBRA sub-region Esp2 (%)	68.96	35.06
Pre-European extent in IBRA sub-region Mal01 (%)	39.22	47.69
Pre-European extent in LGA (%)	44.92	13.43
Current extent conserved in IUCN area (%)	54.80	35.86

## 4.5 Surrounding Land Use

The area directly included in the clearing permit application 'Site G – Heywood road - SLK 0 - 6' is currently intact and vegetated 100 m wide road reserve, managed by the Shire of Esperance. The surrounding land use is broad-acre agriculture. At the southern part of the site there is a DPLH managed reserve R 32126 gazetted for "Government Purposes", there is extensive historic gravel extraction at this site. The area is within rural zoning.

The site was 1.3km north from Beaumont Nature Reserve 32128. Nature Reserve 32130 was 4.4km north of the site. No other Conservation vested reserves were within 5km of the site.

## 4.6 Potential Threatened and Priority Flora

No species of threatened flora (TF) and 43 species of priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Appendix 3)). Of these, 33 PF species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site G – Heywood road - SLK 0 - 6' project. No confirmed records, indicating known populations, of any rare or priority flora were directly located within the clearing permit area.

## 4.7 Potential Threatened and Priority Ecological Communities

The desktop study identified the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' within 'Site G – Heywood road - SLK 0 - 6' project area. No other TEC's or priority ecological communities (PEC) were identified by the desktop study as being within 'Site G – Heywood road - SLK 0 – 6' or within a 20 km buffer of the site.

EPBC TEC 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)'

## 4.8 Potential Threatened and Priority Fauna

Twelve threatened fauna and two priority fauna were recorded within a 20 km radius of the proposed impact site (Appendix 4). Of these, six species were residents (not migratory).

## 4.9 *Phytophthora* Dieback

Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2022) data shows no positive or negative *Phytophthora cinnamomi* or other *Phytophthora* sp. Dieback sample results in the immediate area.

# 5 FIELD SURVEY RESULTS AND DISCUSSION

## 5.1 Flora

A total of 237 vascular plant taxa, representative of 139 genera and 52 families, were recorded within 'Heywood road - SLK 0 - 6' survey area. Of these 213 were native species and 24 were introduced. The majority of taxa recorded were representative of the Myrtaceae (37 taxa), Fabaceae (30 taxa) and Proteaceae (20 taxa) families (see Appendix 1 for the complete incidental species list).



A number of plant specimens collected could not be identified accurately to species level due to the absence of sufficient taxonomic characters to enable accurate identification. The principal reasons for not being able to fully identify some of the collected specimens to species level were:

- Plant material was sterile or lacked sufficient taxonomic features to permit accurate identification to species level. In these cases, the species is identified as, for example, *Pterostylis* sp.;
- The plant material collected could not be determined to a known taxon. For example, *Lepidosperma* sp. (as species are currently undergoing taxonomic revision) and three specimens were sent to Sydney;
- Insufficient time (and desire) to identify weeds to species level eg: *Lolium* sp.

To confirm that the *Microtus* specimen collected was the non-threatened species *Microtis alba* and not the P4 *Microtis quadrata*, this specimen was sent off and verified at the WAH as non-threatened species, *Microtis alba* (KSW21622, Accession 9874). The specimen was retained by WAH.



**Figure 2.** Non-threatened species *Microtis alba* verified by WAH, KSW21622, Accession 9874.

## 5.2 Threatened and Priority Flora

No TF species, and six priority species were identified within the clearing footprint. Queries of spatial datasets were requested specifically for these species, to interrogate impact of proposed works on species sustainability (DBCA 2023; DBCA 2022c; DBCA 2022a). Only one species was not recorded on the TPFL database (*Aotus* sp. Dundas). DBCA do not actively manage or monitor the majority of low priority species, due to their prevalence in the landscape relative to



TF. There are 136 species recorded as priority three or four conservation status within the Shire of Esperance boundaries (DBCA 2022c).

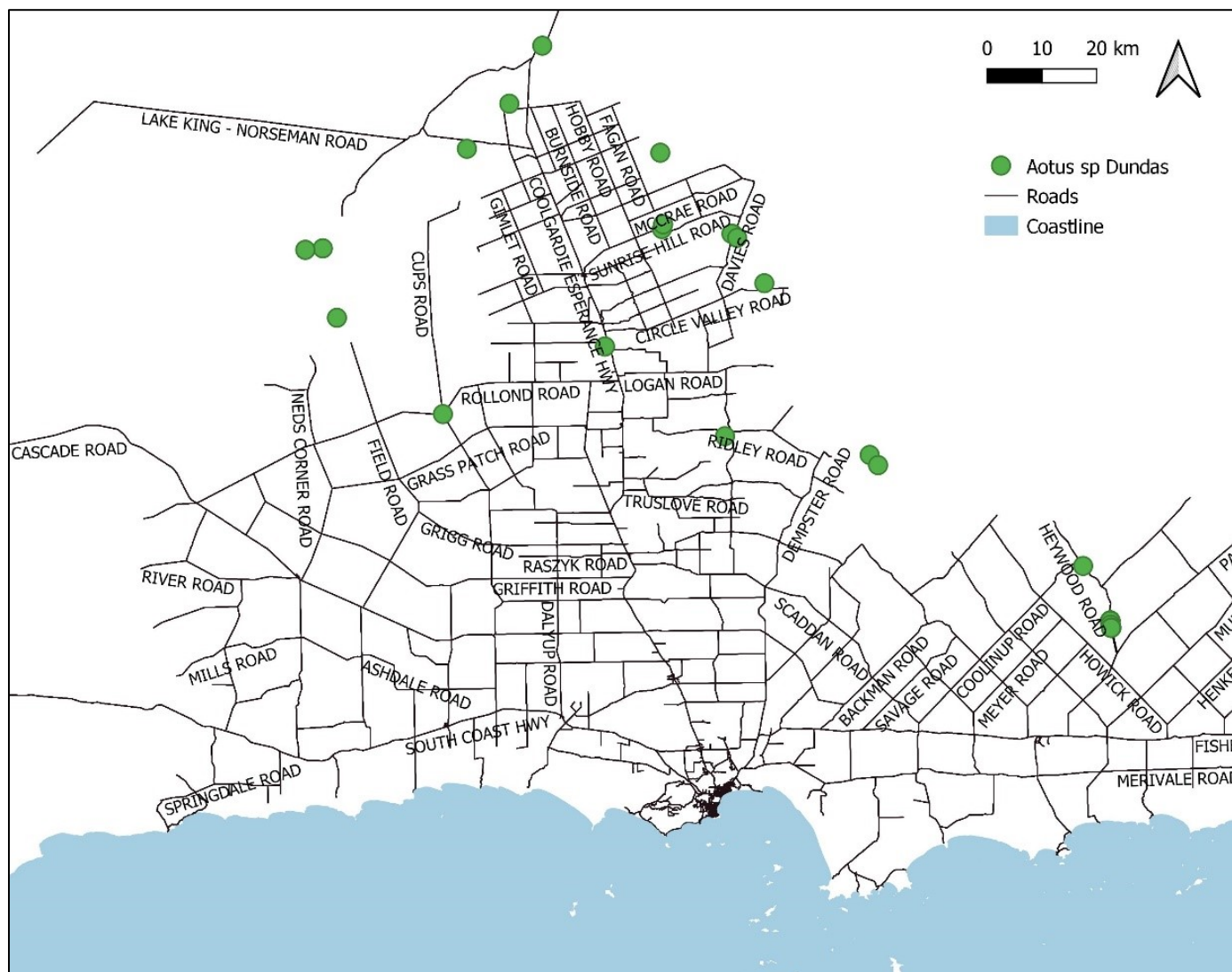
### 5.2.1 *Aotus* sp. Dundas, Priority 2

Three specimens of *Aotus* sp. Dundas were sent to the WA Herbarium for identification confirmation (KSW16322 and 16422; Accession 9841 and KSW20522; Accession 9874 with all specimens retained). A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). If proposed works occur, 1 plant will be impacted upon, from a population total of 238.

As *Aotus* sp. Dundas is not on the TPFL database all population data is from WAH database. *Aotus* sp. Dundas is found from 20 km south of Norseman to this population a range of 180 km. There are 23 records on WAH, this new population (which has not yet been databased) is the furthest to the south-east. Some of these records are very old, only 6 records are from this century and only 5 of these were recorded with a GPS. Accounting for geographical inaccuracies with recording there is probably 17 known populations of this species.

Additionally, Ecoscape had reported finding 22 new populations of *Aotus* sp. Dundas containing a total population of 4532 plants during the State Barrier Fence Biological Surveys (Ecoscape, 2015). These plants were “scattered intermittently over 235 km of the central portion of the study area”. Only two of these (totaling 50+ plants and approximately 30 km apart) have been lodged at WAH (PERTH 09061606 and PERTH 09061592).

*Aotus* sp Dundas is found in sand often near salt lakes. It is easily confused with the non-threatened *Aotus* sp. Southern Wheatbelt, which has an overlapping distribution. The reason that so many specimens were sent off from ‘Site G - Heywood Road 0 - 6 SLK’ site, was that the plants were intermediary in character between the two species. Specimen KSW16422, Accession 9841 was: “atypical in that the branchlets are apparently not spinescent. Spinescent branchlets and smaller bracteoles are the best means of distinguishing this taxon from *A. sp. Southern Wheatbelt*.” (Mike Hislop pers. comm.). Specimen KSW20522, Accession 9874: “combines the non-spinescent habit of *A. sp. Southern Wheatbelt* with the bracteole character of *A. sp. Dundas*. I am not sure of the significance of that but good to have the specimens” (Mike Hislop pers. comm.).



**Figure 3.** WAH records of Priority 2 species *Aotus* sp. Dundas including recently discovered populations by the Shire of Esperance.



**Figure 4.** Priority 2, *Aotus* sp. Dundas photographed on Heywood road by Katherine Walkerden on 12/10/2022.

#### 5.2.2 *Bentleya diminuta*, Priority 2

A specimen of *Bentleya diminuta* was sent to the WA Herbarium for identification confirmation (KSW14122; Accession 9783 with specimen retained). It was confirmed as *Bentleya diminuta* by Mike Hislop on 23/11/2022. A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). The three colonies of this species covered approximately 200m<sup>2</sup>, and were on both sides of Heywood road for 50 m at SLK 3.36 - 3.41. Plant numbers were not counted but are estimated to be in the thousands. If proposed works occur, approximately half of the area of occupancy will be disturbed.



**Figure 5.** Mapped boundaries of the three colonies of *Bentleya diminuta* at Heywood road between SLK 3.36 - 3.41.

*Bentleya diminuta* is a species with a wide distribution, having a 356km east to west and 150km north to south distribution. The species occurs within the Shire of Esperance, Lake Grace and Kondinin. There was a total of 11 herbarium records, 4 TPFL records and an additional 4 populations recently found by the Shire of Esperance. 6 of the herbarium records represent a single population within the Shire of Lake Grace.

The species is known for growing along road shoulders and the known populations are regularly graded. The species likely benefits from the regular disturbance and the patches proposed to be cleared will likely be replaced by new recruits after the roadworks are complete.



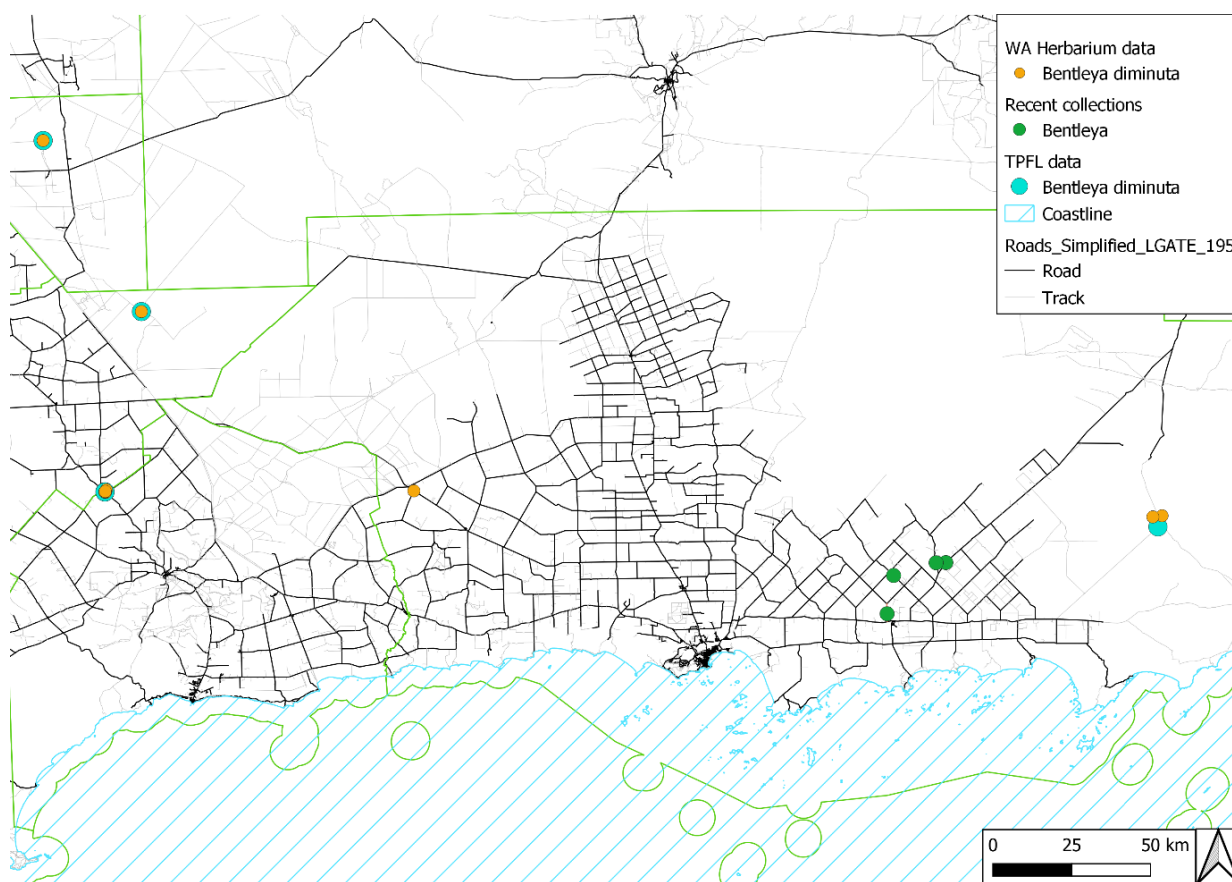
**Table 4.** Confirmed records of Priority 2 species, *Bentleya diminuta* found by Julie Waters and Katherine Walkerden during 2022.

Herbarium reference	Location	Disturbance	Frequency	Tenure	Record date	Confirmative
KSW1321 ACC 9116 Not retained	On Parmango Rd, SLK 22.63. 4.08km north east of the Heywood rd, Parmango Rd intersection	Road verge	1000s	Road Reserve	30/08/2021	Mike Hislop
KSW14122 ACC 9783	Heywood road at SLK 3.4	Road verge	4 small colonies, 1000+ individual herbs.	Road Reserve	11/10/2022	Mike Hislop
KSW22122 ACC 10048	Kettle road reserve. 1.69km South East of Kettle road and Meyer road intersection.	Road verge	Several hundred in patch.	Road Reserve	13/12/2022	Mike Hislop
KSW22222 ACC 10048	Ridgeland road reserve. 2.5km North of Ridgeland Road and Fisheries road Intersection.	Road verge	6 patches over 250 metre section of road	Road Reserve	13/12/2022	Mike Hislop

**Table 5.** Known Herbarium records of priority 2 species, *Bentleya diminuta*, detailing location details, frequency, tenure and collection date.

Sheet number/ TPFL population	Location	Frequency	Tenure	Record date
1590901	Cape Arid National Park, c.4 km W of Mount Ragged, along Mount Ragged- Balladonia road		National Park	28/09/1983
3370879	0.6 km N of junction of Beatty, Fitzgerald and Ravensthorpe-Lake King roads towards Lake King (ca 37 km from Ravensthorpe), Roe district	Abundant in graded area.	Freehold	5/11/1990
3211703 Population 1	6.2 km SW of Mount Ragged along Balladonia Rd (3.1 km from Gora Rd turnoff), Cape Arid National Park	Very common along verge of track and to N and S of track particularly under or near mallee; 2000+ plants.	National Park	24/04/1993
5304415 Population 2	To the SE of mine site, c. 700m SE of of Hatter Hill. [Plot - HHILL03]		UCL	3/09/1996
6453724 Population 3	Mount Madden CBH bins proposed new truck exit, ca 530 m N of Beatty Road intersection with Lake King - Ravensthorpe Road	Very common in patches, 500+ in mallee/shrubs; 1000s on disturbed road verge	Road Reserve	8/10/2000

7184980 Population 3	Mt Madden wheatbin - along road verge and into farmland from Fitzgerald Road for 600 m N towards Lake King	100+ plants.	Road Reserve	25/11/2004
7113579	36.7 km from Ravensthorpe on Lake King Road (approximately 600 m N of Fitzgerald/Beatty Road) on both road verges	Widespread in the locality.	Freehold	20/10/2004
7820100	Lake King - Ravensthorpe Road. Just NW of the intersection with Fitzgerald Road. Boundary of Lake Grace Shire and Ravensthorpe Shire		Road Reserve	20/10/2004
7291612 Population 4	ca 2.7 km NNE of North Ironcap, 6.2 km W of Forrestania Crossroads turn N on airstrip track for 8.6 km to T intersection, walk N for 50-150 m	Localised patch, 100 + growing beneath <i>Westringia rigida</i> .	UCL	20/06/2005
8667047	Corner of Clare and Cascades Road, Cascade	Total cover of population approx 10 m <sup>2</sup> (one location), probably all one plant.	Road reserve	6/09/2012
8882193	Ravensthorpe to Lake King Road, just N of Beatty Road, near the Mount Madden wheat bins	Common.	Road reserve	26/08/2016



**Figure 6.** Known records of Priority 2 *Bentleia diminuta* across a 356km east to west and 150km north to south distribution (DBCA 2022) including recently discovered populations by the Shire of Esperance.

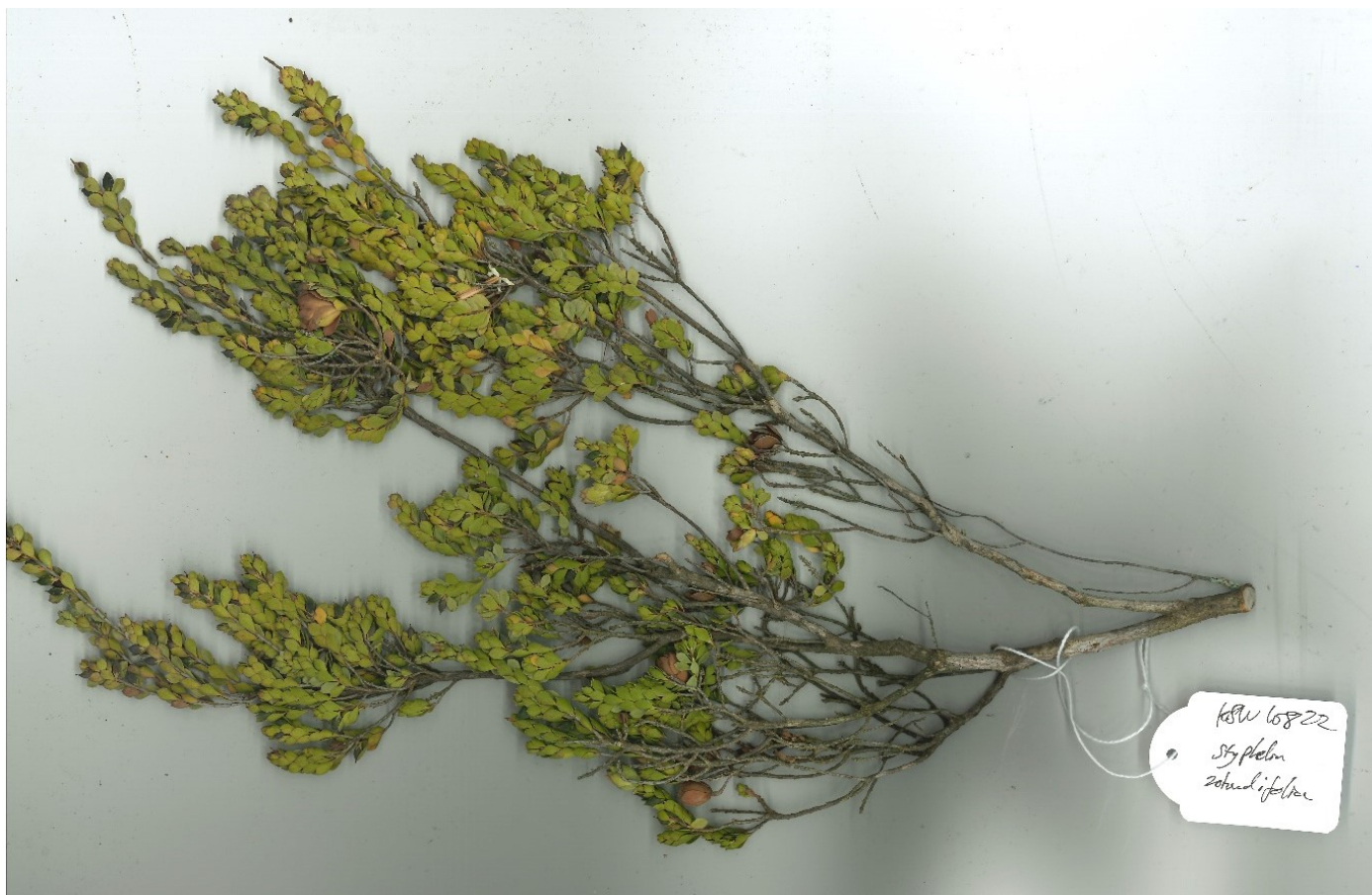


**Figure 7.** Photograph of *Bentley diminuta* on Heywood Road taken by Katherine Walkerden on the 11/11/2022.

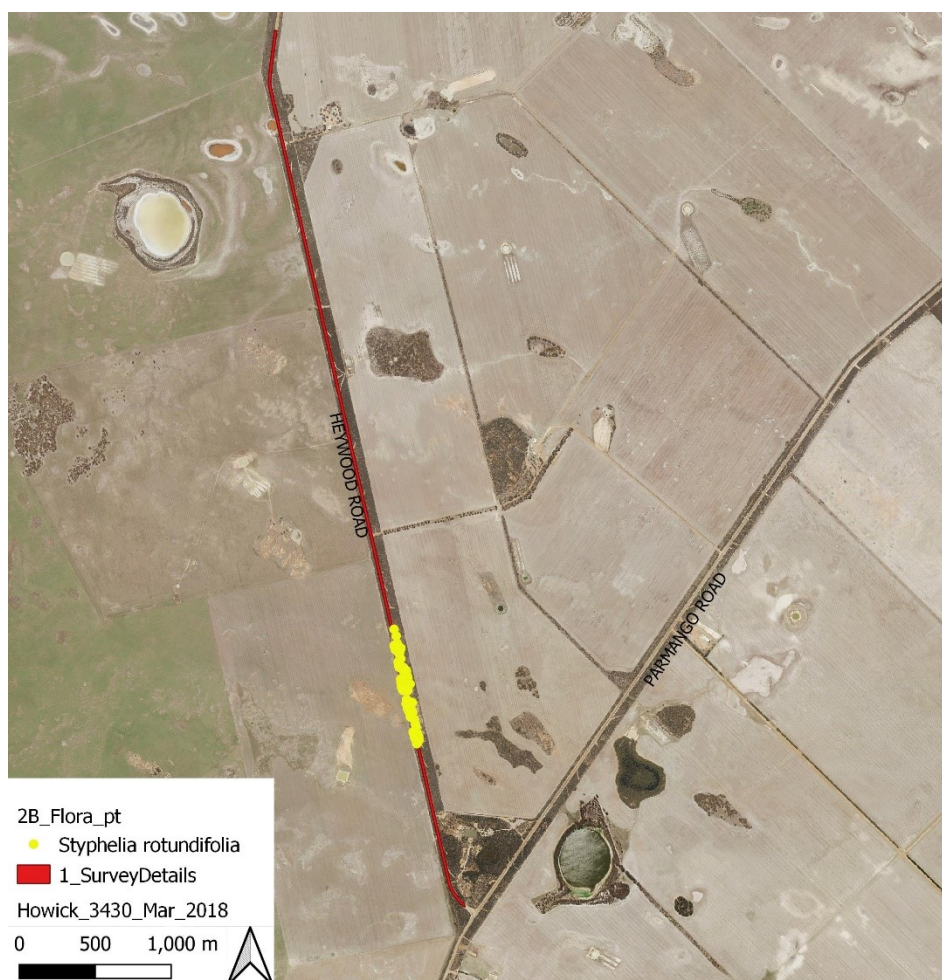
### 5.2.3 *Styphelia rotundifolia*, Priority 3

A specimen of *Styphelia rotundifolia* was sent to the WA Herbarium for identification confirmation (KSW16822 Accession 9841, with specimen retained). It was confirmed as *Styphelia rotundifolia* by Mike Hislop on 28/12/2022. A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). If proposed works occur, 27 plants will be impacted upon, from a population total of 327. *Styphelia rotundifolia* is found from Esperance east to Israelite Bay and north to Mt Ragged and Truslove 170km east-west and 60km north-south. There are 50 records of *Styphelia rotundifolia* on Florabase and 9 TPFL records. Most of these are from conservation reserves including Cape Le Grand and Cape Arid National Parks, Islands within the Recherche Archipelago nature reserve and other nature reserves including Mt Burdett. It is found in sand over granite. The *Styphelia rotundifolia* plants within 'Site G – Heywood road - SLK 0 - 6' were all mostly in a previously disturbed area where gravel had previously been extracted which is quite different to most of the other recorded locations on skeletal soils near granite. Only one other population (PERTH 09475699) is recorded in rehabilitated gravel areas.





**Figure 8.** Priority 3 *Styphelia rotundifolia* specimen KSW16822 Accession 9841 from Heywood Road.



**Figure 9.** Location of Priority 3 species *Styphelia rotundifolia* within the 'Site G – Heywood road - SLK 0 - 6' project.

#### 5.2.4 *Acacia bartlei*, Priority 3

A specimen of *Acacia bartlei* was sent to the WA Herbarium for identification confirmation (KSW16522; Accession 9841 with specimen retained). It was confirmed as Mike Hislop on 28/12/2022. A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). If proposed works occur, 1 plant will be impacted upon, from a population total of 10 spilt over two subpopulations.

*Acacia bartlei* has a wide geographic range spanning 166km east to west and 64km north to south, all populations of this species are located within the Shire of Esperance. There was a total of 29 preserved herbarium specimens for this species. A large majority of the occurrences are geographically inaccurate and has unclear tenure. A single specimen was located within conservation estate (Dundas Nature Reserve), three specimens were located within UCL, three specimens were located within Shire of Esperance recreation reserves and three had been located within a road reserve, the remaining records had unclear tenure or were within private property. Several of the 29 records are likely to represent the same population, but it is unclear due to geographic uncertainty of the records.

Four additional populations have been found by Julie Waters and Katherine Walkerden during spring 2022, which have not yet been mounted at the WA Herbarium (Table 6.). Examining prior herbarium records and recent finds of *Acacia bartlei*, the species inhabits a range of habitat types, with the most frequent habitat descriptions being Open Mallee

woodland, Closed Mallee Woodland and a *Eucalyptus occidentalis* swamp. There were several records of the species growing on the edges of salt lakes. Only a single record of *Acacia bartlei* had been entered into the TPFL database.

**Table 6.** Confirmed records of Priority 3 species, *Acacia bartlei* found by Julie Waters and Katherine Walkerden during Spring 2022.

Herbarium reference	Location	Site description	Frequency	Tenure	Record Date	Confirmative
KSW142-p Accession# 9713	Rollond road (SLK 40.58) and Lort River crossing. Southern section of road reserve.	Lort River, fringing saline river	24	Road Reserve & DPLH Parklands Reserve	13/08/2022	R. Davis
KSW14922 Accession# 9783	Circle Valley road at SLK 0.26. Southern side of road.	Open Woodland	Single plant found	Road Reserve	16/09/2022	M. Hislop
KSW15922 Accession# 9841	Coolinup road collected at SLK 38.81. Eastern side of road.	Edge of Salt Lake	7 plants in total	Road Reserve	13/09/2022	M. Hislop
KSW16522 Accession# 9841	Heywood road at SLK 5.47. Eastern side of road.	Salinity affected <i>Eucalyptus occidentalis</i> swamp	10 plants.	Road Reserve	12/10/2022	M. Hislop

**Table 7.** Known Herbarium records of Priority 3 species *Acacia bartlei*, detailing location details, frequency, tenure and collection date (DBCA, 2023a).

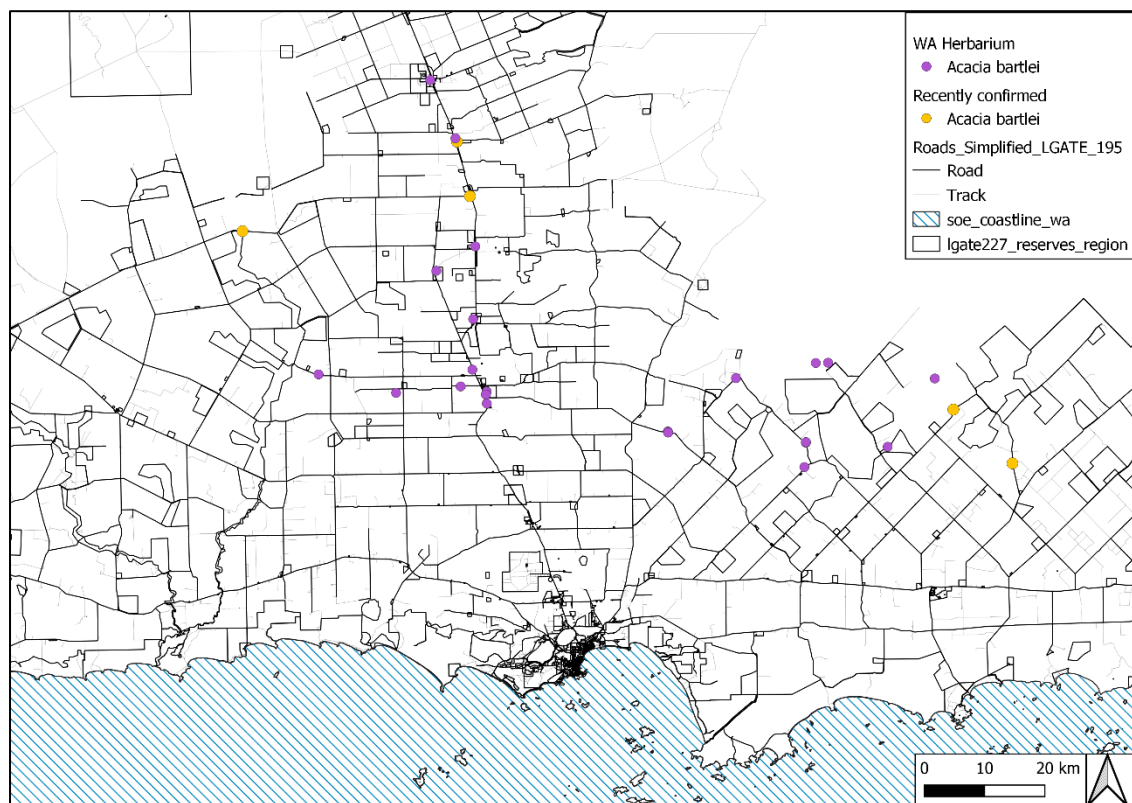
Sheet number	Location	Frequency	Tenure	Record date
192996	1 mile E of Kau Rock		UCL	16/10/1970
666157	15.5 km W of Scaddan		Unclear	19/12/1971
666149	Scaddan		Unclear	1973
666122	62 miles S of Norseman on Esperance Road [= ca 1 km S of Salmon Gums]		Unclear	1973
666130	31.4 miles from Esperance on way to Norseman		Unclear	1973
192457	W of highway on Swan Lagoon Road, between Truslove and Salmon Gums		Unclear	1979
880558	Circle Valley		Unclear	1987
1264540	E of Scaddan - track between Dempster and Burdett Roads		Unclear	6/09/1984
658693	0.5 km W of Kau Rock		UCL	6/09/1984
619876	500 metres W of Highway, ca 5-6 km N of Scaddan (on Aboriginal Lands Trust block),	Abundant.	Unclear	14/08/1985
768618	2 km S of Scaddan on Coolgardie - Esperance Highway		Unclear	31/08/1986
5334039	Edge of salt lake boundary Reserve 24952 and Loc.418, ca 600 m W of Highway, Scaddan,		Shire recreation reserve	22/09/1998
5267153	Coolinup, Kau Rock Road (Neridup Location 413), Esperance,		Private land	24/09/1998
5504500	W of Highway, ca 1 km S of Burdett Road, Scaddan		Road Reserve	27/09/2000



5591570	NE of Esperance, Burdett Road, 4 km W of Backmans Road	About 10 plants along road verge.	Private land	27/06/2000
5591511	2 km S of Scaddan on Coolgardie - Esperance Highway		Shire recreation reserve	27/06/2000
5689627	NE of Esperance, Burdett Road, 4 km W of Blackmans Road		Private land	5/12/2000
5689619	2 km S of Scaddan on Coolgardie - Esperance Highway		Shire recreation reserve	5/12/2000
8183546	Grass Patch. Opposite Grass Patch Road. 0.4 km S of Grass Patch Tavern, Roe	Moderately common.	Unclear	19/08/2001
8183511	12.2 km S of Grass Patch. Tavern along Coolgardie Esperance Highway, Roe	Moderately common.	Unclear	24/01/2002
6736394	Mt Ney Rd, 3 km S of Burdett Rd (NE of Esperance)	Frequent, localised.	Private land	29/09/2002
6748694	On Griggs Road 5.6 km E of Lort River (NW of Esperance)	Frequent localised.	Private land	19/03/2003
6748708	8.3 km W of Wittenoom Road on Scaddan Road (NE of Esperance)	Frequent.	Road Reserve.	19/03/2003
6748724	Burdett Road, midway between Mt Ney Road and Backmans Road (NE of Esperance)	Frequent.	Private land	19/03/2003
6748716	Opposite entrance to Wittenoom Hills station on Backmans Road, 4.1 km NE of Lanes Road (approx 1 km SW of Burdett Road, adjacent to old gravel pit) NE of Esperance	Occasional.	Private land	19/03/2003
8391351	ca 4 km SW of Pyramid Lake, 120 km NW of Esperance		Unclear	1/09/2012
9061525	C. 8 km SE of Mt Ney, along firebreak adjacent to agricultural land	200+ plants.	UCL	1/10/2014
8705976	INV 478. Track SW of Gnamma Hill on Fraser Range Station, track joins Dempster Road	Infrequent.	Nature Reserve	30/07/2015
192996	Scaddan Road, near entrance to 'Viking' farm, extending W to low lying swampy area	>= 50 plants.	Road reserve.	13/12/2017



**Figure 10.** Location of Priority 3 species *Acacia bartlei* within the 'Site G – Heywood rd, SLK 0 - 6' project.



**Figure 11.** Known records of Priority 3 species *Acacia bartlei* across an 166km east to west geographic range and a 64km north to south geographic range (DBCA 2022) including recently discovered populations by the Shire of Esperance.



**Figure 12.** Specimen KSW16522 of the Priority 3 species *Acacia bartlei* from Heywood road.



### 5.2.5 *Persoonia scabra*, Priority 3

Two specimens of *Persoonia scabra* (One from each population) were sent to the WA Herbarium for identification confirmation (KSW16622 (southern population) and KSW16722 (northern population); Accession 9841 with neither specimen retained. Both were confirmed as *Persoonia scabra* by Mike Hislop on 28/12/2022. A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). If proposed works occur, 0 plants will be impacted upon, from total plant count of 7 plants over two populations.

The southern population was a single plant which will not be impacted upon. The northern population consisted of 6 plants which will not be impacted upon.

There was a total of 20 prior Herbarium records for this species, nine of these records were secure in National Parks. *Persoonia scabra* has a wide range spanning over 250km east to west, with populations recorded in the Shire of Esperance and Ravensthorpe. The largest population had a total of 15 plants listed with most populations having between 1-5 plants, similar to that seen within the survey area. Soil in the previous records were frequently sand or sand over gravel with several specimens in rehabilitated gravel pits. Previous records were also frequently for mixed mallee shrublands consistent with parts of the site.

An additional 8 populations have been found by shire of Esperance staff throughout 2022, all of these populations were found within shire road reserves.

**Table 8.** Confirmed records of Priority 3 species, *Persoonia scabra* found by Julie Waters and Katherine Walkerden during 2022.

Herbarium reference	Location	Frequency	Tenure	Record date	Confirmative
KSW039-p ACC 9604	Western side of Salt lake 7.5km north of Dempster Road and Ridley Road intersection.	15 seen scattered throughout reserve. Population likely higher	Road reserve	29/05/2022	Rob Davis
KSW9522 ACC 9690	Loop road at SLK 2.48	single specimen found	Road reserve	22/07/2022	Mike Hislop
KSW132-p ACC 9713	Wittenoom road at SLK 9.03, on both sides of road.	3 plants	Road reserve	5/08/2022	Rob Davis
KSW137-p ACC 9713	Burdett Road SLK 4.27, North side of road.	5 plants seen.	Road reserve	05/08/2021	Rob Davis
KSW16622 ACC 9841	Heywood road at SLK 0.75. Eastern side of road.	2 plants seen, area not searched.	Road reserve	10/10/2022	Mike Hislop
KSW16722 ACC 9841	Heywood road SLK 4.75. Eastern side of road.	1 Plant found during survey.	Road reserve	12/10/2022	Mike Hislop
KSW20322 ACC 9874	Boydell road, Northern side of road, 6.27km West of Boydell road and Coolgardie-Esperance Highway Intersection. 13.4km North West of Gibson Townsite.	5 plants found during survey.	Road reserve	25/10/2022	Mike Hislop
KSW20422 ACC 9874	Boydell road, N side of road, 7.92km W of Boydell road and Coolgardie-Esperance Highway	3 plants (2 plants in close proximity, 3rd plant 400 m West of	Road reserve	25/10/2022	Mike Hislop



**Table 9:** Known records of Priority 3, *Persoonia scabra* from a 100km range

Locality	Tenure	Date	Frequency
SW portion of reserve 35302, off access track, S of Fleming Grove Road, W of freight line	Shire reserve (Land use changing from gravel to conservation)	08/06/2022	15 plants scattered throughout reserve
86 km E of Esperance, 24 km E of Condingup on Henkes Road, c. 4.3 km E of Howick Road intersection	Shire Road Reserve	8/10/2020	
44-290 m W of Coolgardie-Esperance Highway on Boydell Road, southern road reserve, 35 km N of Esperance	Shire Road Reserve	7/10/2020	5 plants.
On Norwood Road from intersection of Dempster Road to 20 m E, 28 km E of Scaddan, c. 50 km NNE of Esperance township	Shire Road Reserve	10/09/2019	> 3 plants.
Cape Le Grand National Park, proposed Lucky Bay redevelopment site	National Park	15/09/2014	
3.4 km NW from the northwestern boundary of Kau Rock Nature Reserve	UCL	3/11/2013	1 plant.
Helms Forestry Reserve 23527, bushland slashed access track travelling SE to S boundary	Timber Reserve	2/01/2012	2-5 plants.
New Island Bay, 2.3 km W of Hellfire Bay carpark, 1.9 km SE of Mt Le Grand summit, 7.1 km WSW of Lucky Bay campsite, Cape Le Grand National Park, 29 km SE of Esperance township, Esperance Plains IBRA bioregion	National Park	26/11/2011	occasional, 1 plant seen.
2.1 km W of Hellfire Bay carpark, 1.9 km SE of Mt Le Grand summit, 7.0 km WSW of Lucky Bay campsite, Cape Le Grand National Park, 29 km SE of Esperance township, Esperance Plains IBRA bioregion	National Park	26/11/2011	occasional, 1 plant seen.
New Island Bay, 2.5 km WSW of Hellfire Bay carpark, 1.8 km SE of Mt Le Grand summit, 7.4 km WSW of Lucky Bay campsite, Cape Le Grand National Park, 28 km SE of Esperance township, Esperance Plains IBRA bioregion	National Park	21/10/2011	occasional, 4 plants and 2 seedlings seen.
86.8 km E of Lake King General Store along Norseman Lake King track. Roe District	National Park	31/12/2001	15 plants noted.
26.5 km N of Condingup. Corner of Coolinup Road and Howick Road, NE of Esperance,	Shire Road reserve	31/12/1995	
W end of Dunns beach	National Park	2/12/1992	
5.5 km SW of Mount Ridley	UCL	7/12/1991	
35.5 km due ENE of Muckinwobert Rock 6.21 km NE of Melaleuca Road on West Point Road	Shire Road Reserve	30/09/1984	
23.5 km due SSE of Kau Rocks, 3.1 km NE of intersection 3 on Condingup Road	Shire Road Reserve	2/09/1984	
12 km SW of Mount Buraminy, ca 40 km WNW of Mount Ragged	UCL	8/11/1980	a single plant.
42 km NE of Swallow Rock, Frank Hann National Park, ca 83 km NE of Lake King	National Park	21/08/1980	
32 km NE of Swallow Rock, Frank Hann National Park, ca 84 km ENE of Lake King	National Park	1/08/1980	
72 km W of Salmon Gums	Uncertain	11/11/1979	
Frank Hann National Park	National Park	4/08/1978	



**Figure 13.** Location of Priority 3 species *Persoonia scabra* within the 'Site G – Heywood Road, SLK 0 - 6' project.





**Figure 14.** Priority 3 species *Persoonia scabra* within the 'Site G – Heywood Road, SLK 0 - 6' project.

#### 5.2.6 *Goodenia laevis* subsp. *laevis*, Priority 3

A specimen of *Goodenia laevis* subsp. *laevis* was sent to the WA Herbarium for identification confirmation (KSW16222; Accession 9841 with specimen not retained). It was confirmed as *Goodenia laevis* subsp. *laevis* by Mike Hislop on 28/12/2022. A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 3/4/2023 (Appendix 2). If proposed works occur, 0 plants will be impacted upon, from a population total of 7.

The Shire of Esperance has discovered numerous new populations of *Goodenia laevis* ssp. *laevis* in since 2019 (Table 10). Herbarium specimens and Threatened and Priority Reporting Forms (TPRF) have been completed for confirmed populations. Only one of these had been entered into TPFL at 07/02/2023.

At all sites, the plants were present in the road active footprint that is regularly graded or in dam catchments – all sites with a high level of disturbance. These are specifically outlined below. It can be inferred that the abundance of *Goodenia laevis* ssp. *laevis* at the site is partially due to the disturbance caused by mechanical grading of the road shoulders.

Using the WA Herbarium spatial data, the below inferences can be discussed:

- *G. laevis* ssp. *laevis* is geographically restricted to the Esperance Mallee area, extending from Scaddan to Norseman, and the Cascade region to the edge of Cape Arid. In total this covers 18,000 km<sup>2</sup>.

- Almost all associated vegetation is described as a variation of mixed *Melaleuca* shrubland with *Eucalyptus* woodland over-storey. Extensive areas of this vegetation type remain, providing likely habitat, with similar soil type and associated vegetation.
- 27 records of populations are recorded on the WA Herbarium databases, two records are on the TPFL database. 14 new populations discovered by Shire of Esperance in recent years have not added to DBCA data.
- Of the 27 recorded specimens, seven records are directly described as being within a previously disturbed site, such as old limestone pits, along firebreaks or road shoulders. An additional specimen was listed as growing in a fire scar.

Additionally, Ecoscape had reported finding 58 new populations of *Goodenia laevis* ssp. *laevis* containing a total population of 12,000 plants during the State Barrier Fence Biological surveys (Ecoscape, 2015). There was no record of these collections on DBCA databases.

*Goodenia laevis* ssp. *laevis* is a common species with Mallee habitat and has been historically been under surveyed. The species has had 22 new confirmed populations since 2020 that the Shire of Esperance is aware of, as a result the species has been nominated for delisting by the Esperance DBCA.



**Figure 15.** Specimen KSW16222 of Priority 3 species *Goodenia laevis* ssp. *laevis* taken from within the 'Site G – Heywood Road, SLK 0 - 6' project.



**Table 10.** Confirmed records of Priority 3 species, *Goodenia laevis* ssp. *laevis* found by Shire of Esperance staff since 2019.

Herbarium reference	Location	Site description	Frequency	Tenure	Record date	Confirmative
KW041, Accession# 8281, Specimen not retained	Located in historical footprint of Norwood Rd, to intersection of Norwood and Dempster Rd. Road before stagger was put in	Slope, limestone, 30-50% loose rock, sandy loam, white soil, well drained, dry	100-150 plants in road area	Road Reserve.	10/12/2019	M. Hislop
KW043 Accession# 8281, Specimen not retained	2.86 to 3.5 km north of Cascade Rd, on Neds Corner Rd	Slope, limestone, 30-50% loose material, clay loam, white, well drained, dry soil	82 plants present	Road Reserve.	25/10/2019 - mapped 09/12/2019	M. Hislop
KW059, Accession# 8334, Specimen not retained	On Grass Patch Rd, 2.2 km west of Bishops Rd.	Flat, well drained. White/grey clay loam. Limestone base	50+	Road Reserve.		M. Hislop
KW061, Accession# 8334, Specimen not retained	Grass Patch townsite - R19624. north-west corner of intersection of grass patch Rd and Coolgardie-Esperance Hwy	Flat, loose material with large amounts of leaf litter. White soil - clay loam, likely limestone base	3 plants	Road Reserve.	22/01/20	M. Hislop
KW062, Accession# 8334, Specimen not retained	On north-east intersection of Dalyup and Rasyk Rd.	Gentle slope (heading towards constructed dam), white/grey soil, clay loam, limestone bed rock	200-250 plants	Road Reserve.		M. Hislop
KW076, Specimen not retained	On Holt Rd from 2.4 km to intersection of Burnside Rd. On road reserve	Gently undulating plains, yellow-white sandy loam	Scattered along entire transect - total of 83 plants	Road Reserve.	08/09/20	M. Hislop
KW098	~47 km north of Esperance townsite. ~19 km east of Scaddan townsite. On Styles Rd, from 1.5 to 2 km south of Norwood Rd and Styles Rd	Closed Mallee Woodland with dense Melaleuca shrubland, distinguished from the surrounding	70-90	Road reserve	14/10/2020	M. Hislop

	intersection. On both sides of road reserve					
KSW2021, Accession #9133, Specimen not retained	Holt Rd SLK 6.4- 11.61	Narrow Road reserve in mostly excellent condition	24	Road reserve	6/09/2021	M. Hislop
KSW2821, Accession# 9190, Specimen not retained	Neds Corner Rd, near Grass Patch Rd intersection	Road Reserve	100s	Road Reserve	29/09/2021	M. Hislop
KSW5421, Accession# 9361, Specimen not retained	R37505, Cascade Rd, Cascade	Historic landfill site	100+ scattered throughout R37505, estimate only	Shire reserve	13/12/2021	M. Hislop
KSW2722, Accession# 9405, Specimen not retained	Cascade road SLK 94.17	Road shoulder in Shire Road Reserve	4 plants seen, area not surveyed	Road Reserve	25/01/2022	M. Hislop
KSW3122, Accession# 9441, Specimen not retained	Reserve 19965, Neighbouring Hawkey rd & Dalyup rd T junction	formerly used for limestone extraction, burned in 2015 Scaddan/ Grasspatch bushfires	Around 100 older plants growing along access track, 200+ younger plants in burned area, 300+ in rehabilitated limestone pit	Shire reserve	5/02/2022	M. Hislop
KSW032-p, Accession# 9604	Dempster Road SLK 41.58. Eastern side of road.	Limestone road shoulder.	6	Road Reserve	15/05/2022	R. Davis
KSW12922, Accession# 9740, Specimen retained	Coolinup road at SLK 38.95	Road shoulder.	26 plants GPS'd, 300 metres of road was surveyed	Road Reserve	13/09/2022	M. Hislop
KSW16222, Accession# 9844	Heywood road at SLK 5.58. Western side of road.	Plants just off road. No signs of fire.	7 plants found during	Road Reserve	12/10/2022	M. Hislop

Specimen not retained			survey.			
KSW11022 Acc 9770 Specimen not retained	Rollond Road 600 metres west of Esperance-Coolgardie Highway. SLK 0.63-1.4	Narrow road reserve. Clay-loam soil. No signs of fire. Plants growing on road shoulder.	33 plants	Road Reserve	22/08/2022	M. Hislop
KSW11122 Acc 9770 Specimen retained	Rollond Road, SLK 10.21-9.59	Narrow road reserve. Clay-loam soil. No signs of fire. Plants growing on road shoulder.	494 plants (but not a complete survey)	Road Reserve	24/08/2022	M. Hislop
KSW11822 Acc 9770 Specimen not retained	Rollond Road at SLK 13.23, 2.5km West of Townsend road.	Narrow road reserve. Clay-loam soil. No signs of fire. Plants growing on road shoulder.	23 plants	Road Reserve	30/08/2022	M. Hislop

**Table 11.** Known Herbarium and TPFL records of Priority 3 species *Goodenia laevis* ssp. *laevis*, detailing location details, frequency, tenure and collection date.

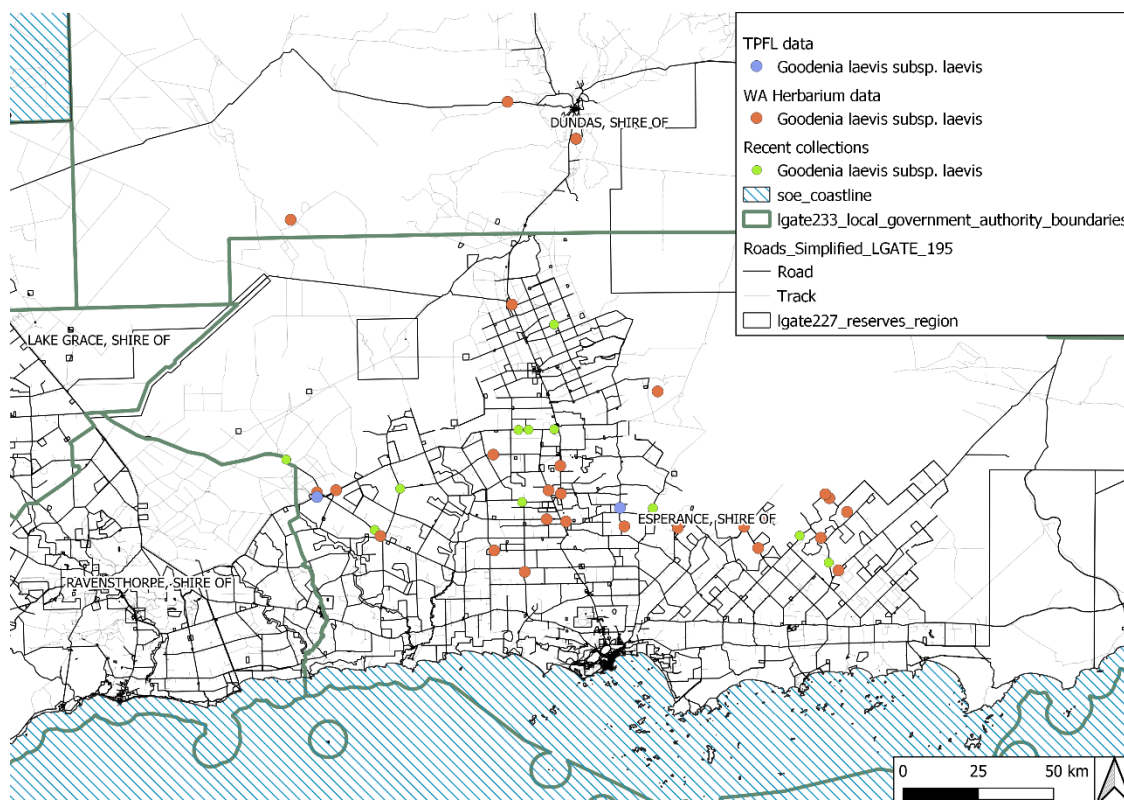
Sheet number/ TPFL population	Location	Frequency	Record date
2607786	Kumarl,		Apr-38
2607719	8 km SE of Mount Beaumont, ca 90 km NE of Esperance	rare.	10/11/1980
2607689	35 km N of Gibson on Esperance - Coolgardie highway		9/11/1982
2607697	20 km E of Scaddan on Styles Road		2/12/1982
2607700	3.4 km S of Mount Ney		Aug-83
4111648	Oldfield 1343 [This location is 28 km NW of Cascade as advised by collector 23/8/2001]		7/12/1993
4256131	Scaddan Road between Norseman-Esperance Highway and rail crossing	abundant locally.	24/12/1995
5083575	28 km NNW of Condingup, Kay Rock Road, NE of Esperance,		31/12/1995
6374417	Grass Patch, 3.9 km S of Grass Patch Track near railway line, E side of Coolgardie Esperance Highway. 5.9 km N of Sime Road. Roe District	moderately common.	15/01/1998
5645115	W side Kau Rock Road ca 300 m N of Mount Ney Road, NE of Esperance,	occasional.	20/11/1998
5400562	New Hyden/Norseman track, ca 17 km W of Great Eastern Highway,	occasional.	13/04/1999
7400330	Norseman, Coolgardie region		20/09/2001
7400403	Norseman, Coolgardie Region		20/09/2001
7184859	1.5 km W of Fields Road on Grass Patch West Road	100+ plants.	16/01/2004
7218923	Bremer Range; c. 50 km S of Hyden-Norseman Road on Maggie Hayes Ninety Mile Tanks track, then E on track to Lake	occasional.	16/03/2005

	along gridline at AGD84 6400000 mN		
8111928	N side of Heywood Road ca 4 km N of Karl Berg junction in old limestone pit, Condingup	2-5 plants.	29/11/2008
9062238	N boundary of Beaumont Nature Reserve. c. 1.5 km E of Mt Beaumont	200+ plants.	23/10/2013
9062203	On agricultural boundary firebreak, c. 39 km E of Salmon Gums	50+ plants.	5/11/2013
9062211	On the boundary of Beaumont Nature Reserve, c. 1 km S of Mt Beaumont	30+ plants.	25/11/2013
9139338	Speddingup Reserve, NE boundary on Belgian Road, 60 m W of Robins Road	uncommon; 2 plants per 100 sq m.	22/11/2016
9196420	In the Cascade townsite, on Wilaust Street, c. 60 m N of Asha Court, c. 80 km NW of Esperance townsite	> 15 plants.	9/12/2019
9375384 Population #1	C. 112 km NW of Esperance, c. 25 km NW of Cascade townsite. On West Point Road c. 300 m from the intersection of West Point Road and Cascade Road	25 plants.	17/09/2020
9475788	Griggs Road SLK 4.65		18/09/2020
Population# 2	Shire Road Reserve, along Styles Rd. Ca 1.5-2.0km S from Norwood Rd and Styles Rd intersection. On both sides of road reserve		14/10/2020
9365362	Parmango Road SLK 21.89 - 22.7	100+	18/01/2022
9475850	Swan Lagoon Road at SLK 20.93, E of Scaddan	24+	5/02/2022
9475893	Dalyup Road SLK 14.43, E of Gibson	300+ plants	16/02/2022
9475885	Norwood Road SLK 1.49, E of Scaddan	100+	27/02/2022



**Figure 16.** Location of Priority 3 species *Goodenia laevis* ssp. *laevis* within the 'Site G – Heywood Road, SLK 0 - 6' project.





**Figure 17.** Known records of Priority 3 species *Goodenia laevis* ssp. *laevis* across a 157km north to south and 188km west to east geographic range (DBCA 2022) including some recently discovered populations by the Shire of Esperance.

### 5.3 Weeds

There was some weed invasion across the entirety of the proposed 'Site G – Heywood road - SLK 0 - 6' area. Overall, 24 invasive species were identified within the project area (Appendix 1). These were mostly agricultural grass weeds.

A single *Acacia pycnantha* plant was found at the driveway at SLK 2.69. This was chopped down and sprayed on 15/11/2022. This is a priority environmental weed in the Shire of Esperance's Environmental Weed Strategy 2009-2018. The site will be monitored for new seedlings.

### 5.4 *Phytophthora* Dieback

DIDMS did not show any dieback within the area. No visual signs of dieback were observed during field work. There were a large number of susceptible species within the project area, none of which were showing signs of disease. As per standard operating conditions, proposed works will be conducted using appropriate hygiene measures to limit spreading of the disease, including clearing in dry conditions and clean down of vehicles and machinery before entering the site.

### 5.7 Vegetation Communities

Five vegetation communities were identified within the 'Site G – Heywood road - SLK 0 - 6', as defined by structure and

composition (Table 12). It is believed that the Beard (1973) vegetation associations identified in Section 4.4 are an appropriate match for three vegetation types observed. These beard vegetation types did not match vegetation type A or D, the Beard vegetation associations are broadscale and frequently do not match fine scale vegetation types.

**Table 12.** Vegetation communities identified within proposed 'Site G – Heywood road - SLK 0 - 6' project area.

Type	Description	Figure	Closest Matching Beard Vegetation Association	Area (ha)
A	Mallee and <i>Hakea cinerea</i> over scattered shrubs with dense Restionaceae and Cyperaceae sedge understorey	18.		0.026
B	Open mallee over mixed Proteaceous heath	19.	Esperance_47	0.001
C	<i>Eucalyptus occidentalis</i> woodland with or without <i>Melaleuca cuticularis</i>	20.	Esperance_931	0.047
D	Mixed <i>Eucalyptus</i> spp., <i>Banksia media</i> and <i>Hakea cinerea</i> over mixed myrtaceous dominated shrubland	21.		0.059
E	Mallee over dense <i>Melaleuca</i> shrubland	22.	Ridley_516	0.025



**Figure 18.** Vegetation type A identified in 'Site G – Heywood road - SLK 0 - 6' project, described as "Mallee and *Hakea cinerea* over scattered shrubs with dense Restionaceae and Cyperaceae sedge understorey".





**Figure 19.** Vegetation type B identified in 'Site G – Heywood road - SLK 0 - 6' project, described as “Open mallee over mixed Proteaceous heath”.



**Figure 20.** Vegetation type C identified in 'Site G – Heywood road - SLK 0 - 6' project, described as *Eucalyptus occidentalis* woodland with or without *Melaleuca cuticularis*.





**Figure 21.** Vegetation type D identified in 'Site G – Heywood road - SLK 0 - 6' project, described as "Mixed Eucalyptus spp., *Banksia media* and *Hakea cinerea* over mixed myrtaceous dominated shrubland".



**Figure 22.** Vegetation type E identified in 'Site G – Heywood road - SLK 0 - 6' project, described as "Mallee over dense *Melaleuca* shrubland".





**Figure 23.** Vegetation types within the 'Site G – Heywood road - SLK 0 - 6' area.

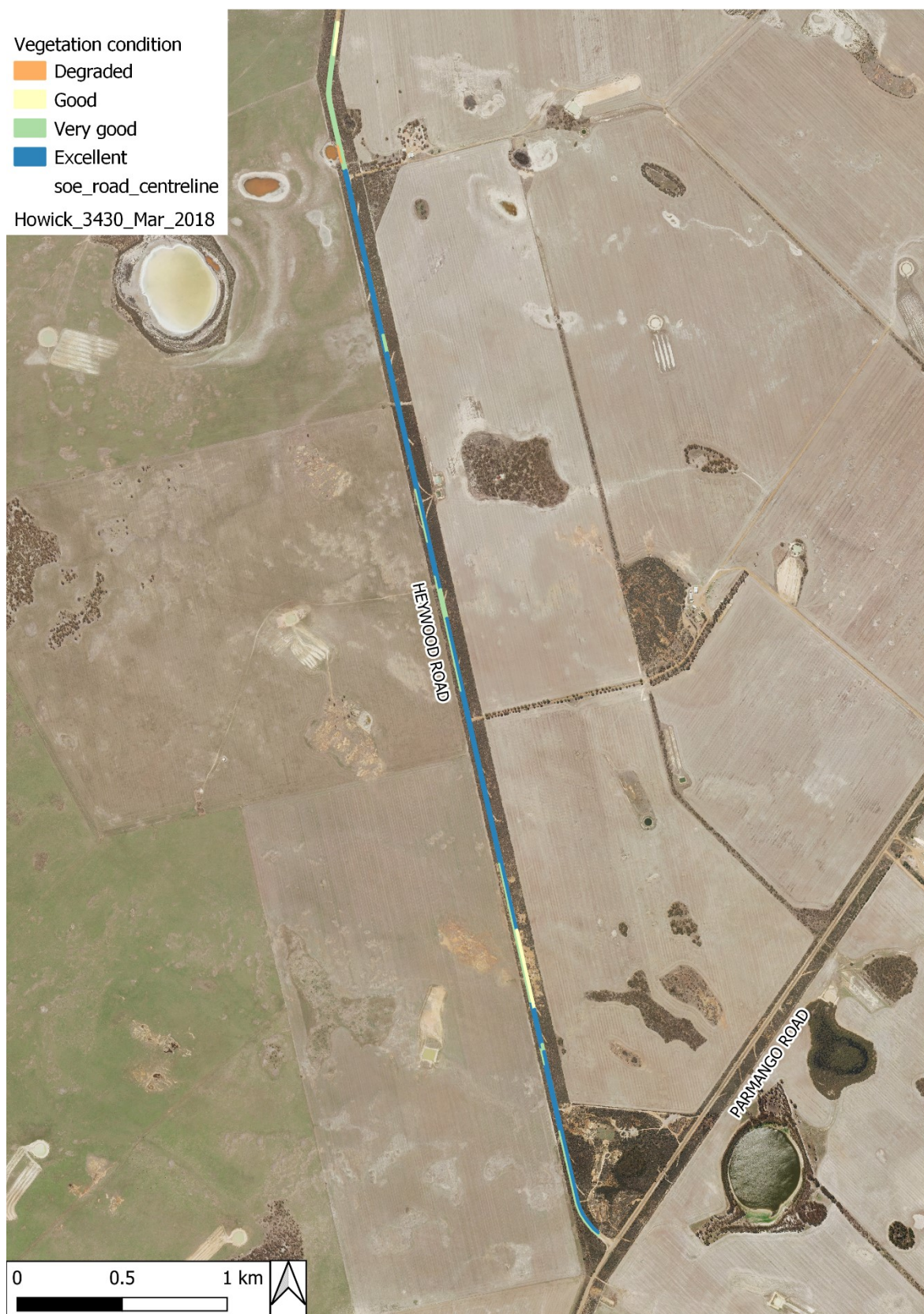
## 5.8 Vegetation Condition

Vegetation condition was mostly very good to excellent across the site. There were some areas that had been degraded by previous gravel extraction and secondary salinity, there was no proposed clearing in these areas. There was no evidence of fire within the project area.

**Table 13.** Quantifying vegetation to be cleared by vegetation type and condition.

Vegetation Type	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
A	<0.001	0.019	0.007	-	-	0.026
B	-	-	0.001	-	-	0.001
C	0.005	0.041	-	-	-	0.047
D	0.057	0.002	-	-	-	0.059
E	0.025	-	-	-	-	0.025
Total	0.087	0.063	0.007	-	-	0.157





**Figure 24.** Vegetation condition across 'Site G –Heywood road - SLK 0 - 6' project, ranging from good to excellent condition. (Note there is no proposed clearing within the mapped degraded areas).

## 5.9 Threatened Ecological Communities

Vegetation Type B, described as 'Open mallee over mixed Proteaceous heath' met criteria to be considered as the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' Kwongkan TEC. Only 0.001ha of good condition Kwongkan TEC will be cleared.

Vegetation type C, described as "*Eucalyptus occidentalis* woodland with or without *Melaleuca cuticularis*" was identified as potentially meeting the WA listed PEC "Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia". Each occurrence of this vegetation type was assessed against the original vegetation community description used for nominating the 'Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia' PEC including an assessment of whether it had intact understorey and fringing vegetation (Appendix 15). In total 0.0424892 ha of this PEC will be cleared under 'Site G – Heywood road - SLK 0 - 6' project.

**Table 14.** Consideration of Vegetation type C occurrences and Swamp Yate PEC listing criterion (Appendix 15).

Occurrence	Criterion 1: Abiotic Factors i) Occurs on valley floor; ii) Basin is more or less circular; iii) Seasonally inundated.	Criterion 2: Centre of basin inhabited by <i>Eucalyptus occidentalis</i> low woodland (often with an understory of <i>Melaleuca cuticularis</i> ).	Criterion 4: Fringing the wetland is dense rushes and sedges.	Criterion 3: Peripheral to the central basin is a waterlogged zone of <i>E. occidentalis</i> associated with heath to open scrub and/or small trees. <i>Melaleuca calycina</i> , <i>M. glaberrima</i> , <i>M. incana</i> , <i>M. pulchella</i> , <i>Taxandria callistachys</i> ;	Swamp Yate PEC determination Yes / No  Area (ha) within Site
Occurrence 1 SLK 1-1.11	i)Occurs on valley floor ii)Basin is roughly circular iii)Seasonally inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> .  <i>Melaleuca cuticularis</i> was not present.	Sedges were in a moderate density surrounded the basin. A handful of rushes were present within the occurrence.	<i>Melaleuca calycina</i> fringed the seasonally inundated section of the occurrence.	Yes  0.008 ha
Occurrence 2 SLK 2.83-2.87 (Western side of road)	i)Occurs on very shallow valley floor ii)Basin is roughly circular iii)Seasonally inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> .  <i>Melaleuca cuticularis</i> was not present.	Sedge layer was present within occurrence. Moderate invasion by Poaceae weeds had occurred.	<i>Melaleuca calycina</i> fringed the seasonally inundated section of the occurrence.	Yes  0.001 ha
Occurrence 3 SLK 3.34-3.38 (Western side of road)	i)Occurs on very shallow valley floor ii)Basin is roughly circular iii)Seasonally inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> . <i>Melaleuca cuticularis</i> was not	Sedge layer was present within occurrence. Moderate invasion by Poaceae weeds had occurred.	<i>Melaleuca calycina</i> and <i>M. societatis</i> fringed the seasonally inundated section of the occurrence	Yes  0.004 ha



Occurrence 4 SLK 4.41-4.67	i) Occurs on very shallow valley floor ii) Basin is roughly circular iii) Seasonally inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> .  <i>Melaleuca cuticularis</i> was not present.	Sedges fringed the basin.	<i>Melaleuca calycina</i> and <i>M. societatis</i> fringed the seasonally inundated section of the occurrence	Yes  0.012 ha
Occurrence 5 SLK 5.35-5.51 (Western side of road) Salinity impacted area	i) Occurs on very shallow valley floor ii) Basin is circular iii) Permanently inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> with a <i>Melaleuca cuticularis</i> understorey.  Large number of dead <i>Eucalyptus occidentalis</i> and <i>Melaleuca cuticularis</i> was present.	Sedge layer was present only on the northern edge of the basin.  Heavy Poaceae weed invasion was present.	<i>Melaleuca calycina</i> and <i>M. societatis</i> fringed the seasonally inundated section of the occurrence.	Partial  0.004 ha
Occurrence 6 SLK 5.37-5.6 (Eastern side of road)	i) occurs on very shallow valley floor ii) Basin is circular iii) Seasonally inundated	Occurrence was dominated by <i>Eucalyptus occidentalis</i> with an intact <i>Melaleuca cuticularis</i> understorey.	Sedge layer was present within occurrence. Moderate invasion by Poaceae weeds had occurred.	<i>Melaleuca calycina</i> and <i>M. societatis</i> fringed the seasonally inundated section of the occurrence. <i>Acacia bartlei</i> which is associated with <i>Eucalyptus occidentalis</i> woodlands was also present.	Yes  0.013 ha

No other TECs or PECs were relevant to the site.

## 5.10 Fauna

Of the species identified within the Desktop survey, only five have suitable habitat within the proposed clearing permit area.

### 5.10.1 Malleefowl, *Leipoa ocellata*, VU

No known records were within 20km of the site. The malleefowl was identified by the Protected Matters Search Tool. Malleefowl are predominantly found within shrublands and low woodlands dominated by Mallees and are associated with Broombush (*Melaleuca uncinata*). Vegetation type E is somewhat suitable for this species, with its dense cover of Melaleucas in the understorey though most of the site is lacking the dense leaf litter that's the species uses for its nest construction. No Malleefowl or evidence of Malleefowl activity was encountered during the flora survey or fieldwork.

### 5.10.2 Chuditch, *Dasyurus geoffroii*, VU

No known records were within 20km of the site. The Chudich was identified by the Protected Matters Search Tool. The Chuditch has been historically inhabited a wide range of habitats, but today it survives mostly in Jarrah Eucalyptus marginata forests and woodlands, mallee shrublands and heathlands. The vegetation within this site likely provides important habitat connectivity for this species, the 100-metre section of road reserve and road reserve bordered by intact vegetation has the potential to provide suitable foraging habitat for this species.

### 5.10.3 Carnaby's Black Cockatoo, *Calyptorhynchus latirostris*, threatened fauna

There was an occurrence record of Carnaby's Black Cockatoo 14.88km from the project area. The site was assessed for suitable habitat. Vegetation types A, B and D may contain suitable foraging habitat and the site is within range of two larger Forrest Products Commission *Pinus pinaster* plantations (8km SW of site, and 12 km SE of site). There was no feeding debris noted at the site during the field survey, there was also no signs of Dieback. Given that that the total clearing within Vegetation types A, B and C was 0.086 ha, no foraging quality scoring (Appendix 12) was done and given that the site did not:

- contain any nesting sites or large trees with hollows;
- contain night roosting areas;
- the amount of high quality foraging habitat was less than 1 ha;
- had low quality (1-4) habitat under 10ha

a referral for assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is unlikely to be required.

### 5.10.4 Southern death adder, *Acanthophis antarcticus*, Priority 3

There was an occurrence record of the Southern Death Adder 14.88km from the project area. This species is found in a wide variety of well-drained habitats, including rainforests and wet sclerophyll forests, woodland, shrublands, grasslands and coastal heathlands, preferring sites with deep fixed leaf litter. The snake is an ambush predator which hides under leaf litter or burrows in sand while waiting for prey. The site had suitable vegetation with dense shrubland though lacked significant leaf litter. The sandy soil at the site is potentially suitable for burrowing. The site also contained a range of suitable prey items including small birds. No evidence of the species was seen during the survey.

### 5.10.5 Peregrine Falcon, *Falco peregrinus*, OS

No known records were within 20km of the site. The Peregrine falcon was identified by the Protected Matters Search Tool. The Peregrine falcon has home ranges of 20-30 square kilometres. The Peregrine Falcon is listed as occurring in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites (cliff faces, tree hollows or in the large abandoned nests of other birds) and prefers coastal and inland cliffs or open woodlands near water. It is likely that the entire project area has potentially suitable hunting grounds.

## 6 REVIEW OF 10 CLEARING PRINCIPLES FOR NATIVE VEGETATION

The 'Site G – Heywood road - SLK 0 - 6' project may be at variance to some of the clearing principles that the Department of Water and Environmental Regulations (DWER) assess applications, as listed under Schedule 5 of the Environmental Protection Act 1986 (DWER 2019).

### 6.1 Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Biodiversity at this site is high with 213 native species recorded over five vegetation communities.

### 6.2 Principle (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

The vegetation may contain foraging habitat for Carnaby's Black Cockatoo, Southern Death Adder, Peregrine falcon, Malleefowl and Chudich. Impacts to all of these species from the proposed clearing is likely to be negligible.

### 6.3 Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

No Threatened flora and six priority species were observed in the area. The numbers of priority flora being disturbed are low. *Persoonia scabra* and *Goodenia laevis subsp. laevis* had no plants being taken and *Aotus sp. Dundas* and *Acacia bartlei* each only had single plant being taken. All species have wide distribution and the removal of these plants is unlikely to have a significant impact on these species.

### 6.4 Principle (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.

Only 0.001 hectares of vegetation in good condition met the definition of EPBC listed Kwongkan TEC, all other areas within the site failed to meet the definition of Kwongkan TEC.

In total 0.0424892 hectares of vegetation that may met the definition of the BC listed 'Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia' PEC.

No other TEC's or PEC's within the Shire of Esperance were relevant to the study area.

### 6.5 Principle (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

The immediate surroundings of the site were highly cleared agricultural land, with the intact vegetation within the site likely playing contributing to ecological linkages in the area. However the amount of vegetation being cleared and the fact that this is a 100m wide road reserve which will still exist as a wildlife corridor after road widening does not constitute being a significant impact.

### 6.6 Principle (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

This principle is at variance as there is one small salt lake is present between SLK 5.4 and SLK 5.5. Vegetation at this site is degraded and effected by salt.

**6.7 Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

Vegetation within this area will be providing limited function as windbreaks and erosion control for the agricultural areas surrounding it. Given the small amount of clearing occurring there's unlikely to be any significant contribution to land degradation

**6.8 Principle (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

The site was 1.3km north from Beaumont Nature Reserve 32128. Nature Reserve 32130 was 4.4km north of the site. Given the relatively small amount of native vegetation being cleared there will be little impact to nearby nature reserves.

**6.9 Principle (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.**

The yate swamp at SLK 5.35-5.51 has been severely impacted by changes to hydrology and salinity levels, however given the small amount of clearing occurring there's unlikely to be any significant impacts to water quality.

**6.10 Principle (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

Given the small amount of clearing occurring there's unlikely to be any significant impacts to flood risk.

## **7 RECOMMENDATIONS**

As Shire Environmental Coordinator signs off on project work packs the following recommendation will be included within the internal SOE approval process for the road project.

- All vehicles and construction equipment to be cleaned prior to start of the project to prevent the introduction of dieback.
- Works to be carried out in the dry(summer) months to minimise spread of dieback.
- Follow up spraying of emergent roadside weeds where gravel has been sourced from farmland to prevent weeds coming into the weed free areas.



## 8 LIST OF PERSONNEL

The following Shire of Esperance Staff were involved in this project.

<b>Name</b>	Julie Waters
<b>Position</b>	Environmental Coordinator
<b>Project Involvement</b>	Desktop and Field Survey, Specimen Identification, GIS Mapping Data Interpretation and Report writing
<b>Qualifications</b>	BEnvSc (Hons)
<b>Experience</b>	20 years working in environmental field including Flora Conservation Officer for previous DBCA, and 15 years' experience as a botanist in the region
<b>Scientific Licence</b>	FT61000787

<b>Name</b>	Katherine Walkerden
<b>Position</b>	Environmental Officer
<b>Project Involvement</b>	Desktop and Field Survey, Specimen Identification, GIS Mapping, Data Interpretation and Report writing
<b>Qualifications</b>	BSc, MEnvSc
<b>Experience</b>	Two years' experience as a Botanist in the region
<b>Scientific Licence</b>	FT61000788

<b>Name</b>	Rosamund Mary Hoggart
<b>Position</b>	Environmental Assistant
<b>Project Involvement</b>	Specimen Identification
<b>Qualifications and Experience</b>	BSc (Hons)Ag 15 years' experience as a botanist in the region and is highly regarded by Esperance Wildflower Society and her peers in Esperance as one of the best botanists in Esperance.
<b>Scientific Licence</b>	N/A

## 9 REFERENCES

Atlas of Living Australia database < <https://www.ala.org.au/>>

Adams E. (2012), *Shire of Esperance Threatened and Priority Flora: Field guide*, unpublished for the Department of Environment and Conservation

Beard J.S. (1973), *The vegetation of the Esperance and Malcom areas, Western Australia, 1:250 000 series*, Vegmap Publications Perth

Biosecurity and Agriculture Management Regulations 2013,  
<[https://www.legislation.wa.gov.au/legislation/statutes.nsf/main\\_mrttitle\\_13043\\_homepage.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrttitle_13043_homepage.html)>

Bureau of Meteorology 2022, Climate statistics for Australian sites.  
[http://www.bom.gov.au/climate/averages/tables/ca\\_wa\\_names.shtml](http://www.bom.gov.au/climate/averages/tables/ca_wa_names.shtml)

Commonwealth of Australia (2014), *Approved Conservation Advice for Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia*, Department of Agriculture, Water and the Environment, <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/126-conservation-advice.pdf>>

Commonwealth of Australia, *Environmental Protection and Biodiversity Conservation Act 1999* (Cth),  
<<https://www.legislation.gov.au/Details/C2022C00214>>

Department of Agriculture, Water and the Environment (2022) *Referral guideline for 3 WA threatened black cockatoo species, Carnaby's Cockatoo (Zanda latirostris), Baudin's Cockatoo (Zanda baudinii) and the Forest Red-tailed Black-cockatoo (Calyptorhynchus banksii naso)* <<https://www.dcceew.gov.au/sites/default/files/documents/referral-guideline-3-wa-threatened-black-cockatoo-species-2022.pdf>>

Department of Biodiversity, Conservation and Attractions (2018) *List of Threatened Ecological Communities Endorsed by the Western Australian Minister for Environment* <[https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened\\_ecological\\_communities\\_endorsed\\_by\\_the\\_minister\\_for\\_the\\_environment\\_june\\_2018.pdf](https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_for_the_environment_june_2018.pdf)>

Department of Biodiversity, Conservation and Attractions (2020), Conservation codes for Western Australian flora and fauna, Government of Western Australia. <<https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities>>

Department of Biodiversity, Conservation and Attractions (2021a), *Threatened Ecological Communities and Priority Ecological Communities Search Results, for Boundaries and Buffers, 15\_1121EC*, Government of Western Australia. [11/11/2021].

Department of Biodiversity, Conservation and Attractions (2022a) Florabase, The Flora of Western Australia Online (and collections housed at the WA Herbarium). <<https://florabase.dpaw.wa.gov.au/search/advanced.>>

Department of Biodiversity, Conservation and Attractions (2022b), *Priority Ecological Communities for Western Australia Version 33*, Government of Western Australia

Department of Biodiversity, Conservation and Attractions (2022c), *Threatened and Priority Flora Database (TPFL) spatial dataset, 45-0522FL*, Government of Western Australia. [26/5/2022]

Department of Biodiversity, Conservation and Attractions (2022d), *Esperance District Threatened and Priority Flora spatial dataset*, Government of Western Australia [01/03/2022]

Department of Biodiversity, Conservation and Attractions (2022e), *Threatened and Priority Fauna Database*, FAUNA#7454, Government of Western Australia. [26/5/2022]

Department of Biodiversity, Conservation and Attractions (2022f), *Carnaby's Roosting site database*, FAUNA#7454, Government of Western Australia. [26/5/2022]

Department of Biodiversity, Conservation and Attractions (2023), *Bentleya diminuta*, *Goodenia laevis* subsp. *laevis*, *Persoonia scabra* and *Styphelia rotundifolia*, *Western Australian Herbarium and Threatened and Priority Reporting (TPFL) spatial extracts*, 40-0123FL, Government of Western Australia. [7/2/2023]

Department of Climate Change, Energy, the Environment and Water (2022), *EPBC Act Protected Matters Search Tool* <<https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool>> [December 2022]

Department of Climate Change, Energy, the Environment and Water (2022), *EPBC Act List of Threatened Ecological Communities*. < <https://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>>

Department of Climate Change, Energy, the Environment and Water (2022), *EPBC Act List of threatened fauna*, Commonwealth of Australia. < <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna> >

Department of Climate Change, Energy, the Environment and Water (2022), *EPBC Act List of Threatened Threatened Flora*. < <https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>>

Department of Climate Change, Energy, the Environment and Water, (2022), *EPBC Act: Protected matters search tool*, Commonwealth of Australia. <<https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool/>>

Department of Environment and Energy (2014), *Draft National Recovery Plan for the Australasian Bittern*, *Botaurus poiciloptilus*, Commonwealth Government of Australia  
<<https://www.environment.gov.au/system/files/consultations/9a03b781-7f67-4874-a919-cf53cd1eee60/files/draft-recovery-plan-australasian-bittern.pdf>>

Department of Environment and Energy (2017), *Australian Vegetation Attribute Manual Version 7.0*  
<<https://www.dcceew.gov.au/sites/default/files/documents/australian-vegetation-attribute-manual-v70.pdf>>

Department of Parks and Wildlife (2018), *2018 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis – Full Report)*, Government of Western Australia

Department of Primary Industries and Regional Development 2022, *Western Australian Organism List*.  
<<https://www.agric.wa.gov.au/organisms>>

Department of Water and Environmental Regulation (2014) *A guide to the assessment of applications to clear native vegetation, Under Part V Division 2 of the Environmental Protection Act 1986*.

Department of Water and Environmental Regulations (2022), *Procedure: Native vegetation clearing permits*,

<<https://dwer.wa.gov.au/procedure/native-vegetation-clearing-permit>> [December 2022]

Environmental Protection Authority (EPA) (2016), *Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*, Government of Western Australia.

<<http://www.epa.wa.gov.au/policies-guidance/technical-guidance-flora-and-vegetation-surveys-environmental-impact-assessment>>

Environmental Protection Authority 2020, *Technical Guidance – Terrestrial vertebrate fauna surveys for Environmental Impact Assessment*, EPA, Western Australia.

<[https://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA-Technical-Guidance-Vertebrate-Fauna-Surveys.pdf](https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA-Technical-Guidance-Vertebrate-Fauna-Surveys.pdf)>

Environmental Protection Authority, (2016) *Environmental Factor Guideline: Flora and Vegetation*, EPA, Western Australia.

Field, C (2009) *Environmental Weed Strategy 2009-2018*, Shire of Esperance

GAIA Resources, State NRM and South Coast Natural Resource Management (2018), *Dieback Information Delivery and Management Service, DIDMS*. <<https://didms.gaiaresources.com.au/>> [December 2022]

Keighery, B.J. (1994). *Bushland plant survey. A guide to plant community survey for the community*. Wildflower Society of WA (Inc.). Nedlands, Western Australia.

Main Roads of Western Australia (2022), *Standard Line Kilometres online application*, Government of Western Australia. <<https://mrapps.mainroads.wa.gov.au/gpsslk>>

Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil Landscape Mapping in south-western Australia*, Resource Management Technical Report 20, Department of Agriculture WA.

Thackway R, Cresswell ID, Shorthouse D, Ferrier S, Hagar T, Pressey T, Wilson P, Fleming M, Howe D, Morgon G, Young P, Copley P, Peters D, Wells P, Miles I, Parkes D, McKenzie N, Thackway R, Kitchin M & Bullen F (1995), *Interim Biogeographic Regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperative Program*, Australia Nature Conservation Agency. <

<https://www.environment.gov.au/system/files/resources/4263c26f-f2a7-4a07-9a29-b1a81ac85acc/files/ibra-framework-setting-priorities-nrs-cooperative-program.pdf> >

Western Australian Government, Biosecurity and Agriculture Management Act 2007, <[https://www.legislation.wa.gov.au/legislation/statutes.nsf/main\\_mrtitle\\_2736\\_homepage.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_2736_homepage.html)>

Western Australian Government, *Biodiversity Conservation Act 2016* [https://www.legislation.wa.gov.au/legislation/statutes.nsf/law\\_a147120.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/law_a147120.html)

Western Australian Government, *Biodiversity Conservation Act 2016 Biodiversity Conservation (Species) Order 2022*, Government Gazette, WA, 30 September 2022,

<<https://www.dpaw.wa.gov.au/images/Biodiversity%20Conservation%20Listing%20of%20Native%20Species%20Flora%20Order%202022.pdf>>

Western Australian Government, *Biodiversity Conservation Regulations 2018*.

<[https://www.legislation.wa.gov.au/legislation/statutes.nsf/law\\_s50938.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/law_s50938.html)>



## 10 APPENDICES

### Appendix 1: Incidental species list

Family	Genus	Species	Weed	WA Cons Status	Herbarium Reference
Araliaceae	<i>Trachymene</i>	<i>pilosa</i>			
Asparagaceae	<i>Laxmannia</i>	<i>minor</i>			
Asparagaceae	<i>Laxmannia</i>	<i>omnifertilis</i>			
Asparagaceae	<i>Lomandra</i>	<i>collina</i>			
Asparagaceae	<i>Lomandra</i>	<i>effusa</i>			
Asparagaceae	<i>Lomandra</i>	<i>mucronata</i>			
Asparagaceae	<i>Thysanotus</i>	<i>patersonii</i>			
Asphodelaceae	<i>Asphodelus</i>	<i>fistulosus</i>			
Asteraceae	<i>Arctotheca</i>	<i>calendula</i>	X		
Asteraceae	<i>Dittrichia</i>	<i>graveolens</i>	X		
Asteraceae	<i>Euchiton</i>	<i>sphaericus</i>			
Asteraceae	<i>Hypochaeris</i>	<i>radicata</i>	X		
Asteraceae	<i>Podolepis</i>	<i>rugata</i> ssp. <i>rugata</i>			
Asteraceae	<i>Pseudognaphalium</i>	<i>luteoalbum</i>	X		
Asteraceae	<i>Pterochaeta</i>	<i>paniculata</i>			
Asteraceae	<i>Senecio</i>	<i>quadridentatus</i>			
Asteraceae	<i>Sonchus</i>	<i>oleraceus</i>	X		
Asteraceae	<i>Vittadinia</i>	<i>gracilis</i>			
Boraginaceae	<i>Echium</i>	<i>plantagineum</i>	X		
Boraginaceae	<i>Halgania</i>	<i>anagalloides</i> var. <i>southern</i>			
Brassicaceae	<i>Lepidium</i>	<i>africanum</i>	X		
Brassicaceae	<i>Raphanistrum</i>	<i>raphanistrum</i>	X		
Campanulaceae	<i>Monopsis</i>	<i>debilis</i> var. <i>depressa</i>	X		
Caryophyllaceae	<i>Petrorhagia</i>	<i>dubia</i>	X		
Caryophyllaceae	<i>Polycarpon</i>	<i>tetraphyllum</i>	X		
Casuarinaceae	<i>Allocasuarina</i>	<i>humilis</i>			
Casuarinaceae	<i>Allocasuarina</i>	<i>lehmanniana</i> ssp. <i>ecarinata</i>			
Casuarinaceae	<i>Allocasuarina</i>	<i>thyoides</i>			
Centrolepidaceae	<i>Centrolepis</i>	<i>aristata</i>			
Centrolepidaceae	<i>Centrolepis</i>	<i>glabra</i>			
Centrolepidaceae	<i>Centrolepis</i>	<i>polygyna</i>			
Chenopodiaceae	<i>Atriplex</i>	<i>lindleyi</i> ssp. <i>inflata</i>			
Chenopodiaceae	<i>Enchylaena</i>	<i>tomentosa</i>			
Chenopodiaceae	<i>Tecticornia</i>	<i>lylei</i>			
Convolvulaceae	<i>Convolvulus</i>	<i>remotus</i>			
Convolvulaceae	<i>Wilsonia</i>	<i>humilis</i>			
Crassulaceae	<i>Crassula</i>	<i>decumbens</i>			
Crassulaceae	<i>Crassula</i>	<i>exserta</i>			
Crassulaceae	<i>Crassula</i>	<i>natans</i>	X		

Cyperaceae	<i>Ficinia</i>	<i>nodosa</i>			
Cyperaceae	<i>Gahnia</i>	<i>ancistrophylla</i>			
Cyperaceae	<i>Gahnia</i>	<i>aristata</i>			
Cyperaceae	<i>Lepidosperma</i>	<i>leptostachyum</i>			
Cyperaceae	<i>Lepidosperma</i>	<i>squamatum</i>			
Cyperaceae	<i>Lepidosperma</i>	sp.			KSW17922 Acc BIS22130
Cyperaceae	<i>Lepidosperma</i>	sp.			KSW18022 Acc BIS22130
Cyperaceae	<i>Lepidosperma</i>	sp.			KSW18122 Acc BIS22130
Cyperaceae	<i>Netrostylis</i>	sp. Mt Madden			
Cyperaceae	<i>Schoenus</i>	<i>breviculmis</i>			
Cyperaceae	<i>Schoenus</i>	<i>brevisetis</i>			
Cyperaceae	<i>Schoenus</i>	<i>caespititius</i>			
Dilleniaceae	<i>Hibbertia</i>	<i>exasperata</i>			
Dilleniaceae	<i>Hibbertia</i>	<i>gracilipes</i>			
Dilleniaceae	<i>Hibbertia</i>	<i>lineata</i>			
Dilleniaceae	<i>Hibbertia</i>	<i>psilocarpa</i>			
Droseraceae	<i>Drosera</i>	<i>drummondii</i>			
Droseraceae	<i>Drosera</i>	<i>glanduligera</i>			
Droseraceae	<i>Drosera</i>	<i>leucoblata</i>			
Ericaceae	<i>Acrotriche</i>	<i>cordata</i>			
Ericaceae	<i>Acrotriche</i>	sp. Israelite Bay			
Ericaceae	<i>Leucopogon</i>	<i>obtusatus</i>			
Ericaceae	<i>Leucopogon</i>	sp. Newdegate			
Ericaceae	<i>Lissanthe</i>	<i>rubicunda</i>			
Ericaceae	<i>Lysinema</i>	<i>ciliatum</i>			
Ericaceae	<i>Styphelia</i>	<i>breviflora</i>			
Ericaceae	<i>Styphelia</i>	<i>concinna</i>			
Ericaceae	<i>Styphelia</i>	<i>exserta</i>			
Ericaceae	<i>Styphelia</i>	<i>intertexta</i>			
Ericaceae	<i>Styphelia</i>	<i>rotundifolia</i>		P3	KSW16822 ACC 9841
Euphorbiaceae	<i>Stachystemon</i>	<i>virgatus</i>			
Fabaceae	<i>Acacia</i>	<i>aemula</i>			
Fabaceae	<i>Acacia</i>	<i>bartlei</i>		P3	KSW16522 ACC 9841
Fabaceae	<i>Acacia</i>	<i>collettioides</i>			
Fabaceae	<i>Acacia</i>	<i>crispula</i>			
Fabaceae	<i>Acacia</i>	<i>cyclops</i>			
Fabaceae	<i>Acacia</i>	<i>lasiocarpa</i> var. <i>bracteolata</i>			
Fabaceae	<i>Acacia</i>	<i>maxwellii</i>			
Fabaceae	<i>Acacia</i>	<i>mutabilis</i> ssp. <i>mutabilis</i>			
Fabaceae	<i>Acacia</i>	<i>myrtifolia</i>			
Fabaceae	<i>Acacia</i>	<i>pravifolia</i>			
Fabaceae	<i>Acacia</i>	<i>pritzeliana</i>			

Fabaceae	<i>Acacia</i>	<i>sulcata</i> var. <i>platyphylla</i>			
Fabaceae	<i>Aotus</i>	sp. Dundas		P2	KSW16322, KSW16422 ACC9841 and KSW 20522 ACC9874
Fabaceae	<i>Chorizema</i>	<i>aciculare</i>			
Fabaceae	<i>Chorizema</i>	<i>nervosum</i>			
Fabaceae	<i>Daviesia</i>	<i>aphylla</i>			
Fabaceae	<i>Daviesia</i>	<i>apiculata</i>			
Fabaceae	<i>Daviesia</i>	<i>dilatata</i>			
Fabaceae	<i>Daviesia</i>	<i>lancifolia</i>			
Fabaceae	<i>Dillwynia</i>	sp. Mallee			
Fabaceae	<i>Eutaxia</i>	<i>lutea</i>			
Fabaceae	<i>Gompholobium</i>	<i>knightianum</i>			
Fabaceae	<i>Gompholobium</i>	<i>marginatum</i>			
Fabaceae	<i>Isotropis</i>	<i>drummondii</i>			
Fabaceae	<i>Kennedia</i>	sp. South Coast			
Fabaceae	<i>Pultenaea</i>	<i>indira</i> ssp. <i>indira</i>			
Fabaceae	<i>Pultenaea</i>	<i>spinulosa</i>			
Fabaceae	<i>Senna</i>	sp. Pallinup River			
Fabaceae	<i>Templetonia</i>	<i>retusa</i>			
Fabaceae	<i>Templetonia</i>	<i>sulcata</i>			
Geraniaceae	<i>Erodium</i>	<i>cicutarium</i>	X		
Goodeniaceae	<i>Coopernookia</i>	<i>strophiolata</i>			
Goodeniaceae	<i>Dampiera</i>	<i>lavandulacea</i>			
Goodeniaceae	<i>Dampiera</i>	<i>sacculata</i>			
Goodeniaceae	<i>Goodenia</i>	<i>concinna</i>			
Goodeniaceae	<i>Goodenia</i>	<i>incana</i>			
Goodeniaceae	<i>Goodenia</i>	<i>laevis</i> ssp. <i>laevis</i>		P3	KSW16222 ACC9841
Goodeniaceae	<i>Goodenia</i>	<i>pterigosperma</i>			
Goodeniaceae	<i>Scaevola</i>	<i>thesioides</i> ssp. <i>filifolia</i>			
Haemodoraceae	<i>Conostylis</i>	<i>bealiana</i>			
Haloragaceae	<i>Glischrocaryon</i>	<i>angustifolia</i>			
Hemerocallidaceae	<i>Chamaescilla</i>	<i>corymbosa</i>			
Hemerocallidaceae	<i>Dianella</i>	<i>revoluta</i> var. <i>revoluta</i>			
Iridaceae	<i>Patersonia</i>	<i>junceae</i>			
Iridaceae	<i>Patersonia</i>	<i>maxwellii</i>			
Juncaceae	<i>Juncus</i>	<i>bufonius</i>			
Juncaceae	<i>Juncus</i>	<i>microcephalus</i>	X		
Juncaceae	<i>Juncus</i>	<i>pallidus</i>			
Juncaginaceae	<i>Triglochin</i>	<i>mucronata</i>			
Lamiaceae	<i>Microcorys</i>	<i>glabra</i>			
Lamiaceae	<i>Microcorys</i>	<i>subcanescens</i>			
Lamiaceae	<i>Westringia</i>	<i>rigida</i>			
Lauraceae	<i>Cassytha</i>	<i>melantha</i>			
Lauraceae	<i>Cassytha</i>	<i>racemosa</i>			



Lythraceae	<i>Lythrum</i>	<i>hyssopifolia</i>	X		
Malvaceae	<i>Lasiopetalum</i>	<i>rosmarinifolium</i>			
Malvaceae	<i>Malva</i>	<i>parvifolia</i>	X		
Myrtaceae	<i>Austrobaecka</i>	<i>latens</i>			
Myrtaceae	<i>Beaufortia</i>	<i>empetrifolia</i>			
Myrtaceae	<i>Beaufortia</i>	<i>schaueri</i>			
Myrtaceae	<i>Calothamnus</i>	<i>gracilis</i>			
Myrtaceae	<i>Calothamnus</i>	<i>quadrifidus</i>			
Myrtaceae	<i>Calytrix</i>	<i>lechenaultii</i>			
Myrtaceae	<i>Conothamnus</i>	<i>aureus</i>			
Myrtaceae	<i>Cyathostemon</i>	<i>ambiguus</i>			
Myrtaceae	<i>Darwinia</i>	<i>diosmoides</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>angulosa</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>celastroides</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>conglobata</i> ssp. <i>conglobata</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>dielsii</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>extrica</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>flocktoniae</i> ssp. <i>hebes</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>incrassata</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>leptocalyx</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>occidentalis</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>transcontinentalis</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>tumida</i>			
Myrtaceae	<i>Eucalyptus</i>	<i>uncinata</i>			
Myrtaceae	<i>Lechenaultia</i>	<i>formosa</i>			
Myrtaceae	<i>Melaleuca</i>	<i>calycina</i>			
Myrtaceae	<i>Melaleuca</i>	<i>cuticularis</i>			
Myrtaceae	<i>Melaleuca</i>	<i>glaberrima</i>			
Myrtaceae	<i>Melaleuca</i>	<i>hamata</i>			
Myrtaceae	<i>Melaleuca</i>	<i>pulchella</i>			
Myrtaceae	<i>Melaleuca</i>	<i>scabra</i>			
Myrtaceae	<i>Melaleuca</i>	<i>societatis</i>			
Myrtaceae	<i>Melaleuca</i>	<i>tuberculata</i> var. <i>macrophylla</i>			
Myrtaceae	<i>Melaleuca</i>	<i>undulata</i>			
Myrtaceae	<i>Micromyrtus</i>	<i>elobata</i>			
Myrtaceae	<i>Phymatocarpus</i>	<i>maxwellii</i>			
Myrtaceae	<i>Rinzia</i>	<i>icosandra</i>			
Myrtaceae	<i>Verticordia</i>	<i>inclusa</i>			
Myrtaceae	<i>Verticordia</i>	<i>minutiflora</i>			
Myrtaceae	<i>Verticordia</i>	<i>vicinella</i>			
Orchidaceae	<i>Disa</i>	<i>bracteata</i>	X		
Orchidaceae	<i>Elythranthera</i>	<i>brunonis</i>			
Orchidaceae	<i>Microtis</i>	<i>alba</i>			KSW21622 ACC9874
Orchidaceae	<i>Pterostylis</i>	sp.			
Phyllanthaceae	<i>Poranthera</i>	<i>microphylla</i>			

					ACC9783
Pittosporaceae	<i>Billardiera</i>	<i>coriacea</i>			
Pittosporaceae	<i>Billardiera</i>	<i>fusiformis</i>			
Pittosporaceae	<i>Billardiera</i>	<i>lehmanniana</i>			
Pittosporaceae	<i>Cheiranthra</i>	<i>filifolia</i>			
Pittosporaceae	<i>Marianthus</i>	<i>bicolor</i>			
Poaceae	<i>Amphipogon</i>	<i>strictus</i>			
Poaceae	<i>Austrostipa</i>	<i>elegantissima</i>			
Poaceae	<i>Austrostipa</i>	<i>hemipogon</i>			
Poaceae	<i>Austrostipa</i>	<i>scabra</i>			
Poaceae	<i>Avena</i>	<i>barbata</i>	X		
Poaceae	<i>Briza</i>	<i>maxima</i>	X		
Poaceae	<i>Cynodon</i>	<i>dactylon</i>	X		
Poaceae	<i>Eragrostis</i>	<i>curvula</i>	X		
Poaceae	<i>Lolium</i>	<i>sp.</i>	X		
Poaceae	<i>Neurachne</i>	<i>alopecuroidea</i>			
Poaceae	<i>Pentameris</i>	<i>airoides</i>	X		
Poaceae	<i>Rytidosperma</i>	<i>setacea</i>			
Polygonaceae	<i>Comesperma</i>	<i>ciliatum</i>			
Polyporaceae	<i>Pycnopus</i>	<i>coccineus</i>			
Primulaceae	<i>Lysimachia</i>	<i>arvensis</i>			
Proteaceae	<i>Banksia</i>	<i>armata</i>			
Proteaceae	<i>Banksia</i>	<i>media</i>			
Proteaceae	<i>Grevillea</i>	<i>nudiflora</i>			
Proteaceae	<i>Grevillea</i>	<i>oligantha</i>			
Proteaceae	<i>Grevillea</i>	<i>plurijuga</i> ssp. <i>superba</i>			
Proteaceae	<i>Hakea</i>	<i>cinerea</i>			
Proteaceae	<i>Hakea</i>	<i>corymbosa</i>			
Proteaceae	<i>Hakea</i>	<i>laurina</i>			
Proteaceae	<i>Hakea</i>	<i>lissocarpha</i>			
Proteaceae	<i>Hakea</i>	<i>marginata</i>			
Proteaceae	<i>Hakea</i>	<i>nitida</i>			
Proteaceae	<i>Hakea</i>	<i>pandanicaarpa</i> ssp. <i>pandanicaarpa</i>			
Proteaceae	<i>Hakea</i>	<i>prostrata</i>			
Proteaceae	<i>Hakea</i>	<i>trifurcata</i>			
Proteaceae	<i>Isopogon</i>	<i>polycephalus</i>			
Proteaceae	<i>Isopogon</i>	sp. Fitzgerald River			
Proteaceae	<i>Persoonia</i>	<i>scabra</i>		P3	KSW16622, KSW16722 ACC9841
Proteaceae	<i>Petrophile</i>	<i>fastigiata</i>			
Proteaceae	<i>Synaphea</i>	<i>media</i>			
Proteaceae	<i>Synaphea</i>	<i>petiolaris</i>			
Restionaceae	<i>Hypolaena</i>	<i>humilis</i>			
Restionaceae	<i>Lepidobolus</i>	<i>chaetocephalus</i>			
Restionaceae	<i>Lepidobolus</i>	<i>preissianus</i>			

Rhamnaceae	<i>Cryptandra</i>	<i>pungens</i>			
Rhamnaceae	<i>Cryptandra</i>	<i>wilsonii</i>			
Rhamnaceae	<i>Spyridium</i>	<i>longicor</i>			
Rhamnaceae	<i>Spyridium</i>	<i>microcephalum</i>			
Rhamnaceae	<i>Spyridium</i>	<i>rotundifolium</i>			
Rhamnaceae	<i>Stenanthemum</i>	<i>notiale ssp notiale</i>			
Rubiaceae	<i>Opercularia</i>	<i>vaginata</i>			
Rutaceae	<i>Boronia</i>	<i>crassifolia</i>			
Rutaceae	<i>Cyanothamnus</i>	<i>inconspicuus</i>			
Rutaceae	<i>Cyanothamnus</i>	<i>ramosus ssp. anethifolius</i>			
Rutaceae	<i>Microcybe</i>	<i>pauciflora ssp. pauciflora</i>			
Santalaceae	<i>Exocarpos</i>	<i>sparteus</i>			
Santalaceae	<i>Santalum</i>	<i>acuminatum</i>			
Sapindaceae	<i>Dodonaea</i>	<i>caespitosa</i>			
Stylidiaceae	<i>Levenhookia</i>	<i>pusilla</i>			
Stylidiaceae	<i>Levenhookia</i>	<i>stipitata</i>			
Thymelaeaceae	<i>Pimelea</i>	<i>angustifolia</i>			
Thymelaeaceae	<i>Pimelea</i>	<i>brachyphylla</i>			
Thymelaeaceae	<i>Pimelea</i>	<i>imbricata var. piligera</i>			
Violaceae	<i>Hybanthus</i>	<i>epacroides</i>			



## Appendix 2: Threatened and Priority Flora Report Forms

### Aotus sp. Dundas, Priority 2



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## Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: Aotus sp. Dundas	TPFL Pop. No: [ ]
OBSERVATION DATE: 12/10/2022	CONSERVATION STATUS: P2
OBSERVER/S: Katherine Walkerden, Julie Waters	PHONE: 0418399385
ROLE: Environmental Officers	ORGANISATION: Shire of Esperance
EMAIL: julie.waters@esperance.wa.gov.au	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):	
Heywood Road, 4.71- 6.1km north north of Parmango Road. Both sides of Heywood road	
4 main clumps of plants: 106 plants @ SLK 5.97-6.1 ; 35 plants @ SLK 5.58-5.62 ; 66 plants @ SLK 5.28-5.37 ; 31 plants @ SLK 4.71-4.81	
Reserve No: [ ]	
DBC DISTRICT: Esperance	LGA: Esperance
Land manager present: <input checked="" type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 469672
WGS84 <input type="checkbox"/>	Long / Easting: 6285536
Unknown <input type="checkbox"/>	ZONE: 51
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: [ ] Map used: [ ]	
Boundary polygon captured: <input type="checkbox"/> Map scale: [ ]	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>
Private property <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
Rail reserve <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Shire road reserve <input checked="" type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
UCL <input type="checkbox"/>	SLK/Pole [ ] to [ ]
Specify other: [ ]	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m²): [ ]
EFFORT: Time spent surveying (minutes): 30	No. of minutes spent / 100 m²: [ ]
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: [ ]
(Refer to field manual for list)	
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	
Alive	238
Dead	[ ]
Area of pop (m²): [ ]	
QUADRATS PRESENT: No. [ ] Size [ ] Data attached <input type="checkbox"/>	Total area of quadrats (m²): [ ]
Summary Quad. Totals: Alive	[ ]
REPRODUCTIVE STATE:	
Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/> Percentage in flower: 10%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
COMMENT: Whole road reserve not surveyed (100m wide road reserve)

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
<p>Edge clearing, too frequent fire, weed, disease. Refer to field manual for list of threats &amp; agents. Specify agent where relevant.</p> <p>Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme</p> <p>Estimate time to potential impact: S=Short (&lt;12mths), M=Medium (&lt;5yrs), L=Long (5yrs+)</p>			
• Road widening	N	L	M
•			



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## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input checked="" type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
<b>CONDITION OF SOIL:</b>	Specific <b>Landform</b> Element: _____ (Refer to field manual for additional values)				
	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION\*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mietragona)

1. Mallee and Banksia media over Myrtaceae shrubland

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

#### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp \_\_\_\_\_

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

**COMMENT:** \_\_\_\_\_

**FIRE HISTORY:** Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

**ROADSIDE MARKERS:** Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Plants were in highest density on the edge of road shoulder and spoon drains.

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: \_\_\_\_\_ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

**LODGE:** WA Herb \_\_\_\_\_ KSW16322 and 16422; Accession 9841 and KSW20522; Accession 9874 all specimens retained

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: \_\_\_\_\_

**COPY SENT TO:** Regional Office ☐ District Office ☒ Other: \_\_\_\_\_

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

## Bentleya diminuta, Priority 2



Department of Biodiversity,  
Conservation and Attractions

# Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: <i>Bentleya diminuta</i>	TPFL Pop. No: <input type="text"/>
OBSERVATION DATE: 11/10/2022	CONSERVATION STATUS: P2
OBSERVER/S: Katherine Walkerden, Julie Waters	PHONE: 0419399385
ROLE: Environmental Officers	ORGANISATION: Shire of Esperance
EMAIL: julie.waters@esperance.wa.gov.au	

DESCRIPTION OF LOCATION (Provide at least nearest town/nearest locality, and the distance and direction to that place):

Heywood Road, 3.37-3.41km north north of Parmango Road. Both sides of Heywood road

3 main colonies of plants

DBCA DISTRICT: Esperance	LGA: Esperance	Reserve No: <input type="text"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 469984	No. satellites: <input type="text"/> Map used: <input type="text"/>
WGS84 <input type="checkbox"/>	Long / Easting: 6284157	Boundary polygon captured: <input type="checkbox"/> Map scale: <input type="text"/>
Unknown <input type="checkbox"/>	ZONE: 51	
LAND TENURE:		
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole <input type="text"/> to <input type="text"/>
		Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <input type="text"/>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m <sup>2</sup> ): <input type="text"/>
EFFORT: Time spent surveying (minutes): <input type="text"/>	No. of minutes spent / 100 m <sup>2</sup> : <input type="text"/>
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: <input type="text"/>
(Refer to field manual for list)	
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	
Alive	Area of pop (m <sup>2</sup> ): <input type="text"/>
Dead	Note: Pls record count as numbers (not percentages) for database.
QUADRATS PRESENT: No. <input type="text"/> Size <input type="text"/> Data attached <input type="checkbox"/>	Total area of quadrats (m <sup>2</sup> ): <input type="text"/>
Summary Quad. Totals: Alive	
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	Percentage in flower: 5%
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/>	

CONDITION OF PLANT: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT: Population extent (boundary) GPSed

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.			
Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme			
Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	N	L	M
•			
•			





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Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input checked="" type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>		Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	0-10% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	30-50% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____	50-100% <input type="checkbox"/>	Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values)				

### CONDITION OF SOIL:

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

### VEGETATION

#### CLASSIFICATION\*:

Eg: 1. Banksia woodland (B.  
attenuata, B. ilicifolia);  
2. Open shrubland  
(Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges  
(Mitretragona)

1. Neighbouring vegetation was Mixed Mallee over Melaleuca shrubland with fabaceae shrubs.

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

### COMMENT:

FIRE HISTORY: Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

ROADSIDE MARKER: Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

FLORA AUTHORISATION / LICENCE No: FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: \_\_\_\_\_ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

LODGE: WA Herb  
Lodgement No: KSW14122; Accession 9783 specimen retained

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: \_\_\_\_\_

COPY SENT TO: Regional Office ☐ District Office ☒ Other: \_\_\_\_\_

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

## Acacia bartlei, Priority 3



Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-claims](http://www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-claims)

TAXON: <u>Acacia bartlei</u>	TPFL Pop. No: <u>        </u>
OBSERVATION DATE: <u>12/10/2022</u>	CONSERVATION STATUS: <u>P3</u> New population <input checked="" type="checkbox"/>
OBSERVER/S: <u>Katherine Walkerden, Julie Waters</u>	PHONE <u>0419399385</u>
ROLE: <u>Environmental Officers</u>	ORGANISATION: <u>Shire of Esperance</u>
EMAIL: <u>julie.waters@esperance.wa.gov.au</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):           
Heywood Road, 5.4-5.6km north north of Parmango Road. Both sides of Heywood road, north of driveway into farm.

Reserve No: <u>        </u>	
DBC DISTRICT: <u>Esperance</u>	LGA: <u>Esperance</u> Land manager present: <input checked="" type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>469520</u>
WGS84 <input type="checkbox"/>	Long / Easting: <u>6286213</u>
Unknown <input type="checkbox"/>	ZONE: <u>51</u>
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: <u>        </u> Map used: <u>        </u>	
Boundary polygon captured: <input type="checkbox"/> Map scale: <u>        </u>	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole <u>        </u> to <u>        </u> Specify other: <u>        </u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m <sup>2</sup> ): <u>        </u>
EFFORT: Time spent surveying (minutes): <u>30</u>	No. of minutes spent / 100 m <sup>2</sup> : <u>        </u>
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: <u>        </u>
(Refer to field manual for list)	
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	
Alive	Mature: <u>10</u> Juveniles: <u>        </u> Seedlings: <u>        </u> Totals: <u>        </u>
Dead	<u>        </u> <u>        </u> <u>        </u> <u>        </u>
QUADRATS PRESENT: No. <u>        </u> Size <u>        </u> Data attached <input type="checkbox"/>	Total area of quadrats (m <sup>2</sup> ): <u>        </u>
Summary Quad. Totals: Alive	<u>        </u> <u>        </u> <u>        </u> <u>        </u>
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	Percentage in flower: <u>80%</u>
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/>	

CONDITION OF PLANT: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:         

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	<u>N</u>	<u>L</u>	<u>M</u>
• <u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>



Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input checked="" type="checkbox"/>					
Wetland <input type="checkbox"/>					
	<b>Specific Landform Element:</b>				
	(Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION\*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mitretrichia)

1. Salinity affected Yate woodland with Melaleuca cuticularis and mixed Poaceae weeds.

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

#### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp \_\_\_\_\_

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

<b>CONDITION OF HABITAT:</b>	Pristine <input type="checkbox"/>	Excellent <input type="checkbox"/>	Very good <input type="checkbox"/>	Good <input checked="" type="checkbox"/>	Degraded <input type="checkbox"/>	Completely degraded <input type="checkbox"/>
<b>COMMENT:</b>	_____					
<b>FIRE HISTORY:</b>	Last Fire: Season/Month: _____ Year: _____		<b>Fire intensity:</b> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>			
<b>FENCING:</b>	Not required <input checked="" type="checkbox"/>	Present <input type="checkbox"/>	Replace / repair <input type="checkbox"/>	Required <input type="checkbox"/>	Length req'd: _____	
<b>ROADSIDE MARKERS:</b>	Not required <input checked="" type="checkbox"/>	Present <input type="checkbox"/>	Replace / reposition <input type="checkbox"/>	Required <input type="checkbox"/>	Quantity req'd: _____	

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

<b>SPECIMEN:</b>	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
<b>LODGE:</b>	WA Herb Lodgement No: KSW16522; Accession 9841 specimen retained				
<b>ATTACHED:</b>	Map <input type="checkbox"/> Mudmap <input type="checkbox"/> Photo <input type="checkbox"/> GIS data <input checked="" type="checkbox"/> Field notes <input type="checkbox"/> Other: _____				
<b>COPY SENT TO:</b>	Regional Office <input type="checkbox"/> District Office <input checked="" type="checkbox"/> Other: _____				

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

## Goodenia laevis ssp. laevis, Priority 3



Department of Biodiversity,  
Conservation and Attractions

### Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: <u>Goodenia laevis subsp. laevis</u>	TPFL Pop. No: <u>          </u>
OBSERVATION DATE: <u>12/10/2022</u>	CONSERVATION STATUS: <u>P3</u> New population <input checked="" type="checkbox"/>
OBSERVER/S: <u>Katherine Walkerden, Julie Waters</u>	PHONE <u>0419399385</u>
ROLE: <u>Environmental Officers</u>	ORGANISATION: <u>Shire of Esperance</u>
EMAIL: <u>julie.waters@esperance.wa.gov.au</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):             
Heywood Road, 5.58 km north north of Parmango Road. West side of Heywood road.

Reserve No: <u>          </u>	
DBC DISTRICT: <u>Esperance</u>	LGA: <u>Esperance</u> Land manager present: <input checked="" type="checkbox"/>
DATUM: <u>GDA94 / MGA94</u> <input checked="" type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required)
<u>AGD84 / AMG84</u> <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
<u>WGS84</u> <input type="checkbox"/>	METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
<u>Unknown</u> <input type="checkbox"/>	No. satellites: <u>          </u> Map used: <u>          </u>
Lat / Northing: <u>469491</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: <u>          </u>
Long / Easting: <u>6286301</u>	
ZONE: <u>51</u>	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole <u>          </u> to <u>          </u> Specify other: <u>          </u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m <sup>2</sup> ): <u>          </u>
EFFORT: Time spent surveying (minutes): <u>30</u>	No. of minutes spent / 100 m <sup>2</sup> : <u>          </u>
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: <u>          </u>
(Refer to field manual for list)	
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	
Alive	Mature: <u>7</u> Juveniles: <u>          </u> Seedlings: <u>          </u> Totals: <u>          </u>
Dead	<u>          </u> <u>          </u> <u>          </u> <u>          </u>
QUADRATS PRESENT: No. <u>          </u> Size <u>          </u> Data attached <input type="checkbox"/>	Total area of quadrats (m <sup>2</sup> ): <u>          </u>
Summary Quad. Totals: Alive	<u>          </u> <u>          </u> <u>          </u> <u>          </u>
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	Percentage in flower: <u>30</u> %
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/>	

CONDITION OF PLANT: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:           

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	N	L	M
•			
•			





Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>		Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	0-10% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	30-50% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____	50-100% <input type="checkbox"/>	Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
	Specific Landform Element: _____ (Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION:

Eg: 1. Banksia woodland (B. attenuata, B. littoralis);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mitrargyre)

1. Mixed Mallee and Hakea cinerea over sparse shrubs with dense restionaceae and Cyperaceae understorey

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp \_\_\_\_\_

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

### COMMENT:

**FIRE HISTORY:** Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

**ROADSIDE MARKERS:** Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: \_\_\_\_\_ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

**LODGE:** WA Herb  
Lodgement No: KSW16222; Accession 9841 specimen not retained

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: \_\_\_\_\_

**COPY SENT TO:** Regional Office ☐ District Office ☒ Other: \_\_\_\_\_

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

## Persoonia scabra, Priority 3



Department of Biodiversity,  
Conservation and Attractions

### Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: <u>Persoonia scabra</u>	TPFL Pop. No: <u>        </u>
OBSERVATION DATE: <u>12/10/2022</u>	CONSERVATION STATUS: <u>P3</u> New population <input checked="" type="checkbox"/>
OBSERVER/S: <u>Katherine Walkerden, Julie Waters</u>	PHONE <u>0419399385</u>
ROLE: <u>Environmental Officers</u>	ORGANISATION: <u>Shire of Esperance</u>
EMAIL: <u>julie.waters@esperance.wa.gov.au</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):           
Heywood Road, 5.4-5.6km north north of Parmango Road. Both sides of Heywood road, north of driveway into farm.

Reserve No: <u>        </u>	
DBCA DISTRICT: <u>Esperance</u>	LGA: <u>Esperance</u> Land manager present: <input checked="" type="checkbox"/>
DATUM: <u>GDA94 / MGA94</u> <input checked="" type="checkbox"/> <u>AGD84 / AMG84</u> <input type="checkbox"/> <u>WGS84</u> <input type="checkbox"/> <u>Unknown</u> <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>469709</u> Long / Easting: <u>6285497</u> ZONE: <u>51</u>
METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: <u>        </u> Map used: <u>        </u> Boundary polygon captured: <input type="checkbox"/> Map scale: <u>        </u>	
LAND TENURE: Nature reserve <input type="checkbox"/> Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/> National park <input type="checkbox"/> State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Conservation park <input type="checkbox"/> Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole <u>        </u> to <u>        </u> Specify other: <u>        </u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m <sup>2</sup> ): <u>        </u>															
EFFORT: Time spent surveying (minutes): <u>30</u> No. of minutes spent / 100 m <sup>2</sup> : <u>        </u>															
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: <u>        </u> (Refer to field manual for list)															
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>															
TOTAL POP'N STRUCTURE:															
<table border="1"> <thead> <tr> <th></th> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td>Alive</td> <td><u>6</u></td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> </tr> <tr> <td>Dead</td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> </tr> </tbody> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Alive	<u>6</u>	<u>        </u>	<u>        </u>	<u>        </u>	Dead	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>
	Mature:	Juveniles:	Seedlings:	Totals:											
Alive	<u>6</u>	<u>        </u>	<u>        </u>	<u>        </u>											
Dead	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>											
QUADRATS PRESENT: No. <u>        </u> Size <u>        </u> Data attached <input type="checkbox"/> Total area of quadrats (m <sup>2</sup> ): <u>        </u>															
Summary Quad. Totals: Alive <u>        </u>															
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/> Percentage in flower: <u>80%</u>															

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:         

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	<u>N</u>	<u>L</u>	<u>M</u>
• <u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>



Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>		Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	0-10% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	30-50% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____	50-100% <input type="checkbox"/>	Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
	Specific Landform Element: (Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION\*

Eg. 1. Banksia woodland (B. attenuata, B. littoralis);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mitretragona)

1. Mallee and Banksia media over mixed Myrtaceous shrubland.

2. ☐

3. ☐

4. ☐

### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

### COMMENT:

**FIRE HISTORY:** Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

**ROADSIDE MARKERS:** Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: \_\_\_\_\_ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

**LODGE:** WA Herb  
Lodgement No: KSW16722; Accession 9841 specimen not retained

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: \_\_\_\_\_

**COPY SENT TO:** Regional Office ☐ District Office ☒ Other: \_\_\_\_\_

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023



Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: <i>Persoonia scabra</i>	TPFL Pop. No: <input type="text"/>
OBSERVATION DATE: 10/10/2022	CONSERVATION STATUS: P3
OBSERVER/S: Katherine Walkerden, Julie Waters	PHONE: 0419399385
ROLE: Environmental Officers	ORGANISATION: Shire of Esperance
EMAIL: julie.waters@esperance.wa.gov.au	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):  
Heywood Road, 0.75km north north of Parmango Road. East side of Heywood road.

Reserve No: <input type="text"/>	
DBCA DISTRICT: Esperance	LGA: Esperance
DATUM:	COORDINATE \$: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 470577
WGS84 <input type="checkbox"/>	Long / Easting: 6281582
Unknown <input type="checkbox"/>	ZONE: 51
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: <input type="text"/> Map used: <input type="text"/>	
Boundary polygon captured: <input type="checkbox"/> Map scale: <input type="text"/>	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>
Private property <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>
UCL <input type="checkbox"/>	SLK/Pole <input type="text"/> to <input type="text"/>
Rail reserve <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Shire road reserve <input checked="" type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Specify other: <input type="text"/>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m <sup>2</sup> ): <input type="text"/>
EFFORT: Time spent surveying (minutes): 3	No. of minutes spent / 100 m <sup>2</sup> : <input type="text"/>
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: <input type="text"/>
(Refer to field manual for list)	
WHAT COUNTED:	
TOTAL POP'N STRUCTURE:	
Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
Mature: <input type="text"/>	Juveniles: <input type="text"/>
Seedlings: <input type="text"/>	Totals: <input type="text"/>
Area of pop (m <sup>2</sup> ): <input type="text"/>	
Dead: <input type="text"/>	
QUADRATS PRESENT:	
No. <input type="text"/> Size <input type="text"/> Data attached <input type="checkbox"/>	Total area of quadrats (m <sup>2</sup> ): <input type="text"/>
Summary Quad. Totals: Alive	
REPRODUCTIVE STATE:	
Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/>	Percentage in flower: 80%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant.			
Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme			
Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	N	L	M
•			





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## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
	<b>Specific Landform Element:</b>				
	(Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION\*

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mitretragona)

1. Scattered Mallees over mixed Proteaceous heath with mixed sedges. Associated species includes: Allocasuarina humilis, Calothamnus quadrifidus.

2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_

### ASSOCIATED

#### SPECIES:

Other (non-dominant) spp \_\_\_\_\_

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

### COMMENT:

**FIRE HISTORY:** Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

**ROADSIDE MARKERS:** Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) \_\_\_\_\_

No plants proposed to be taken under road widening

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: \_\_\_\_\_ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

**LODGE:** WA Herb  
Lodgement No: KSW16622 Accession 9841 – specimen not retained

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: \_\_\_\_\_

**COPY SENT TO:** Regional Office ☐ District Office ☒ Other: \_\_\_\_\_

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

### Styphelia rotundifolia, Priority 3



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## Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at [www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants](http://www.dbcwa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants)

TAXON: <u>Styphelia rotundifolia</u>	TPFL Pop. No: <u>        </u>
OBSERVATION DATE: <u>11/10/2022</u>	CONSERVATION STATUS: <u>P3</u> New population <input checked="" type="checkbox"/>
OBSERVER/S: <u>Katherine Walkerden, Julie Waters</u>	PHONE <u>0419399385</u>
ROLE: <u>Environmental Officers</u>	ORGANISATION: <u>Shire of Esperance</u>
EMAIL: <u>julie.waters@esperance.wa.gov.au</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):           
Heywood Road, 1.25-2.04 km north north of Parmango Road. Both sides of Heywood road  
Plants extend into rehabilitated gravel pits on east side of road

Reserve No: <u>        </u>	
DBCA DISTRICT: <u>Esperance</u>	LGA: <u>Esperance</u> Land manager present: <input checked="" type="checkbox"/>
DATUM:	COORDINATE \$: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>470359</u>
WGS84 <input type="checkbox"/>	Long / Easting: <u>6282489</u>
Unknown <input type="checkbox"/>	ZONE: <u>51</u>
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: <u>        </u> Map used: <u>        </u>	
Boundary polygon captured: <input type="checkbox"/> Map scale: <u>        </u>	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input checked="" type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole <u>        </u> to <u>        </u> Specify other: <u>        </u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m <sup>2</sup> ): <u>        </u>															
EFFORT: Time spent surveying (minutes): <u>30</u> No. of minutes spent / 100 m <sup>2</sup> : <u>        </u>															
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: <u>        </u> (Refer to field manual for list)															
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>															
TOTAL POP'N STRUCTURE:															
<table border="1"> <thead> <tr> <th></th> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td>Alive</td> <td><u>327</u></td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> </tr> <tr> <td>Dead</td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> <td><u>        </u></td> </tr> </tbody> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Alive	<u>327</u>	<u>        </u>	<u>        </u>	<u>        </u>	Dead	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>
	Mature:	Juveniles:	Seedlings:	Totals:											
Alive	<u>327</u>	<u>        </u>	<u>        </u>	<u>        </u>											
Dead	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>											
QUADRATS PRESENT: No. <u>        </u> Size <u>        </u> Data attached <input type="checkbox"/> Total area of quadrats (m <sup>2</sup> ): <u>        </u>															
Summary Quad. Totals: Alive <u>        </u>															
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent fruit <input type="checkbox"/> Percentage in flower: <u>80%</u>															

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:         

THREATS - type, agent and supporting information:	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Road widening	<u>N</u>	<u>L</u>	<u>M</u>
•	<u>        </u>	<u>        </u>	<u>        </u>



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## Threatened and Priority Flora Report Form

Version 1.4 March 2021

### HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input checked="" type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: <input type="text"/>		Specify other: <input type="text"/>	Specify other: <input type="text"/>	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input checked="" type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

### VEGETATION

#### CLASSIFICATION\*

Eg: 1. Banksia woodland (B. attenuata, B. littoralis);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mitretragona)

1. Regenerating Mallee over Banksia armata dominated Proteaceous heath with mixed sedges

2.

3.

4.

#### ASSOCIATED SPECIES:

Allocasuarina humilis, Calothamnus quadrifidus

Other (non-dominant) spp

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

**COMMENT:**

**FIRE HISTORY:** Last Fire: Season/Month:  Year:  Fire intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd:

**ROADSIDE MARKER:** Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd:

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

**FLORA AUTHORISATION / LICENCE No:** FT61000788-1a Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No:  WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

**LODGE:** WA Herb  
Lodgement No: KSW16822 ACC#9841 specimen retained

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other:

**COPY SENT TO:** Regional Office ☐ District Office ☒ Other:

Submitter of Record: Julie Waters Role: Environmental Coordinator Signed: J WATERS Date: 3/04/2023

### Appendix 3: Description of Threatened and Priority Flora Species with the Potential to occur within the 'Heywood road - SLK 0 - 6' Survey Area

Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site G – Heywood road - SLK 0 - 6' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2022c), WA Herbarium (DBCA 2022a) and Esperance District Threatened Flora (DBCA 2022d).

Nt. Acronyms used in the table include priority flora (P), threatened flora (TF), Biodiversity Conservation (BC) Act 2018, Environmental Protection and Biodiversity Conservation (EPBC) Act 1999, critically endangered (CR) and endangered (EN).

Species	Cons Status	Associated Habitat	Likely to occur	Distance from site (km)
<i>Darwinia</i> sp. Gibson	P1	Margins of salt lakes and road verges on grey-brown sandy loam and white sand, with <i>M. cuticularis</i> , <i>M. brevifolia</i> , <i>leucopogon</i> and samphire	Possible	6.50
<i>Scaevola archeriana</i>	P1	Sandy and sandy-clay loam soils. Sandplains, road verges.	Possible	8.44
<i>Leucopogon remotus</i>	P1	<i>Banksia media</i> mallee woodlands on plains near salt lakes	Possible	8.51
<i>Eucalyptus</i> sp. Esperance	P1	Open mallee woodland, loam. Flats.	Possible	15.68
<i>Darwinia</i> sp. Mt Ney	P1	Heath above salt lakes	Possible	18.02
<i>Baeckea</i> sp. Gibson	P1	Shallow sand over granite or laterite	Possible	18.27
<i>Bentleya diminuta</i>	P2	Sandy clay or loam with calcareous nodules. In mallee woodland	Possible	2.56
<i>Calectasia jubilaea</i>	P2	Associated with open low diverse Proteaceous heathland.	Possible	9.56
<i>Eucalyptus sweetmaniana</i>	P2	Coastal areas, below granite	No	10.30
<i>Aotus</i> sp. Dundas	P2	Recorded across a variety of habitats, including open Mallee woodlands, clay, loam, limestone and on the periphery of salt lakes.	Possible	11.17
<i>Tecticornia indefessa</i>	P2	White to brown grey sand near the edges of a salt lakes.	Possible	11.75
<i>Melaleuca viminea</i> subsp. <i>appressa</i>	P2	Shallow sand over clay. Near creeks, salt lakes or wet depressions.	Possible	15.25
<i>Acacia nitidula</i>	P2	Grows in association with granite boulders and granitic gravel.	No	17.68
<i>Melaleuca eximia</i>	P2	Sandy soils associated with granite outcrops	No	17.73
<i>Spyridium mucronatum</i> subsp. <i>multiflorum</i>	P2	Grows on gravel and is associated with Mallee-heath.	Possible	18.58
<i>Eucalyptus luculenta</i>	P2	Mallee-heath with sandy or calcareous soils	Possible	19.58
<i>Acacia euthyphylla</i>	P3	Grey/white clay loam, in seasonal swamps or periphery of salt lakes and marshes, in tall myrtaceous shrubland and mallee woodland	Possible	2.52



<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	Woodland with Melaleuca shrubland. Prefers limestone or white clay loam. Associated with disturbance	Possible	2.54
<i>Persoonia scabra</i>	P3	Sandy heathland environment over gravel, granite or limestone.	Possible	7.57
<i>Daviesia pauciflora</i>	P3	Deep sands in Kwongkan	Unlikely	10.28
<i>Isopogon alpicornis</i>	P3	Eucalyptus woodland with low sedge and scattered ground cover Banksia. Grey/brown sandy loams in Mallee shrubland.	Possible	12.57
<i>Stylidium roseonanthum</i>	P3	Associated with winter wet areas and swamps.	Possible	13.18
<i>Hibbertia hamata</i>	P3	Grows in association with granite boulders and granitic gravel.	Unlikely	14.12
<i>Lasiopetalum parvuliflorum</i>	P3	Sand, gravelly loam. Generally associated with wet areas, eg. along creeks or seasonal swamps	Possible	14.34
<i>Pterostylis faceta</i>	P3	Various habitats – Melaleuca Mallee scrubland, Granite, sandy loam	Possible	14.76
<i>Styphelia rotundifolia</i>	P3	Grows on skeletal soils, granite outcrops, and steep hillslopes.	Possible	15.34
<i>Pultenaea adunca</i>	P3	Variety of soils and habitat	Possible	16.91
<i>Melaleuca dempta</i>	P3	Associated with Mallee shrubland. Grows near salt lakes and winter wet depressions.	Possible	17.27
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	Associated with recently disturbed or burnt sites, across various habitat.	Unlikely to be present during survey period	18.04
<i>Acacia glaucissima</i>	P3	Salmon Gums on open low/Mallee woodland with dwarf scrub or low heath.	Unlikely	18.44
<i>Acacia bartlei</i>	P3	Flat or gently undulating landscapes, waterlogged depression in brown/grey sandy loam or clay loam. Commonly associated with Eucalyptus occidentalis.	Possible	18.65
<i>Leucopogon florulentus</i>	P3	Erect slender shrub, of 0.3-0.8 m high. Grows on sand, sandy clay, and gravelly lateritic soils. No WA Herbarium records in Esperance Shire.	Unlikely	18.87
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	Deep aeolian sand, grey or white sand, white sandy clay. Undulating plains, dunes, hill crests. Associated with salt lakes	Possible	19.13
<i>Myoporum turbinatum</i>	P4	In moist sandy soils, along creeks, rivers, pools or margins of saline depressions.	Possible	3.44

<i>Eremophila serpens</i>	P4	Wide distribution. Favours saline area or sandy rises. Associated with Eucalyptus woodland and Melaleuca shrubland	Possible	9.50
<i>Melaleuca fissurata</i>	P4	Shrub mallee or woodland on sand or sandy loam usually over clay or clay loam	Possible	11.77
<i>Grevillea baxteri</i>	P4	Prefers shrubby heathland with an acid sandy soil usually overlaying heavier soils. Associated with highly diverse Proteaceous shrublands.	Possible	12.79
<i>Kennedia becxiana</i>	P4	Grows in association with granite boulders and granitic gravel.	Unlikely	13.89
<i>Darwinia</i> sp. Mt Burdett	P4	Open shrub or mallee on sandy loams.	Possible	14.94
<i>Microtis quadrata</i>	P4	Mixed habitats. Wide variety of locations	Possible	15.51
<i>Stachystemon vinosus</i>	P4	Various habitats including sandplains and rock crevices on breakaways. Prefers fine loamy sand and stony soils.	Possible	17.74

#### Appendix 4: Description of Threatened and Priority Fauna Species with the Potential to occur within the 'Heywood road - SLK 0 - 6' Survey Area

Scientific Name	Common Name	WA cons. status	EPBC status	Dist (km)	EPBC protected matters tool	Habitat	Likely to occur
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	SP	MI	2.93		Grassy edges of shallow inland freshwater wetlands. They are also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches.	No
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR	2.93	X	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	No
<i>Calidris ruficollis</i>	Red-necked stint	MI	MI	2.93		Coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	No
<i>Pluvialis fulva</i>	Pacific golden plover	SP	MI	2.93		Occupies coastal areas, foraging in coastal fields and prairies with short grass, ploughed fields, coastal freshwater pools, saltmarshes, beaches, open mud and sandflats and reefs.	No
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	EN	EN	14.75	X	Kwongkan shrub or heathland. Presence of Hakea, Banksia and Pine species indicate potential feeding habitat.	Potentially

<i>Acanthopis antarcticus</i>	Southern death adder	P3		14.88		This species is found in a wide variety of well-drained habitats, including rainforests and wet sclerophyll forests, woodland, shrublands, grasslands and coastal heathlands, preferring sites with deep fixed leaf litter.	Potentially
<i>Botaurus poiciloptilus</i>	Australasian bittern	EN	EN	16.51	X	Shallow vegetated freshwater or brackish swamps	No
<i>Falco peregrinus</i>	Peregrine falcon	OSP		16.51		The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water, and may even be found nesting on high city buildings.	Potentially
<i>Tringa nebularia</i>	Common greenshank	P4	MI	16.51		Coastal and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	No
<i>Actitis hypoleucos</i>	Common Sandpiper	SP	MI	16.51		Coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats	No
<i>Apus pacificus</i>	Fork-tailed swift	SP	MI	17.10		Mostly occur over inland plains but sometimes above foothills or in coastal areas. Also over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	No
<i>Hydroprogne caspia</i>	Caspian Tern	SP	MI	17.10		Usually forages in open wetlands, including lakes and rivers.	No



<i>Tringa brevipes</i>	Grey-tailed tattler	P4	MI	17.10		Found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves.	No
<i>Thinornis rubricollis</i>	Hooded plover, hooded dotterel	P4		17.10		Freshwater lakes, freshwater marshes, coastal saline lagoons, and sandy beaches	No
<i>Parantechinus apicalis</i>	Dibbler	EN	EN		X	Dense heath in near coastal areas	No
<i>Calidris canutus</i>	Red Knot, Knot	EN	EN, MI			On the coast in sandy estuaries with tidal mudflats.	No
<i>Leipoa ocellata</i>	Malleefowl	VU	VU		X	Long (40-60 year) unburnt mallee woodlands	Potentially
<i>Cereopsis novaehollandiae grisea</i>	Recherche Cape Barren Goose		VU		X	Offshore islands, usually granite, in areas of pasture, tussock grass or low heathy scrub. During the summer, the non-breeding geese generally leave the islands for the mainland where they feed on improved pasture.	No
<i>Falco hypoleucos</i>	Grey Falcon		VU		X	Arid and semi-arid zones where rainfall is less than 500mm. Timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses	No
<i>Sternula nereis nereis</i>	Australian Fairy Tern		VU		X	Nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. Found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. Roosts on beaches at night.	No
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll		VU		X	Open forest, low open forest, woodland, and open shrub	Potentially

## Appendix 5: State Threatened and Priority Flora and Fauna Definitions

Category	Definition
<b>T – Threatened</b>	<p>Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedules 1 to 4 of the Wildlife Conservation (Rare Flora) Notice under the WC Act). Threatened flora are further ranked by the DBCA to align with IUCN Red List categories and criteria:</p> <p><b>CR:</b> Critically Endangered – considered to be facing an extremely high risk of extinction in the wild (Schedule 1);</p> <p><b>EN:</b> Endangered – considered to be facing a very high risk of extinction in the wild (Schedule 2); or</p> <p><b>VU:</b> Vulnerable – considered to be facing a high risk of extinction in the wild (Schedule 3).</p> <p><b>EX:</b> Presumed Extinct – taxa that have been adequately searched for and there is no reasonable doubt that the last individual has died (Schedule 4)</p>
<b>P1 – Priority 1</b> (Poorly known taxa)	<p>Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation.</p> <p>Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.</p>
<b>P2 – Priority 2</b> (Poorly known taxa)	<p>Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc.</p> <p>Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.</p>
<b>P3 – Priority 3</b> (Poorly known taxa)	<p>Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.</p> <p>Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.</p>
<b>P4 – Priority 4</b> (Rare, Near Threatened and other taxa in need of monitoring)	<p><b>1. Rare</b> - Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p><b>2. Near Threatened</b> - Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p><b>3.</b> Taxa that have been removed from the list of threatened species during the past</p>

## Appendix 6: Commonwealth Definition of Threatened Flora and Fauna Species (Environment Protection and Biodiversity Conservation, EPBC Act 1999)

Category Code	Category
Ex	<b>Extinct</b> Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	<b>Extinct in the Wild</b> Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	<b>Critically Endangered</b> Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	<b>Endangered</b> Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	<b>Vulnerable</b> Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	<b>Conservation Dependent</b> Taxa which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

## Appendix 7: State Definition of Threatened Ecological Communities

Category Code	Category
<b>PTD</b>	<p><b>Presumed Totally Destroyed</b></p> <p>An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies:</p> <ul style="list-style-type: none"> <li>(i) records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or;</li> <li>(ii) all occurrences recorded within the last 50 years have since been destroyed.</li> </ul>
<b>CE</b>	<p><b>Critically Endangered</b></p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:</p> <ul style="list-style-type: none"> <li>(i) The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification;</li> <li>(ii) The current distribution is limited ie. highly restricted, having very few small or isolated occurrences, or covering a small area;</li> <li>(iii) The ecological community is highly modified with potential of being rehabilitated in the immediate future.</li> </ul>
<b>E</b>	<p><b>Endangered</b></p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria:</p> <ul style="list-style-type: none"> <li>(i) The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification;</li> <li>(ii) The current distribution is limited ie. highly restricted, having very few small or isolated occurrences, or covering a small area;</li> <li>(iii) The ecological community is highly modified with potential of being rehabilitated in the short term future.</li> </ul>
<b>V</b>	<p><b>Vulnerable</b></p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria:</p> <ul style="list-style-type: none"> <li>(i) The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated;</li> <li>(ii) The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution;</li> <li>(iii) The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.</li> </ul>



## Appendix 8: State Definition of Priority Ecological Communities

Category Code	Category
P1	<b>Poorly-known ecological communities</b> Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	<b>Poorly-known ecological communities</b> Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	<b>Poorly known ecological communities</b> (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) Communities known from a few widespread occurrences, which are either large or within Significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	<b>Conservation Dependent ecological communities</b> Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

## Appendix 9: Commonwealth Definition of Threatened Ecological Communities

Three categories exist for listing threatened ecological communities under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Listing Category Code	Explanation of Category
<b>Critically endangered</b>	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
<b>Endangered</b>	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
<b>Vulnerable</b>	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium term future.

## Appendix 10: Categories and Control of Declared (Plant) Pests in Western Australia

Control Category	Control Measures
<p><b>C1 (Exclusion)</b></p> <p>‘(a) Category 1 (C1) — Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented’</p> <p>Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.</p>	<p>In relation to a category 1 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.</p>
<p><b>C2 (Eradication)</b></p> <p>‘(b) Category 2 (C2) — Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is feasible’.</p> <p>Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.</p>	<p>In relation to a category 2 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.</p>
<p><b>C3 (Management)</b></p> <p>‘(c) Category 3 (C3) — Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to —</p> <ul style="list-style-type: none"> <li>(i) alleviate the harmful impact of the declared pest in the area; or</li> <li>(ii) reduce the number or distribution of the declared pest in the area; or</li> <li>(iii) prevent or contain the spread of the declared pest in the area.’</li> </ul> <p>Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.</p>	<p>In relation to a category 3 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to —</p> <ul style="list-style-type: none"> <li>(a) alleviate the harmful impact of the declared pest in the area for which it is declared; or</li> <li>(b) reduce the number or distribution of the declared pest in the area for which it is declared; or</li> <li>(c) prevent or contain the spread of the declared pest in the area for which it is declared.</li> </ul>

## Appendix 11: Definition of Vegetation Condition Scale

For the south west and interzone botanical provinces

Condition Rating	Description
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance
Excellent (2)	Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species.
Very Good (3)	Vegetation structure altered; obvious signs of disturbance For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; & grazing.
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; & grazing
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; & grazing.
Completely Degraded (6)	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.

## Appendix 12: Carnaby's Cockatoo foraging habitat scoring template

Adapted from Tables A1 and A2 of Department of Agriculture, Water and the Environment (2022)

Starting score	Carnaby's Cockatoo	
10	<p><b>Start at a score of 10</b> if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as <i>Banksia</i> spp. (including <i>Dryandra</i> spp.), <i>Hakea</i> spp. and <i>Grevillea</i> spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation.</p> <p><b>*This tool only applies to sites equal to or larger than 1 hectare in size.</b></p>	
Attribute	Subtractions	Context adjustor (attributes reducing functionality of foraging habitat)
Foraging potential	-2	<b>Subtract 2</b> from your score if there is no evidence of feeding debris on your site.
Connectivity	-2	<b>Subtract 2</b> from your score if you have evidence to conclude that there is no other foraging habitat within 1km of your site.
Proximity to breeding	-2	<b>Subtract 2</b> if you have evidence to conclude that your site is more than 12km from breeding habitat.
Proximity to roosting	-1	<b>Subtract 1</b> if you have evidence to conclude that your site is more than 20km from a known night roosting habitat.
Impact from significant plant disease	-1	<b>Subtract 1</b> if your site has disease present (e.g. <i>Phytophthora</i> spp. or Marri canker) and the disease is preferred food plants present.
Total score	Enter score	
Other considerations for assessment of foraging habitat	<ul style="list-style-type: none"> <li>- The presence, extent and density (including foliage cover and flowering density) of all plant species that provide foraging, including non-native food sources used</li> <li>- The distribution and size of foraging habitat in proximity (e.g. up to 12 km) to the impact site.</li> <li>- Site degradation (such as cleared, disturbed or degraded areas).</li> <li>- The fire history of the impact site.</li> <li>- Landscape characteristics around the impact site, including details of roosting and breeding habitat in proximity (e.g. up to 20km for roosting and 12km for breeding); and</li> <li>- The location and details of watering points that could support the use of the foraging habitat.</li> </ul>	
Appraisal	<p>To support your habitat score, you should provide an overall appraisal of the habitat on the impact site and within 20km of the impact area to clearly explain and justify the score. It should include discussion on the foraging habitat's proximity to other resources (e.g. exact distance to proximate resources), frequency of use of proximate sites, the degree of evidence and description of vegetation type and condition.</p>	



## Appendix 13: EPBC Act Protected Matters Report

### Listed Threatened Ecological Communities:

Community Name	Threatened Category	Rank	Presence	
			Text	Buffer Status
Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Likely	Community likely to occur within area	In feature area

### Listed Threatened Species:

Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened Category	Migratory Status
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Bird	May	Species or species habitat may occur within area	Critically Endangered	Migratory
<i>Calidris ferruginea</i>	Curlew Sandpiper	Bird	May	Species or species habitat may occur within area	Critically Endangered	Migratory
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Bird	Likely	Species or species habitat likely to occur within area	Endangered	
<i>Calidris canutus</i>	Red Knot	Bird	May	Species or species habitat may occur within area	Endangered	Migratory
<i>Zanda latirostris</i>	Carnaby's Black Cockatoo	Bird	Known	Species or species habitat known to occur within area	Endangered (listed as <i>Calyptorhynchus latirostris</i> )	
<i>Leipoa ocellata</i>	Malleefowl	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	
<i>Cereopsis novaehollandiae grisea</i>	Cape Barren Goose	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	
<i>Falco hypoleucos</i>	Grey Falcon	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	
<i>Sternula nereis nereis</i>	Australian Fairy Tern	Bird	May	Species or species habitat may occur within area	Vulnerable	
<i>Parantechinus apicalis</i>	Dibbler	Mammal	Likely	Species or species habitat likely to occur within area	Endangered	

<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	Mammal	May	Species or species habitat may occur within area	Vulnerable	
<i>Anigozanthos bicolor subsp. minor</i>	Little Kangaroo Paw, Two-coloured Kangaroo Paw	Plant	Known	Species or species habitat known to occur within area	Endangered	
<i>Lambertia echinata subsp. echinata</i>	Prickly Honeysuckle	Plant	May	Species or species habitat may occur within area	Endangered	
<i>Ricinocarpus trichophorus</i>	Barrens Wedding Bush	Plant	Likely	Species or species habitat likely to occur within area	Endangered	

## Appendix 14 – Traffic Count Data – Heywood Road

### MetroCount Traffic Executive Daily Classes

#### DailyClass-184 -- English (ENA)

##### Datasets:

**Site:** [604\_000244\_000200] Heywood Road North of Parmango Road  
**Attribute:** RURAL  
**Direction:** 5 - South bound A>B, North bound B>A. **Lane:** 2  
**Survey Duration:** 0:00 Tuesday, 7 December 2021 => 15:11 Tuesday, 4 January 2022,  
**Zone:**  
**File:** 604\_000244\_000200 0 2022-01-04 1511.EC2 (Plus )  
**Identifier:** HJ27RVC7 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v5.02)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

##### Profile:

**Filter time:** 0:00 Tuesday, 7 December 2021 => 15:11 Tuesday, 4 January 2022 (28.633)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 10 - 160 km/h.  
**Direction:** North, East, South, West (bound), P = North, Lane = 0-16  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 510 / 523 (97.51%)

### Daily Classes

**DailyClass-184**

**Site:** 604\_000244\_000200.2.3SN  
**Description:** Heywood Road North of Parmango Road  
**Filter time:** 0:00 Tuesday, 7 December 2021 => 15:11 Tuesday, 4 January 2022  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1-12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

**Monday, 13 December 2021**

	1	2	3	4	5	6	7	8	9	10	11	12
<b>Total</b>												
<b>Mon</b>	13	0	2	0	0	0	0	0	0	0	9	0
24												
(%)	54.2	0.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.5	0.0
<b>Tue</b>	35	0	6	0	0	0	0	1	0	0	15	0
57												
(%)	61.4	0.0	10.5	0.0	0.0	0.0	0.0	1.8	0.0	0.0	26.3	0.0
<b>Wed</b>	29	2	5	0	0	0	0	0	0	0	16	0
52												
(%)	55.8	3.8	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.8	0.0
<b>Thu</b>	13	0	5	0	0	0	0	1	1	0	5	0
25												
(%)	52.0	0.0	20.0	0.0	0.0	0.0	0.0	4.0	4.0	0.0	20.0	0.0
<b>Fri</b>	18	3	7	0	0	0	0	0	0	0	5	0
33												
(%)	54.5	9.1	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.2	0.0
<b>Sat</b>	5	1	2	1	0	0	0	0	0	0	3	0
12												
(%)	41.7	8.3	16.7	8.3	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0
<b>Sun</b>	14	0	0	0	0	0	0	0	0	0	0	0
14												
(%)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Average daily volume**
**Entire week**

18	1	4	0	0	0	0	0	0	0	0	8	0
31												
(%)	58.5	2.8	12.4	0.5	0.0	0.0	0.0	0.9	0.5	0.0	24.4	0.0

**Weekdays**

22	1	5	0	0	0	0	0	0	0	0	10	0
38												
(%)	56.5	2.6	13.1	0.0	0.0	0.0	0.0	1.0	0.5	0.0	26.2	0.0

**Weekend**

10	1	1	1	0	0	0	0	0	0	0	2	0
13												
(%)	73.1	3.8	7.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0

\* - Incomplete



## Appendix 15: Swamp Yate (*Eucalyptus occidentalis*) woodland in seasonally-inundated basins - Community Description

Description obtained from: Ecologia for Grange Resources Limited (2008) Southdown Magnetite Proposal. Regional Flora and vegetation assessment. Unpublished Report

### Swamp Yate (*Eucalyptus occidentalis*) woodland in seasonally-inundated basins

#### Community Description

The centre of these sumplands was usually inhabited by Swamp Yate (*Eucalyptus occidentalis*) low woodland often with an understorey of the Saltwater Paperbark (*Melaleuca cuticularis*). Peripheral to the central seasonally-inundated basin of these wetlands there was often a waterlogged zone of *E. occidentalis* associated with *Kunzea recurva* heath to open scrub and/or the small trees *Melaleuca preissiana* and *Banksia littoralis* and a number of mallees (primarily *Eucalyptus decipiens* subsp. *adesmophloia*). Fringing the wetland there was usually an *Anarthria laevis* sedgeland. However in the wetlands where there was shallow laterite, the sedgeland was usually replaced with a *Pericalymma ellipticum* heath.

The understorey shrubs of this vegetation were typically very open. *Melaleuca cuticularis*, *Kunzea recurva* and *Hakea nitida* generally formed an open tall shrub layer. *Hakea denticulata*, *Hakea laurina*, *Hakea varia*, *Exocarpos sparteus*, *Agonis theiformis*, *Lambertia inermis* and *Nuytsia floribunda* were also sometimes present in the seasonally waterlogged areas fringing the sumplands. Other common shrub taxa, recorded at low density across the sampled sites were *Isopogon trilobus*, *Acacia pulchella* var. *glaberrima*, *Taxandria spathulata*, *Astartea glomerosa*, *Astartea aspera*, *Beaufortia empetrifolia*, *Melaleuca concinna* and *Conothamnus aureus*. Other mid and low shrub species recorded at lower abundance included *Acacia biflora*, *Acacia luteola*, *A. subcaerulea*, *Adenanthos cuneatus*, *Banksia baueri*, *Banksia dryandroides*, *Bossiaea praetermissa*, *Daviesia inflata*, *Dryandra falcata*, *Dryandra mucronulata* subsp. *mucronulata*, *Dryandra tenuifolia* var. *tenuifolia*, *Gompholobium confertum*, *Hibbertia lineata*, *Leucopogon conostephioides*, *Melaleuca subtrigona*, *Petrophile squamata* subsp. *squamata*, *Petrophile media*, *Spyridium majoranifolium*, *Stirlingia anethifolia* and *Thomasia stelligera*. The perennial herbs *Villarsia parnassifolia*, *Anthotium humile*, *Stylidium corymbosum*, *Goodenia filiformis* and *Velleia trinervis* were abundant in the wetlands in good condition. These herbs inhabited the shallowly-inundated zone of the wetland and were most apparent when the water receded and the herbs were in flower in late summer. A dense ground layer was generally present in the seasonally waterlogged fringe of the sumplands and this was dominated by rushes and sedges including *Anarthria laevis*, *Baumea juncea*, *Gahnia ancistrophylla*, *Lepidosperma striatum*, *Schoenus laevigatus*, *Schoenus subfascicularis* and *Tricostularia compressa*. A suite of native grasses was also recorded including *Amphipogon amphipogonoides*, *Austrostipa hemipogon*, *Cyperochloa hirsuta*, *Deyeuxia quadriseta* and *Neurachne alopecuroidea*. Naturalised alien grasses and herbs were prevalent in the more disturbed wetlands and these included *\*Aira caryophyllea*, *\*Cirsium vulgare*, *\*Conyza parva*, *\*Conyza sumatrensis*, *\*Hordeum leporinum*, *\*Hypochaeris glabra*, *Juncus pallidus*, *\*Lagurus ovatus*, *\*Pennisetum clandestinum*, *\*Pseudognaphalium luteoalbum*, *\*Rumex crispus*, *\*Solanum nigrum* and *\*Vulpia myuros* var. *megalura*.