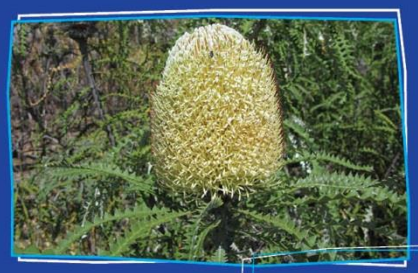
Vegetation, Flora, Fauna and Environmental Considerations, and Targeted Flora Report

Shire of Esperance Strategic Purpose Permit 21/22
Site O – Holt Road



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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 1.902 ha of a 3.85 ha footprint of native vegetation for the purpose of widening the road footprint to meet standards for the class of road during the road re-sheet.

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 the 'Site O - Holt Road' project under the '2021 Strategic Purpose Permit' (Figure 1), for the purpose of road widening during a road re-sheet.

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 16 m. This is still extremely narrow, but is the maximum that could be achieved to balance conservation values and safety standards. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation. The Shire of Esperance has already reduced the proposed impact at this site. After initial discussions, the proposed width of widening has been reduced from 20 m to 16 m to preserve 2 m on either side of the road, to preserve the native vegetation of the road reserve and retain a fauna corridor.

The proposed works are located ~110 km north of Esperance, within the Shire of Esperance managed road reserve of Holt Rd. Specifically, it is located from 2.5 to 0 km west of Burnside Rd, at straight line kilometre (SLK) 4 to 6.37 (Main Roads 2020). A point within the proposed clearing permit area is -32.835540 S, 121.7211621 E (GDA94).

Figure 1. Location of 'Site O – Holt Rd', approximately 110km north of Esperance from SLK 4 – 6.37, west of Burnside Road (Main Roads 2020).

3 Environmental Background

3.1 Scope

The removal of native vegetation to access gravel resources has the potential to affect a multiple environmental factors.

Possible impacts include;

- Threatened Flora (TF) and Priority Flora (PF).
- Threatened Ecological communities (TEC) and Priority Ecological Communities (PEC),
- Threatened fauna.

Assessing these impacts involves two approaches; desktop study and field survey. A desktop study will gather 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 O – Holt Road' is located within the Salt Lake Basin within the Balladonia catchment.

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

A single geological unit was identified within 'Site O – Holt Road', by Schoknecht et al. (2004). It is described as "Undivided poorly consolidated sediments: colluvium, weathered rocks, alluvium, sand, silt, clay, lacustrine and swamp deposits; silcrete, ferricrete, calcrete; shallow-marine sediments 3.85 ha".

3.5 Soils

The soil of 'Site O – Holt Road' is broadly defined as poorly drained calcareous, loamy soils (Schnoknecht et al. 2004). Within the area, there has been one soil types recorded described as "Salmon Gums 1 Subsystem (246Sg_1): Level plain or plateau of low relief and poor external drainage and extensive Gilgia microrelief, Alkaline grey shallow sandy duplex soils and calcareous loamy earths with minor non-cracking clays".

3.6 Topography

During the field survey, topography was observed to be dominated by level plain. Using Schnoknect et al. (2004), the project topography is mapped at a fine scale, traversing a single topographic area described as "level plain".

3.7 Vegetation

The site is located within the Eastern Mallee (Mal01) Interim Biogeographic Regionalisation of Australia (Thackway & Cresswell 1995) region. The MaL01 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 one vegetation association (VA) within the 'Site O – Holt Road' area – VA486 described as Mosaic: Medium woodland; salmon gum & red mallee / Shrublands; mallee scrub, *Eucalyptus eremophilia*. It's pre-european extent is 48.71%, of this, it has reasonable representation in the Esperance LGA with 39.38% remaining, but extremely poor representation in the IUCN with only 6.02% conserved.

3.8 Land use

The area directly included in the clearing permit application 'Site O – Holt Rd' is currently intact and vegetated 20 m wide road reserve, managed by the Shire of Esperance. The current road footprint occupies 14 m. The surrounding land use is agriculture. 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 (Dundas 2015).
- 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 2020A).
    - Threatened and Priority Reporting (TPFL; DBCA 2020B).
    - Esperance District Threatened Flora (DBCA 2020C).
    - TEC and PEC 'Likely to Occur' buffer and boundary areas (DBCA 2020D).
    - 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 (121° 43' 16" E,32° 50' 08" S);
    - 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 Birdata 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 25/08/2020, by the Shire of Esperance's Katie White & Julie Waters, the Environmental Officers at the Shire of Esperance. 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. Within this area, it is most likely that Carnaby's Black Cockatoo would be nesting within this area, in hollows of old growth Eucalyptus trees. Additionally, species that corresponded with suitable habitat within 'Site O – Holt Road' identified in the desktop 20 km radius search were assessed.

4.3 Field investigation: Assessing Threatened and Priority Ecological Communities

The vegetation community of 'Site O – Holt Road' was assessed for the presence a TEC or PEC, using by comparison of the vegetation communities to the 'Priority Ecological Communities for Western Australia Version 30 (DBCA 2020F)' definitions.

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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 07/09/2020 and 08/09/2020 by Katie White, Rhaquelle Meiklejohn and Sophie Willsher, Shire of Esperance's Environmental Officer and Environmental Assistants. 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 2 meters from the edge of the existing road's back-slope was assessed to accurately cover the 16 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.

Due to the high diversity and complexity of Esperance's flora, all species were recorded to compile an incidental species list (Appendix 8.1, Table 6). All species unknown in the field were collected and identified exsitu, using keys, WA Herbarium's Florabase (DBCA 2020E), 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, Danika Penson's FB2000276 and Sophie Willsher's FB62000278. Any species that were unable to be identified were submitted to the WA Herbarium for identification.

Over the course of the 2019 wildflower season, surveyors re-familiarised themselves with key taxonomic indicators and associated habitat, by visiting verified populations of *Acacia bartleri and Eremophila compressa.* 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

Beard (1973) mapped the entire project area as VA486. This is a highly variable VA, ranging from a mosaic of salmon gum and red mallee medium woodland and shrublands of mallee scrub dominated by Eucalyptus eremophila. Five vegetation communities were identified within the 'Site O – Holt Road', as defined by structure and composition (Table 1). Vegetation types A, C and E are a close match to VA486, characterised by their mixed Eucalypt woodlands or low shrublands. Vegetation type D is more suited to VA464, which was not identified by Beard (1973). Vegetation B is more suited to VA1182, which was not identified by Beard (1973). The incidental flora list identified a total of 72 native species across the vegetation communities, representing relatively low diversity

Table 1. Vegetation communities identified within proposed 'Site O – Holt Road' project area.

Type	Description	Figure	Beard Vegetation Association	Area (ha)	Diversity (species)
A	Mixed Eucalyptus Mallee closed woodland with no under-story. Scattered shrub mid-story.	7	486 - Mosaic: Medium woodland; salmon gum & red mallee / Shrublands; mallee scrub, *Eucalyptus eremophila*	0.872	75

B	Closed Eucalyptus Mallee woodland over scattered open Melaleuca mid-story.	8	1182 - Medium woodland; *Eucalyptus rudis* & *Melaleuca rhaphiophylla*	1.154	29
C	Semi-open Mallet Eucalyptus woodland over low shrubland	9	486 - Mosaic: Medium woodland; salmon gum & red mallee / Shrublands; mallee scrub, *Eucalyptus eremophila*	0.3	26
D	Eucalyptus woodland, dominated by *Eucalyptus diptera*. Scattered *Melaleuca teuthioides* shrubland and chenopod understory present.	10	464 – Mosaic: Medium woodland; York gum & Salmon gum / Shrublands; *Melaleuca thyioides* thicket	1.093	40
E	Eucalyptus closed woodland with minimal mid story present.	11	486 - Mosaic: Medium woodland; salmon gum & red mallee / Shrublands; mallee scrub, *Eucalyptus eremophila*	0.413	23

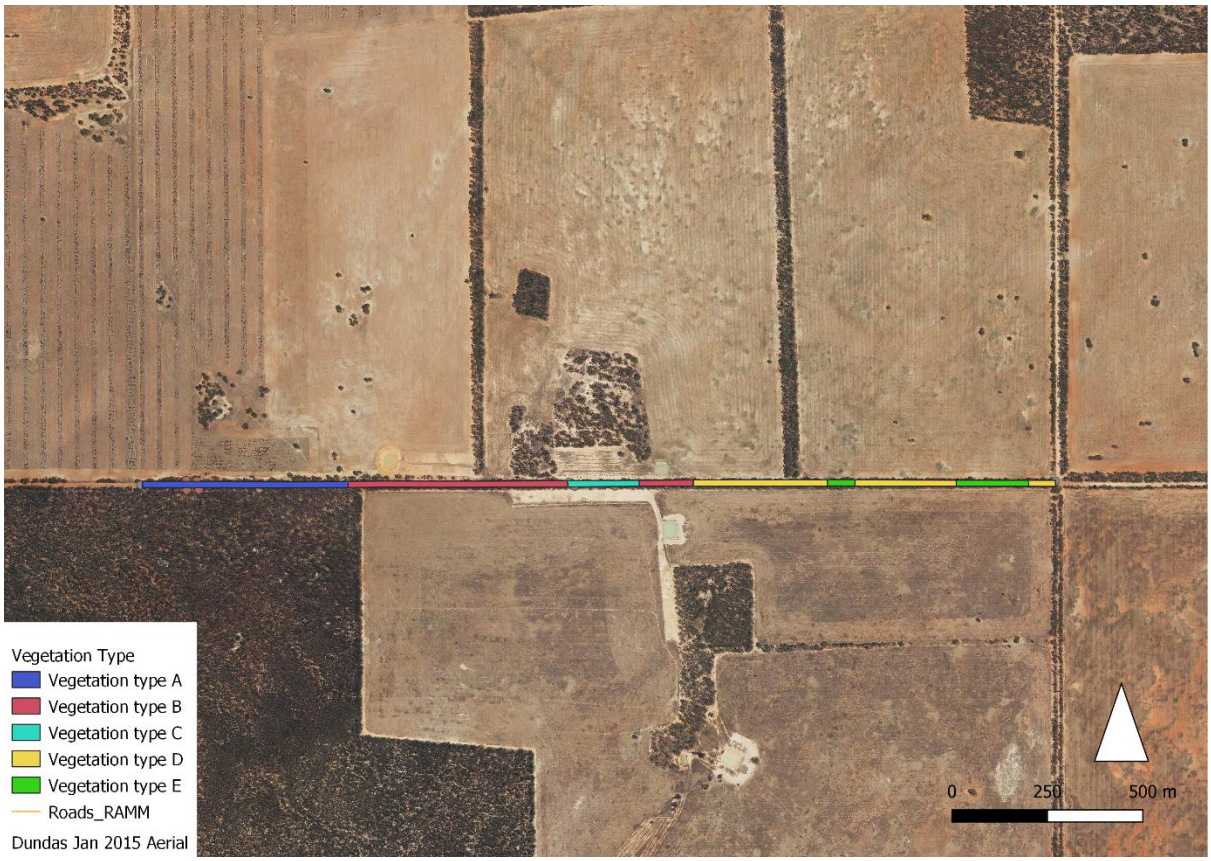

Figure 2. Location of Vegetation types within the 'Site O – Holt Road'

The road reserve of 'Site O – Holt Road' is all in excellent condition. There are no signs of weed infestation, disease or past fire events. It is unlikely proposed works will impact natural hydrological regimes of the area. 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.

There was minimal weed invasion across the entirety of the proposed 'Site O – Holt Road' area. Overall, five invasive species were identified within the project area (Appendix 8.1). Of these, the most extensive and of serious concern were Wild Radish (*Raphnus raphanistrum)* and Cape Weed (*Arctotheca calendula)*. Due to the arid nature of the climate, it is unlikely that these will continue to persist in the landscape or be spread by the road widening activities.

Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2020) data shows no records *Phytophthora cinnamomi* or other *Phytophthora* sp. Dieback sample results in the immediate area. It is unlikely *P. cinnamomi* is active within the area, due to the extremely arid nature of the environment. However, it is possible other plant pathogens are present and a possibility that proposed works will spread along Holt Rd due to proposed works.

5.2 Threatened and Priority Ecological Communities

The desktop study did not identify any Threatened Ecological Communities or Priority Ecological Communities (PEC) as being within 'Site O – Holt Road' or within a 20 km buffer of the site. The field survey confirmed this.

5.3 Threatened and Priority Flora

One threatened flora (TF) and 26 priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Table 2; DBCA 2020A, DBCA 2020B, DBCA 2020C). Of these, nine PF species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site O – Holt Road'. No confirmed records, indicating known populations, were directly located within the clearing permit area.

Table 2. Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site O – Holt Road' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2020B), WA Herbarium (DBCA 2020A) and Esperance District Threatened Flora (DBCA 2020C). Nt. Acronyms used in the table include priority flora (P), threatened flora (TF), non-threatened flora (NT), Biodiversity Conservation (BC) Act 2018, Environmental Protection and Biodiversity Conservation (EPBC) Act 1999.

Species	Conservation Status	Associated Habitat	Likely to occur (Yes, possibly, unlikely, no)
Acacia amyctica	P2	Salmon Gums area on well-drained loams and sandy clay plains with *Eucalyptus floctoniae* low woodland	Yes
Acacia bartlei	P3	Salmon Gums area, waterlogged depressions in brown/grey sandy clay. Tolerates low level salinity	Unlikely
Acacia glaucissima	P3	Salmon Gums on open low/Mallee woodland with dwarf scrub or low heath *Difference to NT species is long curly pods	Yes
Acacia diminuta	P1	Scattered populations from Jerramungup to Scaddan. Grows in sandy clay.	Possible
Adenanthos ileticos	P4	Salmon Gums area – sandy soil, open woodland with various Eucalyptus species	Yes

Angianthus sp. Salmon Gums	P1	Salmon Gums area. Associated with salt lakes	No
Aotus lanea	P1	Grey clayey sand, yellow clay, deep sand. Edge of salt lakes and valleys	Possible – no nearby reliable records to familiarise
Aotus sp. Dundas	P2	Variety of associated habitat - Upslope from salt lake, sandplain, limestone, recent disturbance. *Looks very similar to NT *Aotus* sp. Southern Wheatbelt	Possible
Bossiaea flexuosa	P3	Recorded in Salmon Gums region – grows after fire in soil over gravel or deep sands Mostly recorded to the west in north-grass patch area and Bremer Ranges	Unlikely
Bossiaea spinosa	P3	Vast majority of records to the west - Gravelly sandy soils, undulating plains.	Unlikely
Constephium marchantiorum	P3	Various habitats – plains, creeklines, edge of salt lakes	Possible
Conostephium uncinatum	P2	Various habits - Deep sandy soils, edge of salt lakes, undulating plains, claypans. Most records associated with salt lakes.	Unlikely
Cyathostemon sp. Dowak	P1	Only two records – north-west area on Lake King road. Margin of salt lakes	No
Cyathostemon sp. Esperance	P1	Only two records – salt lake and sandy gravel. One record collected in 2019 very close to site	Unlikely
Cyathostemon sp. Salmon Gums	P3	Various soils - orange sand, white sandy, sandy clay over granite, light brown clay, saline soils. Various habitats – flats, dry river beds, claypans	Yes
Eremophila chamaephila	P3	Open mallee woodland with limestone	Yes
Eremophila compressa	P3	Grass Patch area, open woodland with red brown clay, clay loam, sandy lam on undulating plains	Yes
Eremophila serpens	P4	Wide distribution, including north to Salmon Gums. Favours saline area or sandy rises. Associated with Eucalyptus woodland and Melaleuca shrubland	Yes
Eucalyptus creta	P3	Mallee country preferring heavy brown clay loam. Normally dominant.	Yes
Eucalyptus dolichorhyncha	P4	Mostly distributed towards the western area of Grass Patch	Unlikely
Eucalyptus merrickiae	TF	Associated with margin of salt lakes	No
Goodenia laevis subsp. laevis	P3	Woodland with Melaleuca shrubland. Prefers limestone or white clay loam. Associated with disturbance	Yes
Lepidium fasciculatum	P3	Scattered distribution all over Australia. Semi-arid areas	Possible
Micromyrtus elobata subsp. *scopula*	P3	Open Mallee with mid-dense heath. Undulating sandplains. Wide and scattered distribution. Mostly recorded south	Unlikely
Pimelea halophile	P2	Associated with salt lakes	No
Thysanotus brachyantherus	P2	Clay over limestone or loam	Possible

No TF species were identified within the clearing footprint. However the targeted flora survey identified two PF species, *Acacia amyctica* (P2) and *Goodenia laevis* subsp. *laevis* (P3), within the proposed clearing permit footprint. Queries of spatial datasets were requested specifically for these species, to interrogate impact of proposed works on species sustainability (DBCA 2020A; DBCA 2020B; DBCA 2020C; DBCA 2021). 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 2020C). It was noted that additional information on both species was located on file.

Numerous specimen's unknown to surveyors were collected and verified at the WA Herbarium as non-threatened species, such as *Cyathostemon* aff. *ambiguus,* a highly variable and requiring extensive taxonomic revision (Accession 8652; KW074, specimen retained by WA Herbarium).

5.3.1 *Acacia amyctica,* Priority 2

A specimen of *Acacia amyctica* was sent to the WA Herbarium for identification confirmation (KW075; Accession #8652 with specimen not retained). It was confirmed by Michael Hislop on 12/10/20. 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 8.2). A secondary survey was conducted by Katherine Walkerden on 14/06/2021 for *Acacia amyctica* finding a total of 15 mature specimens. The *Acacia amyctica* population on Holt road is made up of three subpopulations of (6, 7 and 2 plants), 800-900m apart over a 2.1km section of road. The most western subpopulation is outside the clearing footprint and will not be impacted upon. If proposed works occur, 5 plants will be impacted upon, from a population total of 15. All observed plants were very old large sprawling bushes of <0.5 m high x 3 m wide and one especially large plant was 6m wide. Plats have long curly pods and very white stems.

Figure 3. *Acacia amyctica* photographed in June 2021 within 'Site O – Holt Road' with buds forming.

Acacia amyctica occurs in the Salmon Gums–Grass Patch area (between Norseman and Esperance) and also Peak Charles National Park (about 50 km due W of Salmon Gums) and near Dunn Swamp (approximately 80 km due NE of Ravensthorpe). It grows in loam and on sandy clay plains in low woodland and open shrubland. According to DBCA's database searches there are 13 populations over a range of 2000km^2. The area of occupancy includes largely unsurveyed and uncleared southern parts of the Great Western Woodlands, so the species is probably more common than recorded. Most records are over 20 years old so an accurate assessment

Table 3. Population details from Department of Biodiversity, Conservation and Attraction's Threatened and priority species database (DBCA, 2020G).

Locality	Date	Frequency
C. 2 km along firebreak track from Fields Road, W of Lort River, c. 6 km N of Rollond Road	2013	30+ plants.
C. 6 km SW of Pyramid Lake, along firebreak track that heads N of Rollond Road	2013	100+ plants.
Lot 353, Machens Road, Salmon Gums	2009	2-5 plants.
N of Rollands Road on Fields Road, E side of road, Peak Charles	2005	21-50 plants.
Oldfield 1343, 17 km NE of Ravensthorpe [This location is 28 km NW of Cascade as advised by collector 23/8/2001]	1994	
8.2 km S of Peak Charles Rd on Peak Eleanora Rd (= Fields Rd). Peak Charles National Park.	1993	
8.0 km E of Neds Corner road (north) on Rollands road (1.9 km W of Fields road)	1992	10 plants
1 km N of Salmon Gums on Coolgardie - Esperance Highway	1983	
24.75 km W of Grass Patch, 23.4 km W of Norseman - Esperance Highway on Grass Patch Road	1983	
15 km E of Dunn Swamp, ca 80 km NE of Ravensthorpe	1980	frequent.
4 km S of Peak Eleanora, Peak Charles National Park, ca 45 km W of Salmon Gums	1979	frequent.
95 km S of Norseman	1978	
11.5 km N of Salmon Gums towards Norseman	1971	

Figure 4. Map of Acacia Amyctica found within and just outside of 'Site O – Holt Road'

5.3.2 *Goodenia laevis* subsp. *laevis,* Priority 3

A specimen of *Goodenia laevis* subsp. *laevis* was sent to the WA Herbarium for identification confirmation (KW076; Accession #8652 with specimen not retained). 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).

Shire of Esperance counted a total of 120 *Goodenia laevis* ssp. *laevis* plants at the site. Plants were scattered throughout the entire area but were most common in Veg type A (54 plants) and Veg type D (59 plants). They were not just restricted to disturbance area, but in the intact bush that not been disturbed. A total count was not undertaken and total population umber may be higher than 120 plants. It was noted that most plants looked quite old and very few (<5%) were flowering. If the project went ahead 83 plants from a population of at least 120 would be taken.

An extract of data from the WA Herbarium and TPFL spatial datasets was received from DBCA 19/02/2020 (20-0221FL).

During the September 2019 flora season there was five new populations of *G. laevis* subsp. *laevis* discovered. Only one of these had been entered into TPFL on 19/2/2021.

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 could therefore be inferred that the presence of *G. laevis* subsp. *laevis* in the disturbed vegetated island at

the existing storage site is due to disturbance.

- On the intersection of Norwood and Dempster Rd, located within an old road that was ripped when the intersection was realigned. 100 to 150 plants present. No proposed impacts.
- In the Cascade town-site on Wilhaust St, in the back-slopes of the road that are regularly maintained with heavy machinery. 15+ plants present.
- On Neds Corner Rd, approximately 2.4 to 3.5 km north of Cascade Rd. All plants were present in the back-slopes of the road, that are regularly maintained with heavy machinery. 82 plants present.
- Grass Patch Rd, 2.2 km west of Bishops Rd. All plants were present in the back-slopes of the road that are regularly maintained with heavy machinery. 50+ plants present.
- An old government dam on the intersection of Dalyup and Rasyk Rd, which had historically been ripped, hard-standed and cleared to form a catchment for a Dam. 200 to 250 plants were present.

During Spring 2020 Shire of Esperance surveys an additional population of *G. laevis* subsp. *laevis* was found at Grass Patch totaling 94 plants.

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

- *G. laevis* subsp. *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^2.
- 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.
- 20 records of populations are recorded on DBCA databases, with 10 records collected prior to 2000. 5 new populations discovered by Shire of Esperance in recent years have not added to DBCA data.
- Of the 20 recorded specimens, six records are directly described as being within a previously disturbed site, such as old limestone pits or along firebreaks.
- 11 sites are described as along a road and may have been impacted upon during road widening or maintenance. 5 sites are within reserves and likely remain intact. 5 sites cannot be determined tenure status, and is unknown of potential impacts.

5.4 Fauna

Within a 20 km radius of the 'Site O – Holt Road', 96 fauna have previously been recorded. Of these, five species are threatened fauna, priority fauna and fauna protected under international agreement have been recorded (Table 3). No species have suitable habitat within the proposed clearing permit area.

Table 4. Potential threatened, priority and protected under international agreement fauna recorded within a 20 km radius of the proposed 'Site O – Holt Road'.
Nt. Acronyms used include priority (P), threatened (T), and (S) Other specially protected fauna

Scientific Name	Common Name	Conservation Status	Likelihood of occurring	Associated habitat
Calidris ferruginea	Curlew Sandpiper	T	No	Shorebird – wrong habitat
Dasyurus geoffroii	Chuditch, western quoll	T	Possible	Forest and woodland habitats
Falco peregrinus	Peregrine Falcon	S	Possible	Broad habitat range, but prefer woodlands or tall trees for nesting
Leipoa ocellata	Malleefowl	T	Possible	Semi-arid shrublands and low woodlands dominated by mallee and/or acacia
Thinornis rubricollis	Hooded Plover	P4	No	Shorebird – wrong habitat

The lack of dense understory shrubs of all vegetation types within 'Site O – Holt Road' means that malleefowl are unlikely to persist in this area due to lack of protection from predators. No evidence of Chudich or Peregrine Falcon was noted, despite a recorded Chudich in the Salmon Gums area just over a decade ago. Some recent animal diggings were observed, it is uncertain what animal made these but it is probably a goanna or other reptile.

Figure 5. Recent diggings observed made by unknown animal 'Site O – Holt Road'

Figure 6. Recent diggings observed made by unknown animal ‘Site O – Holt Road’

6 Conclusion; assessment of Department of Water and Environmental Regulations clearing principles

The 'Site O – Holt Road' 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 5. Shire of Esperance Assessment against Clearing Principles of the proposed 'Site O – Holt Road'

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 relatively low with 72 native species recorded.
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.	Three threatened or priority fauna were identified as likely to occur in this area, including Chuditch, Malleefowl and Peregrine Falcon. No evidence of these species was found within the project area. The small size of the application area and the presence of large amounts of intact vegetation, of the same vegetation type surrounding the project area provides an alternate nesting and foraging place for these fauna, should they occur in the area.
Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No threatened flora was recorded within the application area. 83 individuals of the Priority 3 species Goodenia levis ssp laevis and XX individuals the Priority 2 species *Acacia amyctica* were recorded in the application area but this is unlikely to have any significant impact on the long term survival 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 of Threatened Ecological communities were recorded from the application area
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 are 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.	No riparian vegetation was recorded from the 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 project.
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 nearby conservation reserves

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.	There is unlikely to be any impacts to surface or groundwater due to groundwater depths in the area and flat terrain
Principle (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	There is unlikely to be any flooding in this area.

7 References

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8 Appendix

8.1 Incidental species list

Table 6: Incidental species list 'Site O – Holt Road'

Family	Genus	Species	Common Name	Weed	Cons Stat	Vegetation Type				
						A	B	C	D	E
Amaranthaceae	*Ptilotus*	*holosericeus*				x				
Apocynaceae	*Alyxia*	*buxifolia*	Dysentery Bush, Sea Box				x		x	
Asparagaceae	*Thysanotus*	*patersonii*					x	x		
Asphodelaceae	*Asphodelus*	*fistulosus*	Onion Weed	x			x		x	
Asteraceae	*Arctotheca*	*calendula*	Cape Weed, Cape Dandelion	x			x			
Asteraceae	*Asteridea*	*athrixioides*	Wirewort				x	x		
Asteraceae	*Cratystylis*	*conocephala*	Greybush							x
Asteraceae	*Olearia*	*muelleri*	Goldfields Daisy			x	x	x	x	x
Asteraceae	*Olearia*	sp.					x			
Asteraceae	*Sonchus*	*oleraceus*	Sour Thistle, Tall Daisy	x			x		x	
Asteraceae	*Vittadinia*	*australasica*					x		x	
Brassicaceae	*Carrichtera*	*annua*	Wards weed	x			x		x	
Brassicaceae	*Raphnus*	*raphanistrum*	Wild Raddish	x		x	x		x	
Chenopodiaceae	*Artriplex*	*vesicaria*				x	x			
Chenopodiaceae	*Chenopodiaceae*	sp.								x
Chenopodiaceae	*Chenopodiaceae*	sp.								x
Chenopodiaceae	*Chenopodiaceae*	sp.				x	x		x	
Chenopodiaceae	*Chenopodiaceae*	sp.					x	x	x	x
Chenopodiaceae	*Chenopodiaceae*	sp.					x		x	
Chenopodiaceae	*Chenopodiaceae*	sp.					x			
Chenopodiaceae	*Eriochiton*	*sclerolaenoides*				x			x	
Chenopodiaceae	*Maireana*	*radiata*							x	

Chenopodiaceae	*Maireana*	*trichoptera*					x		x	
Chenopodiaceae	*Rhagodia*	*crassifolia*						x		
Chenopodiaceae	*Rhagodia*	*preissii*					x	x	x	
Chenopodiaceae	*Salsola*	*australis*	Prickly Saltwort						x	
Chenopodiaceae	*Sclerolaena*	*diacantha*				x			x	x
Chenopodiaceae	*Sclerolaena*	*obliquicuspis*				x	x	x	x	
Convolvulaceae	*Wilsonia*	*humilis*	Silky Wilsonia			x	x		x	
Dilleniaceae	*Hibbertia*	*psilocarpa*					x	x		
Fabaceae	*Acacia*	*amyctica*			P2 - KW075, Acc 8652	x	x	x		
Fabaceae	*Acacia*	*crassuloides*					x			
Fabaceae	*Acacia*	*erinacea*				x				
Fabaceae	*Acacia*	*evenulosa*				x	x			
Fabaceae	*Acacia*	*lachnophylla*				x	x	x	x	x
Fabaceae	*Acacia*	*pritzeliana*					x	x		
Fabaceae	*Daviesia*	*aphylla*					x			
Fabaceae	*Daviesia*	*argillacea*				x	x			
Fabaceae	*Medicago*	sp.							x	
Fabaceae	*Pultenaea*	*arida*				x	x			
Fabaceae	*Senna*	*artemisoides*				x		x	x	
Goodeniaceae	*Coopernookia*	*strophiolata*				x	x	x	x	x
Goodeniaceae	*Goodenia*	*laevis* subsp. *laevis*			P3 - KW076, Acc 8652	x	x	x	x	x
Goodeniaceae	*Scaevola*	*spinescens*				x				
Hemerocallidaceae	*Dianella*	*revoluta*	Blueberry Lilly, Flax Lilly				x			
Lamiaceae	*Westringia*	*rigida*	Stiff Westringia			x	x	x	x	
Lauraceae	*Cassytha*	sp.	Dodder Laurel				x			
Myrtaceae	*Cyathostemon*	aff. *ambiguus*						x		
Myrtaceae	*Eucalyptus*	*delicata*				x			x	
Myrtaceae	*Eucalyptus*	*diptera*	Two winged gimlet			x	x	x	x	x
Myrtaceae	*Eucalyptus*	*eremophila*	Tall Sand Mallee			x		x		
Myrtaceae	*Eucalyptus*	*extensa*				x			x	
Myrtaceae	*Eucalyptus*	*oleosa* ssp. *oleosa*	Red Mallee, Red Morrell			x			x	
Myrtaceae	*Eucalyptus*	*phenax* ssp. *phenax*	Green dumosa Mallee			x	x	x	x	x
Myrtaceae	*Eucalyptus*	*prolixa*	Square fruit mallee			x	x		x	x
Myrtaceae	*Eucalyptus*	*salmonophloia*								x
Myrtaceae	*Eucalyptus*	*urna*				x	x	x		
Myrtaceae	*Melaleuca*	*hamata*					x			

Myrtaceae	*Melaleuca*	*lateriflora*					x			
Myrtaceae	*Melaleuca*	*pauperiflora* ssp. *pauperiflora*				x	x			x
Myrtaceae	*Melaleuca*	*podiocarpa*				x	x		x	x
Myrtaceae	*Melaleuca*	*sapientes*	Silver Melaleuca					x		
Poaceae	*Austrostipa*	*elegantissima*				x	x	x	x	x
Poaceae	*Rytidosperma*	*caespitosum*								x
Poaceae	*Triticum*	*aestivum*	Wheat	x		x	x		x	
Proteaceae	*Grevillea*	*acuaria*				x	x		x	
Proteaceae	*Grevillea*	*huegelii*				x		x		
Rhamnaceae	*Spyridium*	*minutum*				x			x	
Rutaceae	*Boronia*	*inornata*	Desert Boronia				x		x	
Rutaceae	*Microcybe*	*multiflora* ssp. *multiflora*				x	x			
Santalaceae	*Exocarpos*	*aphyllus*					x	x		x
Santalaceae	*Santalum*	*acuminatum*	Quandong			x	x		x	x
Sapindaceae	*Dodonaea*	*stenozyga*	Desert Hop Bush			x	x	x	x	x
Scrophulariaceae	*Diocirea*	*violacea*				x				
Scrophulariaceae	*Eremophila*	*decipiens*				x	x	x	x	x
Scrophulariaceae	*Eremophila*	*dichroantha*	Bale-hooked Eremophila				x			
Scrophulariaceae	*Eremophila*	*ionantha*					x		x	x
Scrophulariaceae	*Eremophila*	*psilocalyx*								x

8.2 TPFL Forms

Acacia amyctica

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://kbapw.wa.gov.au/ under *Standard Report Forms*

TAXON: Acacia amyctica **TPFL Pop. No:**

OBSERVATION DATE: 14/06/2021 **CONSERVATION STATUS:** P2 New population ☐

OBSERVER/S: Katherine Walkerden **PHONE:** 0416558774

ROLE: Environmental Officers **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~110 km north of Esperance and ~16.4 km north-east of Salmon Gums townsite. On Holt Rd, ~2.2 km west of Burnside Rd intersection. Both sidesof road reserve.

Reserve No:

DBCA DISTRICT: South Coast **LGA:** Esperance Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 372241.9 m E

Long / Easting: 6362938.8 m W

ZONE: 51 H

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☐	Rail 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 (m²):

EFFORT: Time spent surveying (minutes): 3 hrs No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	15 plants			
Dead				

Area of pop (m²):

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☒ Flower ☐ Immature fruit ☐ Fruit ☐ Dehisced fruit ☒ Percentage in flower: 0%

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

COMMENT: Very old spreading shrubs, largest was 7M wide, each plant was beginning to bud

THREATS - type, agent and supporting information: 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+)	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening - widening of 1 m on either side of road reserve. Likely to impact 5	H	H	S
•			
•			

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** ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK: (on soil surface; eg gravel, quartz fields)	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	0-10% ☐	Sand ☐	Red ☐	Well drained ☒
Hill ☐	Dolerite ☐	10-30% ☐	Sandy loam ☒	Brown ☐	Seasonally inundated ☐
Ridge ☐	Laterite ☐	30-50% ☒	Loam ☐	Yellow ☒	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	50-100% ☐	Clay loam ☐	White ☒	Tidal ☐
Slope ☒	Limestone ☐		Light clay ☐	Grey ☐	
Flat ☐	Quartz ☐		Peat ☐	Black ☐	
Open depression ☐	Specify other:		Specify other:	Specify other:	
Drainage line ☐					
Closed depression ☐					
Wetland ☐					

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 (Mesomelaena tetragona)

1. Mixed Eucalyptus Mallee closed Woodland with virtually no understory and scattered mid-story
2.
3.
4.

ASSOCIATED SPECIES:
Other (non-dominant) spp: Eucalyptus diptera, Santalum acuminatum, Olearia muelleri

* 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.)

Collected KW075, Accession 8652. confirmed by Michael Hislop at WA Herbarium on 10/12/20. Specimen not retained.

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: Katherine Walkerden Role: Environmental Officer Signed: _____ Date: 15/06/2021

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 ☐

Goodenia laevis ssp laevis

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://dpaw.wa.gov.au/ under *Standard Report Forms*

TAXON: Goodenia laevis ssp laevis **TPFL Pop. No:**

OBSERVATION DATE: 08/09/20 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Katie White and Sophie Willsher **PHONE:** 9083 1518

ROLE: Environmental Officers **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~110 km north of Esperance and ~16.4 km north-east of Salmon Gums townsite. On Holt Rd, scattered regularly from Burnside Rd intersection to 2.4 km east. Both sidesof road reserve.

Reserve No:

DBCA DISTRICT: South Coast **LGA:** Esperance Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 372888.55 m E

Long / Easting: 6363203.9 m N

ZONE: 51 H

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

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

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²):

EFFORT: Time spent surveying (minutes): 3 hrs No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	83 plants			
Dead				

Area of pop (m²):

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☐ Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: 0%

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

COMMENT:

THREATS - type, agent and supporting information: 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+)	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening - widening of 1 m on either side of road reserve. Likely to impact all	H	H	S
•			
•			

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 ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☒
Flat ☐
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other:

LOOSE ROCK: (on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☐
30-50% ☒
50-100% ☐

SOIL TYPE:
Sand ☐
Sandy loam ☒
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other:

SOIL COLOUR:
Red ☐
Brown ☐
Yellow ☒
White ☒
Grey ☐
Black ☐
Specify other:

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

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 (Mesomelaena tetragona)

1. Mixed Eucalyptus Mallee closed Woodland with virtually no understory and scattered mid-story
2.
3.
4.

ASSOCIATED SPECIES:
Other (non-dominant) spp: Eucalyptus diptera, Santalum acuminatum, Olearia muelleri

* 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.)

Collected KW076, Accession 8652. confirmed by Michael Hislop at WA Herbarium on 10/12/20. Specimen not retained.

Almost entirely in the active road footprint and disturbed area.

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: 15/ /

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 ☐

8.3 Vegetation Type Photos

Figure 7. Vegetation type A described as Mixed Eucalyptus Mallee closed woodland with no under-story. Scattered shrub mid-story.

Figure 8. Vegetation type B described as Eucalyptus dominant with rough bark. Closed Eucalyptus Mallee woodland over scattered open Melaleuca mid-story.

Figure 9. Vegetation type 3 described as Semi-open Mallet Eucalyptus woodland over low shrubland.

Figure 10. Vegetation type 4 described as Eucalyptus woodland, dominated by *Eucalyptus diptera*. Scattered *Melaleuca teuthioides* shrubland and chenopod understory present.

Figure 11. Vegetation type 5 described as Eucalyptus closed woodland with minimal midstory present.