

## Vegetation, Flora, Fauna and Environmental Considerations, and Targeted Flora Report

Shire of Esperance Strategic Purpose Permit 21/22  
Site P – Merivale Road Widening



Report compiled by Shire of Esperance Environmental Team:  
Katie White – BSc (Hons), Environmental Officer  
Julie Waters – BEnvSc, Environmental Coordinator  
Sophie Willsher - Environmental Field Assistant  
Danika Penson - Environmental Field Assistant  
Rhaquelle Meiklejohn - Environmental Field Assistant

Reviewed by Parks and Reserves Manager, Dylan Gleave

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## 1 Executive Summary

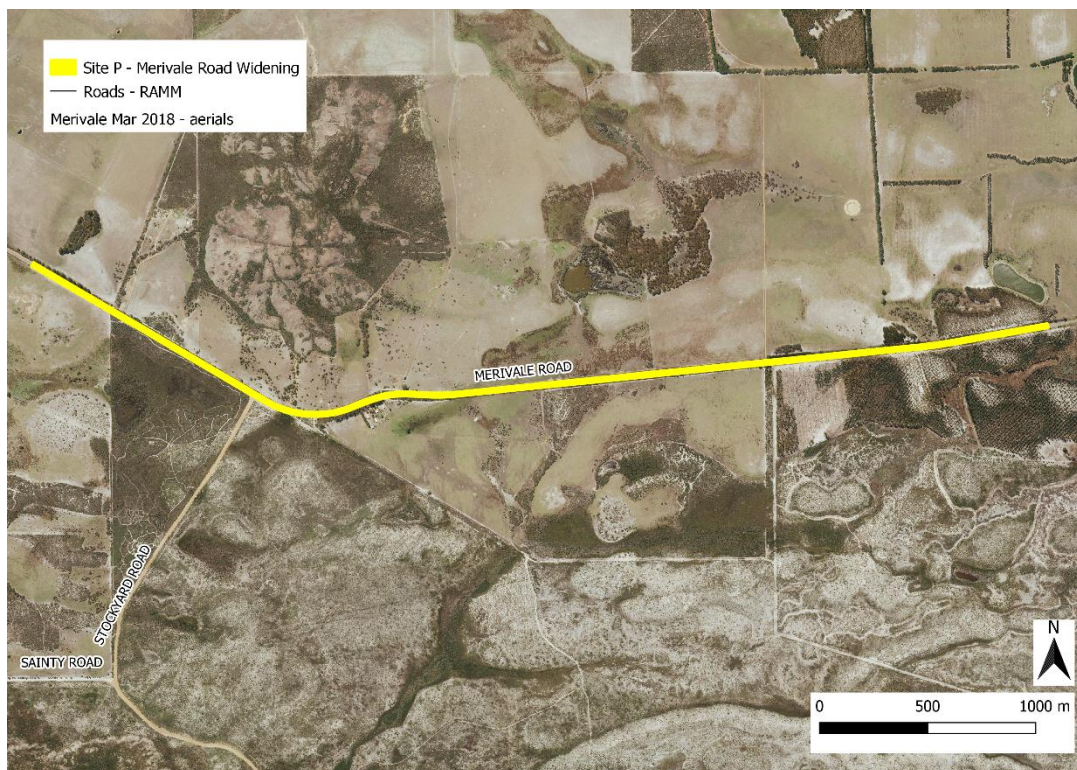
This 'Vegetation, Flora, Fauna and Environmental Considerations and Targeted Flora Report' has been undertaken in accordance with the 'Environmental Protection Authority (EPA) Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016)' as part of the application to the Department of Water and Environmental Regulations (DWER) to clear 5.18 ha of native vegetation within a 10.91 ha footprint for the purpose of road widening.

## 2 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 'Merivale Road Widening' project as Site P under the 'Strategic Purpose Permit 21/22' (Figure 1), for the purpose of road widening.

The Shire of Esperance wishes to upgrade the width of bitumen to 8 m and to realign bends and camber. To complete these works, native vegetation up to 1 m from the current road footprint on both sides of the road is required to be cleared, increasing the active road footprint to 22 m. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation.

The proposed works are located ~21 km east of Esperance, within the Shire of Esperance managed road reserve of Merivale Rd. Specifically, it is located from 1 km west of Stockyard Rd towards Tyrrell Rd, at straight line kilometre (SLK) 14.96 to 19.77 (Main Roads 2020). A point within the proposed clearing permit area is -33.8205 S, 122.1207 E (UTM Zone 51 H, GDA94).



**Figure 1.** Location of 'Site P - Merivale Road Widening' clearing permit application, submitted under the Shire of Esperance's '21/22 Strategic Purpose Permit'.

## 3 Environmental Background

### 3.1 Scope

The removal of native vegetation for the purpose of road widening has the potential to affect a multiple environmental factors.

Possible impacts include;

- Threatened Flora (TF) and Priority Flora (PF).
- Threatened fauna, specifically, potential feeding, nesting and roosting habitat of endangered Carnaby's Black Cockatoo, *Calyptorhynchus latirostris*.
- Threatened Ecological communities (TEC) and Priority Ecological Communities (PEC), specifically the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia' (Kwongkan) TEC.

Assessing these impacts involves two approaches; desktop study and field survey. The desktop study gathered background information on the target area. The field survey allows for detailed understanding of vegetation communities, targeted flora surveys for possible TF or PF, environmental condition, presence of PEC and TEC, and overall potential impact of clearing.

### 3.2 Catchment

Site P - Merivale Road Widening is present within the Esperance Coast catchment area. It is located approximately 7km from the coast.

### 3.3 Climate

The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers (BoM 2020). The area receives an average annual rainfall of 618 mm.

### 3.4 Geology

Three geological units were identified within 'Site P - Merivale Road Widening, West of Stockyards Rd towards Tyrrell Rd', by Schoknecht et al. (2004). They are described as:

- Weakly to moderately deformed and recrystallised granite,
- Sand or gravel plains; with quartz sand sheets, minor clay, local calcrete, laterite, silcrete, silt, alluvium, colluvium and Aeolian sand, and
- Dunes, sandplain with dunes and swales; Aeolian sand with minor silt and clay and Aeolian red quartz sand, clay and silt.

### 3.5 Soils

The soil of 'Site P - Merivale Road Widening' is broadly defined as deep uniform sand (Schnoknecht et al. 2004). Within the area, there has been two other soil types recorded. These include:

- Gravelly, yellow mottled duplex soil with < 30 cm of sand over gravel, and
- Rock outcrops (granite).

### 3.6 Topography

During the field survey, topography was observed to be dominated by sandplains. Whilst being close (240m away) from the granite outcrop of Mount Merrivale, no outlying granite outcrop was observed within the project area. Using Schnoknecht et al. (2004), the project topography is mapped at a fine scale, traversing five topographic areas. These include:

- Longitudinal dunes
- Gently undulating plains

- Level plain <1% slope
- Undulating low rises
- Granite outcrops

### 3.7 Vegetation

The site is located within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) Esperance Plains region (Esp02) and Recherche sub-region. The Esp2 region 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”.

Beard (1973) mapped three vegetation associations (VA) within the ‘Site P – Merivale Road Widening’ area – VA 47, VA 7048 and VA 6048 (Table 1). Of these vegetation types only a small proportion of VA 6048’s pre-European extent remains in the Esp02 IBRA region, and it is poorly represented in WA’s reserves system with only 6.30% being formally conserved within International Union for Conservation of Nature (IUCN) reserves across Western Australia.

**Table 1.** Vegetation associations mapped by Beard (1973) within the ‘Site P – Merivale Road Widening’, and statistics on pre-European remaining areas.

Nt. Acronyms used include Interim Biogeographic Regionalisation of Australia (IBRA), Esperance Plains bioregion (Esp02), local government area (LGA) and International Union of Conservation Nature (IUCN).

Vegetation Association	47	6048	7048
Description	Shrublands; tallerack mallee-heath	Shrublands; banksia scrub-heath on sandplain in the Esperance Plains Region	Shrublands; banksia scrub-heath on coast
Area mapped within site (ha)	2.96	1.14	1.08
Pre-European extent in IBRA region Esp02 (%)	35.05	14.16	78.94
Pre-European extent in LGA (%)	13.43	14.21	78.94
Current extent conserved in IUCN area (%)	49.30	6.30	65.03

### 3.8 Land use

The area directly included in the clearing permit application ‘Site P - Merivale Road Widening’ is currently intact and vegetated 40 m wide road reserve, managed by the Shire of Esperance. The current road footprint occupies 20 m. The surrounding land use is predominantly agricultural, however ‘Site P – Merivale Road Widening’ approximately 200 m of its border with a Public Open Space and is in close proximity to a Cultural and Natural Resource Zone. The area is within rural zoning.

## 4 Methodology

### 4.1 Desktop study

A desktop study was completed prior to any site visit. Geographical Information System (GIS) review existing

- Existing site digital orthophotos, as sourced from LandGate (Merrivale 3330, 2018).
- Western Australian Local Government Association's (WALGA) 'Local Government Mapping (LGMap 2020)' program was used to assess spatial information of geology, topography, soil profiles, native and planted vegetation, water bodies and Interim Biogeographical Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) classification system.
- Data provided by Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Herbarium in July/August 2020 was used to assess threatened flora (TF), priority flora (PF), and threatened (TEC) and priority (PEC) ecological communities within 20 km radius of the site. Specifically, spatial data included;
  - WAHerb extract (DBCA 2020B).
  - Esperance District Threatened Flora (DBCA 2020C).
  - Threatened and Priority Reporting (TPFL; DBCA 2020D).
  - TEC and PEC 'Likely to Occur' buffer and boundary areas (DBCA 2020E).
  - Department of Agriculture, Water and the Environment Protected Matters Search Tool
  - Index of Biodiversity Surveys for Assessment (IBSA).
- To assess fauna, the following databases were searched with a 20km buffer from the center of the site (-33.8205 S, 122.1207 E);
  - Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Museum (WAM) NatureMap data portal
  - DBCA Threatened and Priority Fauna database
  - BirdLife Australia's Atlas and Birddata datasets
  - Department of Agriculture, Water and the Environment Protected Matters Search Tool
  - Atlas of Living Australia database
  - Index of Biodiversity Surveys for Assessment (IBSA).

### 4.2 Field investigation: possible ecological impacts

The site was initially inspected on 01/09/2020, by the Shire of Esperance's Katie White and Sophie Willsher. An assessment of possible ecological impacts included historical clearing, artificial water way constructions, impact of fire regimes, regeneration from disturbance, waterlogging, senescence, weeds, erosion, sedimentation, invasive fauna, *Phytophthora cinnamomi* Dieback, and illegal dumping of rubbish.

Vegetation community was also assessed during the field survey. Broad vegetation types defined by structure and composition were recorded and described. Condition of vegetation was assessed using Keighery (1994) categories, as 'Excellent', 'Very Good', 'Good', 'Degraded' or 'Completely Degraded'. This illustrates how healthy vegetation is, determined by number of dead or dying plants, weed cover and other forms of degradation. 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.

Only a very basic fauna survey was conducted as per EPA (2020) guidelines. Observations of fauna presence, such as call sounds, footprints and scats were also noted, and the area assessed for suitability of endangered Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) feeding, roosting and nesting habitat. Additionally, species that corresponded with suitable habitat within 'Site P – Merivale Road Widening' identified in the desktop 20 km radius search were assessed, including Quenda,

Glossy Ibis and Australasian Bittern.

#### 4.3 Field investigation: Assessing Threatened and Priority Ecological Communities

The vegetation community of 'Site P - Merivale Road Widening' was assessed for the presence a TEC or PEC, specifically 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 30 (DBCA 2020A)' definitions.

#### 4.4 Field Investigation: Targeted flora survey

The targeted flora survey was undertaken following the Environmental Protection Authority's (EPA) 'Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016)'. The entirety of the proposed impact area was surveyed on foot in mid-spring, between 01/09/2020 and 09/10/2020 by Julie Waters, Katie White, Sophie Willsher and Danika Penson, Shire of Esperance's Environmental Officers. Due to the timing, the majority of species were flowering, decreasing the likelihood of missing species. The road was used as a continuous transect. Vegetation up to 1 metre from the edge of the existing road's back-slope was assessed to accurately cover the 22 m width proposed clearing permit area. Suitable associated habitat for TF or PF identified in the desktop study were particularly focused on, and extensively searched. A follow up survey was conducted on 12/11/2020 by Julie Waters and Danika Penson to specifically target the identification and counting of priority 3 *Davesia pauciflora*.

Due to the high diversity and complexity of Esperance's flora, all species were recorded to compile an incidental species list (Appendix 8.2). All species unknown in the field were collected and identified exsitu, using keys, WA Herbarium's Florabase (DBCA 2021A), manuals and Esperance District Herbarium, to ensure no TF or PF were missed. Material was collected under Katie White's Regulation 61, Biodiversity Conservation Regulations 2018 Licence for Flora Taking, FT61000029, as well as Julie Waters'; FB62000139, Sophie Willsher's; FB2000278, and Danika Penson's; FB62000277. Any species that were unable to be identified were submitted to the WA Herbarium for identification.

Over the course of the 2020 wildflower season, surveyors re-familiarised themselves with key taxonomic indicators and associated habitat, by visiting verified populations of *Davesia pauciflora*. For other PF or TF species identified in the desktop survey as possible to occur, scans of pressed specimens from the local Esperance District Herbarium were taken into the field. Any flora thought to be TF or PF was formally collected, counted and mapped using a Panasonic FS-G1 Toughpad with the program ROAM or a GPS Garmin GPS64. Specimens were then lodged with the WA Herbarium for formal verification. When PF were confirmed, TPFL forms were completed and submitted to the DBCA's district Conservation Officer, and Species and Communities Branch.

## 5 Results and Discussion

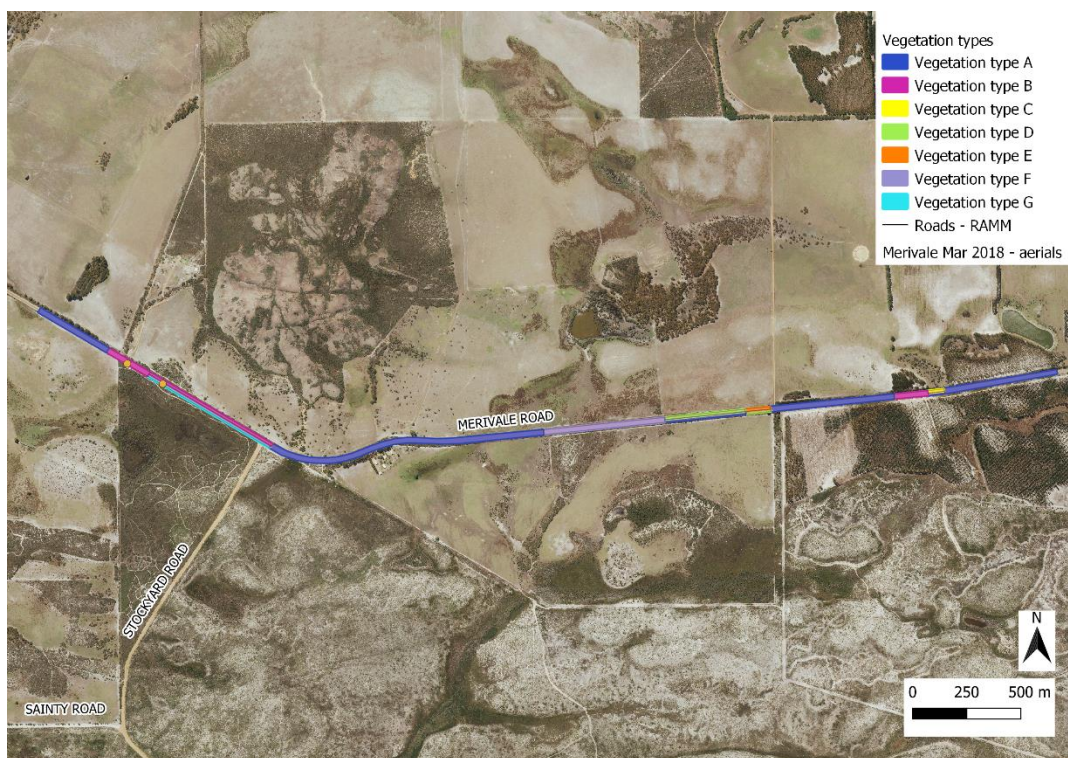
### 5.1 Ecological Impact

#### 5.1.1 Vegetation Communities

Seven vegetation communities were identified within the Site P - Merivale Road Widening', as defined by structure and composition (Table 2). The incidental flora list identified a total of 135 species across all vegetation communities. It is believed that the Beard (1973) vegetation associations identified in Section 3.6 are an appropriate match for two of the vegetation types observed. There was some difficulty in assigning VA for some of the vegetation types due to the level of degradation within the site, however it was assumed that vegetation type A was VA 47 but in a degraded state. Vegetation type B matched Beard's (1973) description of VA 6048, however none of the other vegetation types matched the VA mapped for the area. Vegetation type C was likely to be VA 27; Low woodland; paperbark (*Melaleuca* sp.), in a degraded state. Other vegetation types, including C, D, E and F, that did not meet VA 47 and 6048 were assigned a Beard VA known to occur in Esp02 IBRA region.

**Table 2.** Vegetation communities identified within proposed 'Site P – Merivale Road Widening' project area.

Type	Description	Figure (Photo)	Closest Beard Vegetation Association Description	Area (ha)
A	Degraded <i>Nuytsia</i> and <i>Acacia</i> shrubland with Pines, Victorian Tea Tree and Lovegrass	6	Potentially degraded VA 47, Tallerack recorded in this vegetation type.	6.63
B	Scattered <i>Banksia speciosa</i> and <i>Nuytsia</i> with dominant <i>Melaleuca</i> and <i>Adenanthos</i> shrubland	7	6048 or 7048	1.50
C	<i>Melaleuca cuticularis</i> wetland	8	Potentially degraded VA 27: Low woodland; paperbark ( <i>Melaleuca</i> sp.)	0.08
D	Scattered <i>Nuytsia</i> over dense <i>Anarthria</i> wetland with sedges	9	More similar to VA 51: Sedgeland; reed swamps, occasionally with heath	0.53
E	<i>Baumea</i> wetland	10	51	0.129
F	<i>Melaleuca cuticularis</i> and <i>Hakea adnata</i> wetland with sedges and scattered <i>Taxandria callistachys</i> and <i>Acacia cyclops</i>	11	51	1.25
G	<i>Nuytsia</i> over low, diverse shrubland with no understory or <i>Banksia speciosa</i>	12	4801	0.761



**Figure 2.** Vegetation types within the ‘Site P - Merivale Road Widening’ area, from SLK 14.96 km to 19.77 along Merivale Rd.

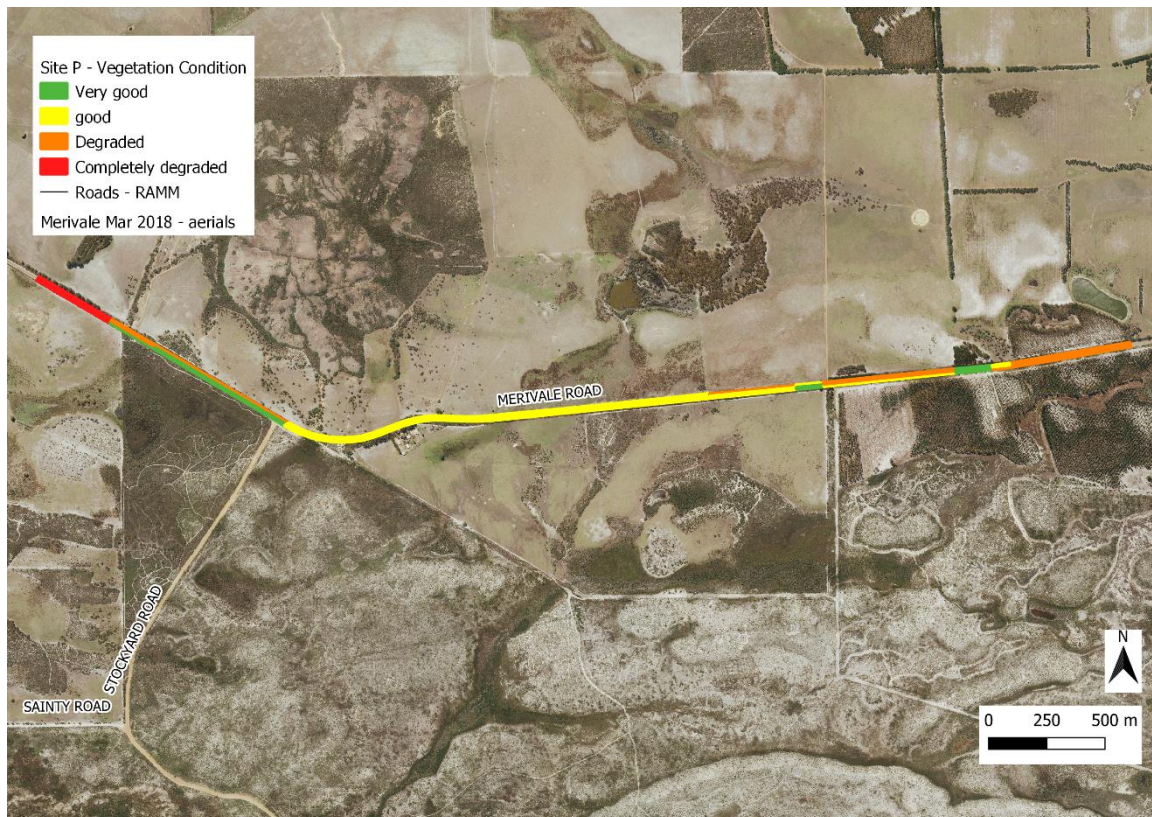
## 5.2 Vegetation Condition

The vegetation condition within ‘Site P – Merivale Road Widening’ ranged from very good condition to completely degraded, with the majority of the area being in good and degraded condition (Figure 3). Vegetation types C, D, E and F contained wetland area, which are considered ecologically sensitive to disturbance. However, it is unlikely proposed works will impact natural hydrological regimes of the area, with extensive alterations in drainage and degradation already occurring within these areas. It is also highly unlikely acid sulphate soils will develop, being the incorrect soil type present. No evidence of invasive fauna, such as scats or digging, were observed. However, it is highly likely that foxes, rabbits and feral cats are extensive throughout the area.

**Table 3.** Vegetation conditions within proposed ‘Site P – Merivale Road Widening’ project area, and the proposed amount of vegetation to be cleared (ha), footprint of each vegetation condition (ha) and proportion that each vegetation condition occupies within the entire footprint (%).

Vegetation Condition	Amount of vegetation to be cleared (ha)	Vegetation condition footprint (ha)	Vegetation condition area proportion of entire footprint (%)
Very Good	0.572	1.35	12.4
Good	2.67	5.5	50.4
Degraded	1.56	3.2	29.7
Completely degraded	0.38	0.81	7.5





**Figure 3.** Vegetation condition across ‘Site P – Merivale Road Widening’ project, ranging from good to completely degraded condition, due to primarily to degradation from weed invasion.

There was extensive weed invasion across the entirety of the proposed ‘Site P - Merivale Road Widening’ area. Overall, six invasive species were identified within the project area (Appendix 8.2). The most concerning of these was a previously unrecorded population *Asparagus declinatus* (Bridal veil) Weed of National Significance. Until 2020, *Asparagus declinatus* was not known to occur within the Shire of Esperance, however in 2020 two populations were located, this one (located in shady areas under the tuarts on the south side of the road at -33.823488S, 121.111528E) and one discovered around the same time within the Esperance townsite, near the Esperance Port by Esperance Wildflower Society. The area of occupation of *Asparagus declinatus* has been mapped on 2/6/2021 and Shire of Esperance have engaged a weed contractor to control the population at this site. It is vital that ongoing control is carried out on this *Asparagus declinatus* population.

Of the other weeds, the most extensive and of serious concern were Victorian Tea Tree (*Leptospermum laevigatum*) and African Love Grass (*Eragrostis curvula*). African Love Grass was present throughout the entire proposed permit area, aside from vegetation type G, and had become the dominant understory species in many areas, degrading the native vegetation and reducing biodiversity. Victorian Tea Tree was present in every vegetation type within the proposed clearing permit area, with dense stands, with significantly reduced biodiversity, being present in several areas of the site. Given the vast majority of the area is so degraded, it’s likely that proposed works will have a minimal impact.

Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2020) data shows positive *Phytophthora cinnamomi* or other *Phytophthora* sp. Dieback sample results in the immediate area. Six positive *P. cinnamomi* Dieback samples were present on Stockyards Rd, within 3k m of its intersection with Merivale Rd. There were also several positive *P. cinnamomi* Dieback samples were present along Merivale Rd east and west of the survey site, and two positive

samples on property adjacent to the survey area at -33.81631 S, 122.11520 E. Dead Grass Trees were observed during the flora survey and noted as possible signs of Dieback. Vegetation type B is the most susceptible to *Phytophthora* Dieback due to the prominence of Proteaceae species in this vegetation type. Given these incidental observations and surrounding data, it is presumed there are infestations present along 'P – Merivale Rd widening'. 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. However, there is always a possibility that proposed works will extensively spread *P. cinnamomi* dieback along Merivale Rd due to proposed works. Most importantly, vehicles will be extensively washed down before moving onto the next job.

### 5.3 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)' directly within 'Site P – Merivale Road Widening' project area. No other TEC's or priority ecological communities (PEC) were identified by the desktop study as being within "Site P – Merivale Road Widening" or within a 500 m buffer of the site.

Vegetation community B, described as 'Scattered *Banksia speciosa* & *Nuytsia* with dominant *Melaleuca* and *Adenanthos* shrubland' met criteria to be considered as Kwongkan TEC. However due to the amount of weed invasion from Victorian Tea tree and African Love grass it is below the condition criteria for Kwongkan TEC, and no areas within 'P – Merivale Rd widening' were considered TEC.

### 5.4 Threatened and Priority Flora

Three threatened flora (TF) and 43 priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Table 4; DBCA 2020B, DBCA 2020C, DBCA 2020D). Of these, one species of TF and 24 PF species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site P - Merivale Road Widening' project. There were no known populations of TF or PF directly located within the clearing permit area.

**Table 4.** Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site P - Merivale Road Widening' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2020D), WA Herbarium (DBCA 2020B) and Esperance District Threatened Flora (DBCA 2020C). 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	Conservation Status	Associated Habitat	Likely to occur
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	EN	Moist sandy soil in heath communities. Has been found in shallow soils near granite outcrops.	Possible
<i>Acacia incanicarpa</i>	P2	Loamy sand. Granitic slopes & ridges.	No
<i>Acacia nitidula</i>	P2	Granite boulders and granitic gravel.	No
<i>Aldrovanda vesiculosa</i>	P2	Shallow freshwater billabongs.	No
<i>Astartea eobalta</i>	P2	Grey brown sand on rise above swamp under yate	No
<i>Atriplex muelleri</i>	P1	Cracking clay.	No

<i>Banksia prolata</i> subsp. <i>calvicola</i>	P4	White sand over limestone. Coastal areas.	Possible
<i>Boronia scabra</i> subsp. <i>attenuata</i>	P3	Sandy skeletal soils over granite. Among granite rocks.	Unlikely
<i>Comesperma lanceolatum</i>	P2	White sand. Marine plains, sand dunes, quartzite ridges.	Possible
<i>Comesperma calvicola</i>	P3	Calcareous or semi-saline clay loams, limestone. Areas around saline water.	Possible
<i>Conostylis seorsiflora</i> subsp. <i>longissima</i>	P2	Granitic soils.	Unlikely
<i>Dampiera decurrens</i>	P2	Skeletal soils around granite outcrops near the coast.	Unlikely
<i>Dampiera sericantha</i>	P1	Sand sometimes with gravel. Plains.	Yes
<i>Daviesia pauciflora</i>	P3	White or grey sand over laterite or limestone. Flats.	Yes
<i>Eucalyptus aquilina</i>	P4	Shallow soils over granite. Shallow valleys, creek beds, hillsides.	No
<i>Eucalyptus insularis</i>	EN	Only known populations occur on islands in Recherche Archipelago and in Cape Le Grand National Park.	Highly unlikely
<i>Eucalyptus ligulata</i> subsp. <i>ligulata</i>	P4	Sand, sandy clay, rocky loam, granite. Near large coastal granite domes.	Yes
<i>Eucalyptus x missilis</i>	P4	Sand over limestone or granite. Coastal sites.	Yes
<i>Eucalyptus semiglobosa</i>	P3	White sand over laterite, silty sand on edge of granite shelf, limestone. Hillslopes, gullies, cliffs.	Possible
<i>Gonocarpus pycnostachyus</i>	P3	Wet depressions near granite outcrops.	Unlikely
<i>Gonocarpus simplex</i>	P4	Peaty sand. Swamps, seasonally inundated areas.	Possible
<i>Goodenia quadrilocularis</i>	P2	Sand. Sand dunes, granite slope and outcrops.	Possible
<i>Lambertia echinata</i> subsp. <i>echinata</i>	CR	Gravelly sandy loam, brown sandy loam, white-grey sand, granite, laterite. Below & between rock outcrops, slopes, hill crests.	Unlikely
<i>Lasiopetalum maxwellii</i>	P 2	Sandy soils. Granite slopes.	Possible
<i>Lechenaultia superba</i>	P4	Quartzite soils. Rocky hillsides.	Unlikely
<i>Lepyrodia fortunata</i>	P2	Peaty swampy sand. Seasonally inundated swamps.	Possible
<i>Leucopogon apiculatus</i>	P3	Skeletal sandy or stony soils over quartzite or granite. Granite outcrops and hills, quartzite ridges, rocky slopes.	Possible
<i>Leucopogon interruptus</i>	P3	Grey sand over granite	Yes

<i>Leucopogon multiflorus</i>	P2	White/grey sand. Rocky slopes, coastal sand dunes, amongst quartzite or granite rocks.	Yes
<i>Leucopogon rotundifolius</i>	P3	Skeletal soils around granite outcrops.	Unlikely
<i>Leucopogon corymbiformis</i>	P2	No known associated habitat.	-
<i>Lobelia archeri</i>	P1	Upper slopes of tall non-calcareous sand hills (some found lower after fire). Requires open spaces to survive, quickly displaced by other vegetation.	No
<i>Myosotis australis</i>	P4	Grey sand over limestone.	No
<i>Myriophyllum petraeum</i>	P4	Strictly confined to ephemeral rock pools on granite outcrops.	No
<i>Opercularia hirsuta</i>	P2	Sandy soils over granite or quartzite.	Possible
<i>Patersonia inaequalis</i>	P2	Sandy clay, lateric or granite sand.	Possible
<i>Pleurophascum occidentale</i>	P4	Shallow soils at the edge of exposed granite.	Unlikely
<i>Ricinocarpos pilifer</i>	P2	Skeletal soil on granite. Rocky outcrop near ocean, mountain summit.	No
<i>Rumic astrum chamaecladum</i>	P2	Clay loam. Winter-wet creek edges.	Possible
<i>Scaevola paludosa</i>	P2	Sandy soils.	Possible
<i>Tecticornia indefessa</i>	P2	White to brown-grey sand near the edge of a salt lake.	No
<i>Thysanotus parviflorus</i>	P4	Grey sand.	Yes
<i>Thysanotus volubilis</i>	P2	Recorded on sandy soil.	Yes
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	Sandy soils or fine windblown clay, mixed with windblown sand or larger alluvial grains eroded from granite outcrops. Recently disturbed or burnt sites, woodlands, plains.	Possible
<i>Utricularia helix</i>	P2	In shallow water 5-15 cm deep. Seasonal swamps.	Possible
<i>Utricularia westonii</i>	P2	Wet soils. Swamps, small shallow pools.	Possible

Two priority species were identified within the clearing footprint during the targeted flora survey. *Leucopogon interruptus* (P3) and *Daviesia pauciflora* (P3). All other species collected were common and known to surveyors.

Queries of spatial datasets were requested specifically for these species, to interrogate impact of proposed works on species sustainability (DBCA 2020B; DBCA 2020C; DBCA 2020D). 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.

#### 5.4.1 *Leucopogon interruptus*, Priority 3

A specimen of *Leucopogon interruptus* was sent to the WA Herbarium for identification confirmation (KW093; Accession 8652 with specimen retained by WA Herbarium). It was confirmed by Michael

Hislop on 10/12/20. A Threatened and Priority Reporting Form (TPFL) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 15/01/21 (Appendix 8.3). A total of 39 specimens of *Leucopogon interruptus* were observed during the survey, 15 of these specimens will be impacted by the clearing.



**Figure 4.** Specimen of *Leucopogon interruptus* (KW093; Accession 8652) collected from 'Site P – Merivale Road Widening' project

*Leucopogon interruptus* grows in grey sand over granite, and in all cases, close to large granite outcrops that are either islands in the Recherche Archipelago or on the mainland. There were only eight known populations of this species in TPFL and WAherb data, and the one discovered during this survey is a previously unrecorded population. A request for TPFL data on the species was requested in February 2021 (Ref TPFL20-0221). There is no population data on this species since 2004, and many of the records are old without detailed counts of number of plants. However only one of the eight known populations are on private property and all other known populations are within National Park or Nature Reserve. It is probable that this species may be present close to other granite outcrops from Esperance to Cape Arid on some of the other islands of the Recherche a range of over 120km, as many of these areas have been poorly surveyed.

**Table 5.** Known records of priority 3 species *Leucopogon interruptus* across an 120km geographic range (DBCA 2020C, 2020B, 2020A, 2021B).

Locality	Date	Frequency	Tenure
Broomstick Hill, Merivale Road, Esperance (Merivale Location 1455 EIME)	29/09/1997	30+ plants.	Private Property
Frenchmans Peak, Cape Le Grand National Park	3/07/2000	3-4 plants.	National Park
Hill Springs Track, slope below ruined homestead, Cape Arid National Park,	20/10/1997		National Park

Middle Island, at E base of Flinders Peak	22/11/1973		Nature Reserve
Mondrain Island	19/11/2002		Nature Reserve
North Twin Peak Island, Recherche Archipelago	30/04/1972		Nature Reserve
Sandy Hook Island, Archipelago of the Recherche	1/05/1982		Nature Reserve
Walk trail Thistle Cove - Hellfire Bay, near rocky cove, Cape Le Grand National Park	18/02/2000	one or two plants	National Park

#### 5.4.2 *Daviesia pauciflora*, Priority 3

A specimen of *Daviesia pauciflora* was sent to the WA Herbarium for identification confirmation (KW136; PERTH 09327525 with specimen retained by WA Herbarium). It was confirmed by Michael Hislop on 24/2/21. A Threatened and Priority Reporting Form (TPFL) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) district Flora Conservation Officer and Species and Communities Branch on 25/1/21 (Appendix 8.3).

PERTH 09327525

*Daviesia pauciflora*  
Fabaceae

**Plant Description, Notes:** Shrub 0.5 m x 0.5 m. Flowers yellow/red. In bud, flower and fruit.

**Vegetation:** Scattered *Banksia speciosa* and *Nuytsia floribunda* with dominant *Melaleuca striata* and *Adenanthos cuneatus* shrubland. Associated species: *Anigozanthos rufus*, *Hibbertia andrewsiana*, *Acacia cyclops*, *Caustis dioica*, *Leptospermum laevigatum*.

**Site Description:** Sandy rise. White sand over granite. Long unburnt.

**Frequency:** 3 plants.

**Locality:** S side of Merrivale Road, c. 15 km E of Esperance

**Location:** -33.821°, 122.100° (GDA94)

**Location (DMS):** 33° 49' 13.9" S 122° 6' 0.5" E (GDA94)

**State:** WA

**Collector:** Waters, J.; Penson, D. Coll No: KW 136

**Collection Date:** 12 November 2020

**Conservation Code:** 3

**Origin:** PERTH

**Record Basis:** PreservedSpecimen



Figure 5. *Daviesia pauciflora*

*Daviesia pauciflora* whilst listed as a priority 3 species, has 24 known populations over a range of 200km. It grows in sandy soils, and when not flowering is very inconspicuous. In the opinion of Julie Waters, it is most likely a poorly collected species rather than a rare one. If proposed works occur, three individual plants will be impacted upon. No full population count was undertaken at this location but it is likely that these plants form part of the larger population from “south west of Mount Merivale” and “Mount Merivale region, Esperance Loc. 2051, 20 km E of Esperance” in the remnant vegetation to the south of the application area. In these locations *Daviesia pauciflora* was described by specimen collector William Archer as: “scattered small colonies (collectively common)”.

**Table 6.** Known records of priority 3 species *Daviesia pauciflora* across an 200km geographic range (DBCA 2020C, 2020B, 2020A, 2021C).

Locality	Date	Frequency
24 miles E of Esperance	24/11/1964	
Location 1110, ca 40 km ENE of the coast at Stokes Inlet, near western border of Shire of Esperance, Eucla Division	16/10/1968	
Eyre district; 100 km from Esperance along road to Ravensthorpe, 6 km E of Munglinup River crossing	8/01/1979	
62 km W of Esperance along road to Ravensthorpe, 9 km NNE of Barker Inlet	8/01/1979	
2.9 km E of Neds Corner Road on Cascades Road, reserve 31745. ENE of Ravensthorpe.	9/10/1984	
1.5 km SW of Mount Merivale, Eyre Botanical District,	2/12/1990	scattered small colonies (collectively common).
Mount Merivale region, Esperance Loc. 2051, 20 km E of Esperance	21/10/1995	scattered small colonies.
Esperance	28/12/1997	
Esperance	28/12/1997	
Remnant vegetation northern boundary Loc.1878,	21/09/1998	
Windbreak Loc. 1878 (lot 1) ca 1 km SE junction Rhinds Road and Dalyup Road continuation, Quadrat 4, No 34, adj. Q4,	1/10/1998	
E side of Parmango Road, 11.5 km NNE of Condingup, Eyre,	13/10/1998	scattered.
2 km E of Condingup and 500 m S of Fisheries Road in VCL to W of gravel road to Condingup Peak	11/04/2002	frequent (100's) occurring in ca 1.5 ha.
0.9 km W along Paterson Road from junction of Coolgardie - Esperance roads, 50 m along service track, ca 10 km N of Esperance	24/05/2005	frequent.
4.2 km E along northern farm boundary at N end of Wittenoom Hills Road, 9.5 km NE of Mt Burdett	8/11/2009	2-5 plants.
Helms Arboretum Bushland	7/03/2011	2-5 plants.
NW corner, Helms Arboretum, Gibson	21/04/2011	one only.
Speddingup East Road, E of Coolgardie - Esperance Highway	7/10/2011	2-5 plants.
Helms Forestry Reserve 23527, Gibson	4/12/2011	one only.
C. 3.8 km E along a firebreak track from the end of Wittenoom Road, 12 km NW from the boundary of Kau	4/11/2013	10+ plants.

Rock Nature Reserve		
Neds Corner Road, 1 km N of Mills Road	12/10/2017	10 plants.
Neds Corner Road, 3 km S of Cascades townsite	12/10/2017	2 plants
81 km NE of Esperance town site, 18.6 km NE of Condingup satellite town, 520 m NW of Howick - Ridgeland [road] intersection on Howick Road	1/10/2019	1 plant observed.
S side of Merrivale Road, c. 15 km E of Esperance	12/11/2020	3 plants

## 5.5 Fauna

Within a 20 km radius of the 'Site P - Merivale Road Widening', 550 species fauna have previously been recorded. Of these, 48 species are threatened fauna, priority fauna and fauna protected under international agreement have been recorded (Table 7). Six of these species have suitable habitat within the proposed clearing permit area, including the Quenda, Glossy Ibis and Australasian Bittern.

**Table 7.** Potential threatened, priority and protected under international agreement fauna recorded within a 20 km radius of the proposed 'Site P - Merivale Road Widening'.

Nt. Acronyms used include priority (P), threatened (T), and protected under international agreement (IA).

Scientific Name	Common Name	Conservation Status	Likelihood of occurring	Associated habitat
<i>Actitis hypoleucos</i>	Common Sandpiper	IA	No	Shorebird
<i>Ardenna carneipes</i>	Flesh-footed Shearwater	T	No	Associated with coastal and offshore waters.
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	IA	No	Shorebird
<i>Atelomastix brennani</i>	Brennan's atelomastix millipede	T	No	Granite.
<i>Atelomastix dendritica</i>	Recherche Atelomastix millipede	T	No	Damp leaf litter. Only known population on Woody Island.
<i>Atelomastix grandis</i>	Le Grand atelomastix millipede	T	No	Granite outcrops and Agonis heath. Only known from Mount Le Grand.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	T	Yes	Ephemeral wetlands with thick cover of reeds.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	IA	No	Shorebird
<i>Calidris alba</i>	Sanderling	IA	No	Shorebird
<i>Calidris ferruginea</i>	Curlew Sandpiper	T	No	Shorebird
<i>Calidris melanotos</i>	Pectoral Sandpiper	IA	No	Shorebird
<i>Calidris ruficollis</i>	Red-necked Stint	IA	No	Shorebird
<i>Calidris tenuirostris</i>	Great Knot	T	No	Lives in coastal mudflats.
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	T	Yes	Kwongkan shrub or heathland. Presence of Hakea, Banksia and Pine species indicate potential feeding habitat.
<i>Carcharodon carcharias</i>	Great White Shark	T	No	Lives in ocean.



<i>Cereopsis novaehollandiae</i>	Cape Barren Goose	T	No	Associated with offshore islands, improved pastures or clovers, salty ground with native succulents, camps on margins of dams, fresh or brackish swamps and lakes.
<i>Charadrius bicinctus</i>	Double-banded Plover	IA	No	Shorebird
<i>Charadrius leschenaultii</i>	Greater Sand Plover	T	No	Shorebird
<i>Charadrius mongolus</i>	Lesser Sand Plover	T	No	Shorebird
<i>Cyliosoma sarahae</i>	Sarah's Pill Millipede	T		
<i>Dermochelys coriacea</i>	Leatherback Turtle	T	No	Lives in the ocean.
<i>Eretmochelys imbricata subsp. Bissa</i>	Hawksbill Turtle	T	No	Lives in the ocean.
<i>Eubalaena australis</i>	Southern Right Whale	T	No	Lives in the ocean.
<i>Falco peregrinus</i>	Peregrine Falcon	T	Possible	Broad habitat range, but prefer woodlands or tall trees for nesting.
<i>Hydroprogne caspia</i>	Caspian Tern	IA	No	Shorebird.
<i>Isoodon fusciventer</i>	Quenda	P4	Yes	Dense understorey, commonly around swamps or in Banksia and Jarrah woodlands.
<i>Ixobrychus dubius</i>	Australian Little Bittern	P4	No	Ephemeral wetlands with thick cover of reeds.
<i>Leipoa ocellata</i>	Malleefowl	T	Unlikely	Semi-arid shrublands and low woodlands dominated by mallee and/or acacia.
<i>Limosa lapponica</i>	Bar-tailed Godwit	IA	No	Shorebird
<i>Motacilla cinerea</i>	Grey Wagtail	IA	No	Flowing water with nearby rocks.
<i>Neophoca cinerea</i>	Australian Sea-lion	IT	No	Lives in ocean.
<i>Notamacropus eugenii subsp. derbianus</i>	Tammar Wallaby	P4	Yes	Coastal scrub, heath and thickets in mallee and woodlands.
<i>Oxyura australis</i>	Blue-billed Duck	P4	No	Almost entirely aquatic, seldom seen on land.
<i>Pandion cristatus</i>	Eastern Osprey	IA	No	Coastal habitats. Nests in tall dead trees and preys on fish.
<i>Pandion haliaetus</i>	Osprey	IA	No	Coastal habitats. Nests in tall dead trees and preys on fish
<i>Petrogale lateralis subsp. lateralis</i>	Black-flanked Rock-wallaby	T	No	Needs lots of rocky outcrops.
<i>Pezoporus flaviventris</i>	Western Ground Parrot	T	Highly unlikely	Associated with low heathland. Local knowledge is that only surviving populations are located in Cape Arid.
<i>Plegadis falcinellus</i>	Glossy Ibis	IA	Yes	Associated with wetlands or water bodies of any form.
<i>Pluvialis fulva</i>	Pacific Golden Plover	IA	No	Shorebird.
<i>Pluvialis squatarola</i>	Grey Plover	IA	No	Shorebird

<i>Sternula nereis nereis</i>	Australian Fairy Tern	T	Possible	Coastal beaches, inlets, harbours, estuaries and lagoons. Fresh and saline wetlands and near-coastal terrestrial wetlands.
<i>Stercorarius antarcticus</i>	Brown Skua	P4	No	Usually well offshore, less often closer to the coast.
<i>Thalassarche melanophris</i>	Black-browed Albatross	T	No	Associated with coastal and offshore waters.
<i>Thalasseus bergii</i>	Crested Tern	IA	No	Associated with coastal and offshore waters.
<i>Thinornis rubricollis</i>	Hooded Plover	P4	No	Shorebird.
<i>Tringa brevipes</i>	Grey-tailed Tattler	IA	No	Shorebird.
<i>Tringa glareola</i>	Wood Sandpiper	IA	No	Shorebird.
<i>Tringa nebularia</i>	Common Greenshank	IA	No	Estuaries, mudflats, mangrove swamps, lagoons and flooded crops.

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

Carnaby's Black Cockatoo's are unlikely to nest within the 'Site P – Merivale Road Widening' project area, as no large trees are present with hollows. Large Blue Gum and Tuart trees are present in the surrounding area, which means Carnaby's Black Cockatoo are likely to frequent the area by roosting in these trees. However, there are no large trees present within each of the vegetation types of the proposed site. Carnaby's Black Cockatoos forage on Proteaceae species nuts, such as Hakea or Banksia species. Vegetation type two, scattered *Banksia speciosa* and *Nuytsia* with dominant *Melaleuca* and *Adenanthos* shrubland, would likely provide foraging grounds. Additionally, the pine trees within the adjacent bushland would likely attract Carnaby's Cockatoos to the area for foraging.

#### 5.5.2 Malleefowl, *Leipoa ocellata*, threatened fauna

Malleefowls are predominantly found in the semi-arid to arid zone in shrublands and low woodlands dominated by Mallee and are associated with Broombush, *Melaleuca uncinata*, and Acacias. Abundant leaf litter and sandy soils are required for nest building, and Malleefowls prefer shrublands with high plant diversity. The two shrubland communities, vegetation types two and seven in the proposed 'Site P – Merivale Road Widening', would be the most suitable within the site for Malleefowls to inhabit. Due to the narrowness of vegetation in the road reserve, it is likely that the frequency of vehicle disturbance and vulnerability to predators suggests this area is unsuitable for Malleefowl nesting. The presence of Acacias and the proximity of the proposed clearing site to Cape Le Grand NP suggests it may be suitable feeding habitat for the species. No Malleefowls or evidence of Malleefowl activity was encountered during the flora survey.

#### 5.5.3 5.5.1 Australasian Bittern, *Botaurus poiciloptilus*, threatened fauna and Australasian Little Bittern, *Ixobrychus dubius*, priority four fauna

The Australasian Bittern is ranked as endangered in Western Australia (DotEE 2014). The most recent surveys were conducted in 2009/2010, with population estimates ranging from 38 to 154 birds. The wetland system surrounding and extending into Cape Le Grand National Park is one of three wetlands suites critical most important for the species survival (DotEE 2014). Australasian Bitterns are known to nest in densely vegetated swamps, typically consisting of *Baumea*, *Gahnia*, and *Typha* species, and low bushy *Melaleuca* shrubs. Nests are built ~5 -10 cm above the water, forming a flat platform of ~30-40 cm in diameter. If environmental conditions are suitable for mating the male Australasian Bittern makes a booming call to attract a mate from September through to December, in the Esperance region. Peak calling occurs in October and November, which coincided with times surveys were conducted at

'Site P – Merivale Road Widening' project. Australasian Little Bittern has very similar behavioural patterns and habitat requirements as the Australasian Bittern.

Vegetation types C, D, E and F are all described as wetland vegetation, and are considered suitable habitat within 'Site P – Merivale Road Widening'. In particular, the dense wetland vegetation found in vegetation type four and six may be suitable for nesting. One of the surveyors, Julie Waters has two years of experience in conducting Australasian Bittern surveys. No nests and no calling of Australasian Bittern and Australasian Little Bittern's ("the Bitterns") were heard or observed over during the flora survey. However, it is possible that the Bitterns do use these wetland areas and were not observed or heard over the two days. Predation close to road is also likely.

#### 5.5.4 Quenda, *Isoodon fusciventer*, priority four fauna

Quendas live in dense understorey vegetation, particularly around swamps. Within 'Site P – Merivale Road Widening', every vegetation type would be suitable for inhabitation by quendas. No quendas or burrows were observed during the survey however this does not indicate their absence, as they are most active during dawn and dusk and usually stay close to vegetation cover.

#### 5.5.5 Peregrine Falcon, *Falco peregrinus*, specially protected fauna

Peregrine Falcons is found in most habitats across Australia, from rainforests to arid zones, however is not common anywhere. Peregrine Falcons nest in old woodland trees, in large abandoned nests or tree hollows, and feed primarily on small-medium sized birds. The vegetation within proposed clearing permit 'Site P - Merivale Road Widening' did not contain any suitable nesting habitat for this species. The proposed clearing area is likely suitable hunting ground for the Peregrine Falcon, however due to the species' low population density and large range it would likely be unaffected by clearing at the proposed site.

#### 5.5.6 Tammar Wallaby, *Notamacropus eugenii subsp. derbianus*, Priority 4 fauna

Tammar Wallaby requires dense, low vegetation for shelter during the daytime and open, grassy areas for feeding, and is known to venture into open pastures adjacent to bushland refuges. They commonly inhabit areas of coastal scrub, heath, dry sclerophyll forests and thickets in mallee and woodlands. Vegetation types A, B and G would likely provide suitable daytime shelter habitat for Tammars, and the surrounding agricultural land also offers potential grazing areas. Although mainland populations of Tammar Wallaby's have significantly declined in abundance due to land clearing and fox predation, it is still possible that they utilise vegetation within the proposed 'Site P – Merivale Road Widening' area.

#### 5.5.7 Australian Fairy Tern, *Sternula nereis subsp. nereis*, threatened fauna

The Australian Fairy Tern inhabits a range of habitats including coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries, lagoons, fresh and saline wetlands and near-coastal terrestrial wetlands. The Fairy Terns diet consists almost entirely of fish, but they are also known to feed on plant material, molluscs and crustaceans. Fairy Terns nest inside estuaries and on sandy beaches, specifically in areas with sandy substrates and low, sparse vegetation. There were no areas identified within the proposed clearing permit area that would be suitable for Fairy Tern nesting. It is possible that Fairy Terns could utilise the wetland habitats with vegetation types C, D and E, however it vehicle disturbance and weed encroachment are two of the main threats to this species and are heavily prevalent across the proposed clearing area.

#### 5.5.8 Glossy Ibis, *Plegadis falcinellus*, protected under international agreement

The Glossy Ibis requires shallow water and mudflats, and is commonly found in well-vegetated wetlands, floodplains and mangroves, and is unlikely to be seen foraging on farmlands. They feed in shallow water on insects and insect larvae, molluscs, crustaceans and sometimes small snakes, birds, fish and frogs. It is possible that the Glossy Ibis utilises the wetland habitats with vegetation types three,

four and five, however the proximity of these wetlands to vehicle disturbance likely renders them less favourable habitat than wetlands within the nearby Cape Le Grand National Park.

#### 5.5.9 Western Ground Parrot, *Pezoporus flaviventris*, threatened fauna

The Western Ground Parrot is associated with dense shrublands, typically formed by Proteaceae dominated Kwongkan coastal shrubland communities. Two vegetation types within 'Site P – Merivale Road Widening' possess potential suitable habitat for the Western Ground Parrot; vegetation type B and type G. However, the degraded condition of majority of the vegetation within the proposed clearing area and the frequency of vehicle disturbance along Merivale Rd would likely discourage utilisation of the present vegetation. In addition to this, the likelihood of Western Ground Parrot occurring within the proposed clearing permit area is highly unlikely as it is locally known that all remnant populations of the Western Ground Parrot are in Cape Arid National Park

## 6 Conclusion and Assessment against Clearing Principles

The 'Site P – Merivale Road Widening' 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).

**Table 8.** Shire of Esperance Assessment against Clearing Principles of the proposed 'Site P - Merivale Road Widening'.

Assessment against Clearing Principles	Conclusion
Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	Biodiversity at this site is high with 135 species recorded over 7 vegetation communities
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.	None of the application area would be considered as significant habitat for fauna
Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Two priority species were recorded from the area. However both of these have wide ranges and the removal of these plants is unlikely to effect the existence of these species.
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.	No priority ecological communities were recorded from the application area as vegetation did not meet the condition thresholds to be considered as Kwongkan TEC
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.	There is large areas of uncleared vegetation immediately adjacent to the application area
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.	Some wetland vegetation is in this application area.
Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Soil types in the area are unlikely to erode or become degraded due to this road widening.

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.	Clearing of the vegetation is unlikely to have an impact on the environmental values of any adjacent or nearby conservation area all over 6km away.
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.	Unlikely to have any impacts.
Principle (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	Unlikely to have any impacts.

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## 8 Appendix

### 8.1 Vegetation types



**Figure 6.** Vegetation type A identified in 'Site P - Merivale Road Widening' project, described as 'Degraded *Nuytsia* and *Acacia* shrubland with Pines, Victorian Tea Tree and Lovegrass'.



**Figure 7.** Vegetation type B identified in 'Site P - Merivale Road Widening' project, described as 'Scattered *Banksia speciosa* and *Nuytsia* with dominant *Melaleuca* and *Adenanthos* shrubland'





**Figure 8.** Vegetation type C identified in 'Site P - Merivale Road Widening' project, described as '*Melaleuca cuticularis* wetland'



**Figure 9.** Vegetation type D identified in 'Site P - Merivale Road Widening' project, described as 'Scattered *Nuytsia* over dense *Anarthria* wetland with sedges'.



**Figure 10.** Vegetation type E identified in 'Site P - Merivale Road Widening' project, described as 'Baumea wetland'.



**Figure 11.** Vegetation type F identified in 'Site P - Merivale Road Widening' project, described as '*Melaleuca cuticularis* and *Hakea adnata* wetland with sedges and scattered *Taxandria callistachys* and *Acacia cyclops*'.



**Figure 12.** Vegetation type G identified in 'Site P - Merivale Road Widening' project, described as 'Nuytsia over low, diverse shrubland with no understory or *Banksia speciosa*'

## 8.2 Incidental species list

**Table 9.** Incidental Species List 'Site P - Merivale Road Widening'.

Family	Genus	Species	Common Name	Spec no.	Weed	Veg A	Veg B	Veg C	Veg D	Veg E	Veg F	Veg G
Anarthriaceae	Anarthria	scabra				x	x		x			x
Anarthriaceae	Lyginia	imberbis					x		x	x		x
Apiaceae	Xanthosia	huegelii	Heath Xanthosia									x
Asparagaceae	Asparagus	declinatus			x					x		
Asparagaceae	Lomandra	hastilis				x						x
Asparagaceae	Thysanotus	dicotomum	Branching Fringe Lily									x
Asparagaceae	Thysanotus	patersonii					x					
Asteraceae	Arctotheca	calendula	Cape Weed, Cape Dandelion		x	x	x				x	x
Asteraceae	Conyza	sumatrensis	Fleabane		x	x		x				
Asteraceae	Hypochaeris	radicata	Flatweed Daisy		x	x		x		x		
Asteraceae	Rhodanthe	citrina					x					
Asteraceae	Ursinia	anthemoides	Ursinia Daisy		x	x	x	x			x	x
Asteraceae	Vellereophyton	dealbatum	White cudweed		x	x						
Brassicaceae	Raphnus	raphanistrum	Wild Radish		x	x				x		x
Campanulaceae	Wahlenbergia	campensis	Cape Bluebell		x		x					x
Caryophyllaceae	Silene	gallica			x		x					
Casuarinaceae	Allocasuarina	humilis	Dwarf She-oak			x	x			x		
Cyperaceae	Baumea	juncea	Bare Twigrush						x		x	
Cyperaceae	Caustis	dioica	Puzzle grass			x	x					x
Cyperaceae	Cyathochaeta	equitans				x						
Cyperaceae	Ficinia	nodosa	Knotted Club Rush			x			x		x	
Cyperaceae	Gahnia	trifida	Saw Sedge			x				x	x	
Cyperaceae	Lepidosperma	sp.					x	x			x	
Cyperaceae	Lepidosperma	squamatum				x						
Cyperaceae	Mesomelaena	tetragona	Semaphore Sedge						x			
Cyperaceae	Tricostularia	aphylla					x					x
Dilleniaceae	Hibbertia	acerosa										x
Dilleniaceae	Hibbertia	andrewsiana				x	x			x		
Dilleniaceae	Hibbertia	gracilipes							x			
Dilleniaceae	Hibbertia	racemosa	Stalked Guinea Flower			x	x		x	x		x
Droseraceae	Drosera	drummondii	Drummond's Sundew						x			
Ericaceae	Leucopogon	interruptus		KW093			x			x		
Ericaceae	Leucopogon	obovatus	Coastal Beard Heath			x				x		
Ericaceae	Lysinema	ciliatum	Curry Flower									x

Euphorbiaceae	Euphorbia	terracina			x					x		
Fabaceae	Acacia	cyclops	Coastal Wattle			x	x	x	x	x	x	x
Fabaceae	Acacia	nigricans				x		x	x		x	
Fabaceae	Acacia	saligna	Orange Wattle			x			x		x	
Fabaceae	Acacia	dealbata			x	x						
Fabaceae	Cytisus	proliferus	Tagasaste, Tree Lucerne		x	x						
Fabaceae	Daviesia	pauciflora		KW136			x					
Fabaceae	Jacksonia	spinosa				x	x				x	x
Fabaceae	Labichea	lanceolata subsp. brevifolia							x			
Fabaceae	Ornithopus	compressus	Yellow serradella/vetch		x	x		x	x			
Fabaceae	Ornithopus	sativus	Common Bird's Foot		x	x						
Geraniaceae	Erodium	cicutarium	Storksbill Pelargonium		x		x					
Geraniaceae	Pelargonium	capitatum	Rose Pelargonium		x	x	x		x			x
Goodeniaceae	Dampiera	fasciculata	Bundle-leaf Dampiera							x		
Haemodoraceae	Anigozanthos	rufus	Esperance Kangaroo Paw			x	x					x
Haemodoraceae	Conostylis	seorsiflora subsp.	Seorsiflora	JW01921				x				
Hemerocallidaceae	Agrostocrinum	scabra	Blue Grass Lily			x				x	x	
Iridaceae	Freesia	alba × leichtlinii			x	x				x		
Iridaceae	Patersonia	lantana	Woolly patersonia				x					
Iridaceae	Patersonia	occidentalis	Purple Flag			x	x	x			x	
Iridaceae	Romulea	rosea	Guildford grass		x						x	
Juncaceae	Juncus	acutus			x	x						
Juncaceae	Juncus	pallidus	great soft-rush			x			x		x	
Lauraceae	Cassytha	racemosa	Dodder Laurel			x					x	
Loranthaceae	Nuytsia	floribunda	Munji, Christmas Tree, Cabbage Tree			x	x		x			x
Lythraceae	Lythrum	hyssopifolia	Lesser loosestrife		x	x						
Malvaceae	Lasiopetalum	sp.					x					
Myrtaceae	Agonis	baxteri				x			x			
Myrtaceae	Baekkea	sp. Esperance		JW01521		x				x	x	
Myrtaceae	Beaufortia	micrantha					x					
Myrtaceae	Calothamnus	gracilis					x			x		
Myrtaceae	Calothamnus	quadrifidus										x
Myrtaceae	Calytrix	decandra								x		
Myrtaceae	Conothamnus	aureus				x	x			x		x
Myrtaceae	Darwinia	vestita	Pom pom Darwinia								x	
Myrtaceae	Eucalyptus	globulus	Southern Blue Gum		x	x						

Myrtaceae	Eucalyptus	gomphocephala	Tuart		x	x						
Myrtaceae	Eucalyptus	pleurocarpa	Tallerack			x						
Myrtaceae	Leptospermum	laevigatum	Victorian Tea Tree		x	x	x	x	x	x	x	x
Myrtaceae	Leptospermum	maxwellii					x			x		x
Myrtaceae	Melaleuca	brevifolia	mallee honey-myrtle								x	x
Myrtaceae	Melaleuca	cuticularis	Salt Water Paper Bark					x			x	
Myrtaceae	Melaleuca	incana ssp. tenella	Soft Paper Bark			x		x	x			
Myrtaceae	Melaleuca	scabra	Rough Honey Myrtle						x	x		
Myrtaceae	Melaleuca	striata				x	x					x
Myrtaceae	Melaleuca	thymoides	Thyme Honey Myrtle									
Myrtaceae	Phymatocarpus	maxwellii				x	x	x		x		
Myrtaceae	Taxandria	callistachys	Freshwater Myrtle			x	x	x			x	
Myrtaceae	Taxandria	spathulata									x	
Myrtaceae	Taxandria	spathulata							x			
Myrtaceae	Verticordia	minutiflora					x					
Onagraceae	Oenothera	stricta	Evening Primrose		x	x		x		x		
Orchidaceae	Caladenia	decora	Esperance King Spider Orchid				x					
Orchidaceae	Caladenia	flava	Cowslip orchid				x					
Orchidaceae	Disa	bracteata	South African Weed Orchid		x		x					
Orchidaceae	Diuris	corymbosa	Donkey Orchid			x						
Orchidaceae	Elythranthera	brunonis	Purple Enamel Orchid				x					
Orchidaceae	Microtis	media					x				x	x
Orchidaceae	Thelymitra	sp.					x					
Pinaceae	Pinus	pinaster	Pinaster Pine Tree		x	x	x					
Pittosporaceae	Billardiera	fusiformis	Australian Blue Bell				x			x	x	
Poaceae	Austrostipa	hemipogon					x					x
Poaceae	Avena	fatua	Wild oats		x		x					
Poaceae	Briza	maxima	Blowfly grass		x	x	x	x	x	x		x
Poaceae	Bromus	diandrus			x	x				x		
Poaceae	Cenchrus	clandestinus	Kikuyu		x	x						
Poaceae	Ehrharta	calycina			x		x	x	x	x		
Poaceae	Ehrharta	longiflora	Annual Veldt Grass		x	x						
Poaceae	Eragrostis	curvula	African Love Grass		x	x	x	x	x	x	x	
Poaceae	Holcus	setiger				x						
Poaceae	Lagurus	ovatus				x				x		
Polygalaceae	Comesperma	volubile					x					
Polygonaceae	Rumex	acetosella	Sheeps Sorrell		x		x					

Polygonaceae	Rumex	vesicarius	Ruby dock		x						x	
Polygonaceae	Rumex	acetosella	Sheeps sorrel		x					x		
Primulaceae	Lysimachia	arvensis	Scarlet Pimpernel		x							x
Proteaceae	Adenanthos	cuneatus	Jug flower, Coastal Coral Flower			x	x	x	x		x	x
Proteaceae	Banksia	pulchella	Teasel Banksia				x					x
Proteaceae	Banksia	repens				x						
Proteaceae	Banksia	speciosa	Showy Banksia			x	x					
Proteaceae	Hakea	adnata									x	
Proteaceae	Hakea	cinerea	Ashy Hakea			x			x		x	
Proteaceae	Hakea	corymbosa	Cauliflower Hakea			x						x
Proteaceae	Hakea	trifurcata	Two leaf Hakea			x						
Proteaceae	Isopogon	polycephalus	Clustered Conehead			x	x					x
Proteaceae	Lambertia	inermis	Chiddick, Native Honeysuckle				x					
Proteaceae	Synaphea	oligantha				x				x		
Restionaceae	Chordifex	laxus				x						
Restionaceae	Chordifex	laxus				x						
Restionaceae	Chordifex	sphacelatus					x				x	
Restionaceae	Chordifex	crispatus, male										
Restionaceae	Hypolaena	exsulca, female					x		x			x
Restionaceae	Hypolaena	exsulca, male				x		x	x	x	x	x
Restionaceae	Hypolaena	humilis				x						
Restionaceae	Leptocarpus	crebriculmis							x	x		
Rhamnaceae	Spyridium	globulosum	Basket Bush			x	x		x		x	x
Rutaceae	Boronia	spathulata				x				x		
Rutaceae	Cyanothamnus	ramosus subsp. anethifolius				x						x
Sapindaceae	Dodonaea	bursariifolia									x	
Solanaceae	Solanum	nigrum	Nightshade		x	x	x			x		
Stylidiaceae	Stylidium	macranthum	Crab Claws									x
Xanthorrhoeaceae	Xanthorrhoea	platyphylla	Grass Tree			x						x

### 8.3 TPFL Forms *Leucopogon interruptus*



Department of Biodiversity,  
Conservation and Attractions

## Threatened and Priority Flora Report Form

Version 1.3 August 2017

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 <http://dpcw.wa.gov.au> under Standard Report Forms

<b>TAXON:</b> <u>Leucopogon interruptus</u>	<b>TPFL Pop. No.:</b> _____
<b>OBSERVATION DATE:</b> <u>20/05/2021</u>	<b>CONSERVATION STATUS:</b> <u>P3</u> New population <input type="checkbox"/>
<b>OBSERVER/S:</b> <u>Julie Waters and Katherine Walkerden</u>	<b>PHONE:</b> <u>9083 1519</u>
<b>ROLE:</b> <u>Environmental officers</u>	<b>ORGANISATION:</b> <u>Shire of Esperance</u>

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place): 20km East of Esperance  
townsite. Immediately east of the Merrivale road/ Stockyards road intersection on the north side of the road.

**Reserve No.:** \_\_\_\_\_

**DBC DISTRICT:** Esperance **LGA:** Esperance **Land manager present:**

**DATUM:** **COORDINATES:** (If UTM coords provided, Zone is also required) **METHOD USED:**

GDA94 / MGA94  DecDegrees  DegMinSec  UTM's  GPS  Differential GPS  Map   
 AGD84 / AMG84  Lat / Northing: 33.82333 No. satellites: \_\_\_\_\_ Map used: \_\_\_\_\_  
 WGS84  Long / Easting: 121.10752 Boundary polygon captured:  Map scale: \_\_\_\_\_  
 Unknown  ZONE: 51H

**LAND TENURE:**

Nature reserve  Timber reserve  Private property  Rall reserve  Shire road reserve   
 National park  State forest  Pastoral lease  MRWA road reserve  Other Crown reserve   
 Conservation park  Water reserve  UCL  SLK/Pole \_\_\_\_\_ to \_\_\_\_\_ Specify other: \_\_\_\_\_

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): 15 No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate  Count method: \_\_\_\_\_  
(Refer to field manual for list)

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	<b>Area of pop (m<sup>2</sup>):</b> _____ Note: PIs record count as numbers (not percentages) for database.
Alive	<u>34</u>	<u>5</u>			
Dead					

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

**Summary Quad. Totals: Alive**

--	--	--	--

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_ %

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

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

<b>THREATS - type, agent and supporting information:</b>	<b>Current Impact (N-E)</b>	<b>Potential Impact (L-E)</b>	<b>Potential Threat Onset (S-L)</b>
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	E	S
• Weeds	M	E	M
•			

Please return completed form to **Species And Communities Branch DBCA**,  
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: [flora.data@dbca.wa.gov.au](mailto:flora.data@dbca.wa.gov.au)  
**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.  
 Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Entered In Database



## Threatened and Priority Flora Report Form

Version 1.3 August 2017

**HABITAT INFORMATION:**

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input checked="" type="checkbox"/>	Granite <input checked="" type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input checked="" type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" 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 checked="" type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input checked="" 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 <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 (Mesomelaena tetragona)

1. Nutsia floridunda over disturbed shrubland
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**ASSOCIATED SPECIES:**

Other (non-dominant) spp

Leptospermum laevigatum, Adenanthos cunneatus, Anarthria scabra, Jacksonia spinosa  
Caustis diocla, Love grass

\* 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.)  
Specimen number - KW093, Accession 8652. Confirmed by Michael Hislop 10/12/20. Specimen retained by WA Herbarium

DRF PERMIT/ LICENCE No: FT61000788, FT61000787 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

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

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

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

Submitter of Record: Katherine Walkerden Role: Environmental Officer Signed: \_\_\_\_\_ Date: 11/06/2021

Please return completed form to **Species And Communities Branch DBCA**,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer**, Species and Communities Branch.  
Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Entered in Database

# Daviesia pauciflora



## Threatened and Priority Flora Report Form

Version 1.3 August 2017

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 <http://dbca.wa.gov.au> under Standard Report Forms

TAXON: <b>Daviesia pauciflora</b>	TPFL Pop. No: <input type="text"/>
OBSERVATION DATE: <b>12/11/20</b>	CONSERVATION STATUS: <b>P3</b> New population <input checked="" type="checkbox"/>
OBSERVER/S: <b>Julie Waters and Danika Penson</b>	PHONE: <b>90831519</b>
ROLE: <b>Environmental Officer</b>	ORGANISATION: <b>Shire of Esperance</b>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):   
**15 km east of Esperance townsite. On south side of Merivale Rd. ~550 m west of Stockyards Rd intersection.**

Reserve No:

DBC DISTRICT: <b>South Coast</b>	LGA: <b>Esperance</b>	Land manager present: <input type="checkbox"/>
DATUM: <input checked="" type="checkbox"/> GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input type="checkbox"/> Unknown	COORDINATE S: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input checked="" type="checkbox"/> UTM <input type="checkbox"/> Lat / Northing: <b>33.49°13.9'</b> Long / Easting: <b>122.06.05'</b> ZONE: <input type="text"/>	METHOD USED: GPS <input 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: <input type="checkbox"/> Nature reserve <input type="checkbox"/> Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/> <input 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"/> <input type="checkbox"/> Conservation park <input type="checkbox"/> Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole <b>15.40 to 15.30</b> Specify other: <input type="text"/>		

AREA ASSESSMENT: <input checked="" type="checkbox"/> Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m <sup>2</sup> ): <input type="text"/>																
EFFORT: Time spent surveying (minutes): <b>30</b> No. of minutes spent / 100 m <sup>2</sup> : <input type="text"/>																
POP'N COUNT ACCURACY: <input checked="" type="checkbox"/> Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: <input type="text"/> (Refer to field manual for list)																
WHAT COUNTED: <input checked="" type="checkbox"/> Plants <input type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>																
TOTAL POP'N STRUCTURE:																
<table border="1"> <tr> <td></td> <td>Mature:</td> <td>Juveniles:</td> <td>Seedlings:</td> <td>Totals:</td> <td rowspan="3">Area of pop (m<sup>2</sup>): <input type="text"/> Note: Pls record count as numbers (not percentages) for database.</td> </tr> <tr> <td>Alive</td> <td><b>3</b></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Dead</td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m <sup>2</sup> ): <input type="text"/> Note: Pls record count as numbers (not percentages) for database.	Alive	<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Dead	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Mature:	Juveniles:	Seedlings:	Totals:	Area of pop (m <sup>2</sup> ): <input type="text"/> Note: Pls record count as numbers (not percentages) for database.											
Alive	<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>												
Dead	<input type="text"/>	<input type="text"/>	<input type="text"/>	<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 <input type="text"/>																
REPRODUCTIVE STATE: <input type="checkbox"/> Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/> <input type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/> Percentage in flower: <b>80%</b>																
CONDITION OF PLANTS: <input type="checkbox"/> Healthy <input type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>																
COMMENT: <input type="text"/>																

THREATS - type, agent and supporting information: <small>Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats &amp; 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 (&lt;12mths), M=Medium (&lt;5yrs), L=Long (5yrs+)</small>	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening of Merivale Rd - likely to impact all plants.	M	H	S
• <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
• <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Please return completed form to Species And Communities Branch DBCA,  
 Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: [flora.data@dbca.wa.gov.au](mailto:flora.data@dbca.wa.gov.au)  
 RECORDS: Please forward to Flora Administrative Officer, Species and Communities Branch.  
 Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Entered in Database

## Threatened and Priority Flora Report Form

Version 1.3 August 2017

### 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 checked="" type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input checked="" type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" 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 checked="" type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input checked="" 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 checked="" 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"/>	Specify <b>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. alternata, B. ilicifolia);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Scattered Banksia speciosa and Nuytsia floribunda with dominant Melaleuca striata and
2. Adenanthos cuneatus shrubland
3. \_\_\_\_\_
4. \_\_\_\_\_

### ASSOCIATED SPECIES:

Anigozanthos rufus, Hibbertia andrewsii, Acacia cyclops, Caustis dioica, Leptospermum laevigatum  
(Victorian Tea Tree)

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.) \_\_\_\_\_

Only surveyed along roadside edge- did not survey in adjacent intact bushland

KW136, Accession 8774. Identified Mike Hislop 24/2/13. Specimen retained at WA Herbarium

**DRF PERMIT/ LICENCE No:** FT61000029 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

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

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

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

Submitter of Record: Katie White Role: Environmental Officer Signed: KW Date: 25/02/21

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