



STATE BARRIER FENCE BIOLOGICAL SURVEYS

Department of Agriculture and Food Western Australia

ecoscape

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ACRONYMS AND ABBREVIATIONS

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<i>ARRP Act 1976</i>	Western Australian <i>Agriculture and Related Resource Protection Act 1976</i> (superseded by the <i>BAM Act 1997</i>)
<i>BAM Act 2007</i>	Western Australian <i>Biosecurity and Agriculture Management Act 2007</i>
BoM	Bureau of Meteorology
C1, C2, C3	Declared Pest categories under the <i>BAM Act 2007</i>
CALM	Western Australian Department of Conservation and Land Management (prior to becoming DEC)
cf.	(Latin) <i>confer</i> , “compare”
CR	Critically Endangered
DAFWA	Department of Agriculture and Food Western Australia
DBH	Diameter at breast height
DEC	Western Australian Department of Environment and Conservation (now, in part, DPaW)
DER	Western Australian Department of Environmental Regulation
DEWHA	Department of the Environment, Water, Heritage and the Arts
DMP	Western Australian Department of Mines and Petroleum
DPaW	Western Australian Department of Parks and Wildlife
DoE	Commonwealth Department of the Environment
DoP	Western Australian Department of Planning
DSEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities (now DoE)
Ecoscope	Ecoscope (Australia) Pty Ltd
EERG	Esperance Extension Reference Group
EN	Endangered
EPA	Western Australian Environmental Protection Authority
<i>EPBC Act 1999</i>	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDA 94	Geographic Datum of Australia 1994
GHD	GHD Pty Ltd
GPS	Global Positioning System
GWA	Government of Western Australia
IA	Migratory birds protected under an international agreement
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
MGA	Map Grid of Australia
NHT	National Heritage Trust
NP	National Park
NR	Nature Reserve
NVIS	National Vegetation Inventory System
M	Migratory
MNES	Matters of National Environmental Significance
OEPA	Western Australian Office of the Environmental Protection Authority
PEC	Priority Ecological Community
PF	Priority Flora
P1, P2, P3, P4, P5	Priority Flora and Fauna species rankings

ACRONYMS AND ABBREVIATIONS	
PMST	Protected Matters Search Tool
S	Specially protected fauna under Schedule 4 of <i>WC Act 1950</i>
SBF	State Barrier Fence
SLK	Straight Line Kilometres
sp.	Species (generally referring to an unidentified taxon or when a phrase name has been applied)
spp.	Referring to multiple species of the same genera
subsp.	Subspecies (infrataxon)
S1	Schedule 1 Fauna species listed under the <i>WC Act 1950</i> (Threatened Fauna)
S3	Schedule 3 Fauna species listed under the <i>WC Act 1950</i> (Migratory)
S4	Schedule 4 Fauna species listed under the <i>WC Act 1950</i> (Other specially protected fauna)
TEC	Threatened Ecological Community
T	Threatened Fauna species listing by DPaW
TF	Threatened Flora (formerly termed Declared Rare Flora, DRF, in Western Australia)
UCL	Unallocated Crown Land
var.	Variety (infrataxon)
VU	Vulnerable
WAH	Western Australian Herbarium
WAOL	Western Australian Organism List
WAM	Western Australian Museum
WAPC	Western Australian Planning Commission
<i>WC Act 1950</i>	Western Australian <i>Wildlife Conservation Act 1950</i>
WONS	Weeds of National Significance
X	Presumed extinct species
*	Introduced species

SUMMARY

The Department of Agriculture and Food Western Australia (DAFWA) proposes to extend the State Barrier Fence (SBF) by up to 622 km in length from east of Ravensthorpe to east of Esperance. Ecoscape was commissioned by the DAFWA to undertake a range of biological surveys of its proposed SBF Esperance extension including flora, fauna and dieback assessments.

The survey corridor (study area) is a 100 m wide easement following the SBF proposed alignment (640 km in length including an optional section), totalling an area of 6 340 ha.

The vegetation and flora assessments included targeted searches for conservation significant flora (Threatened and Priority Flora), identification of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) potentially influenced by the alignment, Level 2 (detailed) surveys for areas adjacent to conservation estate and recording of representative data for all vegetation types intersected by the SBF alignment. The fauna assessments included identification of the different fauna habitats occurring within the study area and determination of any further requirements for targeted (Level 2) surveys for conservation significant species.

The vegetation and flora desktop assessment identified that:

- two of the pre-European vegetation associations have 10-30% of their original extent remaining for Western Australia and one additional vegetation association has 10-30% remaining for the Shire of Esperance
- one TEC and 10 PECs have been identified as occurring within the vicinity of the study area. An additional TEC (Proteaceae Dominated Kwongkan Shrublands), listed in January 2014, has the potential to occur within the study area based on indicative mapping.
- 166 species of conservation significant flora were identified that could potentially occur within the study area based on distribution and/or habitat preferences
- four Environmentally Sensitive Areas occur within 500 m of the study area including Cape Arid National Park and three Threatened Flora locations.

The fauna desktop assessment identified:

- 61 significant species as defined by the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. These included one Critically Endangered, four Endangered and seven Vulnerable fauna species as well as 49 migratory birds
- 23 Priority species as identified by Department of Parks and Wildlife (DPaW). These included two schedule 4, five Priority 1, one Priority 2, three Priority 3, 12 Priority 4 and two Priority 5 species.

The flora and vegetation field survey identified:

- 88 vegetation types within the study area
- two of the vegetation types are considered likely or potentially matching the description of the recently listed 'Proteaceae Dominated Kwongkan Shrublands' TEC
- the vegetation condition ranged from Degraded to Pristine, with 98% of sites within the study area classified as Very Good or better
- 860 vascular flora taxa
- three Threatened Flora (TF) taxa were recorded within the study area during the field survey (*Anigozanthos bicolor* subsp. *minor*, *Conostylis lepidospermoides* and *Eucalyptus merrickiae*). One additional species of TF (*Rhizanthella gardneri*) is known to occur within the study area based on recent records.
- 59 Priority Flora (11 Priority 1, 12 Priority 2, 25 Priority 3 and 11 Priority 4) were recorded plus one additional species of Priority 2 flora that is known to occur from recent records

- twenty introduced species including the Declared Pest plants **Asparagus asparagoides* (Bridal Creeper), **Carthamus lanatus* (Saffron Thistle) and **Onopordum acaulon* (Stemless Thistle).

Potential impacts to conservation significant vegetation and flora have been assessed. The 'Proteaceae Dominated Kwongkan Shrublands' TEC is listed as Endangered under the *EPBC Act 1994*. If impact to this TEC cannot be avoided, it may require referral to Commonwealth regulatory authorities. There are two pre-European vegetation associations with less than 30% extent remaining, these mostly correspond areas already impacted by the low fuel modified buffer strip.

The four TF taxa recorded are listed under both the *EPBC Act 1994* and the *WC Act 1950* and cannot be removed or damaged without Ministerial approval. Management options that avoid or minimise impact to these species should be considered and implemented during construction and ongoing maintenance.

The fauna field survey identified:

- eight fauna habitat types
- eight significant species including two Vulnerable, four Priority 4, one Priority 5 and one Migratory species.

Potential impacts to the conservation significant fauna species are assessed as minor to none in each case. The eastern part of the proposed fence extension has potential for (minor) impact on the Critically Endangered Western Ground Parrot (*Pezoporus flaviventris*), limited to a low risk of collision for individual birds dispersing beyond the currently occupied range, but not acting as a barrier; any collision risk will be further reduced by enhancement of fence visibility. Impacts of vegetation clearing and fence construction to fauna (including all species, not only conservation listed) are likely to be predominantly negative but relatively minor.

The dieback assessments are presented in a separate report (Glevan 2015). In summary:

- the majority of the study area was categorised as Uninterpretable due to inadequate rainfall or an insufficient coverage of reliable indicator species
- only 42% of the study area that was identified as being vulnerable to *Phytophthora* Dieback was observed to be interpretable
- *Phytophthora* Dieback, caused by *P. cinnamomi*, was not observed in the vegetation within or immediately adjacent to the study area
- an infestation of *P. rosacearum* was observed at a single location adjacent to Bandalup Road
- a significant infestation of *P. inundata* was identified toward the eastern end of the study area and is having a significant impact on the susceptible vegetation
- both of the recorded infestations will require hygiene procedures to mitigate any spread of the pathogen from the existing infestation.

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

The State Barrier Fence (SBF) currently extends from the Zuytdorp Cliffs, north of Kalbarri, and terminates approximately 25 km to the east of Ravensthorpe, approximately 1 170 km in length. The Department of Agriculture and Food Western Australia (DAFWA) proposes to extend the SBF to protect the more-recently developed land east of Ravensthorpe from major emu migration events and wild dogs. A scoping study was conducted in 2012 to identify project constraints associated with several potential fence alignment options. Subsequently a preferred alignment has been developed. The proposed Esperance extension will be between 606 km to 622 km in length, depending on the final option selected; the final option for a single section southeast of Pyramid Lake was not determined prior to the commencement of the surveys. The majority of the proposed Esperance extension occurs on the boundary between agricultural land and Unallocated Crown Land (UCL) broadly extending from east of Ravensthorpe, north around the Salmon Gums region and terminating east of Esperance at Cape Arid National Park (NP).

The construction of the Esperance extension will require the clearing of native vegetation within a 20 m wide easement. Ecoscape was commissioned by the DAFWA to undertake a range of biological surveys of its proposed SBF Esperance extension including flora, fauna and dieback assessments. These assessments are intended to inform several potential environmental assessments and may include referral to the Western Australian Environmental Protection Authority (EPA), referral to the Commonwealth Department of the Environment (DoE) and application to the Western Australian Department of Environmental Regulation (DER) for the purpose of obtaining a native vegetation clearing permit.

1.2 STUDY AREA

The survey corridor (study area) occurs within the Shires of Ravensthorpe and Esperance. It consists of a 100 m wide easement following the SBF proposed alignment (640 km including one optional section), totalling 6 340 ha (**Map 1**). Approximately 3 km of this corresponds with the intersections of drainage lines (Oldfield, Young and Lort rivers) and has been excluded from the study area. As a reference point to describe locations, the study area has been marked with straight line kilometre (SLK) values (SLK 0 to SLK 640).

Much of the study area is located within an area of vegetation maintained as a low fuel modified buffer between the uncleared UCL and agricultural land. This low fuel buffer strip varies in width, generally being 50-80 m wide (in addition to the access track/s). The low fuel buffer is scrub-rolled at approximately 10 year intervals, with the knocked-down vegetation burnt within a year. In many areas there is a second access track between the low fuel buffer and uncleared vegetation, although this track is maintained less frequently than the main track adjacent to the agricultural lands (GHD Pty Ltd [GHD] 2012).

Most of the study area is adjacent to agricultural land and follows existing tracks, roads and low fuel buffer area (with associated tracks) with the exception of a number of sections totalling approximately 66 km in linear length. These sections were: SLK 94 to SLK 98, SLK 180 to SLK 184, SLK 225 to SLK 231, SLK 236 to SLK 244, SLK 281 to SLK 286, SLK 294 to SLK 304, SLK 403 to SLK 420, SLK 424 to SLK 435 and SLK 440 to SLK 442.

1.3 PROJECT OBJECTIVES

1.3.1 Vegetation and Flora

The objectives of the vegetation and flora assessments were to:

- undertake targeted flora surveys to identify and map the extent of conservation significant flora (Threatened and Priority Flora) intersected by the study area
- identify the presence and extent of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) potentially influenced by the alignment
- conduct assessments at Level 2 covering sections of the study area that are adjacent to conservation estate (including seven Nature Reserves and one National Park)
- record representative data of all vegetation types that intersect the alignment.

The assessments were undertaken in accordance with EPA *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia* (2004a).

1.3.2 Fauna and Fauna Habitat

The objectives of the fauna assessment were to identify the different fauna habitats within the study area and determine the necessity for any subsequent targeted surveys for conservation significant species. To achieve this a Level 1 fauna survey was undertaken in accordance with EPA *Guidance Statement No.56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (2004b) and *Technical Guide: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA & Department of Environment & Conservation [DEC] 2010). Results of prior desktop studies and surveys relating to fauna and habitat of the study area were reviewed for completeness and relevance.

1.3.3 *Phytophthora* Dieback

Dieback, or Jarrah Dieback, is a colloquial term for the vegetation condition deterioration (disease) caused by the presence of *Phytophthora cinnamomi*.

P. cinnamomi is an introduced soil-borne pathogen (water mould) that causes the death of a vast and diverse range of plant species in the southwest of Western Australia. The pathogen enters through the plant roots, gradually breaking down their structure and ultimately causing them to 'rot'. As a result of this 'root rot', the vascular system (xylem and phloem) in the root region of the plant is destroyed, eliminating the plant's ability to transport water and nutrients and ultimately causing its death.

The objectives of the dieback assessment were to:

- review the flora data generated from the on-ground field survey to further review the interpretability of vegetation occurring within the potentially susceptible areas of the proposed alignment
- undertake a field survey to delineate and map dieback within the study area.

The *Phytophthora* dieback survey was conducted to comply with:

- O'Gara *et al.* (2005) *Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia. Part 1 - A Review of Current Management*
- Department of Conservation and Land Management (CALM 2003) *Phytophthora cinnamomi and the disease caused by it. Volume II - Interpreter Guidelines for Detection, Diagnosis and Mapping.*

The dieback assessment was conducted in 2014 by Glevan Consulting utilising the results of the vegetation and flora assessments. It is presented in a separate report (Gleven 2015).

1.4 LEGISLATION AND POLICIES

This assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*
- Western Australian *Environmental Protection Act 1986*
- Western Australian *Wildlife Conservation (WC) Act 1950*
- Western Australian *Biosecurity and Agriculture Management Act (BAM) Act 2007*
- Department of Environment Water Heritage and the Arts (2009) *Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999.*

In addition to those listed above, the assessment complied with the Office of the Environmental Protection Authority (OEPSA) requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA (2000) *Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia*
- EPA (2002) *Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection*
- EPA (2004c) *Position Statement No. 7: Principles of Environmental Protection*
- EPA (2008) *Guidance Statement No. 33: Environmental Guidance for Planning and Development*
- EPA (2004a) *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia*
- EPA (2003) *Guidance Statement No. 55: Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process*
- EPA (2004b) *Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia*
- EPA and Department of Environment and Conservation (EPA & DEC 2010) *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment.*

1.4.1 Planning Approval

Planning documents that may need consideration before clearing is commenced include:

- Western Australian *Planning and Development Act 2005*
- Western Australian Planning Commission (WAPC) & Department of Planning (DoP) (2012) *State Planning Policy 2.5. Land use planning in rural areas*
- WAPC & DoP (2013) *State Planning Policy No. 2.6. State Coastal Planning Policy*
- DoP (2010) *Shire of Esperance Town Planning Scheme No. 23*
- DoP (2012) *Shire of Ravensthorpe Town Planning Scheme No. 5 (Updated to include Amd 23 gg 7/12/12).*

1.5 PERMITS

The State Barrier Fence Biological Survey was conducted under the following permits:

- Department of Parks and Wildlife (DPaW) Regulation 4 Authority permit CE004257 (permit to take flora for scientific purposes within CALM lands)
- Department of Lands Occupational Licence 01088-2009_A3672192 (licence for flora and fauna studies).

1.6 PREVIOUS SURVEYS

The study area was included in a scoping study by GHD during 2012. Much of the desktop assessment is included in the GHD report (GHD 2012). Other than this, there are very few publicly available reports relating to the flora and fauna of any section of the study area.

Other publicly available surveys from nearby include:

- Craig *et al.* (2008) *Vegetation of the Ravensthorpe Range, Western Australia: Mt Short to Kundip 1:10 000 scale*
- Biota Environmental Sciences (2000) *Ravensthorpe Nickel Project Fauna Survey 2000*
- Kern *et al.* (2008) *Floristic survey of the Ravensthorpe Range*
- Markey *et al.* (2012) *Floristic Communities of the Ravensthorpe Range*

2.0 EXISTING ENVIRONMENT

2.1 PHYSICAL ENVIRONMENT

2.1.1 Climate

The southwestern portion of Western Australia is considered to have a Mediterranean-type climate that exhibits cool, wet winters and hot, dry summers (Davis *et al.* 1996). According to the Köppen-Geiger climate classification, the study area is located on the boundary of an area considered to have dry summer subtropical climate (Csb) that is also known as temperate Mediterranean-type climate (Peel *et al.* 2007), with at least three times as much rain in the wettest month of winter as the driest month of summer (Sustainable Development Department & Food and Agricultural Organisation of the United Nations 1999), and cold semi-arid climate (Bsk) (Peel *et al.* 2007), arid regions where annual evapotranspiration exceeds annual precipitation (Sustainable Development Department & Food and Agricultural Organisation of the United Nations 1999).

A number of Bureau of Meteorology (BoM) stations are located close to the western and central sections of the study area; however none are located near the eastern portion. Mean rainfall and temperature data for three sites (Ravensthorpe, representing the western portion of the study area (BoM 2014c), Salmon Gums, representing the northern central portion (BoM 2014d) and Esperance Aero, representing the eastern portion (BoM 2014b)) are presented in **Figure 1 – Figure 3**. A summary of this data is presented in **Table 1**, and indicates a more mild climate closer to the coast (i.e. Esperance Aero, approximately 19 km from the coast, has cooler summer temperatures and warmer winter temperatures) than inland (Ravensthorpe is approximately 38 km from the coast and Salmon Gums approximately 98 km from the coast). **Table 1** also indicates there is higher rainfall closer to the coast but also more summer/winter seasonality (i.e. Esperance Aero experiences 59% of its annual rainfall in the May-September period compared with 49.6% of Salmon Gum’s rainfall falling in this period).

Table 1: Summary of temperature and rainfall data for Ravensthorpe (BoM 2014c), Salmon Gums (BoM 2014d) and Esperance Aero (BoM 2014b)

BOM STATION	HOTTEST MONTH	COLDEST MONTH	DRIEST MONTH	WETTEST MONTH RAINFALL (MM)	MEAN TOTAL RAINFALL (MM)	MAY-SEP (WET SEASON) RAINFALL (MM)	PROPORTION OF RAINFALL IN WET SEASON MONTHS (%)
Ravensthorpe	29.0° (Jan)	6.7° (Jul/Aug)	23.5° (Dec)	47.3 (Jul)	427.4	221.4	51.80
Salmon Gums	30.6° (Jan)	4.6° (Jul/Aug)	20.1° (Dec)	38 (Jun)	351.2	174.2	49.60
Esperance Aero	27.7° (Jan)	7.5° (Jul)	20.4° (Dec)	78.9 (Jul)	570.8	338.6	59.32

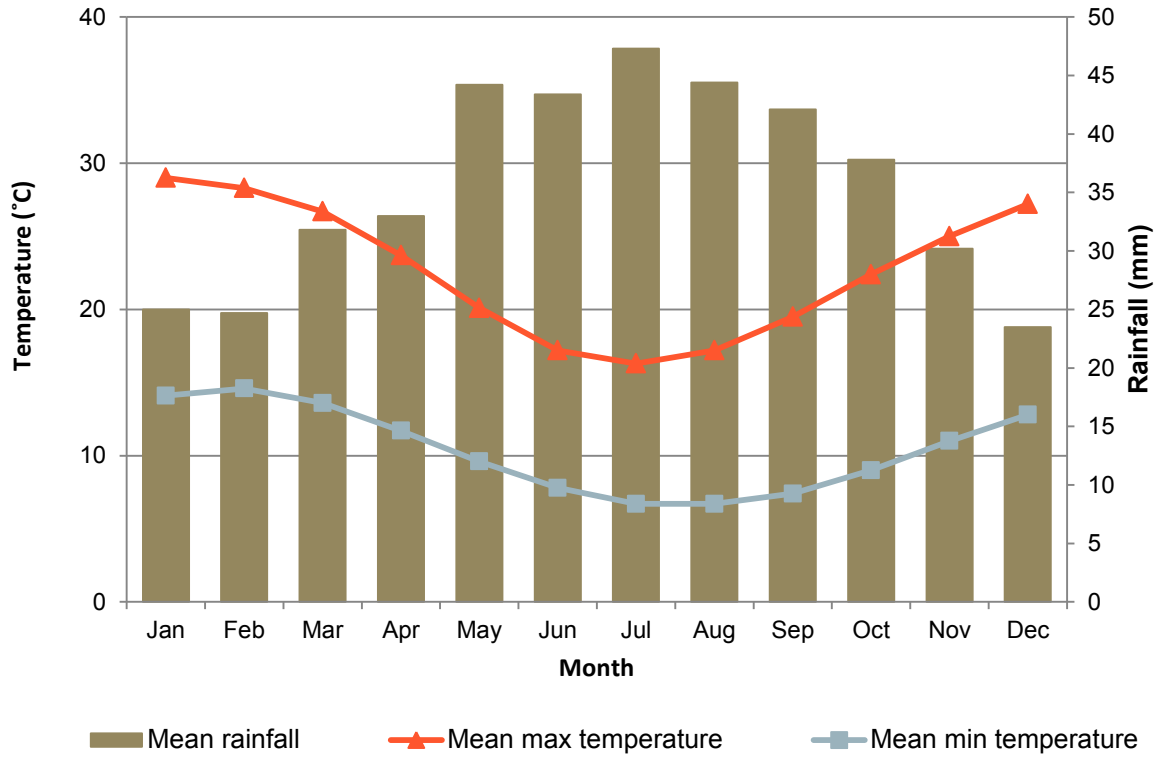


Figure 1: Ravensthorpe (BoM station 010633; active 1901-2013) (BoM 2014c)

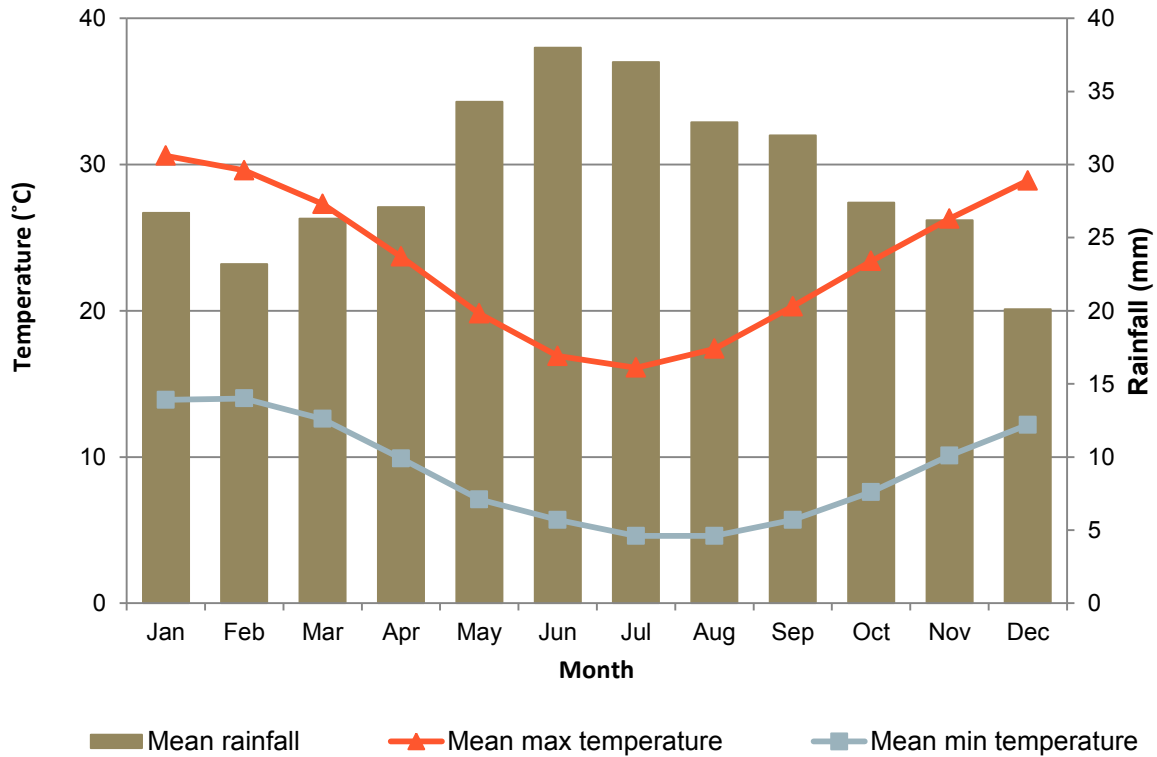


Figure 2: Salmon Gums Research Station (BoM station 012071; active 1932-2013) (BoM 2014d)

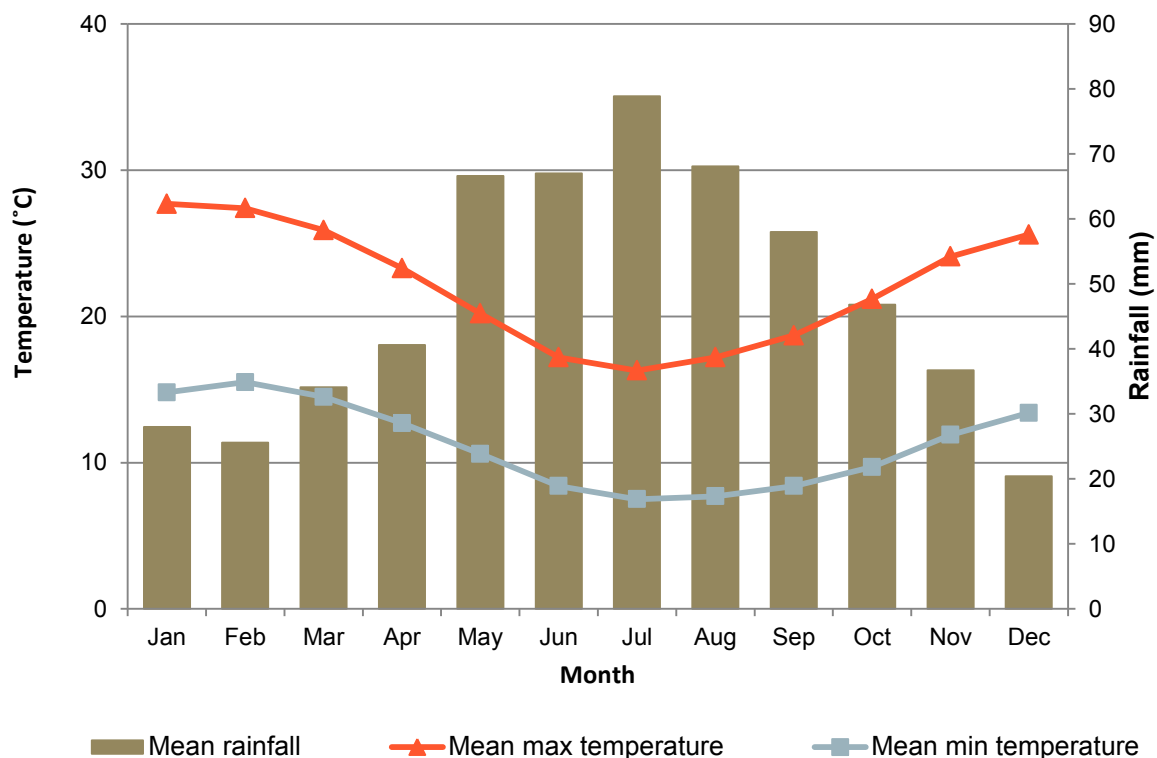


Figure 3: Esperance Aero (BoM station 009542; active 1950-2013) (BoM 2014b)

2.1.2 Geology

Broad scale mapping of geology has been compiled and published by the Department of Mines and Petroleum (DMP 2006). **Table 2** shows the geology units that occur within the study area.

Table 2: DMP 1:500,000 geology units occurring within the study area

UNIT	DESCRIPTION	EXTENT IN STUDY AREA (HA)	PROPORTION OF STUDY AREA (%)
P_-_re-mg	RECHERCHE GRANITE: Moderately to strongly deformed and recrystallized granite; heterogeneous; even grained or porphyritic	478.64	7.55%
P_-_ep-mg	ESPERANCE GRANITE: Weakly to moderately deformed and recrystallized granite; even grained or porphyritic	1524.34	24.04%
P_-_da-mgn	DALYUP GNEISS: granitic augen gneiss and granitic gneiss	1048.39	16.54%
A-g-Y	Granitic rocks, undivided; metamorphosed	2331.82	36.78%
P_-_cm-mgn	CORAMUP GNEISS: Granitic gneiss; heterogeneous; mainly derived from Recherche Granite; deformed with orthogneiss (c. 1700-1600 Ma) and paragneiss; including quartzite (?c. 1550 Ma)	258.11	4.07%
A-b-YSC	Metamorphosed mafic rock dominant	9.97	0.16%
A-mgss-YKA	Foliated granitic rock; locally gneissic; includes amphibolite lenses	82.83	1.31%
A-mgss-YSC	Granite and granodiorite; moderately to strongly-deformed	605.47	9.55%
Total		6339.59	100.00%

2.1.3 Soil Subsystems

Soil landscape mapping produced by DAFWA (2012b) determined that the study area contains the 31 soil subsystems outlined in **Table 27** in **Appendix Two**. The DAFWA (2012b) Soil-landscape spatial dataset does not extend to the far eastern north-south portion of the study area (Cape Arid NP, 0.35% of the study area).

2.1.4 Hydrology

The Oldfield River (southwest of Cheadanup Nature Reserve (NR)), Young River (northeast of Cheadanup NR) and Lort River (west of Field Road) are the most significant drainage lines that intersect the overall study area; however these correspond with 'gaps' in the study area at these crossings and it is understood the fence will not directly impact any of these drainage lines. There are also several unnamed, minor, ephemeral or seasonally inundated drainage lines that intersect the study area that the proposed fence will cross.

The *EPBC Act Protected Matters* search (**Appendix Three**, Australian Government & DoE 2013b) identified the study area to be upstream from the Lake Gore and Lake Warden System RAMSAR wetlands. Both are close to the coast near Esperance and 65 km and 50 km (respectively) from the nearest point of the study area. There are no significant drainage lines that discharge from the study area into either of these RAMSAR wetlands. Oldfield River discharges into Oldfield Estuary whilst Young and Lort River discharge into Stokes Inlet (west of Lake Gore).

The study area intersects extensive areas containing salt lake systems, particularly in the central portion. These lakes are periodically inundated and remain dry for most of the year. The only named lakes that intersect the study area are Pyramid Lake (northwest of the locality of Cascade) and Exclamation Lake (northwest of Salmon Gums). Whilst the study area occurs within a region of extensive salt lakes, there are few that actually intersect the study area. The majority of lakes that do extend into the study area do not span the entire 100 m width and are likely to be avoided by the fence construction.

2.1.5 Regional Context

2.1.5.1 Environmentally Sensitive Areas

According to the Environmentally Sensitive Areas (ESA) mapping for the state, viewable on Landgate's (2012) online *WA Atlas*, the following ESAs were recorded within 500 m of the study area:

- Cape Arid NP
- three Threatened Flora locations (two corresponding with *Conostylis lepidospermoides* and one with *Eucalyptus merrickiae*)

2.1.5.2 Land Use and Tenure

The majority of the study area occurs within UCL adjacent to agricultural land. The study area is located adjacent to seven Nature Reserves and one NP (**Table 3**). Whilst the boundary of the study area extends within the boundary of some of these reserves, DAFWA has indicated that clearing is unlikely to extend into them.

Table 3: Conservation estate within 100 m of the study area

NAME	RESERVE NUMBER	CATEGORY	CLASS	IUCN	APPROX. SLK LOCATION
Cheadanup NR	R31754	Nature Reserve	A	1a	SLK 26 – SLK 30
Unnamed	R35659	Nature Reserve	C	1a	SLK 119– SLK 122
Lake Gilmour NR	R42943	Nature Reserve	A	1a	SLK 260 – SLK 270
Salmon Gums NR	R33113	Nature Reserve	A	1a	SLK 320 – SLK 326
Mt Ney NR	R32782	Nature Reserve	A	1a	SLK 447 – SLK 455
Beaumont NR	R32783	Nature Reserve	A	1a	SLK 474 – SLK 486
Clyde Hill NR	R38545	Nature Reserve	A	1a	SLK 517 – SLK 521
Cape Arid NP	R24047	National Park	A	2	SLK 637 – SLK 640

2.2 BIOLOGICAL ENVIRONMENT

2.2.1 Bioregional Context

The study area is largely within the Eastern Mallee subregion of the Mallee Interim Biogeographical Regionalisation for Australia (IBRA) region (Commonwealth of Australia 2012). A small portion at the western end of the study area corresponds with the Western Mallee subregion of the Mallee IBRA region and the Fitzgerald subregion of the Esperance Plains IBRA region. A small portion at the eastern end corresponds with the Recherche subregion of the Esperance Plains IBRA region. These IBRA regions and subregions are detailed below.

The description of the Mallee IBRA bioregion (Comer *et al.* 2002) is:

The Mallee bioregion is the south-eastern part of Yilgarn Craton is gently undulating, with partially occluded drainage. Mainly mallee over myrtaceous-proteaceous heaths on duplex (sand over clay) soils. Melaleuca shrublands characterise alluvia, and Halosarcia low shrublands occur on saline alluvium. A mosaic of mixed eucalypt woodlands and mallee occur on calcareous earth plains and sandplains overlying Eocene limestone strata in the east.

The Eastern Mallee MAL1 (Comer *et al.* 2002) and Western Mallee MAL2 (Beecham & Danks 2001) IBRA subregions of the Mallee bioregion are described respectively as:

The Eastern Mallee subregion comprises calcareous clays and loams as duplex soils that often contain sheet and modular kankar, outcrops of metamorphosed sandstone, and white and yellow sandplains and loamy plains with numerous saltpans (pan fields). Mallee on sandplains, samphire around small salt lakes, mallee and patches of woodland on clay, and scrub-heath on sandstone. Mallee with Boree (Melaleuca pauperiflora) on calcareous clay and loam. Climate is semi-arid (Dry) Warm Mediterranean and has 300-500 mm of annual rainfall during winter.

Western Mallee (MAL2) subregion has more relief than its eastern counterpart: main surface-types comprise clays and silts underlain by kankar, exposed granite, sandplains and laterite pavements. Salt lake systems on a granite basement. Occluded drainage system. Mallee communities occur on a variety of surfaces; Eucalyptus woodlands occur mainly on fine-textured soils, with scrub-heath on sands and laterite. The climate is warm Mediterranean and annual rainfall is 250-500 mm. Total area of the subregion is 4 763 963 ha.

The Esperance Plains IBRA bioregion is described in Comer *et al.* (2001a) as:

...characterised by proteaceous 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 plain. Eucalypt woodlands occur in gullies and alluvial foot-slopes.

The Fitzgerald ESP1 (Comer *et al.* 2001b) and Recherche ESP2 (Comer *et al.* 2001a) IBRA subregions of the Esperance Plains bioregion are described respectively as:

The ESP1 subregion has variable relief, comprising subdued relief on the sandplains of the coastal region, punctuated with metamorphosed granite and quartzite ranges both inland and on the coastal plain. It lies mainly on the Bremer Sedimentary Basin and the eastern and western sections of the ESP1 subregion within the Albany-Fraser Orogen of the Yilgarn Craton. It has extensive western plains over Eocene marine sediment basement with small areas of Gneiss outcropping. Archaean greenstones – sand sheets with varying levels of lateritisation with gravel soils also occurs. The region is dominated by duplex soils and deep and shallow sands on the plains and dissected areas and by shallow sandy soils on the mountain ranges.

ESP2 subregion has variable relief, comprising the Quaternary coastal sandplains and dunes overlying Proterozoic gneiss and granite as well as Eocene and more recent coastal limestones. Numerous granitic islands occur in the near shore area of this subregion. Vegetation comprises heath, coastal dune scrub, mallee, mallee-heath and granite heath. Vegetation types are diverse. The climate is Temperate Mediterranean, with 400-700 mm annual rainfall and total area is 1 606 517 ha.

2.2.2 Vegetation

2.2.2.1 Pre-European Vegetation

There are 20 broad pre-European Vegetation Associations, based on Shepherd *et al.* (2002), which occur within the study area (**Table 28** in **Appendix Two**). There is a presumption against clearing vegetation associations with less than 30% pre-European extent remaining (EPA 2000; 2008). Vegetation associations with 10-30% of their pre-European extent are indicated by orange shading in **Table 28**. Vegetation associations with less than 10% of their pre-European extent remaining are regarded by the EPA as representing endangered; there were none identified within the study area (EPA 2000).

Three vegetation associations have 10-30% of their pre-European extent remaining at various scales:

- vegetation association 512 (Shrublands; mallee scrub, *Eucalyptus eremophila* & Forrest's marlock (*E. forrestiana*) has 10-30% of its pre-European extent remaining within Western Australia, the Mallee IBRA region, the Eastern Mallee (MAL1) IBRA subregion and Shire of Esperance. Several occurrences of this vegetation association have been mapped between SLK 29 and SLK 131 (Shepherd *et al.* 2002).
- vegetation association 4801 (Shrublands; heath with scattered *Nuytsia floribunda* on sandplain) has 10-30% of its pre-European extent remaining within Western Australia, the Esperance Plains IBRA region, the Recherche (ESP2) IBRA subregion and Shire of Esperance. A single occurrence of this vegetation association has been mapped between SLK 607 and SLK 609 (Shepherd *et al.* 2002).
- vegetation association 47 (Shrublands; tallerack mallee-heath) has 10-30% of its pre-European extent remaining within the Shire of Esperance, but more than 30% remaining at other scales.

2.2.2.2 Great Western Woodlands

The Great Western Woodlands is the largest remaining area of intact Mediterranean-climate woodland on Earth, occupying almost 16 million ha from the edge of the Western Australian Wheatbelt to Kalgoorlie-Boulder in the north, the edge of the inland deserts to the northeast and Nullarbor Plain to the east.

Approximately 20 per cent of Australia's known flora species and a significant portion of Australia's fauna species occur within these woodlands (DEC 2010a).

The DPaW has developed a strategy to protect the biodiversity, cultural values and economic and social benefits of the Great Western Woodlands (DEC 2010a).

The study area largely corresponds with the southern edge of the Great Western Woodlands.

2.2.2.3 Threatened and Priority Ecological Communities

Ecological communities are naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide 'ecological services' (DEC 2013).

Threatened Ecological Communities (TECs) are categorised at both State (DEC 2010b) and Commonwealth level (under the *EPBC Act 1999*), while Priority Ecological Communities (PECs) are categorised at State level only. Definitions of the Commonwealth and Western Australian ratings are summarised in **Table 20** and **Table 21** in **Appendix One**.

Database Search Results

Database searches were conducted as part of the scoping study (GHD 2012). From this study, the *EPBC Act Protected Matters* search indicated that no Commonwealth-listed TECs were known to occur within or near the study area. One State-listed TEC (*Russell Range mixed thicket complexes*) was identified to occur approximately 18 km from the GHD study area. Ten PECs were identified from within the GHD search area; however none were identified as occurring within the study area based on their known distribution.

The DPaW Ecological Communities database search does not identify other significant vegetation described in *Guidance Statement No. 51* (EPA 2004a), including scarce vegetation types, communities including unusual species or a novel combination of species, vegetation acting as a refuge or key habitat for threatened species, vegetation representative of a range of a unit, or vegetation having a restricted distribution.

Scoping Field Survey Results

The scoping study assessed numerous alignment options with the objective of identifying the best option in regards to their potential to provide optimum vermin control and minimal environmental and social impact. Therefore, it assessed substantial additional sections of potential alignment that have not been included for survey in the present study, which mostly addresses the single preferred option.

The scoping field survey (GHD 2012) did not identify any TECs or PECs within the GHD survey area. This study conducted a review of potential PECs within the study area which identified five PECs that could potentially occur.

Review of TEC and PEC lists

Prior to undertaking field surveys, Ecoscape reviewed the current Commonwealth (Australian Government & DoE 2013a) and State TEC and PEC (DEC Species & Communities Branch 2013; DPaW Species & Communities Branch 2013) lists to identify any additional communities that may have been added. There were no new additions to these lists from nearby.

In January 2014 a community described as 'Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia' was endorsed by the Commonwealth Minister for the Environment for inclusion on the *EPBC* list of TECs as Endangered. The indicative mapping shows that this

TEC has the potential to occur within the study area. Due to the recent listing of this community, it was not specifically targeted for field survey in 2013. Follow up surveys in 2014 were designed to clarify the presence/extent of this TEC.

2.2.3 Flora

2.2.3.1 Conservation Significant Flora

For the purposes of this report, conservation significant flora species are those that are listed by DPaW as Threatened Flora (TF) and Priority Flora (PF). Flora species are classified as TF or listed as PF where populations are geographically restricted or threatened by local processes.

TF species (previously known in Western Australia as Declared Rare Flora) are listed by DPaW and are protected under the Western Australian *WC Act 1950*. Rare flora species, as they are termed in the *WC Act*, are gazetted under Sub-section 2 of Section 23F, thereby making it an offence to remove or damage rare flora without Ministerial approval.

Some TF species have additional legislative protection by being listed under the Commonwealth *EPBC Act 1999*.

Definitions of the Commonwealth (DoE) categories are provided in **Table 22** in **Appendix One**.

There are seven categories covering State-listed TF and PF species (DPaW 2014), which are outlined in **Table 23** in **Appendix One**. PF for Western Australia are regularly reviewed by the DPaW whenever new information becomes available, with species status altered or removed from the list when data indicates that they no longer meet the requirements outlined in **Table 23**.

Scoping Study Results

The scoping study assessed numerous alignment options with the objective of identifying the best option in regards to their potential to provide optimum vermin control and minimal environmental and social impact. Therefore, it assessed substantial additional sections of potential alignment that have not been included for survey in the present study, which mostly addresses the single preferred option. Database searches were conducted as part of the scoping study by GHD (2012). The combined database searches for the scoping study identified 14 TF and 145 PF from within a 20 km buffer of the GHD study area, with 61 taxa identified as occurring within 1 km of the 2012 alignment.

There were 42 conservation significant flora taxa identified by the scoping study that were not identified by the updated searches conducted in 2013 (outlined below). These taxa either fell outside of the updated search buffer area or are no longer listed as conservation significant. They included the following taxa:

Acacia ancistrophylla var. *perarcuata* (P3), *A. dorsenna* (P1), *A. empelioclada* (no longer listed), *Allocasuarina eriochlamys* subsp. *grossa* (P3), *A. globosa* (TF), *Andersonia carinata* (P2), *Atriplex lindleyi* subsp. *conduplicata* (P3), *Austrostipa pycnostachya* (no longer listed), *Beyeria sulcata* var. *truncata* (P3), *Banksia prolata* subsp. *prolata* (P3), *Boronia scabra* subsp. *attenuata* (P3), *Bossiaea arcuata* (P1), *B. aurantiaca* (P1), *Caesia viscida* (P2), *Caladenia cristata* (P1), *Darwinia* sp. Mt Ragged (S. Barrett 663) (P2), *Daviesia microcarpa* (TF), *Dicrastylis capitellata* (P1), *Dillwynia acerosa* (no longer listed), *Eremophila purpurascens* (P3), *Eucalyptus balanopelex* (no longer a recognised species; considered a hybrid), *E. brockwayi* (P3), *E. jimberlanica* (P1), *E. ligulata* subsp. *ligulata* (P4), *E. platydisca* (TF), *E. pterocarpa* (P4), *E. sweetmaniana* (P2), *E. goniantha* subsp. *goniantha* (no longer listed), *Goodenia quadrilocularis* (P2), *Grevillea phillipsiana* (P1), *Hakea tuberculata* (no longer listed), *Lasiopetalum maxwellii* (P2), *L. parvuliflorum* (P3), *Leucopogon compactus* (P4), *L. interruptus* (P3), *L. multiflorus* (P2), *Melaleuca coccinea* (P3), *M. incana* subsp. *tenella* (no longer listed), *Micromyrtus papillosa* (P1), *Myoporum velutinum* (TF), *Myriophyllum* sp. Mt Arid (L.S.J. Sweetman 6767) (P2) and *Xanthosia collina* (P3).

The scoping study field survey identified 11 conservation significant flora species from within the 2012 study area, although several of these were not confirmed identifications (listed with 'cf.' included in the name). One of these unconfirmed identifications (*Allocasuarina* cf. *globosa*) is a TF species that was not identified as occurring nearby or likely to occur within the study area by any of the database searches. The location of *Hibbertia hamata* (P3) recorded during the scoping study is a significant distance from the current study area boundary.

Database Search Results

An updated search of the Commonwealth DoE online databases (*Protected Matters Search Tool* (PMST; Australian Government & DoE 2013b) and *Species Profile and Threats Database* (DoE 2014b)) was conducted to identify threatened flora with Commonwealth protection nearby. The 2013 PMST results, using a 20 km buffer around the study area, identified 24 TF (**Appendix Three**). Fifteen of these were not identified by the other database searches, however the PMST search also identifies species for which the habitat is known or may occur within the search area, as well as known records. Two species with a Commonwealth listing of TF are no longer listed as such by DPaw; both *Centrolepis caespitosa* and *Marianthus mollis* now have DPaw P4 status.

DPaw Threatened Flora database searches identify TF and PF from validated populations of TF and some PF from the Threatened Flora Database and specimens in the Western Australian Herbarium (WAH). An updated DPaw database search, conducted during 2013 (DPaw search reference 48-1013FL), identified 147 conservation significant flora taxa from within 10 km of the study area. Fifteen TF were identified by this database search, along with 30 Priority 1 (P1) taxa, 28 P2 taxa, 49 P3 taxa and 25 P4 taxa.

The DPaw Threatened Flora database search does not identify other significant flora species, described in *Guidance Statement No. 51* (EPA 2004a) as including keystone or relictual species, those having anomalous features, range extremities, range extensions, population outliers, restricted subtaxa and hybrids, local endemics or poorly reserved species.

NatureMap (DPaw 2007-2014) was reviewed to identify conservation significant flora species that have been recorded from within and near the study area using a simplified version of the study area and including a 10 km buffer (**Figure 4**). The *NatureMap* search, conducted in January 2014, identified 125 conservation significant flora taxa, 120 of which had been identified by other searches.

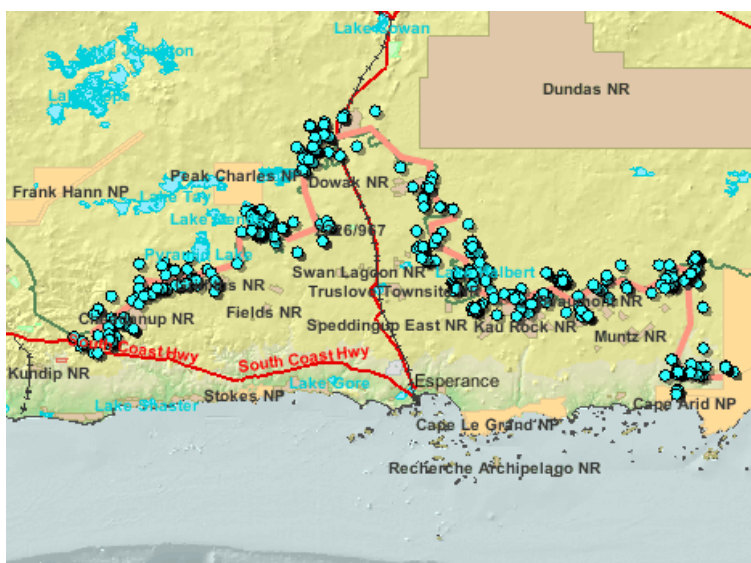


Figure 4: *NatureMap* (DPaw 2007-2014) search area

The combined updated database search results are included in **Table 29** in **Appendix Four**, and totalled 166 conservation significant vascular flora taxa. These consisted of 29 DPaW-listed TF, 30 P1, 28 P2, 51 P3 and 28 P4-listed taxa.

2.2.3.2 Introduced Flora

The Western Australian Organism List (WAOL; Department of Agriculture and Food Western Australia [DAFWA] 2014c) details organisms listed as Declared Pests under the *Biosecurity and Agriculture Management (BAM) Act 2007* that replaces the *Agriculture and Related Resources Protection (ARRP) Act 1976*. Under the *BAM Act 2007*, Declared Pests are listed as one of three categories:

- C1 (exclusion), that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment:
- C2 (eradication), that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- C3 (management), that applies to established pests where it is not feasible or desirable to manage them in order to limit their damage.

Some of the more invasive introduced species are also included in a number of other weed lists maintained by DoE and Weeds Australia, including Weeds of National Significance (WONS, Weeds Australia 2012b), the National Environmental Alert List (DoE 2012a), Sleeper Weeds (DoE 2012b), Species Targeted for Eradication (DoE 2014c) and Target Species for Biological Control (Weeds Australia 2012a).

Introduced species have also been ranked by a number of attributes, including ecological impact, invasiveness and feasibility of control, in the various DEC/DPaW regions (DEC 2011b).

Plants are regarded as introduced if they are listed as 'alien' on *FloraBase* (WAH 1998-2014). *FloraBase* lists 239 introduced species as having been collected within the Mallee bioregion, 309 within the Esperance Plain bioregion and 227 within the Shire of Esperance.

The *NatureMap* (DPaW 2007-2014) search identified 36 species of weeds within the study area or nearby, using the same search area as shown in **Figure 4**. None of the species identified by the *NatureMap* search (**Table 4**) are listed as Declared Pests (DAFWA 2014c).

The *PMST* search (Australian Government & DoE 2013b), using a 20 km buffer around the study area (**Appendix Three**), identified five introduced plant species that have habitat that is likely to occur within the search area (**Asparagus asparagoides*, **Carrichtera annua*, **Lycium ferocissimum*, **Opuntia* spp. and **Tamarix aphylla*). None of these species were identified as occurring within the *NatureMap* (DPaW 2007-2014) search area (**Figure 4**). **Asparagus asparagoides* was identified during the GHD (2012) scoping study field survey, however the two sites are outside of the current study area (far eastern end of scoping study area).

Table 4: NatureMap (DPaW 2007-2014) introduced species search results

SPECIES	SPECIES	SPECIES
* <i>Aira caryophyllea</i>	* <i>Hordeum glaucum</i>	* <i>Polypogon monspeliensis</i>
* <i>Avellinia michelii</i>	* <i>Hordeum leporinum</i>	* <i>Raphanus raphanistrum</i>
* <i>Brassica tournefortii</i>	* <i>Hornungia procumbens</i>	* <i>Rostraria cristata</i>
* <i>Carpobrotus aequilaterus</i>	* <i>Hypochaeris glabra</i>	* <i>Rostraria pumila</i>
* <i>Cirsium vulgare</i>	* <i>Isolepis marginata</i>	* <i>Salvia verbenaca</i>
* <i>Conyza bonariensis</i>	* <i>Limonium lobatum</i>	* <i>Solanum nigrum</i>
* <i>Crassula natans</i>	* <i>Lolium perenne x rigidum</i>	* <i>Sonchus oleraceus</i>
* <i>Ehrharta calycina</i>	* <i>Lolium rigidum</i>	* <i>Spergularia diandra</i>
* <i>Eragrostis cilianensis</i>	* <i>Medicago truncatula</i>	* <i>Ursinia anthemoides</i>
* <i>Erodium cicutarium</i>	* <i>Parapholis incurva</i>	* <i>Vulpia muralis</i>
* <i>Euphorbia maculata</i>	* <i>Pentameris airoides</i> subsp. <i>airoides</i>	* <i>Vulpia myuros</i>
* <i>Galium murale</i>	* <i>Petrorhagia dubia</i>	* <i>Vulpia myuros</i> forma <i>megalura</i>

2.2.4 Fauna

Information on the fauna assemblage of the project area was drawn from sources including State and Commonwealth government databases, and results of regional studies. Databases were accessed by GHD as part of the preliminary flora and fauna assessment (2012), and included the DPaW's *NatureMap* (which incorporates the Western Australian Museum's (WAM) *FaunaBase* and the DEC Threatened and Priority Fauna Database) and the *EPBC Act Protected Matters Search Tool (PMST)*. Ecoscape also conducted a more recent *EPBC Act Protected Matters Search*.

A new *NatureMap* (DPaW 2007-2014) list was not generated automatically for this report; but the GHD (2012) lists, current *PMST* search, and several other sources (Birdlife Australia 2013; Burbidge *et al.* 2004; DPaW 2013; Simpson & Day 2004; Van Dyck & Strahan 2008) were used to generate a comprehensive list of potentially occurring species, and their distributions inspected individually using the mapping utility on the *NatureMap* site. Conservation status was checked and updated to current (2015) for all species.

2.2.4.1 Conservation Significant Fauna

The combined searches identified one Critically Endangered, four Endangered and six Vulnerable vertebrate fauna species (listed under the *EPBC Act 1999*) potentially occurring in the vicinity of the study area (**Appendix Eight**). There were 47 migratory bird species identified, seven of which are also listed as threatened under the *Wildlife Conservation Act 1950*. In addition to these there were three schedule 4 (Specially Protected), three Priority 1, two Priority 2, three Priority 3, 12 Priority 4 and two Priority 5 vertebrate species listed (definitions in **Appendix One**).

Eleven conservation listed invertebrate species were identified as potentially occurring in the vicinity of the study area, including eight listed as Vulnerable under the *Wildlife Conservation Act 1950* (but not the *EPBC Act 1999*), two Priority 1 and one Priority 3.

3.0 METHODS

3.1 VEGETATION AND FLORA SURVEYS

3.1.1 General Approach

The vegetation and flora surveys were undertaken by teams of two personnel, with the team leader being a senior botanist. Data was recorded on an Apple iPad using a custom-designed database. Vegetation types were hand drawn onto field maps for later digitisation (see **Section 3.1.3**).

In order to facilitate field surveys, in particular searches for conservation significant flora species, the study area was divided into six zones. Additionally, SLK values were assigned along the linear length of the study area at 1 km intervals to provide a convenient reference point, beginning from SLK 0 at the western end and SLK 640 at the eastern end (this total includes the gaps associated with three river crossings).

Both the low fuel buffer area and adjacent undisturbed bushland were surveyed, however an emphasis was placed on areas closest to agricultural boundaries as this was understood to be the most likely area for the fence construction.

In 2013 the entire study area was surveyed with a particular emphasis on targeted searches for conservation significant flora and ecological communities. All vegetation types occurring within the study area were mapped and described. Portions of the study area located adjacent to conservation estate (Nature Reserves and National Parks) were subject to a Level 2 assessment (**Section 3.1.4**). Neither relevés (unbounded flora sample sites to describe the vegetation structure and dominant species) nor quadrats (in the area subject to a Level 2 survey) were permanently marked in any way, nor were any conservation significant flora flagged or otherwise marked. Co-ordinates for all were recorded.

The vegetation and flora surveys are undertaken to be compliant with:

- *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessments in Western Australia* (EPA 2004a)
- *Terrestrial Biological Surveys as an Element of Biodiversity Protection Position Statement No. 3* (EPA 2002).

A second season flora survey was undertaken in 2014 in order to satisfy the following objectives:

- further refining population boundaries for conservation significant species of greatest concern and identifying strategies for minimising impacts
- additional surveys for species considered to have a high likelihood of occurrence that were not recorded during the initial surveys
- rescoring a subset of floristic quadrats established adjacent to DPaW managed land
- re-evaluating areas that have potential to be included in the newly endorsed TEC.

Several dieback hygiene measures were adopted and implemented as part of the field survey. Areas considered susceptible were only accessed by vehicle in dry soil conditions. Vehicles and equipment were cleaned prior to field survey and also at regular intervals during the field survey as appropriate (i.e. after exposure to any wet soil conditions). A dieback cleaning kit (containing a spray bottle with methylated spirits and a stiff brush) was carried in vehicles and used as necessary.

3.1.2 Targeted Conservation Significant Flora Searches

In order to assist with identification in the field, survey teams had access to literature (including images) of conservation significant species identified by the DPaW database search. Known populations were visited, where possible, to familiarise personnel with the species.

The entire study area was searched for conservation significant flora during at least one pass in 2013. It was traversed either on foot (over the majority of the study area including all areas that do not have associated tracks) or by vehicle. Traversing on foot was conducted in a 'meandering' nature between points of flora interest such as conservation significant flora locations.

Where a section of the alignment was traversed by vehicle, it was driven slowly to permit the passenger to search for conservation significant flora species during the traverse. The vehicle was stopped if likely conservation significant flora were observed, where there were previous records of conservation significant flora, where there were specific habitats likely to support conservation significant flora (as identified by the desktop assessment e.g. lake edges, rocky areas, granite-derived soil, hills, slopes in drainage lines, at the interface between land forms) or at regular intervals. Where new populations of conservation significant flora were identified, the search area was 'backtracked' to determine the population extent.

Where a section of the alignment did not have track access or where the available track was unlikely to be where clearing would take place (e.g. in a NR, where the track was away from the more disturbed edge of the reserve where fence positioning is more likely), the area was walked in either a single meandering pass or by two assessors walking separate meandering transects to cover as much of the alignment as possible.

Where likely conservation significant flora were observed, a representative voucher specimen was collected from each population for later identification, a GPS position and number of plants in the vicinity were recorded, and a photograph taken.

Whilst the whole width of the study area corridor was included for assessment, the search for conservation significant flora concentrated on the low fuel buffer area adjacent to the agricultural lands (where the buffer existed), as this was considered the most likely part of the corridor that the barrier fence would be constructed as it has the least impact on native vegetation, based on existing disturbance.

A review of conservation significant flora, conducted following the 2013 field surveys, identified areas and specific species to target for additional survey in 2014. The 2014 spring flora survey therefore targeted various sections scattered across the study area that were considered to have a high likelihood of conservation significant flora that were not identified by the previous surveys.

3.1.3 Vegetation Descriptions and Mapping

Vegetation types were described using representative relevés (unbounded areas) and quadrats (for areas adjacent to Nature Reserves and National Parks), in which the following were recorded:

- MGA coordinates in GDA 94 datum using an Apple iPad, to an accuracy usually within 5 m
- National Vegetation Inventory System (NVIS) vegetation description based on the height and estimated cover of dominant species
- description of landform and habitat
- broad description of surface soil type and stony surface mantle
- percentage of litter cover and depth
- percentage of bare ground
- evidence of clearing (including the low fuel buffer), grazing, weed invasion, frequent fires etc
- a photograph.

A standard vegetation classification and description system was utilised during the vegetation survey. Vegetation was described from each of the relevés and quadrats using the height and estimated cover of up to three dominant and characteristic species of each stratum (upper, mid and ground) at Level V of the NVIS (National Heritage Trust [NHT] 2003), shown in **Table 24** and **Table 25** in **Appendix One**.

Each relevé and quadrat was individually numbered, and vegetation types were described from a composite of the component relevés and quadrats (i.e. those relevés and quadrats that were considered to represent

the same vegetation type). The codes used to describe the vegetation types were derived from the dominant species of each stratum from each vegetation type.

To collect spatial information for the study area, 1:25 000 scale photographic images were marked up in the field with vegetation type boundaries identified using changes in dominant and characteristic species and vegetation structure. These hand-drafted vegetation boundaries were then digitised and attributed in ArcGIS Version 10.2.

3.1.3.1 Vegetation Condition

The vegetation condition was assessed using the Keighery (1994) Bushland Condition Scale (Table 26). Tracks crossing the study area occurred at a scale too small to be assessed separately for vegetation condition.

3.1.4 Level 2 Surveys

Level 2 vegetation and flora surveys were conducted for areas within or adjacent to conservation estates. There are seven Nature Reserves and one National Park adjacent to the study area. Level 2 surveys incorporate background research, a reconnaissance survey (by GHD in 2012) and intensive field assessments. The Level 2 survey was conducted at a higher intensity than the flora and vegetation survey of most of the study area.

Vegetation types in the Level 2 survey area were described using quadrats 10 m x 10 m in dimension, which is the size recommended in the South-west Botanical Province. The data recorded for relevés (**Section 3.1.3**) were also recorded in the quadrats, with the addition of collection of an inventory of all species present within the quadrat, with estimated maximum height and percent foliage cover.

Quadrats were recorded in both the low fuel buffer area (where it occurred in areas adjacent to the conservation estate) and uncleared vegetation (in conservation estate and adjacent to the low fuel buffer area).

The flora survey of the Level 2 area within and adjacent to conservation estates involved collection of a more complete flora inventory in comparison to the rest of the study area, largely from quadrats used to describe the vegetation but also from opportunistic observations and collections, and conservation significant flora searches.

The majority of quadrats were established in 2013. The 2014 spring survey included re-scoring a subset of quadrats and establishing new quadrats in under-represented areas.

3.1.5 Flora Identification and Data Entry

Voucher specimens were collected of all species that could not be identified with confidence in the field. Each voucher specimen was assigned a unique number to facilitate tracking of data, and pressed in the field. Specimens were dried and treated in accordance with the requirements of the WAH.

These voucher specimens were identified by Ecoscape (mostly Stephen Kern) to infrataxa (subspecies, variety, affinity or hybrid) level where possible, using appropriate publications, and comparison with pressed specimens housed at the WAH.

Nomenclature was checked against the current listing of scientific names recognised by the WAH and listed on *FloraBase* (WAH 1998-2014) and updated as necessary.

All raw site data was entered into a Microsoft Access database, with species names entered following formal identification of the collected specimens. Use of the database enables output of the data in formats for display and analysis.

3.1.6 Field Survey Timing and Personnel

The field survey was undertaken between 7 October and 1 December 2013 over six survey periods with a follow up survey conducted in September/October 2014. The personnel undertaking the surveys were:

- 7-17 October 2013; Stephen Kern (Senior Botanist, flora collecting permit SL010338, rare flora collecting permit 54-1314) and Richard Daniel (Botanist, flora collecting permit SL010340)
- 14-24 October 2013; Jared Nelson (Senior Botanist, flora collecting permit SL010330) and Sonya Bateman (Senior Environmental Scientist, flora collecting permit SL010333)
- 17-26 October 2013; Lyn Atkins (Senior Botanist, flora collecting permit SL010339) and Andrew Fry (Environmental Scientist, flora collecting permit SL010337)
- 28 October- 7 November 2013; Stephen Kern and Richard Daniel
- 31 October- 7 November 2013; Jared Nelson and Natalie Randall (Senior Environmental Scientist/Zoologist, flora collecting permit SL010331)
- 22 November- 2 December 2013; Stephen Kern and Sonya Bateman
- 29 September- 10 October 2014; Stephen Kern (SL010878, rare flora collecting permit 100-1415) and Andrew Fry (SL010884).

Sonya Bateman and Natalie Randall concurrently undertook the fauna survey of the study area whilst assisting with the vegetation and flora survey, primarily searches for conservation significant flora species.

Figure 5 (BoM 2014e) indicates that the seasonal conditions for the study area were good, based on the average to above average rainfall for the six months prior to (and including) the survey period in 2013, when the majority of field surveys were undertaken. Approximate locations of points close to the western end (east of Ravensthorpe), northern extremity (north of Salmon Gums) and eastern end (the western edge of Cape Arid NP) are indicated in **Figure 5**. Rainfall data from the nearest BoM stations similarly demonstrate above average rainfall in the six months prior to survey (**Figure 6**, **Figure 7** and **Figure 8**) for both 2013 and 2014.

Western Australian Rainfall Deciles 1 July to 31 December 2013

Distribution Based on Gridded Data
Product of the National Climate Centre

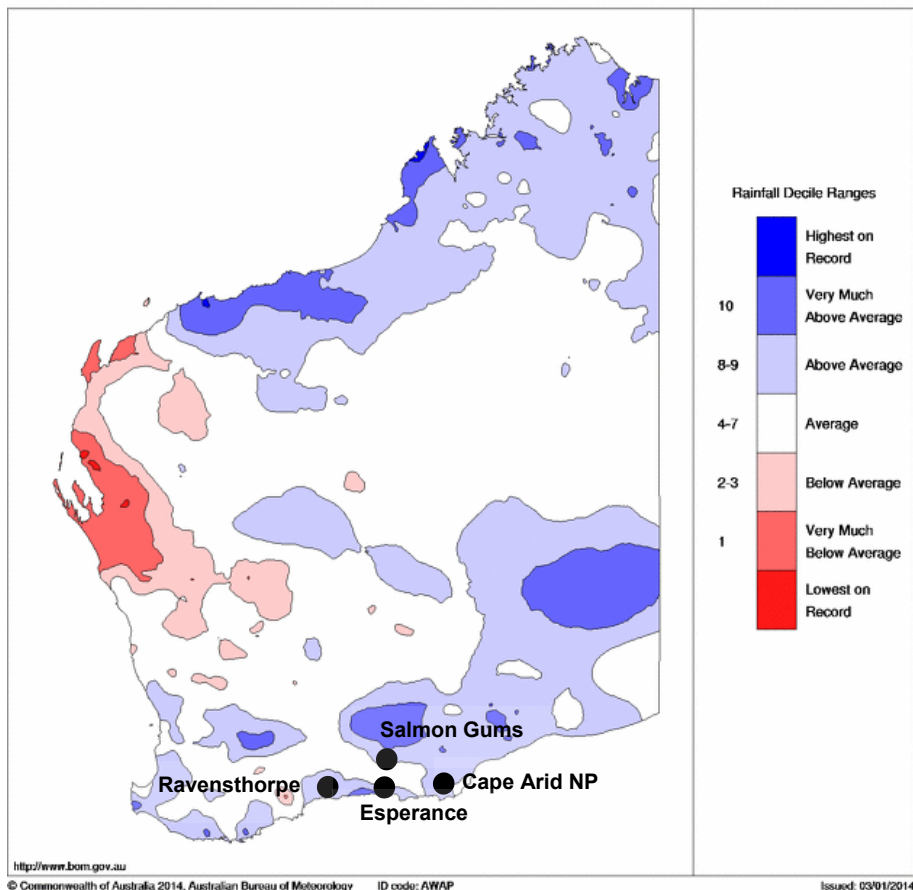


Figure 5: Western Australia rainfall deciles July to December 2013 (BoM 2014e)

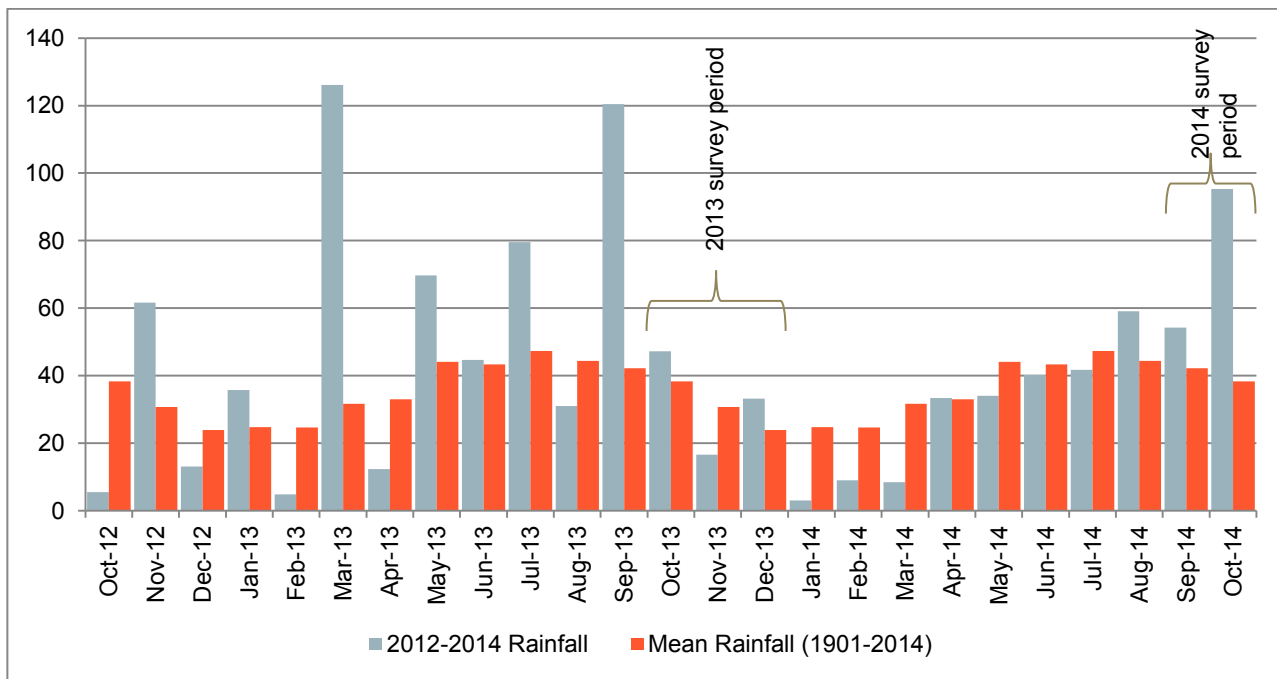


Figure 6: Ravensthorpe BoM station 2012-2014 (BoM 2014c)

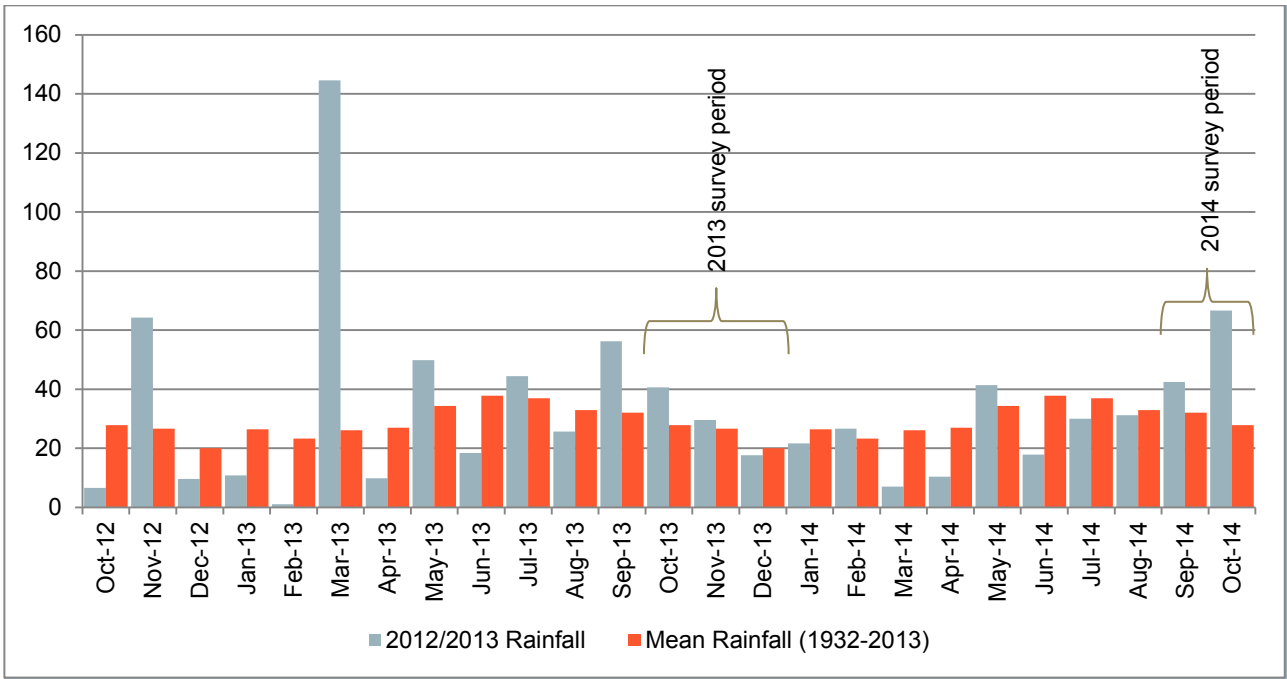


Figure 7: Salmon Gums Research Station BoM station 2012-2014 (BoM 2014d)

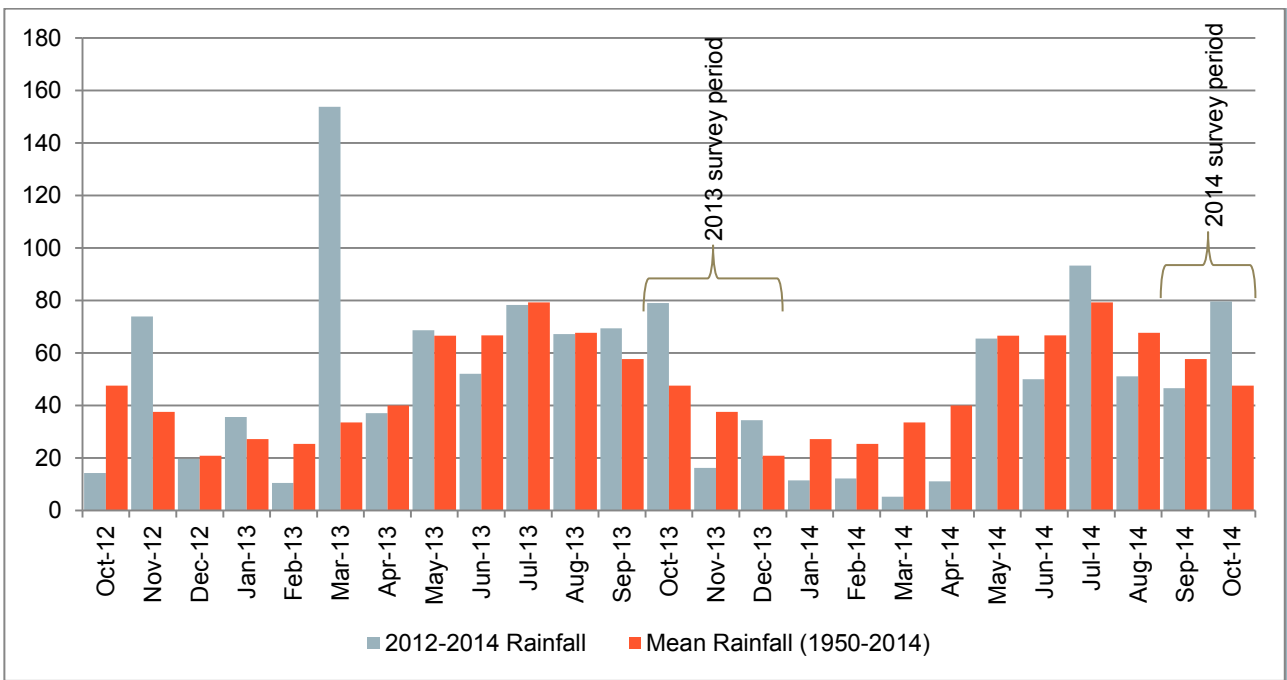


Figure 8: Rainfall data for Esperance Aero BoM station 2012-2014 (BoM 2014b)

3.1.7 Vegetation and Flora Significance

3.1.7.1 Conservation Significant Likelihood Assessment

Whilst searches for conservation significant flora species were undertaken during the field survey, it was not possible to assess all areas at an intensity required to be completely confident that all individual plants were located, nor could the surveys be undertaken at a time when all potential conservation significant species (as identified by the database searches, **Table 29** in **Appendix Four**) were flowering and more likely to be identifiable. Therefore, whilst some species identified by the database searches were recorded during the

survey, some of the remaining potential species listed in this table may also be present within the study area. In order to achieve a better understanding of the likelihood of conservation significant species occurring within the study area, a likelihood assessment of possible taxa was undertaken (**Table 39** in **Appendix Seven**).

The likelihood of a species occurring in the study area is based on the following attributes, as listed on *FloraBase* (WAH 1998-2014) including information from recent nearby surveys. The attributes were:

- broad soil type usually associated with the species
- broad landform usually associated with the species
- usual vegetation (characteristic species or structural type) with which the species is usually associated
- species having previously been recorded from within approximately 20 km of the study area (considered as 'nearby').

The likelihood rating is assigned using the following categories:

- **Known:** it does occur within the study area and was recorded during the field surveys or has recent reliable historical records (i.e. the location details are considered to be accurate and the vegetation condition has not changed significantly since the recording)
- **Possible:** it may occur within the study area (but was not recorded); broadly, 2-4 of the required attributes (but always including records from nearby) are present in the study area
- **Unlikely:** it could occur but is not expected; 1-3 of the required attributes are present in the study area but;
 - it is not known from nearby, or
 - it is known from nearby but has no other required attributes, or
 - it is known from nearby but has at least one well-defined attribute that does not occur in the study area (e.g. it is associated with a specific landform or soil type) or in the study area in the vicinity of the known record that precludes its presence
- **Highly Unlikely:** the species characteristics include none of the required attributes of soil, landform, associated vegetation and having previously been recorded nearby, and as such it almost certainly does not occur within the study area.

3.1.7.2 Other Measures of Vegetation Type Significance (Locally Significant Vegetation Types)

In *Guidance Statement No. 51* (2004a), the EPA lists several reasons why vegetation may be considered to be significant in addition to its listing as a TEC or PEC or because the extent is below a minimum threshold. These reasons, which may apply at a number of scales but are not defined in detail, include:

- scarcity
- unusual species
- novel combinations of species
- role as a refuge
- role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species
- being representative of the range of a unit (particularly a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extension or isolated outliers of the main range)
- restricted distribution.

The above reasons can define locally significant vegetation.

3.2 FAUNA SURVEYS

3.2.1 Field Survey

The fauna assessment methodology was based on a Level 1 assessment as described in the EPA's *Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (2004b) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA & DEC 2010).

The fauna and habitat field surveys were conducted by Sonya Bateman (Senior Environmental Scientist) and Natalie Randall (Senior Environmental Scientist). The field surveys were undertaken between 7 October and 1 December, 2013 over three survey periods. These were;

- 14-24 October (Sonya Bateman)
- 31 October- 7 November (Natalie Randall)
- 22 November- 2 December; (Sonya Bateman).

The fauna survey included:

- opportunistic observations of fauna species present within the study area
- searching for evidence of conservation significant fauna species by identification of tracks, scats, bones, diggings, calls and during the opportunistic observations
- assessing ecological processes that may interact with the proposed works
- assessing habitat condition and type.

Opportunistic observations were made during the day whilst walking through the study area investigating all habitats. These searches are used to identify presence of fauna species through recording evidence such as tracks, scats, bones and other traces of fauna presence and occupation of the study area. Searches were focussed on potential conservation significant fauna species habitats.

3.2.2 Habitat Assessment

Habitats within a study area are often classified predominantly by topography, or by vegetation and substrate associations (EPA 2004b), however Hall *et. al.* (1997) asserts that no such prior categories should be assumed to dominate. Habitats should be distinguished with respect to the known or inferred requirements of the particular organisms of interest; in this case, those of the conservation-significant fauna that are known or likely to occur in any part of the study area ('target species'). Vegetation structure, rock and soil type, elevation, aspect, permanent and ephemeral water sources, and more or less specific topographic and structural features may all be relevant, as may the presence/absence of particular taxa of plants (food, shelter etc.) and animals (prey, predators, symbionts, competitors etc.).

Accordingly, the approach to habitat assessment and mapping was based on requirements of a set of target species potentially occurring in the study area, particularly those with the highest conservation priority and/or most specific habitat requirements (DSEWPaC 2011a; 2011b; DEWHA 2010).

Habitat condition was assessed according to the following categories (Coffey Environments 2010; modified from the vegetation condition scale of Trudgen 1991):

- High quality fauna habitat – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.
- Very good fauna habitat – These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats. Fauna assemblages in these areas are likely to be minimally effected by disturbance.
- Good fauna habitat – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The

habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.

- Disturbed fauna habitat – These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.
- Highly degraded fauna habitat – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. They exhibit limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.

3.2.3 Opportunistic Observations

Fauna sightings, and potentially identifiable tracks, scats, feathers, bones and diggings, were recorded opportunistically when encountered whilst moving around within the study area, and in comparable habitats in the vicinity. These include observations by the flora team where identification could be confirmed. In most instances, a record was created using a GPS-enabled camera (Apple iPhone or iPad), and photographs were used for subsequent identification of animals and tracks not determinable in the field.

3.2.4 Taxonomy and Nomenclature

Taxonomy and nomenclature for fauna species used in this report follows that of the WAM (2013), except for birds which follow the widely accepted taxonomy of Christidis and Boles (2008) or more recent published revisions (e.g. Meliphagidae; literature sources cited where appropriate).

Table 5 lists the references used. Ecoscape has presumed that the identifications referred to in the Appendices or in reports used to provide local and regional comparative data were reliable and has only corrected records where the nomenclature or other data was obviously incorrect.

Table 5: References used for species identification

IDENTIFICATION	REFERENCE
Mammals	Menkhorst & Knight (2004)
Reptiles	Storr et al. (1983; 1990; 1999; 2002), Wilson & Swan (2010), Macdonald (2013)
Birds	Simpson & Day (2004), Morcombe (2012)
Tracks, Scats etc.	Saunders (1974), Triggs (1996), Moseby et al. (2011)

4.0 VEGETATION SURVEY RESULTS

4.1 VEGETATION TYPES

Eighty nine vegetation types were recorded from within the study area; their extents are shown in **Table 6**. The **Map 2** series shows the distribution of vegetation types within the study area. More detailed descriptions of these vegetation types are presented in **Appendix Five**.

Table 6: Vegetation types and their extents within the study area

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
AcLd	<i>Allocasuarina campestris</i> , <i>Melaleuca uncinata</i> and <i>Acacia mimica</i> var. <i>angusta</i> mid shrubland over <i>Lepidosperma drummondii</i> , <i>Platysace effusa</i> and <i>Hibbertia gracilipes</i> low open sedgeland/ shrubland	Q17, R101, R103, R167, R170	36.69	0.58
AfCr	<i>Acacia fragilis</i> , <i>Grevillea plurijuga</i> and <i>Melaleuca pulchella</i> mid shrubland over <i>Cryptandra recurva</i> low sparse shrubland	R158	9.13	0.14
AsAt	<i>Acacia singula</i> , <i>Calothamnus quadrifidus</i> and <i>Verticordia chrysantha</i> mid open shrubland over <i>Allocasuarina thuyoides</i> , <i>Melaleuca tuberculata</i> var. <i>macrophylla</i> and <i>Lepidosperma</i> sp. low open shrubland/ sedgeland	R028	9.28	0.15
BaMs	<i>Banksia armata</i> var. <i>armata</i> , <i>Melaleuca striata</i> and <i>Grevillea baxteri</i> mid open shrubland over <i>Melaleuca scabra</i> , <i>Xanthorrhoea platyphylla</i> and <i>Lepidosperma</i> sp. low shrubland	Q50, R070	4.55	0.07
BpBe	<i>Banksia pilostylis</i> and <i>Adenanthos cuneatus</i> mid open shrubland over <i>Beaufortia empetrifolia</i> , <i>Hypolaena humilis</i> and <i>Melaleuca scabra</i> low shrubland/ rushland	R062	36.54	0.58
BsBeAl	<i>Banksia speciosa</i> and <i>Hakea obliqua</i> subsp. <i>obliqua</i> tall shrubland over <i>Beaufortia empetrifolia</i> , <i>Leucopogon crassifolius</i> and <i>Melaleuca striata</i> mid open shrubland over <i>Anarthria laevis</i> , <i>Banksia petiolaris</i> and <i>Stirlingia anethifolia</i> low open rushland/ shrubland	Q49, R061, R063	74.67	1.18
Cl	Cleared (completely degraded)	nil	3.31	0.05
CqAp	<i>Calothamnus quadrifidus</i> , <i>Acacia assimilis</i> subsp. <i>atroviridis</i> and <i>Grevillea teretifolia</i> mid open shrubland over <i>Acacia pingiculosa</i> subsp. <i>teretifolia</i> , <i>Cryptandra graniticola</i> and <i>Lepidosperma rigidulum</i> low shrubland/ sedgeland	Q39, Q40	3.34	0.05
DcTp	<i>Dodonaea ceratocarpa</i> , <i>Acacia triptycha</i> and <i>Thryptomene australis</i> subsp. <i>brachyandra</i> mid open shrubland over <i>Trachymene pilosa</i> , <i>*Hypochaeris glabra</i> and <i>*Aira cupaniana</i> low open herbland/ grassland	R071	2.24	0.04
Degraded	Degraded	nil	44.94	0.71
DhCc	<i>Duboisia hopwoodii</i> and <i>Rhagodia preissii</i> mid sparse shrubland over <i>Commersonia craurophylla</i> , <i>Acacia glaucissima</i> and <i>Glischrocaryon aureum</i> low open shrubland/ herbland	Q11, 12	15.29	0.24
EaCqLb	<i>Eucalyptus angulosa</i> mid open woodland over <i>Calothamnus quadrifidus</i> and <i>Banksia media</i> mid open shrubland over <i>Leucopogon breviflorus</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i> and <i>Schoenus subfascicularis</i> low open shrubland/ sedgeland	R074	18.43	0.29
EcCc	<i>Eucalyptus conglobata</i> low open mallee woodland over <i>Commersonia craurophylla</i> , <i>Acacia glaucissima</i> and <i>Glischrocaryon aureum</i> low open shrubland/ herbland	Q31, Q32, Q33, R177, R178	55.39	0.87

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EcPe	<i>Eucalyptus conglobata</i> mid mallee shrubland over <i>Pultenaea elachista</i> , <i>Grevillea plurijuga</i> and <i>Westringia rigida</i> low open shrubland	R141	5.21	0.08
EdDiMa	<i>Eucalyptus dielsii</i> , <i>E. ?calycogona</i> and <i>E. uncinata</i> mid woodland/ mallee woodland over <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>Dodonaea stenozyga</i> and <i>Melaleuca teuthidoides</i> mid open shrubland over <i>Microcybe albiflora</i> , <i>Spyridium minutum</i> and <i>Westringia rigida</i> low sparse shrubland	Q21	5.38	0.08
EdMhLp	<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i> and <i>E. scyphocalyx</i> mid mallee woodland over <i>Melaleuca hamata</i> and <i>Callitris preissii</i> mid open shrubland over <i>Leptomeria pachyclada</i> , <i>Coleanthera myrtoides</i> and <i>Conostephium drummondii</i> low open shrubland	R035	18.23	0.29
EdMhVr	<i>Eucalyptus dolichorhyncha</i> , <i>E. perangusta</i> and <i>E. phaenophylla</i> subsp. <i>interjacens</i> low open mallee shrubland over <i>Melaleuca hamata</i> , <i>Aluta appressa</i> and <i>Calothamnus quadrifidus</i> mid shrubland over <i>Verticordia roei</i> subsp. <i>roei</i> , <i>V. chrysantha</i> and <i>Lepidosperma drummondii</i> low open shrubland/ sedgeland	R057, R136	46.29	0.73
EdMpLsp	<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i> and <i>E. scyphocalyx</i> mid mallee woodland over <i>Melaleuca plumea</i> , <i>Melaleuca hamata</i> and <i>Melaleuca sapientes</i> mid shrubland over <i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798), <i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085) and <i>Hibbertia</i> sp. low open sedgeland/ shrubland	R048	20.91	0.33
EdMpOm	<i>Eucalyptus diptera</i> , <i>E. urna</i> and <i>E. eremophila</i> mid woodland over <i>Melaleuca pauperiflora</i> , <i>M. podiocarpa</i> and <i>M. linguiformis</i> mid open shrubland over <i>Olearia muelleri</i> , <i>Scaevola spinescens</i> and <i>Daviesia</i> sp. low sparse shrubland	R122, R124, R129, R135, R151	140.05	2.21
EdMpRs	<i>Eucalyptus diptera</i> and <i>E. polita</i> low woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> mid open shrubland over <i>Rhodanthe spicata</i> low open herbland	Q04	2.15	0.03
EdMqMm	<i>Eucalyptus delicata</i> , <i>E. urna</i> and <i>E. salmonophloia</i> mid mallee woodland over <i>Melaleuca quadrifaria</i> , <i>M. teuthidoides</i> and <i>M. pauperiflora</i> tall open shrubland over <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> low isolated shrubs	R148, R153, R181, R184	191.01	3.01
EeAl	<i>Eucalyptus extrica</i> , <i>Grevillea baxteri</i> and <i>Hakea obliqua</i> subsp. <i>obliqua</i> low open mallee shrubland/ shrubland over <i>Anarthria laevis</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> and <i>Banksia repens</i> low sedgeland/ shrubland	R066, R076	103.01	1.62
EeDsDv	<i>Eucalyptus extensa</i> , <i>E. spreata</i> and <i>E. diptera</i> mid woodland over <i>Dodonaea stenozyga</i> , <i>Exocarpos aphyllus</i> and <i>Eremophila scoparia</i> mid open shrubland over <i>Pultenaea arida</i> , <i>Diocirea violacea</i> and <i>Halgania andromedifolia</i> low sparse shrubland	R186, R187	27.73	0.44
EeEsBi	<i>Eucalyptus eremophila</i> , <i>E. flocktoniae</i> subsp. <i>flocktoniae</i> and <i>E. phenax</i> subsp. <i>phenax</i> mid mallee woodland over <i>Exocarpos sparteus</i> and <i>Melaleuca cucullata</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Spyridium cordatum</i> and <i>Pultenaea purpurea</i> low open shrubland.	R005	8.09	0.13
EeGbMs	<i>Eucalyptus extrica</i> low sparse mallee shrubland over <i>Grevillea baxteri</i> , <i>Daviesia apiculata</i> and <i>Adenanthos cuneatus</i> mid open shrubland over <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Beaufortia empetrifolia</i> and <i>Calothamnus gracilis</i> low sedgeland/ shrubland	R067, R072, R073, R075	152.75	2.41

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EeMeLd	<i>Eucalyptus eremophila</i> mid open woodland over <i>Melaleuca exuvia</i> , <i>M. thyooides</i> and <i>Cyathostemon</i> cf. <i>ambiguus</i> tall open shrubland over <i>Lepidosperma drummondii</i> , <i>Darwinia</i> sp. Karonie (K. Newbey 8503) and <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> low open sedgeland/ shrubland	R055, R126	17.11	0.27
EeMhHa	<i>Eucalyptus eremophila</i> , <i>E. pileata</i> and <i>E. scyphocalyx</i> mid open mallee shrubland over <i>Melaleuca hamata</i> , <i>Grevillea plurijuga</i> and <i>Dodonaea amblyophylla</i> mid open shrubland over <i>Halgania andromedifolia</i> and <i>Cooperookia strophiolata</i> low open shrubland	R050, R131, R137, R155,	66.57	1.05
EeMIom	<i>Eucalyptus eremophila</i> , <i>E. leptocalyx</i> and <i>E. valens</i> mid open woodland over <i>Melaleuca linguiformis</i> , <i>M. thyooides</i> and <i>Alyxia buxifolia</i> mid open shrubland over <i>Olearia muelleri</i> , <i>Scaevola spinescens</i> and <i>Waitzia suaveolens</i> var. <i>flava</i> low open shrubland/ herbland	R102, R111, R117, R119, R130, R159, R180, R188, R190	210.36	3.32
EeMsGa	<i>Eucalyptus eremophila</i> , <i>E. flocktoniae</i> and <i>E. scyphocalyx</i> low woodland/ mallee woodland over <i>Melaleuca societatis</i> , <i>M. sapientes</i> and <i>M. teuthioides</i> mid shrubland over <i>Gahnia ancistrophylla</i> , <i>Spyridium minutum</i> and <i>Comesperma spinosum</i> low open sedgeland/ shrubland	Q42, Q43, R011, R015, R016, R017, R022, R026, R030, R039, R093, R096, R113, R133, R134, R142, R144, R145, R157, R160, R163, R173, R189	1471.12	23.21
EeMsGa/ EIMsAs	Mosaic, see separate descriptions	N/A	40.57	0.64
EeMsGa/ EoMpAs	Mosaic, see separate descriptions	N/A	26.62	0.42
EeMsWc	<i>Eucalyptus eremophila</i> , <i>E. kessellii</i> and <i>E. flocktoniae</i> mid mallee woodland over <i>Melaleuca sapientes</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Melaleuca teuthioides</i> mid shrubland over <i>Westringia cephalantha</i> var. <i>caterva</i> , <i>Cooperookia strophiolata</i> and <i>Olearia muelleri</i> low open shrubland	R112, R116, R140, R142, R161, R162	285.35	4.50
EePmHh	<i>Eucalyptus extrica</i> , <i>E. angulosa</i> and <i>E. leptocalyx</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Beaufortia empetrifolia</i> and <i>Melaleuca pulchella</i> mid shrubland over <i>Hypolaena humilis</i> , <i>Acacia crispula</i> and <i>Anarthria laevis</i> low open rushland/ shrubland	R077, R079, R083, R085	106.47	1.68
EfEaHsp	<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i> , <i>E. eremophila</i> and <i>E. pileata</i> mid woodland over <i>Exocarpos aphyllus</i> , <i>Melaleuca johnsonii</i> and <i>M. lateriflora</i> mid open shrubland over <i>Halgania</i> sp. Peak Eleanor (M.A. Burgman 3547 B), <i>Pultenaea ?arida</i> and <i>Pomaderris rotundifolia</i> low sparse shrubland	R047	25.11	0.40
EfMcAc	<i>Eucalyptus flocktoniae</i> , <i>E. quadrans</i> and <i>E. extensa</i> mid mallee woodland over <i>Melaleuca cucullata</i> , <i>M. strobophylla</i> and <i>Dodonaea stenozyga</i> tall shrubland over <i>Acacia crassuloides</i> , <i>A. erinacea</i> and <i>Hakea commutata</i> low open shrubland	R040, R043, R049, R132	120.72	1.90
EfMmBi	<i>Eucalyptus flocktoniae</i> low open mallee shrubland over <i>Melaleuca marginata</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>inornata</i> and <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> low open shrubland	R139	20.23	0.32

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EfMpAc	<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i> , <i>E. conglobata</i> and <i>E. leptocalyx</i> mid mallee woodland over <i>Melaleuca podiocalyx</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> and <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> mid open shrubland over <i>Acacia crassuloides</i> , <i>A. deficiens</i> and <i>Pomaderris rotundifolia</i> low sparse shrubland	R042, R045	24.36	0.38
EfMsDb	<i>Eucalyptus forrestiana</i> , <i>E. conglobata</i> and <i>E. flocktoniae</i> low woodland/ mallee woodland over <i>Melaleuca societatis</i> , <i>M. podiocalyx</i> and <i>M. bromelioides</i> mid shrubland over <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Spyridium minutum</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low open shrubland	R098, R107, R108, R154, R175, R176	243.10	3.83
EgAs	<i>Eucalyptus grossa</i> , <i>Melaleuca uncinata</i> and <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i> mid shrubland over <i>Acacia sulcata</i> var. <i>platyphylla</i> , <i>Lepidosperma drummondii</i> and <i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i> low open shrubland/ sedgeland	Q15, Q20, R037, R046	66.05	1.04
EgAs/ EpBmMs	Mosaic, see separate descriptions	N/A	10.70	0.17
EgMqCc	<i>Eucalyptus gracilis</i> , <i>E. ovularis</i> and <i>E. spreta</i> mid woodland over <i>Melaleuca quadrifaria</i> , <i>M. teuthidoides</i> and <i>M. lanceolata</i> tall open shrubland over <i>Cratystylis conocephala</i> , <i>Atriplex vesicaria</i> and <i>Zygophyllum aurantiacum</i> low open shrubland	R125, R127, R146, R152	167.46	2.64
EgMtBi	<i>Eucalyptus gracilis</i> and <i>E. sp.</i> low open woodland over <i>Melaleuca teuthidoides</i> mid sparse shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Westringia rigida</i> and <i>Acacia merrallii</i> low open shrubland	Q25	7.51	0.12
EiAiMe	<i>Eucalyptus incrassata</i> and <i>E. uncinata</i> tall mallee woodland over <i>Adenanthos ileticos</i> , <i>Banksia media</i> and <i>Phymatocarpus maxwellii</i> mid open shrubland over <i>Micromyrtus elobata</i> subsp. <i>scopula</i> and <i>Darwinia polycephala</i> low sparse shrubland	R110, R114	45.42	0.72
EiBsLd	<i>Eucalyptus incrassata</i> , <i>E. phaenophylla</i> subsp. <i>interjacens</i> and <i>E. uncinata</i> mid open mallee shrubland over <i>Beaufortia schaueri</i> , <i>Calothamnus quadrifidus</i> and <i>Gastrolobium nutans</i> mid shrubland over <i>Lepidosperma drummondii</i> , <i>Conostylis argentea</i> and <i>Schoenus brevisetis</i> low sedgeland/ herbland	R020	12.59	0.20
EiMcGa	<i>Eucalyptus incrassata</i> and <i>E. phaenophylla</i> mid mallee shrubland over <i>Melaleuca calycina</i> , <i>M. societatis</i> and <i>M. johnsonii</i> mid open shrubland over <i>Gahnia ancistrophylla</i> , <i>Daviesia lancifolia</i> and <i>Gahnia aristata</i> low sparse sedgeland/ shrubland	R001	43.18	0.68
EiMpAc	<i>Eucalyptus indurata</i> , <i>E. conglobata</i> and <i>E. flocktoniae</i> mid open mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. strobophylla</i> and <i>M. podiocalyx</i> mid open shrubland over <i>Acacia crassuloides</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Microcybe multiflora</i> subsp. <i>multiflora</i> low open shrubland	Q44, Q45, R044	29.03	0.46
EkBmPm	<i>Eucalyptus kessellii</i> , <i>E. pleurocarpa</i> and <i>E. pileata</i> mid open mallee shrubland over <i>Banksia media</i> mid sparse shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca pulchella</i> and <i>Daviesia lancifolia</i> low shrubland	R023, R025	20.48	0.32
EkMtDb	<i>Eucalyptus kessellii</i> , <i>E. eremophila</i> and <i>E. aff. leptocalyx</i> mid open mallee woodland over <i>Melaleuca teuthidoides</i> , <i>M. sapientes</i> and <i>M. podiocalyx</i> tall open shrubland over <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Acacia glaucissima</i> low sparse shrubland	R115, R156, R182	89.79	1.42

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EIMbBi	<i>Eucalyptus luculenta</i> and <i>E. eremophila</i> low sparse mallee shrubland over <i>Melaleuca bromelioides</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> low sparse shrubland	Q25	3.72	0.06
EIMsAs	<i>Eucalyptus luculenta</i> , <i>E. uncinata</i> and <i>E. eremophila</i> mid open mallee woodland over <i>Melaleuca societatis</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Melaleuca hamata</i> mid open shrubland over <i>Acacia sorophylla</i> , <i>Pultenaea purpurea</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low sparse shrubland	Q26, Q27, Q28, Q30, R097, R164, R165, R166, R169, R171	180.81	2.85
EIMsDp	<i>Eucalyptus</i> aff. <i>leptocalyx</i> and <i>E. uncinata</i> mid woodland over <i>Melaleuca societatis</i> and <i>M. teuthidoides</i> tall open shrubland over <i>Darwinia polycephala</i> , <i>Cyathostemon</i> aff. <i>ambiguus</i> and <i>Baeckea crassifolia</i> low open shrubland	R109	5.79	0.09
EIMsLg	<i>Eucalyptus leptocalyx</i> and <i>E. flocktoniae</i> mid mallee woodland over <i>Melaleuca societatis</i> , <i>M. hamata</i> and <i>M. undulata</i> tall open shrubland over <i>Lepidosperma gahnioides</i> , <i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798) and <i>Gahnia ancistrophylla</i> low open sedgeland	R099	49.77	0.79
EIMsLg/ EIPmGa	Mosaic, see separate descriptions	N/A	4.05	0.06
EIMsSm	<i>Eucalyptus leptocalyx</i> , <i>E. uncinata</i> and <i>E. varia</i> subsp. <i>varia</i> mid open mallee shrubland over <i>Melaleuca societatis</i> and <i>M. glaberrima</i> mid shrubland over <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Gahnia ancistrophylla</i> low open shrubland/ sedgeland	R081, R086, R087, R088, R168, R172, R174	401.82	6.34
EIPmGa	<i>Eucalyptus leptocalyx</i> , <i>E. pleurocarpa</i> and <i>E. micranthera</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca pulchella</i> and <i>M. plumea</i> mid shrubland over <i>Gahnia ancistrophylla</i> and <i>Boronia crassifolia</i> low open sedgeland/ shrubland	R100, R104	72.50	1.14
EIPmGa/ EfMsDb	Mosaic, see separate descriptions	N/A	6.00	0.09
EIPmSm	<i>Eucalyptus leptocalyx</i> and <i>E. uncinata</i> and <i>E. angulosa</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca societatis</i> and <i>Banksia media</i> mid shrubland over <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> , <i>Microcybe pauciflora</i> subsp. <i>pauciflora</i> and <i>Conostephium drummondii</i> low open shrubland	R090	61.63	0.97
EmMpCc	<i>Eucalyptus melanoxylon</i> , <i>E. dundasii</i> and <i>E. salmonophloia</i> mid woodland over <i>Melaleuca pauperiflora</i> , <i>M. quadrifaria</i> and <i>M. teuthidoides</i> tall sparse shrubland over <i>Cratystylis conocephala</i> , <i>Maireana</i> sp. and <i>Acacia merrallii</i> low open shrubland	Q01, Q05, Q08, R185	176.94	2.79
EoArTsp	<i>Eucalyptus occidentalis</i> mid woodland over <i>Acacia rostelifera</i> and <i>A. cyclops</i> mid open shrubland over <i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/ 897), <i>Neurachne alopecuroidea</i> and <i>Dodonaea caespitosa</i> low sedgeland/ grassland/ shrubland	R068	1.45	0.02
EoEd	<i>Eucalyptus ovularis</i> and <i>E. platycorys</i> mid sparse mallee shrubland over <i>Eremophila dichroantha</i> , <i>E. aff. rugosa</i> and <i>Philotheca fitzgeraldii</i> low shrubland	R138	41.29	0.65
EoMcBi	<i>Eucalyptus oleosa</i> subsp. <i>oleosa</i> , <i>E. conglobata</i> and <i>E. dielsii</i> mid mallee woodland over <i>Melaleuca cucullata</i> , <i>M. acuminata</i> subsp. <i>acuminata</i> and <i>M. podiocarpa</i> tall shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Olearia muelleri</i> and <i>Acacia profusa</i> low sparse shrubland	R121	43.68	0.69

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EoMpAm	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> mid mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and <i>M. quadrifaria</i> mid shrubland over <i>Acacia merrallii</i> and <i>Daviesia</i> sp. low scattered shrubs	R056	12.62	0.20
EoMpAs	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> mid mallee woodland over <i>Melaleuca podiocarpa</i> , <i>M. teuthidoides</i> and <i>M. brevifolia</i> mid open shrubland over <i>Acacia sorophylla</i> , <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low open shrubland	R094	23.47	0.37
EoMpPa	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> , <i>E. eremophila</i> and <i>E. diptera</i> mid open woodland/ mallee woodland over <i>Melaleuca pauperiflora</i> , <i>Alyxia buxifolia</i> and <i>Eremophila ionantha</i> mid sparse shrubland over <i>Pultenaea arida</i> , <i>Olearia muelleri</i> and <i>Austrostipa trichophylla</i> low sparse shrubland/ grassland	Q02, Q03	17.33	0.27
EoMpSf	<i>Eucalyptus occidentalis</i> mid woodland over <i>Melaleuca pulchella</i> , <i>M. calycina</i> and <i>Baeckea pachyphylla</i> mid shrubland over <i>Schoenus subfascicularis</i> low sparse sedgeland	R006	7.47	0.12
EoMs	<i>Eucalyptus occidentalis</i> mid woodland over <i>Melaleuca strobophylla</i> and <i>Acacia diaphana</i> tall open shrubland	R089	5.13	0.08
EoMtTc	<i>Eucalyptus obesa</i> and <i>E. pleurocarpa</i> mid open mallee shrubland over <i>Melaleuca tuberculata</i> var. <i>macrophylla</i> , <i>Beaufortia micrantha</i> var. <i>micrantha</i> and <i>Calothamnus gracilis</i> mid open shrubland over <i>Tricostularia compressa</i> , <i>Chordifex sphacelatus</i> and <i>Schoenus subfascicularis</i> low open sedgeland/ rushland	R012	11.12	0.18
EoOm	<i>Eucalyptus olivina</i> mid open woodland over <i>Olearia muelleri</i> , <i>Lepidosperma drummondii</i> and <i>Gahnia ancistrophylla</i> low sparse shrubland/ sedgeland	Q07	2.45	0.04
EpAh	<i>Eucalyptus pleurocarpa</i> and <i>E. tumida</i> mid sparse mallee shrubland over <i>Allocasuarina humilis</i> , <i>Melaleuca hamata</i> and <i>Banksia armata</i> var. <i>armata</i> low open shrubland	Q14	10.54	0.17
EpBmMs	<i>Eucalyptus pleurocarpa</i> , <i>E. phaenophylla</i> and <i>E. incrassata</i> mid open mallee shrubland over <i>Beaufortia micrantha</i> var. <i>micrantha</i> , <i>M. rigidifolia</i> and <i>M. hamata</i> mid open shrubland over <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Lysinema pentapetalum</i> and <i>Lepidosperma</i> spp. low open sedgeland/ shrubland	Q36, Q38, Q41, R003, R004, R014, R018, R019, R024, R029, R038, R059	168.18	2.65
EpEa	<i>Eucalyptus platypus</i> subsp. <i>platypus</i> , <i>E. flocktoniae</i> subsp. <i>flocktoniae</i> and <i>E. dielsii</i> low open woodland over <i>Exocarpos aphyllus</i> , <i>Gastrolobium musaceum</i> and <i>Daviesia argillacea</i> mid open shrubland	Q34, Q35, R007, R010, R021	43.01	0.68
EpMhGa	<i>Eucalyptus phaenophylla</i> , <i>E. leptocalyx</i> and <i>E. uncinata</i> mid mallee woodland over <i>Melaleuca hamata</i> , <i>M. subfalcata</i> and <i>Exocarpos sparteus</i> mid sparse shrubland over <i>Gahnia ancistrophylla</i> , <i>Spyridium cordatum</i> and <i>Acacia ingrata</i> low sparse sedgeland/ shrubland	R002, R008, R013, R032	102.67	1.62
EqMpOm	<i>Eucalyptus quadrans</i> mid mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. acuminata</i> subsp. <i>acuminata</i> and <i>Acacia amyctica</i> mid shrubland over <i>Olearia muelleri</i> low sparse shrubland	R031	10.29	0.16
EsBpLt	<i>Eucalyptus sporadica</i> and <i>E. clivicola</i> mid mallee woodland/ woodland over <i>Baeckea pachyphylla</i> , <i>Melaleuca eurystoma</i> and <i>Melaleuca hamata</i> mid open shrubland over <i>Lepidosperma tuberculatum</i> and <i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/ 897) mid open sedgeland	Q37	4.14	0.07

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EsGIWr	<i>Eucalyptus spreata</i> mid isolated trees over <i>Geijera linearifolia</i> , <i>Santalum acuminatum</i> and <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> tall sparse shrubland over <i>Westringia rigida</i> , <i>Atriplex vesicaria</i> and <i>Austrostipa variabilis</i> low shrubland/ tussock grassland	R183	33.54	0.53
EsMt	<i>Eucalyptus spreata</i> and <i>E. kumarlensis</i> low woodland over <i>Melaleuca thyoides</i> , <i>Cyathostemon</i> aff. <i>ambiguus</i> and <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> low shrubland	R053	18.73	0.30
EspLp	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157), <i>Exocarpos sparteus</i> and <i>Melaleuca hamata</i> low open mallee shrubland/ shrubland over <i>Leptomeria pachyclada</i> , <i>Phymatocarpus maxwellii</i> and <i>Dillwynia divaricata</i> low open shrubland	R033	15.46	0.24
EspMhLsp	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157) and <i>Allocasuarina huegeliana</i> mid low open mallee shrubland/ woodland over <i>Melaleuca hamata</i> , <i>Acacia patagiata</i> and <i>A. mutabilis</i> subsp. <i>angustifolia</i> mid open shrubland over <i>Lepidosperma</i> aff. <i>brunonianum</i> and <i>Lomandra micrantha</i> subsp. <i>teretifolia</i> low sparse sedgeland/ herbland	R009	9.20	0.15
EspPmCl	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157) mid sparse mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Adenanthos cuneatus</i> and <i>Acacia assimilis</i> subsp. <i>atroviridis</i> mid shrubland over <i>Calytrix leschenaultii</i> , <i>Lepidosperma carphoides</i> and <i>Chordifex sphacelatus</i> low sparse shrubland/ sedgeland/ rushland	R027	2.67	0.04
EtMgLd	<i>Eucalyptus tetraptera</i> and <i>E. leptocalyx</i> mid sparse mallee shrubland over <i>Melaleuca glena</i> , <i>M. rigidifolia</i> and <i>M. glaberrima</i> mid shrubland over <i>Lepidosperma drummondii</i> and <i>Gahnia ancistrophylla</i> low sparse sedgeland	R106	18.85	0.30
EtMs	<i>Eucalyptus transcontinentalis</i> , <i>E. urna</i> and <i>E. eremophila</i> low woodland over <i>Melaleuca sapientes</i> , <i>M. podiocalpa</i> and <i>M. eleuterostachya</i> low shrubland	R052	29.56	0.47
EtMuGsp	<i>Eucalyptus tumida</i> , <i>E. uncinata</i> and <i>E. flocktoniae</i> mid sparse mallee shrubland over <i>Melaleuca undulata</i> , <i>M. societatis</i> and <i>Grevillea plurijuga</i> low open shrubland over <i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005), <i>Acacia gonophylla</i> and <i>A. crassuloides</i> low sparse sedgeland/ shrubland	Q13, Q16, Q18	50.86	0.80
EuAcSs	<i>Eucalyptus uncinata</i> and <i>E. conglobata</i> mid mallee shrubland over <i>Acacia cyclops</i> , <i>A. nitidula</i> and <i>Dodonaea amblyophylla</i> mid open shrubland over <i>Schoenus subfascicularis</i> , <i>Gahnia</i> sp. and <i>Lepidosperma</i> sp. Mt Burdett (M.A. Burgman & C. Layman MAB 3287) low open sedgeland	R078	6.59	0.10
EuGpBi	<i>Eucalyptus uncinata</i> and <i>E. leptocalyx</i> mid open mallee shrubland over <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Melaleuca hamata</i> and <i>Melaleuca societatis</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Pultenaea purpurea</i> and <i>Hibbertia psilocarpa</i> low open shrubland	Q51, Q52	44.75	0.71
EuMh	<i>Eucalyptus uncinata</i> and <i>E. phaenophylla</i> subsp. <i>interjacens</i> mid mallee woodland over <i>Melaleuca hamata</i> , <i>Acacia patagiata</i> and <i>A. assimilis</i> subsp. <i>assimilis</i> mid shrubland	R036	5.00	0.08
EuMpRs	<i>Eucalyptus urna</i> and <i>E. valens</i> low open forest over <i>Melaleuca pauperiflora</i> , <i>M. brevifolia</i> and <i>M. sapientes</i> mid open shrubland over <i>Ricinocarpos stylosus</i> and <i>Daviesia</i> sp. low sparse shrubland	R054, R150	14.06	0.22

CODE	VEGETATION DESCRIPTION	SITES	AREA (ha)	PROPORTION OF STUDY AREA (%)
EuMtDI	<i>Eucalyptus uncinata</i> and <i>E. tumida</i> mid sparse mallee shrubland over <i>Melaleuca teuthidoides</i> , <i>M. rigidifolia</i> and <i>M. hamata</i> mid shrubland over <i>Daviesia lancifolia</i> , <i>Pultenaea elachista</i> and <i>Microcybe albiflora</i> low open shrubland	Q19, Q24	67.95	1.07
EuMtPe	<i>Eucalyptus uncinata</i> , <i>E. conglobata</i> and <i>E. indurata</i> mid open mallee woodland over <i>Melaleuca teuthidoides</i> , <i>Daviesia incrassata</i> subsp. <i>incrassata</i> and <i>Melaleuca calycina</i> mid open shrubland over <i>Pultenaea elachista</i> , <i>Spyridium minutum</i> low sparse shrubland	Q22	10.73	0.17
EvEaPf	<i>Eucalyptus valens</i> and <i>E. kumarlensis</i> low open forest over <i>Exocarpos aphyllus</i> , <i>Callitris preissii</i> and <i>Alyxia buxifolia</i> tall sparse shrubland over <i>Phebalium filifolium</i> , <i>Lepidosperma drummondii</i> and <i>Bertya virgata</i> low open shrubland	R123, R051	18.01	0.28
EvEaPf/ EtMs	Mosaic, see separate descriptions	N/A	27.20	0.43
HcBe	<i>Hakea cinerea</i> , <i>H. pandanica</i> subsp. <i>pandanica</i> and <i>Eucalyptus extrica</i> mid open shrubland/ mallee shrubland over <i>Beaufortia empetrifolia</i> , <i>Leucopogon crassifolius</i> and <i>Melaleuca pulchella</i> low shrubland	Q46, Q47, Q48, R060, R064, R065, R069	159.41	2.51
MaTs	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>Melaleuca thyoides</i> and <i>Melaleuca lanceolata</i> tall shrubland over <i>Triodia scariosa</i> , <i>Bossiaea leptacantha</i> and <i>Westringia rigida</i> low open hummock grassland/ shrubland	Q09, R120	25.74	0.41
MbAj	<i>Melaleuca brevifolia</i> , <i>M. subalaris</i> and <i>M. thyoides</i> mid open shrubland over <i>Austrostipa juncifolia</i> and <i>Tecticornia</i> spp. mid sparse grassland/ samphire shrubland	Q06, Q23, R105, R084, R147, R179	64.97	1.02
MhAj	<i>Melaleuca hamulosa</i> tall sparse shrubland over <i>Austrostipa juncifolia</i> and <i>Gahnia</i> sp. L (K.R. Newbey 7888) mid open tussock grassland/ sedgeland	R041	1.54	0.02
MuTm	<i>Melaleuca uncinata</i> , <i>Thryptomene australis</i> subsp. <i>brachyandra</i> and <i>Acacia nitidula</i> mid shrubland over <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> , <i>Spartochloa scirpoidea</i> and <i>Platysace effusa</i> low shrubland/ tussock grassland	R082, R095	26.83	0.42
SL	Salt lake (no vegetation)	nil	19.19	0.30
Tspp	<i>Tecticornia</i> spp. and <i>Maireana oppositifolia</i> low open samphire shrubland/ chenopod shrubland	Q10, R034, R128, R149	16.36	0.26
Total			6339.59	100.00

4.2 CONSERVATION SIGNIFICANCE OF VEGETATION TYPES

4.2.1 TECs and PECs

At the time of the 2013 field survey there were no known TECs or PECs within or close to the study area boundary. No vegetation similar to any currently described TECs (DEC Species & Communities Branch 2013) or PECs (DPaW Species & Communities Branch 2013) was identified during this or the scoping survey (GHD 2012).

Based on a comparison of recorded vegetation types with the search results of GHD (2012) and current listings one TEC and one PEC are now considered to potentially occur within the study area, as follows:

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

This TEC was listed in January 2014 and was not targeted as part of the 2013 field surveys. The diagnostic characteristics of this community are that it occurs within the Southeast Coastal Province and is characterised by having at least 30% cover of Proteaceae species across all strata. In recently disturbed situations it is a requirement that two or more diagnostic Proteaceae species are present (DoE 2014a). The indicative mapping of this TEC shows that its potential range extends across the majority of the study area, except for the central/northern portion around Salmon Gums (DoE 2014a).

Two vegetation types are considered likely to match the description of the 'Proteaceae Dominated Kwongkan Shrublands' TEC; **BaMs** (dominated by *Banksia armata*, **Plate 1**,) and **BsBeAI** (dominated by *Banksia speciosa*, **Plate 2**). Both of these vegetation types contain at least two of the diagnostic species and would be expected to have at least 30% cover in an undisturbed state. There are numerous other vegetation types that contain at least two diagnostic Proteaceous species, however it is not considered likely that Proteaceous cover would reach 30% in undisturbed situations in these vegetation types.



Plate 1: BaMs vegetation type



Plate 2: BsBeAI vegetation type

The areas mapped as **BaMs** and **BsBeAI** vegetation types occupy 4.55 ha (0.07% of the study area) and 74.67 ha (1.18%) respectively. During the 2014 field survey, areas considered likely to represent the 'Proteaceae Dominated Kwongkan Shrublands' TEC were revisited to evaluate their species composition,

structure and extent within the study area. One floristic quadrat was established within each of **BaMs** (Q50) and **BsBeAI** (Q49) to better characterise these vegetation types.

DPaW has confirmed that **BsBeAI** is likely to meet the criteria for the 'Proteaceae Dominated Kwongan Shrublands' TEC (based on the combined cover of Proteaceae species) whilst **BaMs** is potentially representative of this TEC (S. Barrett¹ pers. comm.). **BaMs** does not currently contain 30% cover of Proteaceae species; however disturbance from wildfires and scrub-rolling events makes it difficult to determine the Proteaceae cover that would be expected in an undisturbed condition.

Swamp Yate (*Eucalyptus occidentalis*) woodlands in seasonally inundated clay basins (South Coast) (Priority 3)

Several woodland vegetation types were recorded with *Eucalyptus occidentalis* as the dominant species including **EoArTsp**, **EoMpSf** and **EoMs**. All of these vegetation types were associated with minor drainage depressions.

This PEC is only recorded from the Yellilup Swamp area, significantly west of the study area. *Eucalyptus occidentalis* dominated drainage lines are widespread in the South Coast region and it is not considered that any of the vegetation types dominated by this species are analogous to this PEC.

4.3 VEGETATION CONDITION

Vegetation condition within relevés and quadrats was assessed during the field survey according to the Keighery (1994) Bushland Condition Scale. The vegetation condition ranged from Degraded to Pristine. The majority of the sites within the study area (97.9%) were classified as Very Good or better (**Table 7**). Sites located within the low fuel modified buffer strips were typically in Very Good to Excellent condition, largely depending on the age since disturbance and level of weed invasion (negligible for the majority of sites). Whilst the vegetation structure within the low fuel modified buffer strips has been altered by scrub rolling (**Plate 3**) the potential for regeneration is good due to species composition and low impact from weed invasion. Sites recorded within undisturbed vegetation were typically in Excellent to Pristine condition due to minimal evidence of disturbance or weed invasion.

Table 7: Summary of vegetation condition of sites the study area (assessed according to Keighery 1994)

VEGETATION CONDITION	NO. SITES	% SITES
Pristine	33	13.69
Excellent	137	56.85
Very Good	66	27.39
Good	4	1.66
Degraded	1	0.41
Completely Degraded	0	0

¹ Sarah Barrett: Threatened Flora Conservation Officer, Department of Parks and Wildlife, Albany.



**Plate 3: Vegetation within the low modified buffer strip
that has been recently scrub rolled**

5.0 FLORA SURVEY RESULTS

5.1 FLORA INVENTORY

Eight hundred and sixty vascular flora taxa from 266 genera and 69 families were identified from the study area from 189 relevés, 52 quadrats, opportunistic observations in the Level 2 flora survey areas and conservation significant flora searches. Thirty three specimens could not be identified to species level due to lack of reproductive material, totalling 3.9% of taxa. Several unidentified specimens may be representative of taxa already included in the inventory for which better collections were available. Twenty six species were introduced species (weeds). This inventory is not comprehensive as the recording of relevés focussed on dominant and characteristic species for the purpose of mapping vegetation, therefore the genera such as *Eucalyptus* and *Melaleuca* are represented disproportionately high when compared with most other genera.

The most commonly represented families were Myrtaceae (189 taxa), Fabaceae (110), Proteaceae (69), Asteraceae (46), Cyperaceae (36), Ericaceae (33), Goodeniaceae (27), Chenopodiaceae (25) and Poaceae (23). The most commonly represented genera were *Eucalyptus* (73 taxa), *Acacia* (55), *Melaleuca* (50), *Leucopogon* (16), *Banksia* (15), *Hakea* (15), *Daviesia* (14), *Eremophila* (13) and *Grevillea* (13).

An inventory of all flora taxa recorded during the field surveys is presented in **Appendix Six**. Complete site data is presented in **Appendix Eleven**.

5.2 CONSERVATION SIGNIFICANT FLORA

5.2.1 EPBC Act 1999

Three TF plant taxa, *Anigozanthos bicolor* subsp. *minor* and *Conostylis lepidospermoides*, both listed as Endangered under the *EPBC Act 1994*, and *Eucalyptus merrickiae*, listed as Vulnerable, were recorded during the field survey. Their locations are displayed on the **Map 3** series.

Descriptions of TF taxa recorded within the study area are presented below.

Rhizanthella gardneri was not recorded during the field survey but is known to occur from previous collections within the study area, discussed below in **Section 5.2.4**.

5.2.2 WC Act 1950

Anigozanthos bicolor subsp. *minor*, *Conostylis lepidospermoides* and *Eucalyptus merrickiae* are also listed as Threatened pursuant to Subsection 2 of Section 23F of the *WC Act 1950*. All are listed as Vulnerable under the *Act*.

5.2.3 Priority Flora

Fifty nine PF taxa (11 P1, 13 P2, 25 P3 and 10 P4) were recorded from the study area during the field surveys (**Table 8**). Their locations are displayed on the **Map 3** series. One additional PF taxon, *Paracaleana parvula* (P2) is considered to occur within the study area based on recent reliable records, but was not recorded during the field surveys.

Descriptions of PF taxa recorded within the study area are presented below.

Table 8: Summary of conservation significant flora recorded during the field surveys

SPECIES	DPAW STATUS	VEGETATION TYPES	NO. POPNS.	NO. PLANTS
TOTAL			644	127,551
<i>Acacia diaphana</i>	P1	EoMs	2	221
<i>Baeckea</i> sp. Gibson (K.R. Newbey 11084)	P1	AcLd	2	250
<i>Boronia baeckeacea</i> subsp. <i>patula</i>	P1	EeMIOm, EeMsWc, EiAiMe, EIMsLg, EIPmGa, MbAj	7	447
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)	P1	AcLd	1	200
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)	P1	EIMsSm, EuMtDI, MbAj	7	2,222
<i>Dicrastylis archeri</i>	P1	EpBmMs	1	200
<i>Eucalyptus misella</i>	P1	EdMhVr, EpBmMs	4	70
<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P1	EeMeLd, Tspp	2	200
<i>Leucopogon remotus</i>	P1	EIMsSm, EIPmSm	2	16
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)	P1	EpBmMs	2	1,690
<i>Philothea gardneri</i> subsp. <i>globosa</i>	P1	EiBsLd, EpMhGa	2	135
<i>Acacia amyctica</i>	P2	EeMsGa, EqMpOm, EsMt	5	337
<i>Acacia nitidula</i>	P2	EePmHh, EIMsSm, EuAcSs, MbAj, MuTm	9	6,340
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	EcCc, EeMeLd, EeMIOm, EeMsGa, EeMsWc, EiAiMe, EkMtDb, EsMt, MaTs, MbAj	22	4,532
<i>Darwinia luehmannii</i>	P2	EeMsWc, EiAiMe	2	157
<i>Daviesia newbeyi</i>	P2	EIPmSm	1	400
<i>Drosera salina</i>	P2	MbAj	2	550
<i>Eucalyptus luculenta</i>	P2	EeMsGa, EeMsGa, EIMbBi, EIMsAs, EIMsSm, EuGpBi	11	12
<i>Frankenia brachyphylla</i>	P2	EeMeLd, MbAj, Tspp	3	400
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)	P2	EdMhVr, EeMhHa, EeMsGa, EfEaHsp, EfMcAc, EgAs	22	5,921
<i>Hydrocotyle</i> sp. Coraginaensis (K. Newbey 7747)	P2	MuTm	1	100
<i>Melaleuca eximia</i>	P2	EuMtDI	1	20
<i>Persoonia spathulata</i>	P2	BpBe, BsBeAl, EeAl, EiAiMe, EIMsSm, EpBmMs, EpEa	8	36
<i>Thysanotus brachyantherus</i>	P2	EdDiMa, EdMhLp, Tspp	3	15
<i>Acacia bartlei</i>	P3	EIMsSm	1	200
<i>Acacia euthyphylla</i>	P3	EeMIOm, EeMsGa, EIMsSm, EuMtDI, MbAj	8	907
<i>Acacia glaucissima</i>	P3	AcLd, DhCc, EcCc, EdDiMa, EdMpOm, EeMeLd, EeMhHa, EeMIOm, EeMsGa, EeMsWc, EfMsDb, EgAs, EgMqCc, EiAiMe, EkMtDb, EIMsLg, EIMsSm, EIPmGa, EpAh, EsGIWr, EtMuGsp, EuGpBi, EuMtDI, EuMtPe, EvEaPf, MaTs, MbAj	82	10,835
<i>Acacia improcera</i>	P3	EeMsGa, EeMsWc, EkMtDb, MaTs	6	341
<i>Acacia singula</i>	P3	AsAt, EeMsGa, EpBmMs	3	1,271
<i>Bossiaea flexuosa</i>	P3	EdMhVr, EeMIOm, EeMsGa, EpBmMs, EsGIWr, MbAj, Tspp	11	3,494
<i>Comesperma calcicola</i>	P3	DhCc, EcCc, EIMsAs, MaTs, MbAj, MhAj, MuTm	9	102
<i>Conostephium marchantiorum</i>	P3	EeMIOm, MbAj	4	73

SPECIES	DPAW STATUS	VEGETATION TYPES	NO. POPNS.	NO. PLANTS
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	AfCr, EcCc, EdMpOm, EeMIOM, EgMqCc, EkMtDb, MbAj, Tssp	24	4,684
<i>Daviesia pauciflora</i>	P3	EIPmGa	1	71
<i>Eremophila chamaephila</i>	P3	EeMsGa, EfMcAc, EiMcGa, EiMpAc, EIMsAs, EoEd, EpEa	11	10,258
<i>Eremophila compressa</i>	P3	EeMsGa, EfMcAc	4	1,224
<i>Frankenia drummondii</i>	P3	MbAj, Tssp	3	341
<i>Frankenia glomerata</i>	P3	EeMeLd, EsGIWr, MhAj	3	380
<i>Gonocarpus pycnostachyus</i>	P3	DcTp, EeGbMs	1	330
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	AcLd, EdDiMa, EdMhVr, EeDsDv, EeMhHa, EeMsGa, EeMsWc, EfMsDb, EgAs, EkMtDb, EIMsAs, EIMsLg, EIMsSm, EpAh, EtMuGsp, EuGpBi, EuMh, EuMtDI	58	12,026
<i>Isopogon allicornis</i>	P3	BsBeAl, EIPmGa, HcBe	6	31
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	AcLd, EcCc, EeMIOM, EeMsGa, EeMsWc, EePmHh, EfMsDb, EgAs, EiAiMe, EkMtDb, EIMsDp, EIMsLg, EIMsSm, EIPmGa, EIPmSm, EuMtDI, EuMtPe, MbAj, MuTm	44	18,390
<i>Persoonia cymbifolia</i>	P3	EeMIOM, EeMsGa, EeMsWc, EiAiMe, EkMtDb, EIMsDp	11	24
<i>Persoonia scabra</i>	P3	EeMIOM, EePmHh, EfMsDb, EIPmGa	7	30
<i>Pityrodia chrysocalyx</i>	P3	EeMIOM, EeMsGa, EeMsWc, EiAiMe, EtMs, EvEaPf, MbAj	11	4,941
<i>Pultenaea adunca</i>	P3	EpEa	1	250
<i>Pultenaea craigiana</i>	P3	EpEa	1	200
<i>Pultenaea daena</i>	P3	EeMsGa	2	561
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	AcLd, EIMsDp, EIMsSm, EuMtDI, MbAj, Tssp	6	42
<i>Adenanthos ileticos</i>	P4	AfCr, EeMhHa, EeMIOM, EeMsGa, EeMsWc, EiAiMe, EkMtDb, MbAj	15	4,588
<i>Darwinia polycephala</i>	P4	AfCr, EeMhHa, EeMIOM, EeMsGa, EeMsWc, EfMsDb, EiAiMe, EkMtDb, EIMsDp, EIPmGa, MbAj	18	7,240
<i>Eremophila serpens</i>	P4	EeMsGa, EiMpAc, MbAj, MuTm	5	37
<i>Eucalyptus dolichorhyncha</i>	P4	EdMhVr, EeMhHa, EeMsGa, EfMcAc, EpBmMs	10	435
<i>Eucalyptus stoatei</i>	P4	CqAp, EeMsGa, EfMpAc, EgAs, EkBmPm, EpBmMs, EpEa, EspLp	48	2,164
<i>Grevillea aneura</i>	P4	AsAt, EdMhVr, EdMpOm, EeMsGa, EeMsWc, EfMcAc, EgAs, EiAiMe, EiBsLd, EpBmMs, EspPmCl	22	5,702
<i>Grevillea baxteri</i>	P4	BaMs, BsBeAl, EeAl, EeGbMs, EePmHh, HcBe	22	3,932
<i>Gyrostemon ditrigynus</i>	P4	EeMIOM, EeMsGa, EeMsWc, EiAiMe, EkMtDb, EIPmSm, MbAj	19	3,195
<i>Melaleuca fissurata</i>	P4	EeMIOM, EeMsGa, EIMsSm, MbAj	20	1,605
<i>Thysanotus parviflorus</i>	P4	EIPmGa	2	2
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	TF	DcTp	1	27
<i>Conostylis lepidospermoides</i>	TF	EeMsGa, EiMcGa, EoMtTc, EpBmMs, EpEa, EpMhGa, EspPmCl	9	2,735
<i>Eucalyptus merrickiae</i>	TF	EeMIOM, EeMsGa, EeMsWc, EiAiMe	11	412

Threatened Flora

Anigozanthos bicolor subsp. *minor* (TF)

The Small Two-coloured Kangaroo Paw (*Anigozanthos bicolor* subsp. *minor*, **Plate 4**), is a slender red and green-flowered kangaroo paw 5-20 cm high that usually has several flowering stalks. It grows in moist sandy soil (*FloraBase*, WAH 1998-2014). There are 29 records for this taxon listed on *NatureMap* (DPaW 2007-2014) from between Jerramungup and Ravensthorpe, and east to near Condingup; an east-west range of approximately 360 km. However, according to the *2008 Interim Recovery Plan* (DEC 2008) there were only three confirmed extant populations (of 14 listed populations), consisting of only approximately 230 individual plants (current at the time the Interim Recovery Plan was written, although *FloraBase* (WAH 1998-2014) lists a population numbering in the thousands recorded in 2006). A single population was recorded during the survey, representing a new population of the species.



Plate 4: *Anigozanthos bicolor* subsp. *minor* (TF)

Anigozanthos bicolor subsp. *minor* is currently considered to contain two distinct species and is soon to be the subject of a taxonomic revision (S. Hopper² pers. comm.). The proposed new name for the species recorded during the SBF surveys is *Anigozanthos condingupensis* ms. This proposed new species is known from less than 10 locations ranging from Stokes Inlet NP to the vicinity of the SBF location. It is usually found after fire for a year or two in soils associated with granite, then disappearing into the seedbank (Steve Hopper pers. comm.).

Twenty seven plants were recorded from a single geographically restricted, previously unrecorded, population that extended for a length of approximately 200 m along the study area between Shao Lu and Fisheries Roads, in the eastern portion of the study area. Individuals were only observed to be growing on the old tracks associated with scrub rolling, indicating a preference for disturbed areas. The associated vegetation type (**DcTp**) was unique to this location and was not recorded elsewhere within the study area. A search of the surrounding area in 2014 did not identify additional individuals outside of the study area adjacent to the known population; however this species typically requires a disturbance event to promote germination. This population could potentially be avoided by constructing the fence directly adjacent to the agricultural boundary, however this would not likely achieve a buffer of 50 m that is typically required for TF.

² Professor Stephen Hopper, University of Western Australia

***Conostylis lepidospermoides* (TF)**

Sedge *Conostylis lepidospermoides* (**Plate 5**) is a tufted sedge-like perennial herb to 35 cm high and 40 cm wide. It has flowering stalks 1-4 cm long with up to six yellow flowers and usually grows in yellow or grey sand over laterite (*FloraBase*, WAH 1998-2014). There are 47 records for this species listed on *NatureMap* (DPaW 2007-2014), all located to the west or northwest of Esperance; a north-south and east-west range of approximately 120 km. However, according to the *Approved Conservation Advice* (Commonwealth of Australia Threatened Species Scientific Committee 2008) there are only 17 known populations, most of them on verges adjacent to cleared land, totalling only 670 individual plants.



Plate 5: *Conostylis lepidospermoides* (TF)

Nine populations of *Conostylis lepidospermoides* were recorded intermittently between the westernmost end of the study area and Young River, extending across a total linear range of approximately 56 km. There were estimated to be almost 3 000 individual plants recorded within the study area. There was previously one historic record of this species within the study area, however this population could not be located despite a targeted search, potentially due to inaccurate location coordinates.

Conostylis lepidospermoides was consistently recorded growing in sandy soils, within vegetation types **EeMsGa, EiMcGa, EoMtTc, EpBmMs, EpEa, EpMhGa** and **EspPmCl**.

In 2014, searches were conducted to identify whether, and to what extent, populations occur outside of the study area. It was apparent that flowering of *Conostylis lepidospermoides* in 2014 was not as prolific as 2013, making it more difficult to locate the species. Six of the nine populations were observed to extend well beyond the boundary of the study area (**Table 10**). It is considered likely that the other three populations extend into adjacent areas considering the vegetation types supporting *Conostylis lepidospermoides* are not restricted to the study area.

Most populations of *Conostylis lepidospermoides* occur within the study area at relatively high density, with individual plants not usually separated by more than 5-10 m. Therefore the proposed fence construction is unlikely to be able to avoid impact to this species within the current alignment.

Table 10: Summary of *Conostylis lepidospermoides* populations within the study area

NO PLANTS WITHIN STUDY AREA	NO PLANTS OUTSIDE STUDY AREA	NOTES
1,450	Estimated 1,350+	Extensive population, widespread within and adjacent to the study area.
20	10+	Small, scattered population, that extends either side of the study area
360	None observed	Plants were not observed outside of the study area, however habitat is suitable
265	Estimated 710+	Widespread within and adjacent to the study area
50	None observed	Plants were not observed outside of the study area, however habitat is suitable
140	None observed	Plants were not observed outside of the study area, however habitat is suitable
10	Estimated 80+	Scattered plants within and adjacent to the study area
290	Estimated 150+	Widespread within and adjacent to the study area
150	Estimated 90+	Scattered plants within and adjacent to the study area

***Eucalyptus merrickiae* (TF)**

Goblet Mallee (*Eucalyptus merrickiae*, **Plate 6**, **Plate 7**) is a rough-barked mallee to 6 m high with narrow leaves and distinctive red bud caps in groups of three. It usually grows close to salt lakes in sandy or loamy soil (Slee *et al.* 2006; *FloraBase*, WAH 1998-2014) but was also observed higher in the landscape during the field surveys. There are 76 records of this species listed on *NatureMap* (DPaW 2007-2014), most of which are located approximately north of Esperance over a north-south and east-west range of approximately 80 km.

Eleven populations of *Eucalyptus merrickiae* were recorded intermittently over 56 km of the study area alignment, none of which were previously known to occur. There were 412 individual plants estimated from all populations combined. Most populations were associated with or in close proximity of salt lakes. *Eucalyptus merrickiae* was recorded from the northeastern portion of the study area, in the vicinity of Salmon Gums NR. All populations have been previously impacted by the existing scrub-rolling, numerous plants were observed to be successfully regenerating within this area. Most populations occur directly adjacent to agricultural land and there is the potential to avoid these populations completely if the fence could be constructed within the already cleared agricultural land.



Plate 6: *Eucalyptus merrickiae* (TF) buds



Plate 7: *Eucalyptus merrickiae* (TF) form

During the 2014 field survey, all populations of *Eucalyptus merrickiae* were re-surveyed to identify the extent beyond the boundary of study area. Individual population details are summarised in **Table 11**. All populations were recorded to extend beyond the study area boundary. There are extensive areas of potentially suitable habitat for *Eucalyptus merrickiae* (i.e. salt lake edges) within the UCL adjacent to study area.

Table 11: Summary of *Eucalyptus merrickiae* populations within the study area

NO PLANTS WITHIN STUDY AREA	NO PLANTS OUTSIDE STUDY AREA	NOTES*
40	10+ plants to the south of the study area	Most plants are within the unchained portion of the study area. All plants are likely to be avoided by utilising the northern side of the scrub-rolled vegetation
16	150+ plants to the north of the study area	Scattered plants occur within the scrub-rolled area. An estimated that 5-10 plants may be impacted by the proposed fence construction, the least impact is on the southern side of the scrub-rolled area.
70	100+ plants to the east of the study area	Estimated 5-10 plants may be impacted, the least plants would be impacted on the western side of the scrub-rolled area.
55	50+ plants to the south of the study area	Estimated 5-10 plants may be impacted, the least plants would be impacted on the northern side of the scrub-rolled area.
41	50+ plants to the south of the study area	Estimated 5-10 plants may be impacted, the least plants would be impacted on the northern side of the scrub-rolled area.
62	100+ plants to the west of the study area	Population likely to be completely avoided by placing fence at the eastern side of the scrub-rolled area
60	20+ plants to the east of the study area	Scattered plants occur within the scrub-rolled vegetation, impact can possibly be limited
27	400+ plants occur on either side of the study area	Scattered plants occur within the scrub-rolled area. The population is mostly avoidable on the western side of the scrub-rolled area, however an estimated 5-10 plants may be impacted.
19	130+ plants to the east of study area	Population is likely to be mostly or completely avoidable by utilising the western side of the study area
13	200+ plants on both sides of the study area	Population is likely to be mostly or completely avoidable by utilising the western side of the scrub-rolled area
9	30+ plants to the south of the study area	Population can be completely avoided by utilising the northern side of the scrub-rolled area (uphill from the small salt lake)

*'Avoiding' populations in the table above avoiding direct impact (i.e. clearing), it does not take into account the commonly applied 50 m buffer for TF.

Priority 1 Flora

Acacia diaphana (P1)

Acacia diaphana (**Plate 8, Plate 9**) is a bushy shrub to 3 m high, favouring clay or sandy loam soil associated with wet or waterlogged depressions (*FloraBase*, WAH 1998-2014). There are 13 records for this species listed on *NatureMap* (DPaW 2007-2014), all located northeast of Esperance over an east-west range of approximately 85 km.

Two populations of *Acacia diaphana* were recorded during the field surveys, comprising approximately 221 individual plants within the study area. One of these populations was close to, but not included in, a known population at Clyde Hill NR; the other is also a new population, located nearby but to the east. Both populations are associated with drainage depressions dominated by *Eucalyptus occidentalis* (Swamp Yate). Field observations indicate that this species is most abundant within the scrub-rolled area, suggesting that it is likely to be a disturbance opportunist, regenerating in abundance following disturbance events such as fire.

There was an additional population of *Acacia diaphana* recorded during the 2012 scoping study near. However an assessment of this area did not identify any plants at this location, despite the habitat appearing to be suitable.

It is understood that *Acacia diaphana* is currently being considered for TF listing (E. Massenbauer³ pers. comm.), therefore impact to this species should be minimised as much as possible. The population was apparently confined to the northern side of the scrub-rolled area whilst the population was restricted to the eastern side of the scrub-rolled area, with scattered plants observed in the undisturbed vegetation to the east of the study area.



Plate 8: *Acacia diaphana* (P1) flowers and foliage



Plate 9: *Acacia diaphana*

³ Emma Massenbauer: Flora Conservation Officer, Department of Parks and Wildlife

***Baeckea* sp. Gibson (K.R. Newbey 11084) (P1)**

Baeckea sp. Gibson (K.R. Newbey 11084) (**Plate 10, Plate 11**) is an erect shrub to 2 m high with pink flowers (*FloraBase*, WAH 1998-2014). There are five records of this taxon listed on *NatureMap* (DPaW 2007-2014), all northeast of Esperance, with an east-west range of approximately 80 km

Two populations, comprising approximately 250 individual plants, were located east of Karl Berg Road, in the eastern portion of the study area. These were new populations but close to a known population.



Plate 10: *Baeckea* sp. Gibson (K.R. Newbey 11084) (P1) flowers



Plate 11: *Baeckea* sp. Gibson (K.R. Newbey 11084) (P1) habit

***Boronia baeckeacea* subsp. *patula* (P1)**

Boronia baeckeacea subsp. *patula* (**Plate 12**) is a slender shrub to 1 m high with pink and white flowers; it differs from its more common relative (*B. baeckeacea* subsp. *baeckeacea*) by its larger, and at times trifoliate, leaves (*FloraBase*, WAH 1998-2014). There are eight records of this taxon listed on *NatureMap* (DPaW 2007-2014), all northeast of Esperance over a range of approximately 60 km.

Seven populations comprising approximately 447 individual plants were recorded during the field surveys. One population was recorded east of Salmon Gums and is a new record located approximately 50 km north or west of previously known populations (DPaW 2007-2014). The remaining populations are close to and probably include one previously known record, and are distributed from north of Kau Rock Nature Reserve and east to near Mt Ney Nature Reserve.



Plate 12: *Boronia baeckeacea* subsp. *patula* (P1)

***Chamelaucium* sp. Mt Heywood (K. Newbey 7954) (P1)**

Chamelaucium sp. Mt Heywood (K. Newbey 7954) (**Plate 13**) is an upright shrub to 1 m tall with white (turning pink with age) flowers (*FloraBase*, WAH 1998-2014). There are 4 records of this taxon listed on *NatureMap* (DPaW 2007-2014), all located to the northeast of Esperance from two populations that are separated by approximately 70 km.

A single population of *Chamelaucium* sp. Mt Heywood (K. Newbey 7954) was recorded close to comprising at least 200 individual plants, though it was not conservation-listed at the time of survey and hence not specifically targeted for survey. This taxon was noted to be associated with granite derived soils. This record represents a new population for the *Chamelaucium* sp. Mt Heywood (K. Newbey 7954). Considering this population represents one of only three known populations of this taxon, South Coast NRM has advised to preserve it if possible. Minimising clearing and utilising existing firebreak tracks will substantially reduce impacts to this population which extends across a linear length of less than 500 m.



Plate 13: *Chamelaucium* sp. Mt Heywood (K. Newbey 7954) (P1)

***Darwinia* sp. Mt Ney (M.A. Burgman & S. McNee 1274) (P1)**

Darwinia sp. Mt Ney (M.A. Burgman & S. McNee 1274) (**Plate 14**, **Plate 15**) is a low spreading shrub to 30 cm high with grey leaves and white flowers, growing in sandy soils (*FloraBase*, WAH 1998-2014). There are 13 records of this species listed on *NatureMap* (DPaW 2007-2014), all located to the northeast of Esperance over an east-west range of approximately 50 km.

There were nine populations comprising over 2 200 individual plants recorded during the field surveys. They were located intermittently between, between Mt Ney and into Beaumont Nature Reserves, and were all associated with salt lakes or depressions. All are new populations, located approximately 10-40 km from previously known records (DPaW 2007-2014).



Plate 14: *Darwinia* sp. Mt Ney (M.A. Burgman & S. McNee 1274) (P1) flower



Plate 15: *Darwinia* sp. Mt Ney (M.A. Burgman & S. McNee 1274) (P1) habit

***Dicrastylis archeri* (P1)**

Dicrastylis archeri (**Plate 16**) is an erect, spindly shrub with white flowers (*FloraBase*, WAH 1998-2014). *FloraBase* lists a plant height of 0.4m to 1 m. However, the recorded population had individuals up to 1.8 m high. There are nine records of this species listed on *NatureMap* (DPaW 2007-2014), located in an area between Peak Charles NP and north of Beaumont Nature Reserve over an east-west range of approximately 140 km.

There was one population comprising at least 200 individual plants recorded during the field surveys. The population was recorded near, to the west of Lort River, and was associated with deep sandy soil. This population was not previously known, located approximately 15 km from a previously known record (DPaW 2007-2014).



Plate 16: *Dicrastylis archeri* (P1)

***Eucalyptus misella* (P1)**

Eucalyptus misella (**Plate 17**) is a low-growing smooth-barked mallee to 3 m high, growing in sandy soils (*FloraBase*, WAH 1998-2014), often in saline areas (Brooker & Kleinig 2001) although another reference (*Euclid*, Slee *et al.* 2006) considers that it grows high in the landscape and is not associated with salt lakes. The populations recorded during the field survey were recorded on sandplain, and were not associated with salt lakes. There are 32 records of this species listed on *NatureMap* (DPaW 2007-2014), all to the west and north of Esperance over an east-west range of approximately 140 km.

There were four populations comprising approximately 70 individual plants located within a closely spaced area near Fields Rd. The area encompasses previously known records of *Eucalyptus misella* thus does not constitute new populations.



Plate 17: *Eucalyptus misella* (P1)

***Hydrocotyle* sp. Hexaptera (T. Erickson TEE 173) (P1)**

Hydrocotyle sp. Hexaptera (T. Erickson TEE 173) is a prostrate annual herb to 5 cm high (**Plate 18**). The specimen records listed on *FloraBase* (WAH 1998-2014) indicate this taxon to be associated with salt lakes.

Hydrocotyle sp. Hexaptera (T. Erickson TEE 173) was recorded from a two widely separated locations (on the edge of Pyramid Lake and adjacent to Salmon Gums Nature Reserve), both on the edges of salt lakes. There are seven records of this taxon listed on *NatureMap* (DPaW 2007-2014), all from near Lake King. Therefore both are new populations, extending the range of this species by approximately 200 km to the east. It is estimated that both populations contain at least 100 individual plants each.



Plate 18: *Hydrocotyle* sp. Hexaptera (T. Erickson TEE 173) (P1)

***Leucopogon remotus* (P1)**

The specimen records for *Leucopogon remotus* (**Plate 19**) listed on *FloraBase* (WAH 1998-2014) describe this taxon as an erect shrub to 1.4 m high with white flowers, growing on sandy, loamy or limestone soils, at times associated with salt lakes. There are 20 records for this species listed on *NatureMap* (DPaW 2007-2014), all east and northeast of Esperance over an east-west range of approximately 100 km.

Two populations comprising 16 individual plants were recorded during the field surveys. One of the populations is a new record for this species, whilst the other had been previously documented (DPaW 2007-2014).



Plate 19: *Leucopogon remotus* (P1)

***Leucopogon* sp. Bonnie Hill (K.R. Newbey 9831) (P1)**

Leucopogon sp. Bonnie Hill (K.R. Newbey 9831) (**Plate 20**, **Plate 21**) is an erect shrub to 0.5m high growing in sandy soil (FloraBase, WAH 1998-2014). There are 14 records of this taxon listed on *NatureMap* (DPaW 2007-2014), with their distribution falling into two groups to the northwest and northeast of Esperance, approximately 160 km apart.

Two populations comprising approximate 1 700 individual plants were recorded near Fields Road, a previously known population.



**Plate 20: *Leucopogon* sp. Bonnie Hill
(K.R. Newbey 9831) (P1) leaf detail**



**Plate 21: *Leucopogon* sp. Bonnie Hill (K.R.
Newbey 9831) (P1) habit**

***Philotheca gardneri* subsp. *globosa* (P1)**

Philotheca gardneri subsp. *globosa* (**Plate 22, Plate 23**) is a rounded shrub to 0.5 m high growing on sandy soils (*FloraBase*, WAH 1998-2014). There are 15 records of this taxon listed on *NatureMap* (DPaW 2007-2014), all of them northwest of Esperance, over an east-west distribution of approximately 100 km.

Two populations comprising approximately 135 individual plants were recorded during the field surveys. Both populations are new records, with one (west of Cascade Rd) located approximately 10 km from its nearest previously known record and the other (east of Cascade Rd) approximately 6 km from its nearest previously known record (DPaW 2007-2014).



Plate 22: *Philotheca gardneri* subsp. *globosa* (P1) flower and leaves



Plate 23: *Philotheca gardneri* subsp. *globosa* (P1) habit

Priority 2 Flora

Acacia amyctica (P2)

Acacia amyctica (**Plate 24, Plate 25**) is bushy shrub to 1.5 m high, growing on sandy loam or clay soils (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). The phyllodes have spinescent tips. There are 25 records of this species listed on *NatureMap* (DPaW 2007-2014), all to the northwest to north of Esperance, with an east-west distribution of approximately 80 km.

Five populations comprising approximately 337 individual plants were recorded during the field surveys. One group of two populations are east of Cascade Road and the other group of populations are located between Neds Corner Road to Fields Road. All are new populations but located within 10 km of previously known records (DPaW 2007-2014).



Plate 24: *Acacia amyctica* (P2) flowers and phyllodes



Plate 25: *Acacia amyctica* (P2) habit

Acacia nitidula (P2)

Acacia nitidula (**Plate 26, Plate 27**) is a spreading shrub usually to 2 m high on granitic soils, particularly around granite boulders (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). There are 36 records of this species listed on *NatureMap* (DPaW 2007-2014), all within 50 km of the coast from Cape Riche, eastwards to Cape Arid; a distance of approximately 430 km.

Nine populations comprising over 6 000 individual plants were recorded during the field surveys, located in the eastern portion of the study area scattered east and south of Clyde Hill Nature Reserve. The nearest previous record of *Acacia nitidula* is approximately 25 km southeast of the southernmost population recorded during these field surveys (DPaW 2007-2014).



Plate 26: *Acacia nitidula* (P2) fruit and phyllodes



Plate 27: *Acacia nitidula* (P2) habit

***Aotus* sp. Dundas (M.A. Burgman 2835) (P2)**

According to the specimen details listed on *FloraBase* (WAH 1998-2014), *Aotus* sp. Dundas (M.A. Burgman 2835) (Plate 28, Plate 29) is a shrub to 0.8 m high, often associated with saline areas. There are 18 records of this taxon listed on *NatureMap* (DPaW 2007-2014) occurring from northwest to northeast of Esperance; an east-west distribution of approximately 140 km and north-south distribution of approximately 120 km.

Twenty two populations comprising over 4 500 individual plants were recorded during the field surveys, scattered intermittently over 235 km of the central portion of the study area. All were new populations however they were within the broad area considered to be represent the species distribution as shown on *NatureMap* (DPaW 2007-2014).



Plate 28: *Aotus* sp. Dundas (M.A. Burgman 2835) (P2) fruit and foliage



Plate 29: *Aotus* sp. Dundas (M.A. Burgman 2835) (P2) habit

***Darwinia luehmannii* (P2)**

Darwinia luehmannii (**Plate 30**, **Plate 31**) is a spreading shrub to 0.5 m high, often associated with white sandy soil and granite rocks (*FloraBase*, WAH 1998-2014). There are five records of this species listed on *NatureMap* (DPaW 2007-2014), all within 15 km of each other, to the northeast of Esperance.

Two closely spaced populations comprising approximately 157 individual *Darwinia luehmannii* plants were recorded during the field surveys, located east of Salmon Gums. These are new records for this species, located approximately 15 km north of previously known populations (DPaW 2007-2014).



Plate 30: *Darwinia luehmannii* (P2) flowers



Plate 31: *Darwinia luehmannii* (P2) habit

***Daviesia newbeyi* (P2)**

Daviesia newbeyi (**Plate 32**) is a bushy shrub to 1.5 m high growing on sand or sandy clay soil over granite (*FloraBase*, WAH 1998-2014). There are 26 records for this species listed on *NatureMap* (DPaW 2007-2014); they are scattered over a wide area from near Mt Holland, southwards to the Fitzgerald River NP (approximately 200 km) and eastwards to near Cape Arid NP (approximately 320 km).

A single population comprising approximately 400 individual plants were recorded during the field surveys, located in the far eastern portion of the study area, east of Clyde Hill Nature Reserve. This population is only approximately 2.5 km west of a previous record (DPaW 2007-2014) and may be contiguous with it.



Plate 32: *Daviesia newbeyi* (P2)

***Drosera salina* (P2)**

Drosera salina (**Plate 33**) is a perennial herb to 0.07 m high with white flowers growing on the margins of salt lakes (*FloraBase*, WAH 1998-2014). There are 17 records of this species listed on *NatureMap* (DPaW 2007-2014), located between Willoughby Nature Reserve and south of Norseman (an east-west range of approximately 340 km).

Two populations comprising approximately 550 individual plants were recorded during the field surveys northwest of Salmon Gums, both are new records for the species. Both populations were recorded from the margins of salt lakes in loose, sandy soil.



Plate 33: *Drosera salina* (P2) whole plant with basal rosette uncovered (usually underground)

***Eucalyptus luculenta* (P2)**

Eucalyptus luculenta (**Plate 34**) is a mallee to 5 m tall with cream coloured flowers (*FloraBase*, WAH 1998-2014). There are 4 records of this species listed on *NatureMap* (DPaW 2007-2014), restricted to a 35 km range to the north of Cape Arid NP (one record within the Park).

At least 11 populations of *Eucalyptus luculenta* were recorded from relevés and quadrats. It is uncertain how many plants are likely to be impacted as this species was not priority listed at the time of the field surveys and hence was not targeted for survey. However it was noted to be a dominant species of several vegetation types within the range that it was recorded and is likely to number several thousand individual plants. *Eucalyptus luculenta* was recorded from numerous records between Beaumont Nature Reserve and the intersection with Parmango Road.



Plate 34: *Eucalyptus luculenta* (P2) flowers and foliage

***Frankenia brachyphylla* (P2)**

Frankenia brachyphylla (**Plate 35, Plate 36**) is a decumbent shrub found on salt lake margins (*FloraBase*, WAH 1998-2014). There are four records of this species listed on *NatureMap* (DPaW 2007-2014), from three widely spaced locations (near Koolyanobbing, near the northern extremity of the study area, and near Truslove; a range of approximately 360 km).

Frankenia brachyphylla was identified by available taxonomic literature; however there were no specimens available at the WAH to confirm the identity. As one of the populations was located approximately 500 m from an existing known population, it is considered that the identification is correct.

Three populations comprising approximately 400 individual plants were located during the field surveys at scattered locations near Pyramid Lake, Neds Corner Road and near north of Kumarl Lake King Road. It occurred on the edges of salt lakes. One of the populations is likely contiguous with a known population nearby.



Plate 35: *Frankenia brachyphylla* (P2) flowers and leaves



Plate 36: *Frankenia brachyphylla* (P2) habit

***Halgania* sp. Peak Eleanora (M.A. Burgman 3547 B) (P2)**

Halgania sp. Peak Eleanora (M.A. Burgman 3547 B) (**Plate 37, Plate 38**) is a low shrub to 0.4 m high and 0.6 m wide, with purple flowers, growing on various substrates (*FloraBase*, WAH 1998-2014). There are six records of this taxon listed on *NatureMap* (DPaW 2007-2014), most within approximately 35 km of Peak Charles and one outlier population approximately 180 km to the east.

Twenty two populations comprising almost 6 000 individual plants were recorded during the field surveys, occurring intermittently south of Peak Charles. This taxon was observed to be most prolific within the low fuel modified buffer strip. All are new populations but are located within the known species distribution (DPaW 2007-2014).



Plate 37: *Halgania* sp. Peak Eleanora (M.A. Burgman 3547 B) (P2) close up



Plate 38: *Halgania* sp. Peak Eleanora (M.A. Burgman 3547 B) (P2) habit

***Hydrocotyle* sp. Coraginaensis (K. Newbey 7747) (P2)**

Hydrocotyle sp. Coraginaensis (K. Newbey 7747) (**Plate 39**) is a prostrate annual herb to 5 cm high. The specimen records listed on *FloraBase* (WAH 1998-2014) indicate this taxon to be associated with salt lakes. There are three records of this taxon listed on *NatureMap* (DPaW 2007-2014), all to the north and northeast east of Esperance, across a range of approximately 200 km.

A single population of *Hydrocotyle* sp. Coraginaensis (K. Newbey 7747) was estimated to contain at least 100 individual plants. It was recorded from a seasonally inundated freshwater claypan (though dry at the time of survey) on granite derived soils. This population represents a new record for the taxon, and extends the known range by approximately 50 km to the south.



Plate 39: *Hydrocotyle sp. Coraginaensis* (K. Newbey 7747) (P2) scanned image of whole plants

Melaleuca eximia (P2)

Melaleuca eximia (Plate 40, Plate 41) is an erect shrub with large red bottlebrush flowers growing in sandy or clay soils, or associated with granite outcrops (Holiday 1989; *FloraBase*, WAH 1998-2014). There are 13 records of this species listed on *NatureMap* (DPaW 2007-2014), all from northeast of Esperance over a 100 km east-west range.

A single population of approximately 20 individuals was recorded within and adjacent to Beaumont Nature Reserve. This is a new population, located 30 km from its nearest known record, but is within the known distribution of *Melaleuca eximia* (DPaW 2007-2014).



Plate 40: *Melaleuca eximia* (P2) flower



Plate 41: *Melaleuca eximia* (P2) habit

***Persoonia spathulata* (P2)**

Persoonia spathulata (**Plate 42**, **Plate 43**) is an erect shrub to 0.6 m high with yellow flowers, growing in sandy soils (*FloraBase*, WAH 1998-2014). There are only three records of this species listed on *NatureMap* (DPaW 2007-2014), from northeast and east of Esperance over a linear range of approximately 140 km.

Persoonia spathulata was recorded from eight populations comprising approximately 36 individual plants, scattered along the study area east of Lort River, east of Salmon Gums, east of Parmango Road and several from west of Cape Arid NP. Most of the populations are considered to be new populations of the species (DPaW 2007-2014).



Plate 42: *Persoonia spathulata* (P2) flower and leaves



Plate 43: *Persoonia spathulata* (P2) habit

***Thysanotus brachyantherus* (P2)**

Thysanotus brachyantherus (**Plate 44**) is a perennial herb to 0.4 m high, growing in sandy soil (*FloraBase*, WAH 1998-2014). There are 12 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed over a wide range from approximately 475 km north of Esperance (west of Menzies) to approximately 150 km east of Esperance (Cape Arid NP and northwards); a linear range of approximately 500 km.

Three widely spaced populations of *Thysanotus brachyantherus*, comprising approximately 15 individual plants, were recorded during the field survey. The populations were recorded east of Cascade Rd (western portion of the study area), near Magagnotti Rd (northern part of the study area) and adjacent to Beaumont NR (eastern portion of the study area). All are new populations, with the former being a range extension of approximately 60 km and the others being within the known species distribution (DPaW 2007-2014).



Plate 44: *Thysanotus brachyantherus* (P2)

Priority 3 Flora

Acacia bartlei (P3)

Acacia bartlei (**Plate 46**) is recently described tall shrub or small tree to 7 m tall, typically occurring in waterlogged depressions in association with *Eucalyptus occidentalis* (*FloraBase*, WAH 1998-2014). There are 26 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed from north of the Cascade locality to Kau Rock NR; a linear range of approximately 150 km.

A single population of *Acacia bartlei* was recorded, comprising at least 200 individual plants. The population was associated with a seasonally damp depression west of Beaumont NR. This population represents a new record for the species, and extends the known range by approximately 10 km to the east.



Plate 45: *Acacia bartlei* (P3) scanned image of collection

Acacia euthyphylla (P3)

Acacia euthyphylla (**Plate 46**) is an erect shrub to 2 m high; it grows in various substrates generally close to salt lakes and seasonal swamps (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). There are 22 records of this species listed on *NatureMap* (DPaW 2007-2014), scattered from north of Esperance (near Truslove) to east of Esperance (near Cape Arid NP); an east-west range of approximately 120 km and north-south range of approximately 90 km.

Acacia euthyphylla was recorded from eight populations over two general areas. The more northern populations, east of Grass Patch, were associated with salt lake edges. The more eastern populations, in Beaumont NR and westwards, were associated with shallow depressions in the landscape, and may represent a single contiguous population as it is likely to also occur outside the study area. One population is considered to represent a known population on the edge of Beaumont NR; the others are new populations but within or close to the distribution of this species (DPaW 2007-2014).



Plate 46: *Acacia euthyphylla* (P3) habit

***Acacia glaucissima* (P3)**

Acacia glaucissima (**Plate 47**, **Plate 48**) is a dense shrub to 1.5 m high, growing in sand or clay soils (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). There are 24 records of this species listed on *NatureMap* (DPaW 2007-2014), from northwest to northeast of Esperance over an east-west range of approximately 170 km.

Ecoscope recorded 82 populations of *Acacia glaucissima* comprising nearly over 10 000 individual plants, most frequently and most densely in the low fuel modified buffer of the study area alignment, where it was considered to be a disturbance opportunist species. Where it was within undisturbed vegetation it was sparsely distributed. Populations of *Acacia glaucissima* were extensively recorded across a large area to the west of Salmon Gums and Beaumont NR. Some were previously recorded populations, and all occurred within the known species distribution (DPaW 2007-2014).



Plate 47: *Acacia glaucissima* (P3) fruit and phyllodes



Plate 48: *Acacia glaucissima* (P3) habit

***Acacia improcera* (P3)**

Acacia improcera (**Plate 49**, **Plate 50**) is a spreading spiny shrub to 0.4 m high, growing in sand, loam or clay soils (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). There are 14 records of this species listed on *NatureMap* (DPaW 2007-2014), from northeast of Esperance (near Lake King) to north of Esperance; an east-west range of approximately 230 km and north-south range of approximately 130 km.

There were six populations comprising approximately 341 individual plants recorded during the field surveys, located in two widely spread areas approximately 50 km apart. One population was located west of Salmon Gums; the others were located intermittently to the east of Salmon Gums. All are new populations but occur within the known species distribution (DPaW 2007-2014).



Plate 49: *Acacia improcera* (P3) fruit and phyllodes



Plate 50: *Acacia improcera* (P3) habit

***Acacia singula* (P3)**

Acacia singula (**Plate 51**, **Plate 52**) is a shrub to 2 m high, growing on a number of different soil types (Shire of Dalwallinu *et al.* 2010; *FloraBase*, WAH 1998-2014). There are 44 records of this species listed on *NatureMap* (DPaW 2007-2014), from Tarin Rock eastwards to north of Munglinup; an east-west range of approximately 200 km.

There were three populations of *Acacia singula*, comprising over 1 200 individual plants, recorded during the field surveys over a 3 km range, west of Cascade Rd in the western part of the study area. These populations are likely to be contiguous through the adjacent uncleared vegetation, and represent a previously known population.



Plate 51: *Acacia singula* (P3) flowers and phyllodes



Plate 52: *Acacia singula* (P3) habit

***Bossiaea flexuosa* (P3)**

Bossiaea flexuosa (Plate 53, Plate 54) is a compact shrub to 0.6 m high, usually occurring in deep sandy soils on the edges of salt lakes (*FloraBase*, WAH 1998-2014). There are 27 records of this species listed on *NatureMap* (DPaW 2007-2014), from northwest to northeast of Esperance, over a radius of over 200 km.

Eleven populations of *Bossiaea flexuosa*, comprising over 3 400 individual plants, were recorded during the field surveys. The populations were distributed between Fields Road and Lort River and south of Salmon Gums NR. Several populations were previously known to exist; all others are new populations but are located within the known species distribution (DPaW 2007-2014).

Bossiaea flexuosa was always recorded in association with sandy soils, however not always in association with salt lakes.



Plate 53: *Bossiaea flexuosa* (P3) fruit and stems



Plate 54: *Bossiaea flexuosa* (P3) habit and habitat

***Comesperma calcicola* (P3)**

Comesperma calcicola (**Plate 55**) is a perennial herb to 0.3 m high with pink flowers, growing in calcareous or semi-saline soils (*FloraBase*, WAH 1998-2014). There are 11 widely spaced records of this species listed on *NatureMap* (DPaW 2007-2014), mostly to the northeast of Esperance over an east-west range of approximately 150 km, but with an outlier population near Lake Cronin, approximately 250 km to the northwest of Esperance.

Nine populations comprising approximately 100 individual plants were recorded during the field surveys. *Comesperma calcicola* populations were scattered within the study area from east of Cascade Rd (western portion of the study area) to Clyde Hill NR (eastern portion of the study area). All are new populations of this species, but located within the confines of the known species distribution (DPaW 2007-2014).



Plate 55: *Comesperma calcicola* (P3)

***Conostephium marchantiorum* (P3)**

Conostephium marchantiorum (**Plate 56, Plate 57**) is an erect shrub to 1.8 m high, usually growing in sandy soil near creeklines and salt lakes (*FloraBase*, WAH 1998-2014). There are 47 records of this species listed on *NatureMap* (DPaW 2007-2014), located from the northwest to north of Esperance over an east-west range of approximately 80 km and north-south range of approximately 70 km.

Four populations of *Conostephium marchantiorum*, comprising approximately 73 individual plants, were recorded during the field surveys. They were all located towards the north of the study area, north of Magagnotti Rd, near Kumarl Lake King Rd, and near McCrea Rd. All are new populations, located approximately 20 km north of its previously known distribution (DPaW 2007-2014); this range extension is considered minor.



Plate 56: *Conostephium marchantiorum* (P3)



Plate 57: *Conostephium marchantiorum* (P3) habit and habitat

***Cyathostemon* sp. Salmon Gums (B. Archer 769) (P3)**

Cyathostemon sp. Salmon Gums (B. Archer 769) (**Plate 58, Plate 59**) is a dense shrub to 3 m high, growing in a variety of soil types associated with either granite or wet areas like lakes, rivers and clay pans (*FloraBase*, WAH 1998-2014). There are 12 records of this taxon listed on *NatureMap* (DPaW 2007-2014), to the north and northwest of Esperance over an east-west and north-south range of approximately 140 km.

Twenty four populations of this species, comprising over 4 600 individual plants, were recorded during the field surveys. They were distributed over three main discontinuous groups northwest of Salmon Gums, east of Salmon Gums and east of Grass Patch. The latter population represent a minor range extension to the east of the known species distribution (DPaW 2007-2014), however this is not considered significant.

The genus *Cyathostemon* is currently under review.



Plate 58: *Cyathostemon* sp. Salmon Gums (B. Archer 769) (P3) flowers



Plate 59: *Cyathostemon* sp. Salmon Gums (B. Archer 769) (P3) habit and habitat

***Daviesia pauciflora* (P3)**

Daviesia pauciflora (**Plate 60**, **Plate 61**) is a tufted shrub to 0.8 m high growing on sand over laterite or limestone (*FloraBase*, WAH 1998-2014). There are 28 records of this species listed on *NatureMap* (DPaW 2007-2014), mostly located between Fitzgerald River NP and Cape Le Grand NP (an east-west range of approximately 230 km, and north of these to approximately 50 km), but with an outlier record from near Tarin Rock (near Lake Grace, approximately 180 km northwest of the westernmost southern record).

A single population comprising approximately 71 individual plants was recorded during the field surveys, near Kau Rock NR, and is likely to be included in a previously known population (DPaW 2007-2014).



Plate 60: *Daviesia pauciflora* (P3) habit



Plate 61: *Daviesia pauciflora* (P3) flowers and foliage

***Eremophila chamaephila* (P3)**

Eremophila chamaephila (**Plate 62**, **Plate 63**) is a low dome-shaped shrub to 0.25 m high with small blue-purple flowers, growing in sand or clay soils (*FloraBase*, WAH 1998-2014). There are 26 records of this species listed on *NatureMap* (DPaW 2007-2014), from Fitzgerald River NP to Clyde Hill, north of Cape Arid NP; an east-west range of over 300 km.

Eleven populations comprising over 10 000 individual plants were recorded during the field surveys. These populations were scattered throughout much of the study area. All are within this species known distribution (DPaW 2007-2014); one of the populations was previously known.



Plate 62: *Eremophila chamaephila* (P3) flowers



Plate 63: *Eremophila chamaephila* (P3) habit

***Eremophila compressa* (P3)**

Eremophila compressa (**Plate 64**, **Plate 65**) is an erect spindly shrub to 2 m high, usually growing on clay or loamy soils (*FloraBase*, WAH 1998-2014). There are 24 records of this species listed on *NatureMap* (DPaW 2007-2014), most of which are in the Salmon Gums area. *Eremophila compressa* has a north-south range of approximately 160 km and an east-west range of approximately the same.

Four populations comprising over 1 200 individual plants were recorded during the field surveys. All were in the western portion of the study area west of Fields Road and east of Lort River. All are new populations however two are relatively close to previous records.



Plate 64: *Eremophila compressa* (P3)
flowers and leaves



Plate 65: *Eremophila compressa* (P3)
habit and habitat

***Frankenia drummondii* (P3)**

Frankenia drummondii (**Plate 66**) is a prostrate, mat-like shrub with white flowers, growing in sandy soils associated with lakes and creeklines (*Ecocape* 2007; *FloraBase*, WAH 1998-2014). There are 60 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed over much of the eastern part of southwestern Western Australia, with an east-west range of approximately 400 km and north-south range of approximately 230 km. The study area is at the eastern edge of the range.

Three populations were recorded during the field surveys comprising approximately 340 individual plants. They were located in the northern part of the study area, close to Kumarl Lake King Rd. All were new populations but close to an existing record for this species.

All *Frankenia drummondii* populations were associated with salt lakes edges.



Plate 66: *Frankenia drummondii* (P3) form

***Frankenia glomerata* (P3)**

Frankenia glomerata (**Plate 67, Plate 68**) is a prostrate shrub with pink flowers growing in sandy soil (*FloraBase*, WAH 1998-2014). There are 55 records of this species listed on *NatureMap* (DPaW 2007-2014), over a large portion of Western Australia from the Little Sandy Desert bioregion, to coastal areas including the Geraldton Sandplains bioregion, and east to the Mallee bioregion; a north-south range of over 1 000 km, and east-west range of over 800 km.

Three populations of *Frankenia glomerata* were recorded during the field surveys comprising of approximately 380 individual plants. Two populations were associated with Pyramid Lake and the other near Swann Rd. All are new populations of this species but within its known distribution (DPaW 2007-2014).



Plate 67: *Frankenia glomerata* (P3) flowers



Plate 68: *Frankenia glomerata* (P3) habit

***Gonocarpus pycnostachyus* (P3)**

Gonocarpus pycnostachyus (**Plate 69**) is an annual herb to 0.15 m high, growing in sandy or clay soils (*FloraBase*, WAH 1998-2014). There are 19 records of this species listed on *NatureMap* (DPaW 2007-2014), mostly to the east and northeast of Esperance (over an approximately 130 km range), with two outlier populations, one in the Little Sandy Desert bioregion (approximately 950 km north of Esperance) and one in the Avon Wheatbelt bioregion (over 400 km northwest of Esperance), although neither of these records have specimens held in the WAH (WAH 1998-2014).

A single population of this species comprising approximately 330 individual plants was recorded during the field surveys. This is a new population of *Gonocarpus pycnostachyus* but within its known distribution (DPaW 2007-2014). It was located in the eastern portion of the study area near Shao Lu Rd.



Plate 69: *Gonocarpus pycnostachyus* (P3)

***Goodenia laevis* subsp. *laevis* (P3)**

Goodenia laevis subsp. *laevis* (**Plate 70, Plate 71**) is an erect to sprawling subshrub to 0.25 m high, growing in sandy loam or lateritic soils (*FloraBase*, WAH 1998-2014). There are 16 records of this taxon listed on *NatureMap* (DPaW 2007-2014), with a north-south distribution from Norseman to Scaddan (approximately 140 km) and an east-west range of approximately 170 km.

Fifty eight populations of *Goodenia laevis* subsp. *laevis*, comprising over 12 000 individual plants, were recorded intermittently over much of the alignment, excluding a small section to the northeast of Salmon Gums. According to the *NatureMap* (DPaW 2007-2014) distribution of this taxon, this represents a minor western range extension of approximately 20 km and infills a range gap in the northeastern portion of the study area.

This taxon was noted to be more common in disturbed areas than in undisturbed woodland and mallee vegetation.



Plate 70: *Goodenia laevis* subsp. *laevis* (P3) flowers



Plate 71: *Goodenia laevis* subsp. *laevis* (P3) habit

Isopogon alcicornis (P3)

Isopogon alcicornis (Plate 72) is a tufted lignotuberous shrub to 0.5 m high, growing in sandy or loamy soils (FloraBase, WAH 1998-2014). There are 25 records of this species listed on *NatureMap* (DPaW 2007-2014), from Dalyup east to Cape Arid NP (approximately 150 km) and a north-south range of approximately 40 km.

Six populations of this species, comprising approximately 30 individual plants, were recorded during the field surveys. The populations formed two main groups in the eastern portion of the study area, near Bronzewing Rd and west of Cape Arid NP. All are new records however both are close to previously known populations.



Plate 72: *Isopogon alcicornis* (P3)

***Micromyrtus elobata* subsp. *scopula* (P3)**

Micromyrtus elobata subsp. *scopula* (**Plate 73**) is an erect shrub to 1 m high (although usually less), growing in sand or sandy clay soil (*FloraBase*, WAH 1998-2014). There are 10 records of this taxon listed on *NatureMap* (DPaW 2007-2014), all from north to northwest of Esperance over an east-west range of approximately 150 km.

Forty four populations of this taxon, comprising over 18 000 individual plants, were recorded during the field surveys. *Micromyrtus elobata* subsp. *scopula* was recorded intermittently over approximately 180 km of the study area alignment, in the northeastern to eastern portion. These records infill a gap in the taxon's distribution but is broadly within its known distribution (DPaW 2007-2014).

Micromyrtus elobata subsp. *scopula* occurred on sandy soils, most frequently close to salt lakes.



Plate 73: *Micromyrtus elobata* subsp. *scopula* (P3)

***Persoonia cymbifolia* (P3)**

Persoonia cymbifolia (**Plate 74, Plate 75**) is an erect to spreading shrub to 1 m high, growing in sandy soils (*FloraBase*, WAH 1998-2014). There are 41 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed between Mt Holland and Cape Arid NP; an east-west distribution of approximately 340 km.

Eleven populations of *Persoonia cymbifolia* were recorded during the field surveys, comprising approximately 24 individual plants. These populations were scattered between Lort River and Ridley Road; typically only isolated plants were observed. All are new populations, however they were all within the known distribution of this species (DPaW 2007-2014).



Plate 74: *Persoonia cymbifolia* (P3) leaf detail



Plate 75: *Persoonia cymbifolia* (P3) habit

***Persoonia scabra* (P3)**

Persoonia scabra (Plate 76) is an erect or spreading lignotuberous shrub to 0.9 m high, growing on sand or sandy loam soil (*FloraBase*, WAH 1998-2014). There are 13 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed from Frank Hann NP east to near Clyde Hill NR; an east-west range of approximately 250 km.

Seven populations comprising approximately 30 individual plants were recorded during the field surveys. They were located in the eastern portion of the study area. All are new populations but within the known distribution of this species (DPaW 2007-2014).



Plate 76: *Persoonia scabra* (P3) habit

***Pityrodia chrysocalyx* (P3)**

Pityrodia chrysocalyx (**Plate 77**, **Plate 78**) is an erect shrub to 1 m high, growing in sandy soils, at times associated with salt lakes (*FloraBase*, WAH 1998-2014). There are 16 records of this species listed on *NatureMap* (DPaW 2007-2014), between Lake Tay, Norseman and Esperance; an east-west range of approximately 120 km and north-south range of approximately 190 km.

Eleven populations of *Pityrodia chrysocalyx* comprising almost 5 000 individual plants were recorded during the field surveys. These populations occurred intermittently between north of Griffiths/Edwards Rd (western portion of the study area) and south of Logans Road. One of the populations corresponds with a previously known population however the others are new records for the species.



Plate 77: *Pityrodia chrysocalyx* (P3) flowers and leaves



Plate 78: *Pityrodia chrysocalyx* (P3) habit

***Pultenaea adunca* (P3)**

Pultenaea adunca (**Plate 79**) is a slender, erect shrub to 1 m high growing in sandy soil (*FloraBase*, WAH 1998-2014). There are 14 records of this species listed on *NatureMap* (DPaW 2007-2014); it has a wide east-west distribution of over 360 km, from Jerramungup to east of Beaumont.

One population comprising at least 250 individual plants was recorded during the field surveys, adjacent to Cheadanup NR in the western portion of the study area. This is a new population for this species but is within its known distribution (DPaW 2007-2014).



Plate 79: *Pultenaea adunca* (P3) foliage

***Pultenaea craigiana* (P3)**

According to the specimen details listed on *FloraBase* (WAH 2014), *Pultenaea craigiana* (**Plate 80**) is an erect shrub to 1 m high growing in a range of soils including loam and clay. There are 31 records of this species listed on *NatureMap* (DPaW 2007-2014), all from near Ravensthorpe and Kundip, over a north-south range of less than 30 km and east-west range of less than 25 km.

One population of *Pultenaea craigiana*, comprising at least 200 individual plants, was recorded adjacent to Cheadanup NR in the western portion of the study area. This is a new population for this species and an eastern range extension of approximately 30 km (DPaW 2007-2014).



Plate 80: *Pultenaea craigiana* (P3) flowers and foliage

***Pultenaea daena* (P3)**

Pultenaea daena (**Plate 81**, **Plate 82**) is a dense, prostrate shrub growing in a range of soils including sand, sandy loam and sandy or loamy clay over a number of substrates including limestone and laterite (*FloraBase*, WAH 1998-2014). There are 27 records of this species listed on *NatureMap* (DPaW 2007-2014), over a wide distribution between Lake Cronin, Lake Magenta, Cheadanup and east of Lake Johnston; an east-west range of approximately 160 km and north-south range of approximately 150 km.

Two populations of *Pultenaea daena* were recorded, comprising approximately 650 individual plants, located close to Cheadanup NR in the western portion of the study area. The westernmost population is previously known.



Plate 81: *Pultenaea daena* (P3) flower and leaf detail



Plate 82: *Pultenaea daena* (P3) habit

***Trachymene anisocarpa* var. *trichocarpa* (P3)**

Trachymene anisocarpa var. *trichocarpa* (**Plate 83**) is an erect annual herb growing in sandy soil (*FloraBase*, WAH 1998-2014). There are only six records of this taxon listed on *NatureMap* (DPaW 2007-2014), all from north and east of Esperance, with an east-west distribution of approximately 90 km and north-south distribution of approximately 70 km.

Six populations comprising approximately 40 individual plants were recorded in the eastern portion of the study area. All are new populations but close to previous records.



Plate 83: *Trachymene anisocarpa* var. *trichocarpa* (P3)

Priority 4 Flora

Adenanthos ileticos (P4)

Adenanthos ileticos (**Plate 84, Plate 85**) is a lignotuberous shrub to 3 m high (but usually less) growing in sandy soils (*FloraBase*, WAH 1998-2014). There are 54 records of this species listed on *NatureMap* (DPaW 2007-2014), from between Salmon Gums and Grass Patch (approximately 35 km) and to approximately 110 km to the east, with an outlier population approximately 80 km north of the eastern extremity.

Fifteen populations comprising almost 4 600 individual plants were recorded in the northeastern portion of the study area, scattered intermittently over a 103 km range. One population north of Salmon Gums was previously known, however the others are new records. The populations of *Adenanthos ileticos* recorded during these field surveys encompass the north-south distribution of the species (DPaW 2007-2014), with only minor extensions in both directions (less than 10 km).

Adenanthos ileticos was always associated with sandy soils, frequently occurring on the lunettes surrounding salt lakes.



Plate 84: *Adenanthos ileticos* (P4) detail



Plate 85: *Adenanthos ileticos* (P3) habit (centre)

Darwinia polycephala (P4)

Darwinia polycephala (**Plate 86, Plate 87**) is a low shrub to 0.5 m high, growing in sand and clay soils often near salt lakes (*FloraBase*, WAH 1998-2014). There are 29 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed between Grass Patch and Scaddan (approximately 25 km) and approximately 60 km eastwards, with an outlier population in Cape Arid NP, approximately 100 km further east.

Eighteen populations of this species were recorded during the field surveys, comprising over 7 200 individual plants. They were located intermittently along the northeastern portion of the study area, from near Circle Valley Road to near Kau Rock NR). These populations are mostly within its known distribution (DPaW 2007-2014), with a minor range extension of approximately 20 km northwards.

Darwinia polycephala was recorded on sandy soils, most frequently close to salt lakes.



Plate 86: *Darwinia polycephala* (P4) flowers and leaves



Plate 87: *Darwinia polycephala* (P4) habit

***Eremophila serpens* (P4)**

Eremophila serpens (**Plate 88**, **Plate 89**) is a prostrate, creeping shrub to 0.4 m high and forming patches to 2 m wide, growing in sand, alluvium and loam soils (*FloraBase*, WAH 1998-2014). There are 41 records of this species listed on *NatureMap* (DPaW 2007-2014), with a wide distribution from Skeleton Rock, south to the Fitzgerald River NP (approximately 225 km) and eastwards to near Beaumont NR, approximately 330 km. There is an outlier population near York, over 200 km to the west of the main species range.

Five populations of *Eremophila serpens*, comprising approximately 36 individual plants, were recorded from two widely separated areas of the study area alignment. It was recorded near adjacent to Rolland Rd and near Muntz Rd. The former is close to a previously known population and may be considered to be part of it; the latter is a new record and an approximate 35 km range extension to the east.

Eremophila serpens was associated with disturbed soil, and frequently occurred on bare soil mounds.



Plate 88: *Eremophila serpens* (P4) flower and leaves



Plate 89: *Eremophila serpens* (P4) habit

***Eucalyptus dolichorhyncha* (P4)**

Eucalyptus dolichorhyncha (**Plate 90**, **Plate 91**) is a smooth-barked mallee to 6 m high growing on sandy clay or clay soils (Slee *et al.* 2006; *FloraBase*, WAH 1998-2014). There are 45 records of this species listed on *NatureMap* (DPaW 2007-2014), distributed from north to northwest of Esperance, over a north-south range of approximately 80 km.

Ten populations of this species were recorded during the field surveys and comprised approximately 435 individual plants. It was recorded intermittently, either side of Lort River in the western portion of the study area. All are new populations but close to known populations and within the known distribution as indicated on *NatureMap* (DPaW 2007-2014).



Plate 90: *Eucalyptus dolichorhyncha* (P4) buds



Plate 91: *Eucalyptus dolichorhyncha* (P4) habit

***Eucalyptus stoatei* (P4)**

Eucalyptus stoatei (**Plate 92**, **Plate 93**) is a smooth-barked mallet or marlock to approximately 7.5 m high, growing in sandy and sandy clay soils, often with gravel (Brooker & Kleinig 2001; Slee *et al.* 2006; *FloraBase*, WAH 1998-2014). There are 48 records of this species listed on *NatureMap* (DPaW 2007-2014), mostly east of Ravensthorpe over an approximate 95 km east-west range.

Forty eight populations of *Eucalyptus stoatei* were recorded during the field surveys comprising over 2 100 individual plants. It occurred intermittently, from Cheadanup NR to Neds Corner Rd. One corresponds with a previously known population and all are within its known distribution (DPaW 2007-2014).



Plate 92: *Eucalyptus stoatei* (P4) buds



Plate 93: *Eucalyptus stoatei* (P4) habit

***Grevillea aneura* (P4)**

Grevillea aneura (Plate 94, Plate 95) is a dense prickly shrub to 2.8 m high, growing in sand, sandy clay and gravelly soils, often favouring Scrub rolled areas (*FloraBase*, WAH 1998-2014). There are 47 records of this species listed on *NatureMap* (DPaW 2007-2014), from near Lake King to north of Clyde Hill; and east-west range of over 320 km.

Grevillea aneura was recorded from 22 populations comprising over 5 700 individual plants. These populations were scattered intermittently in the western and eastern portions of the study area, from north of Melaleuca Rd to near Machens Rd in the west and from near Circle Valley Rd in the east. All populations are within the species known distribution (DPaW 2007-2014), with most being new records and only three likely to be considered for inclusion in previously known populations.



Plate 94: *Grevillea aneura* (P4) flower and leaves



Plate 95: *Grevillea aneura* (P4) habit

***Grevillea baxteri* (P4)**

Grevillea baxteri (**Plate 96**, **Plate 97**) is an erect to spreading shrub to 3.5 m high, growing in sandy soils (*FloraBase*, WAH 1998-2014). There are 42 records of this species listed on *NatureMap* (DPaW 2007-2014), from between Truslove and Israelite Bay; an east-west range of over 200 km.

Twenty two populations comprising over 3 900 individual plants were recorded over a 58 km length of the study area alignment, near the eastern end. Three of these correspond with previously recorded populations and all are within the species known distribution (DPaW 2007-2014).



Plate 96: *Grevillea baxteri* (P4) flower and leaves



Plate 97: *Grevillea baxteri* (P4) habit

***Gyrostemon ditrigynus* (P4)**

Gyrostemon ditrigynus (**Plate 98**, **Plate 99**) is a shrub to 1.5 m high, growing on sandy, sandy clay and loam soils, frequently following fire (*FloraBase*, WAH 1998-2014). There are 42 records of this species listed on *NatureMap* (DPaW 2007-2014); it has a wide east-west range of over 400 km from near Hyden to Cape Arid NP.

The location of a 2004 record of *Gyrostemon ditrigynus* within the study area alignment at Mt Ney NR was searched; no plants were located by Ecoscape, nor were any recorded by GHD (2012) during its survey. The collecting information for this specimen (WAH 2014) indicates that the location had been burnt in 2001, and it is therefore concluded that the population has since senesced and died, as frequently is the case for species known as disturbance (or fire) opportunists.

Nineteen populations comprising over 3 100 individual plants were recorded in the northeastern and eastern portions of the study area, scattered between Salmon Gums NR) and south of Logans Road, and near Parmango Rd. The latter corresponds with a previously known population; the others are all new populations, with all populations within the known species distribution (DPaW 2007-2014).



Plate 98: *Gyrostemon ditrigynus* (P4) female flowers and foliage



Plate 99: *Gyrostemon ditrigynus* (P4) habit

***Melaleuca fissurata* (P4)**

Melaleuca fissurata (Plate 100, Plate 101) is a shrub to 4 m high, although usually approximately 2 m, growing in sandy or sandy loam soils near saline areas (*FloraBase*, WAH 1998-2014). There are 31 records of this species listed on *NatureMap* (DPaW 2007-2014), located from north of the Stirling Range eastwards to north of Beaumont NR; an east-west range of over 400 km.

Twenty populations of *Melaleuca fissurata* were recorded during the field surveys, comprising over 1 600 individual plants. They occurred intermittently in the eastern portion of the study area; between Caranya Rd and Muntz Rd. One of the populations corresponds with a previously known population however the others are all new records, and within the known species distribution (DPaW 2007-2014).



Plate 100: *Melaleuca fissurata* (P4) foliage



Plate 101 *Melaleuca fissurata* (P4) habit

***Thysanotus parviflorus* (P4)**

Thysanotus parviflorus (**Plate 102**) is a perennial herb to 0.3 m high, growing in sandy soils (*FloraBase*, WAH 1998-2014). There are 17 records of this species listed on *NatureMap* (DPaW 2007-2014), located between Tenterden and Beaumont NR; an east-west range of approximately 480 km.

Two populations, each consisting of a single plant, were recorded during the field surveys. Both were near Bronzewing Rd in the eastern portion of the study area. Both are new records, within the known species distribution (DPaW 2007-2014).



Plate 102: *Thysanotus parviflorus* (P4)

5.2.4 Historical Records of Conservation Significant Flora Within the Study Area

A number of conservation significant flora species have records that indicate they have previously been recorded from within the study area alignment. Several of these were not located during the field surveys, and are briefly discussed below.

Allocasuarina cf. globosa; GHD (2012) recorded a species it considered resembled *Allocasuarina globosa* (TF) near the western end of the study area alignment. The current alignment does not include the location where GHD recorded this species.

Myoporum turbinatum (Salt Myoporum, TF); there is a record of this species from the study area alignment near Beaumont NR, however GHD (2012) did not include *Myoporum turbinatum* in its list of species located during its survey. Despite intensive searches of the area by Ecoscape during both 2013 and 2014, no plants were located, nor does the habitat at the designated location match known habitat of this species. The record of *Myoporum turbinatum* dates from 1980 (WAH 2014) and Ecoscape suspects that the recorded location may be inaccurate. Therefore Ecoscape does not consider *Myoporum turbinatum* to occur within the study area alignment.

Rhizanthella gardneri (Underground Orchid, TF); there are two records for this species from a single population along the study area alignment near the Oldfield River, recorded in 2004 (WAH 2014). This species grows underground and can only be located during its flowering period (May to July) when the flower bracts form a small opening at the soil surface, although this is often below the leaf litter layer (Brown *et al.* 2003). Targeted searches for this species were conducted in both 2013 and 2014, however all field surveys were conducted from September to November which is outside the recognised flowering period. The population was discovered relatively recently (2004) and the location is demarcated with Threatened Flora roadside markers, hence there is no reason to suspect that the location details are inaccurate. Consequently, despite not being recorded during the field survey, Ecoscape considers that *Rhizanthella gardneri* does occur within the study area alignment. Further surveys could potentially be conducted during the flowering period of this species. However, such searches are unlikely to locate all plants (due to the cryptic nature of this species) and might be destructive to individual plants or habitat due to the intensive survey methods required (potentially including digging).

Paracaleana parvula (P2); there are a number of records for this species from towards the eastern end of the study area, near Cape Arid NP, dated between 1998 and 2004 (WAH 2014). Orchids are frequently difficult to locate as they are often small, with indistinctly coloured flowers, occur in dense vegetation, and are only identifiable and visible during their often short flowering period. *Paracaleana parvula* is a small and highly cryptic species of orchid. Ecoscape considers that all of these factors may have been applicable during its field survey and, despite not locating any plants during the targeted searches, *Paracaleana parvula* does occur within the study area alignment at the previously recorded locations.

5.2.5 Range Extensions, Range Edges and Other Significant Features

The following species are considered to be range extensions or range edges based on where they were recorded within the study area, assessed using *FloraBase* (WAH 1998-2014) and *NatureMap* (DPaW 2007-2014):

- *Acacia bartlei* (P3); a minor eastern range extension of approximately 10 km
- *Acacia singula* (P3); at the eastern extent of its known range
- *Austrostipa pycnostachya*; at the easternmost extent of its known range
- *Baeckea* sp. fine-leaved (C.M. Lewis 517); a substantial eastern range extension of approximately 150 km
- *Bertya virgata*; a southern range extension of approximately 50 km

- *Boronia baeckeacea* subsp. *patula*; one of the recorded populations represents a northern range extension of approximately 50 km
- *Conostephium marchantiorum*; a minor northern range extension of approximately 20 km
- *Cryptandra minutifolia* subsp. *brevistyla*; one of the records represents an eastern range extension of approximately 100 km
- *Cyathostemon* sp. Salmon Gums (B. Archer 769); one population represents a minor eastern range extension of approximately 20 km
- *Darwinia polycephala*; a minor northern range extension of approximately 20 km
- *Eragrostis falcata*; approximately 200 km from the nearest known record of the species, representing a southeastern range extension
- *Eremophila gibbosa*; a minor southern range extension of approximately 30 km
- *Eremophila serpens*; a minor eastern range extension of approximately 35 km
- *Goodenia laevis* subsp. *laevis*; a minor western range extension of approximately 20 km
- *Lepidosperma gahnioides*; the two populations recorded (near Mt Ney NR) represent an eastern range extension of approximately 180 km
- *Hydrocotyle* sp. *Coraginaensis* (K. Newbey 7747); a southern range extension of approximately 50 km
- *Hydrocotyle* sp. *Hexaptera* (T. Erickson TEE 173) (P1); a substantial eastern range extension of over 200 km
- *Olearia picridifolia*; a western range extension of approximately 40 km; most collections of this species are from the Nullarbor region
- *Petrophile stricta*; a southeastern range extension of approximately 70 km
- *Pultenaea craigiana* (P3); an eastern range extension of approximately 30 km
- *Ricinocarpos stylosus*; a minor southern range extension of approximately 30 km
- *Spergularia brevifolia*; a rarely collected species, the population recorded (north of Salmon Gums) is approximately 140 km north of the closest population
- *Stenanthemum ?emarginatum*; this sterile, poor quality specimen (if confirmed) would represent a range extension of over 200 km
- *Stylidium zeicolor*; an eastern range extension of approximately 70 km
- *Synaphea reticulata*; an eastern range extension of approximately 50 km
- *Thysanotus brachyantherus* (P2); one of the populations represents a southwest range extension of approximately 60 km.

Species with local endemism or a restricted distribution are considered to be significant flora according to *Guidance Statement No. 51* (EPA 2004a). *Darwinia* sp. Mt Ney Virgate (A.S. George 15837); whilst not formally listed as Threatened or Priority Flora, has a very small known geographic extent with only nine collections from around Mt Ney and is therefore considered of potential significance.

5.2.6 Flora Vouchering

Ninety two flora collections were vouchered according to WA Herbarium guidelines (Western Australian Herbarium 2017), listed in **Table 11**. The accession number assigned to the batch was 6349. Flora vouchering effort focussed on specimens from significant new populations of conservation significant flora, range extensions or species of taxonomic interest.

Table 11: Summary of specimens vouchered with the WA Herbarium

SPECIES	CONS. CODE.	COLLECTOR NO.	DATE	COLLECTOR(S)	BROAD LOCATION
<i>Acacia amyctica</i>	P2	SK31-3	13/10/2013	S. Kern & R. Daniel	Pyramid Lake
<i>Acacia amyctica</i>	P2	FIOP-659	28/11/2013	S. Kern	Lort River
<i>Acacia bartlei</i>	P3	FIOP-136	01/10/2014	S. Kern	Mt Ney
<i>Acacia diaphana</i>	P1	FIOP-183	01/11/2013	S. Kern	Clyde Hill
<i>Acacia diaphana</i>	P1	FLOP-9	01/10/2014	S. Kern & A. Fry	Beaumont
<i>Acacia euthyphylla</i>	P3	FIOP-274	23/10/2013	J. Nelson	Grass Patch
<i>Acacia glaucissima</i>	P3	FIOP-508	24/11/2013	S. Kern	
<i>Acacia glaucissima</i>	P3	FIOP-569	25/11/2013	S. Kern	Mt Beaumont
<i>Acacia improcera</i>	P3	FIOP-376	24/10/2013	J. Nelson	Salmon Gums
<i>Acacia improcera</i>	P3	FIOP-368	05/11/2013	S. Kern	Salmon Gums
<i>Acacia nitidula</i>	P2	FIOP-61	30/10/2013	R. Daniel	Condungup
<i>Adenanthos ileticos</i>	P4	FIOP-184	22/10/2013	J. Nelson	Grass Patch
<i>Anigozanthos bicolor subsp. minor</i>	TF	FIOP-35	29/10/2013	R. Daniel	Condungup
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	FIOP-439	06/11/2013	S. Kern	Salmon Gums
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	FIOP-510	24/11/2013	S. Kern	Salmon Gums
<i>Baeckea</i> sp. Gibson (K.R. Newbey 11084)	P1	FIOP-382	01/11/2013	J. Nelson	Beaumont
<i>Boronia baeckeacea subsp. patula</i>	P1	FIOP-203	02/11/2013	S. Kern	Mt Ney
<i>Boronia baeckeacea subsp. patula</i>	P1	FIOP-376	05/11/2013	S. Kern	Salmon Gums
<i>Bossiaea flexuosa</i>	P3	FIOP-671	06/11/2013	J. Nelson	Salmon Gums
<i>Bossiaea flexuosa</i>	P3	FIOP-142	19/10/2013	J. Nelson	Salmon Gums
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)	P1	FIOP-396	02/11/2013	J. Nelson	Beaumont
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)	P1	FI-76	02/10/2014	S. Kern	Beaumont
<i>Comesperma calcicola</i>	P3	FIOP-734	29/11/2013	S. Kern	Pyramid Lake
<i>Comesperma calcicola</i>	P3	FIOP-260	04/11/2013	R. Daniel	Mt Burdett
<i>Conostephium marchantiorum</i>	P3	FIOP-612	05/11/2013	J. Nelson	Salmon Gums
<i>Conostylis lepidospermoides</i>	TF	FIOP1-1	08/10/2013	R. Daniel	Bandalup Road
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	FIOP-102	18/10/2013	J. Nelson	Exclamation Lake
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	FIOP-481	23/11/2013	S. Kern	Salmon Gums
<i>Darwinia luehmannii</i>	P2	FIOP-387	05/11/2013	S. Kern	Salmon Gums
<i>Darwinia polycephala</i>	P4	FIOP-371	06/11/2013	R. Daniel	Salmon Gums
<i>Darwinia polycephala</i>	P4	FIOP-276	04/11/2013	S. Kern	Scadden
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNeen 1274)	P1	FIOP-558	25/11/2013	S. Kern	Mt Beaumont
<i>Daviesia newbeyi</i>	P2	FIOP-171	01/11/2013	S. Kern	Clyde Hill
<i>Daviesia pauciflora</i>	P3	FIOP-285	04/11/2013	S. Kern	Kau Rock
<i>Dicrastylis archeri</i>	P1	FI-210	06/10/2014	S. Kern	Lort River
<i>Drosera salina</i>	P2	FI-159	05/10/2014	S. Kern	Exclamation Lake
<i>Eremophila chamaeophila</i>	P3	FIOP-35	16/10/2013	J. Nelson	Salmon Gums
<i>Eremophila compressa</i>	P3	FIOP-56	17/10/2013	J. Nelson	Lort River

SPECIES	CONS. CODE.	COLLECTOR NO.	DATE	COLLECTOR(S)	BROAD LOCATION
<i>Eucalyptus merrickiae</i>	TF	SK117-2	06/11/2013	S. Kern & R. Daniel	Salmon Gums
<i>Eucalyptus merrickiae</i>	TF	FIOp-321	05/11/2013	S. Kern	Salmon Gums
<i>Eucalyptus merrickiae</i>	TF	FIOp-443	06/11/2013	S. Kern	Salmon Gums
<i>Eucalyptus luculenta</i>	P2	Q52-1	02/10/2014	S. Kern & A. Fry	Mt Beaumont
<i>Eucalyptus luculenta</i>	P2	13I25-1	24/10/2013	L. Atkins & A. Fry	Clyde Hill
<i>Eucalyptus luculenta</i>	P2	SK97-3	01/11/2013	S. Kern & R. Daniel	Clyde Hill
<i>Frankenia brachyphylla</i>	P2	FI-160	05/10/2014	S. Kern	Exclamation Lake
<i>Frankenia brachyphylla</i>	P2	FI-247	07/10/2014	S. Kern	Pyramid Lake
<i>Frankenia drummondii</i>	P3	FIOp-107	18/10/2013	J. Nelson	Exclamation Lake
<i>Frankenia glomerata</i>	P3	FIOp-555	24/11/2013	S. Kern	Salmon Gums
<i>Frankenia glomerata</i>	P3	FI-246	07/10/2014	S. Kern	Pyramid Lake
<i>Frankenia glomerata</i>	P3	FI-258	07/10/2014	S. Kern	Pyramid Lake
<i>Gonocarpus pycnostachyus</i>	P3	FIOp-36	29/10/2013	S. Kern & R. Daniel	Condungup
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	FIOp-369	05/11/2013	S. Kern	Salmon Gums
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	FIOp-588	25/11/2013	S. Kern	Mt Beaumont
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	13I21-11	23/10/2013	L. Atkins & A. Fry	Mt Beaumont
<i>Grevillea aneura</i>	P4	FIOp1-86	11/10/2013	S. Kern	Cascade
<i>Grevillea aneura</i>	P4	FIOp-436	06/11/2013	S. Kern	Salmon Gums
<i>Grevillea baxteri</i>	P4	f1314-21	28/10/2013	S. Kern & R. Daniel	Cape Arid
<i>Gyrostemon ditrigynus</i>	P4	FIOp-437	06/11/2013	S. Kern	Salmon Gums
<i>Gyrostemon ditrigynus</i>	P4	FIOp-279	05/11/2013	R. Daniel	Salmon Gums
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)	P2	FI-170	06/10/2014	S. Kern	Salmon Gums
<i>Hydrocotyle</i> sp. Coraginaensis (K.R. Newbey 7477)	P2	FIOp-534	01/10/2014	S. Kern & A. Fry	Clyde Hill Nature Reserve
<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P1	FIOp-143	07/10/2014	S. Kern & A. Fry	Pyramid Lake
<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P1	13I10-5	19/10/2013	L. Atkins & A. Fry	Salmon Gums
<i>Isopogon alcicornis</i>	P3	FIOp-3	28/10/2013	S. Kern	Condungup
<i>Melaleuca eximia</i>	P2	FIOp-64	22/10/2013	A. Fry	Mt Beaumont
<i>Melaleuca fissurata</i>	P4	FIOp-565	25/11/2013	S. Kern	Mt Beaumont
<i>Melaleuca fissurata</i>	P4	FIOp-231	02/11/2013	S. Kern	Kau Rock
<i>Melaleuca fissurata</i>	P4	13I23-3	23/10/2013	L. Atkins & A. Fry	Mt Beaumont
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	FIOp-436	03/11/2013	J. Nelson	Mt Beaumont
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	FIOp-100	31/10/2013	S. Kern	Condungup
<i>Persoonia cymbifolia</i>	P3	FIOp-438	06/11/2013	S. Kern	Salmon Gums
<i>Persoonia cymbifolia</i>	P3	FIOp-675	28/11/2013	S. Kern	Lort River
<i>Persoonia scabra</i>	P3	FIOp-224	03/11/2013	R. Daniel	Kau Rock
<i>Persoonia spathulata</i>	P2	FIOp-653	26/11/2013	S. Kern	Boyatup
<i>Persoonia spathulata</i>	P2	FIOp1-9	29/10/2013	S. Kern	Boyatup
<i>Persoonia spathulata</i>	P2	FI-209	06/10/2014	S. Kern	Lort River
<i>Philothea gardneri</i> subsp. <i>globosa</i>	P1	FIOp1-63	13/10/2013	R. Daniel	Pyramid Lake
<i>Pityrodia chrysocalyx</i>	P3	FIOp-370	05/11/2013	S. Kern	Salmon Gums

SPECIES	CONS. CODE.	COLLECTOR NO.	DATE	COLLECTOR(S)	BROAD LOCATION
<i>Pityrodia chrysocalyx</i>	P3	FIOP-295	05/11/2013	S. Kern	Salmon Gums
<i>Pultenaea adunca</i>	P3	CH02-1	08/10/2013	S. Kern & R. Daniel	Cheadanup Nature Reserve
<i>Pultenaea craigiana</i>	P3	CH01-3	08/10/2013	S. Kern & R. Daniel	Cheadanup Nature Reserve
<i>Pultenaea daena</i>	P3	FIOP-750	29/11/2013	S. Kern	Cheadanup Nature Reserve
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	FIOP-580	25/11/2013	S. Kern	Mt Beaumont
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	FIOP-557	25/11/2013	S. Kern	Mt Beaumont
<i>Spergularia brevifolia</i>		13I05-8	18/10/2013	L. Atkins & A. Fry	Lake Gilmour
<i>Olearia picridifolia</i>		13I29-4	24/10/2013	L. Atkins & A. Fry	Clyde Hill
<i>Lepidosperma gahnioides</i>		SK99-2	02/11/2013	S. Kern & R. Daniel	Mt Ney
<i>Lepidosperma gahnioides</i>		13I18-4	22/10/2013	L. Atkins & A. Fry	Mt Ney
<i>Eragrostis falcata</i>		FIOP-242	05/10/2014	S. Kern & A. Fry	Exclamation Lake
<i>Hibbertia</i> aff. <i>recurvifolia</i>		f1316-16	28/10/2013	S. Kern & R. Daniel	Cape Arid National Park
<i>Synaphea reticulata</i>		Q50-9	30/09/2014	S. Kern & A. Fry	Condingup
<i>Petrophile stricta</i>		FIOP-149	06/10/2014	S. Kern & A. Fry	Pyramid Lake

5.3 INTRODUCED FLORA

Twenty six introduced flora species were recorded from quadrats, descriptive relevés and opportunistic records. These species are listed in **Table 12** with their rankings (DEC 2011b). This list is not considered a comprehensive for the study area as introduced species were not specifically targeted during field surveys.

Three of the introduced flora species recorded from the study area are Declared Pests and are listed on WAOL. **Asparagus asparagoides* (Bridal Creeper, **Plate 103**) and **Carthamus lanatus* (Saffron Thistle, **Plate 104**) are listed as a C3 organisms (Declared Pests) for the whole of Western Australia and **Onopordum acaulon* (Stemless Thistle, **Plate 105**) as a C3 organism for a number of south-western local government areas (including the Shires of Ravensthorpe and Esperance within which the study area occurs). The following locations of these Declared Pests were recorded:

- **Asparagus asparagoides* near SLK 639, adjacent to Cape Arid NP
- **Carthamus lanatus* near SLK 267, adjacent to Lake Gilmour NR
- **Onopordum acaulon* near SLK 275, north of Salmon Gums adjacent to Beete Road.

**Asparagus asparagoides* is also a WONS listed species (Weeds Australia 2012b). No plants listed on the National Environmental Alert List (DoE 2012a), listed as Sleeper Weeds (DoE 2012b), listed as Species Targeted for Eradication (DoE 2014c) or listed as a Target Species for Biological Control (Weeds Australia 2012a) were recorded from the study area.



Plate 103: **Asparagus asparagoides*



Plate 104: **Carthamus lanatus*



Plate 105: **Onopordum acaulon*

Table 12: Introduced flora ratings

SPECIES	COMMON NAME	DP	WONS	DEC WEED PRIORITIZATION RANK+		
				Ecol. Impact	Invasiveness	Control
<i>*Aira cupaniana</i>	Silvery Hairgrass	-	-	-	-	-
<i>*Arctotheca calendula</i>	Cape Weed	-	-	U	M	L
<i>*Asparagus asparagoides</i>	Bridal Creeper	C3	Y	H	R	L
<i>*Avellinia michelii</i>	Avellinia	-	-	-	-	-
<i>*Brassica tournefortii</i>	Wild Turnip	-	-	U	U	L
<i>*Bromus rubens</i>	Red Brome	-	-	-	-	-
<i>*Carthamus lanatus</i>	Saffron Thistle	C3	-	U	R	M
<i>*Centaurea melitensis</i>	Maltese Cockspur	-	-	H	R	L
<i>*Conyza sp.</i>	Fleabane	-	-	U	R	L
<i>*Cucumis myriocarpus</i>	Prickly Paddy Melon	-	-	-	-	-
<i>*Disa bracteata</i>	South African Orchid	-	-	U	R	L
<i>*Ehrharta calycina</i>	Perennial Veldt Grass	-	-	H	M	M
<i>*Hordeum leporinum</i>	Barley Grass	-	-	U	U	H
<i>*Hypochaeris glabra</i>	Flat Weed	-	-	U	R	L
<i>*Lepidium africanum</i>	Common Peppercross	-	-	L	U	U
<i>*Lolium rigidum</i>	Annual Rye Grass	-	-	U	U	L
<i>*Lysimachia arvensis</i>	Pimpernel	-	-	U	R	L
<i>*Medicago minima</i>	Small Burr Medic	-	-	-	-	-
<i>*Mesembryanthemum nodiflorum</i>	Slender Iceplant	-	-	U	U	L
<i>*Onopordum acaulon</i>	Stemless Thistle	C3	-	-	-	-
<i>*Pinus pinaster</i>	Pinaster Pine	-	-	M	M	H
<i>*Sisymbrium irio</i>	London Rocket	-	-	L	U	U
<i>*Solanum nigrum</i>	Black Berry Nightshade	-	-	U	R	L
<i>*Sonchus oleraceus</i>	Common Sowthistle	-	-	U	R	L
<i>*Spergularia marina</i>	Salt Sand Spurry	-	-	-	-	-
<i>*Spergularia rubra</i>	Sand Spurry	-	-	U	R	L

+DEC Weed Prioritization Rank (DEC 2011b):

- Ecological Impact: High, Medium, Low, Unknown
- Invasiveness: Rapid, Moderate, Slow, Unknown
- Feasibility of Control: High, Medium, Low, Unknown.

5.4 BOTANICAL SURVEY LIMITATIONS STATEMENT

A statement of survey limitations is included in **Table 13**.

Table 13: Botanical survey limitations

POSSIBLE LIMITATIONS	CONSTRAINTS (YES/NO): SIGNIFICANT, MODERATE OR NEGLIGIBLE	COMMENT
Competency/ experience of the consultant conducting the survey	No	The senior botanist from each field team had recent relevant experience in the South-west Botanical Province of Western Australia. The project manager and lead botanist (Stephen Kern) has extensive experience (10 years) in the region and played a significant role in the DEC survey of the nearby Ravensthorpe Range (Kern <i>et al.</i> 2008).
Proportion of the flora identified	Yes: negligible	The focus of this survey was on targeted searches for conservation significant flora. There were no species suspected to be conservation significant that could not be fully identified with confidence. A total of 860 flora taxa were identified from the study area of which 33 (3.9%) could not be identified to species level due to lack of reproductive material. None of these are considered to have potential to be conservation significant, based on comparison with known species.
Sources of Information (historic/recent/ new data)	Yes: negligible to moderate	All available sources of information were reviewed. However, there are very few flora and vegetation surveys available for any of the study area specifically.
Proportion of the task achieved and further work that may need to be undertaken	No	The entire study area was traversed during the course of this survey (including targeted searches for conservation significant flora and vegetation mapping) and Level 2 surveys were completed for sections that are adjacent to conservation estate (one National Park and seven Nature Reserves). Therefore the specified scope of works has been achieved. An additional flora field survey in 2014 was conducted to further delineate populations of conservation significant flora, re-sample level 2 survey areas and gather data for TEC determination.
Timing/weather/ season/cycle	Yes: negligible	The timing of the surveys was optimal to identify most flora species, including conservation significant taxa. The seasonal conditions were considered to be good due to the average or above average seasonal rainfall prior to the surveys. Weather conditions during the surveys was usually excellent, with good visibility and suitable temperatures for plants to have extended flowering. A few days of the field survey were 'rained out', making some areas temporarily inaccessible however no areas were left unsurveyed due to weather conditions.
Intensity of survey (e.g. in retrospect was the intensity adequate?)	Yes: negligible	The intensity of the targeted searches was considered adequate to identify the majority of conservation significant flora likely to occur within the study area and adequately describe vegetation. The sections of the study area adjacent to conservation estate were surveyed at an intensity considered appropriate for a Level 2 survey.
Completeness (e.g. was relevant area fully surveyed?)	No	The entire area was traversed by a single pass (occasionally two passes). The 2014 flora field survey was designed to further assess areas deemed to require additional survey.
Resources (e.g. degree of expertise available for plant identification)	No	There were no constraints in terms of field surveyor's ability to identify likely conservation significant flora species or identify differences between species. Any species not identified in the field were identified with reference to WAH collections or in consultation with relevant experts.
Remoteness and/or access problems	Yes: negligible	All sections of the study area were accessed, however some areas did not have track access, requiring walking over (at times) considerable distances.
Availability of contextual (e.g. bioregional) information for the survey area	Yes: negligible	The South-west Botanical Province (with the exception of some specialised habitat that does not occur within the study area) is generally well-known and there are sufficient sources of information to provide a regional context. However, there are minimal publicly available reports specifically relating to the flora in the vicinity of the study area.

6.0 LEVEL 2 FLORA AND VEGETATION SURVEY

RESULTS

There is one National Park and seven Nature Reserves located adjacent to the study area, extending across a total linear length of approximately 45 km. The study area adjacent to these areas was the subject of more intensive Level 2 flora and vegetation surveys. Therefore, a total of eight sections of the study area were surveyed as Level 2 flora and vegetation assessments. Results are presented individually below.

Much of the data typically presented in a Level 2 flora and vegetation assessment is provided as a whole for the entire SBF study area in the sections above.

6.1 CAPE ARID NATIONAL PARK – R24047

Cape Arid NP is located adjacent to the far eastern end of the study area between SLK 637 – SLK 640. The field surveys were undertaken during 28 October 2013 and 30 September 2014.

6.1.1 Vegetation

The study area adjacent to Cape Arid NP contains a single vegetation type; **HcBe** (*Hakea cinerea*, *H. pandanica* subsp. *pandanica* and *Eucalyptus extrica* mid open shrubland/mallee shrubland over *Beaufortia empetrifolia*, *Leucopogon crassifolius* and *Melaleuca pulchella* low shrubland), displayed on **Map 2-15**. Three quadrats were recorded to document the vegetation. A detailed description of this vegetation type is presented in **Appendix Five**. This vegetation type is not considered to represent a TEC or PEC.

The vegetation condition of the study area adjacent to Cape Arid NP was considered to be Excellent. The vegetation has been partially impacted by previous scrub rolling; however the vegetation structure and composition is similar to the undisturbed state. There was minimal weed invasion recorded.

6.1.2 Flora

One hundred and thirteen vascular flora taxa from 74 genera and 29 families were identified from the study area adjacent to Cape Arid NP, from three quadrats, opportunistic observations and conservation significant flora searches. One specimen could not be identified to species level due to lack of reproductive material, totalling 0.9% of taxa. Five species were introduced species (weeds).

The most commonly represented families were Proteaceae (25 taxa), Myrtaceae (24), Fabaceae, Cyperaceae, Ericaceae (8 each) and Haemodoraceae (4). The most commonly represented genera were *Banksia* (8 taxa), *Hakea* (7), *Melaleuca* (6), *Conostylis* and *Schoenus* (3 each). A complete flora inventory for the study area adjacent to Cape Arid NP is presented in **Table 31, Appendix Six**.

6.1.2.1 Conservation Significant Flora

There were no TF species recorded from the study area adjacent to Cape Arid NP.

One PF taxa, *Grevillea baxteri* (P4), was recorded from this section of study area; locations are displayed on **Map 3-32**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.1.2.2 Introduced Flora

Five introduced species were recorded from quadrats and opportunistic records; **Arctotheca calendula* (Cape Weed), **Asparagus asparagoides* (Bridal Creeper), **Disa bracteata*, **Hypochaeris glabra* (Smooth Catsear) and **Pinus pinaster* (Pinaster Pine). These species are listed in **Table 12** (above) with their rankings (DEC 2011b).

6.2 CHEADANUP NATURE RESERVE – R31754

Cheadanup NR is located adjacent to the study area along a section of West Point Road, between SLK 26 – SLK 30. The field surveys were undertaken during 12 October 2013 and 7-8 October 2014.

6.2.1 Vegetation

Four vegetation types, **CqAp**, **EpBmMs**, **EpEa** and **EsBpLt**, were recorded from within the study area adjacent to Cheadanup NR, documented by eight quadrats. **Map 2-2** shows the distribution of vegetation types within the study area. These four vegetation types are described below. Detailed descriptions are presented in **Appendix Five**. In summary these vegetation types are:

- **CqAp** – *Calothamnus quadrifidus*, *Acacia assimilis* subsp. *atroviridis* and *Grevillea teretifolia* mid open shrubland over *Acacia pinguiculosa* subsp. *teretifolia*, *Cryptandra graniticola* and *Lepidosperma rigidulum* low shrubland/sedgeland
- **EpBmMs** – *Eucalyptus pleurocarpa*, *E. phaenophylla* and *E. incrassata* mid open mallee shrubland over *Beaufortia micrantha* var. *micrantha*, *Melaleuca rigidifolia* and *M. hamata* mid open shrubland over *Mesomelaena stygia* subsp. *stygia*, *Lysinema pentapetalum* and *Lepidosperma* spp. low open sedgeland/shrubland
- **EpEa** – *Eucalyptus platypus* subsp. *platypus*, *E. flocktoniae* subsp. *flocktoniae* and *E. dielsii* low open woodland over *Exocarpos aphyllus*, *Gastrolobium musaceum* and *Daviesia argillacea* mid open shrubland
- **EsBpLt** – *Eucalyptus sporadica* and *E. clivicola* mid mallee woodland/woodland over *Baeckea pachyphylla*, *Melaleuca eurystoma* and *M. hamata* mid open shrubland over *Lepidosperma tuberculatum* and *Tetraria* sp. Mt Madden (C.D. Turley 40 BP/897) mid open sedgeland.

None of these vegetation types are considered to represent a TEC or PEC.

Vegetation condition was recorded as Excellent for all eight quadrats. This section of the study area has been the subject of historical scrub-rolling; however the vegetation is regenerating to a state similar to its uncleared equivalent, with no weeds recorded.

6.2.2 Flora

One hundred and fifty six vascular flora taxa from 74 genera and 29 families were identified from the study area adjacent to Cheadanup NR, from eight quadrats, opportunistic observations and conservation significant flora searches. Two specimens could not be identified to species level due to lack of reproductive material, totalling 1.3% of taxa. There were no introduced species (weeds) recorded.

The most commonly represented families were Myrtaceae (41 taxa), Fabaceae (24), Proteaceae (15), Cyperaceae (12), Ericaceae (10) and Goodeniaceae (9). The most commonly represented genera were *Melaleuca* (12 taxa), *Eucalyptus* (11), *Acacia* (9), *Leucopogon* (6), *Grevillea*, *Hakea*, *Lepidosperma* and *Schoenus* (5 each). A complete flora inventory for the study area adjacent to Cheadanup NR is presented in **Table 32, Appendix Six**.

6.2.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Cheadanup NR.

Three PF taxa, *Pultenaea adunca* (P3), *Pultenaea craigiana* (P3) and *Eucalyptus stoatei* (P4), were recorded from this section of the study area. Their locations are displayed on **Map 3-2**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.2.2.2 Introduced Species

No introduced species were recorded from the study area adjacent to Cheadanup NR.

6.3 NATURE RESERVE R35659

Nature Reserve R35659 is located adjacent to the study area along a section of Rollond Road, between SLK 119– SLK 122. The field surveys were undertaken during 14-15 October 2013 and 7 October 2014.

6.3.1 Vegetation

Two vegetation types, **EeMsGa** and **EiMpAc**, were recorded from within the study area adjacent to R35659, documented by four quadrats. **Map 2-4** shows the distribution of vegetation types within this section of the study area. These two vegetation types are described below. Detailed descriptions are presented in **Appendix Five**. In summary these vegetation types are:

- **EeMsGa** – *Eucalyptus eremophila*, *E. flocktoniae* and *E. scyphocalyx* low woodland/mallee woodland over *Melaleuca societatis*, *M. sapientes* and *M. teuthidoides* mid shrubland over *Gahnia ancistrophylla*, *Spyridium minutum* and *Comesperma spinosum* low open sedgeland/shrubland
- **EiMpAc** – *Eucalyptus indurata*, *E. conglobata* and *E. flocktoniae* mid open mallee woodland over *Melaleuca pauperiflora* subsp. *pauperiflora*, *M. strobophylla* and *M. podiocarpa* mid open shrubland over *Acacia crassuloides*, *Daviesia benthamii* subsp. *acanthoclona* and *Microcybe multiflora* subsp. *multiflora* low open shrubland.

Neither of the vegetation types recorded from within the study area adjacent to R35659 are considered to represent a TEC or PEC.

Vegetation condition was recorded as Excellent for all four quadrats. This section of the study area has been the subject of historical scrub-rolling, however the vegetation is regenerating to a state similar to its uncleared equivalent, with no weeds recorded.

6.3.2 Flora

Fifty four vascular flora taxa from 27 genera and 15 families were identified from the study area adjacent to R35659, from four quadrats, opportunistic observations and conservation significant flora searches. Two specimens could not be identified to species level due to lack of reproductive material, totalling 3.7% of taxa. There were no introduced species (weeds) recorded.

The most commonly represented families were Myrtaceae (19 taxa), Fabaceae (12), Proteaceae (4), Lamiaceae, Rutaceae and Santalaceae (3 each). The most commonly represented genera were *Melaleuca* (10 taxa), *Eucalyptus* (9), *Acacia* (5) and *Grevillea* (3). A complete flora inventory for the study area adjacent to R35659 is presented in **Table 33, Appendix Six**.

6.3.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to R35659.

Two PF taxa, *Eremophila chamaephila* (P3) and *Eremophila serpens* (P4), were recorded from this section of the study area. Their locations are displayed on **Map 3-6**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.3.2.2 Introduced Flora

No introduced species were recorded from the study area adjacent to R35659.

6.4 LAKE GILMOUR NATURE RESERVE – R42943

Lake Gilmour NR is located adjacent to the study area along a section of Beete Road, between SLK 260 – SLK 270. The field surveys were undertaken during 17-18 October 2013 and 5 October 2014.

6.4.1 Vegetation

Five vegetation types, **EdMpRs**, **EmMpCc**, **EoMpPa**, **EoOm** and **MbAj** plus a non-vegetated area of salt lake, were recorded from within the study area adjacent to Lake Gilmour NR, documented by seven quadrats. **Map 2-7** shows the distribution of vegetation types within this section of the study area. These vegetation types are described below. Detailed descriptions of these vegetation types are presented in **Appendix Five**. In summary these vegetation types are:

- **EdMpRs** – *Eucalyptus diptera* and *E. polita* low woodland over *Melaleuca pauperiflora* subsp. *pauperiflora* mid open shrubland over *Rhodanthe spicata* low open hermland
- **EmMpCc** – *Eucalyptus melanoxydon*, *E. dundasii* and *E. salmonophloia* mid woodland over *Melaleuca pauperiflora*, *M. quadrifaria* and *M. teuthoides* tall sparse shrubland over *Cratystylis conocephala*, *Maireana* sp. and *Acacia merrallii* low open shrubland
- **EoMpPa** – *Eucalyptus oleosa* subsp. *cylindroidea*, *E. eremophila* and *E. diptera* mid open woodland/ mallee woodland over *Melaleuca pauperiflora*, *Alyxia buxifolia* and *Eremophila ionantha* mid sparse shrubland over *Pultenaea arida*, *Olearia muelleri* and *Austrostipa trichophylla* low sparse shrubland/ grassland
- **EoOm** – *Eucalyptus olivina* mid open woodland over *Olearia muelleri*, *Lepidosperma drummondii* and *Gahnia ancistrophylla* low sparse shrubland/ sedgeland
- **MbAj** – *Melaleuca brevifolia*, *M. subalaris* and *M. thyoides* mid open shrubland over *Austrostipa juncifolia* and *Tecticornia* spp. mid sparse grassland/samphire shrubland.

None of the vegetation types recorded from within the study area adjacent to Lake Gilmour NR are considered to represent a TEC or PEC.

Vegetation condition was variable recorded as Excellent for two of the quadrats, Very Good for four quadrats and Good for one quadrat. Vegetation condition ratings were influenced by levels of weed invasion and historical partial clearing.

6.4.2 Flora

One hundred and four vascular flora taxa from 53 genera and 20 families were identified from the study area adjacent to Lake Gilmour NR, from seven quadrats, opportunistic observations and conservation significant flora searches. Four specimens could not be identified to species level due to lack of reproductive material, totalling 3.8% of taxa. Fifteen introduced species (weeds) were recorded.

The most commonly represented families were Asteraceae (22 taxa), Myrtaceae (20), Chenopodiaceae (11), Poaceae (9), Aizoaceae (4) and Scrophulariaceae (4). The most commonly represented genera were *Eucalyptus* (11 taxa), *Melaleuca* (8), *Austrostipa*, *Eremophila* (4), *Maireana* and *Rhagodia* (3 each). A complete flora inventory for the study area adjacent to Lake Gilmour NR is presented in **Table 34, Appendix Six**.

6.4.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Lake Gilmour NR.

One PF taxa (*Cyathostemon* sp. Salmon Gums (B. Archer 769), P3) was recorded from this section of the study area. The locations are displayed on **Map 3-14**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.4.2.2 Introduced Flora

Fifteen introduced species were recorded from the study area adjacent to Lake Gilmour NR from quadrats and opportunistic records; **Arctotheca calendula* (Cape Weed), **Avellinia michelii* (Avellinia), **Brassica tournefortii* (Mediterranean Turnip), **Bromus rubens* (Red Brome), **Carthamus lanatus* (Saffron Thistle), **Centaurea melitensis* (Maltese Cockspur), **Conyza* sp., **Hordeum leporinum* (Barley Grass), **Lolium rigidum* (Annual Rye Grass), **Lysimachia arvensis* (Pimpernel), **Medicago minima* (Small Burr Medic), **Mesembryanthemum nodiflorum* (Slender Iceplant), **Onopordum acaulon* (Stemless Thistle), **Sisymbrium irio* (London Rocket) and **Sonchus oleraceus* (Common Sowthistle). These species are listed in **Table 12** (above) with their rankings (DEC 2011b).

6.5 SALMON GUMS NATURE RESERVE – R33113

Salmon Gums NR is located adjacent to the study area along a section of Davies Road, between SLK 320 – SLK 326. The field surveys were undertaken during 19 and 25 October 2013 and 4 October 2014.

6.5.1 Vegetation

Five vegetation types, **DhCc**, **EcCc**, **EeMIOM**, **EeMsGa**, **MaTs** and **Tspp**, were recorded from within the study area adjacent to Salmon Gums NR, documented by four quadrats and three relevés. **Map 2-9** shows the distribution of vegetation types within this section of the study area. These vegetation types are described below. Detailed descriptions of these vegetation types are presented in **Appendix Five**. In summary these vegetation types are:

- **DhCc** – *Duboisia hopwoodii* and *Rhagodia preissii* mid sparse shrubland over *Commersonia kraurophylla*, *Acacia glaucissima* and *Glischrocaryon aureum* low open shrubland/ herbland
- **EcCc** – *Eucalyptus conglobata* low open mallee woodland over *Commersonia kraurophylla*, *Acacia glaucissima* and *Glischrocaryon aureum* low open shrubland/herbland
- **EeMIOM** – *Eucalyptus eremophila*, *E. leptocalyx* and *E. valens* mid open woodland over *Melaleuca linguiformis*, *M. thyoides* and *Alyxia buxifolia* mid open shrubland over *Olearia muelleri*, *Scaevola spinescens* and *Waitzia suaveolens* var. *flava* low open shrubland/herbland
- **EeMsGa** – *Eucalyptus eremophila*, *E. flocktoniae* and *E. scyphocalyx* low woodland/ mallee woodland over *Melaleuca societatis*, *M. sapientes* and *M. teuthidoides* mid shrubland over *Gahnia ancistrophylla*, *Spyridium minutum* and *Comesperma spinosum* low open sedgeland/shrubland
- **MaTs** – *Melaleuca acuminata* subsp. *acuminata*, *M. thyoides* and *M. lanceolata* tall shrubland over *Triodia scariosa*, *Bossiaea leptacantha* and *Westringia rigida* low open hummock grassland/shrubland
- **Tspp** – *Tecticornia* spp. and *Maireana oppositifolia* low open samphire shrubland/chenopod shrubland.

None of the vegetation types recorded from within the study area adjacent to Salmon Gums NR are considered to represent a TEC or PEC.

Vegetation condition was variable and was recorded as Very Good within four sites and Good within the remaining two. Vegetation condition ratings were influenced by recent scrub-rolling across this section of the study area and levels of weed invasion.

6.5.2 Flora

Ninety six vascular flora taxa from 47 genera and 22 families were identified from the study area adjacent to Salmon Gums NR, from quadrats, relevés, opportunistic observations and conservation significant flora searches. Four specimens could not be identified to species level due to lack of reproductive material, totalling 4.1% of taxa. Three introduced species (weeds) were recorded.

The most commonly represented families were Myrtaceae (16 taxa), Asteraceae (14), Poaceae (10), Chenopodiaceae (9), and Amaranthaceae (5). The most commonly represented genera were *Melaleuca* (8 taxa), *Eucalyptus*, *Austrostipa*, *Ptilotus* (5), *Acacia* and *Maireana* (3 each). A complete flora inventory for the study area adjacent to Salmon Gums NR is presented in **Table 35, Appendix Six**.

6.5.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Salmon Gums NR. There is a historical record of *Eucalyptus merrickiae* (TF) located to the east of the study area near SLK 321; however extensive searches did not locate any of this species within this section.

Four PF taxa, *Hydrocotyle* sp. Hexaptera (T. Erickson TEE 173) (P1), *Aotus* sp. Dundas (M.A. Burgman 2835) (P2), *Acacia glaucissima* (P3) and *Comesperma calcicola* (P3), were recorded from the study area adjacent to Salmon Gums NR. The locations are displayed on **Map 3-18**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.5.2.2 Introduced Flora

Three introduced species were recorded from the study area adjacent to Salmon Gums NR from quadrats, relevés and opportunistic records; **Hordeum leporinum* (Barley Grass), **Hypochaeris glabra* (Smooth Catsear) and **Sonchus oleraceus* (Common Sowthistle). These species are listed in **Table 12** (above) with their rankings (DEC 2011b).

6.6 MT NEY NATURE RESERVE – R32782

Mt Ney NR is located adjacent to the study area between SLK 447 – SLK 455. The field surveys were undertaken on 21-22 October 2013 and 3 October 2014.

6.6.1 Vegetation

Four vegetation types, **AcLd**, **EgAs**, **EpAh** and **EtMuGsp**, were recorded from within the study area adjacent to Mt Ney NR, documented by six quadrats. **Map 2-12** shows the distribution of vegetation types within this section of the study area. These vegetation types are described below. Detailed descriptions of these vegetation types are presented in **Appendix Five**. In summary these vegetation types are:

- **AcLd** – *Allocasuarina campestris*, *Melaleuca uncinata* and *Acacia mimica* var. *angusta* mid shrubland over *Lepidosperma drummondii*, *Platysace effusa* and *Hibbertia gracilipes* low open sedgeland/shrubland

- **EgAs** – *Eucalyptus grossa*, *Melaleuca uncinata* and *Calothamnus quadrifidus* subsp. *quadrifidus* mid shrubland over *Acacia sulcata* var. *platyphylla*, *Lepidosperma drummondii* and *Cryptandra minutifolia* subsp. *brevistyla* low open shrubland/sedgeland
- **EpAh** – *Eucalyptus pleurocarpa* and *E. tumida* mid sparse mallee shrubland over *Allocasuarina humilis*, *Melaleuca hamata* and *Banksia armata* var. *armata* low open shrubland
- **EtMuGsp** – *Eucalyptus tumida*, *E. uncinata* and *E. flocktoniae* mid sparse mallee shrubland over *Melaleuca undulata*, *M. societatis* and *Grevillea plurijuga* low open shrubland over *Gahnia* sp. Ravensthorpe (G.F. Craig 5005), *Acacia gonophylla* and *A. crassuloides* low sparse sedgeland/shrubland.

None of the vegetation types recorded from within the study area adjacent to Mt Ney NR are considered to represent a TEC or PEC.

Vegetation condition was variable and was recorded as Excellent within four quadrats and Very Good within the remaining two. Vegetation condition ratings were influenced by previous scrub-rolling across this section which has influenced the structure.

6.6.2 Flora

One hundred and nine vascular flora taxa from 62 genera and 28 families were identified from the study area adjacent to Mt Ney NR from quadrats, opportunistic observations and conservation significant flora searches. Three specimens could not be identified to species level due to lack of reproductive material, totalling 2.8% of taxa. There were no introduced species (weeds) recorded.

The most commonly represented families were Myrtaceae (19 taxa), Fabaceae (16), Cyperaceae (13), Proteaceae (7), Rutaceae (6), Ericaceae, Goodeniaceae and Rhamnaceae (5 each). The most commonly represented genera were *Eucalyptus* (8 taxa), *Melaleuca*, *Acacia*, *Boronia* (5 each), *Gahnia*, *Hakea* and *Schoenus* (4 each). A complete flora inventory for the study area adjacent to Mt Ney NR is presented in **Table 36, Appendix Six**.

6.6.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Mt Ney NR.

Two PF taxa, *Acacia glaucissima* (P3) and *Goodenia laevis* subsp. *laevis* (P3), were recorded from this section of the study area. There is a historical record of *Gyrostemon ditrigynus* (P4) between SLK 450 and SLK 451. The locations of conservation significant flora are displayed on **Map 3-24**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.6.2.2 Introduced Flora

No introduced species were recorded from the study area adjacent to Mt Ney NR.

6.7 BEAUMONT NATURE RESERVE – R32783

Beaumont NR is located adjacent to the study area between SLK 474 – SLK 486. The field surveys were undertaken during 23 October 2013 and 2 October 2014.

6.7.1 Vegetation

Six vegetation types, **EdDiMa**, **EgAs**, **EuGpBi**, **EuMtDI**, **EuMtPe** and **MbAj**, were recorded from within the study area adjacent to Beaumont NR, documented by eight quadrats. **Map 2-13** shows the distribution of vegetation types this section of the study area. These vegetation types are described below. Detailed descriptions are presented in **Appendix Five**. In summary these vegetation types are:

- **EdDiMa** – *Eucalyptus dielsii*, *E. ?calycogona* and *E. uncinata* mid woodland/mallee woodland over *Daviesia incrassata* subsp. *incrassata*, *Dodonaea stenozyga* and *Melaleuca teuthidoides* mid open shrubland over *Microcybe albiflora*, *Spyridium minutum* and *Westringia rigida* low sparse shrubland
- **EgAs** – *Eucalyptus grossa*, *Melaleuca uncinata* and *Calothamnus quadrifidus* subsp. *quadrifidus* mid shrubland over *Acacia sulcata* var. *platyphylla*, *Lepidosperma drummondii* and *Cryptandra minutifolia* subsp. *brevistyla* low open shrubland/sedgeland
- **EuGpBi** – *Eucalyptus uncinata* and *E. leptocalyx* mid open mallee shrubland over *Grevillea plurijuga* subsp. *plurijuga*, *Melaleuca hamata* and *M. societatis* mid open shrubland over *Boronia inornata* subsp. *leptophylla*, *Pultenaea purpurea* and *Hibbertia psilocarpa* low open shrubland
- **EuMtDI** – *Eucalyptus uncinata* and *E. tumida* mid sparse mallee shrubland over *Melaleuca teuthidoides*, *M. rigidifolia* and *M. hamata* mid shrubland over *Daviesia lancifolia*, *Pultenaea elachista* and *Microcybe albiflora* low open shrubland
- **EuMtPe** – *Eucalyptus uncinata*, *E. conglobata* and *E. indurata* mid open mallee woodland over *Melaleuca teuthidoides*, *Daviesia incrassata* subsp. *incrassata* and *M. calycina* mid open shrubland over *Pultenaea elachista*, *Spyridium minutum* low sparse shrubland
- **MbAj** – *Melaleuca brevifolia*, *M. subalaris* and *M. thyoides* mid open shrubland over *Austrostipa juncifolia* and *Tecticornia* spp. mid sparse grassland/samphire shrubland.

None of the vegetation types recorded from within the study area adjacent to Beaumont NR are considered to represent a TEC or PEC.

Vegetation condition was recorded as Pristine and Excellent within four quadrats each, reflecting the largely undisturbed state of the vegetation within this section of the study area that did not include a low fuel modified buffer zone.

6.7.2 Flora

One hundred and four vascular flora taxa from 54 genera and 25 families were identified from the study area adjacent to Beaumont NR from quadrats, opportunistic observations and conservation significant flora searches. Three specimens could not be identified to species level due to lack of reproductive material, totalling 2.9% of taxa. There were no introduced species (weeds) recorded.

The most commonly represented families were Myrtaceae (33 taxa), Fabaceae (16), Proteaceae (7), Ericaceae (6), Cyperaceae (5), Rutaceae (5), and Santalaceae (4). The most commonly represented genera were *Melaleuca* (14 taxa), *Eucalyptus* (10), *Acacia* (5), *Leucopogon* (4), *Boronia*, *Hibbertia*, *Daviesia*, *Hakea* and *Pultenaea* (3 each). A complete flora inventory for the study area adjacent to Beaumont NR is presented in **Table 37**, **Appendix Six**.

6.7.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Beaumont NR.

Ten PF taxa, *Darwinia* sp. Mt Ney (M.A. Burgman and S. McNee 1274) (P1), *Eucalyptus luculenta* (P2), *Melaleuca eximia* (P2), *Thysanotus brachyantherus* (P2), *Acacia euthyphylla* (P3), *Acacia glaucissima* (P3), *Goodenia laevis* subsp. *laevis* (P3), *Micromyrtus elobata* subsp. *scopula* (P3), *Trachymene anisocarpa* var. *trichocarpa* (P3) and *Melaleuca fissurata* (P4), were recorded from the study area adjacent to Beaumont NR. The locations are displayed on **Map 3-26**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.7.2.2 Introduced Flora

No introduced species were recorded from this section of the study area.

6.8 CLYDE HILL NATURE RESERVE – R38545

Clyde Hill NR is located adjacent to the study area between SLK 517 – SLK 521. The field surveys were undertaken during 24 October 2013 and 1 October 2014.

6.8.1 Vegetation

Three vegetation types, **EgMtBi**, **EIMbBi** and **EIMsAs**, were recorded from within the study area adjacent to Clyde Hill NR, documented by six quadrats. **Map 2-14** shows the distribution of vegetation types within this section of the study area. These vegetation types are described below. Detailed descriptions are presented in **Appendix Five**. In summary these vegetation types are:

- **EgMtBi** – *Eucalyptus gracilis* and *E. sp.* low open woodland over *Melaleuca teuthidoides* mid sparse shrubland over *Boronia inornata* subsp. *leptophylla*, *Westringia rigida* and *Acacia merrallii* low open shrubland
- **EIMbBi** – *Eucalyptus luculenta* and *E. eremophila* low sparse mallee shrubland over *Melaleuca bromelioides* mid open shrubland over *Boronia inornata* subsp. *leptophylla* and *Microcybe multiflora* subsp. *baccharoides* low sparse shrubland
- **EIMsAs** – *Eucalyptus luculenta*, *E. uncinata* and *E. eremophila* mid open mallee woodland over *Melaleuca societatis*, *Daviesia benthamii* subsp. *acanthoclona* and *M. hamata* mid open shrubland over *Acacia sorophylla*, *Pultenaea purpurea* and *Boronia inornata* subsp. *leptophylla* low sparse shrubland.

None of the vegetation types recorded from within the study area adjacent to Clyde Hill NR are considered to represent a TEC or PEC.

Vegetation condition was recorded as Very Good within all five quadrats. The vegetation condition ratings were influenced by previous scrub-rolling, which has modified the structure within this section of the study area.

6.8.2 Flora

Fifty three vascular flora taxa from 31 genera and 18 families were identified from the study area adjacent to Clyde Hill NR from quadrats, opportunistic observations and conservation significant flora searches. Two specimens could not be identified to species level due to lack of reproductive material, totalling 3.8% of taxa. There were no introduced species (weeds) recorded.

The most commonly represented families were Myrtaceae (15 taxa), Fabaceae (12), Rutaceae (4), Proteaceae (3), Goodeniaceae (3). The most commonly represented genera were *Melaleuca*, *Eucalyptus* (7 taxa each), *Acacia* (6) and *Boronia* (3). A complete flora inventory for the study area adjacent to Cheadanup NR is presented in **Table 38, Appendix Six**.

6.8.2.1 Conservation Significant Flora

There were no TF species recorded the study area adjacent to Clyde Hill NR.

Two PF taxa (*Eucalyptus luculenta* (P2) and *Comesperma calcicola* (P3)) were recorded from the study area adjacent to Clyde Hill NR. The locations are displayed on **Map 3-28**.

Descriptions of PF taxa recorded within the study area are given in **Section 5**.

6.8.2.2 Introduced Flora

No introduced species were recorded from the study area adjacent to Clyde Hill NR.

7.0 FAUNA SURVEY RESULTS

7.1 HABITAT ASSESSMENT

7.1.1 Assessment Site Details

Locations and brief descriptions of assessment sites are listed in **Table 14** and shown on the **Map 4** series. Site photographs are provided in **Appendix Ten**.

7.1.2 Habitat Types

Eight habitat types were distinguished based on landscape and vegetation features relevant to the likelihood of occurrence of vertebrate fauna, including conservation significant fauna. These are described in **Table 14** below, using data from **Table 6** and detailed flora inventories for assessment sites (**Appendix Five**).

The habitat types were delineated in the **Map 4** series based on interpretation of aerial imagery and topographic data as well as the vegetation mapping. The extent of each is indicated in **Table 14**.

Creeklines are not listed here as a separate habitat type; although riparian areas tend to be important habitat for terrestrial as well as aquatic fauna due to relatively fertile soils and more continuous water supply (Catterall *et al.* 2007; James *et al.* 1995), most creeklines in the study area are minor ephemeral drainages with vegetation similar to surrounding areas, and the few more significant creeks are excluded from the fenceline alignment for cultural reasons (DAFWA 2014a).

Table 14: Approximate extents of habitat types in the study area

TYPE	HABITAT DESCRIPTION	AREA (HA)	PERCENT
1 – Mallee Woodland	<i>Eucalyptus</i> Woodland over mixed shrubs	3247	51.2
2 – Mallee Shrubland	<i>Eucalyptus</i> Shrubland over mixed shrubs	1742	27.5
3 – Shrubland	<i>Acacia</i> or other species mixed shrubland/herbland	129	2.0
4 – Woodland	<i>Eucalyptus</i> sp. over shrubs/sedges	579	9.1
5 – Banksia Shrubland	<i>Banksia</i> or Proteaceae sp.	116	1.8
6 – Salt Lake/Fringe	Samphire/chenopod shrubland or <i>Melaleuca</i> sp. shrubland	83	1.3
7 – Forest	Tall <i>Eucalyptus</i> sp. with mixed tall shrubs	376	5.9
8 – Salt Lake	Open water or bare ground	19	0.3
Degraded/Cleared	Degraded areas and cleared areas	48	0.8

Habitat Type 1 – Mallee Woodland; is dominated by mixed stands of mallee (*Eucalyptus ?calycogona*, *E. conglobata*, *E. delicata*, *E. dielsii*, *E. diptera*, *E. dissimulata*, *E. eremophila*, *E. extensa*, *E. flocktoniae*, *E. forrestiana*, *E. incrassata*, *E. kessellii*, *E. leptocalyx*, *E. luculenta*, *E. oleosa*, *E. phaenophylla*, *E. phenax*, *E. pileata*, *E. quadrans*, *E. scyphocalyx*, *E. sporadica*, *E. spreata*, *E. sp.* Fraser Range (D. Nicolle 2157), *E. uncinata*) and some tree eucalypts (*E. clivicola*, *E. indurata*, *E. kumarlensis*, *E. salmonophloia*, *E. urna*), mostly mid height (3 - 10 m) and some exceeding 10 cm Diameter at Breast Height (DBH), usually with a mid shrub layer comprising species of *Melaleuca* (most commonly), and sometimes *Acacia*, *Banksia*, *Callitris*, *Daviesia*, *Dodonaea*, *Exocarpos* and/or *Phymatocarpus*, and other low shrubs, herbs and sedges. Habitat value for significant vertebrate fauna is relatively high due to sandy soil, abundant leaf litter, fallen logs and presence of hollows in standing and fallen trees.

Habitat Type 2 – Mallee Shrubland; is dominated by mixed stands of mallee eucalypts (*E. angulosa*, *E. conglobata*, *E. dolichorhyncha*, *E. eremophila*, *E. extrica*, *E. flocktoniae*, *E. grossa*, *E. incrassata*, *E. kessellii*, *E. leptocalyx*, *E. luculenta*, *E. micranthera*, *E. obesa*, *E. ovularis*, *E. perangusta*, *E. phaenophylla*, *E. pileata*,

E. platycorys, *E. pleurocarpa*, *E. scyphocalyx*, *E. sp.* Fraser Range (D. Nicolle 2157), *E. tetraptera*, *E. tumida*, *E. uncinata*, *E. varia*, low (<3 m high) to mid height (3 – 10 m) and less than 10 cm DBH, the upper storey sometimes mixed with species of *Grevillea*, *Hakea*, *Melaleuca*, *Exocarpos*, and/or *Allocasuarina*; usually over a mid shrub layer comprising species of *Melaleuca*, *Acacia*, *Adenanthos*, *Aluta*, *Banksia*, *Beaufortia*, *Calothamnus*, *Daviesia*, *Dodonaea*, *Gastrolobium*, *Grevillea*, and/or *Phymatocarpus*, and other low shrubs, herbs, sedges and rushes. Sites identified with mallee shrubland habitat may represent mallee woodland that has incompletely recovered from fire or partial clearing. Soil and litter provide important habitat values, but logs and tree hollows are less abundant than in woodland. Dense (thicket) vegetation may provide important refuge for small and medium-sized vertebrates from introduced predators, particularly where *Gastrolobium* occurs (naturally containing fluoroacetate, i.e. 1080).

Habitat Type 3 – Shrubland; various low to mid-height (<2 m high) species of *Acacia*, *Allocasuarina*, and/or *Melaleuca* along with *Calothamnus*, *Grevillea*, *Thryptomene*, *Duboisia*, *Rhagodia* with various low shrubs, sedges, herbs or tussock grass. Sandy soil, presence of litter and dense vegetation provide habitat values for some significant fauna species.

Habitat Type 4 – Woodland; low to mid-height (<10 m high) tree eucalypts (*E. extensa*, *E. gracilis*, *E. occidentalis*, *E. polita*, *E. transcontinentalis*, *E. urna*, *E. valens*) mixed with mallees (*E. angulosa*, *E. dielsii*, *E. diptera*, *E. eremophila*, *E. flocktoniae*, *E. leptocalyx*, *E. olivina*, *E. ovularis*, *E. platypus*, *E. spreata*, *E. uncinata*), usually over low to mid shrub species of *Melaleuca* (often several species), *Acacia*, *Alyxia*, *Baeckea*, *Calothamnus*, *Cyathostemon*, *Daviesia*, *Dodonaea*, *Eremophila*, *Exocarpos* and/or *Gastrolobium* and various lower shrubs, herbs, sedges, and/or grasses. Relatively high habitat values due to presence of logs and tree hollows in addition to sandy soil and leaf litter.

Habitat Type 5 – Banksia Shrubland; mid or tall shrub (1 - >2m high) species of *Banksia* (*B. armata*, *B. pilostylis*, *B. speciosa*) over or mixed with low to mid species of *Melaleuca*, *Adenanthos*, *Beaufortia*, *Grevillea*, *Hakea*, *Lepidosperma* and/or *Xanthorrhoea* and other low shrubs and rushes. Sandy soil, leaf litter and seasonally abundant food resources provide important habitat values, important foraging habitat for species that may depend on other nearby habitats for shelter or other resources.

Habitat Type 6 – Salt Lake/Fringe; *Melaleuca* shrubland (*M. brevifolia*, *M. subalaris*, *M. thyoides*, *M. hamulosa*) and/or samphire/chenopod shrubland (*Tecticornia*, *Maireana*); with some grasses and sedges, adjacent to open salt lakes. Used by resident terrestrial vertebrates, and potential foraging and shelter habitat for shorebirds that utilise inland salt lakes when conditions are temporarily suitable.

Habitat Type 7 – Forest; open canopy of low to mid height tree eucalypts (*E. dundasii*, *E. gracilis*, *E. kumarlensis*, *E. melanoxylon*, *E. salmonophloia*, *E. urna*, *E. valens*) and occasional mallees (*E. ovularis*, *E. spreata*), over mid to tall shrub species of *Melaleuca* (usually several species) or *Exocarpos*, *Callitris* and *Alyxia*, and mixed low shrubs. Relatively high habitat values due to presence of logs and tree hollows in addition to sandy soil and leaf litter.

Habitat Type 8 – Salt Lake; open saline depressions or flats without vegetation, seasonally or occasionally inundated when they may be used by visiting shorebirds.

7.1.3 Habitat Condition

The condition of the habitat within most of the study area had been modified due to previous scrub rolling in the low fuel modified buffer adjacent to agricultural land. These areas, although disturbed, still provide some level of habitat value as well as connectivity to the surrounding bushland. Habitat condition (assessed using criteria similar to Keighery (1994), cf. **Table 26**) was considered good within the scrub-rolled areas (though more unsuitable for some species than others) and very good within the remaining areas. Habitat condition was not considered to vary across the study area independent of habitat or vegetation type, so is not mapped separately.

7.1.4 Opportunistic Observations

Conservation significant species that were observed during the fauna assessment are presented in **Table 15** below and displayed on **Map 4**. All vertebrate species identified during the survey are shown in **Appendix Eight (Table 40)**.

Table 15: Significant fauna and habitat locations (GDA 94 Zone 51)

SPECIES	COMMON NAME	CONS. STATUS	OBS ¹	HABITAT TYPE	CORR ²	EASTING	NORTHING
<i>Dasyurus geoffroii</i>	Western Quoll / Chuditch	VU	Track (?)	Salt Lake/Fringe	N	387090	6372625
<i>Leipoa ocellata</i>	Malleefowl	VU	Mound	Mallee Woodland	N	380359	6377758
<i>Leipoa ocellata</i>	Malleefowl	VU	Track	Mallee woodland	Y	402902	6363036
<i>Oreoica gutturalis</i>	Crested Bellbird	P4	Call	Mallee woodland	Y	331888	6333954
<i>Oreoica gutturalis</i>	Crested Bellbird	P4	Call	Mallee woodland	Y	384751	6378494
<i>Oreoica gutturalis</i>	Crested Bellbird	P4	Call	Mallee shrubland	N	466920	6307789
<i>Macropus irma</i>	Western Brush Wallaby	P4	Sighting	Mallee shrubland	Y	281617	6307591
<i>Macropus irma</i>	Western Brush Wallaby	P4	Sighting	Mallee woodland	Y	343708	6330830
<i>Macropus irma</i>	Western Brush Wallaby	P4	Sighting	Mallee shrubland	Y	501472	6268026
<i>Platycercus icterotis</i>	Western Rosella	P4	Call	Mallee woodland	Y	403184	6329211
<i>Pomatostomus superciliosus</i>	White Browed Babbler	P4	Sighting	Forest	N	459571	6302368
<i>Pomatostomus superciliosus</i>	White Browed Babbler	P4	Sighting	Mallee shrubland	N	385864	6375677
<i>Isoodon obesulus</i>	Quenda	P5	Dig	Salt Lake/Fringe	Y	352682	6366691
<i>Isoodon obesulus</i>	Quenda	P5	Dig	Woodland	Y	380274	6383032
<i>Isoodon obesulus</i>	Quenda	P5	Dig	Mallee woodland	Y	403137	6330874
<i>Isoodon obesulus</i>	Quenda	P5	Dig	Shrubland	Y	413797	6323395
<i>Isoodon obesulus</i>	Quenda	P5	Dig	Mallee woodland	Y	414316	6322305
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Burrow	Woodland	Y	355888	6377010
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Forest	N	353574	6367917
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Mallee shrubland	N	355028	6378063
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Mallee woodland	N	358008	6379907
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Salt Lake/Fringe	Y	380439	6382240
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Woodland	Y	412279	6318734
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Call	Woodland	Y	414327	6322294
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Mallee woodland	N	396688	6369313
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Mallee woodland	N	355717	6376743
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Salt Lake/Fringe	Y	393697	6369875
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Salt Lake/Fringe	Y	387118	6373123
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Salt Lake/Fringe	Y	355575	6373757
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Salt Lake/Fringe	Y	349974	6358916

SPECIES	COMMON NAME	CONS. STATUS	OBS ¹	HABITAT TYPE	CORR ²	EASTING	NORTHING
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Salt Lake/Fringe	Y	403189	6330126
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Woodland	Y	349981	6358914
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Woodland	Y	350621	6361561
<i>Merops ornatus</i>	Rainbow Bee-eater	M	Sighting	Woodland	Y	305836	6319326

¹ OBS: observation type;

² CORR: 'Y' location in proposed fence corridor, 'N' outside in adjacent habitat.

7.1.5 Fauna Survey Limitations

A statement of survey limitations is included in **Table 16**.

Table 16: Fauna survey limitations

POSSIBLE LIMITATIONS	CONSTRAINTS (YES/NO): SIGNIFICANT, MODERATE OR NEGLIGIBLE	COMMENT
Competency/experience of the consultant conducting the survey	No	Extensive experience in field surveys in the southwest of Western Australia.
Scope	No	Scope was Level 1 reconnaissance survey, and was not attempting to confirm all species present or complete targeted survey.
Proportion of the fauna identified	Yes: negligible	No vertebrate species were collected, most observed vertebrate fauna observed were identified.
Proportion of the task achieved and further work that may need to be undertaken	No	No further work needed.
Timing/weather/season/cycle	Yes: moderate	Annual conditions were average or above based on rainfall records prior to the surveys. Daily weather conditions varied from good to poor (rain and low temperatures) and may have resulted in low fauna activity and detection levels.
Intensity of survey (e.g. In retrospect was the intensity adequate?)	No	Intensity judged to be adequate for level of survey.
Disturbances which affected results of the survey	No	Much of the study area was within a scrub rolled (disturbed) area, however the purpose of the survey was to identify fauna and fauna habitat within this area and therefore not considered a constraint.
Completeness (e.g. Was relevant area fully surveyed?)	No	Representative areas adequately surveyed.
Resources (e.g. Degree of expertise available for plant identification)	Yes: moderate	Few area-specific references are available. There were adequate resources available to identify fauna species.
Remoteness and/or access problems	No	All sections of the study area were accessed, however some areas did not have track access, requiring walking over (at times) considerable distances.
Availability of contextual (e.g. bioregional) information for the survey area	No	The southwest of Western Australia is generally well-known for fauna and there are sufficient sources of information to provide a regional context.

8.0 VEGETATION AND FLORA DISCUSSION

8.1 VEGETATION SIGNIFICANCE

8.1.1 Vegetation Types

Eighty eight vegetation types were recorded from within the study area. Broadly, these vegetation types include forest, woodland, mallee woodland, mallee shrubland and shrubland. Interpretation of vegetation types was complicated by disturbance events including scrub-rolling within the low fuel modified buffer strip as well as wildfires. Consequently the vegetation is in various stages of succession across the study area from recently disturbed (less than one year) to long undisturbed. Vegetation structure and species composition are significantly influenced by disturbance history. As a result, it is possible that some vegetation types described from this study may represent different successional stages rather than being distinct vegetation types.

8.1.2 Threatened and Priority Ecological Communities

Two vegetation types are considered likely or potentially matching the description of the recently listed 'Proteaceae Dominated Kwongkan Shrublands' TEC; **BaMs** and **BsBeAI**. This TEC is listed on the *EPBC* list of TECs as Endangered. **BsBeAI** has been confirmed by DPaW as likely to represent the 'Proteaceae Dominated Kwongkan Shrublands' TEC based on its proteaceous cover of 30% or greater. The **BaMs** vegetation assessed currently contains less than 30% proteaceous cover, though it has been impacted by previous disturbance including scrub-rolling and wildfire. It is considered possible that this vegetation type could exceed the 30% proteaceous cover threshold if undisturbed and therefore should be treated as a potential TEC as a precaution.

Vegetation considered potentially representative of the 'Proteaceae Dominated Kwongkan Shrublands' TEC covers 79.22 ha (1.25%) of the study area, extending for a total linear length of 8 km across five separate occurrences. All locations of the potential TEC occur towards the eastern end of the study area, between SLK 604 and SLK 630. The locations of the **BaMs** and **BsBeAI** vegetation types are entirely adjacent to agricultural land and correspond with areas of the existing low fuel modified buffer strip. Therefore the vegetation has been subject to historical impacts from scrub rolling activities.

Avoidance of impacts to this likely TEC would only be possible if the fence could be deviated through existing agricultural land. If impacts to the TEC cannot be avoided, clearing within this area will most likely require referral to Commonwealth regulatory authorities. However, considering that the identified areas of TEC correspond with impacted sections associated with the existing low fuel modified buffer strip, DAFWA should seek clarification regarding the need for referral.

One PEC, 'Swamp Yate (*Eucalyptus occidentalis*) woodlands in seasonally inundated clay basins', was identified in the results as having potential to occur based on the dominant species. However, it is considered unlikely that any of the vegetation types recorded within the study area can be considered representative of this PEC based on the distance from the known occurrences, generally widespread range of *Eucalyptus occidentalis* and the defining species' association with drainage lines rather than clay basins (i.e. defining habitat not present).

8.1.3 Pre-European Vegetation Associations

Two vegetation associations occurring within the study area, '512: Shrublands; mallee scrub, *Eucalyptus eremophila* & Forrest's marlock (*E. forrestiana*)' and '4801: Shrublands; heath with scattered *Nuytsia floribunda* on sandplain' have 10-30% of their pre-European extent remaining in Western Australia. One

additional vegetation association, '47: Shrublands; tallerack mallee-heath' has 10-30% of its pre-European extent remaining within the Shire of Esperance, but more than 30% at other scales. Pre-European vegetation association mapping was included in the scoping study for the proposed State Barrier Fence Esperance extension (GHD 2012).

There is a presumption against clearing vegetation associations, based on Shepherd *et al.* (2002), with less than 30% pre-European extent remaining (EPA 2000; 2008). Several occurrences of vegetation association 512 has been mapped between SLK 29 and SLK 131, and a single occurrence of vegetation association 4801 has been mapped between SLK 607 and SLK 608 (Shepherd *et al.* 2002). These areas correspond almost entirely with sections of the study area that have been previously scrub rolled within the low modified fuel buffer zone and impact is therefore considered minor.

8.1.4 Other Measures of Vegetation Conservation Significance

In *Guidance Statement No. 51* (2004a), the EPA lists several reasons why vegetation may be considered as significant. Several vegetation types may be considered significant as providing key habitat for TF:

- **DcTp** as habitat for *Anigozanthos bicolor* subsp. *minor*
- **EeMsGa, EiMcGa, EoMtTc, EpBmMs, EpEa, EpMhGa** and **EspPmCI** as habitat for *Conostylis lepidospermoides*
- **EeMIOM, EeMsGa, EeMsWc** and **EiAiMe** as habitat for *Eucalyptus merrickiae*
- **EspMhLsp** as habitat for *Rhizanthella gardneri*.

The majority of vegetation types recorded support at least one species of PF. However, vegetation types associated with salt lakes were particularly notable for supporting conservation significant flora with at least 14 taxa considered to be typically associated with salt lake systems.

8.2 VEGETATION CONDITION

The vegetation condition of the study area ranged from Degraded to Pristine, although the majority of sites recorded (97.9%) were classified as Very Good or better. Vegetation condition was significantly influenced by impacts from the existing low fuel modified buffer strip. It is considered likely that the majority of the area impacted by this strip has the potential to regenerate to its original state successfully if it remained undisturbed, however this is unlikely as it is anticipated that the low fuel modified buffer will be retained following fence construction.

Weeds were rarely a factor in vegetation condition classifications with minimal infestations observed across the entire study area. The significant weeds (Declared Pest plants) occurred on the northern (east-west) portion of the study area, where prevailing winds are likely to have blown seeds from farmland into the adjacent uncleared lands. Similarly, livestock grazing did not influence vegetation condition classifications as there are existing fences bordering the agricultural land. Almost no impacts of grazing by feral (e.g. rabbits) and native (e.g. kangaroo) herbivores were observed.

8.3 FLORA SIGNIFICANCE

There were 860 vascular flora taxa recorded from the study area from 189 relevés, 52 quadrats, opportunistic observations and conservation significant flora searches. This is not considered a comprehensive inventory as the recording of relevés focussed on dominant and characteristic species for the purpose of mapping vegetation, therefore the genera such as *Eucalyptus* and *Melaleuca* are represented disproportionately highly compared with most other genera.

The field surveys were conducted in spring (October to November) which is ideal timing for the Southwest Botanical Province. The 2013 and 2014 seasonal conditions were considered to be average or above

average for flora based on the rainfall in the preceding months and the majority of flora taxa collected had reproductive material at the time of survey.

8.3.1 Conservation Significant Flora

8.3.1.1 Threatened Flora

Three plant taxa listed as TF were recorded during the survey; *Anigozanthos bicolor* subsp. *minor*, *Conostylis lepidospermoides* and *Eucalyptus merrickiae*. A fourth species of TF, *Rhizanthella gardneri*, is known to occur within the study area based on reliable (recent) historical records. All four TF taxa are listed under both the *EPBC Act 1994* and the *WC Act 1950*. Rare flora species, as they are termed in the *WC Act*, are gazetted under Sub-section 2 of Section 23F, thereby making it an offence to remove or damage rare flora without Ministerial approval. Fence construction should aim to avoid impact to these species or minimise impact as much as possible. It is typically a requirement of clearing permits that TF populations be avoided by at least 50 m. If impact to these species cannot be avoided then a 'permit to take Threatened Flora'. DPaW has advised that *EPBC* referral will be not required. Permission to take TF is typically only granted if the impacts can be demonstrated not to be significant to the conservation of the species.

A discussion of the potential management implications for each of these species is provided below.

Anigozanthos bicolor* subsp. *minor

Twenty seven plants were recorded within the study area from a single geographically restricted, previously unrecorded, population that extended for a linear length of approximately 200 m between Shao Lu and Fisheries Roads, in the eastern portion of the study area. All observed plants were growing on the existing tracks associated with the low fuel modified buffer strip. It may be possible to avoid this population by constructing the fence immediately adjacent to agricultural land (southwest of the population) as no plants were observed in this area; however this would not achieve a 50 m buffer. There were no *Anigozanthos bicolor* subsp. *minor* plants observed to the northeast of the study area in undisturbed vegetation, however the habitat appears to be suitable and may require a disturbance event to promote growth.

There are 14 previously known populations of *Anigozanthos bicolor* subsp. *minor* (DEC 2008c), though *NatureMap* (DPaW 2007-2014) indicates at least 17 (this possibly includes additional recent records). The total number of plants for all known populations of this taxon is problematic to estimate as it responds to disturbance events and can only be detected periodically.

Anigozanthos bicolor subsp. *minor* is currently considered to contain two distinct species and is soon to be the subject of a taxonomic revision (S. Hopper pers. comm.). The proposed new name for the species recorded during the SBF surveys is *Anigozanthos condingupensis* ms. This proposed new species is known from less than 10 locations ranging from Stokes Inlet NP to the vicinity of the SBF location. It is usually found after fire for a year or two in soils associated with granite, then disappears into the seedbank (S. Hopper pers. comm.).

Conostylis lepidospermoides

Nine populations of *Conostylis lepidospermoides* were recorded intermittently between the westernmost end of the study area and Young River, extending for a total linear distance of approximately 56 km. None of these populations had been previously recorded. There were estimated to be almost 3 000 individual plants occurring within the study area. The populations typically spanned the entire 100 m width of the study area, extending into adjacent vegetation. Plants were observed both within the low fuel modified buffer strip as well as within undisturbed vegetation. The construction of the SBF would impact approximately 20% of the plants recorded, based on a 20 m wide disturbance footprint.

Most populations of *Conostylis lepidospermoides* occur within the study area at relatively high density, with individual plants not usually separated by more than 5-10 m. Therefore the proposed fence construction is unlikely to be able to avoid impact to all populations of this species within the current alignment. Impact to this species may be minimised by deviating the fence through agricultural land (where possible). Minimising the disturbance footprint in areas that correspond with *Conostylis lepidospermoides* populations, including the use of existing tracks, would also help minimise direct impacts to this species.

The approved conservation advice for *Conostylis lepidospermoides* (Commonwealth of Australia Threatened Species Scientific Committee 2008a) identifies 670 mature plants known to occur from all populations. Therefore this survey has substantially increased the total known population for this species. In spring 2014 DPaW conducted surveys for this species and identified three additional populations. There is now considered to be 21 populations of *Conostylis lepidospermoides* outside the study area (J. Waters⁴ pers. comm.) plus nine that were recorded in the present survey, therefore 30 in total.

Eucalyptus merrickiae

Eleven populations of *Eucalyptus merrickiae* were recorded intermittently over 56 km of the study area alignment, none of which were previously known to occur. There were 412 individual plants estimated from all populations combined. Most populations were associated with, or in close proximity to, salt lakes. All populations are located in sections that are adjacent to agricultural land and correspond with the existing low fuel modified buffer strip. Plants occurring within the existing low fuel modified buffer strip were observed to be successfully resprouting from lignotubers (**Plate 106**).



Plate 106: *Eucalyptus merrickiae* (TF) resprouting within the low fuel modified buffer strip

Impact to several populations of *Eucalyptus merrickiae* may be avoided or minimised by constructing the fence as far as possible from vegetation associated with salt lakes in the region, outlined in **Section 5**. However, *Eucalyptus merrickiae* was not strictly confined to salt lakes and it is unlikely that impact to this

⁴ Julie Waters: Conservation Officer, Department of Parks and Wildlife, Esperance District

species can be completely avoided within the currently defined study area. There is potential to avoid most populations if the fence were to be deviated through adjacent agricultural land.

During the 2014 field survey, all populations of *Eucalyptus merrickiae* were re-surveyed to identify the extent beyond the boundary of study area. All populations were recorded to extend beyond the study area boundary; details for each are summarised in **Section 5**. There are also considered to be extensive areas of potentially suitable habitat for *Eucalyptus merrickiae* (i.e. salt lake edges) within the UCL adjacent to the study area.

The approved conservation advice for *Eucalyptus merrickiae* (Commonwealth of Australia Threatened Species Scientific Committee 2008b) does not specify how many individual plants of this species are known to occur. There are 12 populations outlined in the conservation advice compared with approximately 33 that can be identified using *NatureMap* (DPaW 2007-2014), possibly due to more recent information.

Rhizanthella gardneri

Rhizanthella gardneri was not recorded during the field survey, though is known from recent records near the Oldfield River. It can only be readily detected during its flowering period (May to July) and even during that period it is highly cryptic. The record is considered reliable based on the location details, date of survey and presence of TF road markers at the site.

The population of *Rhizanthella gardneri* is located adjacent to a 'gap' in the study area that corresponds with the Oldfield River. This population could be completely avoided if this gap is expanded by approximately 400 m to the north, which would effectively avoid impacting the vegetation type associated with *Rhizanthella gardneri* (**EspMhLsp**).

8.3.1.2 Priority Flora

Fifty nine PF (11 P1, 13 P2, 25 P3 and 10 P4) were recorded from the study area during the field surveys. One additional PF taxa (*Paracaleana parvula*), not recorded during the field surveys, is considered to occur within the study area based on numerous reliable historical records.

PF do not have formal protection, however regulatory authorities typically expect the proponent of any clearing that will impact on these species to demonstrate that they have taken appropriate action to minimise impacts.

The majority of PF populations recorded extend across the entire 100 m width of the study area and commonly into adjacent vegetation. As such, complete avoidance in regard to the fence construction is unlikely to be possible in most cases. At least 11 of the PF taxa recorded are considered by Ecoscape to be 'disturbance opportunists' with plant numbers and populations elevated as a result of previous scrub rolling in the low fuel modified buffer strip or other activities that have modified the vegetation structure (including wildfires). The PF taxa considered likely to be disturbance opportunists, based on field observations, are *Acacia glaucissima*, *A. improcera*, *Daviesia newbeyi*, *Eremophila chamaephila*, *E. compressa*, *E. serpens*, *Goodenia laevis* subsp. *laevis*, *Gyrostemon ditrigynus*, *Halgania* sp. Peak Eleanor (M.A. Burgman 3547 B), *Micromyrtus elobata* subsp. *scopula* and *Pityrodia chrysocalyx*. These species were observed to be either absent or occurred in very low numbers/density within undisturbed vegetation.

On average it is anticipated that up to 20% of the individual plants calculated to occur within the study area will be impacted by the fence construction based on a 20 m width of the proposed clearing footprint. As most populations extend across the entire 100 m width and frequently also into adjacent vegetation, it is considered unlikely that many (if any) populations of PF will be completely destroyed as a result of the fence

construction. The majority of the study area corresponds with the low fuel modified buffer strip, therefore most populations are currently already impacted by relatively frequent disturbance events.

Vegetation types associated with salt lakes were noted to support a high number of PF. At least 14 TF and PF were considered to be most typically associated with salt lakes including *Aotus* sp. Dundas (M.A. Burgman 2835), *Bossiaea flexuosa*, *Comesperma calcicola*, *Conostephium marchantiorum*, *Cyathostemon* sp. Salmon Gums (B. Archer 769), *Darwinia polycephala*, *Darwinia* sp. Mt Ney (M.A. Burgman & S. McNee 1274), *Drosera salina*, *Eucalyptus merrickiae* (TF), *Frankenia brachyphylla*, *Frankenia drummondii*, *Frankenia glomerata*, *Hydrocotyle* sp. *Coraginaensis* (K. Newbey 7747), *Hydrocotyle* sp. Hexaptera (T. Erickson TEE 173), *Melaleuca fissurata* and *Thysanotus brachyantherus*. It is likely that more detailed surveys of the region may demonstrate many of these species to more abundant than their conservation status suggests as there are high numbers of salt lakes in the region (hence suitable habitat), particularly in the central portion of the study area. However, in general, the salt lake vegetation across the region has not been subject to detailed flora surveys.

8.3.1.3 Impact Assessment

An impact assessment has been conducted for conservation significant flora identified from the study area. **Table 17** summarises the population details recorded for each species and provides a comparison with the number of known populations. The number of populations/plants outlined in **Table 17** have been calculated based on the following:

- the calculated number of plants is based on the 100 m wide corridor that has been defined as the study area for biological surveys; it is expected that up to 20% of these will be impacted by the proposed fence construction based on a 20 m wide clearing footprint
- the number of populations calculated for the study area is based on a distance between records of greater than 500 m
- the number of previously recorded populations is based on *NatureMap* (DPaW 2007-2014) records whereby separate populations are defined as records that are greater than 500 m apart
- in most cases, only a portion of the population is likely to be impacted as most populations extend beyond the boundary of the study area.

The results of this survey have substantially increased the number of known populations for numerous conservation significant flora taxa, doubling (or more) the number of known populations for at least 15 taxa. Many of the conservation significant taxa encountered, whilst geographically restricted, were observed to be locally abundant within sections of the study area, particularly those that are considered to be disturbance opportunists. The majority of populations were not restricted to the boundaries of the study area and extended into adjacent vegetation.

The data presented in **Table 17** can be used to as a basis for identifying species of greatest concern, for which management strategies for minimising impacts may need to be considered.

Table 17: Summary of conservation significant flora and potential impacts

SPECIES	STATUS	NO. PLANTS IN STUDY AREA	NO. POPNS RECORDED IN STUDY AREA IN 2013/2014	NO. OF PREVIOUSLY RECORDED POPNS ¹
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	TF	27	1	17
<i>Conostylis lepidospermoides</i>	TF	2735	9	22 (2)
<i>Eucalyptus merrickiae</i>	TF	412	11	33 (2)
<i>Rhizanthella gardneri</i> ²	TF	?	1	12
<i>Acacia diaphana</i>	P1	221	2	10

SPECIES	STATUS	NO. PLANTS IN STUDY AREA	NO. POPNS RECORDED IN STUDY AREA IN 2013/2014	NO. OF PREVIOUSLY RECORDED POPNS ¹
<i>Baekkea</i> sp. Gibson (K.R. Newbey 11084)	P1	250	2	4
<i>Boronia baeckeacea</i> subsp. <i>patula</i>	P1	447	7	6 (1)
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)	P1	200	1	2
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)	P1	2222	7	9
<i>Dicrastylis archeri</i>	P1	200	1	6
<i>Eucalyptus misella</i>	P1	70	4	7(1)
<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P1	200	2	4
<i>Leucopogon remotus</i>	P1	16	2	10 (2)
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)	P1	1690	2	4 (1)
<i>Philotheca gardneri</i> subsp. <i>globosa</i>	P1	135	2	14
<i>Acacia amyctica</i>	P2	337	5	11
<i>Acacia nitidula</i>	P2	6340	9	15
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	4532	22	14 (2)
<i>Darwinia luehmannii</i>	P2	157	2	5
<i>Daviesia newbeyi</i>	P2	400	1	13
<i>Drosera salina</i>	P2	550	2	9
<i>Eucalyptus luculenta</i>	P2	12	11	3
<i>Frankenia brachyphylla</i>	P2	400	3	3
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)	P2	5921	22	5
<i>Hydrocotyle</i> sp. Coraginaensis (K. Newbey 7747)	P2	100	1	3
<i>Melaleuca eximia</i>	P2	20	1	7
<i>Paracaleana parvula</i> ¹	P2	?	6	8 (6)
<i>Persoonia spathulata</i>	P2	36	8	3
<i>Thysanotus brachyantherus</i>	P2	15	3	9
<i>Acacia bartlei</i>	P3	200	1	19
<i>Acacia euthyphylla</i>	P3	907	8	21
<i>Acacia glaucissima</i>	P3	10835	82	21 (1)
<i>Acacia improcera</i>	P3	341	6	13
<i>Acacia singula</i>	P3	1271	3	15 (1)
<i>Bossiaea flexuosa</i>	P3	3494	11	20 (1)
<i>Comesperma calcicola</i>	P3	102	9	8
<i>Conostephium marchantiorum</i>	P3	73	4	30
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	4684	24	11 (1)
<i>Daviesia pauciflora</i>	P3	71	1	19
<i>Eremophila chamaeophila</i>	P3	10258	11	14 (1)
<i>Eremophila compressa</i>	P3	1224	4	15 (1)
<i>Frankenia drummondii</i>	P3	341	3	29
<i>Frankenia glomerata</i>	P3	380	3	36
<i>Gonocarpus pycnostachyus</i>	P3	330	1	7
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	12026	58	15
<i>Isopogon alpicornis</i>	P3	31	6	14
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	18390	44	9 (1)
<i>Persoonia cymbifolia</i>	P3	24	11	20 (1)
<i>Persoonia scabra</i>	P3	30	7	12 (1)
<i>Pityrodia chrysocalyx</i>	P3	4941	11	12 (1)

SPECIES	STATUS	NO. PLANTS IN STUDY AREA	NO. POPNS RECORDED IN STUDY AREA IN 2013/2014	NO. OF PREVIOUSLY RECORDED POPNS ¹
<i>Pultenaea adunca</i>	P3	250	1	12
<i>Pultenaea craigiana</i>	P3	200	1	7
<i>Pultenaea daena</i>	P3	561	2	13
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	42	6	5
<i>Adenanthos ileticos</i>	P4	4588	15	35 (2)
<i>Darwinia polycephala</i>	P4	7240	18	21
<i>Eremophila serpens</i>	P4	36	5	25 (1)
<i>Eucalyptus dolichorhyncha</i>	P4	435	10	23
<i>Eucalyptus stoatei</i>	P4	2164	48	27 (2)
<i>Grevillea aneura</i>	P4	5702	22	30 (3)
<i>Grevillea baxteri</i>	P4	3932	22	30 (1)
<i>Gyrostemon ditrigynus</i>	P4	3195	19	21 (2)
<i>Melaleuca fissurata</i>	P4	1605	20	26
<i>Thysanotus parviflorus</i>	P4	2	2	14
TOTAL		127551	644	

¹ Figures in brackets indicate the number of previously known populations that have been duplicated in the 2013/2014 field survey records (within a distance of 500 m)

² Denotes species that were not recorded during the 2013/2014 field surveys that are considered to occur within the study area

A likelihood of occurrence assessment has been conducted for all species identified by the desktop searches and is presented in **Table 39** in **Appendix Seven**. This assessment has indicated that an additional 48 conservation significant flora taxa have potential to occur within the study area based on habitat preferences and proximity to known populations. Ecoscape considers it unlikely that many of these species would occur within the study area because the targeted searches did not identify them despite intensive targeted searches across the entire study area, however their presence cannot be completely discounted.

DPaW recommends applying the precautionary principle and minimising impact to PF that are known from less than 200 individual plants or three or less populations. The number of individual plants for PF is largely unavailable for the majority of the taxa listed in **Table 17**. The following taxa are known from three or less populations outside of the proposed fence alignment:

- *Chamelaucium* sp. Mt Heywood (K. Newbey 7954)
- *Eucalyptus luculenta* (11 new populations were recorded within the fence alignment)
- *Frankenia brachyphylla*
- *Hydrocotyle* sp. Coraginaensis (K. Newbey 7747)
- *Persoonia spathulata* (8 new populations were recorded within the fence alignment).

8.3.2 Introduced Flora

In general, the vegetation assessed within the study area contained very low levels of weed invasion, commonly completely absent despite the close proximity to agricultural land. Twenty six introduced species were recorded from quadrats, descriptive relevés and opportunistic records. **Asparagus asparagoides* (Bridal Creeper) and **Carthamus lanatus* (Saffron Thistle) are Declared Pests for the whole of Western Australia whilst **Onopordum acaulon* (Stemless Thistle) is listed as a Declared Pest for several Shires, including Ravensthorpe and Esperance.

This list of introduced species is not considered comprehensive for the study area as they were not specifically targeted during field surveys.

9.0 FAUNA DISCUSSION

9.1 FAUNA ASSEMBLAGE

Approximately 405 species of vertebrates and 11 invertebrates were identified from all sources as potentially occurring within the study area (**Appendix Eight**). This is a likely overestimate for vertebrates because some of the sources (e.g. Burbidge *et al.* 2004) covered a wider geographic area. The highest detection rates (species recorded in 2013-14 surveys as a proportion of species potentially present) are for introduced mammals (large size, conspicuous tracks and scats) and passerine birds (high activity levels, conspicuous appearance, sociality, distinctive calls), while other mammals (mostly small and nocturnal) and reptiles (mostly small, relatively inactive due to season and weather conditions) were more difficult to detect.

Table 18: Summary of fauna species numbers potentially present in area and recorded by survey

GROUP	POTENTIAL IN AREA	DETECTED BY SURVEY	PERCENT
Frogs	18	1*	6%
Native terrestrial mammals	25	5	20%
Bats	8	0	0%
Introduced mammals	13	5	38%
Freshwater turtles	1	0	0%
Lizards	64	11	17%
Snakes	29	2	7%
Non-passerine birds	143	32	22%
Passerine birds	83	43	52%

* one frog seen, incompletely metamorphosed and not identifiable beyond *Heleioporus* or *Neobatrachus* sp. (Limnodynastidae)

Both the IBRA regions/subregions (Commonwealth of Australia 2012) and broader-scale zones such as those of Spencer (1896) can be useful in describing the distribution of fauna; relatively few vertebrate species have natural ranges restricted to single IBRA regions, and many have broad distributions corresponding well to Spencer's Bassian, Eyrean or Torresian zones. The fauna of the study area can be characterised as a mixture of regional elements including:

- southwestern endemics
- coastal/marine species
- southern (Bassian) species
- arid zone (Eremaean) species
- mallee specialists.

The location and habitats of the study area make it somewhat marginal for each of these regional elements, so that many characteristic species of each group are likely to be absent. These include northern or Eremaean species recorded near the Eyre Highway, but not known to intersect the study area (e.g. *Tympanocryptis cephalus*, *Strophurus intermedius*, *S. assimilis*, *Hesperoedura reticulata*, *Todiramphus pyrrhopygia*, *Acanthiza i. iredalei*, *Artamus personatus*, *Corvus orru*); high-rainfall-dependent southwestern forms, which often reach their eastern limit close to Ravensthorpe; and most of the coastal/marine species that are rarely found more than a short distance (if at all) inland. Because of this marginal or transitional property, many species known to occur in close proximity to part of the study area may be unlikely to occur within it.

The fauna can also be partitioned according to soil, vegetation and climatic attributes of occupied habitats; Burbidge *et al.* (2004) conducted such an analysis for small ground-living vertebrates based on co-

occurrence at survey sites throughout the WA agricultural zone, and their results can be applied in predicting occurrence of species across different habitats in the present study area.

9.2 SUMMARY OF CONSERVATION SIGNIFICANT FAUNA

A summary of conservation significant fauna species identified in the desktop study as potentially occurring is given in **Table 19**, including an estimate of residence status and potential habitat types in the study area, and an indication of potential impact due to clearing and construction of the fence extension. Potential to interact with the fence extension was assessed by considering various sources of information on distribution, including inspection of *NatureMap* (DPAW 2007-2014) records with regard to spatial accuracy and date of occurrence. For each species, impacts are considered to be minor if any (assessed as 'none' if out of range, i.e. the current species distribution does not intersect with the study area, or for species with habitat or movements such as to have no negative interaction with localised clearing or fences). Details of distribution, habitat and potential impacts for particular species (conservation significant, target and some other fauna) are given in **Appendix Nine**. Two recently de-listed species are retained in this table.

Table 19: Summary of occurrence, habitat and potential impacts on conservation significant fauna

SPECIES	COMMON NAME	EPBC ACT	WC ACT /DPAW	OCCURRENCE	HABITAT TYPE	IMPACT
<i>Dasyurus geoffroii</i>	Western Quoll	VU	VU	present	1,4,7	H - minor
<i>Parantechinus apicalis</i>	Dibbler	EN	EN	out of range	-	none
<i>Phascogale calura</i>	Red-tailed Phascogale	EN	EN	likely	1,2,3,4,5,7	F,P - minor
<i>Myrmecobius fasciatus</i>	Numbat	VU	VU	out of range	-	none
<i>Isoodon obesulus fusciventer</i>	Quenda	-	P5	present	2,3,5,6,7	H,F,P - minor
<i>Macropus irma</i>	Western Brush Wallaby	-	P4	present	1,2,3,4,7	B,H,C - minor
<i>Macropus eugenii derbianus</i>	Tammar Wallaby	-	P5	out of range	-	none
<i>Nyctophilus major</i>	Greater Long-eared Bat	-	P4	potential	1,4,7	H,C - minor
<i>Pseudomys occidentalis</i>	Western Mouse	-	P4	potential	2,3	H,F,P - minor
<i>Pseudomys shortridgei</i>	Heath Mouse	VU	VU	unlikely	-	none
<i>Christinus</i> sp.	Cape Le Grand Gecko	-	P2	out of range	-	none
<i>Lerista viduata</i>	Ravensthorpe Range Slider	-	P1	out of range	-	none
<i>Aspidites ramsayi</i>	Woma	-	S,P1	out of range	-	none
<i>Morelia spilota imbricata</i>	Southwestern Carpet Python	-	S,P4	potential	1,2,4,5,6,7	H,P - minor
<i>Acanthophis antarcticus</i>	Southern Death Adder	-	P3	likely	1,2,3,4,5	H - minor
<i>Parasuta spectabilis bushi</i>	Mallee Black-headed Snake	-	P1	out of range	-	none
<i>Paroplocephalus atriceps</i>	Lake Cronin Snake	-	P3	potential (northwest part)	any	H - minor
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	present	1,2,3,4,5	H,P,C - minor
<i>Cereopsis novaehollandiae grisea</i>	Recherche Cape Barren Goose	VU	VU	out of range	-	none
<i>Apus pacificus</i>	Fork-tailed Swift	M	IA	likely visitor	any	none
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	EN	out of range	-	none
<i>Ardea modesta</i>	Eastern Great Egret	M	IA	out of range	-	none
<i>Ardea ibis</i>	Cattle Egret	M	IA	out of range	-	none

SPECIES	COMMON NAME	EPBC ACT	WC ACT /DPAW	OCCURRENCE	HABITAT TYPE	IMPACT
<i>Plegadis falcinellus</i>	Glossy Ibis	M	IA	likely visitor	6,8	none
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	M	IA	out of range	-	none
<i>Falco peregrinus</i>	Peregrine Falcon	-	S	likely	any	H - minor/none
<i>Ardeotis australis</i>	Australian Bustard	-	P4	likely in area	(cropland)	C - minor
<i>Burhinus grallarius</i>	Bush Stone-curlew	-	P4 (delisted 2014)	out of range	-	none
<i>Pluvialis fulva</i>	Pacific Golden Plover	M	IA	out of range	-	none
<i>Pluvialis squatarola</i>	Grey Plover	M	IA	out of range	-	none
<i>Charadrius mongolus</i>	Lesser Sand Plover	M	EN	out of range	-	none
<i>Charadrius l. leschenaultii</i>	Greater Sand Plover	M	VU	out of range	-	none
<i>Thinornis rubricollis</i>	Hooded Plover	-	P4	likely (winter)	6,8	H - minor
<i>Gallinago stenura</i>	Pin-tailed Snipe	M	IA	out of range	-	none
<i>Gallinago megala</i>	Swinhoe's Snipe	M	IA	out of range	-	none
<i>Limosa limosa</i>	Black-tailed Godwit	M	IA	out of range	-	none
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	VU	out of range	-	none
<i>Numenius minutus</i>	Little Curlew	M	IA	out of range	-	none
<i>Numenius phaeopus</i>	Whimbrel	M	IA	out of range	-	none
<i>Numenius madagascariensis</i>	Eastern Curlew	M	VU	out of range	-	none
<i>Actitis hypoleucos</i>	Common Sandpiper	M	IA	potential visitor	6,8	H - minor/none
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	IA	out of range	-	none
<i>Tringa nebularia</i>	Common Greenshank	M	IA	likely visitor	6,8	H - minor
<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	IA	potential visitor	6,8	H - minor/none
<i>Tringa glareola</i>	Wood Sandpiper	M	IA	likely visitor	6,8	H - minor
<i>Arenaria interpres</i>	Ruddy Turnstone	M	IA	out of range	-	none
<i>Calidris canutus</i>	Red Knot	M	VU	potential visitor	6,8	H - minor/none
<i>Calidris ruficollis</i>	Red-necked Stint	M	IA	likely visitor	6,8	H - minor
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	IA	likely visitor	6,8	H - minor
<i>Calidris ferruginea</i>	Curlew Sandpiper	M	VU	likely visitor	6,8	H - minor
<i>Calidris tenuirostris</i>	Great Knot	M	VU	out of range	-	none
<i>Calidris alba</i>	Sanderling	M	IA	out of range	-	none
<i>Calidris subminuta</i>	Long-toed Stint	M	IA	out of range	-	none
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	IA	out of range	-	none
<i>Onychoprion anaethetus</i>	Bridled Tern	M	IA	out of range	-	none
<i>Hydroprogne caspia</i>	Caspian Tern	M	IA	out of range	-	none
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	EN	EN	present	1,2,3,4,5,7	H - minor
<i>Platycercus icterotis xanthogenys</i>	Western Rosella	-	P4	present	any	H - minor

SPECIES	COMMON NAME	EPBC ACT	WC ACT /DPAW	OCCURRENCE	HABITAT TYPE	IMPACT
<i>Pezoporus flaviventris</i>	Western Ground Parrot	CR	CR	potential	2,3,5	C – minor/none
<i>Merops ornatus</i>	Rainbow Bee-eater	M	IA	present	all	H - minor
<i>Dasyornis longirostris</i>	Western Bristlebird	VU	VU	out of range	-	none
<i>Hylacola cauta whitlocki</i>	Shy Heathwren	-	P4	likely	1,2	H - minor
<i>Calamanthus campestris montanellus</i>	Rufous Fieldwren	-	P4	likely	2,3,5,6	H - minor
<i>Acanthiza i. iredalei</i>	Slender-billed Thornbill	VU (delisted 2013)	-	out of range	-	none
<i>Pomatostomus superciliosus ashbyi</i>	White-browed Babbler	-	P4	present	1,2,3,4,5,6	H - minor
<i>Psophodes nigrogularis oberon</i>	Western Whipbird	-	P4	potential	1,2,4,5 (western part)	H - minor
<i>Falunculus frontatus leucogaster</i>	Crested Shrike-tit	-	P4	potential	1,4,7	H - minor/none
<i>Oreoica gutturalis</i>	Crested Bellbird	-	P4	present	1,2,3,4,5,6	H - minor
<i>Budginmaya eulae</i>	Eula's Planthopper	-	P1	out of range	-	none
<i>Hylaeus globuliferus</i>	(bee)	-	P3	out of range	-	none
<i>Daphnia jollyi</i>	(water flea)	-	P1	unlikely	-	none
<i>Atelomastix</i> (6 spp.)	(millipede)	-	VU	out of range	-	none
<i>Epicyliosoma sarahae</i>	(pill millipede)	-	VU	out of range	-	none
<i>Zephyrarchaea marki</i>	(assassin spider)	-	VU	out of range	-	none

Letter codes for conservation status as in **Table 22** and **Table 23**; habitat types defined in Section **7.1.2**; codes under 'Impact': H (loss of habitat area), B (barrier preventing movement, isolating sub-populations), F (fragmentation of continuous habitat), P (increased vulnerability to feral predators), C (collision/entanglement hazard, potential for direct mortality or injury)

9.3 DISCUSSION OF POTENTIAL FAUNA IMPACTS

9.3.1 Requirement for Targeted Surveys

The data suggests that no targeted surveys are recommended. The desktop review identified 74 conservation significant species (10 mammals, seven reptiles, 51 bird species, six invertebrate species) as potentially occurring in the area (**Table 19**). Of the 10 conservation significant mammal species potentially occurring, three species were recorded as present (Western Quoll, Quenda and Western Brush Wallaby) and two more species (Red-tailed Phascogale and Western Mouse) as likely to occur. Due to the biology of the species, preferred habitats and home ranges the species are not expected to be significantly impacted by the construction of a fence.

Seven species of reptile were identified as part of this assessment which comprise of four species that are not likely to occur due to the species' range, and three remaining three species are likely to move away from areas of disturbance (**Table 19**). Their main impact due to the construction of the fence is a small amount of habitat loss which is not expected to impact the species as such. For this reason additional targeted surveys are not recommended.

Of the 51 conservation significant bird species, one species, the Malleefowl is mainly ground-dwelling (**Table 19**). The Malleefowl is listed as EPBC Vulnerable and was recorded as present along the corridor. However, impacts on this species are expected to be minor. Clearance of habitat is the main concern and

should be kept to a minimum within suitable habitat types. The survey conducted recorded the species and further surveying is not thought to provide any additional data. Any new mounds would also be easily detected during construction works and could be avoided. Two other species, the Australian Bustard (DPaW Priority 4) and the Bush Stone-curlew (delisted in 2014) were also identified and are mainly ground-dwelling. However, the Bush Stone-curlew is not likely to occur in the area and the Australian Bustard prefers to inhabit open croplands and is able to cross linear barriers due to the relatively high mobility of the species (DSE 2003). The remaining 48 species of conservation significant birds are either not considered likely to occur (e.g. Australasian Bittern) or are highly mobile and impacts on the species are expected to be minor and impacts from the loss of some habitat was not considered to be significant (e.g. Rainbow Bee-eater). Additional surveys for bird species may have encountered more individuals or Malleefowl mounds but data collected to date have adequately shown the presence or absence of the species.

The terrestrial invertebrate fauna identified comprises of 11 species that comprise of eight species listed as EPBC Vulnerable (seven species of millipede and one spider) and three species listed by DPaW (as P1, P3 or P4). The EPBC Vulnerable species and two of the DPaW listed species are all not expected to occur within the study area due to their limited range outside the corridor. The only species with a range intersecting the study area is a water flea (*Daphnia jollyi*). Suitable habitat is not present within the proposed Barrier Fence corridor and therefore any additional surveys are not recommended. If any of these species occur in the area, the fence as such is not considered a barrier for these species and impacts are expected to be negligible.

9.3.2 Previously Identified Potential Risks and Benefits to Wildlife

The benefit-cost analysis by URS (2007) does not include any cost estimate of the impacts on 'target' native species (emu, 'wild dog' including dingo, kangaroos), or on loss of fauna habitat, connectivity, ecosystem functions, or animal welfare. The entire text of the section titled 'Environmental Impacts' is:

Peter Mawson (Department of Environment and Conservation, pers. comm.) suggests there is little adverse impact on non-target native species. None of the larger terrestrial species are migratory, and smaller local species such as reptiles have no difficulty in passing through the fence.

The environmental impact (net cost to the ecosystem) of the fence is thus implicitly assumed to be \$0.00. Ecoscape considers this likely to be an underestimate.

A report by DAFWA's Invasive Species Program (DAFWA 2012a) discusses the following potential risks and benefits to wildlife (see also GHD 2012):

Risks:

- collisions and entrapment
- prevention of dispersal and access to resources
- separation and isolation of populations
- changes to faunal communities within the fence
- other potential negative impacts:
 - alteration of predator behaviour such as preferential predation along fence lines
 - long-term loss of anti-predator behaviour in prey species
 - increase in invasive species number, abundance and distribution as the fence and road allow greater access to bushland
 - restriction of animal movement in fires.

Potential positive impacts:

- reduced threat of 'wild dogs' to medium-sized macropods, possibly including Western Brush Wallaby
- access to fire fighting (benefit to wildlife not explicit)

- dingo conservation: “The wild dogs in the proposed fenced area and immediately to the north have a relatively high degree of dingo purity [(Stephens 2011)]. It has been proposed that maintenance of intact dingo pack structure within some areas in the Great Western Woodlands would have conservation benefits [(Duncan *et al.* 2006)]. A fence preventing movement of dingos/wild dogs into the Agricultural area could facilitate conflicting management approaches (wild dog control and dingo conservation) in the landscape.”

9.3.3 Intended Impacts on Target Wildlife Species, and Unintended Consequences

The purpose of the proposed action has been clearly stated:

The purpose of the proposed State Barrier Fence Esperance extension is to provide non-lethal and long-term protection from those pest animals periodically moving from pastoral land into agricultural areas in the Shires of Ravensthorpe and Esperance. Pest animals such as emus and kangaroos damage crops and wild dogs are impacting on livestock enterprises (DAFWA 2014b).

‘Wild dogs’ (dingo, feral domestic dogs and hybrids), Western Grey Kangaroo and Emu are listed as ‘declared pests’ under the *BAM Act 2007*. Under the *Act*, ‘**control**, in relation to a declared pest or other organism, includes eradicate, destroy, prevent the presence or spread of, manage, examine or test for, survey for or monitor the presence or spread of, and treat’ (Government of Western Australia 2007). However, in practice DAFWA (2014d) states, e.g. ‘*Control techniques [for wild dogs] include baiting with meat poisoned with 1080 (sodium fluoroacetate) and to a lesser extent, trapping and shooting*’. Lethal control has also been carried out on the kangaroo and emu and will presumably continue, although these species are expected to persist within the agricultural zone.

The occurrence of large concentrations of emus is itself an unintended consequence of the presence of long fences. When unconstrained, emus do not aggregate during migration; they are solitary or occur in small family groups, or up to a few tens of birds where food is abundant (see species profile, **Appendix Nine**). Western Grey Kangaroos are less affected by fences as they do not undergo migration and rarely make long individual movements, but numbers may build up over several years in areas of high food abundance, with subsequent local mass mortality due to drought.

As the target ‘pest’ species are native or (in the case of the dingo) fully naturalised, present in a wide range of habitats and with significant functions in the ecosystem, impacts on these species may have a wide range of unintended consequences if their ecological functions are lost. There is evidence that density of both emu and large kangaroo species is regulated by dingo predation (e.g. Pople *et al.* 2000), which is now effectively absent in the agricultural zone, leading to higher and more variable populations of the prey species.. Kangaroos at moderate density benefit soil stability and productivity by excavating ‘hip holes’ that increase water infiltration and retention of nutrients (Eldridge & James 2009; Eldridge & Rath 2002). The emu is considered to be important in maintaining the diversity of native vegetation through its role as a seed disperser (Calviño-Cancela *et al.* 2006; 2008). Presence of the dingo is also considered to be an important control on populations of smaller introduced predators, particularly fox and cat, so that the latter become more abundant when dingoes are removed (Glen *et al.* 2007; Glen & Dickman 2014), leading to increased predation pressure and risk of extinction of birds (including Western Ground Parrot and Malleefowl) and critical weight range mammals. To a large extent these effects have already occurred in the study area, and no new impact is therefore likely.

GHD (2012) notes that the proposed fence extension may also be of benefit in limiting movements of large feral mammals including horses and camels (present in low numbers in the UCL to the north of the agricultural area), and helping to prevent any future incursions of pigs and goats, which are not currently present to a significant extent.

9.3.4 Impacts to Conservation Significant Species

Of the conservation listed fauna species that were identified in desktop searches as potentially occurring in the vicinity of the proposed fence extension (**Table 19** above, and details in **Appendix Nine**), many are considered 'out of range' or (in a few other cases) to have negligible potential for interaction with the fence or associated vegetation clearing due to the habitat preference of the species concerned. In every other case (indicated by letter codes in **Table 19**), potential impacts are considered to be 'minor' in proportion to the current distribution and populations, and to result from:

- the fence acting as a barrier (Western Brush Wallaby), or
- collision/entanglement hazard (some birds, possibly including Western Ground Parrot, Malleefowl)
- loss of habitat area by clearing (some mammals, birds, reptiles)
- loss of habitat connectivity (some mammals, small birds, reptiles), or
- increased exposure to feral predators using the fence and associated clearing as a corridor.

These modes of potential impact to conservation significant species also apply to native fauna species in general, and are discussed further below. Assessment of impacts as 'minor' to particular species does not imply they are negligible in any particular case, or cumulatively.

The potential benefit (positive impact) of dingo exclusion to medium-sized macropods such as Western Brush Wallaby (DAFWA 2012a) is opposed and may be outweighed by the absence of the dingo's role in regulating fox abundance (**Section 9.3.3**), as the fox is generally considered a more significant threatening process for mammals in this weight range (Maxwell *et al.* 1996).

Details of fence design can have a major influence on how it affects particular species, including the height, mesh size, underground extent, and presence of barbed wire strands and footnetting (e.g. URS 2007). The discussion here takes account of the most recently announced specifications, including use of orange droppers to increase visibility to fauna (DAFWA 2014a).

9.3.5 The Fence as a Barrier to Dispersal

As well as 'target' species for which the fence would function as a barrier by design, some other vertebrate species currently occurring in the study area will also be unable to cross. These include at least one conservation listed species, Western Brush Wallaby (*Macropus irma*, P4), and the unlisted Short-beaked Echidna (*Tachyglossus aculeatus*). Individuals and local populations will be prevented from accessing resources within their previously accessible range, so that some decline in abundance and resilience of such species is likely on both sides of the barrier. Complete separation of populations on either side of the fence (except for widely spaced breaks at creeks) reduces effective population size and may lead to a loss of genetic diversity and greater risk of population decline and local extinction (Epps *et al.* 2005) on both sides, but particularly in the agricultural zone where remnant habitat patches are small and isolated. In the case of the Brush Wallaby, loss of genetic diversity and resilience can be minimised by continuing fox control in the agricultural zone. Considering the isolated, remnant nature of habitat within the agricultural zone, the construction of the proposed fence would represent a hardening of a barrier to gene flow rather than a new barrier.

The fence would not present a barrier to movement of any birds, reptiles, or smaller mammals.

9.3.6 Loss of Fauna Habitat

Including cleared tracks 10 m wide on both sides of the fence, each kilometre of fence occupies a footprint of 2 ha (DAFWA 2014a; GHD 2012); the much greater area affected by scrub rolling (10-20 ha/km) may also be completely lost as habitat for many species, so it is expected that (long-term or equilibrium) population of most vertebrates will be reduced in proportion to the area of suitable habitat cleared. Only species adapted

to preferentially utilise bare ground or low shrubland (for breeding, basking, foraging or other activities) will gain habitat and may benefit.

Shorter term effects on faunal composition and diversity could occur as a result of construction activity if it affects refuge or breeding habitat. Thick vegetation (especially containing *Gastrolobium*), fallen logs and debris piles, and trees with hollows are the most significant habitats for numerous species including conservation significant taxa, and disturbance to these should be avoided where possible. However, tree hollows are unlikely to be used for breeding purposes by the Carnaby's Black-Cockatoo as the study area is located outside the known breeding range (DSEWPac 2012).

9.3.7 Habitat Fragmentation and Loss of Connectivity

From the point of view of most vertebrate fauna, agricultural landscapes contain small remnants of habitat within a matrix which may be more or less completely uninhabitable. A minority of species can easily cross considerable gaps to make use of isolated remnant vegetation patches, or forage and conduct other activities within the artificial grassland matrix itself. For small woodland and forest vertebrates, including some birds as well as terrestrial species, a 1-200 m strip either completely cleared or reduced to low shrubland by scrub rolling represents a significant barrier to dispersal (Brooker *et al.* 1999). For species unable to easily cross such gaps, it may lead to genetic isolation and risk of long-term decline, as for those species blocked by the fence itself. However, this impact will be relatively small because most parts of the corridor are at the boundary of previously cleared land.

Fauna impacts due to habitat fragmentation, and edge effects of clearing due to exposure to wind and radiation affecting microclimate and vegetation structure (e.g. weed invasion), are expected to occur as processes of 'relaxation' to a new equilibrium; a gradual loss of fauna species in small fragments and at edges of remnant vegetation may therefore occur over many years (Burbidge *et al.* 2004; Kitchener *et al.* 1982; Saunders *et al.* 1991). The majority of the alignment is along the interface between already cleared agricultural land and native vegetation, a barrier that has been in existence since clearing commenced in the early 1970's, so that much of this loss of local biodiversity has presumably already occurred. Several decades after clearing and fragmentation, ongoing changes in fauna composition may be slow, as found in studies of older reserves in the Avon Wheatbelt (Kitchener *et al.* 1982). In the remaining areas, clearing either side of the fence is not considered as necessarily fragmenting the habitats it passes through, because the linear geometry is the least disruptive to dispersal, and many fauna species can cope with small areas of disturbance within their own home range. However, habitat alteration will commence at the newly created edges and occur progressively for many more years, increasing the effective width of the barrier for certain species.

At longer spatial scales, the loss of connectivity produced by the fence extension would act in direct opposition to the objectives of the State- and Commonwealth-supported GondwanaLink project, which aims to maintain and increase habitat and fauna population connectivity across the mesic southwest and the Great Western Woodlands (Bradby *et al.* 2014).

9.3.8 Animal Welfare Impacts: Entanglement and Injury

The use of barbed wire is no longer proposed for the Esperance extension of the SBF (DAFWA 2014a). Use of barbed wire may be justified for security applications or to deter domestic animals (particularly cattle) from damaging fences by rubbing, but increasingly its use is seen as environmentally damaging and unethical where wildlife interactions are likely. Bats and gliders are particularly vulnerable to lethal entanglement, but birds and larger mammals are also commonly affected (Booth 2007).

Even without barbed wire, some species are susceptible to entanglement and injury while moving along or attempting to cross the fence. These include macropods (Western Grey Kangaroo, possibly Western Brush

Wallaby) and emus which can get the hind legs caught under the top wire/s ('fencehanging', e.g. Macedon Ranges Wildlife Network 2014), and Short-beaked Echidna, which may become stuck while burrowing under or attempting to push through the mesh, leading to slow death (DAFWA 2012a). Injury to emus (as well as damage to crops and fence infrastructure) is most likely to occur when large numbers congregate along a fenceline and are harassed by humans (e.g. legal or illegal shooting, pursuit with vehicles or dogs; Department of Agriculture Western Australia 2001; Johnson 2006).

DAFWA (2015) has recorded quite low numbers of animals entangled in the fence; 41 carcasses were identified and removed from its 1200 km length in 2007-2015, almost all of kangaroos and emus (**Appendix 12**). This is likely to underestimate the average level of collision/entanglement mortality to some extent, due to factors including:

- Potential for rapid decomposition or scavenging removing visible signs of carcasses before seen by staff (this applies particularly to relatively small species such as birds, and animals such as echidnas trapped at or below ground level);
- Some mortality may occur after animals are injured by collision but are able to escape from the fence, and therefore not recorded;
- Collisions and entanglements are most likely to occur immediately after construction, as animals are unfamiliar with the barrier across their usual movement paths (Long & Robley 2004);
- Mortality may be much higher during emu migration events, none of which occurred in the period for which data were available (DAFWA 2015).

While fences are not barriers to movement of birds, they still represent a collision hazard for some species, potentially including Malleefowl and Western Ground Parrot. The critically endangered parrot does not currently occupy habitat in the vicinity of the proposed fence extension, so any impact would be limited to individual birds dispersing from their natal range, and is not considered to limit dispersal or reduce the chance of establishing additional populations in currently unoccupied habitat (**Appendix Nine**). The proposed use of visibility-enhancing features (fluorescent orange droppers at regular intervals) will reduce potential for impacts and entanglement for most species, especially birds.

9.3.9 Facilitation of Introduced Predator Movements

A potentially detrimental aspect to the fence corridor is that it may provide further access to habitats for introduced feral predators, particularly the red fox and feral cat (possibly not applicable to dingo/wild dog, as lethal control is expected to continue on both sides of the fence). Adult foxes may be unable to cross the fence, but smaller foxes and cats are unlikely to be limited by it; however, both species are established throughout the area and no direct effect of the fence on presence or abundance is expected. Roads (and other cleared areas in fragmented habitat mosaics) are frequently used by both species for movement and foraging, and while absence of roads is not a limitation on habitat availability even in forested habitat (Catling & Burt 1995), their presence facilitates access to areas of thick or *Gastrolobium*-containing vegetation (reducing their value as refuges for prey), and may allow increased predator home range size and/or more effective detection and capture of prey exposed on bare ground or in low, weedy roadside vegetation (Arnold *et al.* 1987). Any effect of the fence corridor on feral predator impacts would be marginal relative to existing impacts. On the other hand, use of roads by these predators would also facilitate monitoring and control efforts, so that net effect may be positive.

9.3.10 Altered Fire Regimes

The access roads and scrub rolled buffer associated with the proposed fence extension may have significant effects on the occurrence and extent of wildfires, both by acting as a firebreak and providing access for fire-fighting crews (DAFWA 2012a). As many fauna species are dependent on access to long-unburnt vegetation, or a mosaic of different fire-aged habitats, for foraging and shelter sites, the limitation of wildfire

extent and intensity is potentially beneficial for the survival and abundance of native fauna. However, the increased exposure to wind and sunlight occurring as edge effects of clearing can be expected on average to increase flammability of the vegetation, and the use of vehicles and power tools in construction and maintenance along the fence provides additional potential sources of ignition, so that the net effect on fire regime could be either positive or negative for fauna and habitat. Risk of adverse effects can be minimised by appropriate monitoring and implementation of environmental management practices during construction and maintenance, and limiting access at other times. The fence corridor will also provide emergency fire fighting access, which may be of benefit to fauna by preserving unburnt patches of habitat.

9.3.11 Pyramid Lake 'Pocket'

The northwestern section of the proposed alignment has been identified as potentially creating a fenced pocket north of the alignment, due to the presence of Pyramid Lake (a large salt lake system to the north). The semi-enclosed area is entirely covered by native vegetation and is approximately 5 900 ha in size. Only the medium to large sized terrestrial vertebrate fauna species (e.g. macropods, emu, dingo) will be impacted, as they will not be able to cross the fence. There will remain corridors for these species to move around the ends of the fence at the western end during dry periods. Due to its large size, this area will also take a considerable time to reach unsustainable population levels of these large species, but, if this occurs, it would lead to mass mortality and some degree of habitat degradation.

It is understood that the currently proposed alignment does not include this 'pocket' and the hazard is not expected to occur.

9.3.12 Fauna Diversity

The diversity of terrestrial vertebrate fauna species within the study area is correlated to the types of habitats that exist along the alignment. That is, the higher the number of different types of habitat there are the more diverse the fauna assemblages will be. High diversity is reliant on robust ecological processes that are not under impact from threatening processes e.g. feral predation, weeds and altered fire regimes (Burbidge *et al.* 2004). Processes known or expected to result in a progressive decline of vertebrate fauna diversity are already in operation throughout the study area (effects of clearing, fragmentation, weeds and pasture vegetation, introduced predators and herbivores, absence of top-order predators, edge effects on remnants, etc.). As the alignment generally follows the interface between native vegetation and agricultural land, threatening processes to ecological robustness are more evident and therefore the diversity of the fauna assemblages is already compromised. Any additional decline due to the fence would be difficult to identify against such a background, and may not be significant, but reversal of ongoing biodiversity decline may be less likely (or more difficult and expensive) after construction of the fence extension.

9.3.13 Principles of Environmental Protection

Environmental assessment of proposed actions in Western Australia is governed by, among other things, the Principles of Environmental Protection (EPA 2004c; Government of Western Australia 1986 as amended 2003). Potential impacts of the proposed Esperance extension of the State Barrier Fence on native fauna are considered in relation to these principles:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity
- principles relating to improved valuation, pricing and incentive mechanisms
- the principle of waste minimisation

The precautionary principle states: "Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental

degradation". The only specific threat of serious or irreversible damage here identified as potentially being caused or exacerbated by the fence extension is the potential for further decline or extinction of the Western Ground Parrot. This threat currently relates only to the eastern portion of the study area (vicinity of the species' remnant distribution in Cape Arid NP; **Appendix Nine**) and is considered minor or marginal relative to those of previously existing conditions (e.g. vegetation clearing, altered land use and fire regime, feral cats and foxes, agricultural fencing, roads and vehicles, dieback, climate change). In accordance with the principle, there should be an assessment of the risk-weighted consequences of various options, which may include (1) to avoid extending the fence eastward to the vicinity of Cape Arid NP (removing any additional risk to WGP), and (2) any positive actions designed to benefit conservation of the species, including abatement of previously existing threats. The proposed use of visibility-enhancing features in the barrier fence design reduces collision risk for birds and it may now be considered negligible.

No specific application of the principle of intergenerational equity is identified, but in general the fence extension can be expected to contribute to continued decline in health, diversity and productivity of the environment and may be at variance with the principle.

The third principle states that conservation of biological diversity and ecological integrity should be a fundamental consideration, which implies that they should be regarded as having a high intrinsic value. In previous benefit-cost assessment of the proposed fence extension (URS 2007), this value was assessed in monetary terms as effectively zero, which is at variance with this principle.

The benefit-cost assessment (URS 2007) also conflicts with the principles relating to improved valuation, pricing and incentive mechanisms, in that biodiversity and ecological functions were not included in the valuation of assets and services, so could not be subjected to any pricing mechanisms.

No specific application of the principle of waste minimisation is identified here.

9.3.14 Overall Impacts to Native Fauna and Habitat

The above discussion indicates that impacts of the proposed Esperance extension of the State Barrier Fence to native fauna and habitats are expected to be predominantly negative, but relatively minor in proportion to changes which have already been made in previous decades, while some potential benefits have also been identified. Current evidence is insufficient to estimate the relative magnitudes of the many negative and few positive effects identified.

The alignment will have the overall short term impact of increased mortality to terrestrial vertebrate fauna species caused by clearing and construction activity (e.g. trenching), and slight reduction of equilibrium population sizes in proportion to habitat area where areas of native vegetation are required to be cleared. Short-term impacts can be reduced primarily by choice of the alignment footprint to minimise clearing of native vegetation, and further mitigated through implementing an Environmental Management Plan with such measures as: monitor open trenches and release fauna captured, restrict night driving, and undertake appropriate vehicle inspections prior to commencing daily work.

Direct impacts to most conservation significant fauna species (including EPBC-listed Threatened species such as Western Quoll, Red-tailed Phascogale, Malleefowl and Carnaby's Cockatoo) will be minor to none, as the fence will not be a barrier to animal movement patterns and therefore not restrict potential distribution. Risk of mortality due to collision and entanglement for almost all species is likely to be greatly reduced by avoiding the use of barbed wire and addition of visibility-enhancing features as in the currently proposed design; the remaining risk is considered small, and not significant at a population level. There are potentially deleterious effects on conservation significant fauna if the fence and access roads increase the impact of foxes and feral cats (already 'released' from any regulation by the dingo); but the same access roads may

also facilitate more cost-effective monitoring and control of foxes and cats. The cleared and scrub-rolled areas associated with the fence may increase flammability of remnant vegetation, but also act as firebreaks and fire-fighting access. A coordinated program of trapping and baiting of these carnivore species would likely be one of the most effective means of mitigating long term impacts of the barrier fence as well as of the prior changes in vegetation and land use in the agricultural area. Other interactions of the fence with fauna and habitat may emerge that cannot currently be anticipated, and regular monitoring will be required to detect any such potentially serious consequences.

10.0 RECOMMENDATIONS

Recommendation 1: Avoid or minimise impact to TEC vegetation

The **BaMs** and **BsBeAl** vegetation types are considered likely to represent and potentially represent (respectively) the 'Proteaceae Dominated Kwongkan Shrublands' TEC. This TEC is listed on the *EPBC* list of TECs as Endangered. If impact to this TEC cannot be avoided, then referral to Commonwealth regulatory authorities may be required. Ecoscape recommends that DAFWA should consider methods to avoid or minimise impact to these areas. Avoidance could be achieved by diverting the fence through adjacent agricultural land. Alternatively, impact could be minimised by reducing the clearing footprint as much as possible, utilising the existing low fuel modified buffer strip (including the existing tracks) and limiting access to this section. Hygiene measures should also be implemented during construction and maintenance that reduce the potential for the spread of dieback and weeds within this vegetation.

Recommendation 2: Minimise impact to pre-European vegetation associations with less than 30% extent remaining

Two of the vegetation associations (512 and 4801) mapped by Shepherd *et al.* (2002) within the study area have less than 30% of their pre-European extent remaining in Western Australia. There is a presumption against clearing vegetation associations below this threshold (EPA 2000; 2008). Both of these vegetation associations correspond almost entirely with sections of the study area that have been previously scrub rolled, within the low fuel modified buffer strip. Therefore, whilst additional impact is likely to be minor, DAFWA should consider options to minimise impact to areas that have been mapped as these vegetation associations. This could include minimising the clearing footprint and utilising the existing low fuel modified buffer strip instead of clearing undisturbed vegetation.

Recommendation 3: Avoid or minimise impact to TF taxa

There were four TF taxa recorded within the study area, including one from reliable historical records. All four TF are listed under both the *EPBC Act 1994* and the *WC Act 1950*. It is an offence to remove or damage TF without Ministerial approval. If these species cannot be avoided, which typically includes a 50 m buffer, then a 'permit to take rare flora' and possibly *EPBC* referral will be required. Permission to take TF is typically only granted if the impacts can be demonstrated not to be significant to the conservation of the species. DAFWA should investigate and implement strategies to avoid or minimise impact to TF. Options to avoid or minimise impact to TF taxa are discussed individually in **Section 8.3**.

Recommendation 4: Minimise impact to PF taxa

There were 60 PF taxa recorded within the study area, including one from reliable historical records. PF do not have formal protection, however regulatory authorities typically expect the proponent of any clearing that will impact on PF to demonstrate that they have taken appropriate action to minimise impact. Many of the PF recorded are known from numerous populations and impact is unlikely to be significant, particularly to species which are disturbance opportunists. However, there are several poorly surveyed species known from only a few populations. DAFWA should further liaise with DPaW to identify any PF of concern and identify management strategies that will minimise impact to these.

Recommendation 5: Develop and implement a weed hygiene plan

Weed infestations within the study area are typically minor and limited to a narrow strip of vegetation directly adjacent to the existing agricultural boundary. DAFWA should develop and implement a weed hygiene

management plan in order to reduce the potential for the spread of weeds during construction of the fence and ongoing maintenance. This could include vehicle hygiene measures and limiting unauthorised access.

Recommendation 6: Minimise impact to Threatened Fauna critical habitat

Fauna known or likely to utilise habitats in the study area include four listed as Endangered or Vulnerable by the *EPBC Act 1999* (Western Quoll, Red-tailed Phascogale, Malleefowl, and Carnaby's Black Cockatoo). The following habitat features are particularly important to reproduction and survival of one or more of these species: Eucalypts with hollows in trunk or branches; hollow fallen logs; dense shrubland (thicket), especially containing *Gastrolobium* spp.; woodland/shrubland habitats with abundant leaf litter (at least 6 years since fire, up to 15 years or more). Such habitat features are more restricted and localised than habitat types identified and mapped in this report, and may occur in habitat types 1-5. Impact may be reduced by identifying and avoiding such features in the process of finalising the clearing footprint, or potentially supplementing them by actions such as provision of nestboxes, and relocation of logs and leaf litter from areas subject to clearing to less disturbed habitat in the vicinity.

Recommendation 7: Bushfire management

Many fauna species including conservation significant fauna require access to long-unburnt vegetation for foraging and/or breeding habitat. Vegetation structure and flora composition is also impacted by fire frequency. The potential for unplanned bushfires and associated impacts due to excessive frequency or extent may be reduced by minimising potential sources of ignition from vehicles and tools during construction and maintenance, maintaining access for fire crews, and preventing unauthorised access.

Recommendation 8: Adopt fence design to minimise risk of collision/entanglement by fauna, especially in areas potentially traversed by Western Ground Parrot

The study area does not intersect any areas thought to be currently occupied by this Critically Endangered species, but there is some risk of increased mortality due to collision/entanglement. The magnitude of additional risk from addition of a fence could only be small, but uncertain because the dispersal distance and flight behaviour of the species are poorly known. The proposed design avoids use of barbed wire and includes features for visibility enhancement, which are expected to reduce collision risk to an acceptable level for all fauna.

Recommendation 9: Coordinated control program for foxes and feral cats

In the absence of dingoes, abundance of mesopredators including feral cats and red foxes is expected to fluctuate, and at times of high abundance major impacts may occur to populations of ground-nesting birds and critical weight range mammals in the region, including conservation significant species such as Western Quoll, Red-tailed Phascogale, Malleefowl, and Western Ground Parrot. Major impacts can be reduced or avoided by control programs that succeed in maintaining abundance of cats and foxes at a low level, based on appropriate combination of baiting, trapping and shooting coordinated with monitoring.

Recommendation 10: General recommendations for minimising the overall impact to flora, vegetation and fauna

Fence construction will require a 20 m wide corridor for a length of up to 622 km. Any measures that minimise vegetation clearing will be beneficial to reduce the overall cumulative impact of the proposed fence on flora, vegetation and fauna. The following options should be considered for various sections of the study area:

- where possible, utilise the existing low fuel modified buffer strip instead of clearing undisturbed vegetation where possible, including the preferential use of existing tracks.
- placement of the fence as close as possible to the existing agricultural boundary to reduce the potential for the spread of weeds and limit the overall fragmentation of vegetation/fauna habitat and edge affects.
- limiting unauthorised access to the area to reduce the potential for the spread of weeds

Recommendation 11: Develop and implement dieback hygiene procedures

The Dieback assessment report (Gleven 2015) recommends development of a dieback management plan and outlines appropriate hygiene procedures such as signage of existing infestations and suggested Clean on Entry points.

Recommendation 12: Avoid impacting natural drainage

The proposed fence alignment avoids the three most significant drainage lines, the Oldfield, Young and Lort Rivers. However, any alterations to other drainage should be avoided where possible, including not impeding stream flow, diverting normal/natural creeklines or producing artificial water-holding sumps. Even temporary changes can alter local hydrology and may cause localised plant deaths due to waterlogging or drying conditions.

Recommendation 13: Education

Construction teams should be given an environmental induction before works commence. This induction could include, but not be limited to, the following instructions:

- don't feed wildlife
- dispose of waste disposal in an environmentally sound manner
- don't disturb nesting birds
- don't pick wildflowers
- don't collect firewood for campfires
- avoid driving off established tracks.

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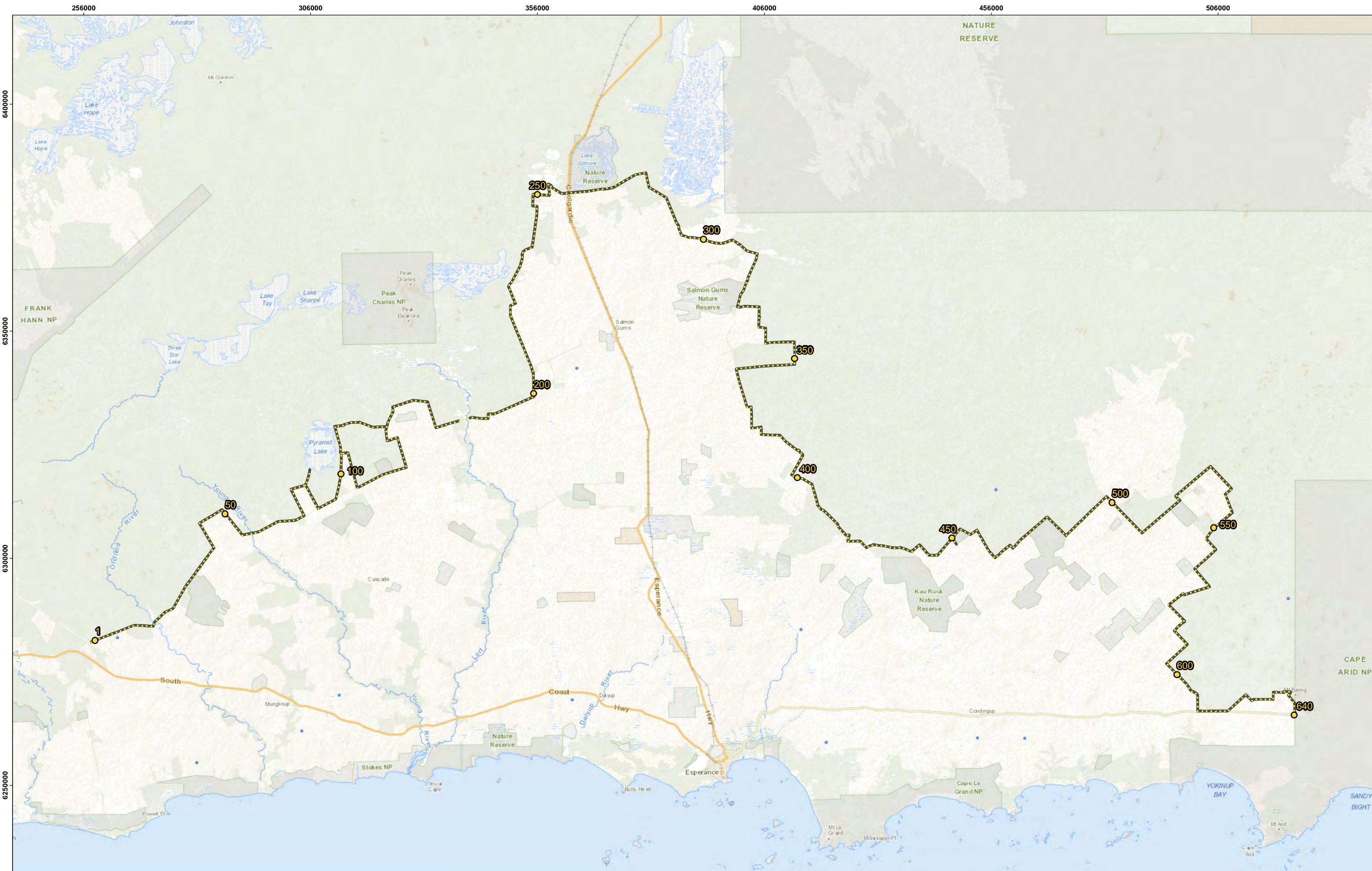
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MAPS



AUTHOR: JN
 DATE: FEB-14

CHECKED: SB
 PROJECT NO: 3087-13

SCALE: 1:750,000 @ A3

STATE BARRIER FENCE ESPERANCE EXTENSION

CLIENT: DAFWA

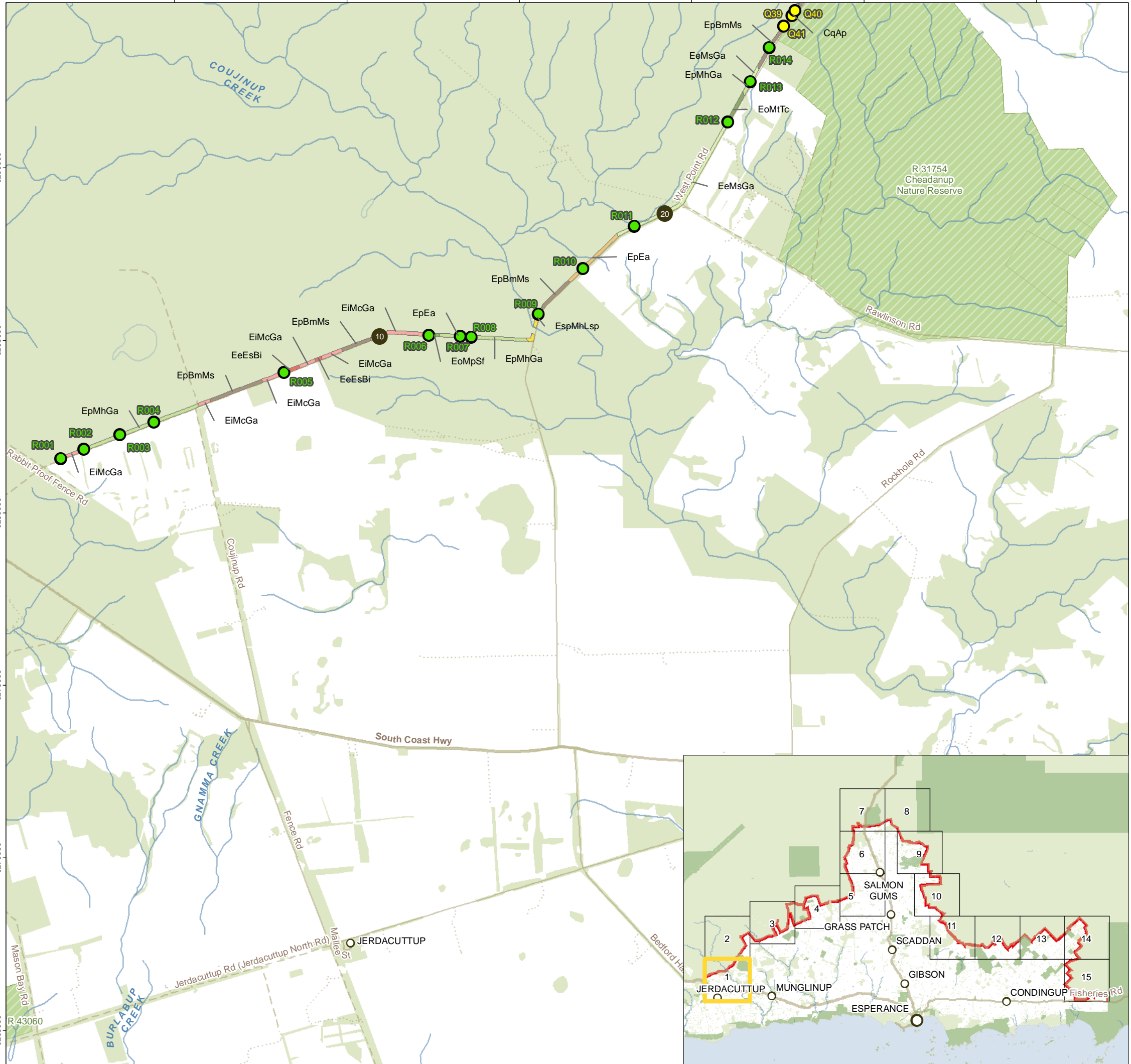
FENCE ALIGNMENT

MAP 1

GDA 1994 MGA Zone 51

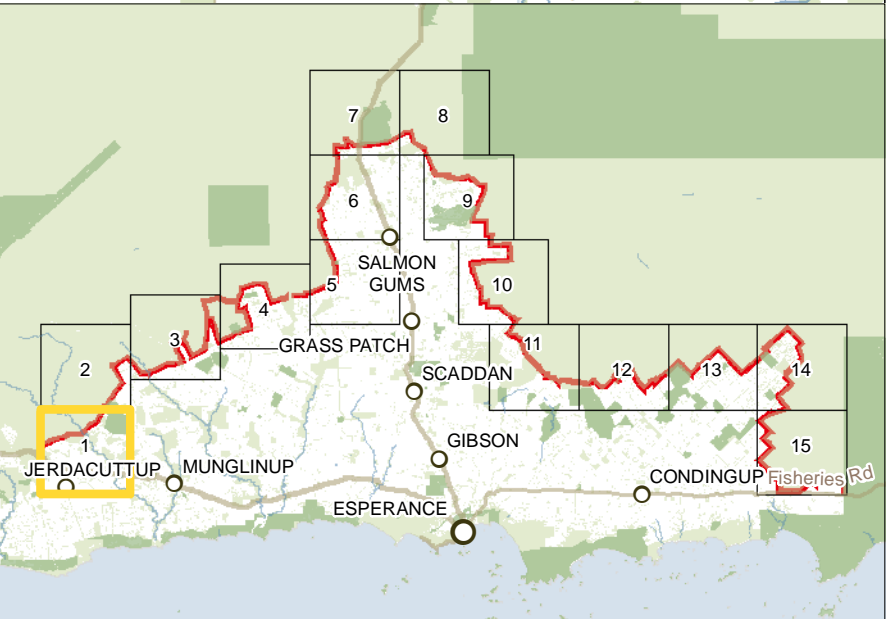
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LEGEND

- 10 km divisions
- Releve
- Quadrat
- Highway
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- CqAp
- EeEsBi
- EeMsGa
- EIMcGa
- EoMpSf
- EoMtTc
- EpBmMs
- EpEa
- EpMhGa
- EspMhLsp
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

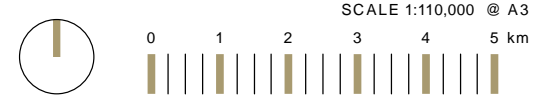


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**STATE BARRIER FENCE ESPERANCE
EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
MAP 2 - 1**

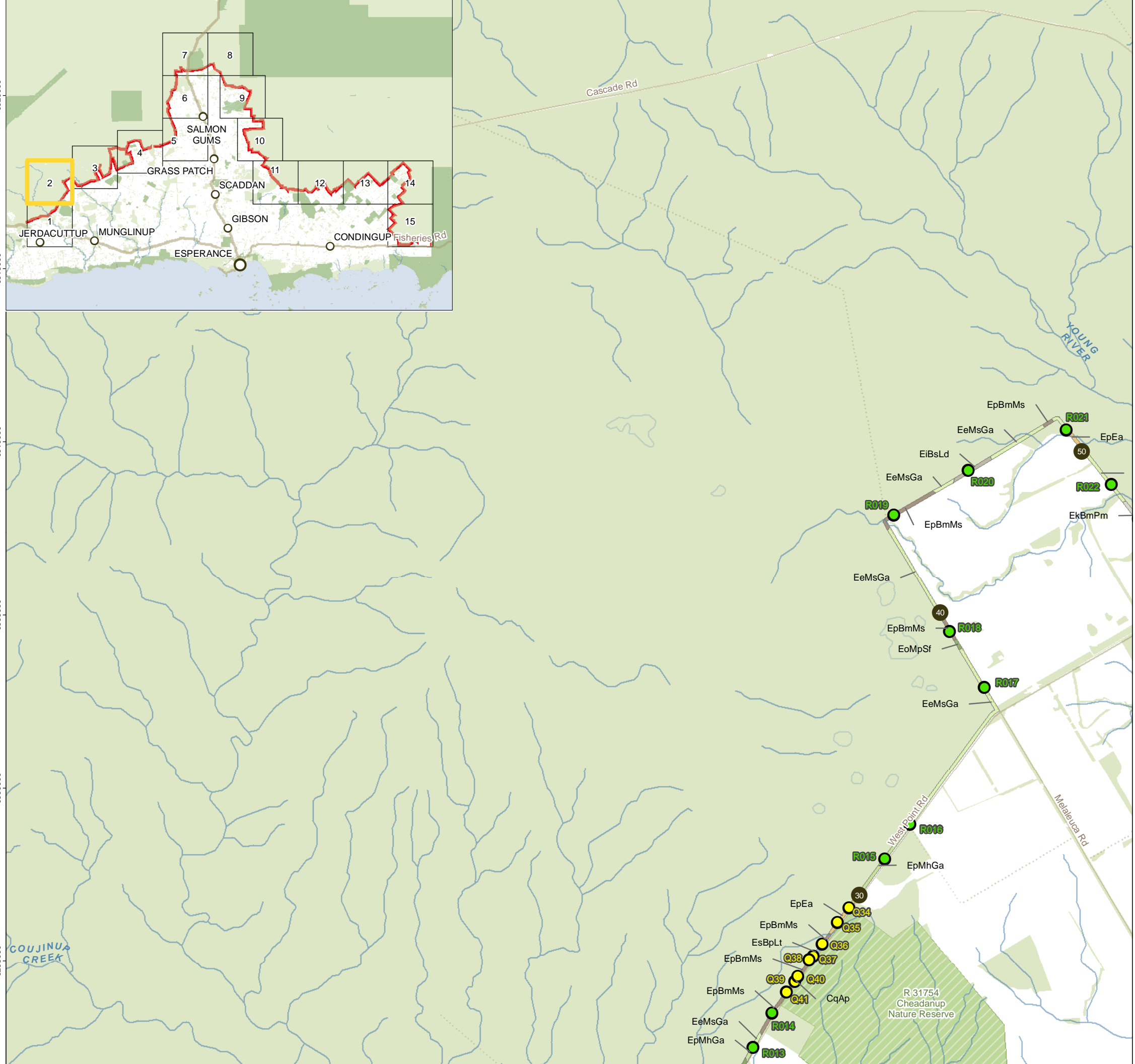


261000 266000 271000 276000 281000 286000

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6305000

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LEGEND

- 10 km divisions
- Releve
- Quadrat
- Local Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- CqAp
- EeMsGa
- EIBsLd
- EkBmPm
- EoMpSf
- EoMTtc
- EpBmMs
- EpEa
- EpMhGa
- EsBpLt
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

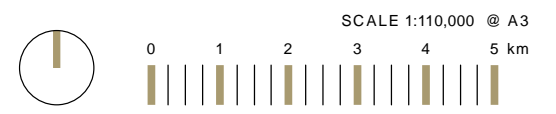


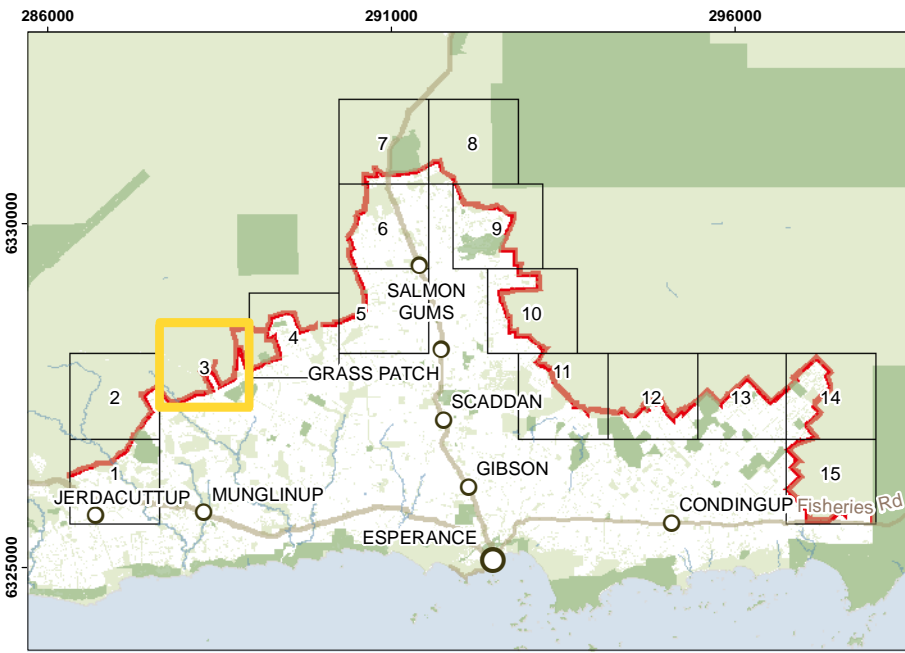
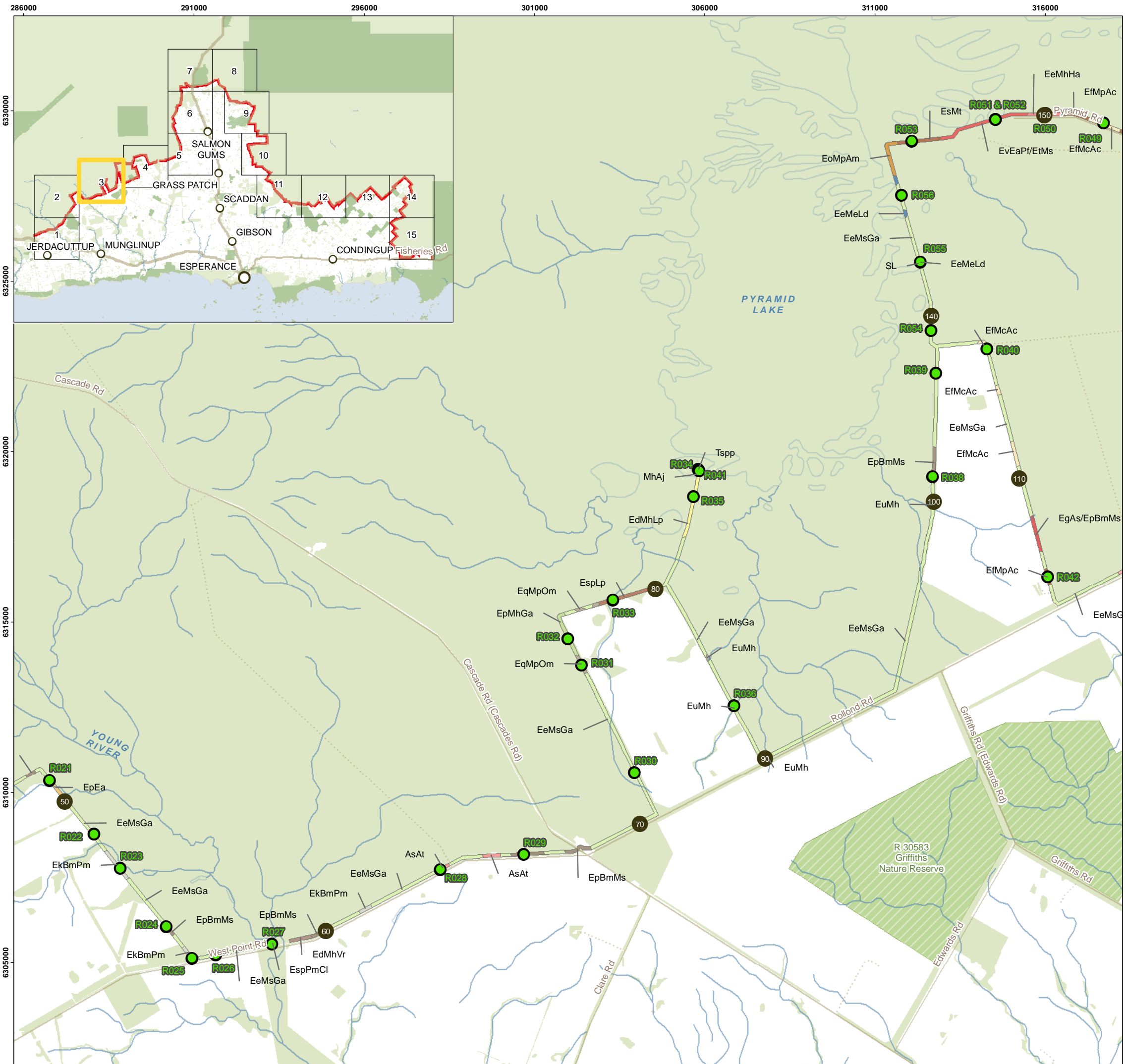
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**STATE BARRIER FENCE ESPERANCE
EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
MAP 2 - 2**





LEGEND

- 10 km divisions
- Releve
- Local Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- AsAt
- EdMhLp
- EdMhVr
- EeMeLd
- EeMhHa
- EeMsGa
- EfMcAc
- EfMpAc
- EgAs
- EgAs/EpBmMs
- EkBmPm
- EoMpAm
- EpBmMs
- EpEa
- EpMhGa
- EqMpOm
- EsMt
- EspLp
- EspPmCl
- EuMh
- EvEaPf/EtMs
- MhAj
- SL
- Tspp
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

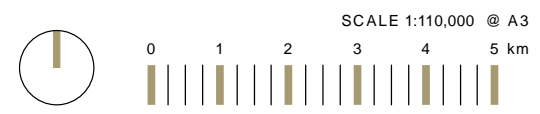


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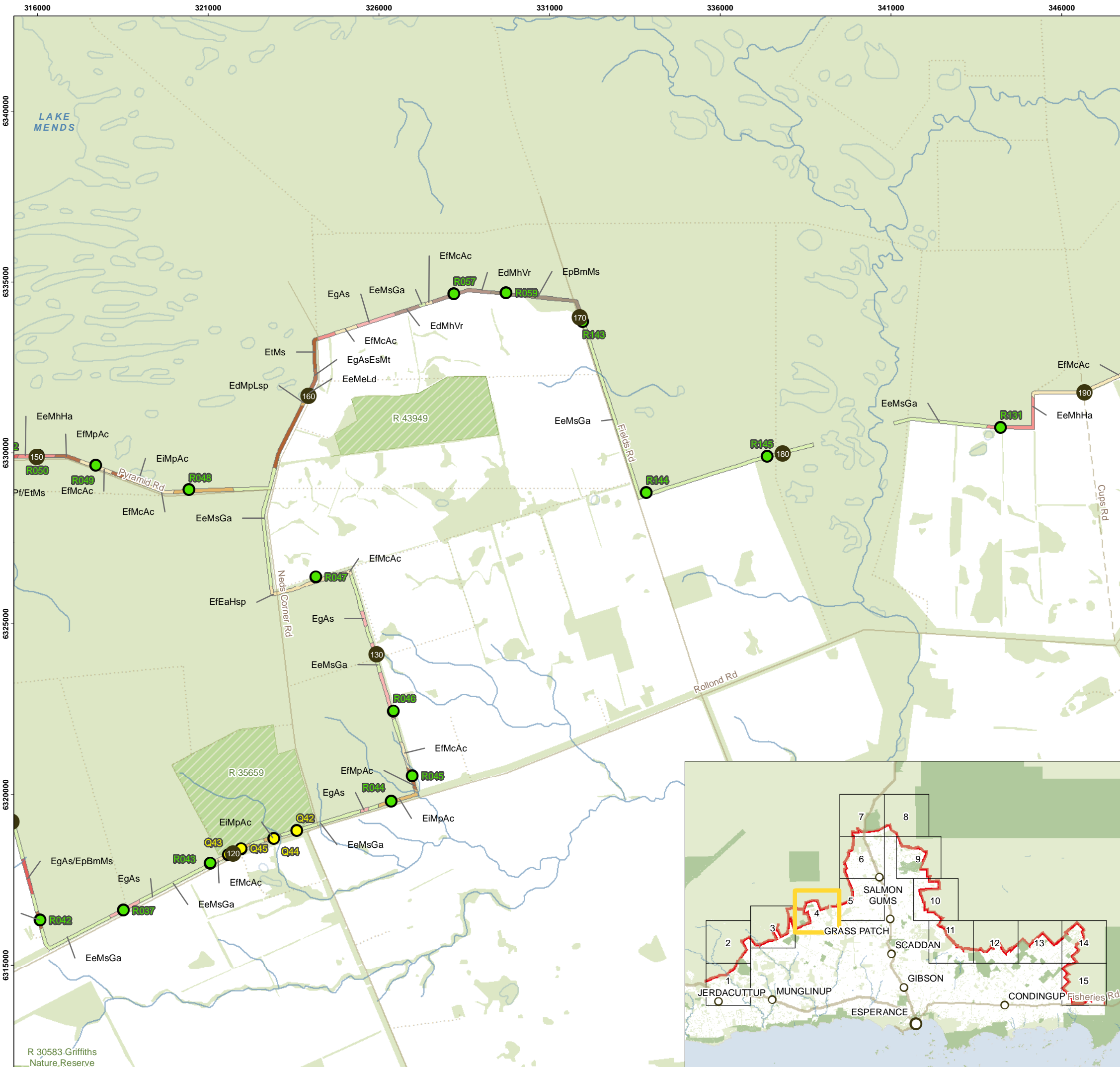
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 3**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
 - Releve
 - Quadrat
 - Local Road
 - Unsealed Road
 - Vehicle Track
 - Watercourses
 - Lakes
- Vegetation Types**
- EdMhVr
 - EdMpLsp
 - EeMeLd
 - EeMhHa
 - EeMsGa
 - EeEaHsp
 - EfMcAc
 - EfMpAc
 - EgAs
 - EgAs/EpBmMs
 - EiMpAc
 - EpBmMs
 - EsMt
 - EtMs
 - EvEaPf/EtMs
 - Native Vegetation Extent (DAFWA 2012)
 - DPaw Managed Lands and Waters (DPaw 2014)

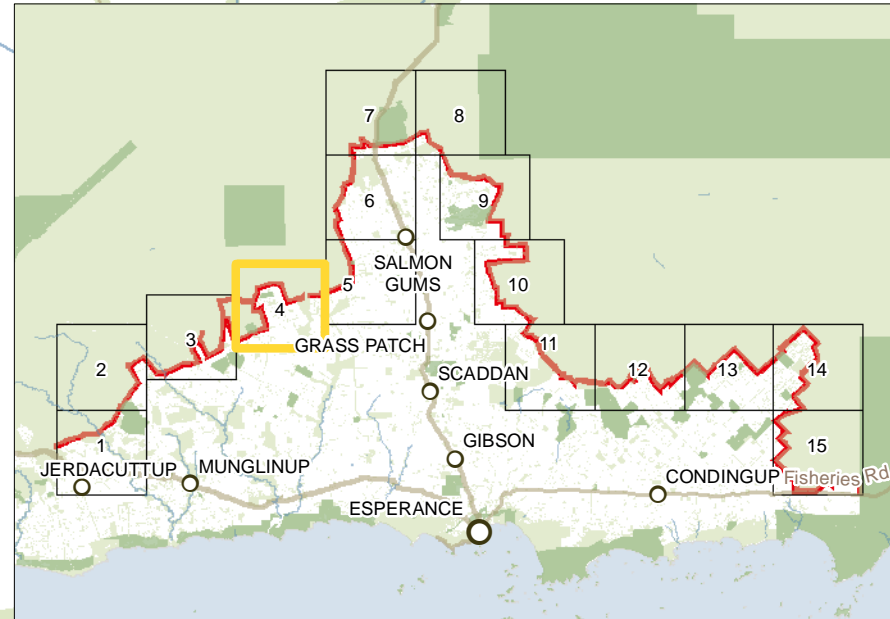
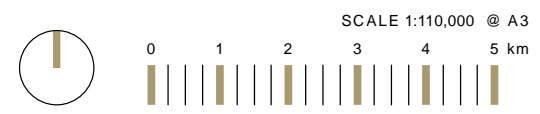


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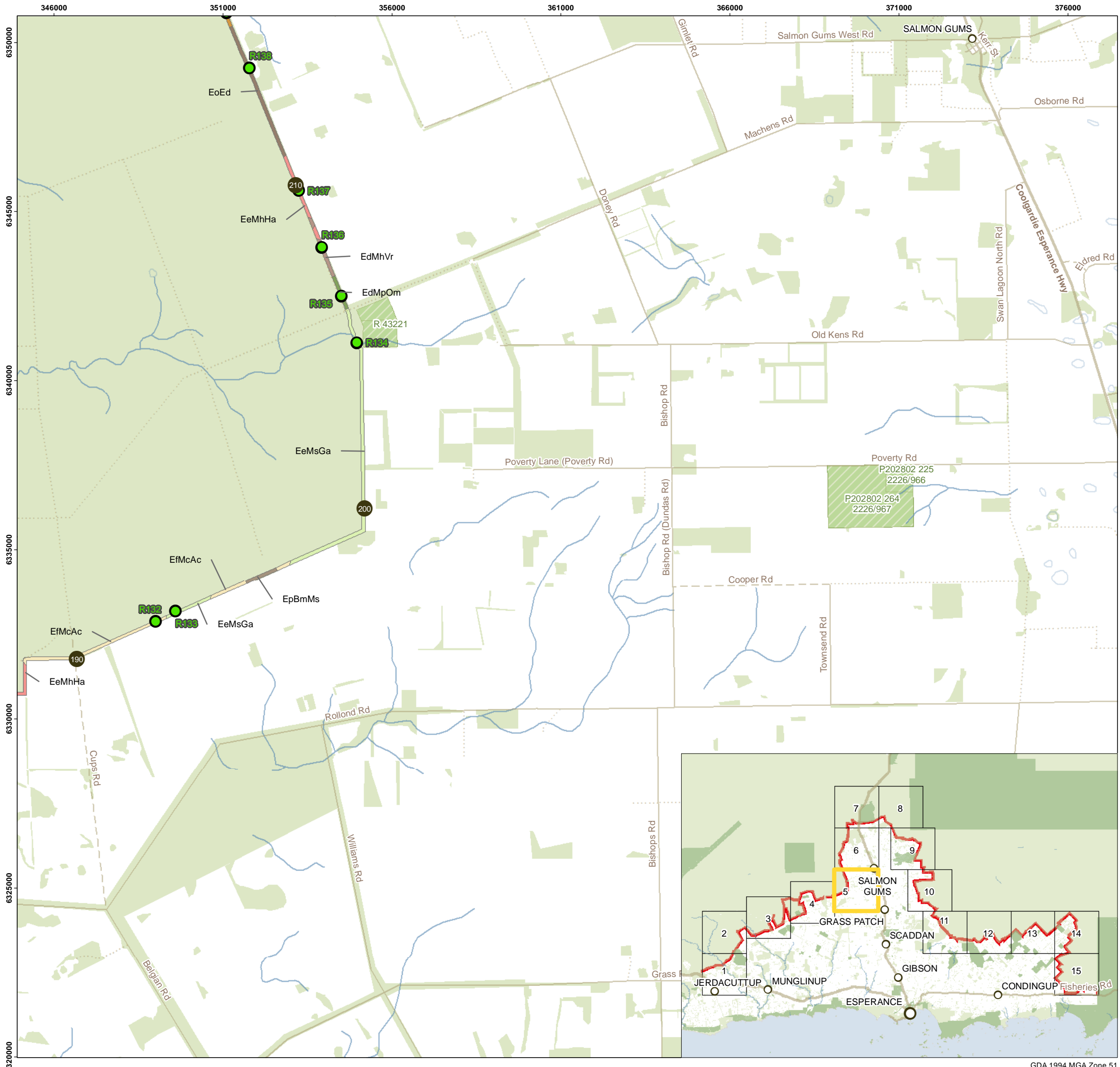
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 4**

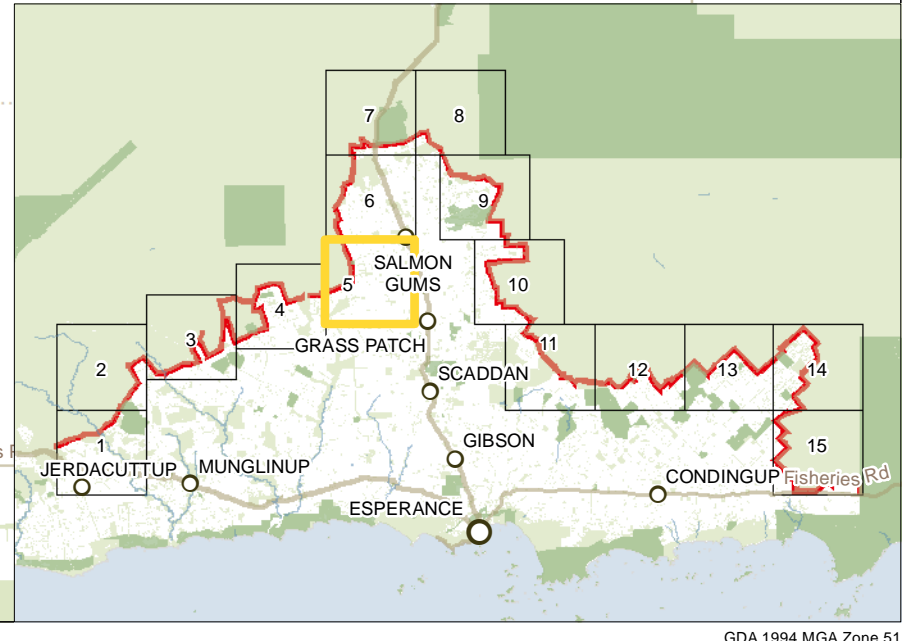


GDA 1994 MGA Zone 51



LEGEND

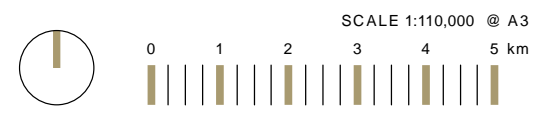
- 10 km divisions
- Releve
- Highway
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- EdMhVr
- EdMpOm
- EeMhHa
- EeMsGa
- EfMcAc
- EfMmBi
- EoEd
- EpBmMs
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)



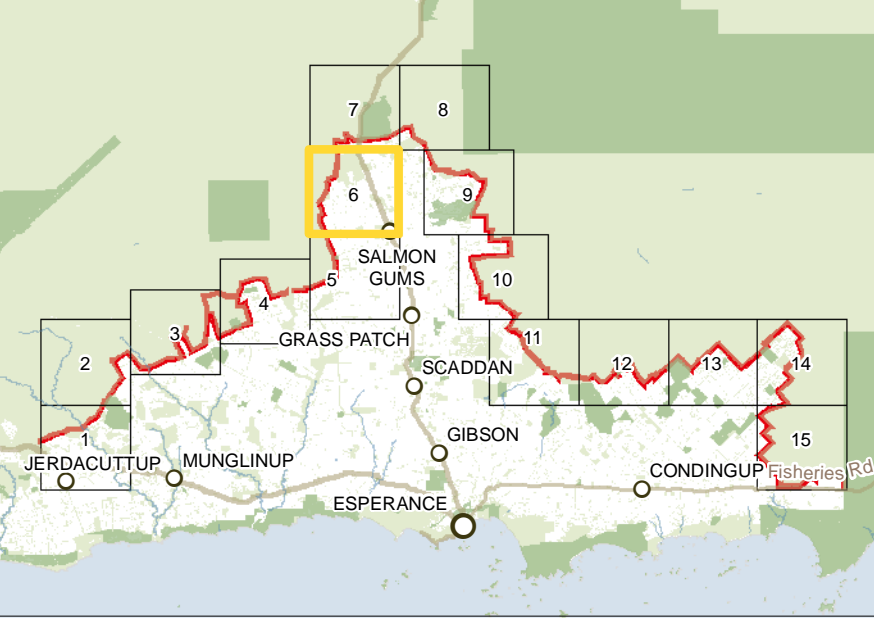
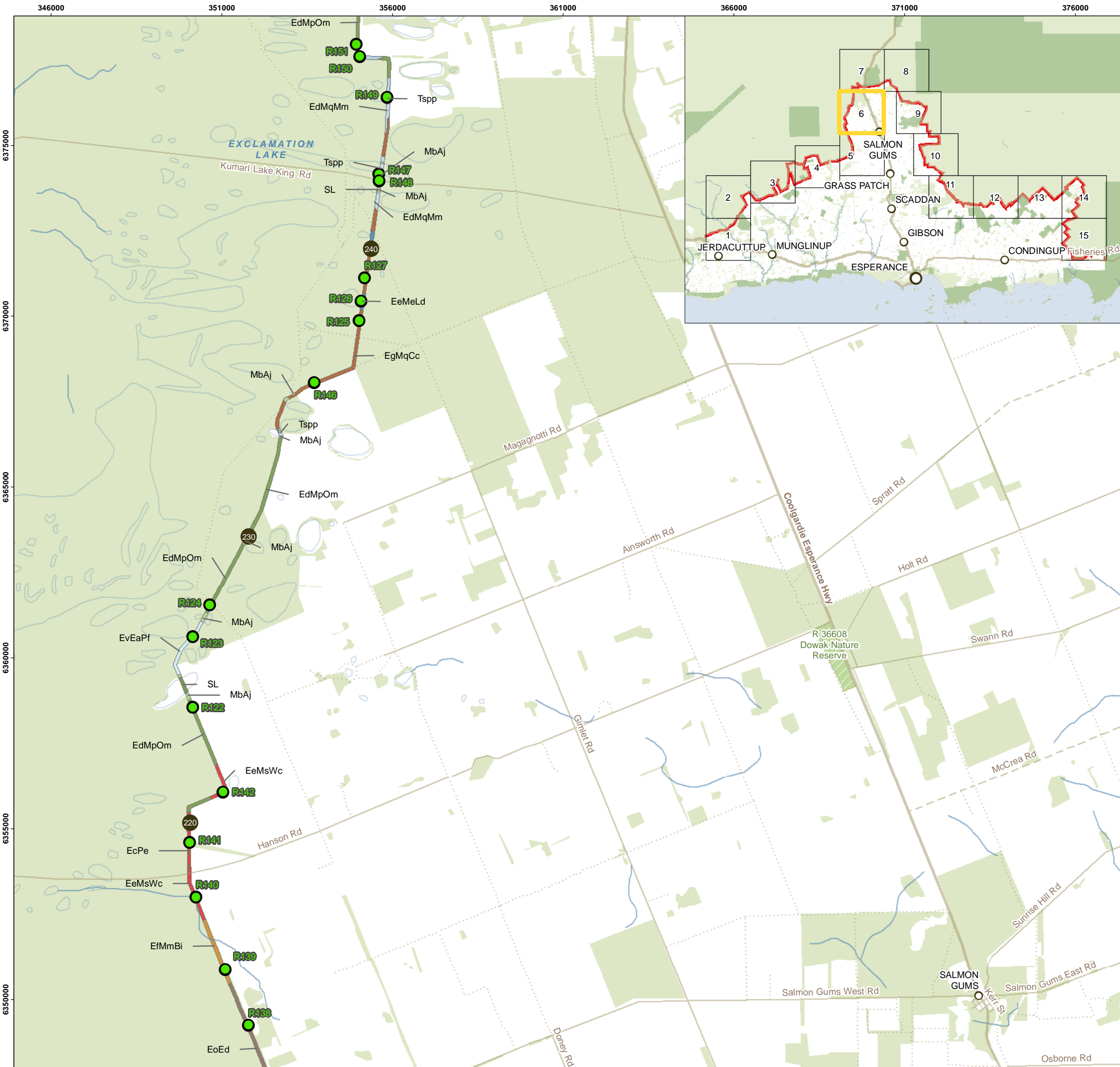
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**
 CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 5**



GDA 1994 MGA Zone 51



- LEGEND**
- 10 km divisions
 - Releve
 - Highway
 - Local Road
 - - - Unsealed Road
 - ⋯ Vehicle Track
 - Watercourses
 - Lakes
- Vegetation Types**
- EcPe
 - EdMpOm
 - EdMqMm
 - EeMeLd
 - EeMsWc
 - EfMmBi
 - EgMqCc
 - EoEd
 - EuMpRs
 - EvEaPf
 - MbAj
 - SL
 - Tspp
 - Native Vegetation Extent (DAFWA 2012)
 - DPaw Managed Lands and Waters (DPaw 2014)

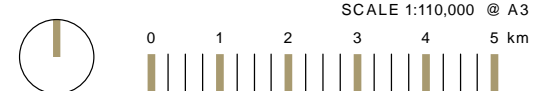


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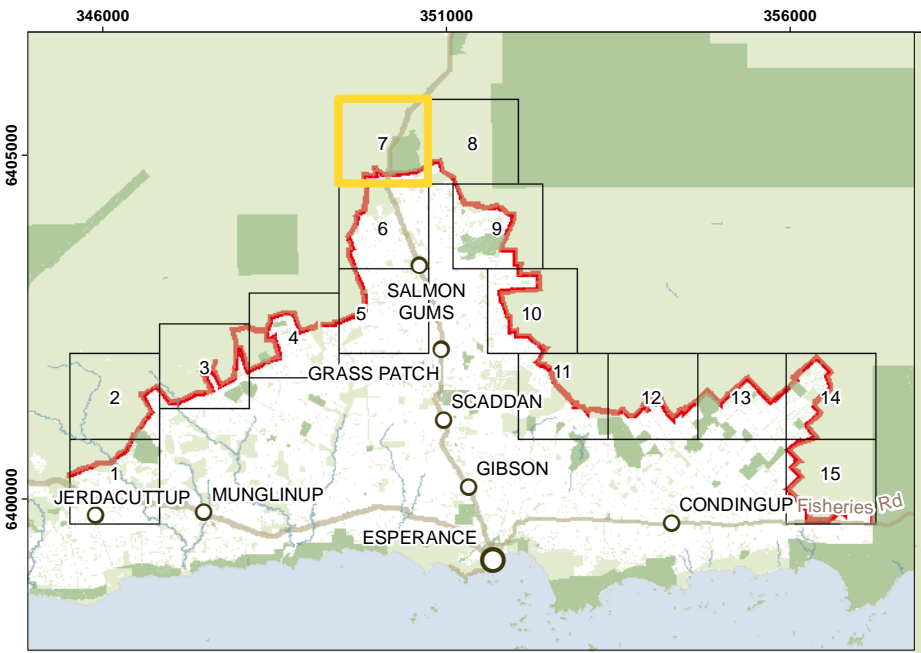
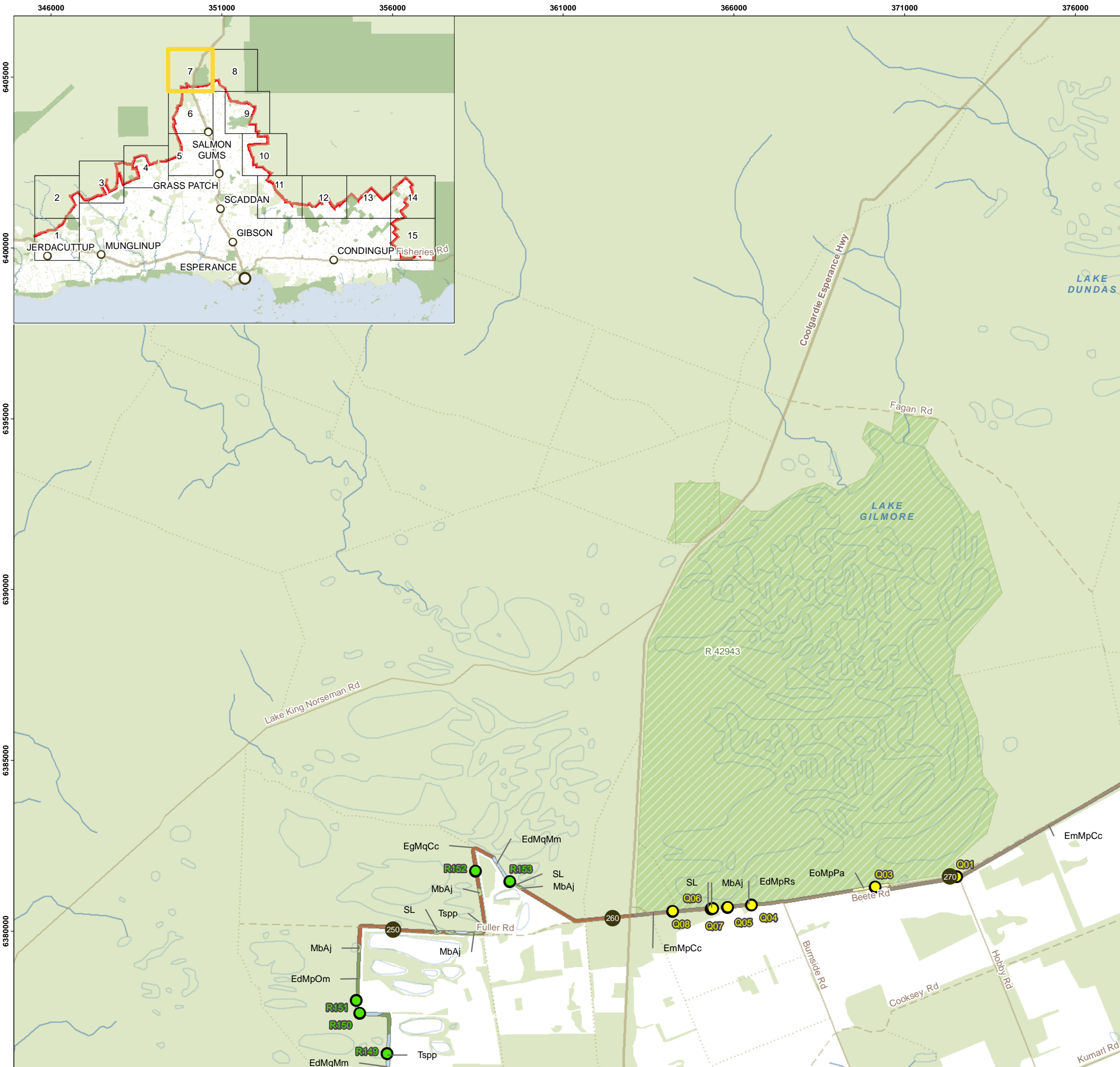
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 6**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Quadrat
- Highway
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- EdMpOm
- EdMpRs
- EdMqMm
- EgMqCc
- EmMpCc
- EoMpPa
- EuMpRs
- MbAj
- SL
- Tspp
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

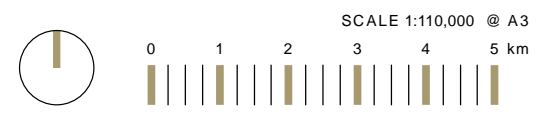


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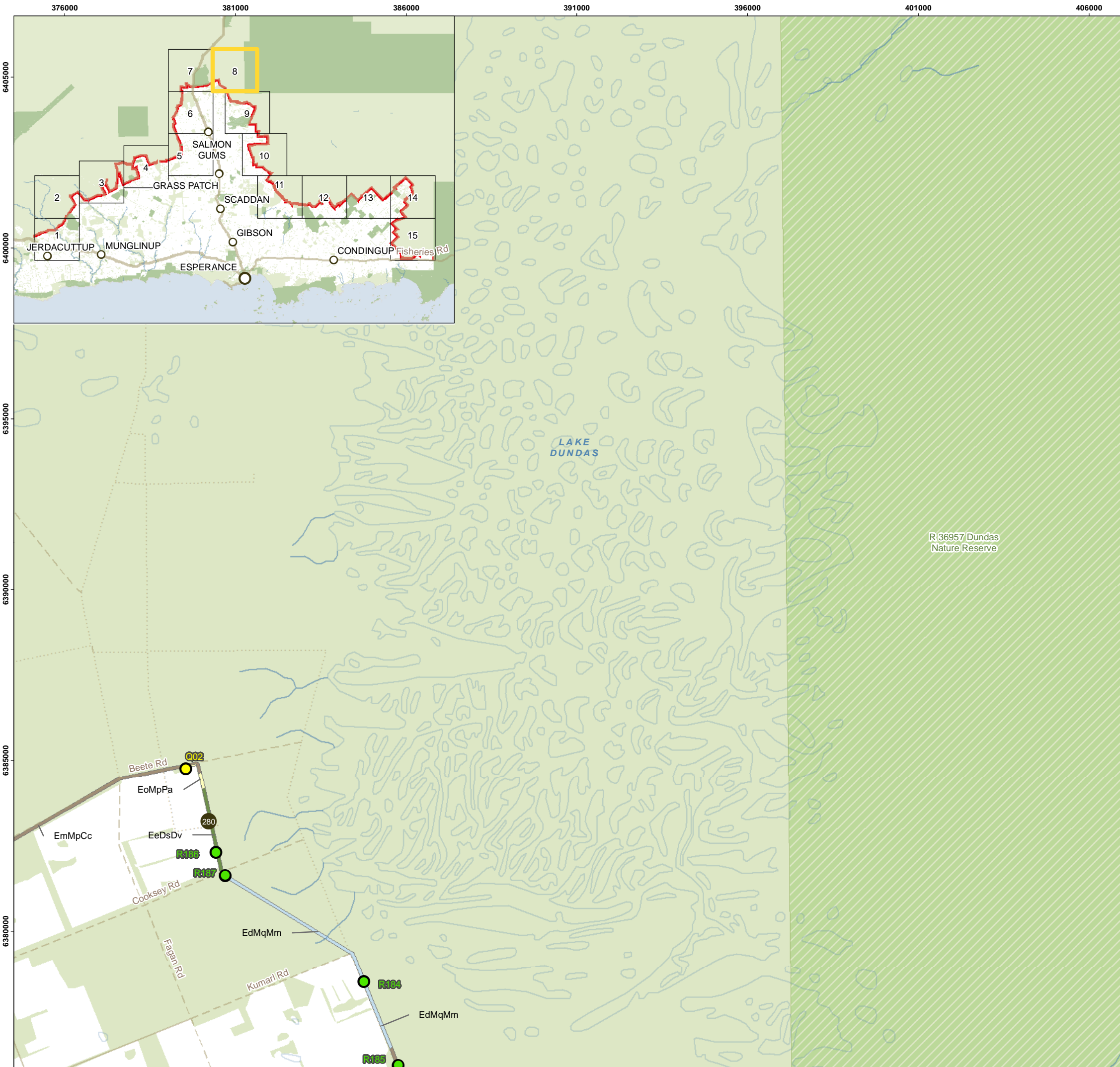
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 7**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Quadrat
- Highway
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- EdMqMm
- EeDsDv
- EmMpCc
- EoMpPa
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

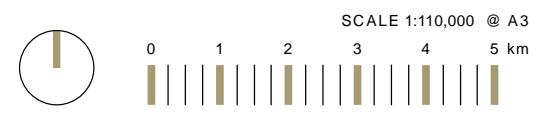


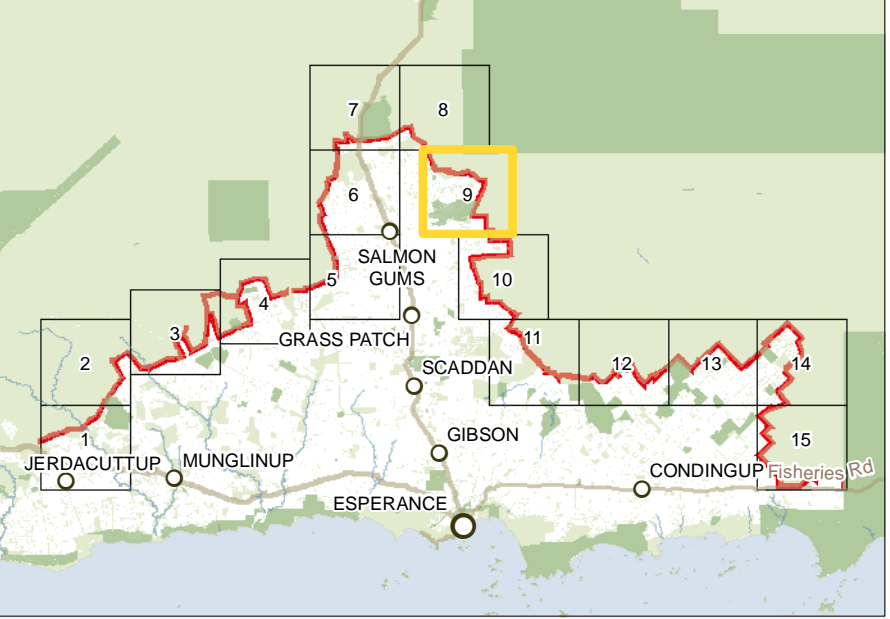
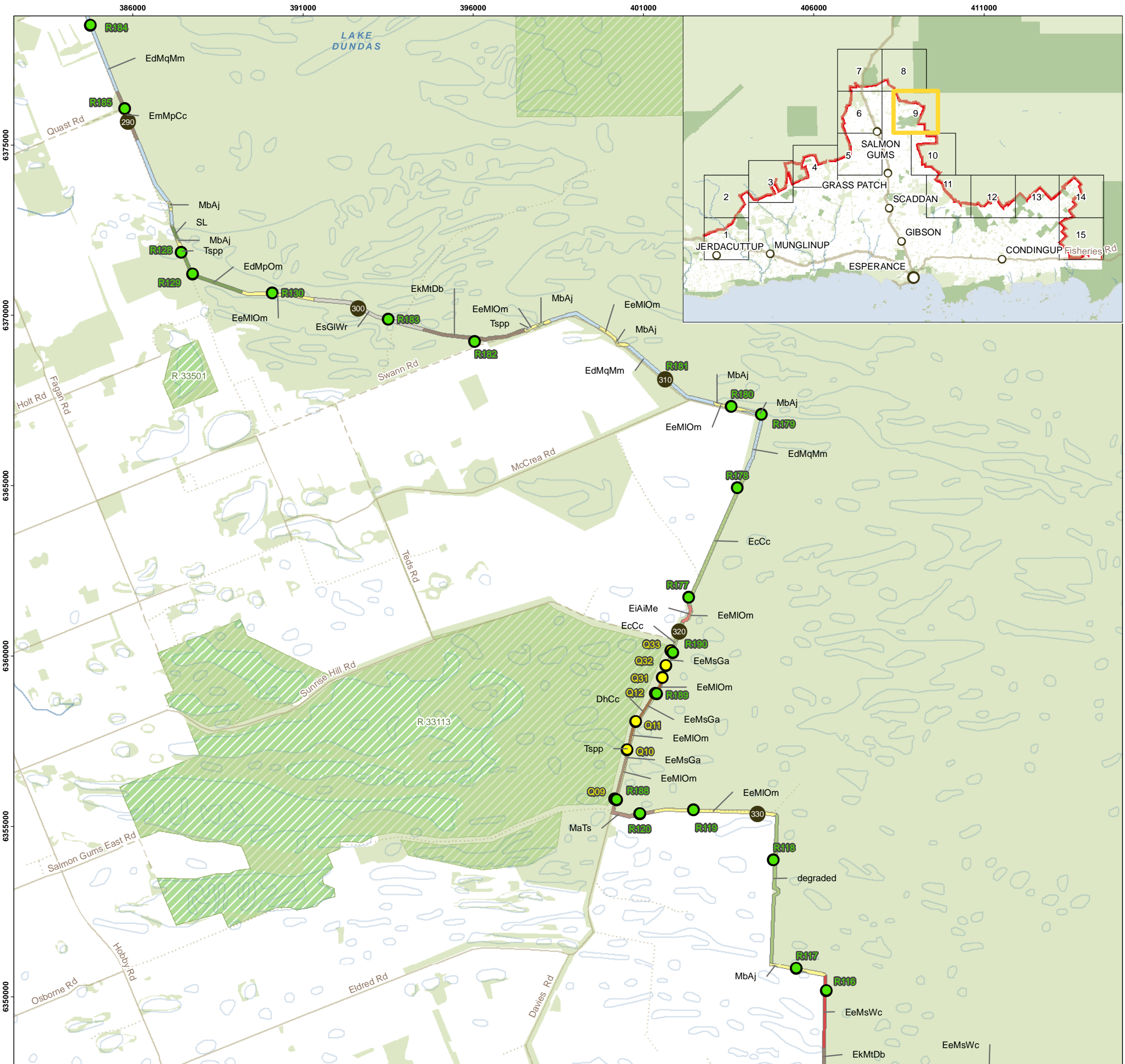
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 8**





LEGEND

- 10 km divisions
- Releve
- Quadrat
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes

Vegetation Types

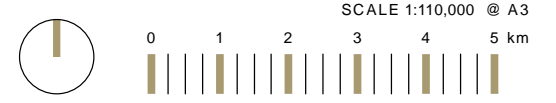
- DhCc
- EcCc
- EdMpOm
- EdMqMm
- EeMIOm
- EeMsGa
- EeMsWc
- EiAiMe
- EKMTDb
- EmMpCc
- EsGIWr
- MaTs
- MbAj
- SL
- Tspp
- degraded
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)



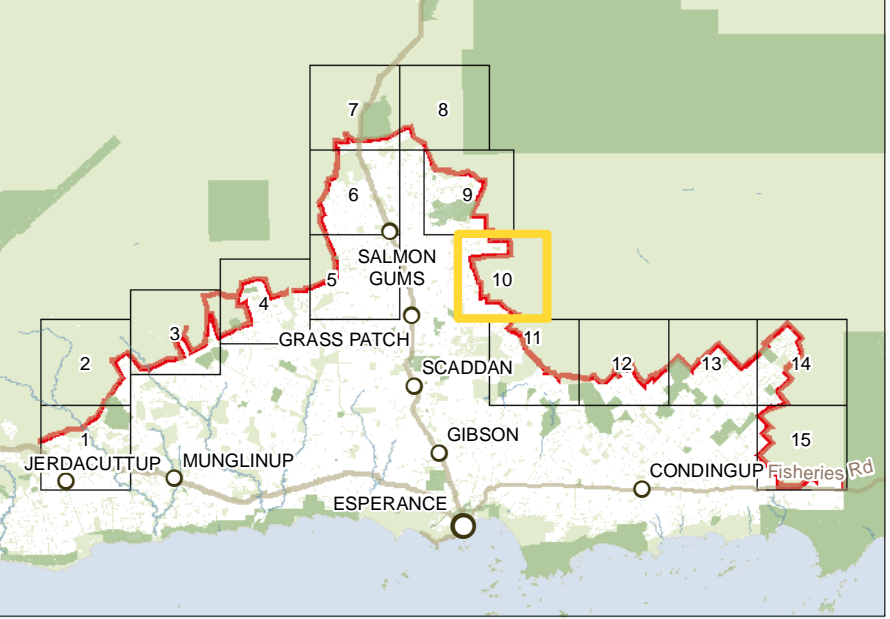
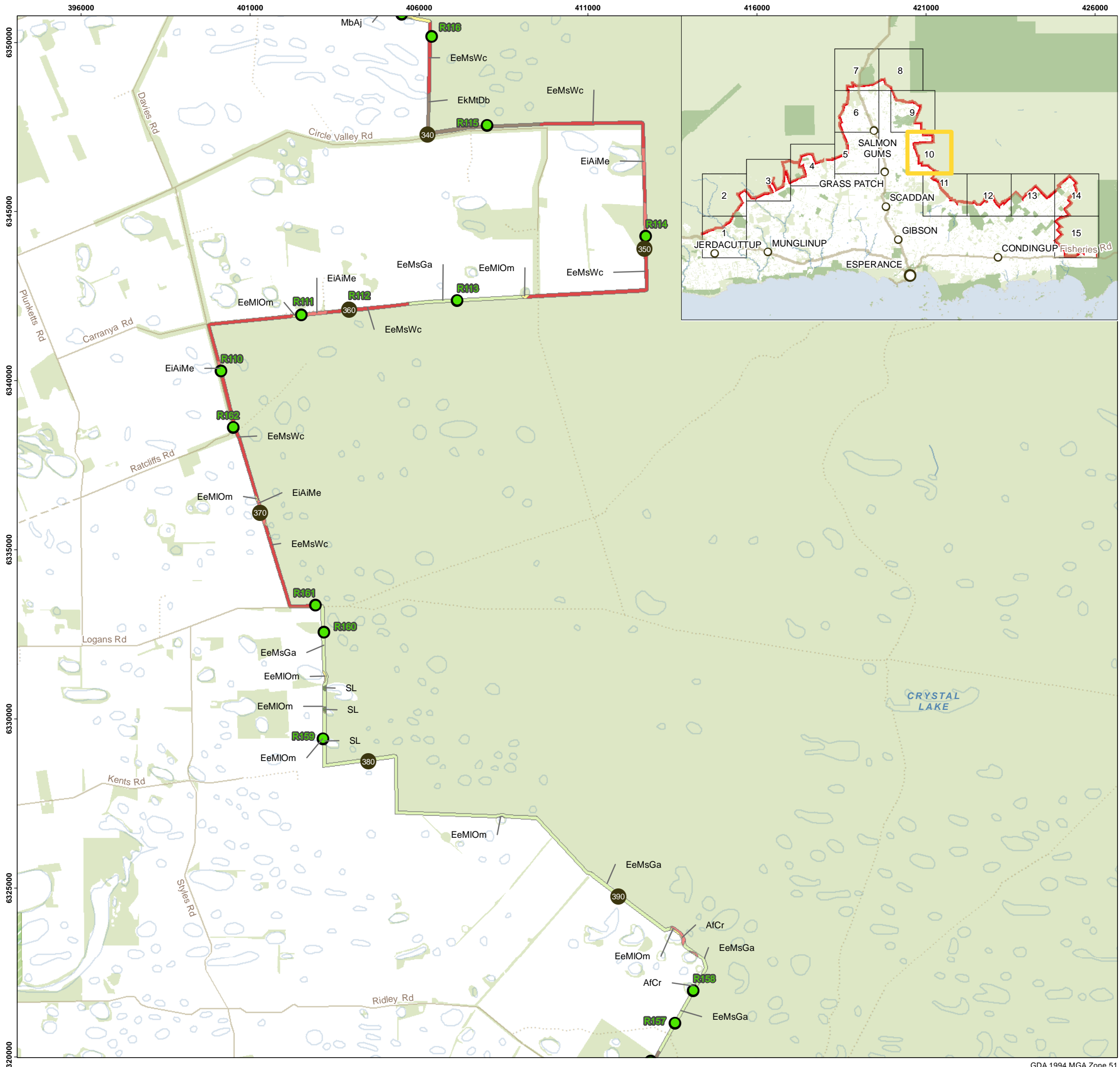
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**
 CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 9**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes

Vegetation Types

- AfCr
- EeMIom
- EeMsGa
- EeMsWc
- EiAiMe
- EkMtDb
- MbAj
- SL
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

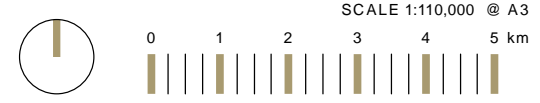


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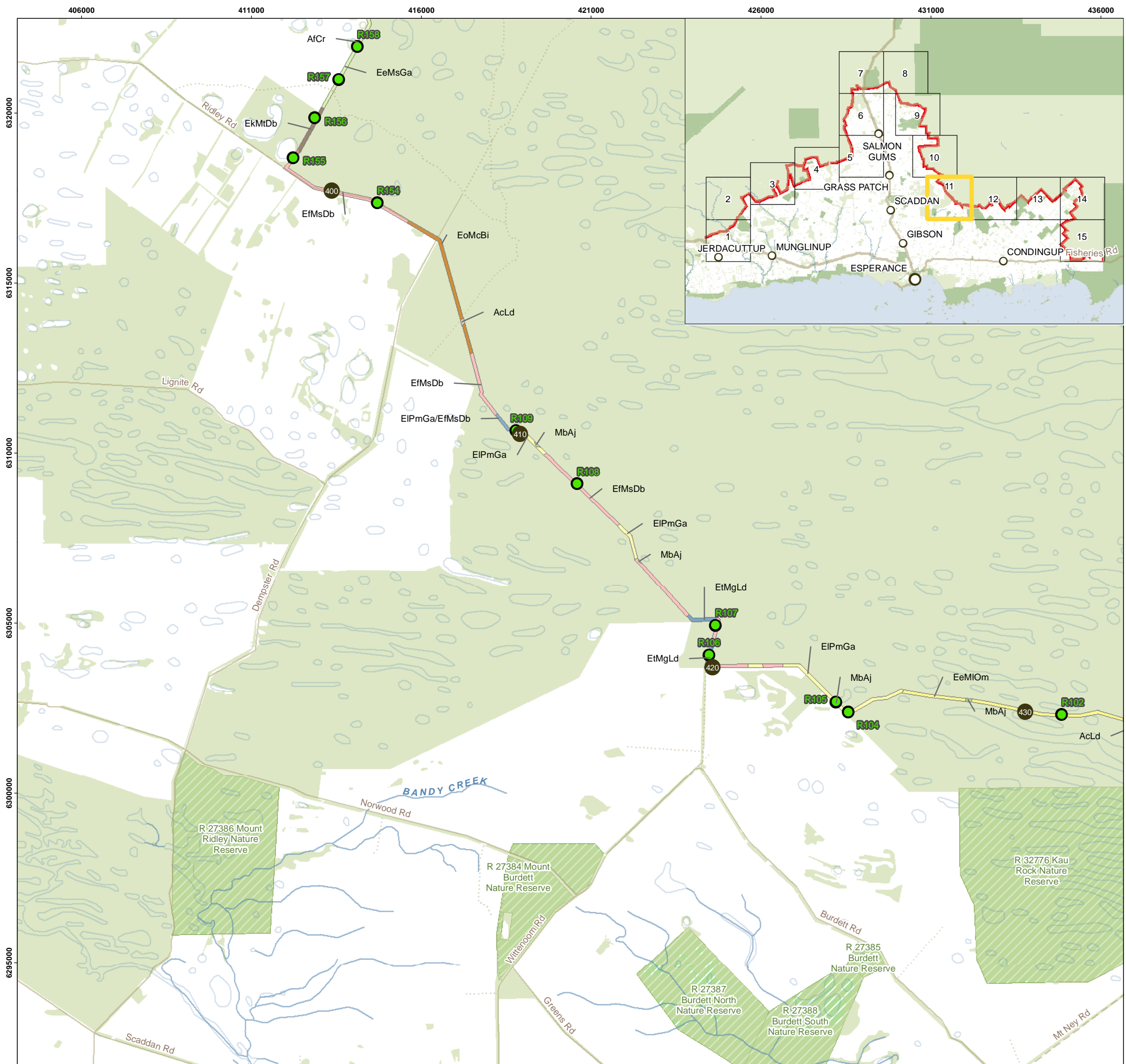
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 10**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- AcLd
- AfCr
- EeMhHa
- EeMIOm
- EeMsGa
- EfMsDb
- EkMtDb
- EIMsDp
- EIPmGa
- EIPmGa/EfMsDb
- EoMcBi
- EtMgLd
- MbAj
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

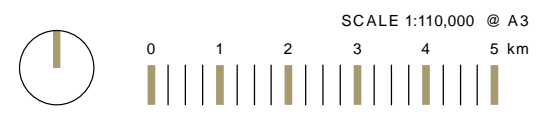


AUTHOR: JN CHECKED: SB
 DATE: FEB-15 PROJECT NO: 3087-13

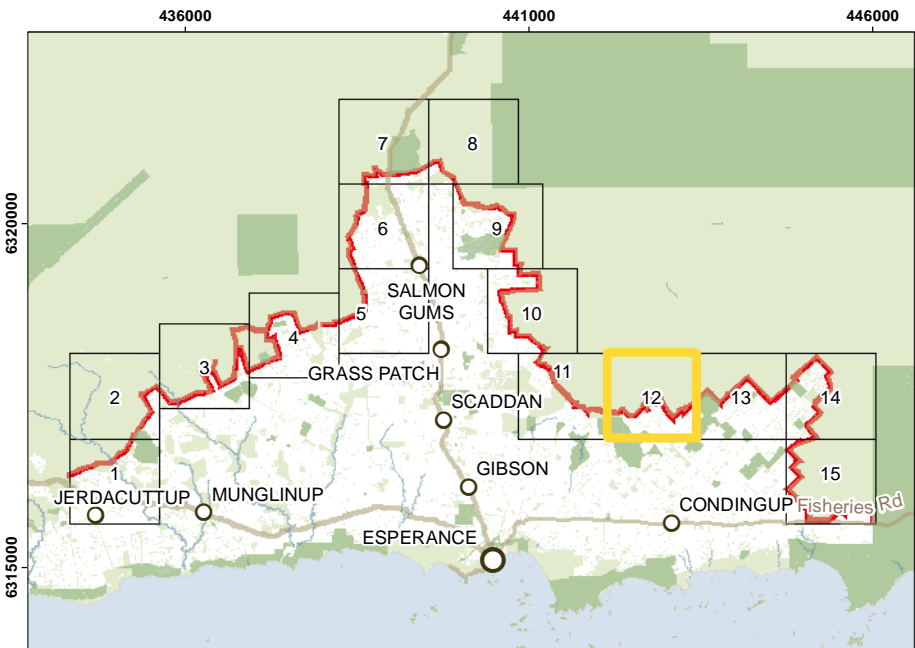
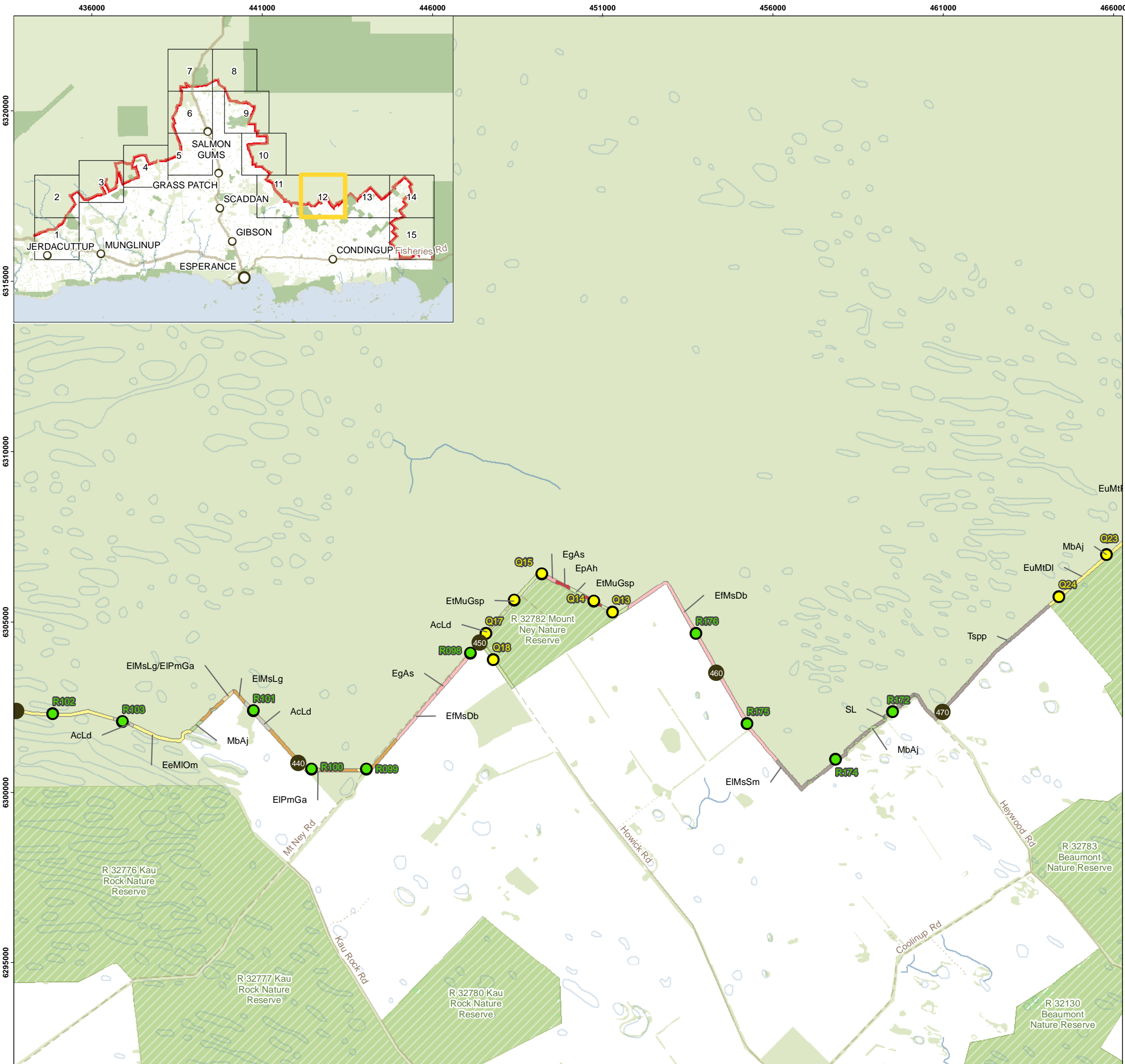
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 11**



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Quadrat
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- AcLd
- EeMIOm
- EfMsDb
- EgAs
- EIMsLg
- EIMsLg/EIPmGa
- EIMsSm
- EIPmGa
- EpAh
- EtMuGsp
- EuMtDI
- MbAj
- SL
- Tspp
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

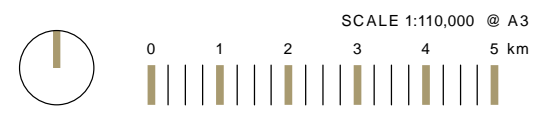


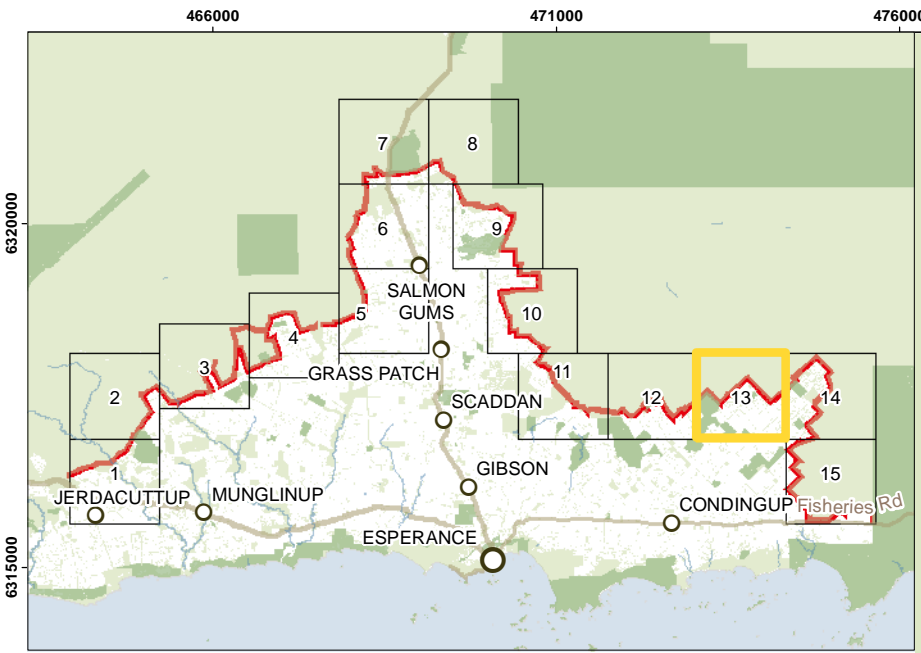
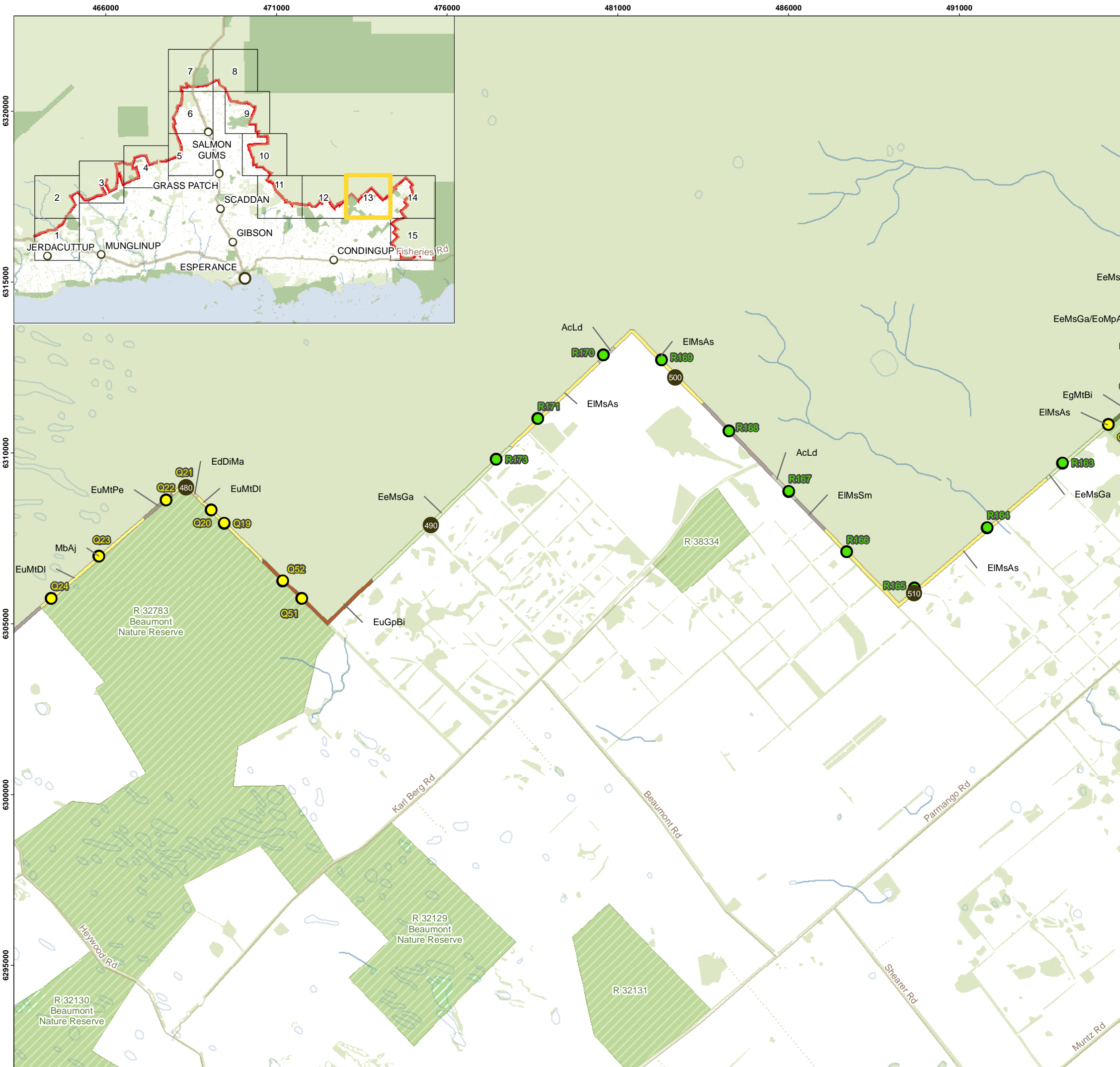
AUTHOR: JN CHECKED: SB
 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**VEGETATION TYPES
 MAP 2 - 12**





LEGEND

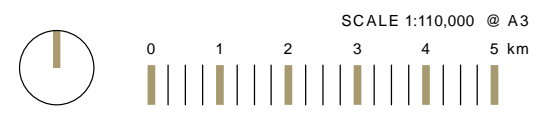
- 10 km divisions
- Releve
- Quadrat
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Vegetation Types**
- AcLd
- EdDiMa
- EeMsGa
- EgAs
- EgMtBi
- EIMsAs
- EIMsSm
- EuGpBi
- EuMtDI
- EuMtPe
- MbAj
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

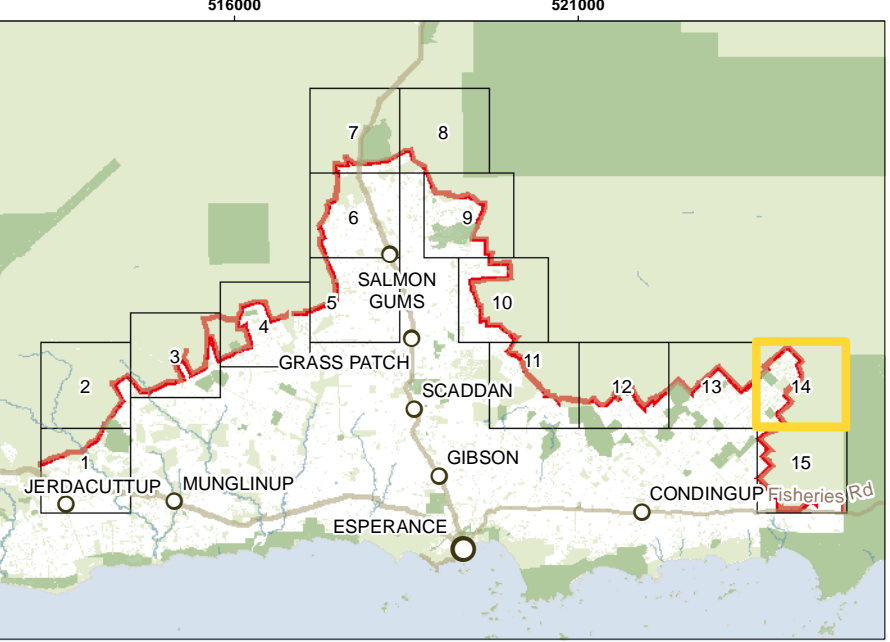
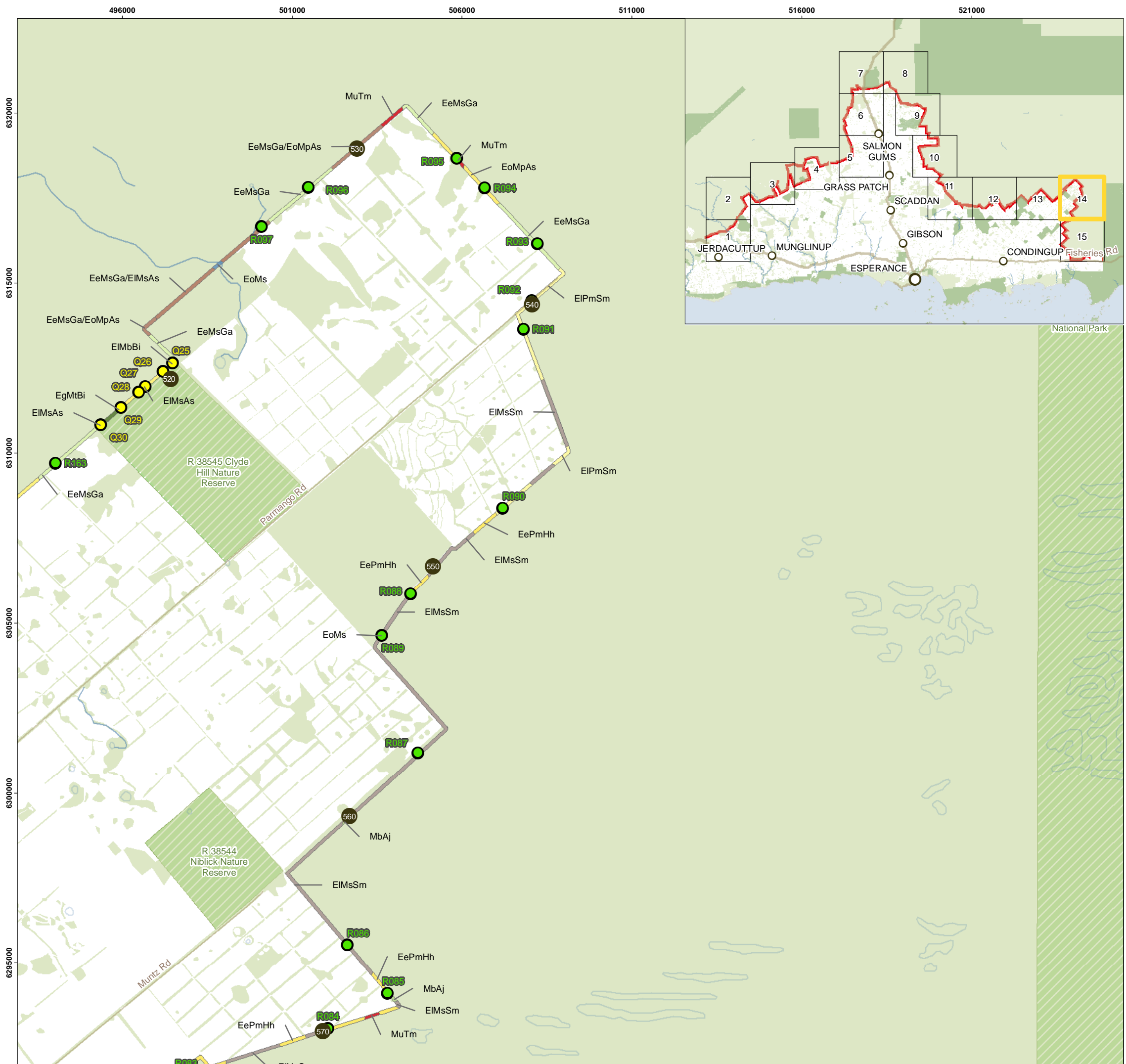


AUTHOR: JN CHECKED: SB
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**
 CLIENT: DAFWA

VEGETATION TYPES
MAP 2 - 13





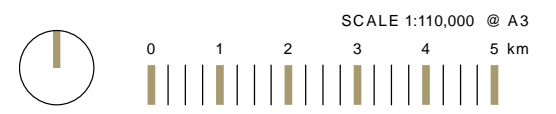
- LEGEND**
- 10 km divisions
 - Releve
 - Quadrat
 - Local Road
 - Watercourses
 - Lakes
- Vegetation Types**
- EeMsGa
 - EeMsGa/EIMsAs
 - EeMsGa/EoMpAs
 - EePmHh
 - EgMtBi
 - EIMbBi
 - EIMsAs
 - EIMsSm
 - EIPmSm
 - EoMpAs
 - EoMs
 - MbAj
 - MuTm
 - Native Vegetation Extent (DAFWA 2012)
 - DPaw Managed Lands and Waters (DPaw 2014)



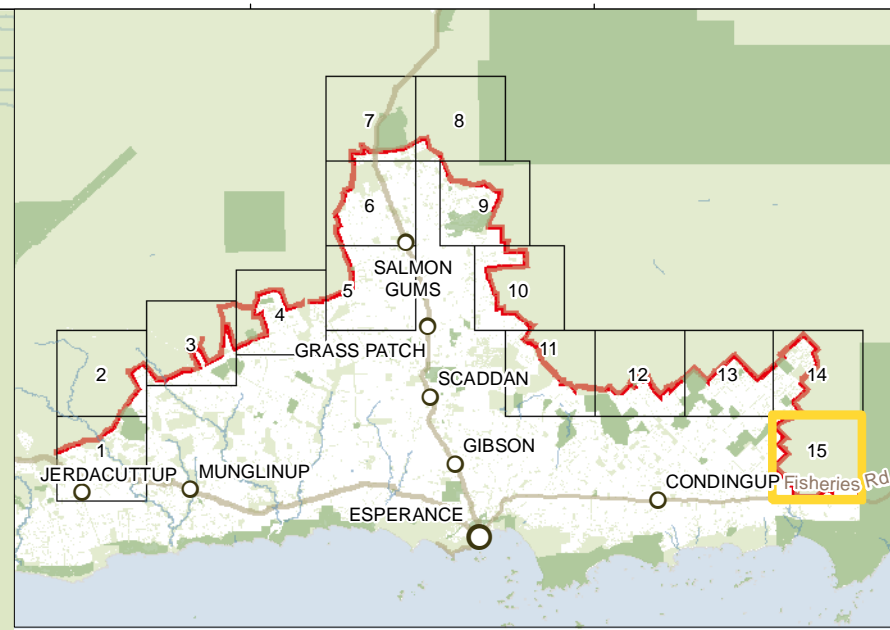
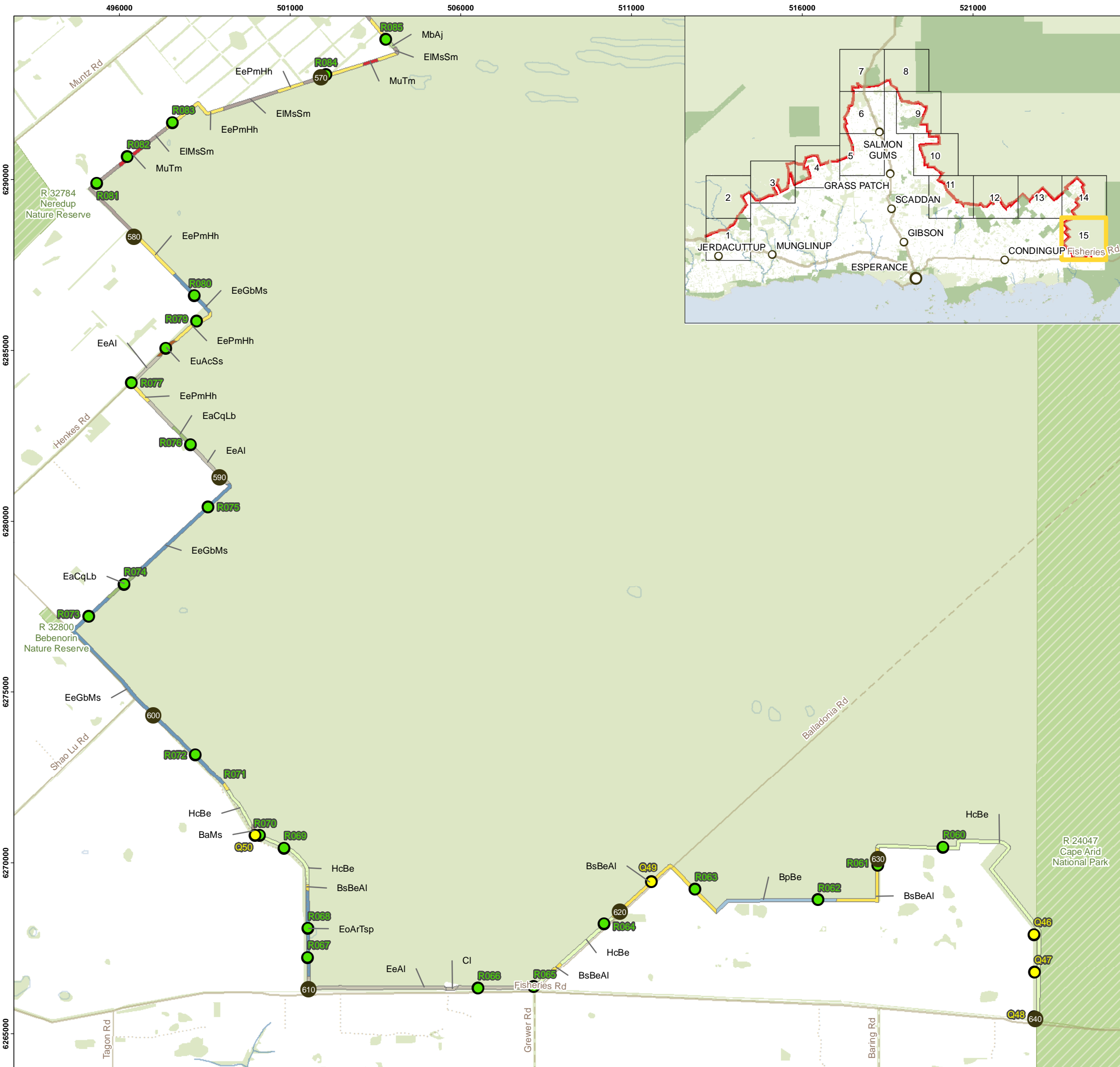
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**
 CLIENT: DAFWA

VEGETATION TYPES
MAP 2 - 14



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Releve
- Quadrat
- Main Road
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes

Vegetation Types

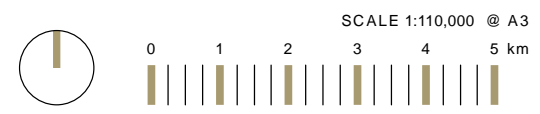
- BaMs
- BpBe
- BsBeAl
- Cl
- DcTp
- EaCqLb
- EeAl
- EeGbmMs
- EePmHh
- EIMsSm
- EoArTsp
- EuAcSs
- HcBe
- MbAj
- MuTm
- Native Vegetation Extent (DAFWA 2012)
- DPAW Managed Lands and Waters (DPAW 2014)



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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**
 CLIENT: DAFWA

VEGETATION TYPES
MAP 2 - 15

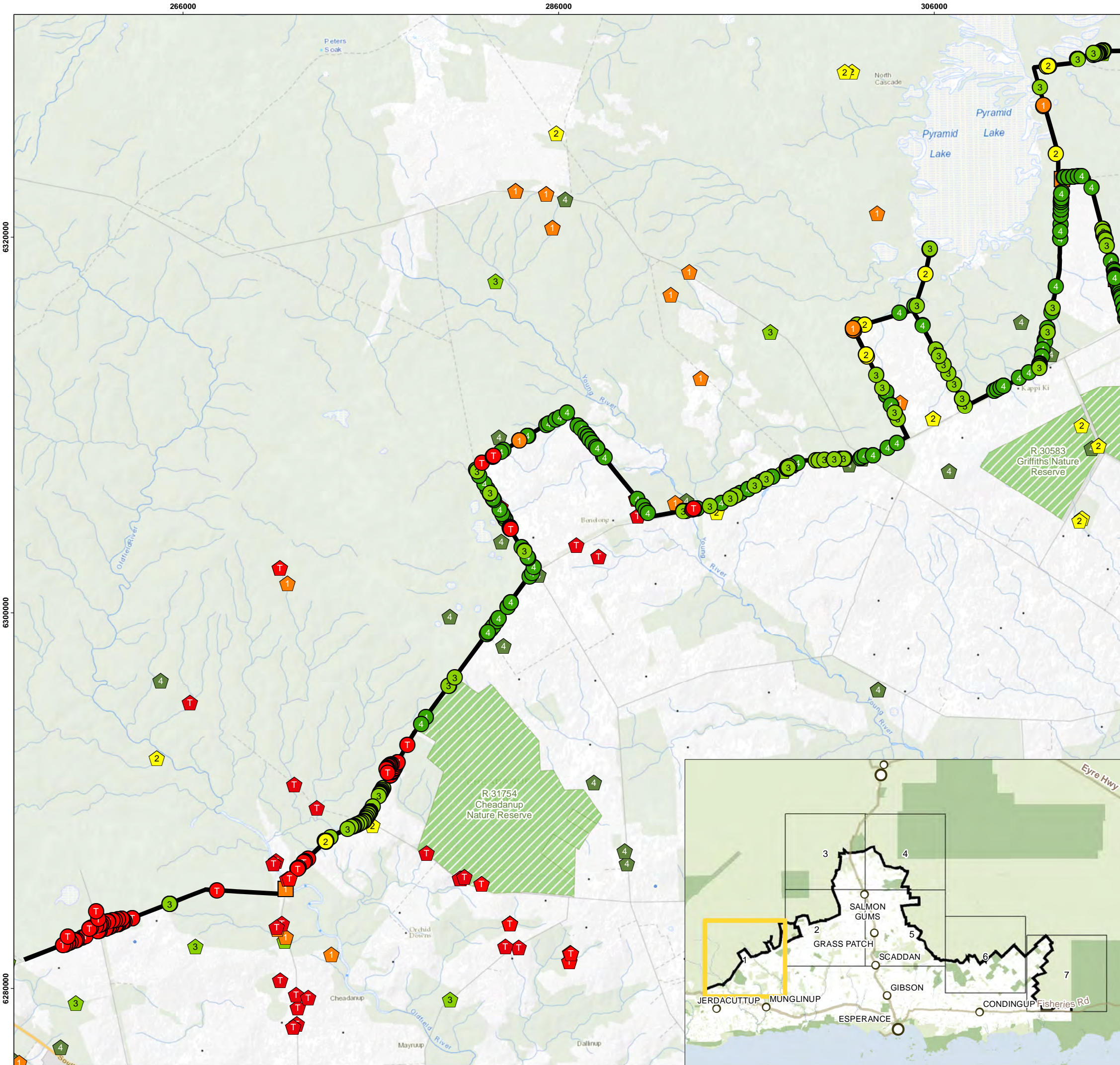


GDA 1994 MGA Zone 51

266000

286000

306000



LEGEND

Ecoscape Observations

- ⬮ Rare or likely to become extinct (Schedule 1, WC Act)
- ⬮ Priority 1 (DPaW)
- ⬮ Priority 2 (DPaW)
- ⬮ Priority 3 (DPaW)
- ⬮ Priority 4 (DPaW)

GHD Observations 2012

- ⬮ Priority 1 (DPaW)

DPaW Flora Database Search Results

- ⬮ Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
- ⬮ Priority 1
- ⬮ Priority 2
- ⬮ Priority 3
- ⬮ Priority 4

Final Alignment Buffer

DPaW Managed Lands and Waters



AUTHOR: JN
DATE: MAR-17

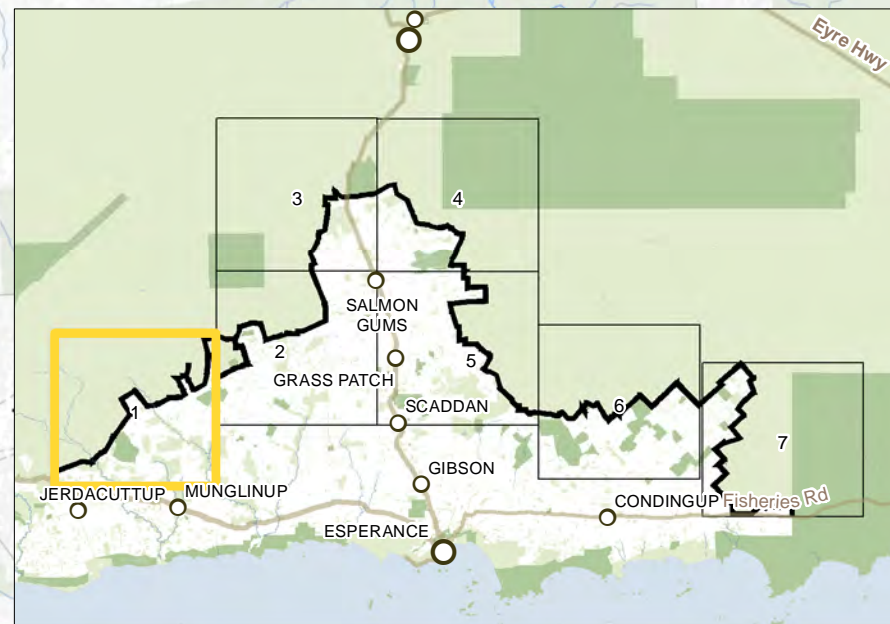
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PROJECT NO: 3922-17

**STATE BARRIER FENCE ESPERANCE
EXTENSION BIOLOGICAL SURVEYS**

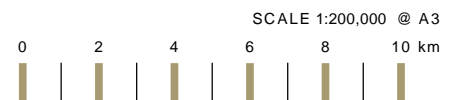
CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
FLORA LOCATIONS**

MAP 3 - 1



GDA 1994 MGA Zone 51



326000

346000

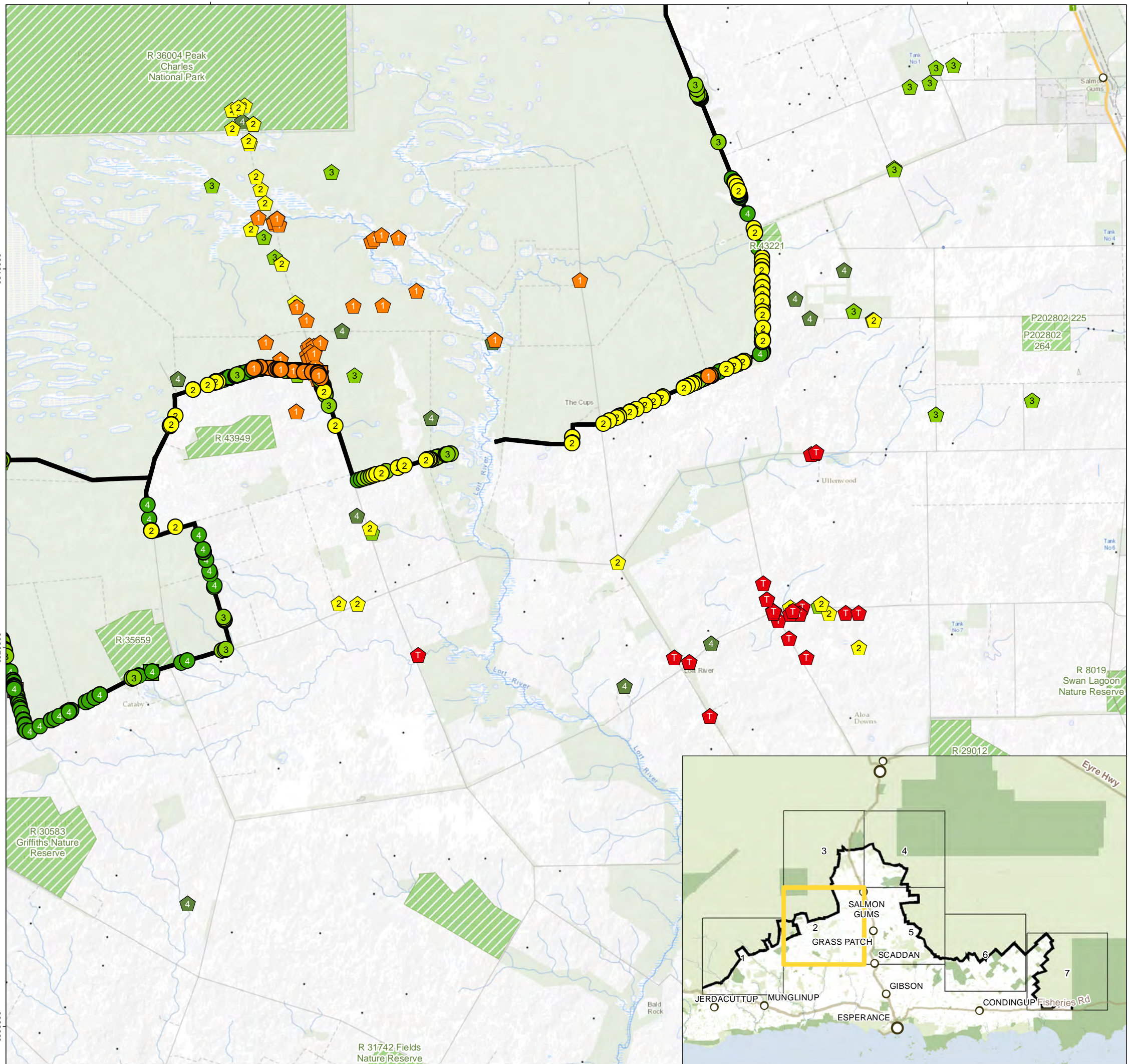
366000

R/36004 Peak Charles National Park

6340000

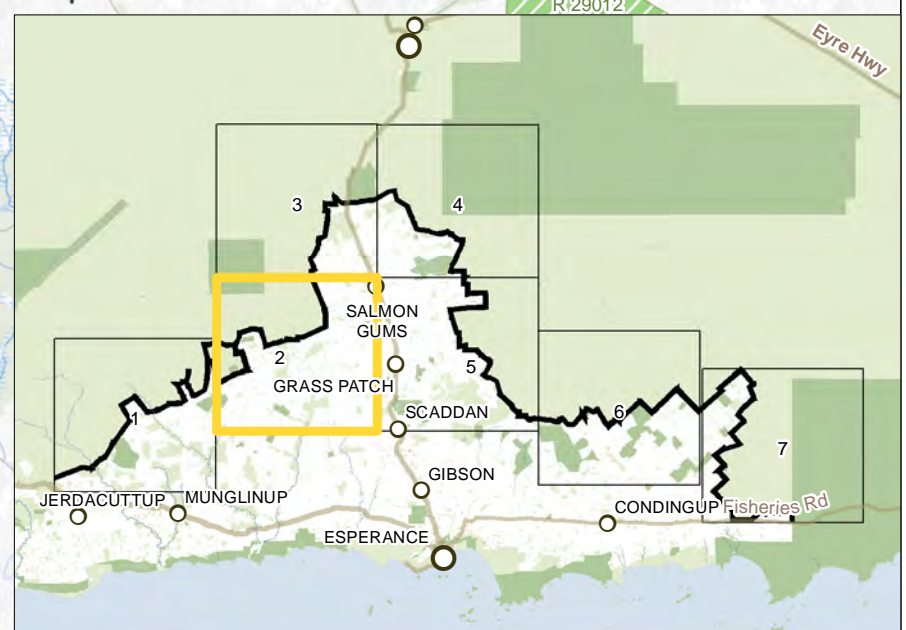
6320000

6300000



LEGEND

- Small Town
- Ecoscape Observations**
- Rare or likely to become extinct (Schedule 1, WC Act)
- Priority 1 (DPaW)
- Priority 2 (DPaW)
- Priority 3 (DPaW)
- Priority 4 (DPaW)
- GHD Observations 2012**
- Priority 1 (DPaW)
- Priority 4 (DPaW)
- DPaW Flora Database Search Results**
- Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
- Priority 1
- Priority 2
- Priority 3
- Priority 4
- Final Alignment Buffer
- DPaW Managed Lands and Waters



AUTHOR: JN CHECKED: SK
 DATE: MAR-17 PROJECT NO: 3922-17

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 2

SCALE 1:200,000 @ A3



GDA 1994 MGA Zone 51

326000

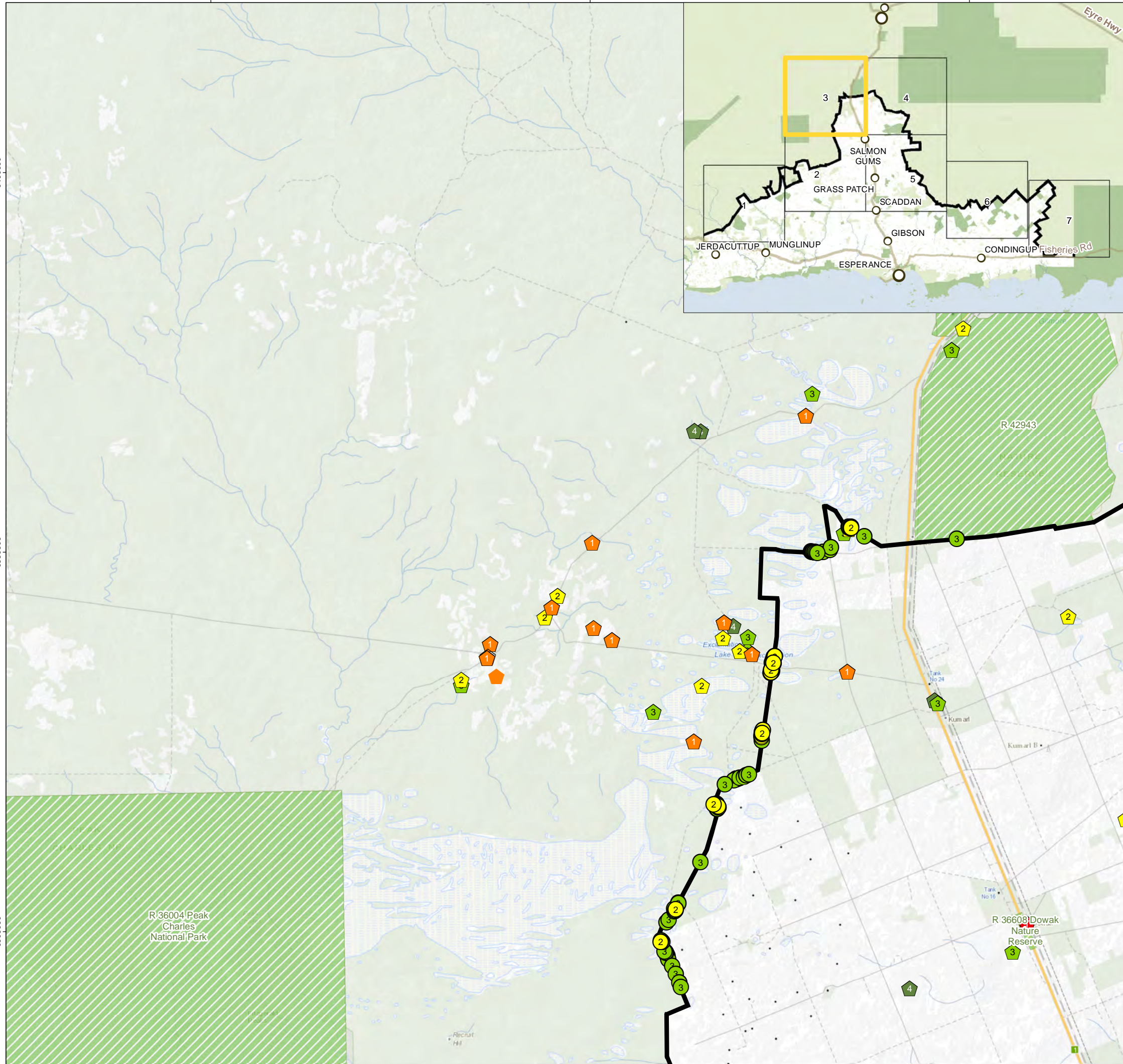
346000

366000

6400000






6380000

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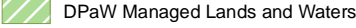


LEGEND

Ecoscope Observations

-  Rare or likely to become extinct (Schedule 1, WC Act)
-  Priority 1 (DPaW)
-  Priority 2 (DPaW)
-  Priority 3 (DPaW)
-  Priority 4 (DPaW)

DPaW Flora Database Search Results

-  Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
-  Priority 1
-  Priority 2
-  Priority 3
-  Priority 4
-  Final Alignment Buffer
-  DPaW Managed Lands and Waters



AUTHOR: JN CHECKED: SK
 DATE: MAR-17 PROJECT NO: 3922-17

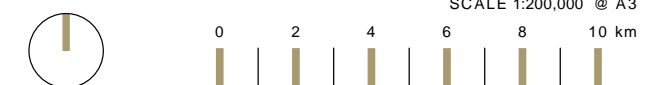
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 3

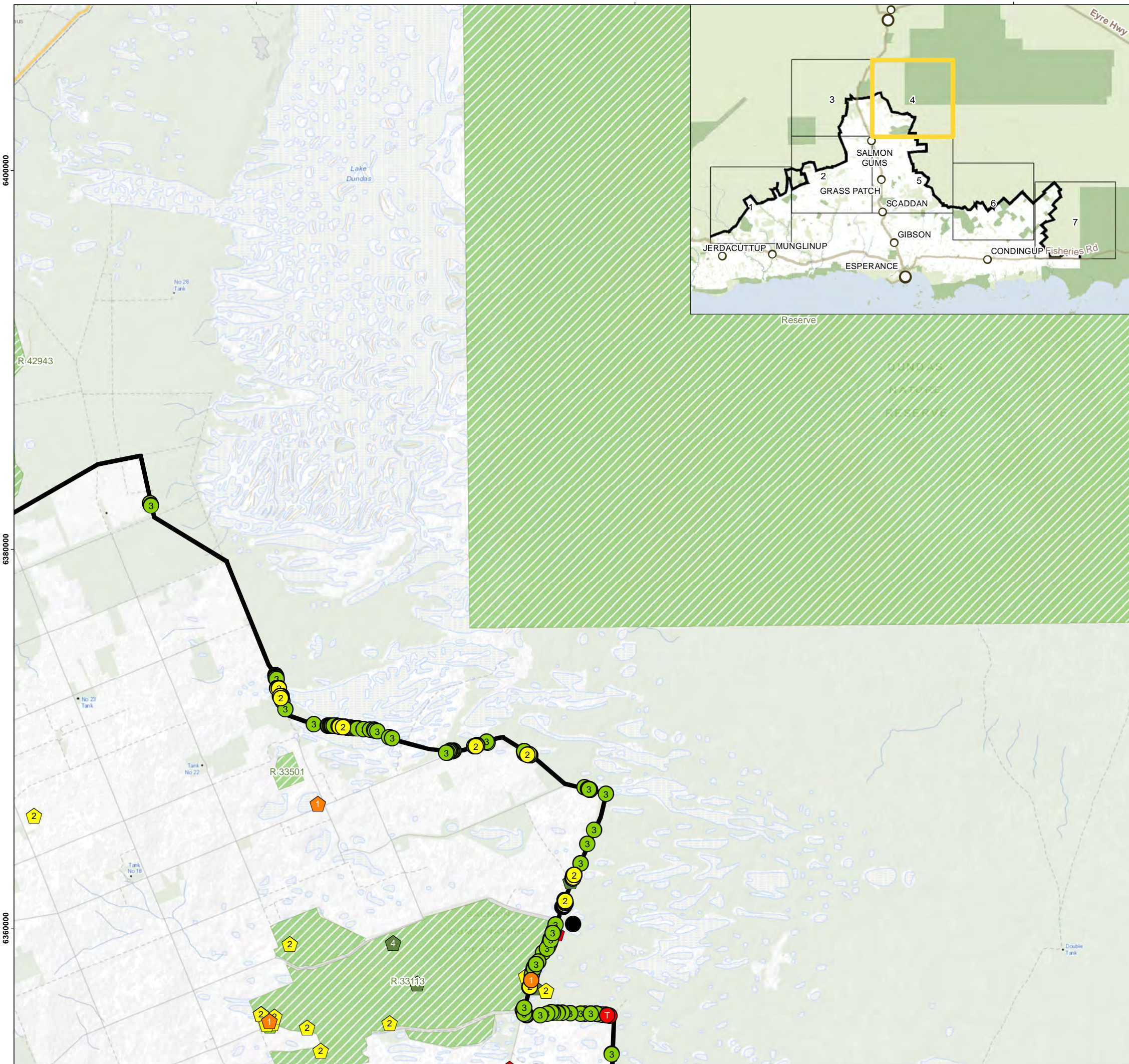
SCALE 1:200,000 @ A3



386000

406000

426000



LEGEND

- Ecoscape Observations**
- Rare or likely to become extinct (Schedule 1, WC Act)
 - Priority 1 (DPaW)
 - Priority 2 (DPaW)
 - Priority 3 (DPaW)
 - Priority 4 (DPaW)
- DPaW Flora Database Search Results**
- ⬠ Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
 - ⬠ Priority 1
 - ⬠ Priority 2
 - ⬠ Priority 3
 - ⬠ Priority 4
 - Final Alignment Buffer
 - DPaW Managed Lands and Waters



AUTHOR: JN CHECKED: SK
 DATE: MAR-17 PROJECT NO: 3922-17

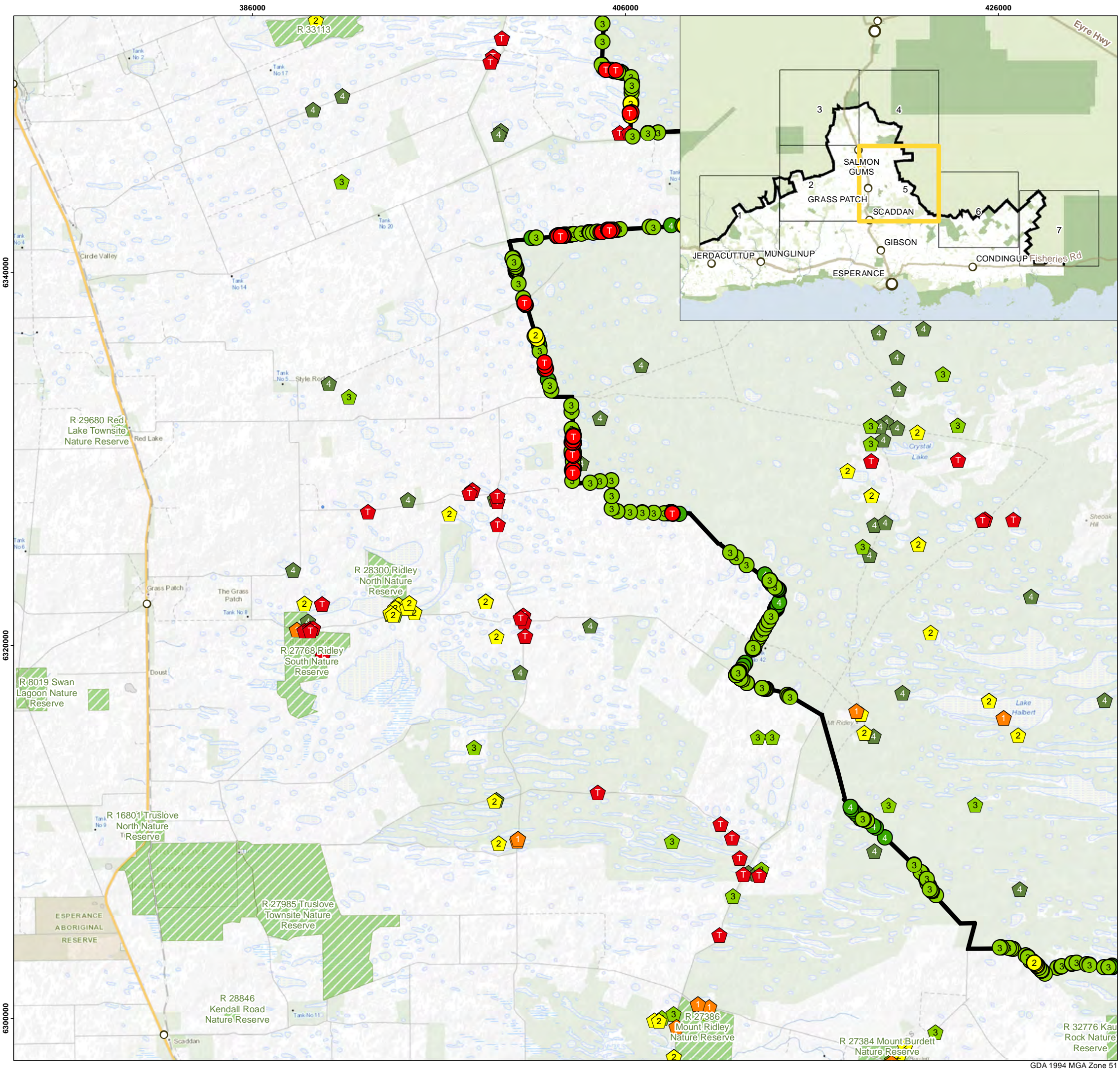
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 4





LEGEND

- Small Town
- Ecoscape Observations**
- T Rare or likely to become extinct (Schedule 1, WC Act)
- 1 Priority 1 (DPaW)
- 2 Priority 2 (DPaW)
- 3 Priority 3 (DPaW)
- 4 Priority 4 (DPaW)
- DPaW Flora Database Search Results**
- T Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
- 1 Priority 1
- 2 Priority 2
- 3 Priority 3
- 4 Priority 4
- Final Alignment Buffer
- DPaW Managed Lands and Waters



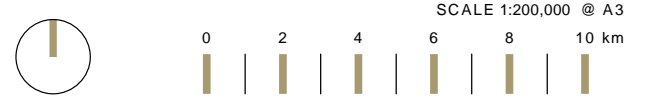
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

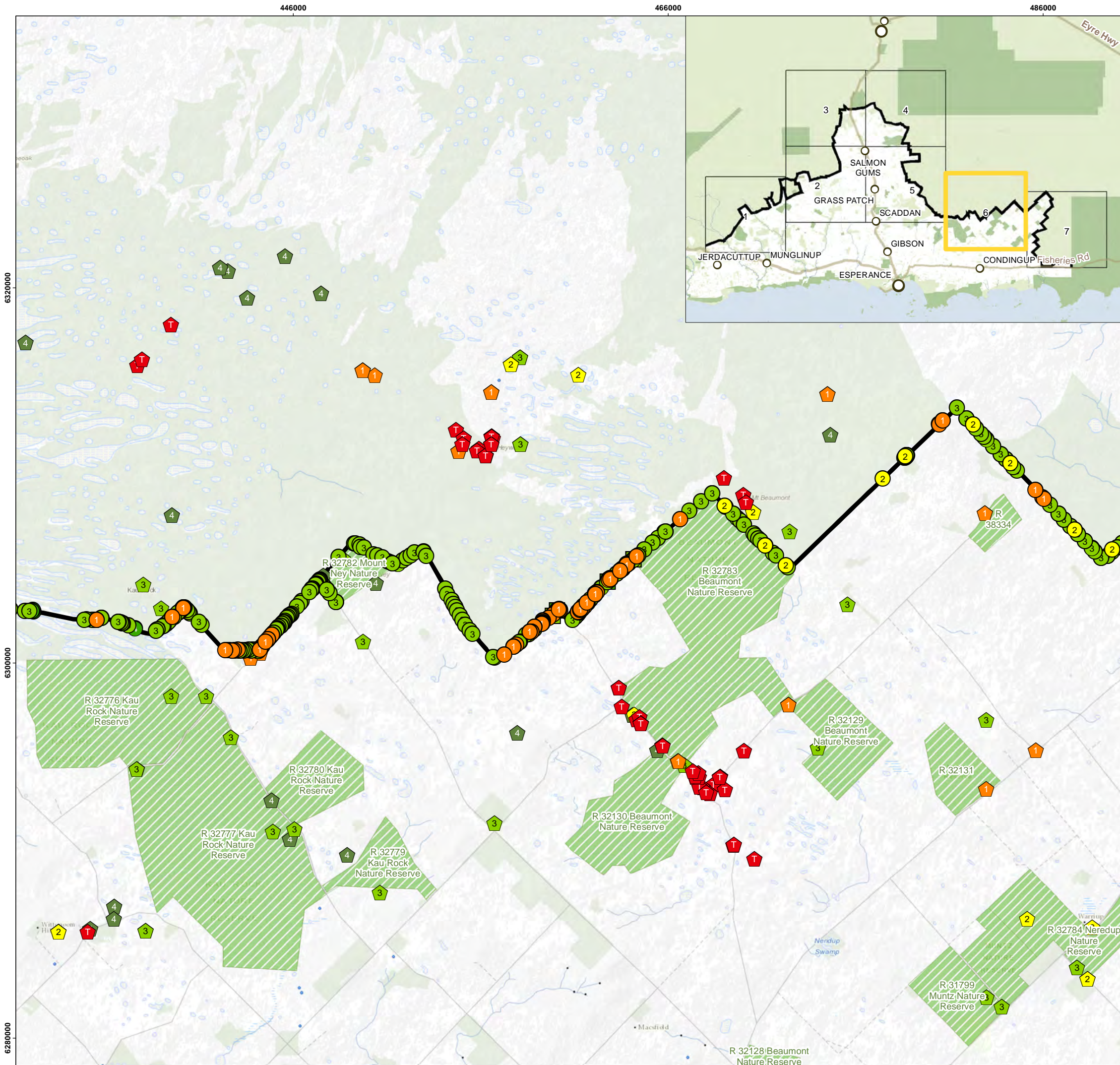
CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 5



GDA 1994 MGA Zone 51



LEGEND

- Ecoscope Observations**
- T Rare or likely to become extinct (Schedule 1, WC Act)
- 1 Priority 1 (DPaW)
- 2 Priority 2 (DPaW)
- 3 Priority 3 (DPaW)
- 4 Priority 4 (DPaW)
- GHD Observations 2012**
- 3 Priority 3 (DPaW)
- 4 Priority 4 (DPaW)
- DPaW Flora Database Search Results**
- T Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
- 1 Priority 1
- 2 Priority 2
- 3 Priority 3
- 4 Priority 4
- Final Alignment Buffer
- DPaw Managed Lands and Waters



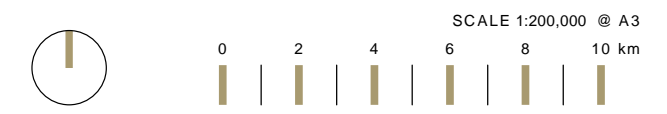
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

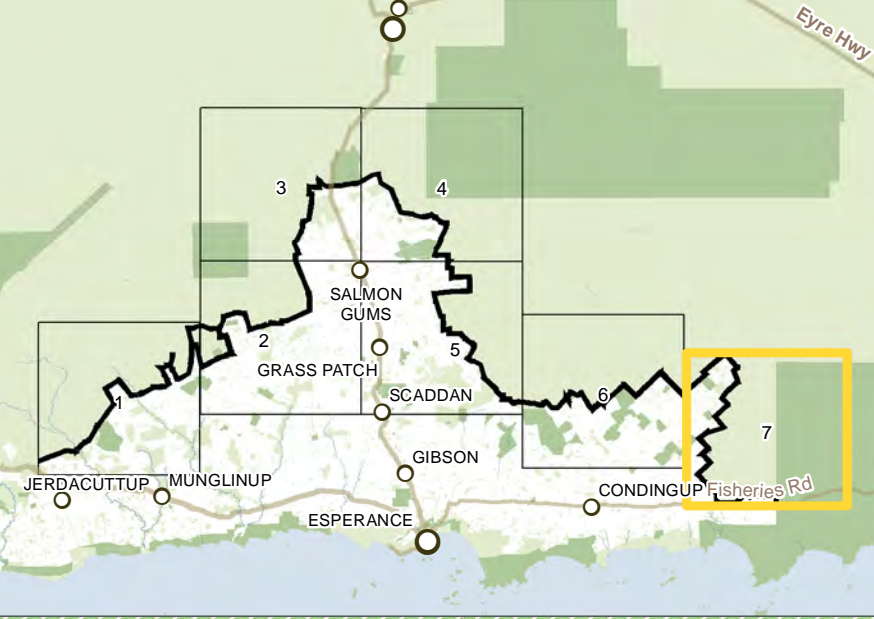
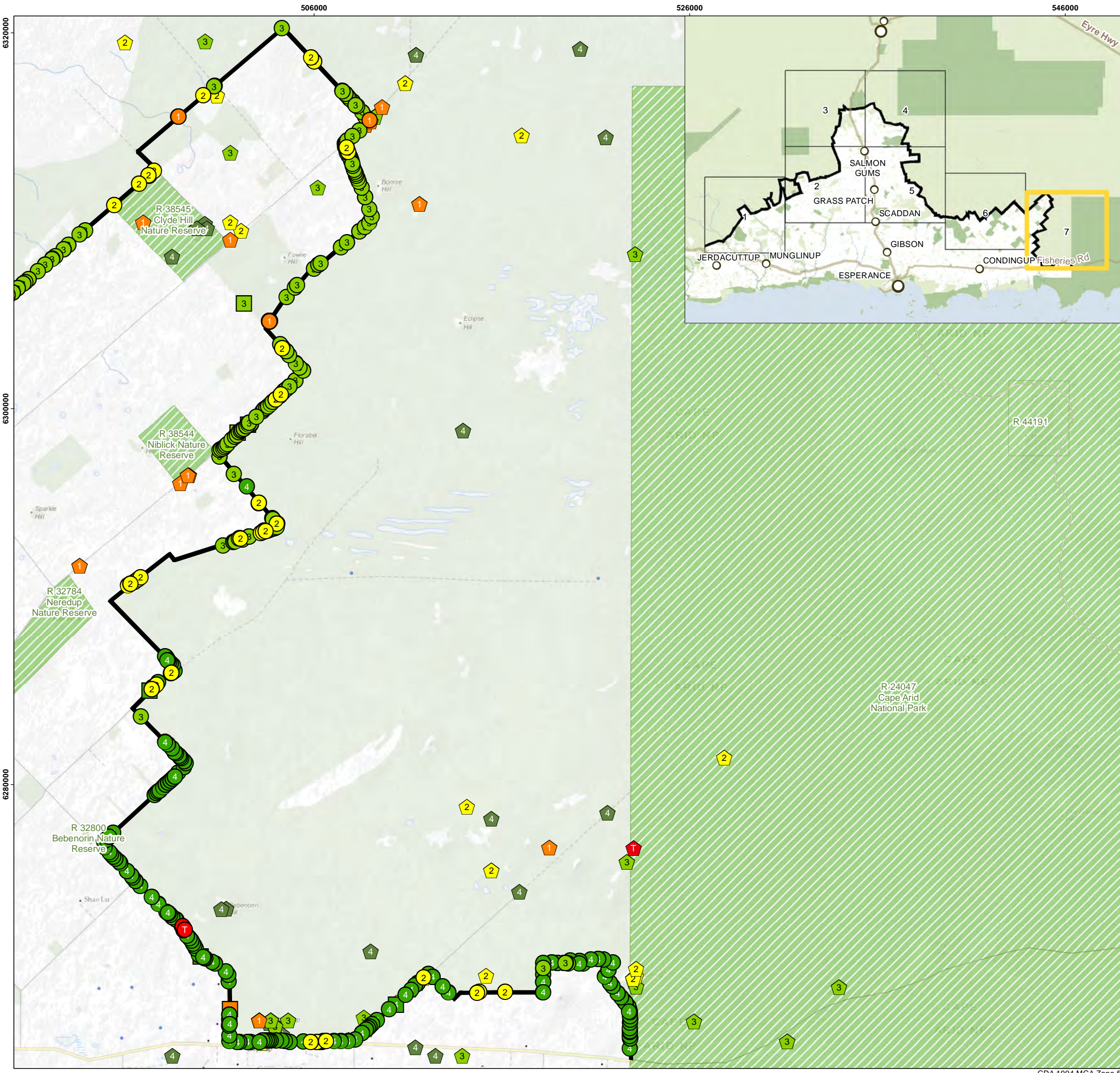
CLIENT: DAFWA

**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 6



GDA 1994 MGA Zone 51



- LEGEND**
- Ecoscope Observations**
- T Rare or likely to become extinct (Schedule 1, WC Act)
 - 1 Priority 1 (DPaW)
 - 2 Priority 2 (DPaW)
 - 3 Priority 3 (DPaW)
 - 4 Priority 4 (DPaW)
- GHD Observations 2012**
- 1 Priority 1 (DPaW)
 - 3 Priority 3 (DPaW)
 - 4 Priority 4 (DPaW)
- DPaW Flora Database Search Results**
- T Threatened; Rare or likely to become extinct (Schedule 1, WC Act)
 - 1 Priority 1
 - 2 Priority 2
 - 3 Priority 3
 - 4 Priority 4
 - Final Alignment Buffer
 - DPaW Managed Lands and Waters



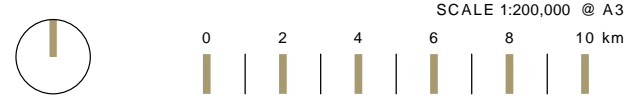
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

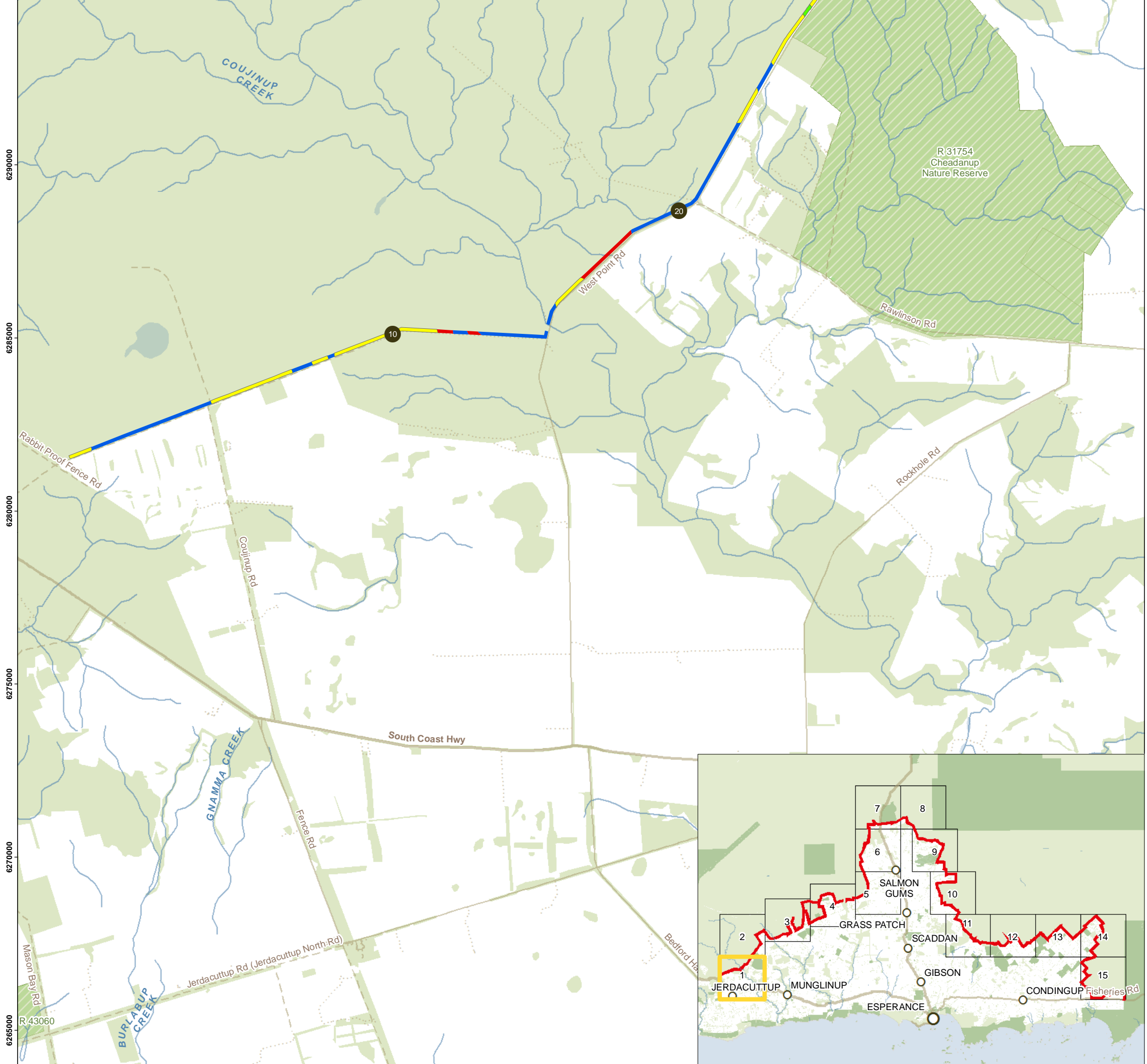
**CONSERVATION SIGNIFICANT
 FLORA LOCATIONS**

MAP 3 - 7



GDA 1994 MGA Zone 51

261000 266000 271000 276000 281000 286000



LEGEND

- 10 km divisions
 - Highway
 - Local Road
 - - - Unsealed Road
 - ⋯ Vehicle Track
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Fauna Habitat Types**
- Woodland
 - Mallee woodland
 - Mallee shrubland
 - Shrubland

6290000
6285000
6280000
6275000
6270000
6265000



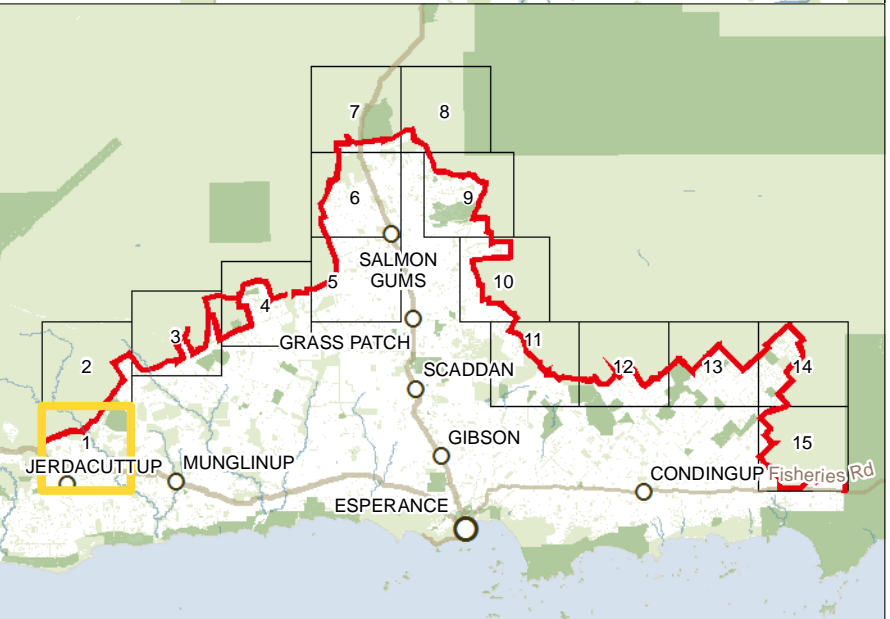
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**STATE BARRIER FENCE ESPERANCE
EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 1



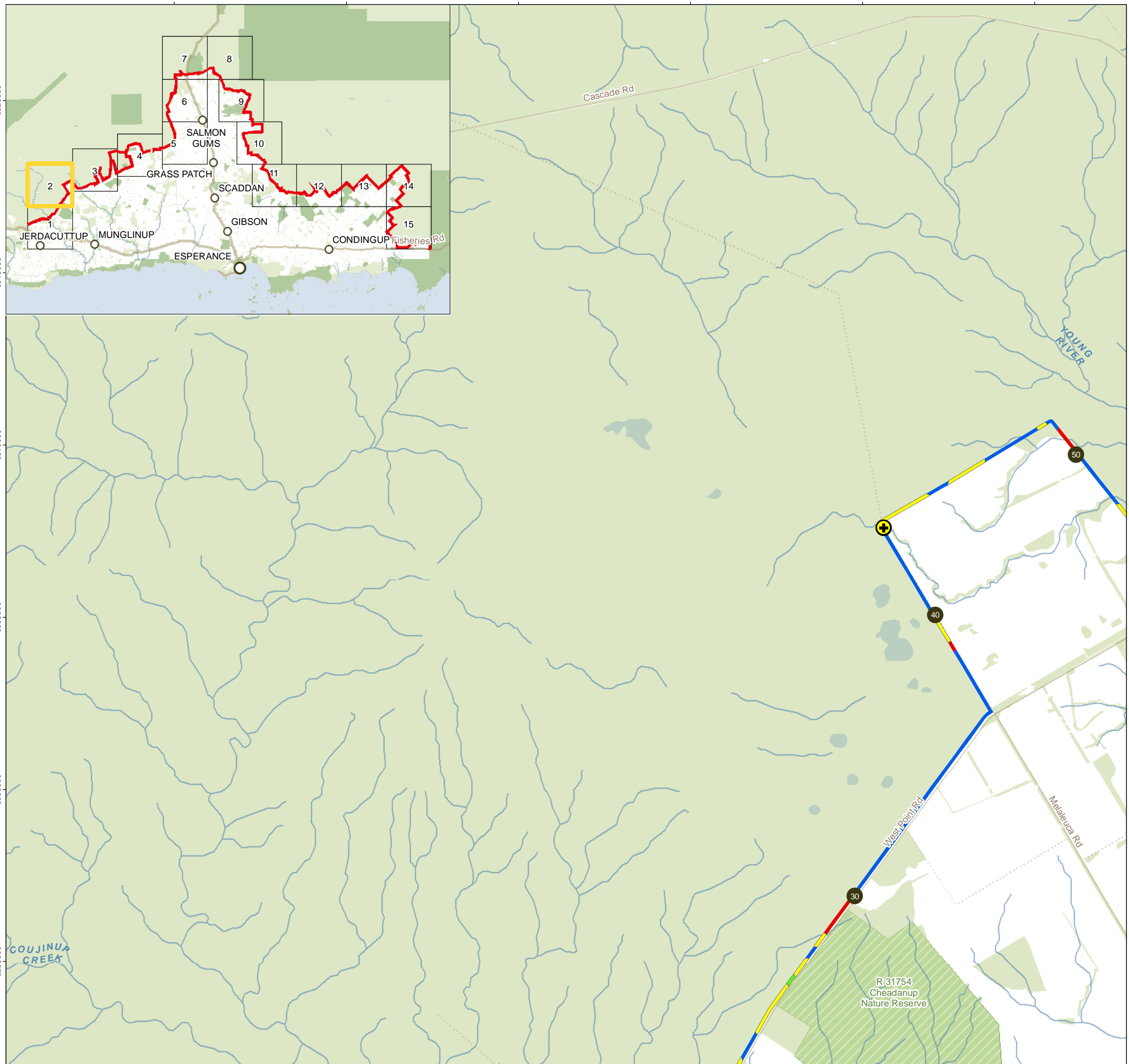
GDA 1994 MGA Zone 51

261000 266000 271000 276000 281000 286000

6320000
6315000

6310000
6305000

6300000
6295000



LEGEND

- 10 km divisions
- Local Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- ⊕ Western Brush Wallaby
- Fauna Habitat Types**
- Woodland
- Mallee woodland
- Mallee shrubland
- Shrubland



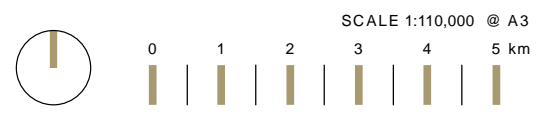
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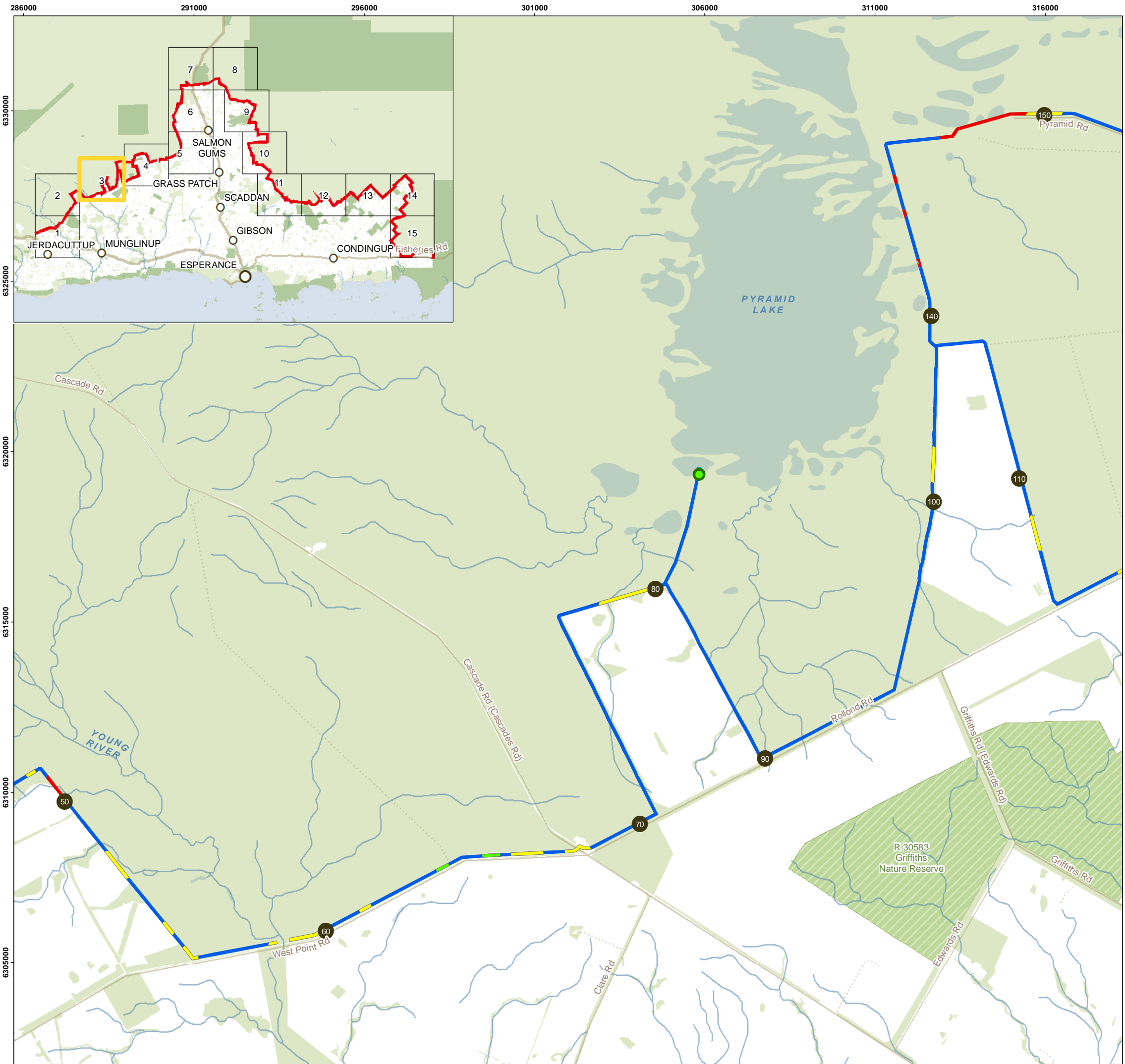
**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 2





LEGEND

- 10 km divisions
- Local Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- Rainbow Bee-eater
- Fauna Habitat Types**
- Woodland
- Mallee woodland
- Mallee shrubland
- Shrubland
- Salt Lake/Fringe
- Salt Lake



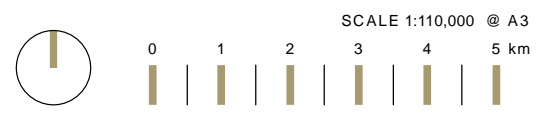
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

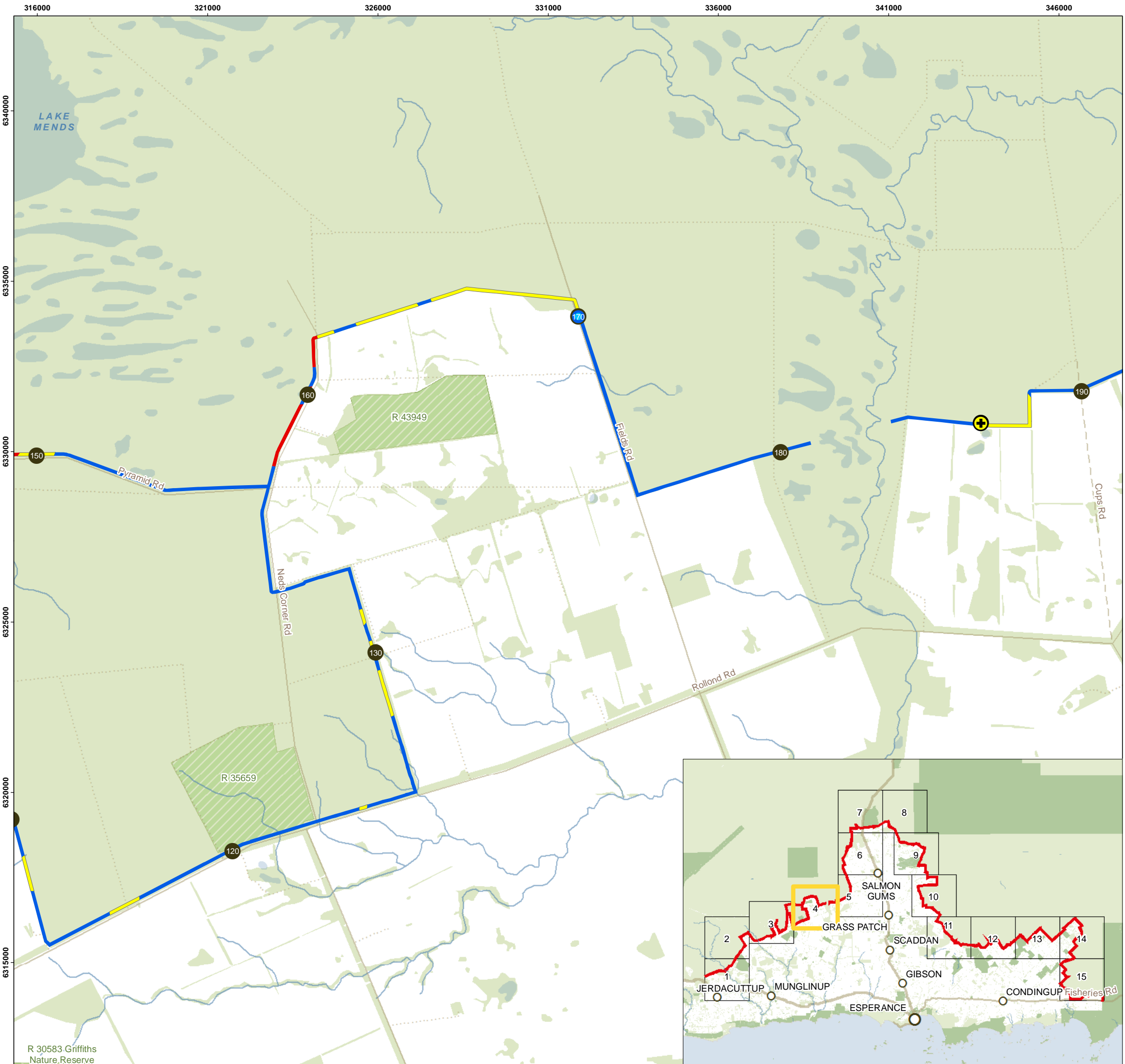
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 3

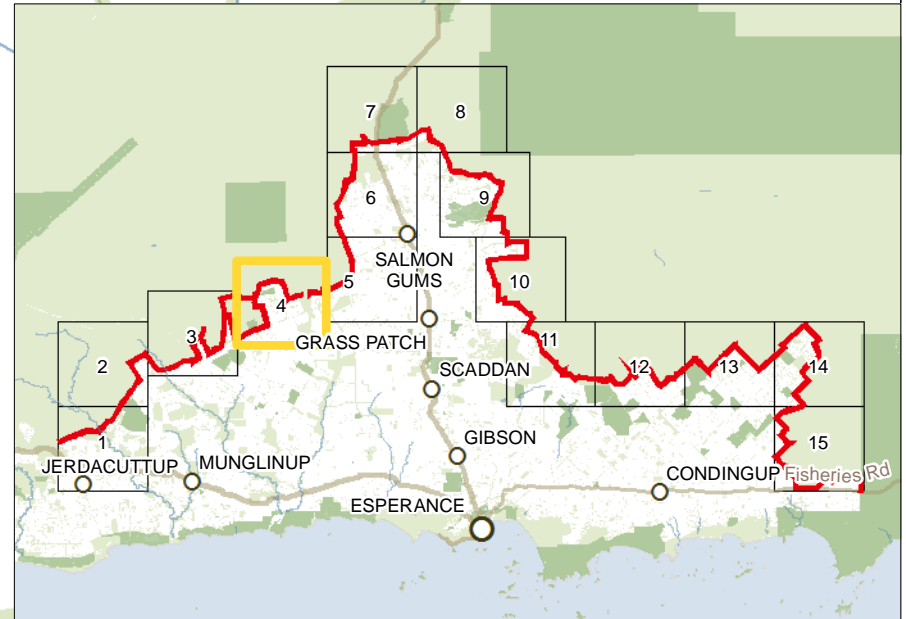


GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Local Road
- Unsealed Road
- Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- Crested Bellbird
- + Western Brush Wallaby
- Fauna Habitat Types**
- Woodland
- Mallee woodland
- Mallee shrubland



AUTHOR: JN CHECKED: SB
 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

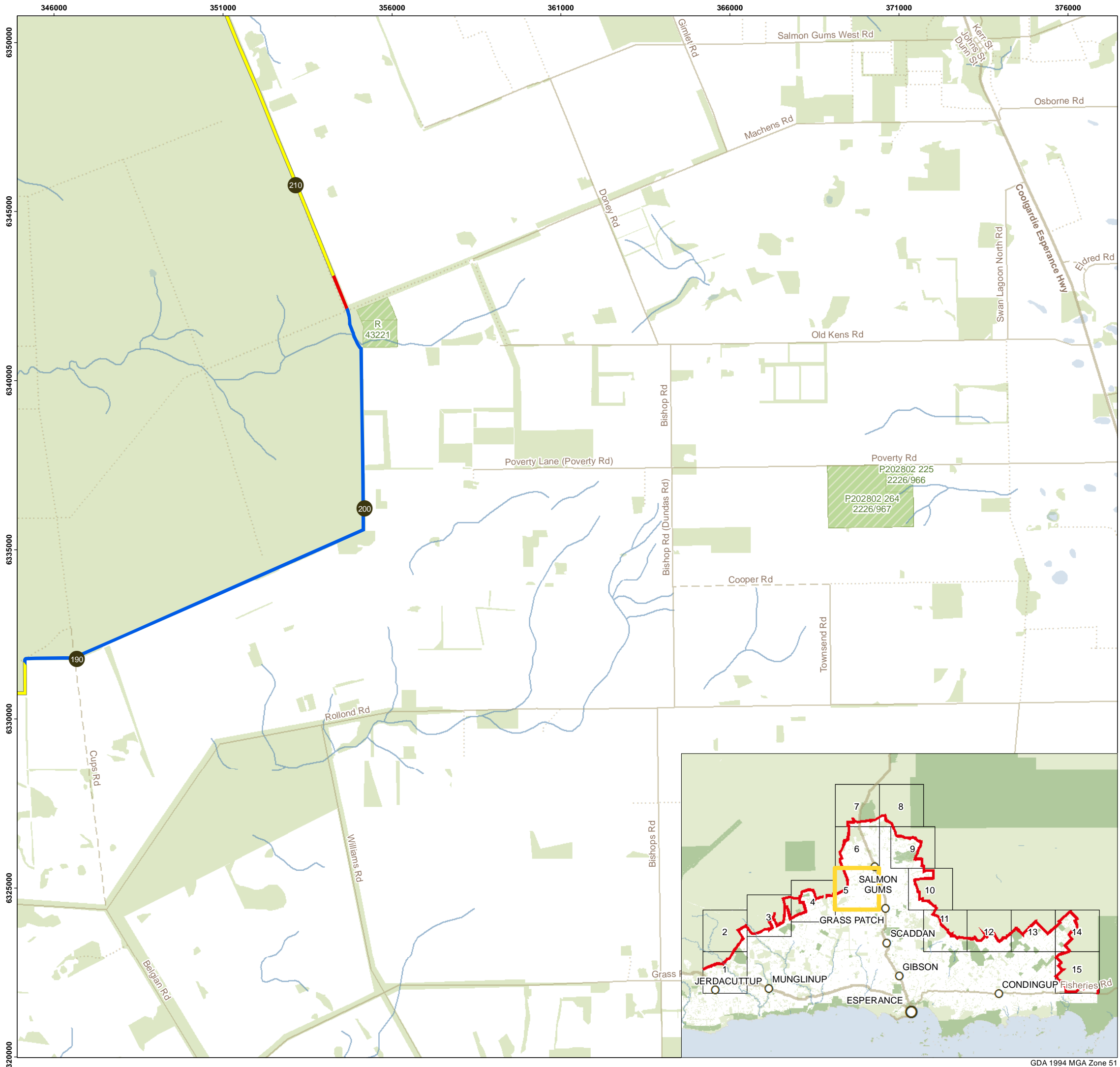
FAUNA HABITAT TYPES

MAP 4 - 4

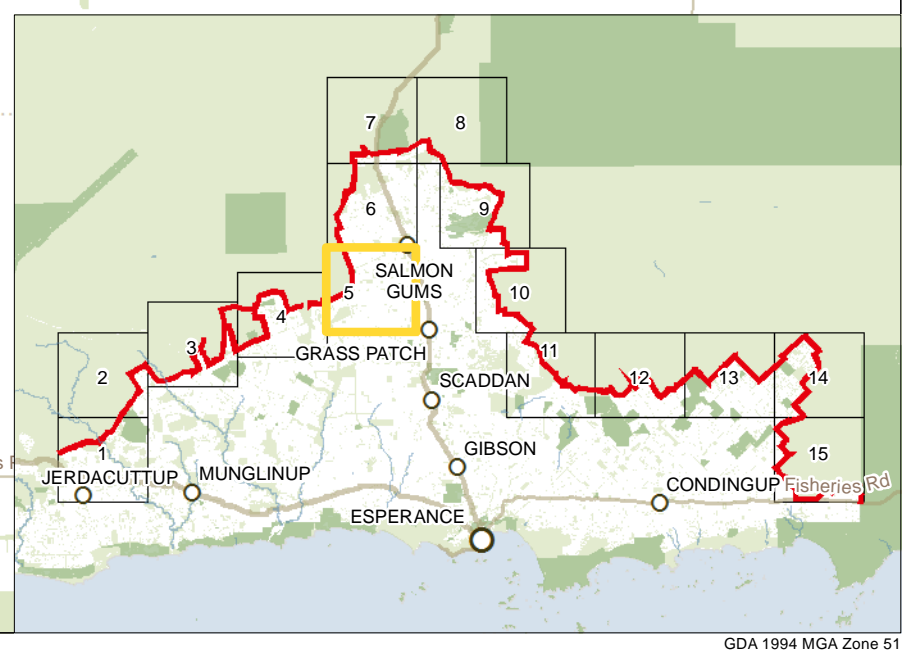


R 30583 Griffiths Nature Reserve

GDA 1994 MGA Zone 51



- LEGEND**
- 10 km divisions
 - Highway
 - Local Road
 - - - Unsealed Road
 - ⋯ Vehicle Track
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Fauna Habitat Types**
- Woodland
 - Mallee woodland
 - Mallee shrubland



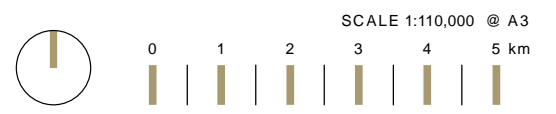
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

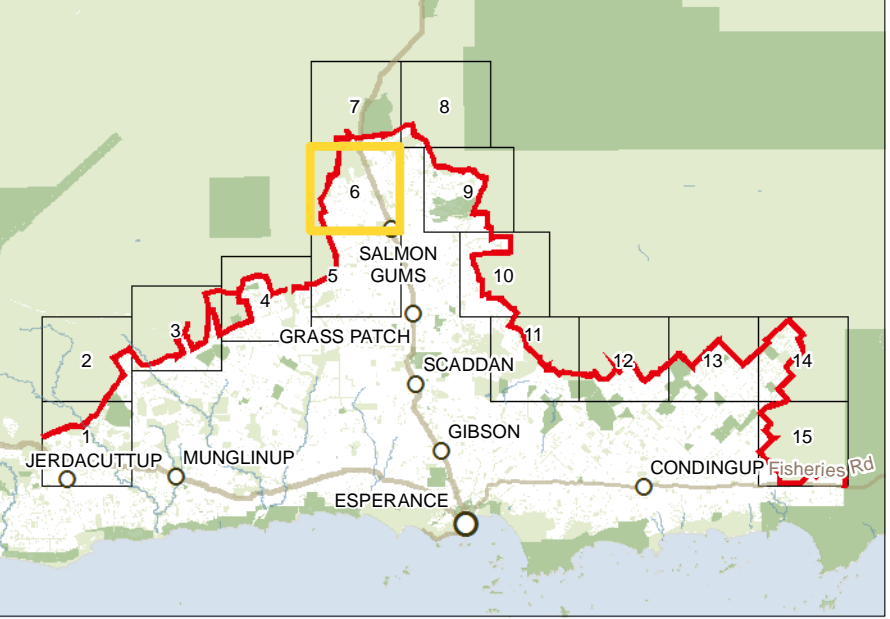
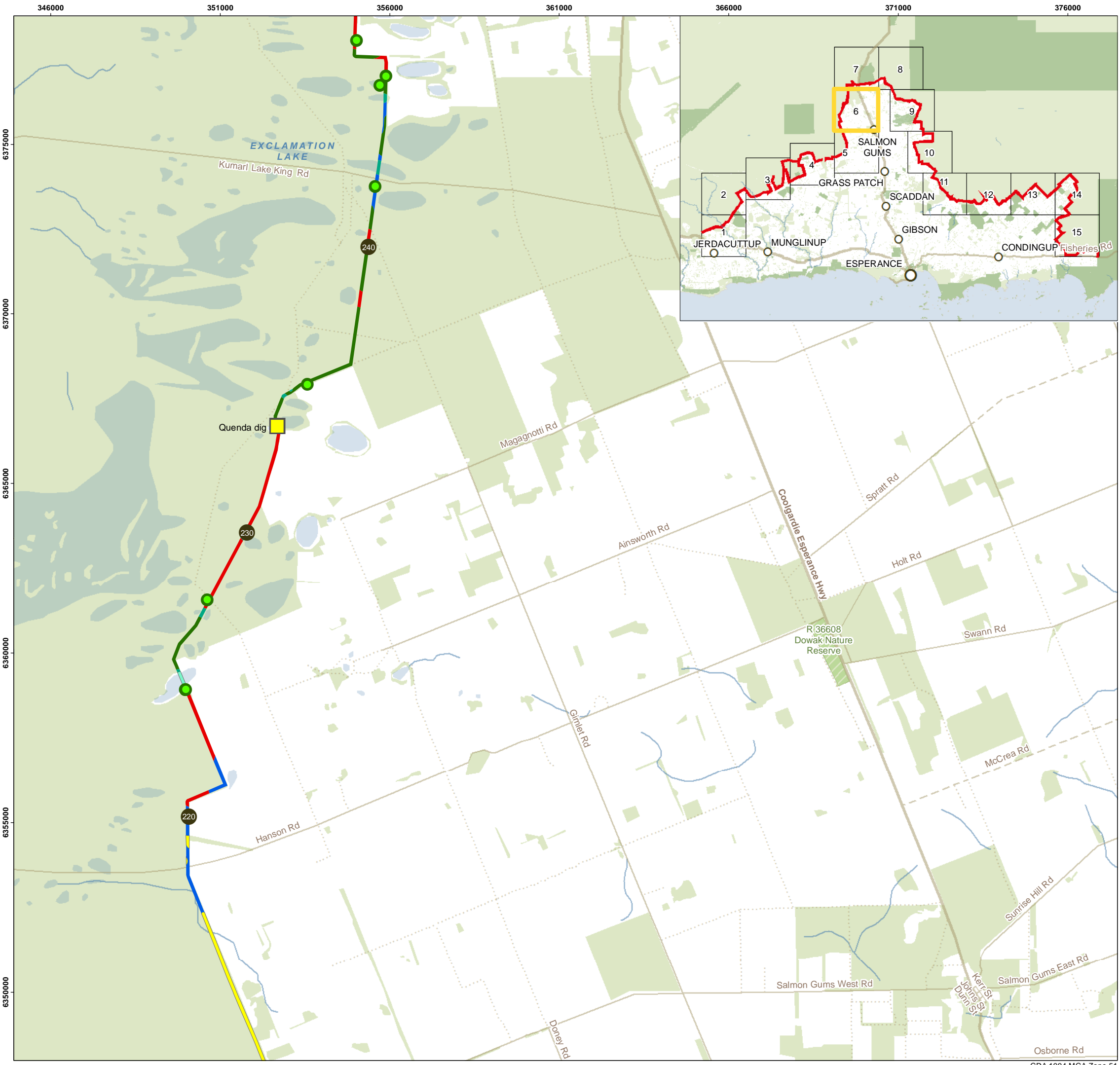
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 5



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Highway
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

Conservation Significant Fauna Observations

- Rainbow Bee-eater
- Quenda

Fauna Habitat Types

- Forest
- Woodland
- Mallee woodland
- Mallee shrubland
- Salt Lake/Fringe
- Salt Lake



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 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

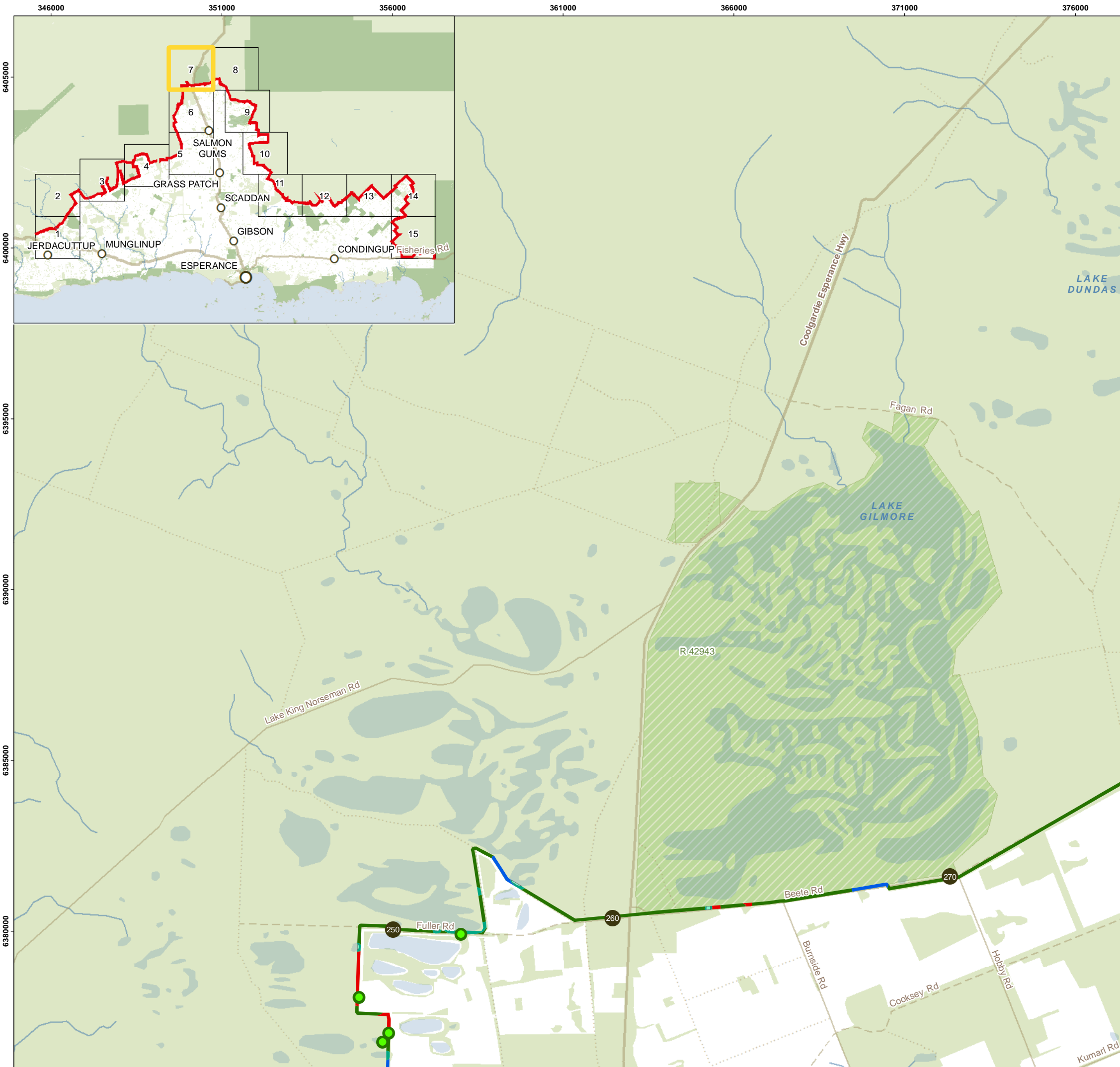
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 6



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Highway
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- Rainbow Bee-eater
- Fauna Habitat Types**
- Forest
- Woodland
- Mallee woodland
- Salt Lake/Fringe
- Salt Lake



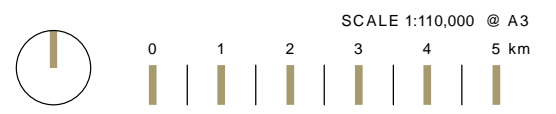
AUTHOR: JN CHECKED: SB
 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

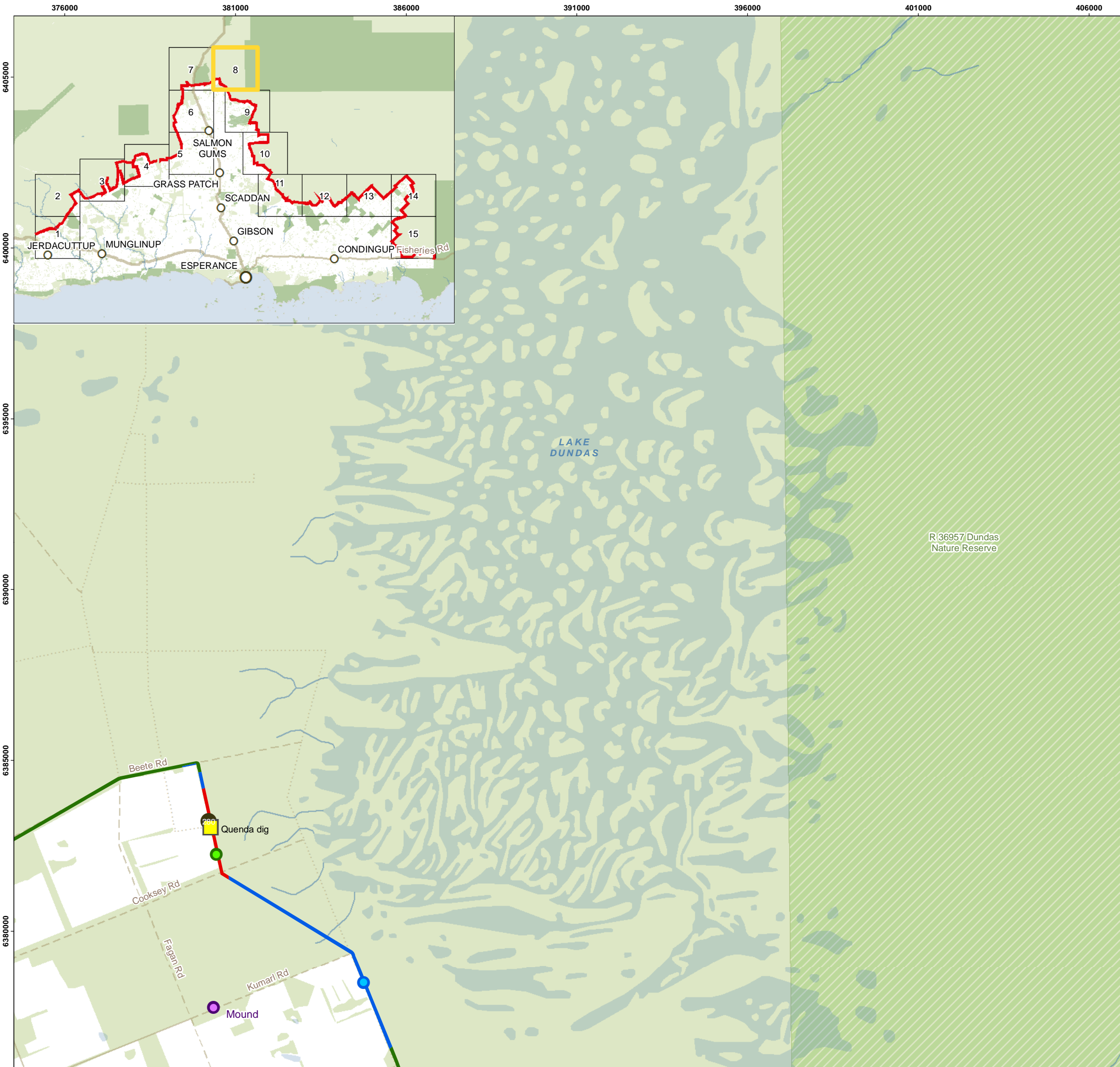
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 7



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
 - Highway
 - Local Road
 - Unsealed Road
 - Vehicle Track
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- Crested Bellbird
 - Mallee Fowl
 - Rainbow Bee-eater
 - Quenda
- Fauna Habitat Types**
- Forest
 - Woodland
 - Mallee woodland



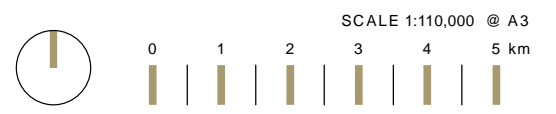
AUTHOR: JN CHECKED: SB
 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

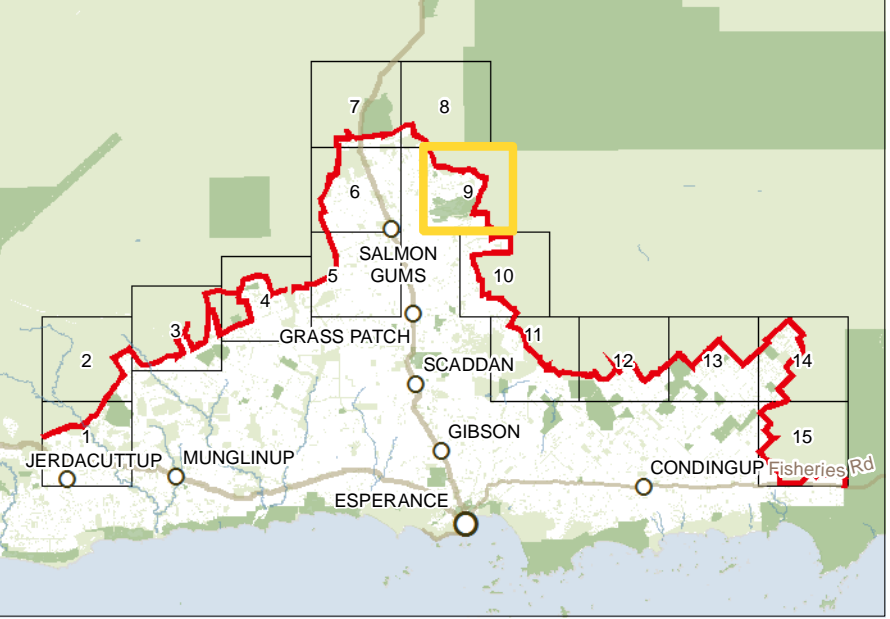
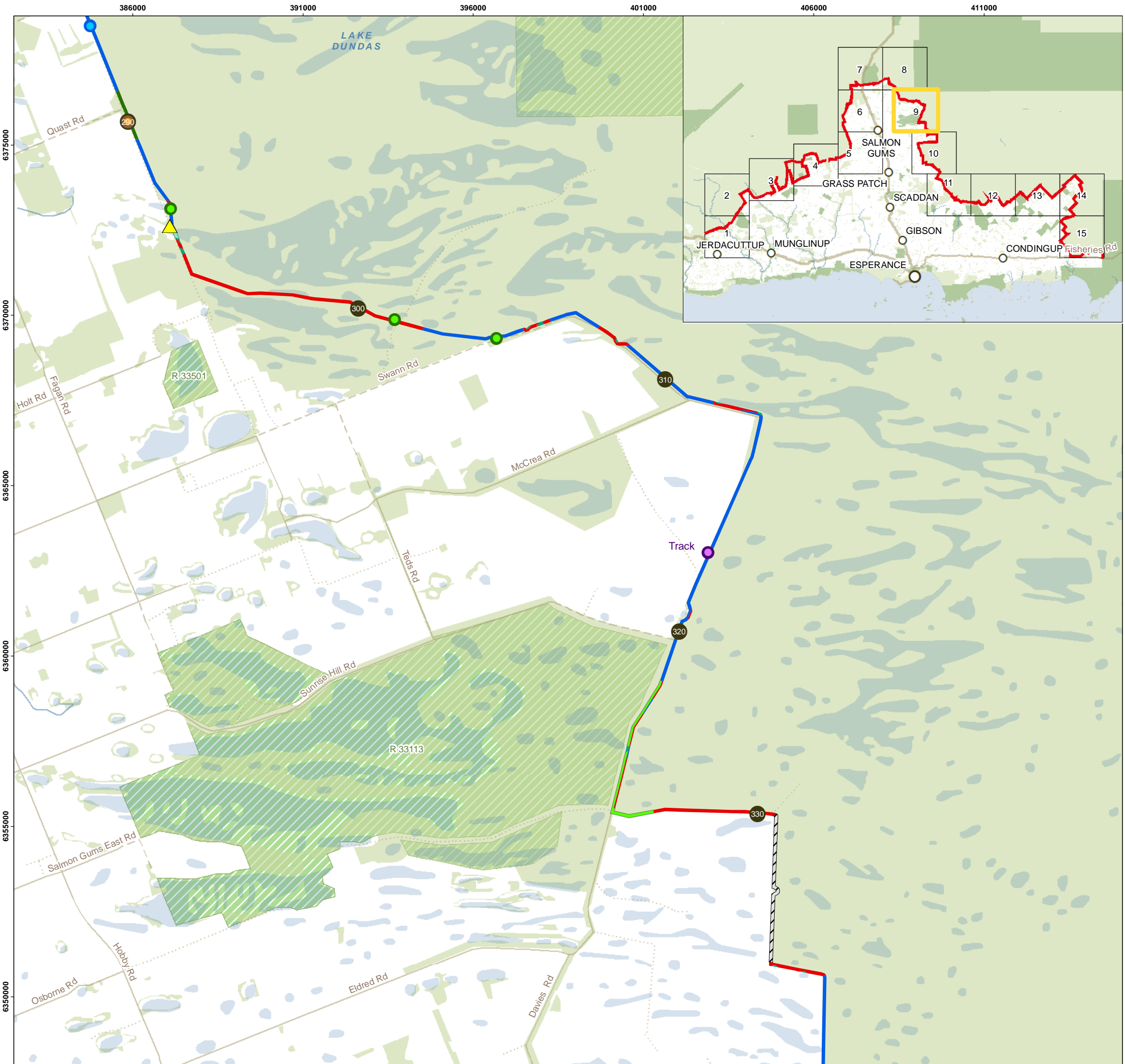
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 8



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- Crested Bellbird
- Mallee Fowl
- Rainbow Bee-eater
- White Browed Babbler
- ▲ Western Quoll / Chuditch
- Fauna Habitat Types**
- Forest
- Woodland
- Mallee woodland
- Shrubland
- Salt Lake/Fringe
- Salt Lake
- Degraded



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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

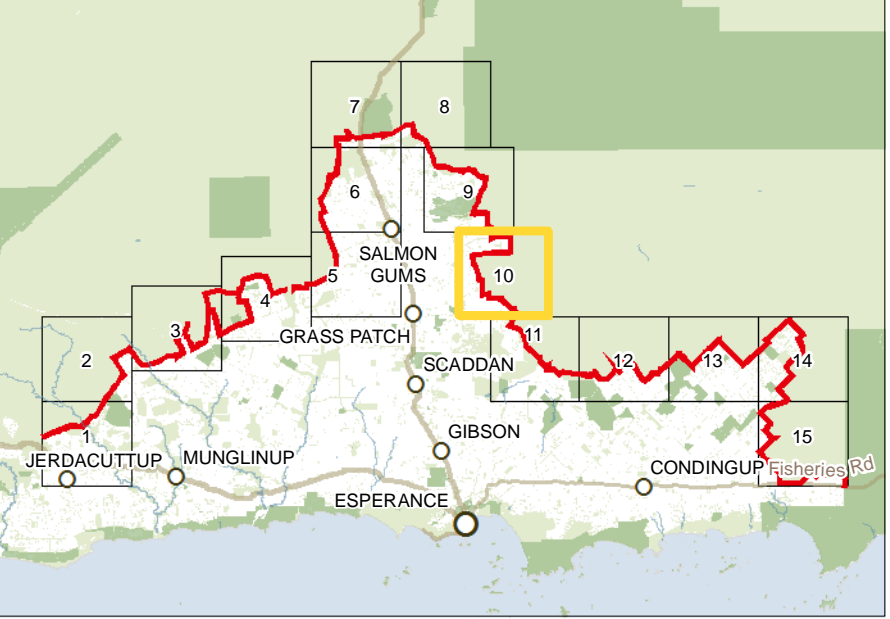
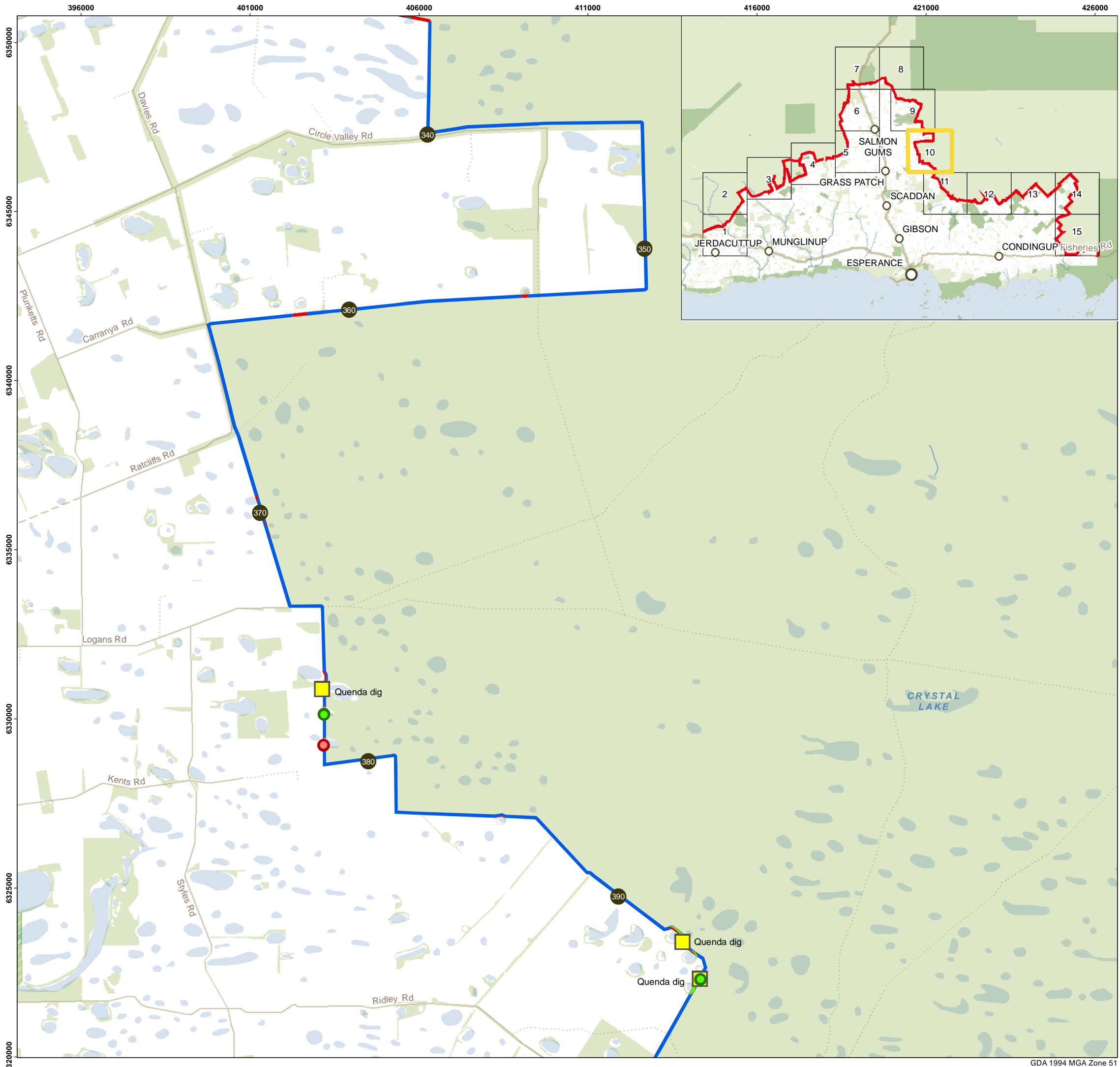
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 9



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

Conservation Significant Fauna Observations

- Rainbow Bee-eater
- Western Rosella
- Quenda

Fauna Habitat Types

- Woodland
- Mallee woodland
- Shrubland
- Salt Lake/Fringe
- Salt Lake

ecoscape

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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

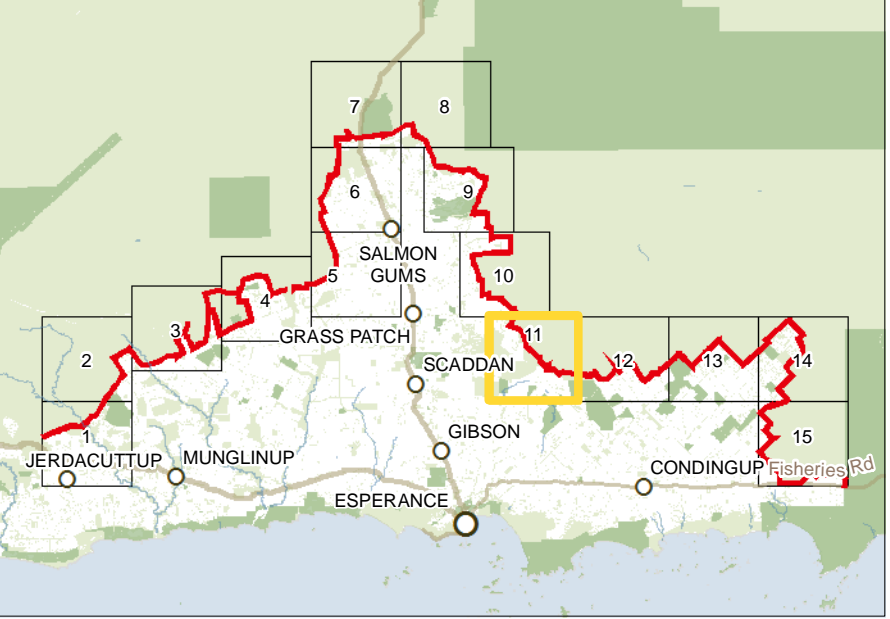
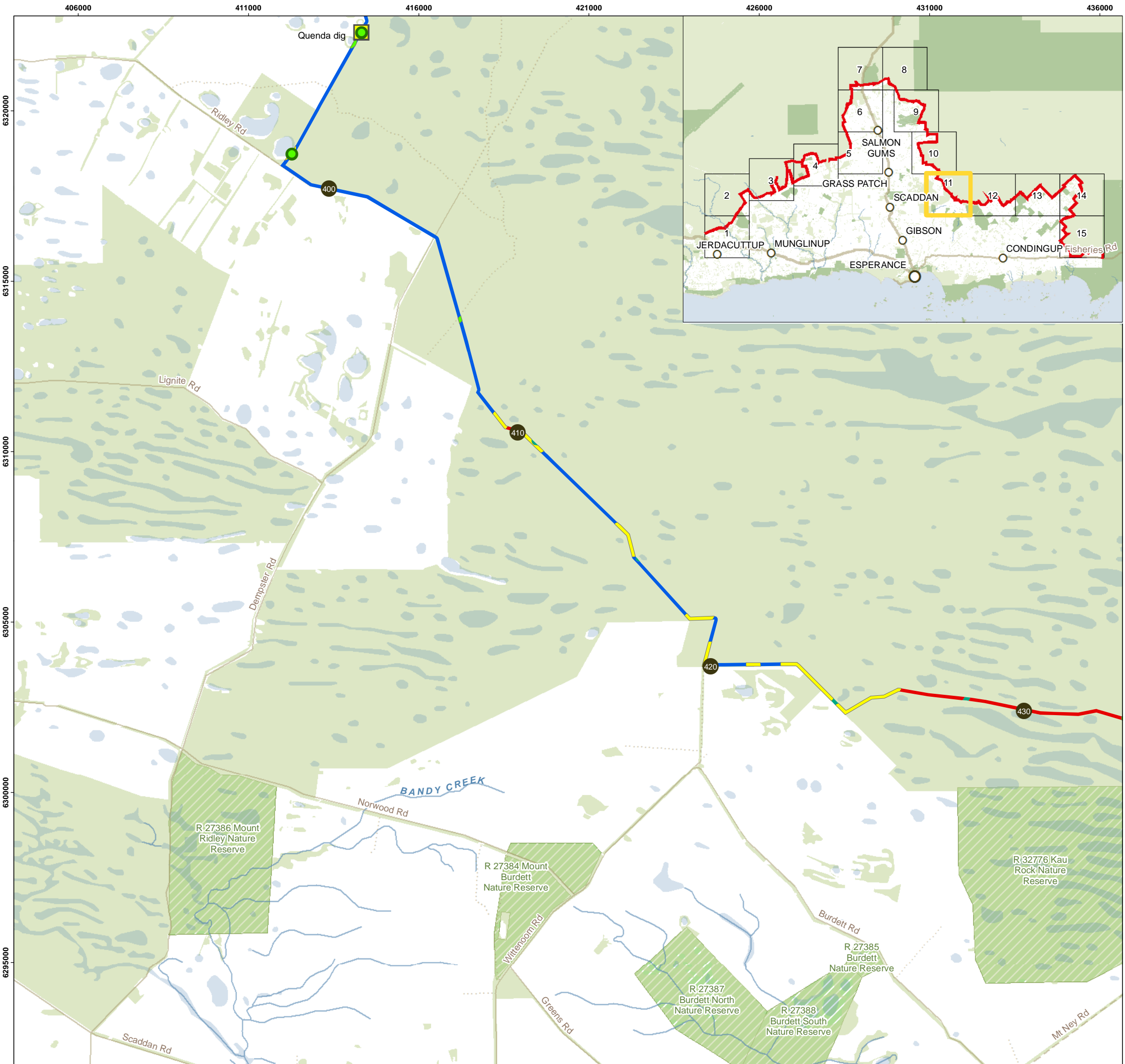
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 10



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

Conservation Significant Fauna Observations

- Rainbow Bee-eater
- Quenda

Fauna Habitat Types

- Woodland
- Mallee woodland
- Mallee shrubland
- Shrubland
- Salt Lake/Fringe

ecoscape

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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

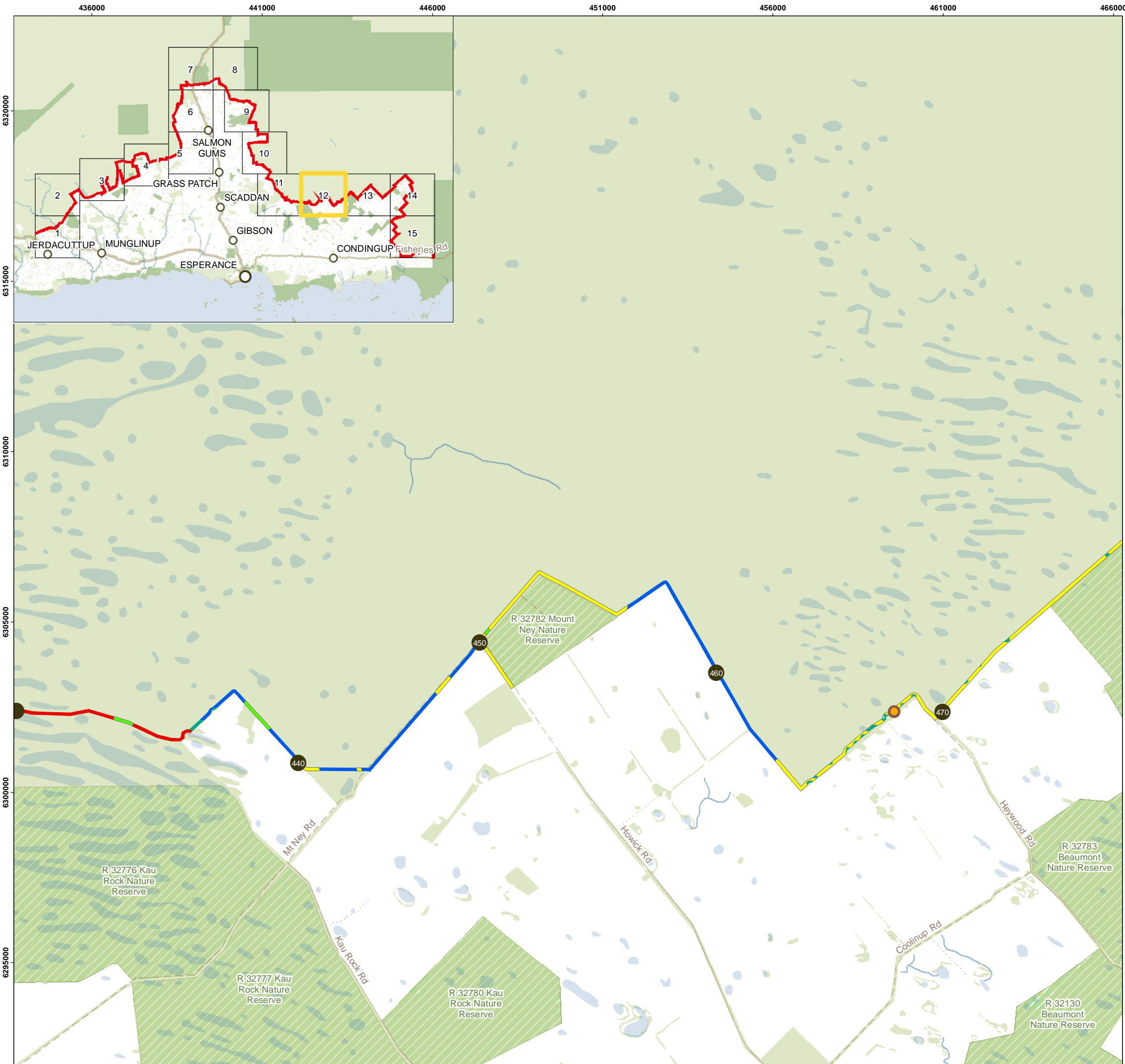
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 11



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
 - Local Road
 - - - Unsealed Road
 - ⋯ Vehicle Track
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- White Browed Babbler
- Fauna Habitat Types**
- Woodland
 - Mallee woodland
 - Mallee shrubland
 - Shrubland
 - Salt Lake/Fringe
 - Salt Lake



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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

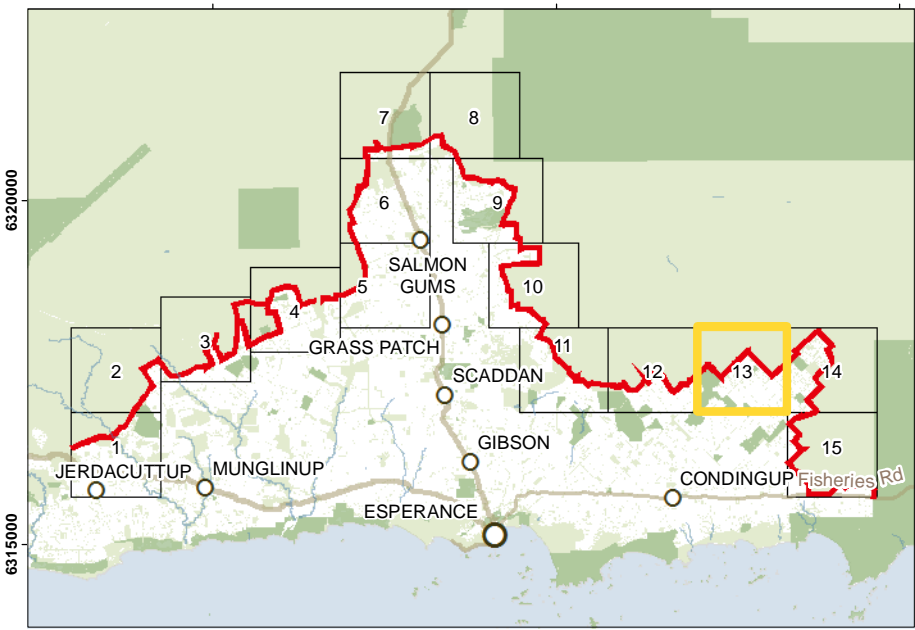
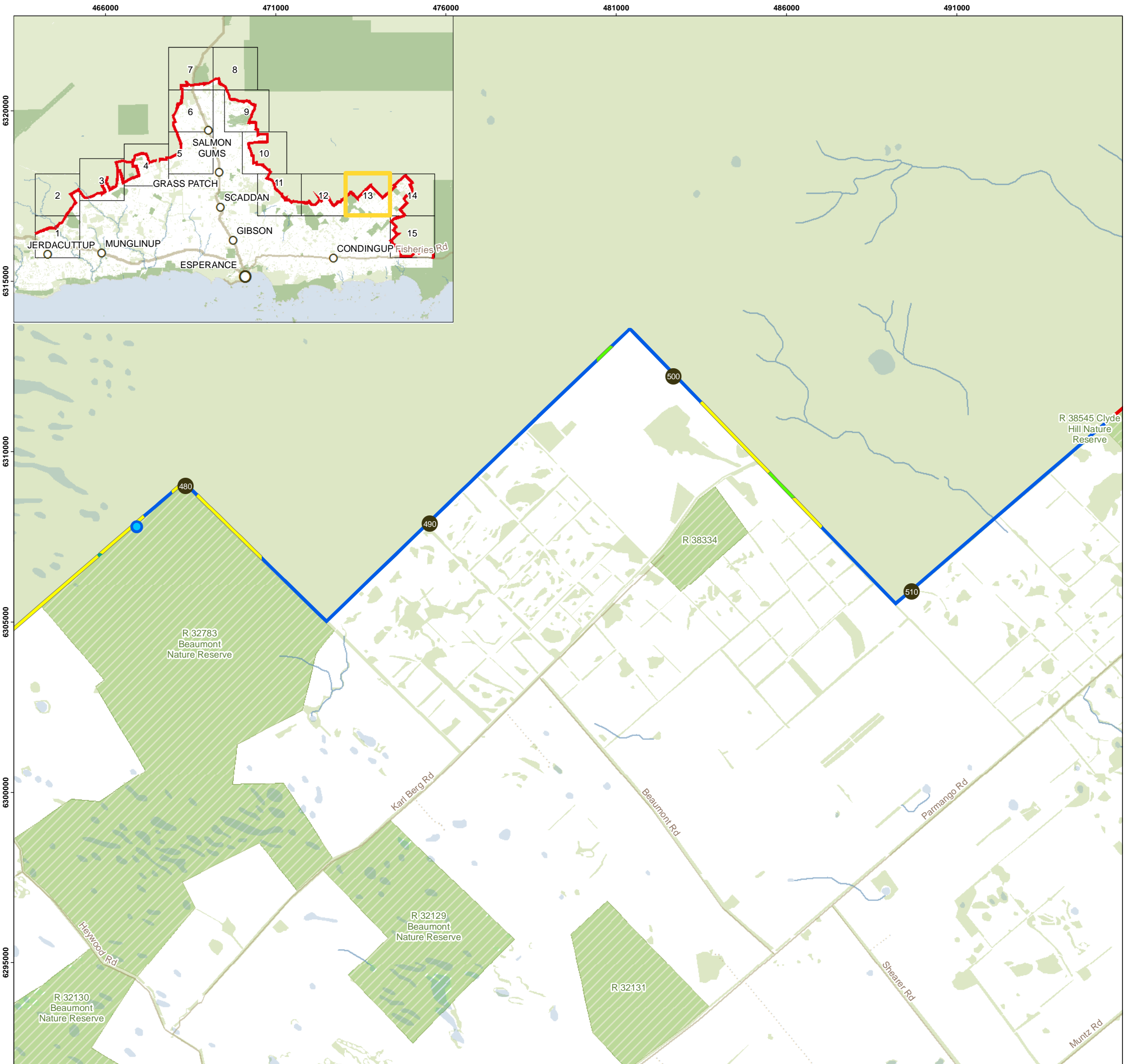
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 12



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
- Local Road
- - - Unsealed Road
- ⋯ Vehicle Track
- Watercourses
- Lakes
- Native Vegetation Extent (DAFWA 2012)
- DPaW Managed Lands and Waters (DPaW 2014)

Conservation Significant Fauna Observations

- Crested Bellbird

Fauna Habitat Types

- Woodland
- Mallee woodland
- Mallee shrubland
- Shrubland
- Salt Lake/Fringe



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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

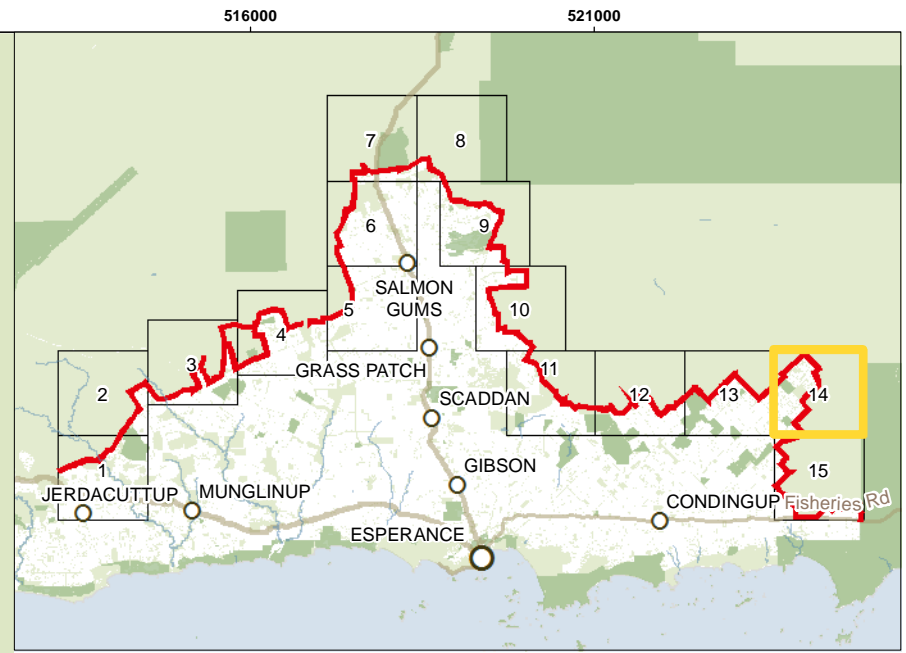
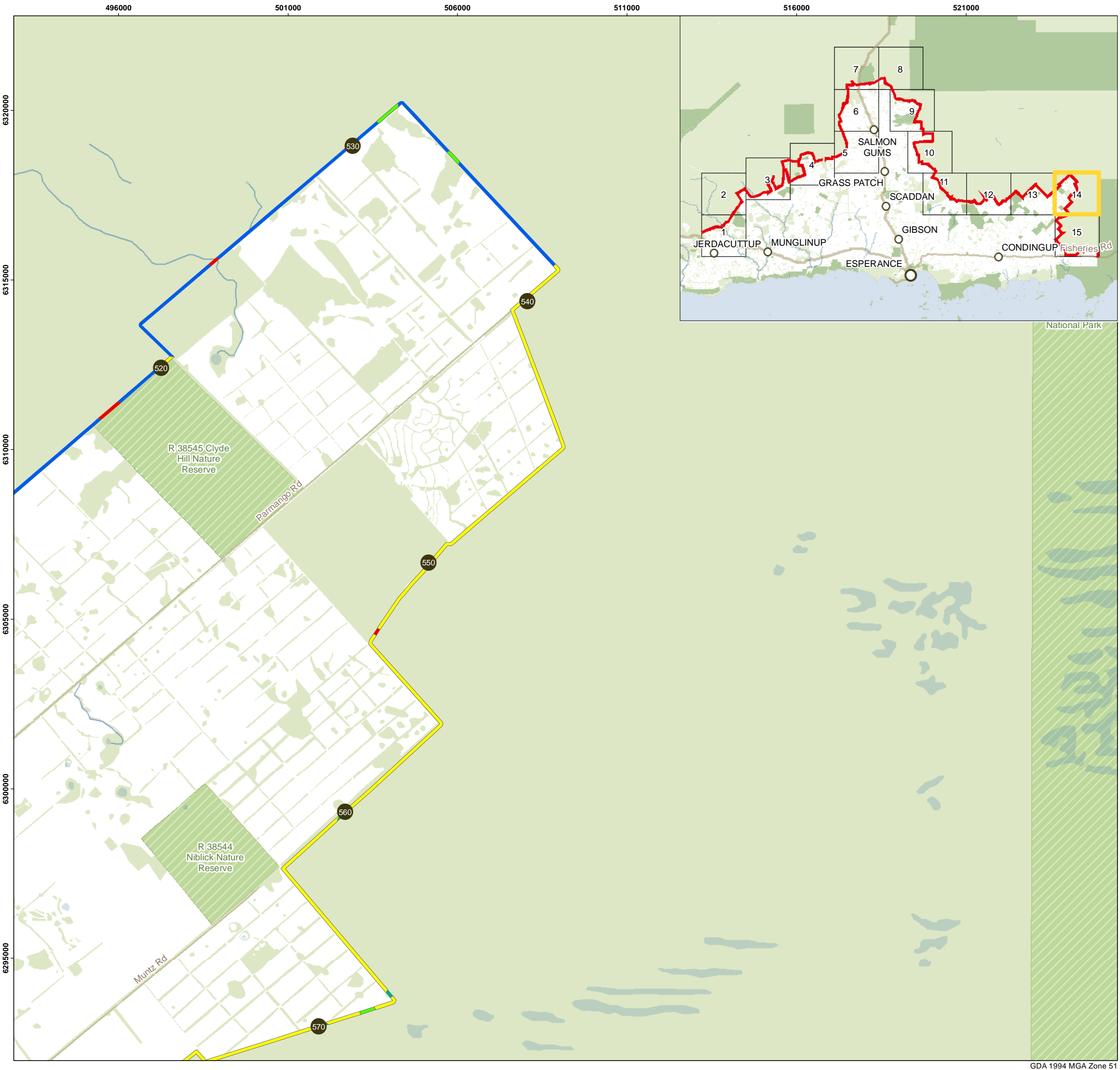
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 13



GDA 1994 MGA Zone 51



- LEGEND**
- 10 km divisions
 - Local Road
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Fauna Habitat Types**
- Woodland
 - Mallee woodland
 - Mallee shrubland
 - Shrubland
 - Salt Lake/Fringe

ecoscape

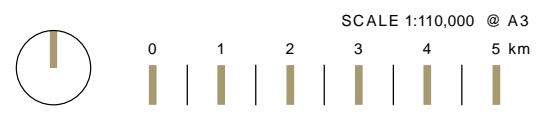
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**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

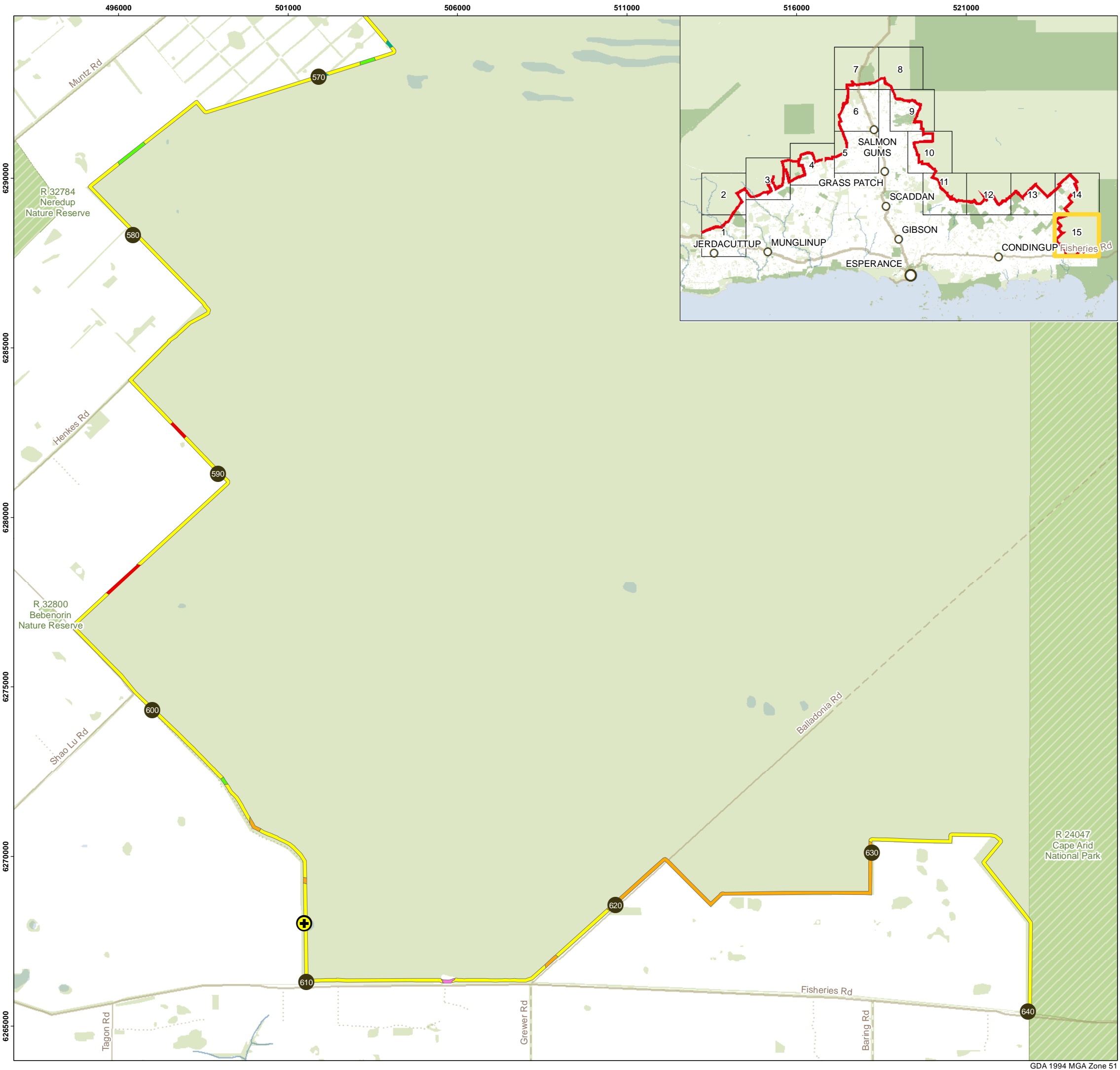
CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 14



GDA 1994 MGA Zone 51



LEGEND

- 10 km divisions
 - Main Road
 - Local Road
 - Unsealed Road
 - Vehicle Track
 - Watercourses
 - Lakes
 - Native Vegetation Extent (DAFWA 2012)
 - DPaW Managed Lands and Waters (DPaW 2014)
- Conservation Significant Fauna Observations**
- + Western Brush Wallaby
- Fauna Habitat Types**
- Woodland
 - Mallee shrubland
 - Banksia* shrubland
 - Shrubland
 - Salt Lake/Fringe
 - Cleared



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 DATE: FEB-15 PROJECT NO: 3087-13

**STATE BARRIER FENCE ESPERANCE
 EXTENSION BIOLOGICAL SURVEYS**

CLIENT: DAFWA

FAUNA HABITAT TYPES

MAP 4 - 15



GDA 1994 MGA Zone 51

APPENDIX ONE: DEFINITIONS AND CRITERIA

Table 20: *EPBC Act* communities categories

<i>EPBC ACT CATEGORY</i>	<i>DEFINITION</i>
Critically Endangered (CR)	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	If, at that time, it is not critically endangered, and is facing a very high risk of extinction in the wild in the near future.
Vulnerable (VU)	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the medium-term future.

Table 21: DPaW definitions and criteria for TECs and PECS (DEC 2010c)

CRITERIA	DEFINITION
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <ul style="list-style-type: none"> A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B. All occurrences recorded within the last 50 years have since been destroyed
Critically Endangered (CR)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <ul style="list-style-type: none"> A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): <ul style="list-style-type: none"> i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): <ul style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

CRITERIA	DEFINITION
Endangered (EN)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ol style="list-style-type: none"> i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii. modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ol style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. <p>C. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
Vulnerable (VU)	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p>

CRITERIA	DEFINITION
Priority Ecological Communities	
Priority One	<p><i>Poorly known ecological communities</i></p> <p>Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
Priority Two	<p><i>Poorly known ecological communities</i></p> <p>Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and / or are not well defined, and appear to be under threat from known threatening processes.</p>
Priority Three	<p><i>Poorly known ecological communities</i></p> <ul style="list-style-type: none"> i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or; ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.</p>
Priority Four	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <ul style="list-style-type: none"> i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority Five	<p><i>Conservation Dependent Ecological Communities</i></p> <p>Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

Table 22: EPBC Act 1999 categories for flora and fauna (Commonwealth of Australia 1999)

EPBC ACT CATEGORY	DEFINITION
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	<p>A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:</p> <p>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</p> <p>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	<p>A native species is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
Vulnerable (VU)	<p>A native species is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.</p>
Conservation Dependent	<p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <p>(i) the species is a species of fish;</p> <p>(ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;</p> <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>

Table 23: DPaW conservation codes for flora and fauna (DPaW 2014)

CONSERVATION CODES FOR WESTERN AUSTRALIAN FLORA AND FAUNA	
T	<p>Threatened species – Listed as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, published under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <ul style="list-style-type: none"> • Fauna that is rare or likely to become extinct are declared to be fauna that is need of special protection • Flora that are extant and considered likely to become extinct, or rare and therefore in need of special protection, are declared to be rare flora <p>Species* which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.</p>
X	<p>Presumed extinct species – Listed as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, published under Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).</p> <p>Species* which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.</p>
IA	<p>Migratory birds protected under an international agreement – Listed as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, listed under Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p> <p>Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), relating to the protection of migratory birds.</p>
S	<p>Other specially protected fauna – Listed as Specially Protected under the <i>Wildlife Conservation Act 1950</i>. Fauna declared to be in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3, are published under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
<p>Threatened Fauna and Flora are ranked according to their level of threat using IUCN Red List categories and criteria. For example: Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) is listed as 'Specially Protected' under the Wildlife Conservation Act 1950, published under Schedule 1, and referred to as a 'Threatened' species with a ranking of 'Endangered'.</p> <p>CR Critically Endangered-considered to be facing an extremely high risk of extinction in the wild. EN Endangered-considered to be facing a very high risk of extinction in the wild. VU Vulnerable-considered to be facing a high risk of extinction in the wild.</p> <p>A list of the current rankings can be downloaded from the Parks and Wildlife Threatened Species and Communities webpage at http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities</p>	
<p>P Priority species</p> <p>Species that may be threatened or near threatened but are data deficient, have not yet been adequately surveyed to be listed under the Schedules of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation dependent species that are subject to a specific conservation program are placed in Priority 5. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.</p>	
P1	<p>Priority One: Poorly-known species</p> <p>Species that are known from one or a few collections or sight records (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road or rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further study.</p>
P2	<p>Priority Two: Poorly-known species</p> <p>Species that are known from one or a few collections (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further study.</p>
P3	<p>Priority Three: Poorly-known species</p> <p>Species that are known from several localities, and the species does not appear to be under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further study.</p>
P4	<p>Priority Four: Rare, Near Threatened and other species in need of monitoring</p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
P5	<p>Priority Five: Conservation Dependent species</p> <p>Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.</p>
<p>*Species includes all taxa (plural of taxon—a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies, variety or forma).</p>	

Table 24: NVIS structural formation terminology, terrestrial vegetation (NHT 2003)

Growth Form	COVER CHARACTERISTICS							
	Foliage cover *	70-100	30-70	10-30	<10	> 0 (scattered)	0-5 (clumped)	unknown
	Cover code	d	c	i	r	bi	bc	unknown
Height Ranges (m)	Structural Formation Classes							
tree, palm	<10,10-30, >30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	tree, palm
tree mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	tree mallee
shrub, cycad, grass-tree, tree-fern	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrub, cycad, grass-tree, tree-fern
mallee shrub	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrub
heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrub
chenopod shrub	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrub
samphire shrub	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrub
hummock grass	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grass
tussock grass	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grass
other grass	<0.5,>0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grass
sedge	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedge
rush	<0.5,>0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rush
herb	<0.5,>0.5	closed herbland	herbland	open herbland	sparse herbland	isolated herbs	isolated clumps of herbs	herb
fern	<1,1-2,>2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	fern
bryophyte	<0.5	closed bryophyte-land	bryophyte-land	open bryophyteland	sparse bryophyteland	isolated bryophytes	isolated clumps of bryophytes	bryophyte
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichen
vine	<10,10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vine

Table 25: NVIS height classes (NHT 2003)

HEIGHT		GROWTH FORM				
Height Class	Height Range (m)	Tree, vine (M & U), palm (single-stemmed)	Shrub, heath shrub, chenopod shrub, ferns, samphire shrub, cycad, tree-fern, grass-tree, palm (multi-stemmed)	Tree mallee, mallee shrub	Tussock grass, hummock grass, other grass, sedge, rush, forbs, vine (G)	Bryophyte, lichen, seagrass, aquatic
8	>30	tall	NA	NA	NA	NA
7	10-30	mid	NA	tall	NA	NA
6	<10	low	NA	mid	NA	NA
5	<3	NA	NA	low	NA	NA
4	>2	NA	tall	NA	tall	NA
3	1-2	NA	mid	NA	tall	NA
2	0.5-1	NA	low	NA	mid	tall
1	<0.5	NA	low	NA	low	low

Source: (based on Walker & Hopkins 1990)

Table 26: Keighery (1994) Bushland Condition Scale

CONDITION	DESCRIPTION
Pristine	No obvious signs of disturbance
Excellent	Vegetation structure intact, disturbance only affecting individual species and weeds are non-aggressive species
Very Good	Vegetation structure altered, obvious signs of disturbance e.g. repeated fires, aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure altered, obvious signs of disturbance. Retains basic vegetation structure or ability to regenerate it. The presence of very aggressive weeds at high density, partial clearing, dieback, logging and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Requires intensive management. The presence of very aggressive weeds at high density, partial clearing, dieback, logging and grazing.
Completely Degraded	Vegetation structure is no longer intact and the area is completely or almost completely without native flora. 'Parkland Cleared'.

APPENDIX TWO: EXISTING ENVIRONMENT

Table 27: DAFWA (2012b) soil-landscape subsystems

UNIT	DESCRIPTION	EXTENT WITHIN STUDY AREA (ha)	PROPORTION OF STUDY AREA (%)
Buraminya 1 Subsystem	Level to very gently undulating plain. Tertiary sediments and aeolian material (local or from interior). Grey non-cracking clays with alkaline grey shallow sandy duplex soils and calcareous loamy earths. Woodland of <i>Eucalyptus oleosa</i> .	108.72	1.71%
Buraminya 2 Subsystem	Gently sloping plain. Tertiary sediments over undulating basement rock of granite and gneiss. Calcareous loamy earths and associated alkaline grey shallow sandy duplex soils. Mallee shrubland and woodland <i>E. ? redunca</i> & <i>E. uncinata</i> .	346.04	5.46%
Buraminya 7 Subsystem	Level to gently undulating plain. Weathered Tertiary sediments & granite and gneiss. Alkaline grey shallow sandy duplex soils and Calcareous loamy earth with minor non-cracking grey clays. Mallee woodland of <i>Eucalypts eremophila</i> .	85.43	1.35%
Condingup 1 Subsystem	Gently undulating plain with subdued sandsheets and dunes. Aeolian sands / Pallinup formation. Pale deep sands and associated grey deep sandy duplex soils (some gravelly). Shrubland of <i>Banksia speciosa</i> and associated mallee heath.	24.06	0.38%
Esperance 2 Subsystem	Gravelly yellow mottled duplex soils, (30-80 cm sand over gravel).	83.75	1.32%
Esperance 6 Subsystem	Red-brown to grey brown alluvial sands.	360.23	5.68%
Halbert 1 Subsystem	Gently to undulating plain with many small playas. Lunettes and sand dunes are common on eastern side of lakes. Alkaline grey deep and shallow sandy duplex & associated salt lake soils, pale deep sands and calcareous loamy earths.	1849.86	29.18%
Halbert 2 Subsystem	Large level saline playas with associated lunettes on the eastern edges of lakes. Salt lake soils with associated calcareous loamy earths, pale deep sands and other soils.	15.51	0.24%
Halbert 3 Subsystem	Gently undulating plain. Tertiary sediments with lacustrine sediments in many small lakes. Alkaline grey shallow and deep sandy duplex soils with associated calcareous loamy earths and pale deep sands. Mallee / <i>Melaleuca</i> understorey.	121.76	1.92%
Halbert 4 Subsystem	Gently undulating to undulating plain with few to common small playas. Alkaline grey shallow and deep sand duplex soils with associated calcareous loamy earths, salt lake soils and pale deep sands.	116.14	1.83%
Halbert 5 Subsystem	Plain with many small playas. Lacustrine sediments / weathered Tertiary sediments. Calcareous loamy earths and alkaline grey shallow sandy duplex soils with associated salt lake soils. Mallee of <i>Eucalyptus redunca</i> , <i>E. uncinata</i> & others.	502.05	7.92%
Munglinup 2 Subsystem	Gently undulating plain and rises with occasional gravelly hillocks. Grey deep and shallow sandy duplex (gravelly) soils and duplex sandy gravels, associated pale deep sands some alkaline grey shallow sandy duplex soils.	70.42	1.11%
Ney 1 Subsystem	Moderately inclined to steeply inclined crests and slopes of hills. Proterozoic granite and gneiss and associated colluvium. Bare rock and associated shallow sands. Mostly devoid of vegetation, some broombush shrubland and heath.	4.65	0.07%
Ney 2 Subsystem	Gently inclined to moderately inclined hillslopes. Proterozoic granite and gneiss and associated colluvium. Grey deep sandy duplex soils and pale deep sands with minor shallow gravel and grey non-cracking clays. Heath and shrubland.	6.24	0.10%

UNIT	DESCRIPTION	EXTENT WITHIN STUDY AREA (ha)	PROPORTION OF STUDY AREA (%)
Ney 3 Subsystem	Gently inclined lower slopes of hills and associated rises. Tertiary sediments and colluvium of granite and gneiss over shallow bedrock. Grey deep sand duplex soils and pale deep sands with minor shallow gravel. Mallee heath and shrubland.	15.13	0.24%
Oldfield 1 Subsystem	Undulating rises and plains in places increasing to rolling rises with incised ephemeral streams. Alkaline grey shallow sandy duplex, minor grey shallow sandy duplex, duplex sandy gravels, and reddish brown non-cracking clays.	44.94	0.71%
Oldfield 4 Subsystem	Very gently undulating plain increasing to gently undulating rises near creeklines. Grey shallow sand duplex soils usually alkaline with minor grey shallow loamy duplex soils, reddish brown non-cracking clays and bare rock.	37.80	0.60%
Salmon Gums 1 Subsystem	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.	347.27	5.48%
Salmon Gums 2 Subsystem	Very gently inclined scarp with external drainage via a well developed network of incipient streams. Alkaline grey shallow sandy duplex soils and calcareous loamy earths with minor non-cracking clays and bare rock.	150.35	2.37%
Salmon Gums 4 Subsystem	Gently inclined to moderately inclined slopes and crests of very low relief occurring in upper landscape positions. Alkaline grey shallow sandy duplex soils and duplex sandy gravels.	61.40	0.97%
Scaddan 1 Subsystem	Alkaline solonetzic duplex soils.	581.11	9.17%
Scaddan 2 Subsystem	Alkaline solodic duplex soils.	45.57	0.72%
Scaddan 4 Subsystem	Red alkaline gradational soils.	593.25	9.36%
Scaddan 6 Subsystem	Red-brown uniform siliceous sands.	238.39	3.76%
Scaddan 7 Subsystem	Soil complex, S1 + S4.	130.56	2.06%
Scaddan 8 Subsystem	Soil complex, S2 + S3.	4.69	0.07%
Wittenoom 1 Subsystem	Moderately inclined to steeply inclined crests and slopes of hills. Proterozoic granite and gneiss and associated colluvium. Bare rock and associated stony soils. Mostly devoid of vegetation, some shrubland of broombush and heath.	15.69	0.25%
Wittenoom 2 Subsystem	Hillslopes. Granite & gneiss & colluvium. Alkaline grey shallow sandy and loamy duplex soils with pale deep sands, minor non-cracking clays & shallow gravels. Mallee heath & shrubland. Some woodland of <i>E. occidentalis</i> in damp areas.	218.03	3.44%
Wittenoom 3 Subsystem	Gently inclined lower slopes and plains of hills. Sediments plus shallow colluvium of granite and gneiss. Alkaline grey shallow sandy and loamy duplex soils with pale deep sand, minor shallow gravels. Mallee / <i>Melaleuca</i> .	128.81	2.03%
Young 1 Subsystem	Soil complex dominated by yellow to red solonetzic soils, on sloping valley sides.	9.56	0.15%
TOTAL		6,317.41	99.65

Table 28: Pre-European vegetation associations within the study area (GWA 2013a)

REGION	VEGETATION ASSOCIATION	ORIGINAL EXTENT (ha)	CURRENT EXTENT (ha)	REMAINING (%)
Western Australia	9	240,509.33	235,161.94	97.78
	10	145,676.38	144,162.80	98.96
	47	1,033,054.74	374,835.52	36.28
	125	3,485,786.61	3,146,091.29	90.25
	128	329,836.19	288,767.14	87.55
	482	1,628,465.00	1,612,811.43	99.04
	486	436,130.35	255,973.27	58.69
	512	237,886.07	62,808.96	26.40
	516	607,434.25	334,357.35	55.04
	519	2,333,413.30	1,440,020.80	61.71
	552	33,908.72	31,669.49	93.40
	924	107,607.70	60,765.47	56.47
	925	5152.66	3,804.24	73.83
	1047	220,297.22	187,159.65	84.96
	1413	1,679,917.00	1,286,967.68	76.61
	1516	126,686.61	59,735.88	47.15
	2048	322,219.98	160,965.74	49.96
	3106	52,660.80	51,602.81	97.99
4048	50,400.59	30,091.48	59.70	
4801	58,196.27	6,493.69	11.16	
Mallee IBRA region	9	67.34	60.98	90.55
	10	45,757.23	44,874.15	98.07
	47	66,127.02	31,401.44	47.49
	125	160,327.47	106,426.83	66.38
	128	47,855.06	31,551.62	65.93
	482	341,081.17	325,427.59	95.41
	486	351,116.16	171,015.91	48.71
	512	237,682.29	62,770.20	26.41
	516	288,175.90	114,141.68	39.61
	519	2,100,312.92	1,248,616.50	59.45
	552	13,104.85	11,296.09	86.20
	924	107,510.91	60,668.68	56.43
	925	5,152.66	3,804.24	73.83

REGION	VEGETATION ASSOCIATION	ORIGINAL EXTENT (ha)	CURRENT EXTENT (ha)	REMAINING (%)
	1413	42,067.77	40,331.85	95.87
	1516	125,543.24	59,433.16	47.34
	2048	313,728.20	154,944.50	49.39
Esperance Plains IBRA region	47	959,935.91	340,852.83	35.51
	128	10,827.32	9,158.46	84.59
	516	318,746.72	220,173.05	69.07
	519	73,495.22	39,197.85	53.33
	1047	217,776.70	185,586.86	85.22
	2048	1,180.21	1,098.01	93.03
	4048	39,025.62	19,453.23	49.85
	4801	58,196.27	6,493.69	11.16
Eastern Mallee (MAL1) IBRA subregion	9	67.34	60.98	90.55
	10	45,757.23	44,874.15	98.07
	47	32,336.14	14,092.93	43.58
	125	78,722.68	76,043.23	96.60
	128	17,297.71	15,739.54	90.99
	482	337,519.84	321,866.26	95.36
	486	287,618.45	107,518.20	37.38
	512	236,569.93	61,668.85	26.07
	516	221,063.22	107,607.37	48.68
	519	536,742.32	46,5627.01	86.75
	552	2,748.62	1,462.07	53.19
	924	107,510.91	60,668.68	56.43
	925	5,152.66	3,804.24	73.83
	1413	25,464.44	24,367.62	95.69
1516	125,543.24	59,433.16	47.34	
Western Mallee (MAL2) IBRA subregion	47	33,790.88	17,308.51	51.22
	512	1,112.36	1,101.35	99.01
	519	1,563,570.61	782,989.49	50.08
	2048	313,692.53	154,908.83	49.38
Fitzgerald (ESP1) IBRA subregion	47	546,400.67	278,577.61	50.98
	128	998.66	903.57	90.48
	519	68,889.18	37,115.76	53.88
	2048	1,180.21	1,098.01	93.03

REGION	VEGETATION ASSOCIATION	ORIGINAL EXTENT (ha)	CURRENT EXTENT (ha)	REMAINING (%)
Recherche (ESP2) IBRA subregion	128	9,828.65	8,254.89	83.99
	516	99,708.37	36,681.89	36.79
	1047	217,776.70	185,586.86	85.22
	4048	39,025.62	19,453.23	49.85
	4801	58,196.27	6,493.69	11.16
Shire of Esperance	9	7,397.88	6,816.78	92.15
	10	45,757.23	4,4874.15	98.07
	47	279,332.67	37,511.39	13.43
	125	131,446.23	125,481.67	95.46
	128	28,430.77	24,828.62	87.33
	482	636,190.01	620,536.43	97.54
	486	297,194.26	11,7037.18	39.38
	512	205,408.56	41,373.03	20.14
	516	303,844.57	136,470.67	44.91
	519	626,558.21	556,752.61	88.86
	552	2,748.62	1,462.07	53.19
	924	107,607.70	60,765.47	56.47
	925	5,152.66	3,804.24	73.83
	1047	220,297.22	187,159.65	84.96
	1413	39,663.72	38,566.90	97.23
	1516	126,686.61	59735.88	47.15
	3106	20,635.15	19,733.25	95.63
4048	38,467.47	22,158.76	57.60	
4801	58,196.27	6,493.69	11.16	
Shire of Ravensthorpe	47	328,157.86	149,851.49	45.66
	128	2,098.65	1,648.78	78.56
	512	32,477.51	21,435.93	66.00
	519	239,727.29	15,4940.07	64.63
	2048	5417.59	5,094.98	94.05

APPENDIX THREE: PROTECTED MATTERS SEARCH RESULTS



EPBC Act Protected Matters Report

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

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

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

Report created: 12/12/13 12:56:21

[Summary](#)

[Details](#)

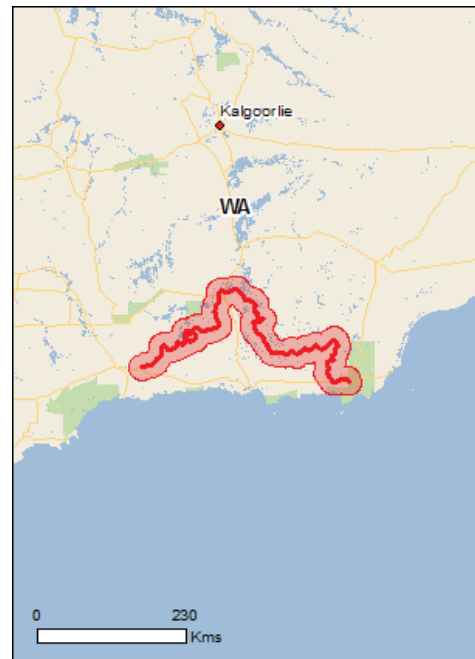
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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[Coordinates](#)

Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	57
Listed Migratory Species:	37

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As [heritage values](#) of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	61
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

Place on the RNE:	11
State and Territory Reserves:	34
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties [\[Resource Information \]](#)

Name	State	Status
Natural		
Fitzgerald River Ravensthorpe Range Area	WA	Nominated place
Great Western Woodlands of Western Australia	WA	Nominated place

Wetlands of International Importance (RAMSAR) [\[Resource Information \]](#)

Name	Proximity
Lake gore	Upstream from Ramsar
Lake warden system	Upstream from Ramsar

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

Name	Status	Type of Presence
Birds		
Acanthiza iredalei iredalei Slender-billed Thornbill (western) [25967]	Vulnerable	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Pezoporus flaviventris Western Ground Parrot, Kyloring [84650]	Critically Endangered	Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Phascogale calura Red-tailed Phascogale [316]	Endangered	Species or species habitat known to occur within area
Plants		
Acacia rhamnophylla Kundip Wattle [64659]	Endangered	Species or species habitat known to occur within area
Anigozanthos bicolor subsp. minor Little Kangaroo Paw, Two-coloured Kangaroo Paw, Small Two-colour Kangaroo Paw [21241]	Endangered	Species or species habitat known to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Centrolepis caespitosa [6393]	Endangered	Species or species habitat may occur within area
Conostylis lepidospermoides Sedge Conostylis [9254]	Endangered	Species or species habitat likely to occur within area
Darwinia oxylepis Gillham's Bell [13188]	Endangered	Species or species habitat may occur within area
Darwinia wittwerorum Wittwer's Mountain Bell [15626]	Endangered	Species or species habitat may occur within area
Daviesia megacalyx Long-sepalled Daviesia [56785]	Endangered	Species or species habitat likely to occur within area
Drummondita longifolia Peak Charles Drummondita [64888]	Vulnerable	Species or species habitat likely to occur within area
Eremophila denticulata subsp. denticulata Fitzgerald Eremophila [64569]	Vulnerable	Species or species habitat likely to occur within area
Eremophila denticulata subsp. trisulcata Cumquat Eremophila [64570]	Endangered	Species or species habitat known to occur within area
Eremophila lactea Milky Emu Bush [2416]	Endangered	Species or species habitat known to occur within area
Eremophila subteretifolia Lake King Eremophila [56702]	Endangered	Species or species habitat may occur within area
Eremophila verticillata Whorled Eremophila [7032]	Endangered	Species or species habitat may occur within area
Eucalyptus merrickiae Goblet Mallee [13119]	Vulnerable	Species or species habitat likely to occur within area
Grevillea involuocrata Lake Varley Grevillea [4631]	Endangered	Species or species habitat likely to occur within area
Kennedia glabrata Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lambertia echinata subsp. echinata Prickly Honeysuckle [56729]	Endangered	Species or species habitat may occur within area
Marianthus mollis Hairy-fruited Billiardiera [82825]	Endangered	Species or species habitat likely to occur within area
Myoporum turbinatum Salt Myoporum [21472]	Endangered	Species or species habitat known to occur within area
Rhizanthella gardneri Underground Orchid, Western Australian Underground Orchid [20109]	Endangered	Species or species habitat likely to occur within area
Ricinocarpos trichophorus Barrens Wedding Bush [19931]	Endangered	Species or species habitat likely to occur within area
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat may occur within area
Thelymitra psammophila Sandplain Sun-orchid [4908]	Vulnerable	Species or species habitat likely to occur within area

Reptiles

Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Sharks

Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pezoporus wallicus flaviventris Western Ground Parrot [26024]	Critically Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area

Other Matters Protected by the EPBC Act

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

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

Name

Commonwealth Land -

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

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

Name	Threatened	Type of Presence
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Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [64471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		within area Species or species habitat likely to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Foraging, feeding or related behaviour likely to occur within area
Pterodroma macroptera Great-winged Petrel [1035]		Breeding likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Roosting known to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area

Mammals

Name	Threatened	Type of Presence
Arctocephalus forsteri New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Reptiles

Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Whales and other Cetaceans

[[Resource Information](#)]

Name	Status	Type of Presence
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Mammals

Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Places on the RNE [[Resource Information](#)]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Dundas Area	WA	Indicative Place
The South Coast Reserves	WA	Indicative Place
Cape Arid National Park and Proposed Extension	WA	Registered
Jerdacuttup River Komatiites	WA	Registered
Peak Charles National Park	WA	Registered
Ravensthorpe Range Area	WA	Registered
Recherche Archipelago	WA	Registered
Indigenous		
Boyatup Art and Occupation Sites	WA	Registered
Mount Ridley Art Site	WA	Registered
Reserve Stone Arrangements	WA	Registered
Historic		
Thomas River Station Homestead (former)	WA	Indicative Place

State and Territory Reserves [[Resource Information](#)]

Name	State
Beaumont	WA
Bebenorin	WA
Burdett	WA
Burdett North	WA
Burdett South	WA
Cape Arid	WA
Cheadanup	WA
Clyde Hill	WA
Dowak	WA
Dundas	WA
Griffiths	WA
Kau Rock	WA
Mount Burdett	WA
Mount Ney	WA
Mount Ridley	WA
Muntz	WA
Neredup	WA
Niblick	WA
Peak Charles	WA
Ravensthorpe Range	WA
Recherche Archipelago	WA
Ridley North	WA
Ridley South	WA
Unnamed WA27177	WA
Unnamed WA32131	WA
Unnamed WA33113	WA
Unnamed WA33501	WA
Unnamed WA35659	WA
Unnamed WA38334	WA

Name	State
Unnamed WA42943	WA
Unnamed WA43060	WA
Unnamed WA43221	WA
Unnamed WA43949	WA
Unnamed WA49742	WA

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax,		Species or species

Name	Status	Type of Presence
Florist's Smilax, Smilax Asparagus [22473]		habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

APPENDIX FOUR: CONSERVATION SIGNIFICANT FLORA DATABASE SEARCH RESULTS

Table 29: Conservation significant flora database search results

1 indicates *PMST* database search result

2 indicates *DPaW* database search result (*DPaW* search reference 48-1013FL)

3 indicates *NatureMap* (*DPaW* 2007-2014) search result

4 indicated *GHD* (2012) scoping study field survey (cf. = unconfirmed identification)

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Acacia amyctica</i>	2, 3	-	P2	Erect, bushy, pungent shrub, 0.7-1.5 m high. Fl. Yellow.	Aug-Sep	Sandy loam or clay. Flats.	Low trees, mallee, shrubland.
<i>Acacia bartlei</i>	2, 3	-	P3	Erect, ± rounded shrubs 1.5–2.5 m tall maturing to trees 4–7(–10) m tall.	Jun-Aug	Waterlogged depressions, brown or grey, sandy loam or clay-loam; may tolerate low to moderate levels of salinity.	Commonly found in association with <i>Eucalyptus occidentalis</i> (Flat topped Yate).
<i>Acacia diaphana</i>	2, 3, 4	-	P1	Bushy shrub, 1.5-3 m high. Fl. yellow.	Sep-Oct	Clay, sandy loam. Wet or waterlogged depressions.	-
<i>Acacia euthyphylla</i>	2, 3, 4 cf.	-	P3	Shrub, 0.7-2 m high. Fl. yellow.	Aug-Sep	Grey/white sand, clay loam. Margins of salt lakes & marshes, seasonal swamps.	Mallee, low woodland, mallee heath, Myrtaceous shrubland.
<i>Acacia glaucissima</i>	2, 3	-	P3	Dense, bushy shrub, 0.3-1.5 m high. Fl. yellow.	Sep-Oct	Sand or clay. Flats, low-lying areas.	Mallee, mallee heath.
<i>Acacia improcera</i>	2, 3	-	P3	Spreading, spiny shrub, 0.15-0.4 m high. Fl. yellow.	Aug-Sep	Sand, loamy clay, clay. Undulating plains, flats.	Mallee, mallee regrowth.
<i>Acacia nitidula</i>	2, 3	-	P2	Spreading shrub, (0.2-)0.6-2(-3) m high. Fl. yellow.	Feb-Oct	Granitic sandy gravelly soils. Amongst granite boulders.	Shrubland, mallee, woodland, coastal heath.
<i>Acacia rhamphophylla</i>	1	EN	T	Low spreading shrub, 0.2-0.4 m high. Fl. yellow.	Aug-Sep	Rocky or sandy clay. Upper slopes of low ranges.	
<i>Acacia singula</i>	2, 3	-	P3	Shrub, 0.35-2 m high. Fl. yellow.	Aug-Oct	Gravelly sand over laterite, white or yellow sand. Rises, hilltops.	Shrubland, woodland, mallee, <i>Allocasuarina acutivalvis</i>

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Acacia truculenta</i>	3	-	P3	Spreading, straggly, prickly shrub, 0.7-2.2 m high. Fl. yellow.	Sep	Sand or loam.	Mallee, woodland, regrowth.
<i>Acrotriche orbicularis</i>	2	-	T	Shrub, 0.6 m high. Fl. green.	Jul-Sep	Loam, clay loam. Slopes, hills, disturbed areas.	Mallee regrowth, woodland.
<i>Adenanthos ileticos</i>	2, 3	-	P4	Diffuse, lignotuberous shrub, 0.7-2(-3) m high. Fl. pink & cream/yellow.	Mar, Jul-Dec	White, yellow or brown sand.	Mallee, shrubland, <i>Banksia media</i> .
<i>Allocasuarina globosa</i>	4 cf.	-	(T)	Dioecious shrub, ca 1.5 m high.		Greenstone, rocky soils, loams, laterite. Hills, ridges, slopes.	Mallee, shrubland, <i>Allocasuarina</i> spp.
<i>Allocasuarina hystricosa</i>	2	-	P4	Dioecious herb, to 3 m high, with erect branchlets with 10-12 leaf teeth per whorl.		Orange, red or brown loam with limestone or granite outcropping. Plains, lower slopes, hilltops.	Mallee, <i>Allocasuarina</i> spp. shrubland.
<i>Angianthus micropodioides</i>	3	-	P3	Erect or decumbent annual, herb, 0.03-0.15 m high. Fl. yellow-white.	Nov-Feb	Saline sandy soils. River edges, saline depressions, claypans.	
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	1, 2	EN	T	Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. Green & red.	Aug-Oct	Sand. Well-watered sites.	Heath, mallee over heath, disturbed areas.
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	2, 3	-	P2	Shrub to 0.8m high.	Oct-Dec	Saline areas, limestone.	Shrub mallee, shrubland.
<i>Cyathostemon</i> sp. Esperance (A. Fairall 2431)	2, 3	-	P1	Erect spreading shrub, to 1.5 m high, to 2.5 m wide. Fl. white.	Sep-Oct	Sandy gravel, sandy clay, loam. Saline depressions, near salt pans, lake margins.	-
<i>Cyathostemon</i> sp. Jyndabinbin Rocks (K.R. Newbey 7689)	2, 3	-	P2	Spreading shrub, 0.3-0.85 m high. Fl. White.	Sep-Jan	Grey sand, granitic sandy loam. Aeolian dunes, flat plains.	Mallee, <i>Acacia</i> or <i>Melaleuca</i> shrubland.
<i>Astroloma</i> sp. Grass Patch (A.J.G. Wilson 110)	2, 3	-	P2	Multi-stemmed, domed shrub, 0.2-0.4 m high. Fl. red.	Jun-Aug	White/grey sand. Edge of salt lakes.	Heathland, low shrubland, mallee.
<i>Astus duomilius</i>	2, 3	-	P1	Shrub.	Oct	Orange sand, somewhat saline. Gentle slope of a lake dune.	Woodland.

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Baeckea</i> sp. Gibson (K.R. Newbey 11084)	2, 3	-	P1	Spreading, erect, mid-dense shrub, to 2 m high. Fl. pink.	Jun, Nov-Dec	Brown sandy loam over laterite & granite. Moderately exposed hills, cleared bushland.	Shrubland, <i>Acacia lasiocalyx</i> , <i>Calothamnus quadrifidus</i> .
<i>Banksia lullfitzii</i>	2, 3	-	P3	Lignotuberous shrub, 0.8-2 m high. Fl. yellow-orange/orange-brown.	Mar-May	Yellow sand. Sandplains.	Shrubland, mallee shrubland, heath.
<i>Banksia xylothemelia</i>	2, 3	-	P3	Often sprawling, lignotuberous shrub, to 1 m high, sometimes suckering. Fl. yellow.	Sep-Oct	Sandy loam, usually over laterite. Sandplains.	Low shrubland, regenerating areas, mallee shrubland
<i>Beyeria cockertonii</i>	2	-	T	Shrub to 0.4 m high. Fl. yellow.	May-Sep	Clay, basalt, komatiite. Slopes.	Mallee heath.
<i>Beyeria villosa</i>	2	-	P4	Erect or spreading shrub to 1.05 m high.	May-Oct	Rocky sandy clay, loam. Hillslopes.	Mallee shrubland, mallee heath.
<i>Boronia baeckeacea</i> subsp. <i>patula</i>	2, 3	-	P1	Slender or straggling shrub, 0.2-1 m high. Fl. pink & white.	Mar-Dec	Clay loam.	Mallee.
<i>Bossiaea flexuosa</i>	2, 3	-	P3	Compact shrub, to 0.6 m high. Fl. yellow-orange-red-brown.	Sep-Nov	Deep sandy soil. Edges of salt lakes.	Shrublands, <i>Melaleuca</i> shrublands, mallee shrublands.
<i>Brachyloma nguba</i>	2, 3	-	P1	Erect, compact to spreading, mid-dense shrub, to 0.8 m high. Fl. red	Apr-May	White to brown sandy clay, shallow sandy loam. Flat plains.	Open mallee woodland, mallee scrub
<i>Caladenia graniticola</i> (previously included in <i>Caladenia hoffmanii</i>)	1	EN	T	Tuberous, perennial, herb, to 0.21 m high, plant usually single flowered. Fl. green-yellow.	Oct	Gritty sandy clay, granite. Near low exposed rock outcrops.	Woodland (<i>Allocasuarina huegeliana</i> , <i>Eucalyptus loxophleba</i> , <i>Leptospermum erubescens</i>).
<i>Chorizema circinale</i>	2, 3	-	P1	Prostrate, scrambling, wiry shrub, to 0.4 m high. Fl. yellow & orange & red.	Sep-Dec	Yellow sand, sandy clay with gravel. Flats, margin of gravel pit.	Shrubland, disturbed areas.
<i>Comesperma calcicola</i>	2, 3	-	P3	Soft perennial, herb, to 0.3 m high. Fl. pink.	Oct-Jan	Calcareous or semi-saline clay loams, limestone. Areas around saline water.	Woodland, mallee, chenopod shrubland.
<i>Commersonia rotundifolia</i>	2, 3	-	P3	Shrub to 1.6 m high, spreading or open. Fl. white, cream.	Aug-Nov	Sandy clay, clay, loam, sand, granite. Slopes.	Mallee. After fire.

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Conostephium marchantiorum</i>	2, 3	-	P3	Erect, much-branched shrub, 0.4-1.8 m high. Fl. red-purple/brown & yellow.	Mar-Nov	White/grey sand. Plains, creeklines, edges of salt lakes.	Mallee, shrubland.
<i>Conostephium uncinatum</i>	2, 3	-	P2	Erect shrub, 0.5-1.4 m high. Fl. green-purple.		Deep sandy soils. Edges of salt lakes, undulating plains, claypans.	Mallee, <i>Melaleuca</i> and <i>Darwinia</i> on edge of salt lakes, <i>Banksia</i> .
<i>Conostylis lepidospermoides</i>	1, 2, 3	EN	T	Rhizomatous, tufted perennial, grass-like or herb, 0.17-0.36 m high. Fl. yellow.	Sep-Oct	Grey or yellow-brown sand over laterite. Flats, slopes.	Mallee, shrubland, heathland.
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	2, 3	-	P3	Mat-forming or upright shrub, 0.1-0.7 m high. Fl. white/cream.	Jan-Oct	Sand, laterite. Sandplain.	Mallee, shrubland, heathland.
<i>Cyathostemon</i> sp. Dowak (J.M. Fox 86/271)	2, 3	-	P1	Rounded, decumbent shrub, to 2 m high. Fl. white.	Oct	Sand. Margins of salt lakes.	Mallee/ <i>Melaleuca</i>
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	2, 3	-	P3	Erect, compact shrub, to 3 m high. Fl. white.	May-Nov	Orange sand, white sand or sandy clay over granite, light brown clay with gypsum, saline soils. Flats, dry river beds, near claypans.	Shrubland, heathland, mallee, <i>Melaleuca</i> .
<i>Dampiera deltoidea</i>	2	-	P4	Erect perennial, herb, 0.12-0.4 m high. Fl. blue.	Sep-Nov	Sand, sandy clay, loam, laterite. Sandplains, around quartzite rocks, slopes.	Mallee, shrubland.
<i>Dampiera orchardii</i>	2, 3	-	P2	Erect perennial, herb, 0.2-0.4 m high.	Sep-Nov	Sand. Margins of salt lakes.	Mallee, <i>Melaleuca</i> .
<i>Dampiera sericantha</i>	2, 3	-	P3	Erect, slender perennial, herb, 0.05-0.3(-0.6) m high, stems with blunt angles. Fl. blue.	May-Dec	Sand, sometimes with gravel. Plains.	Shrubland, heathland.
<i>Darwinia luehmannii</i>	2, 3	-	P2	Dense, spreading shrub, 0.1-0.5 m high. Fl. white & green.	May-Nov	White sand, sandy loam. Flat depressions, base of granite rocks.	Mallee, <i>Banksia media</i> .
<i>Darwinia oxylepis</i>	1	EN	T	Upright, dense shrub, 0.6-1.5 m high. Fl. red.	Aug-Nov	Stony, peaty sand. Rocky gullies.	Mallee heath.
<i>Darwinia polycephala</i>	2, 3, 4cf.	-	P4	Diffuse shrub, 0.1-0.5 m high. Fl. red-purple.	Mar-Sep	Sand, clay. Flats, near salt lakes.	<i>Melaleuca</i> shrubland, mallee.
<i>Darwinia</i> sp. Mt Baring (K.R. Newbey 9775)	2	-	P1	Shrub, ca 0.5 m high. Fl. red.	Aug	White sand. Hill crest.	<i>Eucalyptus tetraptera</i> .

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Darwinia</i> sp. Mt Burdett (N.G. Marchant 80/42)	2, 3	-	P4	Many-stemmed shrub, to 0.5 m high. Fl. red & white.	Mar, Aug	White to cream sand, clay to clay-loam, laterite. Flats, near clay pans & salt lakes, hillcrests, road verges.	Mallee, <i>Melaleuca</i> .
<i>Darwinia</i> sp. Mt Heywood (R. Davis 11066)	2, 3	-	T	Shrub to 1.5 m high, erect, open or compact. Fl. yellow or white, red, cream.	Jun-Sep	Granitic soil. Hills, outcrops.	Shrubland.
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)	2, 3	-	P1	Low, spreading shrub, ca 0.3 m high. Fl. white.	May	White sand. Slight slope.	Shrubland.
<i>Darwinia wittwerorum</i>	1	EN	T	Erect, single-stemmed shrub, 0.3-1 m high. Fl. green/white & pink.	Sep-Dec	Clay loam, sandy clay. Roadsides, slopes.	Mallee heath.
<i>Daviesia megacalyx</i>	1	EN	T	Erect shrub, 0.7-1.6 m high. Fl. yellow/orange & red/brown/pink.	Aug-Sep	Gravelly laterite. Ridges, hillslopes.	Mallee shrubland, mallee heath.
<i>Daviesia newbeyi</i>	2, 3	-	P2	Bushy, multi-stemmed, broom-like shrub, 0.25-1.5 m high. Fl. orange/yellow & red.	Aug-Oct	Sand or sandy clay over granite. Rocky slopes.	Mallee, mallee heath. Burnt areas.
<i>Daviesia pauciflora</i>	2, 3	-	P3	Diffuse, many-stemmed shrub, 0.3-0.8 m high. Fl. yellow & red.	Oct-Jan	White or grey sand over laterite or limestone. Flats.	Shrubland, heathland, <i>Banksia speciosa</i> .
<i>Dicrasyllis archeri</i>	2, 3	-	P1	Erect, spindly shrub, 0.4-1 m high. Fl. cream-white.	Nov-Dec	White sand.	Open mallee woodland.
<i>Drosera salina</i>	2, 3	-	P2	Erect, flexuose tuberous, perennial, herb, to 0.07 m high. Fl. white.	Jul-Sep	White sand. Margins of salt lakes.	Heathland, chenopod shrubland, samphire.
<i>Drummondita longifolia</i>	1	VU	T	Shrub, 0.3-1 m high, well-spaced slender leaves, resinous sepals and branchlets. Fl. red/white/pink.	Apr-Oct	Granitic loam, skeletal sandy loam.	Shrubland; <i>Acacia</i> , <i>Gastrolobium</i> , <i>Calothamnus</i> spp.
<i>Eremophila biserrata</i>	2, 3	-	P4	Prostrate shrub, to 3 m wide. Fl. green/yellow-green.	Sep-Nov, Mar	Sandy or sandy clay soils. Alluvial flats, salt flats & lakes.	<i>Melaleuca</i> shrubland, mallee.
<i>Eremophila chamaephila</i>	2, 3	-	P3	Low, dome-shaped shrub, 0.1-0.25 m high, 0.2-0.8 m wide. Fl. blue-purple.	Nov-Dec	White sand, clay. Sandplains, disturbed road verges, wetlands.	Mallee, <i>Melaleuca</i> shrubland.

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Eremophila compressa</i>	2, 3	-	P3	Erect, often spindly shrub, (0.5-) 0.7-2 m high. Fl. white-cream.	Oct-Dec, Mar	Red brown clay or clay loam, sandy loam. Undulating plains.	Mallee, woodland, shrubland, disturbed areas.
<i>Eremophila denticulata</i> subsp. <i>denticulata</i>	1, 2, 3	VU	T	Erect, open shrub, 0.5-2.5 m high. Fl. pink-orange/yellow-orange-red.	Aug-Feb	Alluvium, sand, sandy clay loam. River beds & plains, laterite breakaways.	Mallee, <i>Eucalyptus occidentalis</i> .
<i>Eremophila denticulata</i> subsp. <i>trisulcata</i>	1	EN	T	Compact shrub, to 2 m high. Fl. pink-orange-red.	May, Sep	Sand or loam over limestone.	Woodland, chenopod shrubland.
<i>Eremophila lactea</i>	1, 2, 3	EN	T	Erect spindly or compact shrub, (0.3-) 0.8-3.5 m high. Fl. blue-purple.	Sep-Nov	White sandy clay loam, calcrete. Open disturbed road verge.	<i>Acacia/Melaleuca</i> shrubland, woodland, mallee.
<i>Eremophila racemosa</i>	2, 3	-	P4	Erect shrub, 0.5-1.7 m high. Fl. purple-pink-red/white.	Mar, Aug-Sep	Sandy or stony loam, clay loam. Undulating plains, roadsides.	Woodland, mallee.
<i>Eremophila serpens</i>	2, 3, 4	-	P4	Prostrate, creeping, forming large patches shrub, 0.03-0.4 m high, forming large patches to 2 m wide. Fl. green/yellow-green.	Sep-Dec, Mar-May	White/grey sand, alluvium, loam. Winter-wet depressions, sub-saline flats, drainage lines, salt lakes.	<i>Melaleuca</i> /chenopod shrubland, sedgeland, woodland, burnt areas.
<i>Eremophila subterretifolia</i>	1, 2, 3	EN	T	Prostrate shrub, 0.04-0.15 m high, to 2.5 m wide. Fl. orange.	Nov-Dec	Grey sand, loam. Edges of salt lakes, sub-saline flats.	<i>Melaleuca</i> shrubland, Salmon Gum woodland.
<i>Eremophila verticillata</i>	1	EN	T	Low spreading shrub, up to 0.8 m high, to 1 m wide. Fl. purple-violet.	Nov-Dec	Clay loam, loam over dolomite. Lake edges.	Woodland, <i>Melaleuca</i> , chenopods.
<i>Eucalyptus creta</i>	2	-	P3	Tree, 3-15 m high, bark smooth. Fl. cream-yellow.	May	Sandy clay or loam. Calcareous plains.	Woodland, <i>Melaleuca</i> .
<i>Eucalyptus dielsii</i> x <i>platypus</i>	2, 3	-	P1	Upright, spreading, moderately dense tree, to 4 m high, bark smooth, light brown.	-	Moderately-drained clay loam. Moderately exposed, almost flat plains, gilgai plains.	<i>Eucalyptus dielsii</i> woodland.
<i>Eucalyptus dolichorhyncha</i>	2, 3	-	P4	Mallee or tree, 1-5 m high. Fl. yellow.	Jan-May	Sandy clay or clay. Flats.	Woodland, mallee, <i>Acacia</i> and <i>Melaleuca</i> spp.
<i>Eucalyptus famelica</i>	2, 3	-	P3	Mallee, 1.5-4 m high, bark smooth. Fl. white.	Apr-Jul	White/grey sand. Wet areas, sometimes slightly brackish.	Woodland, shrubland.
<i>Eucalyptus histophylla</i>	2	-	P3	Mallee, 2-6 m high, bark smooth. Fl. yellow.	Dec	Sandy loam on granite or laterite. Granite outcrops.	Woodland, mallee.

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<i>Eucalyptus litorea</i>	2, 3	-	P2	Mallee, 2-6 m high, bark rough at base, smooth above.		Calcareous sand, sandy clay loam & stones. Leeward of primary dunes, around salt lakes.	Mallee, mallee heath.
<i>Eucalyptus merrickiae</i>	1, 2, 3	VU	T	Mallee, 2-4(-6) m high, bark rough, flaky. Fl. pink/cream-white.	Aug-Nov	Sandy clay, grey sand. Near salt lakes.	<i>Melaleuca</i> , mallee, chenopods.
<i>Eucalyptus misella</i>	2, 3	-	P1	Mallee, 1-3 m high, bark smooth. Fl. cream.	Nov	White, yellow or grey sand. Low-lying sandplains.	Mallee shrubland, mallee heathland, <i>Melaleuca</i> spp.
<i>Eucalyptus purpurata</i>	2	-	T	Tree (mallet), to 10 m high, bark smooth throughout, decorticating in short, long strips, dull light grey over cream. Fl. cream.	Nov	White powdery loam, magnesite. Eastern and north-eastern slopes of ridges.	Woodland, low forest.
<i>Eucalyptus semiglobosa</i>	2, 3	-	P3	Mallee, to 6 m high, bark smooth grey over tan. Fl. cream-white-yellow.	May, Oct-Jan	White sand over laterite, silty sand on edge of granite shelf, limestone. Hillslopes, gullies, cliffs.	Mallee, coastal heath.
<i>Eucalyptus</i> sp. Esperance (M.E. French 1579)	2, 3	-	P1	Mallee, to 5 m high, bark smooth grey over light grey & cream, shedding in ribbons.		Grey sandy loam, red-brown loam, grey-brown calcareous loam. Flats.	Woodland, mallee shrubland.
<i>Eucalyptus stoatei</i>	2, 3	-	P4	Slender tree, 2-7.5 m high, bark smooth. Fl. yellow.	Jul-Feb	Gravelly sand or clay, sandy loam. Flats, rises.	Woodland, mallee heath.
<i>Eutaxia actinophylla</i>	2	-	P3	Shrub, to 0.5 m high. Fl. yellow/red.	Sep-Oct	Red-brown clay loam, red clay loam over granite, gravel. Small depressions.	Woodland, <i>Acacia</i> shrubland.
<i>Eutaxia andocada</i>	2, 3	-	P1	Erect shrub (with sparse ascending branches), 0.2-0.4 m high. Fl. yellow-brown.		White sand or brown sandy-clay over granite.	Shrubland, mallee shrubland.
<i>Frankenia brachyphylla</i>	2, 3	-	P2	Small, decumbent shrub. Fl. white/pink.	Nov	Salt lake margins.	Chenopods.
<i>Frankenia drummondii</i>	2, 3	-	P3	Prostrate shrub. Fl. white.	Oct-Dec	Sand. Lake edges.	Chenopods, <i>Melaleuca</i> spp., woodland.
<i>Frankenia glomerata</i>	2, 3	-	P3	Prostrate shrub. Fl. pink-white.	Nov	White sand.	Samphire, <i>Melaleuca</i> shrubland, mallee.

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<i>Gastrobium involutum</i>	2, 3	-	P1	Erect, spreading shrub, to 3 m high. Fl. orange.	Jun-Nov	Sandy soils over granite. Base of rock outcrops, drainage channels.	<i>Acacia</i> , <i>Melaleuca</i> and <i>Allocasuarina</i> spp. shrublands, <i>Eucalyptus occidentalis</i> woodland.
<i>Gonocarpus pycnostachyus</i>	2, 3	-	P3	Erect annual, herb, 0.1-0.15 m high. Fl. green-red.		Sand or clay soils. Wet depressions, granite rocks.	Shrubland, <i>Banksia media</i> . After fire.
<i>Goodenia laevis</i> subsp. <i>laevis</i>	2, 3	-	P3	Erect, woody shrub (subshrub), 0.1-0.25 m high, largest leaves 15-25 x 1-3 mm, entire. Fl. yellow.	Aug-Dec	Sandy loam or laterite.	Mallee, woodland, <i>Melaleuca</i> shrubland.
<i>Goodenia phillipsiae</i>	2, 3	-	P4	Shrub, ca 0.3 m high. Fl. yellow.	Apr, Nov	Flat, hillslopes. Clay, sandy clay, laterite.	Mallee, mallee heath.
<i>Goodenia turleyae</i>	2, 3	-	P1	Annual, herb, 0.03-0.04 m high. Fl. yellow.	Sep-Nov	White or grey-brown sand over clay, yellow-brown gravelly clay and granite. Moist sheltered areas, near salt lakes.	Samphire, <i>Melaleuca</i> , mallee
<i>Grammosolen</i> sp. Mt Ridley (W.R. Archer 1210911)	2, 3	-	P1	Shrub, to 1 m high.		Sandy soils, salt lake island.	Shrubland.
<i>Grevillea aneura</i>	2, 3	-	P4	Dense, prickly shrub, 0.5-2.8 m high. Fl. red.	Jun-Jan	Sand, sandy clay, gravel, disturbed areas.	Shrubland, mallee shrubland.
<i>Grevillea baxteri</i>	2, 3, 4	-	P4	Erect to spreading shrub, 0.8-3.6 m high. Fl. green-yellow-orange-brown-red.	All year	Sand. Sandplains, disturbed areas.	Low heath, woodland, mallee, Proteaceous heath.
<i>Grevillea fastigiata</i>	2, 3	-	P4	Shrub, 0.9-1.3 m high. Fl. red.	Jan	Red clay, granite.	Mallee.
<i>Grevillea involucrata</i>	1	EN	T	Prostrate to low-domed open shrub, 0.15-0.3 m high, up to 2 m wide. Fl. pink/pink-red.	Jun, Oct	Gravelly sand.	Proteaceous and Myrtaceous heath and shrublands, mallee.
<i>Grevillea punctata</i>	2	-	P3	Shrub, 0.5-2 m high. Fl. red.	Apr-Nov	Stony red loam, red clay.	Mallee, mallee regrowth.

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<i>Gyrostemon ditrigynus</i>	2, 3	-	P4	Shrub, 0.4-1.5 m high.		Sand, sandy clay, loam. Plains, low ironstone ridges.	Woodland, mallee, shrubland. Following fire.
<i>Gyrostemon</i> sp. Ravensthorpe (G. Cockerton & N. Eveleigh 9467)	2	-	P1	Erect shrub to 2.5 m. Fl. orange.		Loam, clay, quartz. Slopes.	Disturbance opportunist. Shrubland, mallee.
<i>Haegiela tatei</i>	3	-	P4	Ascending to erect annual, herb, 0.02-0.08(-0.2) m high. Fl. white-yellow.	Aug-Nov	Clay, sandy loam, gypsum. Saline habitats.	Chenopods, samphire, woodland.
<i>Hakea tuberculata</i>	2	-	No longer listed				
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)	2, 3	-	P2	Low spreading, mid-dense shrub, 0.3-0.4 m high, 0.5-0.6 m wide. Fl. purple-blue.	Sep-Nov	Loamy sand, lateritic sand over limestone or granite. Undulating plains.	Mallee, mallee heath, shrubland. After fire.
<i>Hibbertia abyssa</i>	2	-	T	Erect or sprawling shrub to 1.2 m. Fl. yellow.	Apr-Nov	Loam, laterite, sandstone. Hillslopes, soil stockpile.	Mallee, mallee shrubland. After disturbance.
<i>Hibbertia carinata</i>	2	-	P1	Shrub, to 0.4 m high. Fl. yellow.	Aug-Sep	Well-drained gravelly sand, yellow sand with gravel. Slopes.	Mallee shrubland, <i>Allocasuarina</i> shrubland.
<i>Hibbertia hamata</i>	2, 3, 4	-	P3	Erect shrub, to 0.5 m high. Fl. yellow.	Oct-Dec	Granite. Inland outcrops.	Shrubland, low shrubs.
<i>Hydrocotyle</i> sp. Coraginaensis (K.R. Newbey 7477)	2, 3	-	P2	Low herb 3-7 cm high.	Sep-Nov	Granitic loamy sand on outcrop, salt lake edge.	Melaleuca shrubland.
<i>Hydrocotyle</i> sp. Deciapiens (G.J. Keighery 463)	2, 3	-	P2	Spreading annual herb to 2 cm high.	-	Creek edges, salt lake edges.	Mallee shrubland, chenopods.
<i>Hypocalymma</i> sp. Cascade (R. Bruhn 20896)	2, 3	-	P2	Shrub, 0.4-0.6 m high, crowded, decussate leaves; flowers axillary, 2 cm wide. Fl. pink.	Aug	Sandy loam, granite.	Shrubland, mallee shrubland. Disturbed areas.
<i>Isolepis australiensis</i>	2	-	P3	Annual, grass-like or herb (sedge), 0.03-0.055 m high.	Jun, Sep	Silty sand, sandy clay. Lake margins, pools.	<i>Eucalyptus occidentalis</i> , sedges, low Myrtaceous shrubs.

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<i>Isopogon alcornis</i>	2, 3	-	P3	Low, lignotuberous shrub, 0.3-0.5 m high, up to 0.6 m wide. Fl. yellow/white/pink.	Oct-Feb	Sandy soils, skeletal loam on granite. Sandhills, salt lakes, sandplains.	Mallee shrubland, shrubland, heathland.
<i>Kennedia beckxiana</i>	2, 3	-	P4	Prostrate or twining shrub or climber. Fl. red.	Sep-Dec	Sand, loam. Granite hills & outcrops.	Shrubland, heathland.
<i>Kennedia glabrata</i>	1	VU	T	Prostrate shrub, 0.05-0.5 m high, to 5 m wide. Fl. red.	Aug-Nov	Soil pockets, sandy soils. Granite outcrops.	<i>Taxandria</i> and <i>Agonis</i> shrublands, low shrubland, moss pads.
<i>Kunzea salina</i>	2, 3	-	P3	Spreading or open shrub to 1 m high. Fl. white, pink.	Dec-Jan	Sand. Edge of salt lakes.	<i>Darwinia diosmoides</i> , <i>Melaleuca</i> , mallee.
<i>Kunzea similis</i> subsp. <i>mediterranea</i>	2	-	T	Woody shrub, to 3 m high, with several stiffly erect main stems. Fl. pink.		Grey loamy sand over laterite. Ridge tops.	Mallee, mallee shrubland, Proteaceous heath.
<i>Lambertia echinata</i> subsp. <i>echinata</i>	1	EN	T	Prickly, much-branched, non-lignotuberous shrub, to 1.5 m high. Fl. orange-red-pink.	Sep-Oct	Gravelly sandy loam, brown sandy loam, white-grey sand, granite, laterite. Below & between rock outcrops, slopes, hill crests.	Heath, Proteaceous heath, mallee heath.
<i>Leucopogon apiculatus</i>	2, 3	-	P3	Erect, open-branched shrub, 0.3-2 m high. Fl. white/pink.	Jul-Nov	Skeletal sandy or stony soils over quartzite or granite. Granite outcrops & hills, quartzite ridges, rocky slopes.	Low heath, coastal heath.
<i>Leucopogon florulentus</i>	2, 3	-	P3	Erect slender shrub, 0.3-0.8 m high. Fl. white.	Jun-Nov	White/grey or yellow sand, sandy clay, gravelly lateritic soils. Sandplains, gentle slopes.	Mallee shrubland.
<i>Leucopogon remotus</i>	2, 3	-	P1	Erect shrub to 1 m. Fl. white.	Jun-Oct	Sand, sandy loam, limestone. Plain, slope, near salt lake.	Mallee shrubland, Myrtaceous shrubland, woodland, <i>Banksia</i> shrubland.
<i>Leucopogon rotundifolius</i>	2, 3	-	P3	Robust shrub, (0.2-) 0.5-1.5 m high. Fl. white.	All year	Skeletal soils. Granite outcrops, steep hillslopes.	Thickets, mixed heath, mallee shrubland.

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Leucopogon rugulosus</i>	2, 3	-	P1	Erect shrub to 1 m high. Fl. white.	Jun-Nov	Sandy soil. Sandplain, creeks, lake edges.	Mallee shrubland, low heath.
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)	2, 3, 4	-	P1	Erect shrub, 0.2-0.5 m high. Fl. white.	May-Sep	White/grey sand. Undulating sandplains.	Mallee, mallee heath, heath.
<i>Marianthus mollis</i>	1	EN	P4	Low branching, spreading, silky hairy shrub, to 0.5 m high. Fl. blue.	Aug-Sep	Laterite soils. Hills and ridges.	Mallee shrubland, shrubland.
<i>Melaleuca dempta</i>	2	-	P3	Shrub, (0.2-) 0.6-2(-3) m high. Fl. white-cream.	Aug	Sand, clay. Sandplain, near salt lake.	Mallee, <i>Melaleuca</i> .
<i>Melaleuca eximia</i>	2, 3	-	P2	Erect shrub, 2-3 m high. Fl. red.	Oct-Nov, Jun	Gravelly sand or gravelly clay. Granite outcrops.	
<i>Melaleuca fissurata</i>	2, 3, 4	-	P4	Shrub, 0.5-2(-4) m high. Fl. white/yellow.	Jul-Aug	White/grey sand, sandy loam. Samphire flats, salt pans.	Shrubland, <i>Melaleuca</i> shrubland, Mallee, near samphires.
<i>Melaleuca penicula</i>	2	-	P4	Spreading shrub, 1.8-3 m high. Fl. red.	Jan-Feb	Red/brown loamy sand or red sandy clay. Granite outcrops, valley slopes.	<i>Melaleuca</i> or <i>Allocasuarina</i> shrubland, mallee shrubland.
<i>Melaleuca similis</i>	2, 3	-	P1	Shrub, to 0.6 m high. Fl. pink.	Oct-Nov	Grey sand. Margins of saline drainage lines.	Proteaceous and Myrtaceous shrubland, mallee shrubland.
<i>Melaleuca viminea</i> subsp. <i>appressa</i>	2, 3	-	P2	Spreading shrub, 1.3-4.5 m high. Fl. white-cream.	Sep-Oct	Shallow sand over clay. Near creeks or wet depressions.	Mallee shrubland, <i>Eucalyptus occidentalis</i> .
<i>Microcybe pauciflora</i> subsp. <i>grandis</i>	2	-	P1	Shrub, to 0.6 m high, leaves 14-16 mm long, petals sparsely stellate-hairy. Fl. yellow.		Clay-loam or loam.	Mallee shrubland, <i>Allocasuarina</i> shrubland.
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	2, 3, 4	-	P3	Erect shrub, 0.1-0.4(-1) m high. Fl. white, yellow.	All year	Deep aeolian sand, grey or white sand, white sandy clay. Undulating plains, dunes, hill crests.	Mallee, mallee heath.


SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Mirbelia densiflora</i>	2, 3	-	P3	Erect or straggling shrub, 0.2-1 m high. Fl. yellow-orange.	Oct, Jan	Stony loam, loamy sand. Small ridges, breakaways, undulating plains.	Mallee shrubland, <i>Acacia</i> shrubland. After fire/disturbance.
<i>Myoporum turbinatum</i>	1, 2, 3	EN	T	Erect shrub, 0.5-3 m high. Fl. white.	All year	Sandy soils. In moist areas: along creeks & rivers, near pools, margins of saline depressions.	<i>Melaleuca</i> shrubland, mallee, halophytes.
<i>Myriophyllum petraeum</i>	2, 3	-	P4	Aquatic annual, herb, stems 0.15-0.3 m long. Fl. white.	Aug-Dec	Strictly confined to ephemeral rock pools on granite outcrops.	In water.
<i>Olearia laciniifolia</i>	2, 3	-	P2	Erect, few-stemmed shrub, 0.6-1.2 m high. Fl. blue/purple & white/yellow.	May-Sep	White sand. Around playa lakes.	Mallee, heath, woodland. After fire.
<i>Opercularia rubioides</i>	3	-	P3	Perennial, herb or shrub, 0.04-0.45 m high. Fl. green-cream-white.	Sep-Nov	White/grey sand, gravelly sandy clay, sandy loam. Floodplains, stony hills, flat plains.	Mallee, Myrtaceous and Proteaceous shrubland, <i>Eucalyptus occidentalis</i> .
<i>Paracaleana parvula</i>	2, 3	-	P2	Perennial, herb, to 0.18 m high. Fl. yellow/green.	Oct-Nov	Deep white sands. Plains.	Heath, <i>Banksia</i> woodland, coastal vegetation.
<i>Persoonia baeckeoides</i>	2, 3	-	P1	Erect, spreading shrub, 0.5-1.5 m high. Fl. green-yellow.	Nov-Dec	Gravelly sand, laterite, sandy clay over sandstone. Undulating plains.	Shrubland, mallee shrubland. After fire.
<i>Persoonia cymbifolia</i>	2, 3	-	P3	Erect, spreading shrub, 0.2-0.6(-1) m high. Fl. yellow.	Dec-Jan	Sandy soils. On flats or in rock crevices.	Mallee shrubland, Proteaceous heath, <i>Melaleuca</i> shrubland.
<i>Persoonia scabra</i>	2, 3	-	P3	Erect, spreading, lignotuberous shrub, 0.3-0.9 m high. Fl. yellow.	Nov-Jan	White sand or sandy loam.	Shrubland, mallee shrubland, heath.
<i>Persoonia spathulata</i>	2, 3	-	P2	Erect, spreading shrub, 0.2-0.6 m high. Fl. yellow.	Dec-Jan	Sand.	Low heath, mallee, <i>Banksia</i> .
<i>Philothea apiculata</i>	2	-	P2	Erect shrub, 0.5-1.5 m high. Fl. white-pink.	Aug-Nov	Stony clay loam. Rocky outcrops, hillsides.	Woodland, <i>Atriplex</i> , <i>Melaleuca</i> .


SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Philotheca gardneri</i> subsp. <i>globosa</i>	2, 3, 4 cf.	-	P1	Rounded shrub, 0.25-0.5 m high. Fl. white.	May-Jul	Sandy soils.	Heathland, woodland, mallee shrubland, <i>Callitris</i> , <i>Melaleuca</i> .
<i>Pimelea halophila</i>	2, 3	-	P2	Dwarf, cushion-like shrub, 0.015-0.15 m high. Fl. white-cream.	Aug-Oct	White/grey sand. Salt lake.	Halophytes, samphire, <i>Melaleuca</i> .
<i>Pimelea pelinos</i>	2, 3	-	P1	Erect, straggly shrub, 0.3-0.6 m high. Fl. cream.	Jun-Jul	Sandy clay. Salt lakes.	Shrubland, <i>Melaleuca</i> , <i>Darwinia</i> .
<i>Pityrodia chrysocalyx</i>	2, 3	-	P3	Erect, branched shrub, 0.3-0.75(-1) m high. Fl. white.	Aug-Oct	Sandy soils. Edge of salt lake.	Mallee shrubland, heathland. Disturbed areas.
<i>Prostanthera carrickiana</i>	2, 3	-	P4	Erect shrub, to 1 m high. Fl. pink-red.	Apr-Jul	Sandy clay soils. Granite outcrops.	Heath, mallee.
<i>Pterostylis</i> sp. Ongerup (K.R. Newbey 4874)	2, 3	-	P4	Upright annual, herb, to 0.12 m high.	Sep-Oct	Stony red loamy clay, calcareous grey sand, spongeolite. Sheltered slopes, base of cliffs and valley floors, in soil pockets.	Mallee.
<i>Pterostylis</i> sp. striped sepal greenhood (G. Brockman GBB355)	2, 3	-	P2	Herb, to 0.08 m high.	Sep-Oct	Clay loam, ironstone, granite. At the base of boulders, broken outcrops.	<i>Allocasuarina</i> , <i>Melaleuca</i> , mallee.
<i>Pultenaea adunca</i>	2, 3	-	P3	Erect, slender shrub, (0.15-) 0.3-1 m high. Fl. yellow & red.	Mar, Sep-Oct	White/grey sand.	Mallee shrubland, mallee heath, shrubland.
<i>Pultenaea brachyphylla</i>	2, 3	-	P2	Erect shrub, to 0.5 m high. Fl. yellow & orange & brown.	Sep-Oct	Pale brown sandy loam, sandy clay, gravel, granite, quartz, laterite. Gently undulating loam.	Shrubland, mallee heath.
<i>Pultenaea calycina</i> subsp. <i>proxena</i>	2	-	P4	Many-branched, compact shrub.	Aug-Nov	Sand, clay, sandy clay or loam, with gravel, over magnesite. Moderate slopes, adjacent to creek beds.	Mallee, mallee shrubland. After disturbance.


SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Pultenaea daena</i>	2, 3	-	P3	Dense, prostrate, domed shrub, to 0.07 m high. Fl. yellow.	Mar, Oct-Dec	White to yellow sand or sandy loam, sandy or loamy clay, gravel, limestone, dolomite, laterite. Gently undulating plains, adjacent to salt lakes, in disturbed areas.	Mallee, <i>Melaleuca</i> shrubland, heathland. Disturbed areas.
<i>Pultenaea wudjariensis</i>	2	-	P1	Erect shrub. Fl. yellow.	Oct-Nov	Gravelly clay. Gently hilly country.	Mallee shrubland, mallee heath.
<i>Rhizanthella gardneri</i>	1, 2, 3	EN	T	Tuberous, perennial, herb, flowers develop under the surface and break through as they mature. Fl. pink-purple.	May-Jul	Sand.	<i>Melaleuca uncinata</i> , mallee.
<i>Ricinocarpus trichophorus</i>	2, 3	EN	T	Erect, openly branching shrub, 0.3-1 m high. Fl. white.	May-Sep	Sandy clay, loam. Breakaways, among sandstone rocks.	Mallee shrubland, <i>Acacia</i> and <i>Melaleuca</i> shrubland.
<i>Roycea pycnophylloides</i>	1	EN	T	Perennial, herb, forming densely branched, silvery mats to 1 m wide.	Sep	Sandy soils, clay. Saline flats.	<i>Melaleuca</i> , halophytes, samphire.
<i>Scaevola archeriana</i>	2, 3	-	P1	Erect, resprouting, multi-stemmed, clonal herb, to 0.45 m high. Fl. white, pale blue, mauve.	Dec-Jan	Sandy and sandy-clay loam soils. Sandplains, road verges, edge of salt lakes.	Low shrubland.
<i>Schoenus benthamii</i>	2	-	P3	Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown.	Oct-Nov	White, grey sand, sandy clay. Winter-wet flats, swamps.	Mallee heathland.
<i>Sphaerolobium validum</i>	2	-	P3	Erect shrub, to 0.9 m high. Fl. yellow & red.	Sep-Oct	White-grey sand, red-brown clayey sand, laterite gravel and quartz pebbles. Gently undulating areas, flats, roadsides.	Mallee over Proteaceous shrubland, heathland. Disturbed areas.
<i>Spyridium mucronatum</i> subsp. <i>multiflorum</i>	2	-	P2	Erect or spreading shrub, 0.15-0.6 m high. Fl. white-cream-yellow.	Oct-Jan	Gravelly loam or clay.	Mallee heath, mallee shrubland.
<i>Stachystemon vinosus</i>	2, 3	-	P4	Compact shrub, to 0.1 m high. Fl. purple-red/white.	Sep-Nov	Fine loamy sand, stony soils. Sandplains, rock crevices on breakaways.	Mallee shrubland. Disturbed areas.
<i>Stylidium pulviniforme</i>	2, 3	-	P3	Caespitose perennial, herb, 0.01-0.05 m high, forming dense flat-topped cushions. Fl. white.	Sep-Nov	White sand. Winter-wet areas.	Low heath, halophytes.

SPECIES	DATABASE	EPBC ACT STATUS	DPaW STATUS	DESCRIPTION	FLOWERING PERIOD	HABITAT	ASSOCIATED VEGETATION
<i>Synaphea platyphylla</i>	2	-	P3	Caespitose shrub. Fl. yellow.	Sep-Oct	Sandy loam.	Mallee shrubland. Disturbed areas.
<i>Tecticornia indefessa</i>	2, 3	-	P2	Prostrate, perennial shrub, 0.05-0.15 m high.	-	White to brown-grey sand. Near the edges of salt lakes.	Samphire.
<i>Thelymitra psammophila</i>	1	VU	T	Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow.	Sep-Oct	Sandy clay, loam.	Mallee heath, heathland, <i>Allocasuarina</i> shrubland.
<i>Thysanotus brachyantherus</i>	2, 3	-	P2	Caespitose perennial, herb (with roots becoming tuberous), 0.1-0.4 m high. Fl. purple.	Oct-Dec	Clay, loam, granite. Saline flats, gilgai flats.	Woodland.
<i>Thysanotus parviflorus</i>	2, 3	-	P4	Perennial, herb, 0.1-0.3 m high. Fl. purple.	Oct-Nov	Grey sand. Near salt lake, hills.	Mallee shrubland.
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	2, 3	-	P3	Upright, spreading annual, herb, 0.3-1.5 m high. Fl. blue-white.	Oct-Nov	Sandy soils. Recently disturbed or burnt sites, woodlands, plains.	Woodland, mallee.
<i>Verticordia penicillaris</i>	3	-	P4	Low spreading shrub, 0.15-0.3 m high, to 1 m wide. Fl. cream-yellow.	Sep-Oct	Shallow gritty soils. Granite outcrops.	Not recorded (collected in 1931).
<i>Verticordia verticordina</i>	2, 3	-	P3	Spreading to prostrate shrub, 0.1-0.3 m high. Fl. green/white & red/brown.	Aug-Dec	Sand, clay, granite, limestone.	Heathland, mallee heath, sedgeland.


APPENDIX FIVE: VEGETATION TYPE DESCRIPTIONS


VEGETATION CODE	AcLd
Sites	Q17, R101, R103, R167, R170
Description	<i>Allocasuarina campestris</i> , <i>Melaleuca uncinata</i> and <i>Acacia mimica</i> var. <i>angusta</i> mid shrubland over <i>Lepidosperma drummondii</i> , <i>Platysace effusa</i> and <i>Hibbertia gracilipes</i> low open sedgeland/ shrubland
Other common species	<i>Astus tetragonus</i> , <i>Callitris preissii</i> , <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i> , <i>Calytrix breviseta</i> subsp. <i>stipulosa</i> , <i>Cryptandra myriantha</i> , <i>Dampiera sacculata</i> , <i>Darwinia</i> sp. Mt Ney Virgate (A.S. George 15837), <i>Eucalyptus grossa</i> , <i>E. sp.</i> Fraser Range (D. Nicolle 2157), <i>Gastrolobium discolor</i> , <i>Gompholobium confertum</i> , <i>Laxmannia paleacea</i> , <i>Lepidosperma ?resinosum</i> , <i>Leptospermum incanum</i> , <i>Leucopogon cuneifolius</i> , <i>Levenhookia pusilla</i> , <i>Melaleuca glaberrima</i> , <i>Neurachne alopecuroidea</i> , <i>Philotheca gardneri</i> subsp. <i>gardneri</i> , <i>Platysace effusa</i> , <i>Poranthera microphylla</i> , <i>Schoenus breviculmis</i> , <i>Spartochloa scirpoidea</i> , <i>Stylidium breviscapum</i> , <i>Thryptomene australis</i> subsp. <i>brachyandra</i> , <i>Verticordia eriocephala</i>
Landform	Flat to gently undulating
Soil	Clay loam or loamy sand
Rock type	Granite influenced
Condition	Good to Pristine
Photographs	 <p>R101, Scrub rolled</p> <p>R103, undisturbed</p>


VEGETATION CODE	AfCr
Sites	R158
Description	<i>Acacia fragilis</i> , <i>Grevillea plurijuga</i> and <i>Melaleuca pulchella</i> mid shrubland over <i>Cryptandra recurva</i> low sparse shrubland
Other common species	
Landform	Flat to gently undulating
Soil	Brown loam
Rock type	
Condition	Very Good
Photographs	 <p>R158, scrub rolled</p>


VEGETATION CODE	AsAt
Sites	R028
Description	<i>Acacia singula</i> , <i>Calothamnus quadrifidus</i> and <i>Verticordia chrysantha</i> mid open shrubland over <i>Allocasuarina thuyoides</i> , <i>Melaleuca tuberculata</i> var. <i>macrophylla</i> and <i>Lepidosperma</i> sp. low open shrubland/ sedgeland
Other common species	
Landform	Moderate slope in undulating landscape
Soil	Grey sandy loam
Rock type	?Laterite
Condition	Excellent
Photographs	 <p>R028, scrub rolled</p>


VEGETATION CODE	BaMs
Sites	Q50, R070
Description	<i>Banksia armata</i> var. <i>armata</i> , <i>Melaleuca striata</i> and <i>Grevillea baxteri</i> mid open shrubland over <i>Melaleuca scabra</i> , <i>Xanthorrhoea platyphylla</i> and <i>Lepidosperma</i> sp. low shrubland
Other common species	<i>Allocasuarina humilis</i> , <i>Allocasuarina thuyoides</i> , <i>Amphipogon turbinatus</i> , <i>Anarthria laevis</i> , <i>Beaufortia empetrifolia</i> , <i>Bossiaea preissii</i> , <i>Calothamnus gracilis</i> , <i>Chorizema aciculare</i> subsp. <i>aciculare</i> , <i>Chorizema obtusifolium</i> , <i>Conothamnus aureus</i> , <i>Cryptandra nutans</i> , <i>Cryptandra pungens</i> , <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>Daviesia teretifolia</i> , <i>Drosera menziesii</i> subsp. <i>penicillaris</i> , <i>Eucalyptus extrica</i> , <i>Hakea prostrata</i> , <i>Hibbertia gracilipes</i> , <i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813), <i>Jacksonia venosa</i> , <i>Lepidosperma brunonianum</i> , <i>Leptospermum spinescens</i> , <i>Leucopogon breviflorus</i> , <i>Leucopogon crassifolius</i> , <i>Leucopogon cuneifolius</i> , <i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085), <i>Levenhookia pusilla</i> , <i>Melaleuca scabra</i> , <i>Melaleuca tuberculata</i> var. <i>macrophylla</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Neurachne alopecuroidea</i> , <i>Opercularia vaginata</i> , Orchidaceae sp., <i>Oxymyrrhine gracilis</i> , <i>Petrophile fastigiata</i> , <i>Pimelea angustifolia</i> , <i>Schoenus obtusifolius</i> , <i>Schoenus subflavus</i> subsp. <i>long leaves</i> (K.L. Wilson 2865), <i>Stawellia gymnocephala</i> , <i>Stylidium breviscapum</i> , <i>Synaphea reticulata</i> , <i>Taxandria spathulata</i> , <i>Xanthosia huegelii</i>
Landform	Low sandy rise
Soil	Light grey sand
Rock type	Laterite
Condition	Excellent
Photographs	 <p>R070, scrub rolled</p>


VEGETATION CODE	BpBe
Sites	R062
Description	<i>Banksia pilostylis</i> and <i>Adenanthos cuneatus</i> mid open shrubland over <i>Beaufortia empetrifolia</i> , <i>Hypolaena humilis</i> and <i>Melaleuca scabra</i> low shrubland/ rushland
Other common species	<i>Banksia petiolaris</i> , <i>Eucalyptus extrica</i> , <i>Gahnia trifida</i> , <i>Leucopogon crassifolius</i> , <i>Melaleuca pulchella</i> , <i>M. striata</i>
Landform	Sandplain
Soil	Light grey loamy sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R062, scrub rolled</p>

VEGETATION CODE	BsBeAl
Sites	Q49, R061, R063
Description	<i>Banksia speciosa</i> and <i>Hakea obliqua</i> subsp. <i>obliqua</i> tall shrubland over <i>Beaufortia empetrifolia</i> , <i>Leucopogon crassifolius</i> and <i>Melaleuca striata</i> mid open shrubland over <i>Anarthria laevis</i> , <i>Banksia petiolaris</i> and <i>Stirlingia anethifolia</i> low open rushland/ shrubland
Other common species	<i>Acacia cochlearis</i> , <i>A. nigricans</i> , <i>Adenanthos cuneatus</i> , <i>Allocasuarina humilis</i> , <i>Amphipogon turbinatus</i> , <i>Andersonia parvifolia</i> , <i>Aotus</i> sp. Esperance (P.G. Wilson 7904), <i>Banksia nutans</i> var. <i>nutans</i> , <i>Banksia pilostylis</i> , <i>Banksia pulchella</i> , <i>Bossiaea preissii</i> , <i>Calothamnus gracilis</i> , <i>Calytrix leschenaultii</i> , <i>Caustis dioica</i> , <i>Chamelaucium megalopetalum</i> , <i>Chordifex laxus</i> , <i>Chordifex sphacelatus</i> , <i>Conospermum distichum</i> , <i>Conospermum teretifolium</i> , <i>Cyathochaeta equitans</i> , <i>Dampiera parvifolia</i> , <i>Darwinia vestita</i> , <i>Daviesia apiculata</i> , <i>Gompholobium baxteri</i> , <i>Grevillea baxteri</i> , <i>Hibbertia</i> aff. <i>recurvifolia</i> , <i>Hibbertia gracilipes</i> , <i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813), <i>Isopogon trilobus</i> , <i>Leucopogon carinatus</i> , <i>Lysinema pentapetalum</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Oligarrhena micrantha</i> , <i>Patersonia lanata</i> forma <i>lanata</i> , <i>Petrophile teretifolia</i> , <i>Schoenus brevisetis</i> , <i>Schoenus obtusifolius</i> , <i>Schoenus pleiostemoneus</i> , <i>Synaphea oligantha</i> , <i>Taxandria spathulata</i>
Landform	Sandplain
Soil	Light grey sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R061, scrub rolled</p>


VEGETATION CODE	CqAp
Sites	Q39, Q40
Description	<i>Calothamnus quadrifidus</i> , <i>Acacia assimilis</i> subsp. <i>atroviridis</i> and <i>Grevillea teretifolia</i> mid open shrubland over <i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i> , <i>Cryptandra graniticola</i> , <i>Lepidosperma rigidulum</i> low shrubland/ sedgeland
Other common species	<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i> , <i>Allocasuarina campestris</i> , <i>Amphipogon turbinatus</i> , <i>Astroloma serratifolium</i> , <i>Brachyloma geissoloma</i> , <i>Calytrix leschenaultii</i> , <i>Cassytha glabella</i> , <i>Chorizema aciculare</i> subsp. <i>aciculare</i> , <i>Conostylis argentea</i> , <i>Dampiera lavandulacea</i> , <i>D. sacculata</i> , <i>Daviesia pachyphylla</i> , <i>Dodonaea caespitosa</i> , <i>Goodenia scapigera</i> subsp. <i>scapigera</i> , <i>Grevillea disjuncta</i> , <i>G. nudiflora</i> , <i>Hibbertia pungens</i> , <i>Kunzea affinis</i> , <i>Lepidosperma drummondii</i> , <i>Leptospermum maxwellii</i> , <i>Leucopogon brevicuspis</i> , <i>L. concinnus</i> , <i>L. cuneifolius</i> , <i>L. fimbriatus</i> , <i>L. tamminensis</i> var. <i>australis</i> , <i>Lysinema pentapetalum</i> , <i>Melaleuca eurystoma</i> , <i>M. glaberrima</i> , <i>M. hamata</i> , <i>M. sapientes</i> , <i>M. societatis</i> , <i>Neurachne alopecuroidea</i> , <i>Opercularia vaginata</i> , <i>Petrophile fastigiata</i> , <i>Pimelea imbricata</i> var. <i>piliger</i> , <i>Platysace effusa</i> , <i>Santalum acuminatum</i> , <i>Schoenus breviculmis</i> , <i>Spartochloa scirpoidea</i> , <i>Stylidium dichotomum</i> , <i>Thryptomene australis</i> subsp. <i>brachyandra</i> , <i>Thysanotus ?patersonii</i> , <i>Verticordia acerosa</i> var. <i>preissii</i> , <i>V. chrysantha</i>
Landform	Low rise in undulating landscape
Soil	Clay loam
Rock type	Granite
Condition	Excellent
Photographs	 <p>Q039, scrub rolled</p>


VEGETATION CODE	DcTp
Sites	R071
Description	<i>Dodonaea ceratocarpa</i> , <i>Acacia triptycha</i> , <i>Thryptomene</i> aff. <i>australis</i> mid open shrubland over <i>Trachymene pilosa</i> , <i>*Hypochaeris glabra</i> and <i>*Aira cupaniana</i> low open herbland/ grassland
Other common species	<i>*Ehrharta calycina</i> , <i>Leptospermum incanum</i>
Landform	Sandplain
Soil	Light grey sand
Rock type	Nil
Condition	Very Good
Photographs	 <p>R071, scrub rolled</p>


VEGETATION CODE	DhCc
Sites	Q11, Q12
Description	<i>Duboisia hopwoodii</i> and <i>Rhagodia preissii</i> mid sparse shrubland over <i>Commersonia kraurophylla</i> , <i>Acacia glaucissima</i> and <i>Glischrocaryon aureum</i> low open shrubland/ herbland
Other common species	<i>Acacia enervia</i> subsp. <i>enervia</i> , <i>Alyxia buxifolia</i> , <i>Angianthus tomentosus</i> , <i>Austrostipa hemipogon</i> , <i>A. variabilis</i> , <i>Calandrinia eremaea</i> , <i>Carpobrotus modestus</i> , <i>Chenopodium desertorum</i> subsp. <i>microphyllum</i> , <i>Comesperma calcicola</i> , <i>Coopernookia strophiolata</i> , <i>Cryptandra recurva</i> , <i>Cyathostemon</i> cf. <i>blackettii</i> , <i>Eremophila decipiens</i> subsp. <i>decipiens</i> , <i>Exocarpos aphyllus</i> , <i>Hibbertia psilocarpa</i> , <i>Melaleuca linguiformis</i> , <i>M. thyoides</i> , <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Muehlenbeckia diclina</i> subsp. <i>diclina</i> , <i>Olearia exiguifolia</i> , <i>O. muelleri</i> , <i>Podolepis tepperi</i> , <i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i> , <i>P. seminudus</i> , <i>Rytidosperma setaceum</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena diacantha</i> , <i>Senecio lacustrinus</i> , <i>Solanum hoplopetalum</i> , * <i>Sonchus oleraceus</i> , <i>Vittadinia dissecta</i> , <i>Waitzia suaveolens</i> var. <i>flava</i> , <i>Westringia rigida</i> , <i>Zygophyllum billardierei</i>
Landform	Flat
Soil	Loam or clayey sand
Rock type	?Calcrete
Condition	Good
Photographs	 <p>Q11, scrub rolled</p>


VEGETATION CODE	EaCqLb
Sites	R074
Description	<i>Eucalyptus angulosa</i> mid open woodland over <i>Calothamnus quadrifidus</i> and <i>Banksia media</i> mid open shrubland over <i>Leucopogon breviflorus</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i> and <i>Schoenus subfascicularis</i> low open shrubland/ sedgeland
Other common species	
Landform	Sandplain
Soil	Loamy sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R074, undisturbed (except for fire less than 10 years ago)</p>


VEGETATION CODE	EcCc
Sites	Q31, Q32, Q33
Description	<i>Eucalyptus conglobata</i> low open mallee woodland over <i>Commersonia krauophylla</i> , <i>Acacia glaucissima</i> and <i>Glischrocaryon aureum</i> low open shrubland/ herbland
Other common species	<i>Alyxia buxifolia</i> , <i>Aristida contorta</i> , <i>Austrostipa hemipogon</i> , <i>A. variabilis</i> , <i>Brachyscome ciliaris</i> , <i>Cassytha melantha</i> , <i>Comesperma calcicola</i> , <i>C. integerrimum</i> , <i>Crassula colorata</i> , <i>Cyathostemon</i> cf. <i>ambiguus</i> , <i>Duboisia hopwoodii</i> , <i>Eragrostis dielsii</i> , <i>Eucalyptus</i> sp., <i>Euphorbia</i> sp., <i>Exocarpos aphyllus</i> , <i>Goodenia berardiana</i> , <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Helichrysum leucopsideum</i> , <i>Hibbertia psilocarpa</i> , <i>Hybanthus epacroides</i> , * <i>Hypochaeris glabra</i> , <i>Lobelia cleistogamoides</i> , <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. pauperiflora</i> , <i>M. thyoides</i> , <i>M. undulata</i> , <i>Muehlenbeckia diclina</i> subsp. <i>diclina</i> , <i>Olearia exiguifolia</i> , <i>O. muelleri</i> , <i>Phebalium lepidotum</i> , <i>Pimelea erecta</i> , <i>Podolepis capillaris</i> , <i>P. tepperi</i> , <i>Podotrochea angustifolia</i> , <i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i> , <i>P. humilis</i> , <i>P. spathulatus</i> , <i>Rytidosperma setaceum</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena parviflora</i> , <i>Solanum hoplopetalum</i> , <i>Thelymitra</i> sp., <i>Thysanotus manglesianus</i> , <i>Trachymene cyanopetala</i> , <i>Wahlenbergia preissii</i> , <i>Waitzia suaveolens</i> var. <i>flava</i>
Landform	Flat to gently undulating
Soil	Sandy loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>Q31, scrub rolled</p>



VEGETATION CODE	EcPe
Sites	R141
Description	<i>Eucalyptus conglobata</i> mid mallee shrubland over <i>Pultenaea elachista</i> , <i>Grevillea plurijuga</i> and <i>Westringia rigida</i> low open shrubland
Other common species	<i>Acacia merrallii</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Olearia muelleriana</i> , <i>Santalum acuminatum</i> , <i>Scaevola bursariifolia</i>
Landform	Flat
Soil	Light brown sand
Rock type	Nil
Condition	Very Good
Photographs	 <p>R141, scrub rolled R141, undisturbed</p>


VEGETATION CODE		EdDiMa
Sites	Q21	
Description	<i>Eucalyptus dielsii</i> , <i>Eucalyptus ?calycogona</i> and <i>Eucalyptus uncinata</i> mid woodland/ mallee woodland over <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>Dodonaea stenozyga</i> and <i>Melaleuca teuthoides</i> mid open shrubland over <i>Microcybe albiflora</i> , <i>Spyridium minutum</i> and <i>Westringia rigida</i> low sparse shrubland	
Other common species	<i>Acacia glaucissima</i> , <i>A. hakeoides</i> , <i>A. sulcata</i> var. <i>platyphylla</i> , <i>Baekea latens</i> , <i>Comesperma calymega</i> , <i>Eremophila dichroantha</i> , <i>Exocarpos aphyllus</i> , <i>Goodenia laevis</i> subsp. <i>laevis</i> , <i>Hakea commutata</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia gracilipes</i> , <i>Melaleuca calycina</i> , <i>M. rigidifolia</i> , <i>Pultenaea</i> aff. <i>arida</i> , <i>Wilsonia humilis</i>	
Landform	Flat	
Soil	Brown sandy clay	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="text-align: center;">Q21, undisturbed</p>	


VEGETATION CODE		EdMhLp
Sites	R035	
Description	<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i> and <i>Eucalyptus scyphocalyx</i> mid mallee woodland over <i>Melaleuca hamata</i> and <i>Callitris preissii</i> mid open shrubland over <i>Leptomeria pachyclada</i> , <i>Coleanthera myrtoides</i> and <i>Conostephium drummondii</i> low open shrubland	
Other common species		
Landform	Flat	
Soil	Light grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="display: flex; justify-content: space-around;"> R035, scrub rolled R035, undisturbed </p>	


VEGETATION CODE		EdMhVr
Sites	R136, R057	
Description	<i>Eucalyptus dolichorhyncha</i> , <i>E. perangusta</i> and <i>E. phaenophylla</i> subsp. <i>interjacens</i> low open mallee shrubland over <i>Melaleuca hamata</i> , <i>Aluta appressa</i> and <i>Calothamnus quadrifidus</i> mid shrubland over <i>Verticordia roei</i> subsp. <i>roei</i> , <i>V. chrysantha</i> and <i>Lepidosperma drummondii</i> low open shrubland/ sedgeland	
Other common species	<i>Acacia assimilis</i> subsp. <i>atroviridis</i> , <i>A. multispicata</i> , <i>Allocasuarina campestris</i> , <i>Beaufortia schaueri</i> , <i>Grevillea aneura</i>	
Landform	Flat to gently undulating	
Soil	Light brown sand	
Rock type	Nil	
Condition	Very Good to Excellent	
Photographs	 <p>R057, scrub rolled</p>	


VEGETATION CODE		EdMpLsp
Sites	R048	
Description	<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i> and <i>E. scyphocalyx</i> mid mallee woodland over <i>Melaleuca plumea</i> , <i>M. hamata</i> and <i>M. sapientes</i> mid shrubland over <i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798), <i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085) and <i>Hibbertia</i> sp. low open sedgeland/ shrubland	
Other common species		
Landform	Flat	
Soil	Light grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R048, scrub rolled</p>	


VEGETATION CODE	EdMpOm	
Sites	R122, R124, R129, R135, R151, R177	
Description	<i>Eucalyptus diptera</i> , <i>E. urna</i> and <i>E. eremophila</i> mid woodland over <i>Melaleuca pauperiflora</i> , <i>M. podiocarpa</i> and <i>M. linguiformis</i> mid open shrubland over <i>Olearia muelleri</i> , <i>Scaevola spinescens</i> and <i>Daviesia</i> sp. low sparse shrubland	
Other common species	<i>Acacia crassuloides</i> , <i>Alyxia buxifolia</i> , <i>Austrostipa variabilis</i> , <i>Coopernookia strophiolata</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Eremophila</i> aff. <i>rugosa</i> , <i>E. scoparia</i> , <i>Eucalyptus gracilis</i> , <i>E. kumarlensis</i> , <i>E. quadrans</i> , <i>E. spreta</i> , <i>Exocarpos aphyllus</i> , <i>Halgania cyanea</i> var. <i>cyanea</i> , <i>Hibbertia psilocarpa</i> , <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. hamata</i> , <i>M. johnsonii</i> , <i>M. teuthidoides</i> , <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Santalum acuminatum</i> , <i>Westringia cephalantha</i> var. <i>caterva</i>	
Landform	Flat	
Soil	Loamy sand	
Rock type	Nil	
Condition	Very Good to Pristine	
Photographs		
	R122, scrub rolled	R122, undisturbed

VEGETATION CODE	EdMpRs	
Sites	Q04	
Description	<i>Eucalyptus diptera</i> and <i>E. polita</i> low woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> mid open shrubland over <i>Rhodanthe spicata</i> low open herbland	
Other common species	<i>Angianthus tomentosus</i> , <i>Atriplex</i> sp., <i>Austrostipa hemipogon</i> , <i>Calandrinia eremaea</i> , * <i>Carthamus lanatus</i> , * <i>Centaurea melitensis</i> , * <i>Conyza</i> sp., <i>Crassula colorata</i> , <i>Daucus glochidiatus</i> , <i>Eremophila ionantha</i> , <i>E.</i> sp., <i>Eucalyptus</i> sp., <i>Euchiton sphaericus</i> , * <i>Helichrysum luteoalbum</i> , * <i>Lolium rigidum</i> , * <i>Medicago minima</i> , <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. exuvia</i> , <i>M. teuthidoides</i> , * <i>Onopordum acaulon</i> , <i>Pelargonium drummondii</i> , <i>Podolepis tepperi</i> , <i>Pterostylis roensis</i> , <i>Senecio quadridentatus</i> , <i>Sisymbrium irio</i> , * <i>Sonchus oleraceus</i> , <i>Vittadinia dissecta</i>	
Landform	Open depression	
Soil	Brown moist loam	
Rock type	Nil	
Condition	Good	
Photographs		
	Q04, undisturbed	


VEGETATION CODE	EdMqMm	
Sites	R148, R153, R181, R184	
Description	<i>Eucalyptus delicata</i> , <i>E. urna</i> and <i>E. salmonophloia</i> mid mallee woodland over <i>Melaleuca quadrifaria</i> , <i>M. teuthidoides</i> and <i>M. pauperiflora</i> tall open shrubland over <i>Microcybe multiflora</i> subsp. <i>multiflora</i> and <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> low isolated shrubs	
Other common species	<i>Eucalyptus valens</i>	
Landform	Flat to gently undulating	
Soil	Sand or loam	
Rock type	Nil	
Condition	Very Good to Excellent	
Photographs	 <p style="text-align: center;">R148, undisturbed R181, undisturbed</p>	


VEGETATION CODE	EeAl	
Sites	R066, R076	
Description	<i>Eucalyptus extrica</i> , <i>Grevillea baxteri</i> and <i>Hakea obliqua</i> subsp. <i>obliqua</i> low open mallee shrubland/ shrubland over <i>Anarthria laevis</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> and <i>Banksia repens</i> low sedgeland/ shrubland	
Other common species	<i>Beaufortia empetrifolia</i> , <i>Calothamnus gracilis</i> , <i>Caustis dioica</i> , <i>Conothamnus aureus</i> , <i>Daviesia apiculata</i> , <i>Melaleuca pulchella</i> , <i>M. striata</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>M. tetragona</i> , <i>Xanthorrhoea platyphylla</i>	
Landform	Sandplain	
Soil	Loamy sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="text-align: center;">R076, scrub rolled</p>	



VEGETATION CODE		EeDsDv
Sites	R186, R187	
Description	<i>Eucalyptus extensa</i> , <i>E. spreta</i> and <i>E. diptera</i> mid woodland over <i>Dodonaea stenozyga</i> , <i>Exocarpos aphyllus</i> and <i>Eremophila scoparia</i> mid open shrubland over <i>Pultenaea arida</i> , <i>Diocirea violacea</i> and <i>Halgania andromedifolia</i> low sparse shrubland	
Other common species	<i>Eucalyptus prolixa</i> , <i>Halgania andromedifolia</i> , <i>Santalum acuminatum</i>	
Landform	Upland area of gently undulating landscape	
Soil	Orange to brown sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R187, undisturbed</p>	


VEGETATION CODE		EeEsBi
Sites	R005	
Description	<i>Eucalyptus eremophila</i> , <i>E. flocktoniae</i> subsp. <i>flocktoniae</i> and <i>E. phenax</i> subsp. <i>phenax</i> mid mallee woodland over <i>Exocarpos sparteus</i> and <i>Melaleuca cucullata</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Spyridium cordatum</i> and <i>Pultenaea purpurea</i> low open shrubland.	
Other common species		
Landform	Flat	
Soil	Yellow grey sandy loam	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R005, scrub rolled</p>	


VEGETATION CODE	EeGbMs
Sites	R067, R072, R073, R075
Description	<i>Eucalyptus extrica</i> low sparse mallee shrubland over <i>Grevillea baxteri</i> , <i>Daviesia apiculata</i> and <i>Adenanthos cuneatus</i> mid open shrubland over <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Beaufortia empetrifolia</i> and <i>Calothamnus gracilis</i> low sedgeland/ shrubland
Other common species	<i>Anarthria laevis</i> , <i>Banksia repens</i> , <i>Calytrix decandra</i> , <i>Conothamnus aureus</i> , <i>Eucalyptus angulosa</i> , <i>Hakea cinerea</i> , <i>H. obliqua</i> subsp. <i>obliqua</i> , <i>H. prostrata</i> , <i>Isopogon</i> sp. <i>Fitzgerald River</i> (D.B. Foreman 813), <i>Leptospermum spinescens</i> , <i>L. crassifolius</i> , <i>Melaleuca scabra</i> , <i>M. striata</i> , <i>M. tuberculata</i> var. <i>macrophylla</i> , <i>Petrophile teretifolia</i> , <i>Stirlingia anethifolia</i> , <i>Taxandria spathulata</i>
Landform	Sandplain
Soil	Light grey sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R073, scrub rolled</p>


VEGETATION CODE	EeMeLd
Sites	R055, R126
Description	<i>Eucalyptus eremophila</i> mid open woodland over <i>Melaleuca exuvia</i> , <i>M. thyoides</i> and <i>Cyathostemon</i> cf. <i>ambiguus</i> tall open shrubland over <i>Lepidosperma drummondii</i> , <i>Darwinia</i> sp. <i>Karonie</i> (K. Newbey 8503) and <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> low open sedgeland/ shrubland
Other common species	<i>Aotus</i> sp. <i>Dundas</i> (M.A. Burgman 2835), <i>Leucopogon hamulosus</i> , <i>Lomandra effusa</i> , <i>Melaleuca subalaris</i>
Landform	Associated with salt lakes
Soil	Sand or loamy sand
Rock type	Nil
Condition	Pristine
Photographs	 <p>R126, undisturbed</p>


VEGETATION CODE	EeMhHa
Sites	R050, R131, R137, R155
Description	<i>Eucalyptus eremophila</i> , <i>E. pileata</i> and <i>E. scyphocalyx</i> mid open mallee shrubland over <i>Melaleuca hamata</i> , <i>Grevillea plurijuga</i> and <i>Dodonaea amblyophylla</i> mid open shrubland over <i>Halgania andromedifolia</i> , <i>Cooperhooikia strophiolata</i> low open shrubland
Other common species	<i>Eucalyptus calycogona</i> subsp. <i>calycogona</i> , <i>Hakea commutata</i> , <i>Melaleuca eleuterostachya</i> , <i>M. johnsonii</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. podiocarpa</i> , <i>M. sapientes</i>
Landform	Flat to gently undulating
Soil	Brown loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>R137, scrub rolled</p>


VEGETATION CODE	EeMIOm
Sites	R111, R102, R117, R119, R130, R159, R178, R180, R188, R189, R190
Description	<i>Eucalyptus eremophila</i> , <i>E. leptocalyx</i> and <i>E. valens</i> mid open woodland over <i>Melaleuca linguiformis</i> , <i>M. thyoidea</i> and <i>Alyxia buxifolia</i> mid open shrubland over <i>Olearia muelleri</i> , <i>Scaevola spinescens</i> and <i>Waitzia suaveolens</i> var. <i>flava</i> low open shrubland/ herbland
Other common species	<i>Acacia chrysella</i> , <i>Angianthus tomentosus</i> , <i>Austrostipa variabilis</i> , <i>Bertya virgata</i> , <i>Bossiaea flexuosa</i> , <i>Carpobrotus modestus</i> , <i>Commersonia craurophylla</i> , <i>Cyathostemon</i> cf. <i>ambiguus</i> , <i>C. sp.</i> Salmon Gums (B. Archer 769), <i>Darwinia polycephala</i> , <i>Eucalyptus ?delicata</i> , <i>E. gracilis</i> , <i>E. kumarlensis</i> , <i>E. merrickiae</i> , <i>E. olivina</i> , <i>E. uncinata</i> , <i>Exocarpos aphyllus</i> , <i>Gahnia ancistrophylla</i> , <i>Glischrocaryon flavescens</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia psilocarpa</i> , <i>Lepidosperma drummondii</i> , <i>Leptomeria pachyclada</i> , <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. fissurata</i> , <i>M. lateriflora</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. societatis</i> , <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Micromyrtus elobata</i> subsp. <i>scopula</i> , <i>Podolepis capillaris</i> , <i>Rytidosperma sp.</i> , <i>Westringia rigida</i>
Landform	Flat to gently undulating
Soil	Sand or loam
Rock type	Some calcrete
Condition	Very Good to Pristine
Photographs	  <p>R119, scrub rolled R119, undisturbed</p>


VEGETATION CODE	EeMsGa
Sites	Q42, Q43, R011, R015, R016, R017, R022, R026, R030, R039, R093, R096, R113, R133, R134, R142, R144, R145, R157, R160, R163, R173
Description	<i>Eucalyptus eremophila</i> , <i>E. flocktoniae</i> and <i>E. scyphocalyx</i> low woodland/ mallee woodland over <i>Melaleuca societatis</i> , <i>M. sapientes</i> and <i>M. teuthidoides</i> mid shrubland over <i>Gahnia ancistrophylla</i> , <i>Spyridium minutum</i> and <i>Comesperma spinosum</i> low open sedgeland/ shrubland
Other common species	<i>Acacia binata</i> , <i>A. crassuloides</i> , <i>A. hadrophylla</i> , <i>A. mutabilis</i> subsp. <i>mutabilis</i> , <i>A. octonervia</i> , <i>A. patagiata</i> , <i>A. sorophylla</i> , <i>Alyogyne hakeifolia</i> , <i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412), <i>Baeckea latens</i> , <i>Banksia media</i> , <i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i> , <i>B. inornata</i> subsp. <i>leptophylla</i> , <i>Bossiaea leptacantha</i> , <i>Cooperhooia polygalacea</i> , <i>C. strophiolata</i> , <i>Cyathostemon</i> sp., <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Daviesia campephylla</i> , <i>D. lancifolia</i> , <i>Dillwynia divaricata</i> , <i>Dodonaea bursariifolia</i> , <i>Eucalyptus conglobata</i> , <i>E. cylindriflora</i> , <i>E. extensa</i> , <i>E. leptocalyx</i> , <i>E. luculenta</i> , <i>E.s pileata</i> , <i>E. platypus</i> , <i>E. stoatei</i> , <i>E. suggrandis</i> subsp. <i>suggrandis</i> , <i>E. uncinata</i> , <i>E. urna</i> , <i>Eutaxia lutea</i> , <i>Gahnia aristata</i> , <i>Grevillea huegelii</i> , <i>G. oligantha</i> , <i>G. pectinata</i> , <i>G. plurijuga</i> subsp. <i>plurijuga</i> , <i>Hakea commutata</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia exasperata</i> , <i>H. psilocarpa</i> , <i>Leptomeria pachyclada</i> , <i>Logania stenophylla</i> , <i>Melaleuca bromelioides</i> , <i>M. cucullata</i> , <i>M. glaberrima</i> , <i>M. hamata</i> , <i>M. lateriflora</i> , <i>M. marginata</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. podiocarpa</i> , <i>M. rigidifolia</i> , <i>M. undulata</i> , <i>Microcorys glabra</i> var. <i>glabra</i> , <i>Micromyrtus elobata</i> subsp. <i>scopula</i> , <i>Phebalium obovatum</i> , <i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i> , <i>Pultenaea ?arida</i> , <i>P. spinulosa</i> , <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> , <i>Westringia cephalantha</i> var. <i>caterva</i> , <i>W. dampieri</i> , <i>W. rigida</i>
Landform	Flat to gently undulating
Soil	Sand or sandy loam
Rock type	Nil
Condition	Very Good to Pristine
Photographs	 <p>R026, scrub rolled</p>


VEGETATION CODE	EeMsWc
Sites	R112, R116, R140, R142, R161, R162
Description	<i>Eucalyptus eremophila</i> , <i>E. kessellii</i> and <i>E. flocktoniae</i> mid mallee woodland over <i>Melaleuca sapientes</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Melaleuca teuthidoides</i> mid shrubland over <i>Westringia cephalantha</i> var. <i>caterva</i> , <i>Cooperhookea strophiolata</i> and <i>Olearia muelleri</i> low open shrubland
Other common species	<i>Alyogyne hakeifolia</i> , <i>Eucalyptus conglobata</i> , <i>E. extensa</i> , <i>E. kumarlensis</i> , <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Melaleuca bromelioides</i> , <i>M. glaberrima</i> , <i>M. podiocarpa</i> , <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> ,
Landform	Flat to gently undulating
Soil	Loamy sand
Rock type	Nil
Condition	Very Good to Excellent
Photographs	 <p>R112, scrub rolled</p>


VEGETATION CODE	EePmHh
Sites	R077, R079, R083, R085
Description	<i>Eucalyptus extrica</i> , <i>E. angulosa</i> and <i>E. leptocalyx</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Beaufortia empetrifolia</i> and <i>Melaleuca pulchella</i> mid shrubland over <i>Hypolaena humilis</i> , <i>Acacia crispula</i> and <i>Anarthria laevis</i> low open rushland/ shrubland
Other common species	<i>Banksia media</i> , <i>B. repens</i> , <i>Beaufortia schaueri</i> , <i>Calothamnus gracilis</i> , <i>Conothamnus aureus</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i> , <i>Dampiera lavandulacea</i> , <i>Daviesia apiculata</i> , <i>Eucalyptus uncinata</i> , <i>Gahnia ancistrophylla</i> , <i>Grevillea oligantha</i> , <i>G. pectinata</i> , <i>Hakea cinerea</i> , <i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813), <i>Melaleuca lateriflora</i> , <i>M. scabra</i> , <i>M. societatis</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Micromyrtus elobata</i> subsp. <i>scopula</i> , <i>Neurachne alopecuroidea</i>
Landform	Sandplain
Soil	Loamy sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R079, scrub</p>


VEGETATION CODE		EfEaHsp
Sites	R047	
Description	<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i> , <i>E. eremophila</i> and <i>Eucalyptus pileata</i> mid woodland over <i>Exocarpos aphyllus</i> , <i>Melaleuca johnsonii</i> and <i>M. lateriflora</i> mid open shrubland over <i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B), <i>Pultenaea ?arida</i> and <i>Pomaderris rotundifolia</i> low sparse shrubland	
Other common species	<i>Eucalyptus conglobata</i> , <i>Melaleuca cucullata</i>	
Landform	Flat	
Soil	Light grey brown sandy clay loam	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R047, undisturbed</p>	


VEGETATION CODE		EfMcAc
Sites	R040, R043, R049, R132	
Description	<i>Eucalyptus flocktoniae</i> , <i>E. quadrans</i> and <i>E. extensa</i> mid mallee woodland over <i>Melaleuca cucullata</i> , <i>M. strobophylla</i> and <i>Dodonaea stenozyga</i> tall shrubland over <i>Acacia crassuloides</i> , <i>A. erinacea</i> and <i>Hakea commutata</i> low open shrubland	
Other common species	<i>Acacia binata</i> , <i>Eucalyptus diptera</i> , <i>E. eremophila</i> subsp. <i>eremophila</i> , <i>E. oleosa</i> subsp. <i>cylindroidea</i> , <i>E. platypus</i> , <i>Melaleuca marginata</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. podiocarpa</i>	
Landform	Flat	
Soil	Sandy clay loam	
Rock type	Sometimes quartz	
Condition	Very Good to Excellent	
Photographs	 <p>R049, scrub rolled R040, undisturbed</p>	


VEGETATION CODE	EfMmBi
Sites	R139
Description	<i>Eucalyptus flocktoniae</i> low open mallee shrubland over <i>Melaleuca marginata</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>inornata</i> and <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> low open shrubland
Other common species	
Landform	Upland area of gently undulating landscape
Soil	Light brown loamy sand
Rock type	Nil
Condition	Very Good
Photographs	 <p>R139, undisturbed</p>


VEGETATION CODE	EfMpAc
Sites	R042, R045
Description	<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i> , <i>E. conglobata</i> and <i>E. leptocalyx</i> mid mallee woodland over <i>Melaleuca podocarpa</i> , <i>M. pauperiflora</i> subsp. <i>pauperiflora</i> and <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> mid open shrubland over <i>Acacia crassuloides</i> , <i>A. deficiens</i> and <i>Pomaderris rotundifolia</i> low sparse shrubland
Other common species	
Landform	Flat
Soil	Clay loam or sandy clay
Rock type	Sometimes quartz
Condition	Excellent to Pristine
Photographs	 <p>R042, scrub rolled R042, undisturbed</p>


VEGETATION CODE	EfMsDb
Sites	R098, R107, R108, R154 R175, R176
Description	<i>Eucalyptus forrestiana</i> , <i>E. conglobata</i> and <i>E. flocktoniae</i> low woodland/ mallee woodland over <i>Melaleuca societatis</i> , <i>M. podocarpa</i> and <i>M. bromelioides</i> mid shrubland over <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Spyridium minutum</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low open shrubland
Other common species	<i>Acacia crassuloides</i> , <i>A. sorophylla</i> , <i>Baeckea latens</i> , <i>Comesperma spinosum</i> , <i>Cooperhookea strophiolata</i> , <i>Cyathostemon</i> aff. <i>ambiguus</i> , <i>Eucalyptus dielsii</i> , <i>E. leptocalyx</i> , <i>E. oleosa</i> subsp. <i>cylindroidea</i> , <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Melaleuca cucullata</i> , <i>M. glaberrima</i> , <i>M. rigidifolia</i> , <i>M. teuthidoides</i> , <i>Pultenaea</i> aff. <i>arida</i>
Landform	Flat
Soil	Sand or sandy loam
Rock type	Nil
Condition	Very Good to Pristine
Photographs	 <p>R107, undisturbed</p>


VEGETATION CODE	EgAs
Sites	Q15, Q20, R037, R046
Description	<i>Eucalyptus grossa</i> , <i>Melaleuca uncinata</i> and <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i> mid shrubland over <i>Acacia sulcata</i> var. <i>platyphylla</i> , <i>Lepidosperma drummondii</i> and <i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i> low open shrubland/ sedgeland
Other common species	<i>Acacia evenulosa</i> , <i>Allocasuarina campestris</i> , <i>Aluta appressa</i> , <i>Baeckea latens</i> , <i>Banksia elderiana</i> , <i>Boronia inconspicua</i> , <i>Callitris breviseta</i> subsp. <i>stipulosa</i> , <i>Calytrix breviseta</i> subsp. <i>stipulosa</i> , <i>Cooperhooikia strophiolata</i> , <i>Dampiera</i> sp., <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Dillwynia divaricata</i> , <i>Dodonaea caespitosa</i> , <i>Drummondita hassellii</i> , <i>Eucalyptus conglobata</i> , <i>E. perangusta</i> , <i>Eutaxia lutea</i> , <i>Grevillea aneura</i> , <i>G. oncogyne</i> , <i>Hakea bicornata</i> , <i>H. commutata</i> , <i>H. laurina</i> , <i>H. lissocarpha</i> , <i>Hibbertia gracilipes</i> , <i>Lepidosperma ?resinosum</i> , <i>L. aff. brunonianum</i> , <i>L. sp. Bandalup Scabrid</i> (N. Eveleigh 10798), <i>Leptospermum</i> sp., <i>Leucopogon cuneifolius</i> , <i>L. obtusatus</i> , <i>L. sp. Coujinup</i> (M.A. Burgman 1085), <i>L. sp. Kau Rock</i> (M.A. Burgman 1126), <i>Lysinema pentapetalum</i> , <i>Melaleuca rigidifolia</i> , <i>M. undulata</i> , <i>Mirbelia granitica</i> , <i>Neurachne alopecuroidea</i> , <i>Olx benthamiana</i> , <i>Petrophile fastigiata</i> , <i>Platysace effusa</i> , <i>Pultenaea indira</i> subsp. <i>indira</i> , <i>Rytidosperma setaceum</i> , <i>Schoenus breviculmis</i> , <i>Spyridium minutum</i> , <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> , <i>Verticordia chrysantha</i> , <i>V. eriocephala</i>
Landform	Flat to gently undulating
Soil	Clay loam
Rock type	Sometimes laterite or quartz
Condition	Excellent to Pristine
Photographs	 <p>R037, undisturbed</p>

VEGETATION CODE	EgMqCc
Sites	R125, R127, R146, R152
Description	<i>Eucalyptus gracilis</i> , <i>E. ovularis</i> and <i>E. spreta</i> mid woodland over <i>Melaleuca quadrifaria</i> , <i>M. teuthidoides</i> and <i>M. lanceolata</i> tall open shrubland over <i>Cratystylis conocephala</i> , <i>Atriplex vesicaria</i> and <i>Zygophyllum aurantiacum</i> low open shrubland
Other common species	<i>Boronia inornata</i> subsp. <i>inornata</i> , <i>Eremophila scoparia</i> , <i>Eucalyptus diptera</i> , <i>E. kumarlensis</i> , <i>E. urna</i>
Landform	Flat
Soil	Sand or clay loam
Rock type	Nil
Condition	Excellent to Pristine
Photographs	 <p>R146, scrub rolled</p>


VEGETATION CODE		EgMtBi
Sites	Q29	
Description	<i>Eucalyptus gracilis</i> and <i>E. sp.</i> low open woodland over <i>Melaleuca teuthidoides</i> mid sparse shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Westringia rigida</i> and <i>Acacia merrallii</i> low open shrubland	
Other common species	<i>Austrostipa flavescens</i> , <i>Bossiaea leptacantha</i> , <i>Eremophila dichroantha</i> , <i>Halgania andromedifolia</i> , <i>Leptomeria pachyclada</i> , <i>Olearia muelleri</i> , <i>O. picridifolia</i> , <i>Scaevola bursariifolia</i> , <i>Spyridium minutum</i>	
Landform	Flat	
Soil	Light brown clayey loam	
Rock type	Nil	
Condition	Very Good	
Photographs	 <p style="text-align: center;">Q29, scrub rolled</p>	

VEGETATION CODE		EiAiMe
Sites	R110, R114	
Description	<i>Eucalyptus incrassata</i> and <i>E. uncinata</i> tall mallee woodland over <i>Adenanthos ileticos</i> , <i>Banksia media</i> and <i>Phymatocarpus maxwellii</i> mid open shrubland over <i>Micromyrtus elobata</i> subsp. <i>scopula</i> and <i>Darwinia polycephala</i> low sparse shrubland	
Other common species	<i>Acacia triptycha</i> , <i>Baeckea crassifolia</i> , <i>Beaufortia empetrifolia</i> , <i>Calytrix duplistipulata</i> , <i>Darwinia luehmannii</i> , <i>Hakea cinerea</i> , <i>H. multilineata</i> , <i>Melaleuca plumea</i>	
Landform	Sandplain or gentle sandy rise	
Soil	Sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="text-align: center;">R114, undisturbed</p>	


VEGETATION CODE	EiBsLd
Sites	R020
Description	<i>Eucalyptus incrassata</i> , <i>E. phaenophylla</i> subsp. <i>interjacens</i> and <i>E. uncinata</i> mid open mallee shrubland over <i>Beaufortia schaueri</i> , <i>Calothamnus quadrifidus</i> and <i>Gastrolobium nutans</i> mid shrubland over <i>Lepidosperma drummondii</i> , <i>Conostylis argentea</i> and <i>Schoenus brevisetis</i> low sedgeland/ herbland
Other common species	<i>Allocasuarina campestris</i> , <i>Eucalyptus perangusta</i> , <i>Grevillea aneura</i> , <i>Melaleuca hamata</i>
Landform	Crest of low rise
Soil	Grey sandy loam
Rock type	?Sandstone
Condition	Excellent
Photographs	 <p>R020, undisturbed</p>


VEGETATION CODE	EiMcGa
Sites	R001
Description	<i>Eucalyptus incrassata</i> and <i>E. phaenophylla</i> mid mallee shrubland over <i>Melaleuca calycina</i> , <i>M. societatis</i> and <i>M. johnsonii</i> mid open shrubland over <i>Gahnia ancistrophylla</i> , <i>Daviesia lancifolia</i> and <i>Gahnia aristata</i> low sparse sedgeland/ shrubland
Other common species	
Landform	Flat
Soil	Grey sand
Rock type	Laterite
Condition	Excellent
Photographs	 <p>R001, scrub rolled</p>


VEGETATION CODE	EiMpAc	
Sites	Q44, Q45, R044	
Description	<i>Eucalyptus indurata</i> , <i>E. conglobata</i> and <i>E. flocktoniae</i> mid open mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. strobophylla</i> and <i>M. podocarpa</i> mid open shrubland over <i>Acacia crassuloides</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Microcybe multiflora</i> subsp. <i>multiflora</i> low open shrubland	
Other common species	<i>Acacia binata</i> , <i>A. deficiens</i> , <i>A. merrallii</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Cassya glabella</i> , <i>Comesperma spinosum</i> , <i>Daviesia campephylla</i> , <i>Dodonaea stenozyga</i> , <i>Eremophila chamaeophila</i> , <i>Eucalyptus diptera</i> , <i>E. leptocalyx</i> , <i>E. oleosa</i> subsp. <i>cylindroidea</i> , <i>E. valens</i> , <i>Exocarpos aphyllus</i> , <i>E. sparteus</i> , <i>Grevillea pectinata</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia psilocarpa</i> , <i>Melaleuca cucullata</i> , <i>M. quadrifaria</i> , <i>M. societatis</i> , <i>Pultenaea ?arida</i> , <i>Spyridium minutum</i> , <i>Westringia dampieri</i>	
Landform	Flat	
Soil	Sandy clay loam	
Rock type	Quartz	
Condition	Very Good to Excellent	
Photographs		
	Q45, scrub rolled	near Q45, undisturbed


VEGETATION CODE	EkBmPm	
Sites	R023, R025	
Description	<i>Eucalyptus kessellii</i> , <i>E. pleurocarpa</i> and <i>E. pileata</i> mid open mallee shrubland over <i>Banksia media</i> mid sparse shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca pulchella</i> and <i>Daviesia lancifolia</i> low shrubland	
Other common species	<i>Banksia blechnifolia</i> , <i>Darwinia</i> sp. Lake Cobham (K. Newbey 3262), <i>Eucalyptus flocktoniae</i> , <i>E. incassata</i> , <i>Gahnia aristata</i> , <i>Melaleuca ?plumea</i> , <i>Restionaceae</i> sp.	
Landform	Flat	
Soil	Grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs		
	R023, scrub rolled	


VEGETATION CODE		EkMtDb
Sites	R115, R156, R182	
Description	<i>Eucalyptus kessellii</i> , <i>E. eremophila</i> and <i>Eucalyptus</i> aff. <i>leptocalyx</i> mid open mallee woodland over <i>Melaleuca teuthioides</i> , <i>M. sapientes</i> and <i>M. podiocarpa</i> tall open shrubland over <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Acacia glaucissima</i> low sparse shrubland	
Other common species	<i>Eucalyptus diptera</i> , <i>E. urna</i> , <i>Leptomeria pachyclada</i> , <i>Melaleuca brevifolia</i> , <i>Olearia muelleri</i>	
Landform	Flat to gently undulating	
Soil	Sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="text-align: center;">R115, scrub rolled R115, undisturbed</p>	


VEGETATION CODE		EIMbBi
Sites	Q25	
Description	<i>Eucalyptus luculenta</i> and <i>E. eremophila</i> low sparse mallee shrubland over <i>Melaleuca bromelioides</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> low sparse shrubland	
Other common species	<i>Acacia mutabilis</i> subsp. <i>mutabilis</i> , <i>A. sorophylla</i> , <i>Austrostipa flavescens</i> , <i>Comesperma spinosum</i> , <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>Hibbertia psilocarpa</i> , <i>Leptomeria pachyclada</i> , <i>Melaleuca calycina</i> , <i>M. eleuterostachya</i> , <i>M. teuthioides</i> , <i>Westringia rigida</i>	
Landform	Upland area of gently undulating landscape	
Soil	Light brown clayey loam	
Rock type	Nil	
Condition	Very Good	
Photographs	 <p style="text-align: center;">Q25, scrub rolled</p>	


VEGETATION CODE	EIMsAs
Sites	Q26, Q27, Q28, Q30, R097, R165, R166, R169, R171
Description	<i>Eucalyptus luculenta</i> , <i>E. uncinata</i> and <i>E. eremophila</i> mid open mallee woodland over <i>Melaleuca societatis</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> and <i>Melaleuca hamata</i> mid open shrubland over <i>Acacia sorophylla</i> , <i>Pultenaea purpurea</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low sparse shrubland
Other common species	<i>Acacia brachyclada</i> , <i>A. mutabilis</i> subsp. <i>mutabilis</i> , <i>A. pachypoda</i> , <i>A. pritzeliana</i> , <i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412), <i>Austrostipa flavescens</i> , <i>Boronia fabianooides</i> subsp. <i>fabianooides</i> , <i>B. inconspicua</i> , <i>Bossiaea leptacantha</i> , <i>Cooperookia strophiolata</i> , <i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i> , <i>Cyathostemon</i> sp., <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>Dianella revoluta</i> , <i>Dillwynia divaricata</i> , <i>Dodonaea amblyophylla</i> , <i>D. bursariifolia</i> , <i>Eucalyptus conglobata</i> , <i>E. scyphocalyx</i> , <i>E. valens</i> , <i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005), <i>Goodenia concinna</i> , <i>Grevillea huegelii</i> , <i>G. plurijuga</i> subsp. <i>plurijuga</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia psilocarpa</i> , <i>Leptomeria pachyclada</i> , <i>Melaleuca bromelioides</i> , <i>M. calycina</i> , <i>M. eleuterostachya</i> , <i>M. glaberrima</i> , <i>M. podiocarpa</i> , <i>M. teuthidooides</i> , <i>M. undulata</i> , <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> , <i>Olearia muelleri</i> , <i>Pultenaea elachista</i> , <i>Spyridium minutum</i> , <i>Templetonia rossii</i> , <i>Westringia rigida</i> , <i>Wilsonia humilis</i>
Landform	Flat to gently undulating
Soil	Sand or sandy loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>R097, scrub rolled R097, undisturbed (fire age < 10 years)</p>

VEGETATION CODE	EIMsDp
Sites	R109
Description	<i>Eucalyptus</i> aff. <i>leptocalyx</i> and <i>Eucalyptus uncinata</i> mid woodland over <i>Melaleuca societatis</i> and <i>M. teuthidooides</i> tall open shrubland over <i>Darwinia polycephala</i> , <i>Cyathostemon</i> aff. <i>ambiguus</i> and <i>Baeckea crassifolia</i> low open shrubland
Other common species	
Landform	Flat
Soil	Grey sand
Rock type	Nil
Condition	Pristine
Photographs	 <p>R109, undisturbed</p>


VEGETATION CODE	EIMsLg
Sites	R099
Description	<i>Eucalyptus leptocalyx</i> and <i>E. flocktoniae</i> mid mallee woodland over <i>Melaleuca societatis</i> , <i>M. hamata</i> and <i>M. undulata</i> tall open shrubland over <i>Lepidosperma gahnioides</i> , <i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798) and <i>Gahnia ancistrophylla</i> low open sedgeland
Other common species	
Landform	Flat
Soil	Yellow grey sandy loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>R099, undisturbed</p>


VEGETATION CODE	EIMsSm
Sites	R081, R086, R087, R088, R168, R172, R174
Description	<i>Eucalyptus leptocalyx</i> , <i>E. uncinata</i> and <i>E. varia</i> subsp. <i>varia</i> mid open mallee shrubland over <i>Melaleuca societatis</i> and <i>M. glaberrima</i> mid shrubland over <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> and <i>Gahnia ancistrophylla</i> low open shrubland/ sedgeland
Other common species	<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412), <i>Banksia media</i> , <i>Comesperma spinosum</i> , <i>Coopernookia strophiolata</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Eucalyptus ?pileata</i> , <i>E. luculenta</i> , <i>Eutaxia lutea</i> , <i>Grevillea oligantha</i> , <i>G. pectinata</i> , <i>G. plurijuga</i> , <i>Melaleuca hamata</i> , <i>M. lateriflora</i> , <i>M. podiocarpa</i> , <i>M. thyoides</i> , <i>Micromyrtus elobata</i> subsp. <i>scopula</i> , <i>Nematolepis phebalioides</i> , <i>Pultenaea elachista</i>
Landform	Flat
Soil	Sand
Rock type	Nil, occasionally laterite
Condition	Very Good to Excellent
Photographs	 <p>R087, scrub rolled</p> <p>R087, undisturbed</p>


VEGETATION CODE	EIPmGa	
Sites	R100, R104	
Description	<i>Eucalyptus leptocalyx</i> , <i>E. pleurocarpa</i> and <i>E. micranthera</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca pulchella</i> and <i>M. plumea</i> mid shrubland over <i>Gahnia ancistrophylla</i> and <i>Boronia crassifolia</i> low open sedgeland/ shrubland	
Other common species	<i>Banksia media</i> , <i>Hakea cinerea</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i>	
Landform	Flat to gently undulating	
Soil	Sand or loamy sand	
Rock type	Nil	
Condition	Pristine	
Photographs	 <p>R104, undisturbed</p>	


VEGETATION CODE	EIPmSm	
Sites	R090	
Description	<i>Eucalyptus leptocalyx</i> , <i>E. uncinata</i> and <i>E. angulosa</i> mid open mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Melaleuca societatis</i> and <i>Banksia media</i> mid shrubland over <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> , <i>Microcybe pauciflora</i> subsp. <i>pauciflora</i> and <i>Conostephium drummondii</i> low open shrubland	
Other common species	<i>Cyathostemon</i> aff. <i>tenuifolius</i> , <i>Leptomeria pachyclada</i> , <i>Lissanthe rubicunda</i> , <i>Melaleuca plumea</i> , <i>M. undulata</i> , <i>Micromyrtus elobata</i> subsp. <i>scopula</i> , <i>Persoonia teretifolia</i>	
Landform	flat to gently undulating	
Soil	sand or loamy sand	
Rock type	Nil	
Condition	Very Good to Pristine	
Photographs	 <p>R090, scrub rolled R090, undisturbed</p>	


VEGETATION CODE	EmMpCc
Sites	Q01, Q05, Q08, R185
Description	<i>Eucalyptus melanoxyton</i> , <i>E. dundasii</i> and <i>E. salmonophloia</i> mid woodland over <i>Melaleuca pauperiflora</i> , <i>M. quadrifaria</i> and <i>M. teuthidoides</i> tall sparse shrubland over <i>Cratystylis conocephala</i> , <i>Maireana</i> sp. and <i>Acacia merrallii</i> low open shrubland
Other common species	<i>Angianthus tomentosus</i> , <i>Atriplex</i> sp., <i>Austrostipa elegantissima</i> , <i>A. puberula</i> , * <i>Avellinia michelii</i> , <i>Brachyscome ciliaris</i> , * <i>Brassica tournefortii</i> , * <i>Bromus rubens</i> , * <i>Centaurea melitensis</i> , <i>Enchylaena tomentosa</i> , <i>Eremophila decipiens</i> subsp. <i>decipiens</i> , <i>E. ionantha</i> , <i>E. scoparia</i> , <i>Eucalyptus ?spreta</i> , <i>E. diptera</i> , <i>E. eremophila</i> subsp. <i>eremophila</i> , <i>E. urna</i> , <i>Exocarpos aphyllus</i> , <i>Halgania andromedifolia</i> , * <i>Hordeum leporinum</i> , * <i>Lolium rigidum</i> , <i>Maireana radiata</i> , <i>M. trichoptera</i> ., * <i>Medicago minima</i> , * <i>Mesembryanthemum nodiflorum</i> , <i>Olearia dampieri</i> subsp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628), * <i>Onopordum acaulon</i> , <i>Ptilotus spathulatus</i> , <i>Pultenaea arida</i> , <i>Rhagodia crassifolia</i> , <i>Rytidosperma setaceum</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena diacantha</i> , * <i>Sisymbrium irio</i> , * <i>Sonchus oleraceus</i> , <i>Spergularia brevifolia</i> , <i>Thysanotus manglesianus</i> , <i>Vittadinia dissecta</i> , <i>Wilsonia humilis</i> , <i>Zygophyllum glaucum</i>
Landform	Flat
Soil	Sandy loam
Rock type	Nil
Condition	Very Good to Excellent
Photographs	 <p>R185, undisturbed Q08, undisturbed</p>

VEGETATION CODE	EoArTsp
Sites	R068
Description	<i>Eucalyptus occidentalis</i> mid woodland over <i>Acacia rostellifera</i> and <i>A. cyclops</i> mid open shrubland over <i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897), <i>Neurachne alopecuroidea</i> and <i>Dodonaea caespitosa</i> low sedgeland/ grassland/ shrubland
Other common species	
Landform	Seasonally wet depression
Soil	Grey loam
Rock type	Nil
Condition	Excellent
Photographs	 <p>R068, undisturbed</p>


VEGETATION CODE	EoEd
Sites	R138
Description	<i>Eucalyptus ovularis</i> and <i>E. platycorys</i> mid sparse mallee shrubland over <i>Eremophila dichroantha</i> , <i>E. ionantha</i> and <i>Philotheca fitzgeraldii</i> low shrubland
Other common species	<i>Acacia merrallii</i> , <i>Halgania andromedifolia</i> , <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Westringia rigida</i>
Landform	Gently undulating landscape
Soil	Brown clay loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>R138, scrub rolled</p>


VEGETATION CODE	EoMcBi
Sites	R121
Description	<i>Eucalyptus oleosa</i> subsp. <i>oleosa</i> , <i>E. conglobata</i> and <i>E. dielsii</i> mid mallee woodland over <i>Melaleuca cucullata</i> , <i>M. acuminata</i> subsp. <i>acuminata</i> and <i>M. podiocarpa</i> tall shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Olearia muelleri</i> and <i>Acacia profusa</i> low sparse shrubland
Other common species	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Melaleuca societatis</i> , <i>M. strobophylla</i> , <i>M. teuthidoides</i>
Landform	Flat
Soil	Grey brown sandy clay loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>R121, undisturbed</p>

VEGETATION CODE	EoMpAm
Sites	R056
Description	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> mid mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and <i>M. quadrifaria</i> mid shrubland over <i>Acacia merrallii</i> and <i>Daviesia</i> sp. low scattered shrubs
Other common species	
Landform	Flat
Soil	Grey brown loamy sand
Rock type	Nil
Condition	Pristine
Photographs	 <p>R056, undisturbed</p>


VEGETATION CODE	EoMpAs
Sites	R094, R164
Description	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> mid mallee woodland over <i>Melaleuca podiocarpa</i> , <i>M. teuthidoides</i> and <i>M. brevifolia</i> mid open shrubland over <i>Acacia sorophylla</i> , <i>Microcybe multiflora</i> subsp. <i>baccharoides</i> and <i>Boronia inornata</i> subsp. <i>leptophylla</i> low open shrubland
Other common species	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Halgania andromedifolia</i>
Landform	Flat
Soil	Sand or clay loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>R094, scrub rolled R094, undisturbed</p>


VEGETATION CODE	EoMpPa
Sites	Q02, Q03
Description	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i> , <i>E. eremophila</i> and <i>E. diptera</i> mid open woodland/ mallee woodland over <i>Melaleuca pauperiflora</i> , <i>Alyxia buxifolia</i> and <i>Eremophila ionantha</i> mid sparse shrubland over <i>Pultenaea arida</i> , <i>Olearia muelleri</i> and <i>Austrostipa trichophylla</i> low sparse shrubland/ grassland
Other common species	<i>Austrostipa puberula</i> , <i>Blennospora drummondii</i> , <i>Calandrinia eremaea</i> , <i>Calotis hispidula</i> , <i>Crassula colorata</i> , <i>Daucus glochidiatus</i> , <i>Enchylaena tomentosa</i> , <i>Eremophila deserti</i> , <i>Hydrocotyle callicarpa</i> , <i>Lobelia cleistogamoides</i> , * <i>Medicago minima</i> , <i>Millotia tenuifolia</i> , <i>Plantago debilis</i> , <i>Podolepis capillaris</i> , <i>Poranthera microphylla</i> , <i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i> , <i>P. spathulatus</i> , <i>Rhagodia drummondii</i> , <i>Rytidosperma setaceum</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena diacantha</i> , * <i>Sonchus oleraceus</i> , <i>Thysanotus manglesianus</i> , <i>Trachymene cyanopetala</i> , <i>Velleia cycnopotamica</i> , <i>Wahlenbergia preissii</i>
Landform	Flat
Soil	Loam or clay loam
Rock type	Nil
Condition	Very Good
Photographs	 <p>Q03, scrub rolled</p>


VEGETATION CODE	EoMpSf
Sites	R006
Description	<i>Eucalyptus occidentalis</i> mid woodland over <i>Melaleuca pulchella</i> , <i>M. calycina</i> and <i>Baeckea pachyphylla</i> mid shrubland over <i>Schoenus subfascicularis</i> low sparse sedgeland
Other common species	
Landform	Open depression
Soil	Light yellow grey sand
Rock type	Nil
Condition	Pristine
Photographs	 <p>R006, undisturbed</p>


VEGETATION CODE	EoMs
Sites	R089
Description	<i>Eucalyptus occidentalis</i> mid woodland over <i>Melaleuca strobophylla</i> and <i>Acacia diaphana</i> tall open shrubland
Other common species	
Landform	Depression
Soil	Dark grey silty loam
Rock type	Nil
Condition	Excellent
Photographs	 <p>R089, undisturbed</p>


VEGETATION CODE	EoMtTc
Sites	R012
Description	<i>Eucalyptus obesa</i> and <i>E. pleurocarpa</i> mid open mallee shrubland over <i>Melaleuca tuberculata</i> var. <i>macrophylla</i> , <i>Beaufortia micrantha</i> var. <i>micrantha</i> and <i>Calothamnus gracilis</i> mid open shrubland over <i>Tricostularia compressa</i> , <i>Chordifex sphacelatus</i> and <i>Schoenus subfascicularis</i> low open sedgeland/ rushland
Other common species	
Landform	Flat
Soil	Light grey sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R012, scrub rolled</p>



VEGETATION CODE	EoOm
Sites	Q07
Description	<i>Eucalyptus olivina</i> mid open woodland over <i>Olearia muelleri</i> , <i>Lepidosperma drummondii</i> and <i>Gahnia ancistrophylla</i> low sparse shrubland/ sedgeland
Other common species	<i>Austrostipa puberula</i> , <i>Eremophila ionantha</i> , <i>Maireana trichoptera</i> , <i>Olearia dampieri</i> subsp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628), <i>Podolepis capillaris</i> , <i>Rhagodia preissii</i> , <i>Scaevola spinescens</i> , <i>Sclerolaena parviflora</i>
Landform	Flat
Soil	Yellow sand
Rock type	Nil
Condition	Very Good
Photographs	 <p>Q07, undisturbed</p>


VEGETATION CODE	EpAh
Sites	Q14
Description	<i>Eucalyptus pleurocarpa</i> and <i>E. tumida</i> mid sparse mallee shrubland over <i>Allocasuarina humilis</i> , <i>Melaleuca hamata</i> and <i>Banksia armata</i> var. <i>armata</i> low open shrubland
Other common species	<i>Acacia gonophylla</i> , <i>Amphipogon turbinatus</i> , <i>Boronia crassifolia</i> , <i>Calytrix breviseta</i> subsp. <i>stipulosa</i> , <i>Chorizema aciculare</i> subsp. <i>aciculare</i> , <i>Daviesia lancifolia</i> , <i>Desmocladius myriocladus</i> , <i>Eutaxia lutea</i> , <i>Gompholobium baxteri</i> , <i>G. marginatum</i> , <i>Goodenia pterigosperma</i> , <i>Grevillea oncogyne</i> , <i>Hakea corymbosa</i> , <i>H. lissocarpha</i> , <i>Hypolaena humilis</i> , <i>Lasiopetalum rosmarinifolium</i> , <i>Lepidosperma</i> aff. <i>brunonianum</i> , <i>Leucopogon cuneifolius</i> , <i>Lomandra mucronata</i> , <i>Lysinema pentapetalum</i> , <i>Melaleuca glaberrima</i> , <i>M. rigidifolia</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Monotaxis paxii</i> , <i>Neurachne alopecuroidea</i> , <i>Opercularia vaginata</i> , <i>Pimelea erecta</i> , <i>Platysace effusa</i> , <i>Schoenus pleiostemoneus</i> , <i>Schoenus racemosus</i> , <i>Schoenus subflavus</i> subsp. <i>hispid</i> culms (K.R. Newbey 8278), <i>Spyridium minutum</i> , <i>Stenanthemum ?marginatum</i> , <i>Stylidium piliferum</i> , <i>Verticordia eriocephala</i>
Landform	Flat
Soil	Yellow clayey loam
Rock type	Nil
Condition	Excellent
Photographs	 <p>Q14, undisturbed</p>


VEGETATION CODE	EpBmMs
Sites	Q36, Q38, Q41, R003, R004, R014, R018, R019, R024, R029, R038, R059
Description	<i>Eucalyptus pleurocarpa</i> , <i>E. phaenophylla</i> and <i>E. incrassata</i> mid open mallee shrubland over <i>Beaufortia micrantha</i> var. <i>micrantha</i> , <i>M. rigidifolia</i> and <i>M. hamata</i> mid open shrubland over <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Lysinema pentapetalum</i> and <i>Lepidosperma</i> spp. low open sedgeland/ shrubland
Other common species	<i>Acacia assimilis</i> subsp. <i>atroviridis</i> , <i>A. curvata</i> , <i>A. gonophylla</i> , <i>A. lasiocarpa</i> var. <i>bracteolata</i> , <i>A. pinguiculosa</i> subsp. <i>teretifolia</i> , <i>A. singula</i> , <i>Adenanthos cuneatus</i> , <i>Allocasuarina humilis</i> , <i>A. spinosissima</i> , <i>Amphipogon avenaceus</i> , <i>A. turbinatus</i> , <i>Anthotium humile</i> , <i>Argentipallium niveum</i> , <i>Baeckea pachyphylla</i> , <i>Banksia blechnifolia</i> , <i>B. cirsioides</i> , <i>B. media</i> , <i>Beaufortia schaueri</i> , <i>Beyeria sulcata</i> var. <i>gracilis</i> , <i>Callitris roei</i> , <i>Calothamnus gibbosus</i> , <i>C. gracilis</i> , <i>C. quadrifidus</i> subsp. <i>quadrifidus</i> , <i>Calytrix duplistipulata</i> , <i>C. leschenaultii</i> , <i>Cassytha glabella</i> , <i>Cheiranthra filifolia</i> , <i>Chordifex sphacelatus</i> , <i>Conostylis argentea</i> , <i>Dampiera angulata</i> subsp. <i>angulata</i> , <i>D. lavandulacea</i> , <i>Daviesia lancifolia</i> , <i>D. pachyphylla</i> , <i>D. teretifolia</i> , <i>Desmocladus myriocladus</i> , <i>Eucalyptus falcata</i> , <i>E. falcata</i> subsp. <i>falcata</i> , <i>E. kessellii</i> , <i>E. sp.</i> Fraser Range (<i>D. Nicolle</i> 2157), <i>E. uncinata</i> , <i>Exocarpos sparteus</i> , <i>Gahnia ancistrophylla</i> , <i>Gastrolobium nutans</i> , <i>Gompholobium baxteri</i> , <i>G. confertum</i> , <i>Gompholobium marginatum</i> , <i>Goodenia concinna</i> , <i>G. trichophylla</i> , <i>Grevillea disjuncta</i> , <i>G. nudiflora</i> , <i>G. oligantha</i> , <i>Hakea cinerea</i> , <i>H. corymbosa</i> , <i>H. marginata</i> , <i>H. nitida</i> , <i>H. strumosa</i> , <i>Hemigenia teretiuscula</i> , <i>Hibbertia gracilipes</i> , <i>H. pungens</i> , <i>Isopogon trilobus</i> , <i>Isotropis drummondii</i> , <i>Kunzea jucunda</i> , <i>Lasiopetalum rosmarinifolium</i> , <i>Laxmannia paleacea</i> , <i>Leptospermum erubescens</i> , <i>L. nitens</i> , <i>Leucopogon concinnus</i> , <i>L. fimbriatus</i> , <i>L. sp.</i> Newdegate (<i>M. Hislop</i> 3585), <i>L. tamminensis</i> var. <i>australis</i> , <i>Lomandra micrantha</i> subsp. <i>teretifolia</i> , <i>L. mucronata</i> , <i>Melaleuca glaberrima</i> , <i>M. pulchella</i> , <i>M. societatis</i> , <i>M. subfalcata</i> , <i>M. tuberculata</i> var. <i>macrophylla</i> , <i>M. tuberculata</i> var. <i>tuberculata</i> , <i>Microcorys glabra</i> var. <i>glabra</i> , <i>Neurachne alopecuroidea</i> , <i>Olearia ciliata</i> , <i>Persoonia helix</i> , <i>Petrophile fastigiata</i> , <i>P. teretifolia</i> , <i>Pimelea imbricata</i> var. <i>piligera</i> , <i>Platysace effusa</i> , <i>Pultenaea indira</i> subsp. <i>indira</i> , <i>Schoenus obtusifolius</i> , <i>S. pleiostemoneus</i> , <i>S. racemosus</i> , <i>S. sesquispiculus</i> , <i>S. subflavus</i> subsp. long leaves (<i>K.L. Wilson</i> 2865), <i>Spyridium cordatum</i> , <i>Stylidium involucreatum</i> , <i>S. piliferum</i> , <i>Templetonia rossii</i> , <i>Tetrapora verrucosa</i> , <i>Thomasia microphylla</i> , <i>Tricostularia compressa</i> , <i>Verticordia acerosa</i> var. <i>preissii</i> , <i>V. chrysantha</i> , <i>V. inclusa</i>
Landform	Flat to gently undulating
Soil	Sand or sandy loam
Rock type	Nil, occasionally laterite or quartz
Condition	Excellent
Photographs	 <p>R014, scrub rolled</p>


VEGETATION CODE	EpEa
Sites	Q34, Q35, R007, R010, R021
Description	<i>Eucalyptus platypus</i> subsp. <i>platypus</i> , <i>E. flocktoniae</i> subsp. <i>flocktoniae</i> and <i>E. dielsii</i> low open woodland over <i>Exocarpos aphyllus</i> , <i>Gastrobium musaceum</i> and <i>Daviesia argillacea</i> mid open shrubland
Other common species	<i>Acacia binata</i> , <i>A. glaucoptera</i> , <i>A. octonervia</i> , <i>A. patagiata</i> , <i>Baeckea latens</i> , <i>Beyeria sulcata</i> var. <i>gracilis</i> , <i>Boronia inconspicua</i> , <i>Cassytha melantha</i> , <i>Cooperhooia polygalacea</i> , <i>Dampiera angulata</i> subsp. <i>Peak Charles</i> (K.R. Newbey 5402), <i>Dodonaea bursariifolia</i> , <i>D. glandulosa</i> , <i>D. pinifolia</i> , <i>D. stenozyga</i> , <i>Eucalyptus densa</i> subsp. <i>densa</i> , <i>Exocarpos sparteus</i> , <i>Goodenia scapigera</i> subsp. <i>scapigera</i> , <i>Grevillea pectinata</i> , <i>Hakea commutata</i> , <i>Hibbertia psilocarpa</i> , <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. cucullata</i> , <i>M. hamata</i> , <i>M. sapientes</i> , <i>M. societatis</i> , <i>M. torquata</i> , <i>M. ulicoides</i> , <i>M. undulata</i> , <i>Phebalium obovatum</i> , <i>Pultenaea adunca</i> , <i>P. craigiana</i> , <i>Trymalium elachophyllum</i> , <i>Wilsonia humilis</i>
Landform	Flat to gently undulating
Soil	Sand or sandy loam
Rock type	Occasionally quartz, conglomerate or sandstone
Condition	Excellent to Pristine
Photographs	 <p style="text-align: center;">Q34, scrub rolled R007, undisturbed</p>


VEGETATION CODE	EpMhGa
Sites	R002, R008, R013, R032
Description	<i>Eucalyptus phaenophylla</i> , <i>E. leptocalyx</i> and <i>E. uncinata</i> mid mallee woodland over <i>Melaleuca hamata</i> , <i>M. subfalcata</i> and <i>Exocarpos sparteus</i> mid sparse shrubland over <i>Gahnia ancistrophylla</i> , <i>Spyridium cordatum</i> and <i>Acacia ingrata</i> low sparse sedgeland/ shrubland
Other common species	<i>Acacia octonervia</i> , <i>A. sulcata</i> , <i>Banksia media</i> , <i>Calothamnus gibbosus</i> , <i>Cyathostemon</i> sp., <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Eucalyptus eremophila</i> subsp. <i>eremophila</i> , <i>E. incrassata</i> , <i>Gahnia aristata</i> , <i>Grevillea pectinata</i> , <i>Melaleuca glaberrima</i> , <i>M. lateriflora</i> , <i>Styphelia intertexta</i>
Landform	Flat
Soil	Loamy sand
Rock type	Occasionally laterite
Condition	Excellent to Pristine
Photographs	 <p style="text-align: center;">R008, undisturbed</p>


VEGETATION CODE	EqMpOm	
Sites	R031	
Description	<i>Eucalyptus quadrans</i> mid mallee woodland over <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> , <i>M. acuminata</i> subsp. <i>acuminata</i> and <i>Acacia amyctica</i> mid shrubland over <i>Olearia muelleri</i> low sparse shrubland	
Other common species		
Landform	Flat	
Soil	Light brown clay loam	
Rock type	Nil	
Condition	Excellent	
Photographs		
	R031, scrub rolled	R031, undisturbed


VEGETATION CODE	EsBpLt	
Sites	Q37	
Description	<i>Eucalyptus sporadica</i> and <i>E. clivicola</i> mid mallee woodland/ woodland over <i>Baeckea pachyphylla</i> , <i>Melaleuca eurystoma</i> and <i>M. hamata</i> mid open shrubland over <i>Lepidosperma tuberculatum</i> and <i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897) mid open sedgeland	
Other common species	<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i> , <i>A. pinguiculosa</i> subsp. <i>teretifolia</i> , <i>Astroloma serratifolium</i> , <i>Austrostipa hemipogon</i> , <i>Beaufortia schaueri</i> , <i>Boronia inconspicua</i> , <i>Callitris roei</i> , <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i> , <i>Calytrix leschenaultii</i> , <i>Cheiranthra filifolia</i> , <i>Dampiera angulata</i> subsp. <i>angulata</i> , <i>D. lavandulacea</i> , <i>Dianella brevicaulis</i> , <i>Dodonaea caespitosa</i> , <i>Exocarpos sparteus</i> , <i>Gahnia ancistrophylla</i> , <i>Gastrolobium nutans</i> , <i>Grevillea nudiflora</i> , <i>Hakea laurina</i> , <i>H. nitida</i> , <i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813), <i>Kunzea jucunda</i> , <i>Lasiopetalum compactum</i> , <i>L. rosmarinifolium</i> , <i>Lepidosperma</i> aff. <i>brunonianum</i> , <i>L. sp.</i> Bandalup Scabrid (N. Eveleigh 10798), <i>Leucopogon concinnus</i> , <i>L. fimbriatus</i> , <i>L. sp.</i> Newdegate (M. Hislop 3585), <i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. glaberrima</i> , <i>M. societatis</i> , <i>M. subfalcata</i> , <i>Neurachne alopecuroidea</i> , <i>Opercularia vaginata</i> , <i>Petrophile fastigiata</i> , <i>Rinzia communis</i>	
Landform	Drainage	
Soil	Cream clay sand	
Rock type	Quartz and various other stones	
Condition	Excellent	
Photographs		
	R037, scrub rolled	


VEGETATION CODE	EsGIWr	
Sites	R183	
Description	<i>Eucalyptus spreta</i> mid isolated trees over <i>Geijera linearifolia</i> , <i>Santalum acuminatum</i> and <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> tall sparse shrubland over <i>Westringia rigida</i> , <i>Atriplex vesicaria</i> and <i>Austrostipa variabilis</i> low shrubland/ tussock grassland	
Other common species		
Landform	Associated with salt lakes	
Soil	Brown loam	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R183, undisturbed</p>	


VEGETATION CODE	EsMt	
Sites	R053	
Description	<i>Eucalyptus spreta</i> and <i>E. kumarlensis</i> low woodland over <i>Melaleuca thyooides</i> , <i>Cyathostemon</i> aff. <i>ambiguus</i> and <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i> low shrubland	
Other common species	<i>Aotus</i> sp. Dundas (M.A. Burgman 2835), <i>Melaleuca sapientes</i>	
Landform	Low position in undulating landscape	
Soil	Light grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R054, scrub rolled</p> <p>R053, undisturbed</p>	


VEGETATION CODE		EspLp
Sites	R033	
Description	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157), <i>Exocarpos sparteus</i> and <i>Melaleuca hamata</i> low open mallee shrubland/ shrubland over <i>Leptomeria pachyclada</i> , <i>Phymatocarpus maxwellii</i> and <i>Dillwynia divaricata</i> low open shrubland	
Other common species		
Landform	Flat	
Soil	Light grey brown sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R033, scrub rolled</p>	


VEGETATION CODE		EspMhLsp
Sites	R009	
Description	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157) and <i>Allocasuarina huegeliana</i> mid low open mallee shrubland/ woodland over <i>Melaleuca hamata</i> , <i>Acacia patagiata</i> and <i>A. mutabilis</i> subsp. <i>angustifolia</i> mid open shrubland over <i>Lepidosperma</i> aff. <i>brunonianum</i> and <i>Lomandra micrantha</i> subsp. <i>teretifolia</i> low sparse sedgeland	
Other common species	<i>Exocarpos sparteus</i>	
Landform	Gentle slope	
Soil	Grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R009, scrub rolled</p>	


VEGETATION CODE	EspPmCI
Sites	R027
Description	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157) mid sparse mallee shrubland over <i>Phymatocarpus maxwellii</i> , <i>Adenanthos cuneatus</i> and <i>Acacia assimilis</i> subsp. <i>atroviridis</i> mid shrubland over <i>Calytrix leschenaultii</i> , <i>Lepidosperma carphoides</i> and <i>Chordifex sphacelatus</i> low sparse shrubland/ sedgeland/ rushland
Other common species	
Landform	Open depression
Soil	Grey sand
Rock type	Nil
Condition	Excellent
Photographs	 <p>R027, undisturbed</p>


VEGETATION CODE	EtMgLd
Sites	R106
Description	<i>Eucalyptus tetraptera</i> and <i>E. leptocalyx</i> mid sparse mallee shrubland over <i>Melaleuca glena</i> , <i>M. rigidifolia</i> and <i>M. glaberrima</i> mid shrubland over <i>Lepidosperma drummondii</i> and <i>Gahnia ancistrophylla</i> low sparse sedgeland
Other common species	<i>Melaleuca hamata</i>
Landform	Gently undulating landscape
Soil	Yellow brown sandy loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>R106, undisturbed</p>


VEGETATION CODE	EtMs	
Sites	R052	
Description	<i>Eucalyptus transcontinentalis</i> , <i>E. urna</i> and <i>E. eremophila</i> low woodland over <i>Melaleuca sapientes</i> , <i>M. podiocarpa</i> and <i>M. eleuterostachya</i> low shrubland	
Other common species		
Landform	Gentle rise in low undulating landscape	
Soil	Light grey sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p style="text-align: center;">R052, scrub rolled R052, undisturbed</p>	


VEGETATION CODE	EtMuGsp	
Sites	Q13, Q16, Q18	
Description	<i>Eucalyptus tumida</i> , <i>E. uncinata</i> and <i>E. flocktoniae</i> mid sparse mallee shrubland over <i>Melaleuca undulata</i> , <i>M. societatis</i> and <i>Grevillea plurijuga</i> low open shrubland over <i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005), <i>Acacia gonophylla</i> and <i>A. crassuloides</i> low sparse sedgeland/ shrubland	
Other common species	<i>Acacia evenulosa</i> , <i>A. glaucissima</i> , <i>Acrotriche cordata</i> , <i>Baeckea latens</i> , <i>Boronia inconspicua</i> , <i>B. inornata</i> subsp. <i>inornata</i> , <i>Cassytha</i> sp., <i>Comesperma spinosum</i> , <i>Cyathostemon</i> aff. <i>tenuifolius</i> , <i>Dampiera lavandulacea</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>D. lancifolia</i> , <i>Dianella revoluta</i> , <i>Eucalyptus leptocalyx</i> , <i>Eutaxia lutea</i> , <i>Exocarpos aphyllus</i> , <i>Gahnia ancistrophylla</i> , <i>G. sp. L</i> (K.R. Newbey 7888), <i>G. sp. South West</i> (K.L. Wilson & K. Frank KLV 9266), <i>Gompholobium baxteri</i> , <i>G. confertum</i> , <i>Goodenia laevis</i> subsp. <i>laevis</i> , <i>Grevillea oncogyne</i> , <i>Hakea commutata</i> , <i>H. laurina</i> , <i>Hibbertia</i> aff. <i>gracilipes</i> , <i>H. exasperata</i> , <i>H. psilocarpa</i> , <i>Hypolaena humilis</i> , <i>Lasiopetalum rosmarinifolium</i> , <i>Lepidosperma</i> aff. <i>brunonianum</i> , <i>L. gahnioides</i> , <i>Leucopogon cuneifolius</i> , <i>L. obtusatus</i> , <i>L. sp. Kau Rock</i> (M.A. Burgman 1126), <i>Melaleuca glaberrima</i> , <i>M. hamata</i> , <i>M. rigidifolia</i> , <i>Microcorys glabra</i> var. <i>glabra</i> , <i>Neurachne alopecuroidea</i> , <i>Pimelea cracens</i> , <i>Pultenaea indira</i> subsp. <i>indira</i> , <i>Rytidosperma setaceum</i> , <i>Spyridium minutum</i> , <i>Stylidium turleyae</i> , <i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897), <i>Thysanotus manglesianus</i> , <i>Wilsonia humilis</i>	
Landform	Flat	
Soil	Clayey loam	
Rock type	Nil	
Condition	Very Good to Excellent	
Photographs	 <p>Q16, undisturbed</p>	


VEGETATION CODE		EuAcSs
Sites	R078	
Description	<i>Eucalyptus uncinata</i> and <i>E. conglobata</i> mid mallee shrubland over <i>Acacia cyclops</i> , <i>A. nitidula</i> and <i>Dodonaea amblyophylla</i> mid open shrubland over <i>Schoenus subfascicularis</i> , <i>Gahnia</i> sp. and <i>Lepidosperma</i> sp. Mt Burdett (M.A. Burgman & C. Layman MAB 3287) low open sedgeland	
Other common species		
Landform	Sandplain	
Soil	Grey loamy sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R078, scrub rolled</p>	


VEGETATION CODE		EuGpBi
Sites	Q51, Q52	
Description	<i>Eucalyptus uncinata</i> and <i>E. leptocalyx</i> mid open mallee shrubland over <i>Grevillea plurijuga</i> subsp. <i>plurijuga</i> , <i>Melaleuca hamata</i> and <i>Melaleuca societatis</i> mid open shrubland over <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Pultenaea purpurea</i> and <i>Hibbertia psilocarpa</i> low open shrubland	
Other common species	<i>Acacia erinacea</i> , <i>Acacia glaucissima</i> , <i>Boronia inconspicua</i> , <i>Cassytha melantha</i> , <i>Comesperma spinosum</i> , <i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i> , <i>Cyathostemon</i> cf. <i>ambiguus</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i> , <i>Dianella brevicaulis</i> , <i>Dillwynia divaricata</i> , <i>Dodonaea bursariifolia</i> , <i>Eremophila dichroantha</i> , <i>Eucalyptus luculenta</i> , <i>Eucalyptus tumida</i> , <i>Eutaxia lutea</i> , <i>Exocarpos sparteus</i> , <i>Grevillea oligantha</i> , <i>Hakea commutata</i> , <i>Halgania andromedifolia</i> , <i>Melaleuca bromelioides</i> , <i>Melaleuca teuthidoides</i> , <i>Ozothamnus lepidophyllus</i> , <i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i> , <i>Spyridium minutum</i> , <i>Spyridium mucronatum</i> subsp. <i>mucronatum</i>	
Landform	Flat	
Soil	Light brown loamy sand	
Rock type	Nil	
Condition	Excellent	
Photographs	 <p>R052, undisturbed</p>	

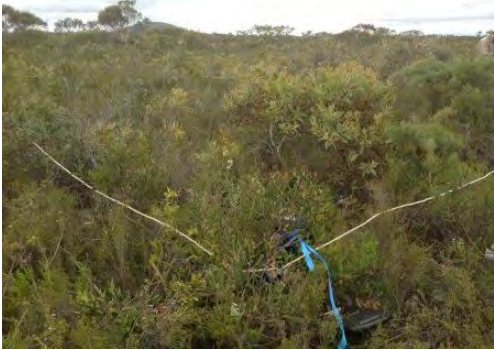
VEGETATION CODE	EuMh
Sites	R036
Description	<i>Eucalyptus uncinata</i> and <i>E. phaenophylla</i> subsp. <i>interjacens</i> mid mallee woodland over <i>Melaleuca hamata</i> , <i>Acacia patagiata</i> and <i>A. assimilis</i> subsp. <i>assimilis</i> mid shrubland
Other common species	
Landform	Minor drainage
Soil	Grey sandy clay
Rock type	Nil
Condition	Excellent
Photographs	 <p>R036, scrub rolled</p>


VEGETATION CODE	EuMpRs
Sites	R150, R054
Description	<i>Eucalyptus urna</i> and <i>E. valens</i> low open forest over <i>Melaleuca pauperiflora</i> , <i>M. brevifolia</i> and <i>M. sapientes</i> mid open shrubland over <i>Ricinocarpus stylosus</i> and <i>Daviesia</i> sp. low sparse shrubland
Other common species	<i>Melaleuca teuthidoides</i>
Landform	Flat
Soil	Sand or sandy loam
Rock type	Nil
Condition	Excellent to Pristine
Photographs	 <p>R054, undisturbed</p>


VEGETATION CODE	EuMtDI
Sites	Q19, Q24
Description	<i>Eucalyptus uncinata</i> and <i>E. tumida</i> mid sparse mallee shrubland over <i>Melaleuca teuthoides</i> , <i>M. rigidifolia</i> and <i>M. hamata</i> mid shrubland over <i>Daviesia lancifolia</i> , <i>Pultenaea elachista</i> and <i>Microcybe albiflora</i> low open shrubland
Other common species	<i>Acacia glaucissima</i> , <i>Baeckea latens</i> , <i>Boronia inornata</i> subsp. <i>leptophylla</i> , <i>Cassyltha melantha</i> , <i>Comesperma spinosum</i> , <i>Daviesia incrassata</i> subsp. <i>incrassata</i> , <i>D. lancifolia</i> , <i>Eucalyptus tetraptera</i> , <i>Eutaxia lutea</i> , <i>Exocarpos aphyllus</i> , <i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005), <i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank KLW 9266), <i>Gastrolobium musaceum</i> , <i>Gompholobium baxteri</i> , <i>Grevillea oncogyne</i> , <i>G. plurijuga</i> subsp. <i>plurijuga</i> , <i>Hakea laurina</i> , <i>Hibbertia exasperata</i> , <i>H. gracilipes</i> , <i>H. psilocarpa</i> , <i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798), <i>Leptomeria pachyclada</i> , <i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126), <i>Melaleuca bromelioides</i> , <i>M. cucullata</i> , <i>M. glaberrima</i> , <i>M. thyoides</i> , <i>Microcybe albiflora</i> , <i>Neurachne alopecuroidea</i> , <i>Persoonia teretifolia</i> , <i>Pultenaea elachista</i> , <i>Santalum acuminatum</i> , <i>Spyridium minutum</i>
Landform	Flat
Soil	Sandy loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>Q19, undisturbed</p>


VEGETATION CODE	EuMtPe
Sites	Q22
Description	<i>Eucalyptus uncinata</i> , <i>E. conglobata</i> and <i>E. indurata</i> mid open mallee woodland over <i>Melaleuca teuthoides</i> , <i>Daviesia incrassata</i> subsp. <i>incrassata</i> and <i>Melaleuca calycina</i> mid open shrubland over <i>Pultenaea elachista</i> and <i>Spyridium minutum</i> low sparse shrubland
Other common species	<i>Acacia glaucissima</i> , <i>A. sulcata</i> var. <i>platyphylla</i> , <i>Boronia inornata</i> subsp. <i>inornata</i> , <i>Cassyltha melantha</i> , <i>Dillwynia divaricata</i> , <i>Grevillea oncogyne</i> , <i>G. plurijuga</i> subsp. <i>plurijuga</i> , <i>Halgania andromedifolia</i> , <i>Hibbertia gracilipes</i> , <i>H. psilocarpa</i> , <i>Leptomeria pachyclada</i> , <i>Lissanthe rubicunda</i> , <i>Melaleuca brevifolia</i> , <i>M. hamata</i>
Landform	Flat
Soil	Red brown sandy loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>Q22, undisturbed</p>


VEGETATION CODE	EvEaPf
Sites	R051, R123
Description	<i>Eucalyptus valens</i> and <i>E. kumarlensis</i> low open forest over <i>Exocarpos aphyllus</i> , <i>Callitris preissii</i> and <i>Alyxia buxifolia</i> tall sparse shrubland over <i>Phebalium filifolium</i> , <i>Lepidosperma drummondii</i> and <i>Bertya virgata</i> low open shrubland
Other common species	<i>Boronia inornata</i> subsp. <i>inornata</i> , <i>Conostephium drummondii</i> , <i>Lissanthe rubicunda</i> , <i>Melaleuca hamata</i> , <i>M. lanceolata</i> , <i>Santalum murrayanum</i>
Landform	Flat, associated with salt lakes
Soil	Sand
Rock type	Nil
Condition	Pristine
Photographs	 <p>R123, undisturbed</p>

VEGETATION CODE	HcBe
Sites	Q46, Q47, Q48, R060, R064, R065, R069
Description	<i>Hakea cinerea</i> , <i>H. pandanica</i> subsp. <i>pandanica</i> and <i>Eucalyptus extrica</i> mid open shrubland/ mallee shrubland over <i>Beaufortia empetrifolia</i> , <i>Leucopogon crassifolius</i> and <i>Melaleuca pulchella</i> low shrubland
Other common species	<i>Acacia cyclops</i> , <i>A. pachyphylla</i> , <i>Adenanthos cuneatus</i> , <i>A. dobsonii</i> , <i>Anarthria laevis</i> , <i>Andersonia parvifolia</i> , <i>Anigozanthos rufus</i> , * <i>Arctotheca calendula</i> , <i>Banksia nutans</i> var. <i>nutans</i> , <i>B. obovata</i> , <i>B. obtusa</i> , <i>B. petiolaris</i> , <i>B. pulchella</i> , <i>B. repens</i> , <i>B. tenuis</i> var. <i>tenuis</i> , <i>Boronia crassifolia</i> , <i>B. spathulata</i> , <i>Bossiaea preissii</i> , <i>Calectasia grandiflora</i> , <i>Calothamnus gracilis</i> , <i>Calytrix decandra</i> , <i>C. leschenaultii</i> , <i>Cassytha glabella</i> , <i>Chordifex sphacelatus</i> , <i>Conospermum distichum</i> , <i>Conostylis seorsiflora</i> subsp. <i>seorsiflora</i> , <i>C. setigera</i> subsp. <i>setigera</i> , <i>Conothamnus aureus</i> , <i>Dampiera parvifolia</i> , <i>Daviesia apiculata</i> , * <i>Disa bracteata</i> , <i>Diuris concinna</i> , <i>Drosera menziesii</i> subsp. <i>menziesii</i> , <i>D. paleacea</i> subsp. <i>trichocaulis</i> , <i>Gompholobium baxteri</i> , <i>Goodenia pterigosperma</i> , <i>Grevillea baxteri</i> , <i>Hakea corymbosa</i> , <i>H. denticulata</i> , <i>H. obliqua</i> subsp. <i>obliqua</i> , <i>H. varia</i> , <i>Hibbertia</i> aff. <i>recurvifolia</i> , <i>H. gracilipes</i> , * <i>Hypochaeris glabra</i> , <i>Hypolaena exsulca</i> , <i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813), <i>I. trilobus</i> , <i>Jacksonia capitata</i> , <i>Lechenaultia formosa</i> , <i>Lepidosperma squamatum</i> , <i>Lepyrodia macra</i> , <i>Levenhookia stipitata</i> , <i>Lyginia imberbis</i> , <i>Lysinema ciliatum</i> , <i>L. pentapetalum</i> , <i>Melaleuca calcicola</i> , <i>M. scabra</i> , <i>M. striata</i> , <i>M. tuberculata</i> var. <i>macrophylla</i> , <i>Mesomelaena stygia</i> subsp. <i>stygia</i> , <i>Oligarrhena micrantha</i> , <i>Oxymyrrhine gracilis</i> , <i>Patersonia lanata</i> forma <i>lanata</i> , <i>Petrophile teretifolia</i> , <i>Phymatocarpus maxwellii</i> , <i>Schoenus pleiostemoneus</i> , <i>S. subfascicularis</i> , <i>S. subflavus</i> subsp. <i>long leaves</i> (K.L. Wilson 2865), <i>Stachystemon brachyphyllus</i> , <i>Stirlingia anethifolia</i> , <i>Stylidium macranthum</i> , <i>S. preissii</i> , <i>Taxandria spathulata</i> , <i>Tricostularia aphylla</i> , <i>T. compressa</i> , <i>Verticordia vicinella</i>
Landform	Sandplain
Soil	Grey sand
Rock type	Nil
Condition	Excellent to Pristine
Photographs	 <p>Q46, scrub rolled</p>

VEGETATION CODE	MaTs
Sites	Q09, R120
Description	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i> , <i>M. thyoides</i> and <i>M. lanceolata</i> tall shrubland over <i>Triodia scariosa</i> , <i>Bossiaea leptacantha</i> and <i>Westringia rigida</i> low open hummock grassland/shrubland
Other common species	<i>Acacia glaucissima</i> , <i>A. mutabilis</i> subsp. <i>angustifolia</i> , <i>Angianthus tomentosus</i> , <i>Austrostipa flavescens</i> , <i>A. hemipogon</i> , <i>A. variabilis</i> , <i>Brachyscome ciliaris</i> , <i>Chenopodium desertorum</i> subsp. <i>microphyllum</i> , <i>Comesperma calcicola</i> , <i>Commersonia craurophylla</i> , <i>Cyathostemon</i> cf. <i>blackettii</i> , <i>Dodonaea stenozyga</i> , <i>Duboisia hopwoodii</i> , <i>Eragrostis dielsii</i> , <i>Gahnia</i> sp. L (K.R. Newbey 7888), <i>Glischrocaryon aureum</i> , <i>Grevillea oligantha</i> , <i>Hibbertia psilocarpa</i> , <i>Maireana erioclada</i> , <i>M. trichoptera</i> , <i>Muehlenbeckia diclina</i> subsp. <i>diclina</i> , <i>Olearia exiguiifolia</i> , <i>Ptilotus holosericeus</i> , <i>P. spathulatus</i> , <i>Rytidosperma setaceum</i> , <i>Waitzia suaveolens</i> var. <i>flava</i> , <i>Zygophyllum billardierei</i>
Landform	Flat
Soil	Loamy sand
Rock type	Sometimes calcrete
Condition	Very Good
Photographs	 <p>R120, scrub rolled</p> <p>R120, undisturbed</p>

VEGETATION CODE	MbAj
Sites	Q06, Q23, R084, R105, R147, R179
Description	<i>Melaleuca brevifolia</i> , <i>M. subalaris</i> and <i>M. thyooides</i> mid open shrubland over <i>Austrostipa juncifolia</i> and <i>Tecticornia</i> spp. mid sparse grassland/ samphire shrubland
Other common species	<i>Angianthus preissianus</i> , <i>*Arctotheca calendula</i> , <i>Argentipallium tephrodes</i> , <i>Austrostipa puberula</i> , <i>Austrostipa pycnostachya</i> , <i>Baeckea uncinella</i> , <i>Calandrinia eremaea</i> , <i>C. granulifera</i> , <i>Carpobrotus modestus</i> , <i>*Conyza</i> sp., <i>Crassula colorata</i> , <i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769), <i>Darwinia</i> sp. Karonie (K. Newbey 8503), <i>Disphyma crassifolium</i> , <i>Enchylaena tomentosa</i> , <i>Eremophila decipiens</i> subsp. <i>decipiens</i> , <i>Eucalyptus quadrans</i> , <i>Euchiton sphaericus</i> , <i>Exocarpos aphyllus</i> , <i>Gunniopsis intermedia</i> , <i>*Helichrysum luteoalbum</i> , <i>Hydrocotyle pilifera</i> var. <i>glabrata</i> , <i>H. rugulosa</i> , <i>Lobelia cleistogamoides</i> , <i>*Lysimachia arvensis</i> , <i>Melaleuca exuvia</i> , <i>M. fissurata</i> , <i>Podolepis capillaris</i> , <i>Rhagodia preissii</i> , <i>Rhodanthe laevis</i> , <i>Sarcocornia quinqueflora</i> , <i>Senecio lacustrinus</i> , <i>*Sonchus oleraceus</i> , <i>Spergularia brevifolia</i> , <i>Tecticornia moniliformis</i> , <i>Tecticornia pergranulata</i> , <i>Tecticornia syncarpa</i> , <i>Thysanotus manglesianus</i> , <i>Vittadinia dissecta</i> , <i>Wilsonia humilis</i> , <i>Zygophyllum billardierei</i>
Landform	Margins of salt lake
Soil	Sand to clay
Rock type	Nil
Condition	Very Good to Excellent
Photographs	 <p>R105, undisturbed</p>

VEGETATION CODE	MhAj
Sites	R041
Description	<i>Melaleuca hamulosa</i> tall sparse shrubland over <i>Austrostipa juncifolia</i> and <i>Gahnia</i> sp. L (K.R. Newbey 7888) mid open tussock grassland/ sedgeland
Other common species	
Landform	Margins of salt lake
Soil	Yellow grey sandy loam
Rock type	Nil
Condition	Pristine
Photographs	 <p>R041, undisturbed</p>

VEGETATION CODE	MuTm
Sites	R082, R095
Description	<i>Melaleuca uncinata</i> , <i>Thryptomene australis</i> subsp. <i>brachyandra</i> and <i>Acacia nitidula</i> mid shrubland over <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i> , <i>Spartochloa scirpoidea</i> and <i>Platysace effusa</i> low shrubland/ tussock grassland
Other common species	<i>Dodonaea lobulata</i> , <i>Melaleuca elliptica</i>
Landform	Flat
Soil	Clay loam or sandy loam
Rock type	Granite
Condition	Excellent
Photographs	 <p>R082, scrub rolled</p>

VEGETATION CODE	Tspp
Sites	Q10, R034, R128, R149
Description	<i>Tecticornia</i> spp. and <i>Maireana oppositifolia</i> low open samphire shrubland/ chenopod shrubland
Other common species	<i>Angianthus tomentosus</i> , <i>Atriplex</i> sp., <i>Austrostipa juncifolia</i> , <i>A. trichophylla</i> , <i>Brachyscome ciliaris</i> , <i>Carpobrotus modestus</i> , <i>Disphyma crassifolium</i> , <i>Eragrostis dielsii</i> , <i>Frankenia desertorum</i> , <i>F. sessilis</i> , <i>Gnephosis drummondii</i> , * <i>Hordeum leporinum</i> , <i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173), <i>Leptospermum erubescens</i> , <i>Maireana oppositifolia</i> , <i>Schenkia australis</i> , <i>Sclerolaena diacantha</i> , <i>Senecio lacustrinus</i> , <i>Surreya diandra</i> , <i>Tecticornia ?loriae</i> , <i>T. halocnemoides</i> , <i>T. lepidosperma</i> , <i>T. moniliformis</i> , <i>Zygophyllum billardierei</i>
Landform	Salt lake
Soil	Clay or clay loam
Rock type	Nil
Condition	Very Good to Excellent
Photographs	 <p>R034, undisturbed</p>

APPENDIX SIX: FLORA INVENTORIES

Table 30: Complete flora inventory from 2013/2014 assessments

SPECIES	WEED	DPAW CONS. CODE
Aizoaceae		
<i>Carpobrotus modestus</i>		
<i>Carpobrotus</i> sp.		
<i>Disphyma crassifolium</i>		
<i>Gunniopsis intermedia</i>		
<i>Mesembryanthemum nodiflorum</i>	*	
Amaranthaceae		
<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>		
<i>Ptilotus holosericeus</i>		
<i>Ptilotus humilis</i>		
<i>Ptilotus polystachyus</i>		
<i>Ptilotus seminudus</i>		
<i>Ptilotus spathulatus</i>		
<i>Surreya diandra</i>		
Anarthriaceae		
<i>Anarthria laevis</i>		
<i>Lyginia imberbis</i>		
Apiaceae		
<i>Daucus glochidiatus</i>		
<i>Platysace effusa</i>		
<i>Xanthosia huegelii</i>		
Apocynaceae		
<i>Alyxia buxifolia</i>		
Araliaceae		
<i>Hydrocotyle callicarpa</i>		
<i>Hydrocotyle medicaginoidea</i>		
<i>Hydrocotyle pilifera</i> var. <i>glabrata</i>		
<i>Hydrocotyle rugulosa</i>		
<i>Hydrocotyle</i> sp. <i>Coraginaensis</i> (K.R. Newbey 7477)		P2
<i>Hydrocotyle</i> sp. <i>Hexaptera</i> (T. Erickson TEE 173)		P1
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>		P3
<i>Trachymene cyanopetala</i>		
<i>Trachymene pilosa</i>		
Asparagaceae		
<i>Asparagus asparagoides</i>	*	
<i>Laxmannia brachyphylla</i>		
<i>Laxmannia paleacea</i>		
<i>Lomandra effusa</i>		
<i>Lomandra hastilis</i>		
<i>Lomandra micrantha</i> subsp. <i>teretifolia</i>		
<i>Lomandra mucronata</i>		
<i>Thysanotus ?patersonii</i>		
<i>Thysanotus brachyantherus</i>		P2
<i>Thysanotus manglesianus</i>		
<i>Thysanotus parviflorus</i>		P4
<i>Thysanotus patersonii</i>		
<i>Thysanotus sparteus</i>		

SPECIES	WEED	DPAW CONS. CODE
Asphodelaceae		
<i>Bulbine semibarbata</i>		
Asteraceae		
<i>Actinobole uliginosum</i>		
<i>Angianthus preissianus</i>		
<i>Angianthus tomentosus</i>		
<i>Arctotheca calendula</i>	*	
<i>Argentipallium niveum</i>		
<i>Argentipallium tephrodes</i>		
<i>Asteridea athrixoides</i>		
<i>Blennospora drummondii</i>		
<i>Brachyscome ciliaris</i>		
<i>Calotis hispidula</i>		
<i>Carthamus lanatus</i>	*	
<i>Centaurea melitensis</i>	*	
<i>Conyza</i> sp.	*	
<i>Cratystylis conocephala</i>		
<i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>		
<i>Euchiton sphaericus</i>		
<i>Gnephosis drummondii</i>		
<i>Gnephosis tridens</i>		
<i>Helichrysum leucopsidium</i>		
<i>Helichrysum luteoalbum</i>		
<i>Hypochaeris glabra</i>	*	
<i>Millotia tenuifolia</i>		
<i>Olearia ciliata</i>		
<i>Olearia</i> sp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628)		
<i>Olearia exiguifolia</i>		
<i>Olearia homolepis</i>		
<i>Olearia muelleri</i>		
<i>Olearia muricata</i>		
<i>Olearia picridifolia</i>		
<i>Olearia ramosissima</i>		
<i>Onopordum acaulon</i>	*	
<i>Ozothamnus blackallii</i>		
<i>Ozothamnus lepidophyllus</i>		
<i>Ozothamnus occidentalis</i>		
<i>Podolepis canescens</i>		
<i>Podolepis capillaris</i>		
<i>Podolepis tepperi</i>		
<i>Podotheca angustifolia</i>		
<i>Pogonolepis muelleriana</i>		
<i>Rhodanthe laevis</i>		
<i>Senecio lacustrinus</i>		
<i>Senecio quadridentatus</i>		
<i>Sonchus oleraceus</i>	*	
<i>Vittadinia dissecta</i>		
<i>Vittadinia gracilis</i>		
<i>Waitzia suaveolens</i> var. <i>flava</i>		

SPECIES	WEED	DPAW CONS. CODE
Boraginaceae		
<i>Halgania anagaloides</i> var. Southern (A.E. Orchard 1609)		
<i>Halgania andromedifolia</i>		
<i>Halgania cyanea</i> var. <i>cyanea</i>		
<i>Halgania integerrima</i>		
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)		P2
<i>Heliotropium curassavicum</i>		
Boryaceae		
<i>Borya constricta</i>		
Brassicaceae		
<i>Brassica tournefortii</i>	*	
<i>Lepidium africanum</i>	*	
<i>Sisymbrium irio</i>	*	
Campanulaceae		
<i>Isotoma scapigera</i>		
<i>Lobelia cleistogamoides</i>		
<i>Wahlenbergia preissii</i>		
Caryophyllaceae		
<i>Spergularia brevifolia</i>		
<i>Spergularia marina</i>	*	
<i>Spergularia rubra</i>	*	
Casuarinaceae		
<i>Allocasuarina acuaria</i>		
<i>Allocasuarina acutivalvis</i>		
<i>Allocasuarina campestris</i>		
<i>Allocasuarina huegeliana</i>		
<i>Allocasuarina humilis</i>		
<i>Allocasuarina scleroclada</i>		
<i>Allocasuarina spinosissima</i>		
<i>Allocasuarina thuyoides</i>		
<i>Casuarina obesa</i>		
Celastraceae		
<i>Psammomoya choretroides</i>		
<i>Stackhousia monogyna</i>		
<i>Stackhousia muricata</i>		
<i>Stackhousia scoparia</i>		
Centrolepidaceae		
<i>Centrolepis cephaloformis</i> subsp. <i>cephaloformis</i>		
<i>Centrolepis polygyna</i>		
Chenopodiaceae		
<i>Atriplex semibaccata</i>		
<i>Atriplex</i> sp.		
<i>Atriplex vesicaria</i>		
<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>		
<i>Didymanthus roei</i>		
<i>Enchylaena tomentosa</i>		
<i>Maireana erioclada</i>		
<i>Maireana eriosphaera</i>		
<i>Maireana oppositifolia</i>		
<i>Maireana radiata</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Maireana</i> sp.		
<i>Maireana trichoptera</i>		
<i>Rhagodia crassifolia</i>		
<i>Rhagodia drummondii</i>		
<i>Rhagodia preissii</i>		
<i>Sarcocornia quinqueflora</i>		
<i>Sclerolaena diacantha</i>		
<i>Sclerolaena parviflora</i>		
<i>Tecticornia ?loriae</i>		
<i>Tecticornia halocnemoides</i>		
<i>Tecticornia lepidosperma</i>		
<i>Tecticornia moniliformis</i>		
<i>Tecticornia pergranulata</i>		
<i>Tecticornia</i> sp.		
<i>Tecticornia syncarpa</i>		
Convolvulaceae		
<i>Wilsonia humilis</i>		
Crassulaceae		
<i>Crassula colorata</i>		
Cucurbitaceae		
<i>Cucumis myriocarpus</i>	*	
Cupressaceae		
<i>Callitris preissii</i>		
<i>Callitris roei</i>		
Cyperaceae		
<i>Caustis dioica</i>		
<i>Cyathochaeta equitans</i>		
<i>Gahnia ancistrophylla</i>		
<i>Gahnia aristata</i>		
<i>Gahnia</i> sp.		
<i>Gahnia</i> sp. L (K.R. Newbey 7888)		
<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)		
<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank KLV 9266)		
<i>Gahnia trifida</i>		
<i>Lepidosperma ?resinosum</i>		
<i>Lepidosperma</i> aff. <i>brunonianum</i>		
<i>Lepidosperma brunonianum</i>		
<i>Lepidosperma carphoides</i>		
<i>Lepidosperma drummondii</i>		
<i>Lepidosperma gahnioides</i>		
<i>Lepidosperma rigidulum</i>		
<i>Lepidosperma</i> sp.		
<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)		
<i>Lepidosperma</i> sp. Mt Burdett (M.A. Burgman & C. Layman MAB 3287)		
<i>Lepidosperma squamatum</i>		
<i>Lepidosperma tuberculatum</i>		
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>		
<i>Mesomelaena tetragona</i>		
<i>Schoenus breviculmis</i>		
<i>Schoenus brevisetis</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Schoenus curvifolius</i>		
<i>Schoenus obtusifolius</i>		
<i>Schoenus pleiostemoneus</i>		
<i>Schoenus racemosus</i>		
<i>Schoenus sesquispiculus</i>		
<i>Schoenus subfascicularis</i>		
<i>Schoenus subflavus</i> subsp. hispid culms (K.R. Newbey 8278)		
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)		
<i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897)		
<i>Tricostularia aphylla</i>		
<i>Tricostularia compressa</i>		
Dasypogonaceae		
<i>Calectasia grandiflora</i>		
Dilleniaceae		
<i>Hibbertia</i> aff. <i>gracilipes</i>		
<i>Hibbertia</i> aff. <i>recurvifolia</i>		
<i>Hibbertia exasperata</i>		
<i>Hibbertia gracilipes</i>		
<i>Hibbertia inclusa</i>		
<i>Hibbertia psilocarpa</i>		
<i>Hibbertia pungens</i>		
<i>Hibbertia</i> sp.		
Droseraceae		
<i>Drosera menziesii</i> subsp. <i>menziesii</i>		
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>		
<i>Drosera paleacea</i> subsp. <i>trichocaulis</i>		
<i>Drosera pycnoblata</i>		
<i>Drosera salina</i>		P2
Ericaceae		
<i>Acrotriche cordata</i>		
<i>Acrotriche ramiflora</i>		
<i>Acrotriche</i> sp. Israelite Bay (M. Hislop & F. Hort MH 2630)		
<i>Andersonia macranthera</i>		
<i>Andersonia parvifolia</i>		
<i>Astroloma serratifolium</i>		
<i>Astroloma tectum</i>		
<i>Brachyloma geissoloma</i>		
<i>Coleanthera myrtoides</i>		
<i>Conostephium drummondii</i>		
<i>Conostephium marchantiorum</i>		P3
<i>Dielsiodoxa oligarrhenoides</i>		
<i>Leucopogon assimilis</i>		
<i>Leucopogon brevicuspis</i>		
<i>Leucopogon breviflorus</i>		
<i>Leucopogon carinatus</i>		
<i>Leucopogon concinnus</i>		
<i>Leucopogon crassifolius</i>		
<i>Leucopogon cuneifolius</i>		
<i>Leucopogon fimbriatus</i>		
<i>Leucopogon hamulosus</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Leucopogon obtusatus</i>		
<i>Leucopogon remotus</i>		P1
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)		P1
<i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085)		
<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)		
<i>Leucopogon</i> sp. Newdegate (M. Hislop 3585)		
<i>Leucopogon tamminensis</i> var. <i>australis</i>		
<i>Lissanthe rubicunda</i>		
<i>Lysinema ciliatum</i>		
<i>Lysinema pentapetalum</i>		
<i>Oligarrhena micrantha</i>		
<i>Styphelia intertexta</i>		
Euphorbiaceae		
<i>Bertya virgata</i>		
<i>Beyeria sulcata</i> var. <i>gracilis</i>		
<i>Euphorbia</i> sp.		
<i>Monotaxis paxii</i>		
<i>Ricinocarpos stylosus</i>		
<i>Stachystemon brachyphyllus</i>		
<i>Stachystemon polyandrus</i>		
Fabaceae		
<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>		
<i>Acacia amyctica</i>		P2
<i>Acacia assimilis</i> subsp. <i>assimilis</i>		
<i>Acacia assimilis</i> subsp. <i>atroviridis</i>		
<i>Acacia bartlei</i>		P3
<i>Acacia binata</i>		
<i>Acacia brachyclada</i>		
<i>Acacia bracteolata</i>		
<i>Acacia camptoclada</i>		
<i>Acacia chrysellia</i>		
<i>Acacia cochlearis</i>		
<i>Acacia crassuloides</i>		
<i>Acacia crispula</i>		
<i>Acacia curvata</i>		
<i>Acacia cyclops</i>		
<i>Acacia deficiens</i>		
<i>Acacia diaphana</i>		P1
<i>Acacia empelioclada</i>		
<i>Acacia enervia</i> subsp. <i>enervia</i>		
<i>Acacia erinacea</i>		
<i>Acacia euthyphylla</i>		P3
<i>Acacia evenulosa</i>		
<i>Acacia fragilis</i>		
<i>Acacia glaucissima</i>		P3
<i>Acacia glaucoptera</i>		
<i>Acacia gonophylla</i>		
<i>Acacia hadrophylla</i>		
<i>Acacia hakeoides</i>		
<i>Acacia improcera</i>		P3

SPECIES	WEED	DPAW CONS. CODE
<i>Acacia inamabilis</i>		
<i>Acacia ingrata</i>		
<i>Acacia lachnophylla</i>		
<i>Acacia laricina</i> var. <i>laricina</i>		
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i>		
<i>Acacia merrallii</i>		
<i>Acacia mimica</i> var. <i>angusta</i>		
<i>Acacia multispicata</i>		
<i>Acacia mutabilis</i> subsp. <i>angustifolia</i>		
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		
<i>Acacia nigricans</i>		
<i>Acacia nitidula</i>		P2
<i>Acacia octonervia</i>		
<i>Acacia pachyphylla</i>		
<i>Acacia pachypoda</i>		
<i>Acacia patagiata</i>		
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		
<i>Acacia pritzeliana</i>		
<i>Acacia profusa</i>		
<i>Acacia rostelifera</i>		
<i>Acacia saligna</i>		
<i>Acacia singula</i>		P3
<i>Acacia sorophylla</i>		
<i>Acacia sulcata</i>		
<i>Acacia sulcata</i> var. <i>platyphylla</i>		
<i>Acacia triptycha</i>		
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)		P2
<i>Aotus</i> sp. Esperance (P.G. Wilson 7904)		
<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412)		
<i>Bossiaea barbarae</i>		
<i>Bossiaea flexuosa</i>		P3
<i>Bossiaea leptacantha</i>		
<i>Bossiaea preissii</i>		
<i>Chorizema aciculare</i> subsp. <i>aciculare</i>		
<i>Chorizema obtusifolium</i>		
<i>Daviesia apiculata</i>		
<i>Daviesia argillacea</i>		
<i>Daviesia articulata</i>		
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		
<i>Daviesia benthamii</i> subsp. <i>benthamii</i>		
<i>Daviesia campephylla</i>		
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		
<i>Daviesia lancifolia</i>		
<i>Daviesia newbeyi</i>		P2
<i>Daviesia pachyphylla</i>		
<i>Daviesia pauciflora</i>		P3
<i>Daviesia scoparia</i>		
<i>Daviesia</i> sp.		
<i>Daviesia teretifolia</i>		
<i>Dillwynia divaricata</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Eutaxia empetrifolia</i>		
<i>Eutaxia lutea</i>		
<i>Eutaxia major</i>		
<i>Gastrolobium discolor</i>		
<i>Gastrolobium latifolium</i>		
<i>Gastrolobium musaceum</i>		
<i>Gastrolobium nutans</i>		
<i>Gompholobium baxteri</i>		
<i>Gompholobium confertum</i>		
<i>Gompholobium marginatum</i>		
<i>Isotropis drummondii</i>		
<i>Jacksonia capitata</i>		
<i>Jacksonia venosa</i>		
<i>Kennedia prostrata</i>		
<i>Leptosema daviesioides</i>		
<i>Medicago minima</i>	*	
<i>Mirbelia granitica</i>		
<i>Pultenaea ?arida</i>		
<i>Pultenaea adunca</i>		P3
<i>Pultenaea arida</i>		
<i>Pultenaea craigiana</i>		P3
<i>Pultenaea daena</i>		P3
<i>Pultenaea elachista</i>		
<i>Pultenaea indira</i> subsp. <i>indira</i>		
<i>Pultenaea purpurea</i>		
<i>Pultenaea spinulosa</i>		
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i>		
<i>Senna pleurocarpa</i> var. <i>angustifolia</i>		
<i>Senna</i> sp. Pallinup River (J.W. Green 4847)		
<i>Templetonia rossii</i>		
<i>Urodon dasyphyllus</i>		
Frankeniaceae		
<i>Frankenia brachyphylla</i>		P2
<i>Frankenia cinerea</i>		
<i>Frankenia desertorum</i>		
<i>Frankenia drummondii</i>		P3
<i>Frankenia glomerata</i>		P3
<i>Frankenia sessilis</i>		
<i>Frankenia tetrapetala</i>		
Gentianaceae		
<i>Schenkia australis</i>		
Geraniaceae		
<i>Pelargonium drummondii</i>		
Goodeniaceae		
<i>Anthotium humile</i>		
<i>Cooperhooia polygalacea</i>		
<i>Cooperhooia strophiolata</i>		
<i>Dampiera angulata</i> subsp. <i>angulata</i>		
<i>Dampiera angulata</i> subsp. Peak Charles (K.R. Newbey 5402)		
<i>Dampiera juncea</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Dampiera lavandulacea</i>		
<i>Dampiera parvifolia</i>		
<i>Dampiera sacculata</i>		
<i>Dampiera</i> sp.		
<i>Goodenia affinis</i>		
<i>Goodenia berardiana</i>		
<i>Goodenia concinna</i>		
<i>Goodenia krauseana</i>		
<i>Goodenia laevis</i> subsp. <i>laevis</i>		P3
<i>Goodenia pterigosperma</i>		
<i>Goodenia scapigera</i> subsp. <i>scapigera</i>		
<i>Goodenia trichophylla</i>		
<i>Lechenaultia brevifolia</i>		
<i>Lechenaultia formosa</i>		
<i>Scaevola argentea</i>		
<i>Scaevola bursariifolia</i>		
<i>Scaevola humifusa</i>		
<i>Scaevola spinescens</i>		
<i>Scaevola thesioides</i> subsp. <i>filifolia</i>		
<i>Velleia cycnopotamica</i>		
<i>Velleia trinervis</i>		
Gyrostemonaceae		
<i>Codonocarpus cotinifolius</i>		
<i>Gyrostemon ditrigynus</i>		P4
Haemodoraceae		
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>		TF
<i>Anigozanthos rufus</i>		
<i>Conostylis argentea</i>		
<i>Conostylis lepidospermoides</i>		TF
<i>Conostylis phathyantha</i>		
<i>Conostylis seorsiflora</i> subsp. <i>seorsiflora</i>		
<i>Conostylis setigera</i> subsp. <i>setigera</i>		
Haloragaceae		
<i>Glischrocaryon aureum</i>		
<i>Glischrocaryon flavescens</i>		
<i>Glischrocaryon roei</i>		
<i>Glischrocaryon</i> sp.		
<i>Gonocarpus pycnostachyus</i>		P3
<i>Haloragis hamata</i>		
Hemerocallidaceae		
<i>Dianella brevicaulis</i>		
<i>Dianella revoluta</i>		
<i>Stawellia gymnocephala</i>		
<i>Stypandra glauca</i>		
Iridaceae		
<i>Patersonia juncea</i>		
<i>Patersonia lanata</i> forma <i>lanata</i>		
<i>Patersonia occidentalis</i>		
Juncaginaceae		
<i>Triglochin mucronata</i>		

SPECIES	WEED	DPAW CONS. CODE
Lamiaceae		
<i>Cyanostegia angustifolia</i>		
<i>Dasymalla terminalis</i>		
<i>Dicrastylis archeri</i>		P1
<i>Hemigenia teretiuscula</i>		
<i>Microcorys glabra</i> var. <i>glabra</i>		
<i>Pityrodia chrysocalyx</i>		P3
<i>Prostanthera grylloana</i>		
<i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i>		
<i>Teucrium eremaeum</i>		
<i>Teucrium myriocladum</i>		
<i>Teucrium</i> sp. Norseman (T.E.H. Aplin 1851)		
<i>Westringia cephalantha</i> var. <i>caterva</i>		
<i>Westringia dampieri</i>		
<i>Westringia rigida</i>		
Lauraceae		
<i>Cassytha glabella</i>		
<i>Cassytha melantha</i>		
<i>Cassytha</i> sp.		
Loganiaceae		
<i>Logania buxifolia</i>		
<i>Logania micrantha</i>		
<i>Logania stenophylla</i>		
Malvaceae		
<i>Alyogyne hakeifolia</i>		
<i>Androcalva crispa</i>		
<i>Androcalva cuneata</i>		
<i>Commersonia craurophylla</i>		
<i>Guichenotia micrantha</i>		
<i>Lasiopetalum compactum</i>		
<i>Lasiopetalum rosmarinifolium</i>		
<i>Lawrencia diffusa</i>		
<i>Lawrencia glomerata</i>		
<i>Lawrencia squamata</i>		
Malvaceae sp.		
<i>Thomasia microphylla</i>		
<i>Thomasia petalocalyx</i>		
Myrtaceae		
<i>Agonis baxteri</i>		
<i>Aluta appressa</i>		
<i>Astus tetragonus</i>		
<i>Baeckea crassifolia</i>		
<i>Baeckea crispiflora</i>		
<i>Baeckea latens</i>		
<i>Baeckea pachyphylla</i>		
<i>Baeckea</i> sp.		
<i>Baeckea</i> sp. fine-leaved (C.M. Lewis 517)		
<i>Baeckea</i> sp. Gibson (K.R. Newbey 11084)		P1
<i>Baeckea uncinella</i>		
<i>Beaufortia empetrifolia</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Beaufortia micrantha</i> var. <i>micrantha</i>		
<i>Beaufortia schaueri</i>		
<i>Calothamnus gibbosus</i>		
<i>Calothamnus gracilis</i>		
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>		
<i>Calothamnus tuberosus</i>		
<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>		
<i>Calytrix decandra</i>		
<i>Calytrix duplistipulata</i>		
<i>Calytrix leschenaultii</i>		
<i>Calytrix tetragona</i>		
<i>Chamelaucium axillare</i>		
<i>Chamelaucium megalopetalum</i>		
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)		P1
<i>Conothamnus aureus</i>		
<i>Cyathostemon</i> aff. <i>tenuifolius</i>		
<i>Cyathostemon</i> cf. <i>ambiguus</i>		
<i>Cyathostemon</i> cf. <i>blackettii</i>		
<i>Cyathostemon</i> sp.		
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)		P3
<i>Darwinia luehmannii</i>		P2
<i>Darwinia polycephala</i>		P4
<i>Darwinia</i> sp. Karonie (K. Newbey 8503)		
<i>Darwinia</i> sp. Lake Cobham (K. Newbey 3262)		
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)		P1
<i>Darwinia</i> sp. Mt Ney Virgate (A.S. George 15837)		
<i>Darwinia vestita</i>		
<i>Eucalyptus</i> ? <i>calycogona</i>		
<i>Eucalyptus</i> ? <i>delicata</i>		
<i>Eucalyptus</i> ? <i>pileata</i>		
<i>Eucalyptus</i> ? <i>spretta</i>		
<i>Eucalyptus</i> aff. <i>leptocalyx</i>		
<i>Eucalyptus angulosa</i>		
<i>Eucalyptus balladoniensis</i> subsp. <i>balladoniensis</i>		
<i>Eucalyptus calycogona</i> subsp. <i>calycogona</i>		
<i>Eucalyptus clivicola</i>		
<i>Eucalyptus conglobata</i>		
<i>Eucalyptus cooperiana</i>		
<i>Eucalyptus cylindriflora</i>		
<i>Eucalyptus delicata</i>		
<i>Eucalyptus densa</i> subsp. <i>densa</i>		
<i>Eucalyptus dielsii</i>		
<i>Eucalyptus diptera</i>		
<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i>		
<i>Eucalyptus dolichorhyncha</i>		P4
<i>Eucalyptus dundasii</i>		
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		
<i>Eucalyptus extensa</i>		
<i>Eucalyptus extrica</i>		
<i>Eucalyptus falcata</i> subsp. <i>falcata</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Eucalyptus flocktoniae</i>		
<i>Eucalyptus forrestiana</i>		
<i>Eucalyptus gracilis</i>		
<i>Eucalyptus grossa</i>		
<i>Eucalyptus halophila</i>		
<i>Eucalyptus incrassata</i>		
<i>Eucalyptus indurata</i>		
<i>Eucalyptus kessellii</i>		
<i>Eucalyptus kumarlensis</i>		
<i>Eucalyptus leptocalyx</i>		
<i>Eucalyptus luculenta</i>		P2
<i>Eucalyptus melanoxylon</i>		
<i>Eucalyptus merrickiae</i>		TF
<i>Eucalyptus micranthera</i>		
<i>Eucalyptus misella</i>		P1
<i>Eucalyptus obesa</i>		
<i>Eucalyptus occidentalis</i>		
<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i>		
<i>Eucalyptus oleosa</i> subsp. <i>oleosa</i>		
<i>Eucalyptus olivina</i>		
<i>Eucalyptus ovularis</i>		
<i>Eucalyptus perangusta</i>		
<i>Eucalyptus phaenophylla</i>		
<i>Eucalyptus phaenophylla</i> subsp. <i>interjacens</i>		
<i>Eucalyptus phaenophylla</i> subsp. <i>phaenophylla</i>		
<i>Eucalyptus phenax</i> subsp. <i>phenax</i>		
<i>Eucalyptus pileata</i>		
<i>Eucalyptus platycorys</i>		
<i>Eucalyptus platypus</i>		
<i>Eucalyptus platypus</i> subsp. <i>platypus</i>		
<i>Eucalyptus pleurocarpa</i>		
<i>Eucalyptus polita</i>		
<i>Eucalyptus prolixa</i>		
<i>Eucalyptus quadrans</i>		
<i>Eucalyptus rigidula</i>		
<i>Eucalyptus salmonophloia</i>		
<i>Eucalyptus scyphocalyx</i>		
<i>Eucalyptus</i> sp.		
<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157)		
<i>Eucalyptus sporadica</i>		
<i>Eucalyptus spreta</i>		
<i>Eucalyptus stoatei</i>		P4
<i>Eucalyptus suggrandis</i> subsp. <i>suggrandis</i>		
<i>Eucalyptus tetraptera</i>		
<i>Eucalyptus transcontinentalis</i>		
<i>Eucalyptus tumida</i>		
<i>Eucalyptus uncinata</i>		
<i>Eucalyptus urna</i>		
<i>Eucalyptus valens</i>		
<i>Eucalyptus varia</i> subsp. <i>varia</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Kunzea affinis</i>		
<i>Kunzea jucunda</i>		
<i>Leptospermum erubescens</i>		
<i>Leptospermum fastigiatum</i>		
<i>Leptospermum incanum</i>		
<i>Leptospermum maxwellii</i>		
<i>Leptospermum nitens</i>		
<i>Leptospermum spinescens</i>		
<i>Melaleuca ?plumea</i>		
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>		
<i>Melaleuca brevifolia</i>		
<i>Melaleuca bromelioides</i>		
<i>Melaleuca calcicola</i>		
<i>Melaleuca calycina</i>		
<i>Melaleuca cordata</i>		
<i>Melaleuca cucullata</i>		
<i>Melaleuca eleuterostachya</i>		
<i>Melaleuca elliptica</i>		
<i>Melaleuca eurystoma</i>		
<i>Melaleuca eximia</i>		P2
<i>Melaleuca exuvia</i>		
<i>Melaleuca fissurata</i>		P4
<i>Melaleuca glaberrima</i>		
<i>Melaleuca glena</i>		
<i>Melaleuca hamata</i>		
<i>Melaleuca hamulosa</i>		
<i>Melaleuca johnsonii</i>		
<i>Melaleuca lanceolata</i>		
<i>Melaleuca lateriflora</i>		
<i>Melaleuca linguiformis</i>		
<i>Melaleuca marginata</i>		
<i>Melaleuca pauciflora</i>		
<i>Melaleuca pauperiflora</i>		
<i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>		
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>		
<i>Melaleuca plumea</i>		
<i>Melaleuca podiocarpa</i>		
<i>Melaleuca pulchella</i>		
<i>Melaleuca quadrifaria</i>		
<i>Melaleuca rigidifolia</i>		
<i>Melaleuca sapientes</i>		
<i>Melaleuca scabra</i>		
<i>Melaleuca societatis</i>		
<i>Melaleuca</i> sp.		
<i>Melaleuca sparsiflora</i>		
<i>Melaleuca striata</i>		
<i>Melaleuca strobophylla</i>		
<i>Melaleuca subalaris</i>		
<i>Melaleuca suberosa</i>		
<i>Melaleuca subfalcata</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Melaleuca teuthidoides</i>		
<i>Melaleuca thyoides</i>		
<i>Melaleuca torquata</i>		
<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>		
<i>Melaleuca tuberculata</i> var. <i>tuberculata</i>		
<i>Melaleuca ulicoides</i>		
<i>Melaleuca uncinata</i>		
<i>Melaleuca undulata</i>		
<i>Micromyrtus elobata</i> subsp. <i>elobata</i>		
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>		P3
<i>Micromyrtus imbricata</i>		
<i>Oxymyrrhine gracilis</i>		
<i>Phymatocarpus maxwellii</i>		
<i>Rinzia communis</i>		
<i>Rinzia</i> sp.		
<i>Taxandria spathulata</i>		
<i>Tetrapora verrucosa</i>		
<i>Thryptomene</i> aff. <i>australis</i>		
<i>Thryptomene australis</i> subsp. <i>brachyandra</i>		
<i>Verticordia acerosa</i> var. <i>preissii</i>		
<i>Verticordia chrysantha</i>		
<i>Verticordia eriocephala</i>		
<i>Verticordia inclusa</i>		
<i>Verticordia picta</i>		
<i>Verticordia plumosa</i> var. <i>incrassata</i>		
<i>Verticordia roei</i> subsp. <i>roei</i>		
<i>Verticordia vicinella</i>		
Olacaceae		
<i>Olax benthamiana</i>		
Orchidaceae		
<i>Disa bracteata</i>	*	
<i>Diuris concinna</i>		
<i>Diuris decremента</i>		
<i>Elythranthera brunonis</i>		
Orchidaceae sp.		
<i>Pterostylis roensis</i>		
<i>Thelymitra occidentalis</i>		
<i>Thelymitra</i> sp.		
Phyllanthaceae		
<i>Phyllanthus calycinus</i>		
<i>Poranthera microphylla</i>		
Pinaceae		
<i>Pinus pinaster</i>	*	
Pittosporaceae		
<i>Billardiera fusiformis</i>		
<i>Billardiera lehmanniana</i>		
<i>Cheiranthra filifolia</i>		
Plantaginaceae		
<i>Plantago debilis</i>		

SPECIES	WEED	DPAW CONS. CODE
Poaceae		
<i>Aira cupaniana</i>	*	
<i>Amphipogon avenaceus</i>		
<i>Amphipogon turbinatus</i>		
<i>Aristida contorta</i>		
<i>Austrostipa elegantissima</i>		
<i>Austrostipa flavescens</i>		
<i>Austrostipa hemipogon</i>		
<i>Austrostipa juncifolia</i>		
<i>Austrostipa puberula</i>		
<i>Austrostipa pycnostachya</i>		
<i>Austrostipa trichophylla</i>		
<i>Austrostipa variabilis</i>		
<i>Avellinia michelii</i>	*	
<i>Bromus rubens</i>	*	
<i>Ehrharta calycina</i>	*	
<i>Eragrostis dielsii</i>		
<i>Hordeum leporinum</i>	*	
<i>Lolium rigidum</i>	*	
<i>Neurachne alopecuroidea</i>		
<i>Rytidosperma setaceum</i>		
<i>Rytidosperma</i> sp.		
<i>Spartochloa scirpoidea</i>		
<i>Triodia scariosa</i>		
Polygalaceae		
<i>Comesperma calcicola</i>		P3
<i>Comesperma calymega</i>		
<i>Comesperma drummondii</i>		
<i>Comesperma integerrimum</i>		
<i>Comesperma polygaloides</i>		
<i>Comesperma scoparium</i>		
<i>Comesperma spinosum</i>		
Polygonaceae		
<i>Muehlenbeckia adpressa</i>		
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>		
<i>Rumex</i> sp.		
Portulacaceae		
<i>Calandrinia eremaea</i>		
<i>Calandrinia granulifera</i>		
Primulaceae		
<i>Lysimachia arvensis</i>	*	
Proteaceae		
<i>Adenanthos cuneatus</i>		
<i>Adenanthos dobsonii</i>		
<i>Adenanthos ileticos</i>		P4
<i>Banksia armata</i> var. <i>armata</i>		
<i>Banksia blechnifolia</i>		
<i>Banksia cirsioides</i>		
<i>Banksia elderiana</i>		
<i>Banksia media</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Banksia nutans</i> var. <i>nutans</i>		
<i>Banksia obovata</i>		
<i>Banksia obtusa</i>		
<i>Banksia petiolaris</i>		
<i>Banksia pilostylis</i>		
<i>Banksia pteridifolia</i>		
<i>Banksia pulchella</i>		
<i>Banksia repens</i>		
<i>Banksia speciosa</i>		
<i>Banksia tenuis</i> var. <i>tenuis</i>		
<i>Conospermum distichum</i>		
<i>Conospermum leianthum</i> subsp. <i>leianthum</i>		
<i>Conospermum leianthum</i> subsp. <i>orientale</i>		
<i>Conospermum teretifolium</i>		
<i>Franklandia fucifolia</i>		
<i>Grevillea aneura</i>		P4
<i>Grevillea baxteri</i>		P4
<i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>		
<i>Grevillea disjuncta</i>		
<i>Grevillea excelsior</i>		
<i>Grevillea huegelii</i>		
<i>Grevillea nudiflora</i>		
<i>Grevillea oligantha</i>		
<i>Grevillea oncogyne</i>		
<i>Grevillea pectinata</i>		
<i>Grevillea plurijuga</i>		
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		
<i>Grevillea teretifolia</i>		
<i>Hakea bicornata</i>		
<i>Hakea cinerea</i>		
<i>Hakea commutata</i>		
<i>Hakea corymbosa</i>		
<i>Hakea denticulata</i>		
<i>Hakea laurina</i>		
<i>Hakea lissocarpha</i>		
<i>Hakea marginata</i>		
<i>Hakea multilineata</i>		
<i>Hakea nitida</i>		
<i>Hakea obliqua</i> subsp. <i>obliqua</i>		
<i>Hakea pandanocarpa</i> subsp. <i>pandanicarpa</i>		
<i>Hakea prostrata</i>		
<i>Hakea strumosa</i>		
<i>Hakea varia</i>		
<i>Isopogon alpicornis</i>		P3
<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)		
<i>Isopogon trilobus</i>		
<i>Persoonia cymbifolia</i>		P3
<i>Persoonia helix</i>		
<i>Persoonia scabra</i>		P3
<i>Persoonia spathulata</i>		P2

SPECIES	WEED	DPAW CONS. CODE
<i>Persoonia teretifolia</i>		
<i>Persoonia trinervis</i>		
<i>Petrophile fastigiata</i>		
<i>Petrophile phyllicoides</i>		
<i>Petrophile squamata</i> subsp. northern (J. Monks 40)		
<i>Petrophile stricta</i>		
<i>Petrophile teretifolia</i>		
<i>Stirlingia anethifolia</i>		
<i>Synaphea divaricata</i>		
<i>Synaphea oligantha</i>		
<i>Synaphea reticulata</i>		
Restionaceae		
<i>Chordifex laxus</i>		
<i>Chordifex sphacelatus</i>		
<i>Desmocladius myriocladus</i>		
<i>Hypolaena exsulca</i>		
<i>Hypolaena humilis</i>		
<i>Lepyrodia macra</i>		
<i>Restionaceae</i> sp.		
Rhamnaceae		
<i>Cryptandra graniticola</i>		
<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>		
<i>Cryptandra myriantha</i>		
<i>Cryptandra nutans</i>		
<i>Cryptandra pungens</i>		
<i>Cryptandra recurva</i>		
<i>Cryptandra spyridioides</i>		
<i>Pomaderris forrestiana</i>		
<i>Pomaderris rotundifolia</i>		
<i>Spyridium cordatum</i>		
<i>Spyridium minutum</i>		
<i>Spyridium mucronatum</i> subsp. <i>mucronatum</i>		
<i>Stenanthemum ?emarginatum</i>		
<i>Stenanthemum notiale</i> subsp. <i>notiale</i>		
<i>Trymalium elachophyllum</i>		
<i>Trymalium myrtillus</i> subsp. <i>myrtillus</i>		
Rubiaceae		
<i>Opercularia vaginata</i>		
Rutaceae		
<i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i>		
<i>Boronia baeckeacea</i> subsp. <i>patula</i>		P1
<i>Boronia crassifolia</i>		
<i>Boronia fabianoides</i> subsp. <i>fabianoides</i>		
<i>Boronia inconspicua</i>		
<i>Boronia inornata</i> subsp. <i>inornata</i>		
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		
<i>Boronia spathulata</i>		
<i>Drummondita hassellii</i>		
<i>Geijera linearifolia</i>		
<i>Microcybe albiflora</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Microcybe multiflora</i> subsp. <i>baccharoides</i>		
<i>Microcybe multiflora</i> subsp. <i>multiflora</i>		
<i>Microcybe pauciflora</i> subsp. <i>pauciflora</i>		
<i>Nematolepis phebaliioides</i>		
<i>Phebalium filifolium</i>		
<i>Phebalium lepidotum</i>		
<i>Phebalium obovatum</i>		
<i>Phebalium tuberosum</i>		
<i>Philotheca fitzgeraldii</i>		
<i>Philotheca gardneri</i> subsp. <i>gardneri</i>		
<i>Philotheca gardneri</i> subsp. <i>globosa</i>		P1
<i>Philotheca rhomboidea</i>		
Santalaceae		
<i>Exocarpos aphyllus</i>		
<i>Exocarpos sparteus</i>		
<i>Leptomeria lehmannii</i>		
<i>Leptomeria pachyclada</i>		
<i>Leptomeria preissiana</i>		
<i>Santalum acuminatum</i>		
<i>Santalum murrayanum</i>		
Sapindaceae		
<i>Dodonaea amblyophylla</i>		
<i>Dodonaea bursariifolia</i>		
<i>Dodonaea caespitosa</i>		
<i>Dodonaea ceratocarpa</i>		
<i>Dodonaea glandulosa</i>		
<i>Dodonaea lobulata</i>		
<i>Dodonaea pinifolia</i>		
<i>Dodonaea stenozyga</i>		
<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>		
Scrophulariaceae		
<i>Diocirea violacea</i>		
<i>Eremophila chamaephila</i>		P3
<i>Eremophila compressa</i>		P3
<i>Eremophila decipiens</i> subsp. <i>decipiens</i>		
<i>Eremophila deserti</i>		
<i>Eremophila dichroantha</i>		
<i>Eremophila gibbosa</i>		
<i>Eremophila glabra</i> subsp. <i>albicans</i>		
<i>Eremophila ionantha</i>		
<i>Eremophila psilocalyx</i>		
<i>Eremophila scoparia</i>		
<i>Eremophila serpens</i>		P4
<i>Eremophila</i> sp.		
<i>Eremophila subfloccosa</i> subsp. <i>glandulosa</i>		
<i>Myoporum tetrandrum</i>		
Solanaceae		
<i>Cyphanthera microphylla</i>		
<i>Duboisia hopwoodii</i>		
<i>Solanum hoplopetalum</i>		

SPECIES	WEED	DPAW CONS. CODE
<i>Solanum nigrum</i>	*	
<i>Solanum nummularium</i>		
<i>Solanum plicatile</i>		
<i>Symonanthus aromaticus</i>		
Stylidiaceae		
<i>Levenhookia pauciflora</i>		
<i>Levenhookia pusilla</i>		
<i>Levenhookia stipitata</i>		
<i>Stylidium breviscapum</i>		
<i>Stylidium dichotomum</i>		
<i>Stylidium involucreatum</i>		
<i>Stylidium limbatum</i>		
<i>Stylidium macranthum</i>		
<i>Stylidium piliferum</i>		
<i>Stylidium preissii</i>		
<i>Stylidium turleyae</i>		
<i>Stylidium zeicolor</i>		
Thymelaeaceae		
<i>Pimelea angustifolia</i>		
<i>Pimelea brachyphylla</i>		
<i>Pimelea brevifolia</i> subsp. <i>brevifolia</i>		
<i>Pimelea cracens</i>		
<i>Pimelea erecta</i>		
<i>Pimelea imbricata</i> var. <i>piliger</i>		
<i>Pimelea spiculigera</i> var. <i>spiculigera</i>		
Violaceae		
<i>Hybanthus epacroides</i>		
<i>Hybanthus floribundus</i>		
Xanthorrhoeaceae		
<i>Xanthorrhoea platyphylla</i>		
Zygophyllaceae		
<i>Zygophyllum aurantiacum</i>		
<i>Zygophyllum billardiarei</i>		
<i>Zygophyllum glaucum</i>		

Table 31: Flora inventory for study area adjacent to Cape Arid National Park

FAMILY	SPECIES	CONS	Q46	Q47	Q48	OPP	
Anarthriaceae	<i>Anarthria laevis</i>		X	X	X		
	<i>Lyginia imberbis</i>		X	X			
Apiaceae	<i>Xanthosia huegelii</i>			X			
Asparagaceae	* <i>Asparagus asparagoides</i>					X	
Asteraceae	* <i>Arctotheca calendula</i>			X			
	* <i>Hypochaeris glabra</i>			X			
Casuarinaceae	<i>Allocasuarina humilis</i>					X	
Cyperaceae	<i>Caustis dioica</i>					X	
	<i>Lepidosperma squamatum</i>			X	X		
	<i>Mesomelaena stygia</i> subsp. <i>stygia</i>				X	X	
	<i>Schoenus pleiostemoneus</i>				X		
	<i>Schoenus subfascicularis</i>		X	X			
	<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)		X				
	<i>Tricostularia aphylla</i>			X	X		
	<i>Tricostularia compressa</i>		X	X			
	Dasypogonaceae	<i>Calectasia grandiflora</i>				X	
	Dilleniaceae	<i>Hibbertia</i> aff. <i>recurvifolia</i>				X	
<i>Hibbertia gracilipes</i>			X	X	X		
Droseraceae	<i>Drosera menziesii</i> subsp. <i>menziesii</i>				X		
	<i>Drosera paleacea</i> subsp. <i>trichocaulis</i>		X	X	X		
Ericaceae	<i>Andersonia parvifolia</i>		X				
	<i>Andersonia macranthera</i>				X		
	<i>Leucopogon assimilis</i>					X	
	<i>Leucopogon crassifolius</i>		X	X	X		
	<i>Lysinema ciliatum</i>		X	X			
	<i>Lysinema pentapetalum</i>				X		
	<i>Oligarrhena micrantha</i>				X		
<i>Dielsiodoxa oligarrhenoides</i>					X		
Euphorbiaceae	<i>Stachystemon brachyphyllus</i>				X		
Fabaceae	<i>Acacia cyclops</i>			X		X	
	<i>Acacia pachyphylla</i>				X		
	<i>Bossiaea preissii</i>			X	X		
	<i>Chorizema obtusifolium</i>				X		
	<i>Daviesia apiculata</i>				X		
	<i>Gompholobium baxteri</i>				X		
	<i>Jacksonia capitata</i>				X		
	<i>Pultenaea indira</i> subsp. <i>indira</i>					X	
Goodeniaceae	<i>Dampiera parvifolia</i>		X	X	X		
	<i>Goodenia pterigosperma</i>		X		X		
	<i>Lechenaultia formosa</i>			X	X	X	
Haemodoraceae	<i>Anigozanthos rufus</i>		X				
	<i>Conostylis seorsiflora</i> subsp. <i>seorsiflora</i>			X			
	<i>Conostylis setigera</i> subsp. <i>setigera</i>				X		
	<i>Conostylis phathyrantha</i>						
Iridaceae	<i>Patersonia lanata</i> forma <i>lanata</i>				X		
Lauraceae	<i>Cassytha glabella</i>				X		
Loganiaceae	<i>Logania micrantha</i>					X	
Myrtaceae	<i>Agonis baxteri</i>					X	
	<i>Beaufortia empetrifolia</i>		X	X	X		
	<i>Calothamnus gracilis</i>		X	X	X		
	<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>					X	
	<i>Calytrix decandra</i>				X		
	<i>Calytrix leschenaultii</i>				X		
	<i>Chamelaucium axillare</i>					X	
	<i>Chamelaucium megalopetalum</i>					X	
	<i>Conothamnus aureus</i>				X	X	
	<i>Darwinia vestita</i>					X	
	<i>Eucalyptus cooperiana</i>					X	
	<i>Eucalyptus extrica</i>		X		X		

FAMILY	SPECIES	CONS	Q46	Q47	Q48	OPP
	<i>Leptospermum maxwellii</i>					X
	<i>Melaleuca calcicola</i>			X	X	
	<i>Melaleuca pulchella</i>		X	X		
	<i>Melaleuca scabra</i>		X	X	X	
	<i>Melaleuca striata</i>				X	
	<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>				X	
	<i>Melaleuca suberosa</i>					X
	<i>Micromyrtus elobata</i> subsp. <i>elobata</i>					X
	<i>Oxymyrrhine gracilis</i>				X	
	<i>Phymatocarpus maxwellii</i>			X		
	<i>Taxandria spathulata</i>		X	X	X	
	<i>Verticordia vicinella</i>		X	X		
Orchidaceae	* <i>Disa bracteata</i>		X			
	<i>Diuris concinna</i>			X		
	<i>Elythranthera brunonis</i>					X
Pinaceae	* <i>Pinus pinaster</i>					X
Pittosporaceae	<i>Billardiera fusiformis</i>					X
Polygonaceae	<i>Rumex</i> sp.					X
Proteaceae	<i>Adenanthos cuneatus</i>		X			
	<i>Adenanthos dobsonii</i>				X	
	<i>Banksia nutans</i> var. <i>nutans</i>				X	
	<i>Banksia obovata</i>		X	X	X	
	<i>Banksia obtusa</i>		X		X	
	<i>Banksia petiolaris</i>		X		X	
	<i>Banksia pulchella</i>		X	X	X	
	<i>Banksia repens</i>		X		X	
	<i>Banksia speciosa</i>					X
	<i>Banksia tenuis</i> var. <i>tenuis</i>			X		
	<i>Conospermum distichum</i>		X			
	<i>Conospermum leianthum</i> subsp. <i>orientale</i>					X
	<i>Grevillea baxteri</i>	P4	X			
	<i>Hakea cinerea</i>		X	X	X	
	<i>Hakea corymbosa</i>				X	X
	<i>Hakea denticulata</i>		X			
	<i>Hakea obliqua</i> subsp. <i>obliqua</i>				X	
	<i>Hakea pandanicaarpa</i> subsp. <i>pandanicaarpa</i>		X		X	
	<i>Hakea prostrata</i>					X
	<i>Hakea varia</i>		X	X		
	<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)		X			
	<i>Isopogon trilobus</i>		X		X	
	<i>Petrophile phyllicoides</i>					X
	<i>Petrophile teretifolia</i>		X	X	X	
	<i>Stirlingia anethifolia</i>		X			
Restionaceae	<i>Chordifex sphacelatus</i>				X	
	<i>Hypolaena exsulca</i>		X	X	X	
	<i>Lepyrodia macra</i>		X	X		
Rubiaceae	<i>Opercularia vaginata</i>					X
Rutaceae	<i>Boronia crassifolia</i>				X	
	<i>Boronia spathulata</i>		X		X	
Stylidiaceae	<i>Levenhookia stipitata</i>			X		
	<i>Stylidium macranthum</i>			X		
	<i>Stylidium preissii</i>				X	
Thymelaeaceae	<i>Pimelea angustifolia</i>					X
	<i>Pimelea brevifolia</i> subsp. <i>brevifolia</i>					X

Table 32: Flora inventory for study area adjacent to Cheadanup Nature Reserve

FAMILY	SPECIES	CONS	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	OPP
Apiaceae	<i>Platysace effusa</i>								X	X	
Asparagaceae	<i>Laxmannia paleacea</i>						X			X	
	<i>Lomandra micrantha</i> subsp. <i>teretifolia</i>						X			X	
	<i>Lomandra mucronata</i>				X						
	<i>Thysanotus</i> ? <i>patersonii</i>								X		
Asteraceae	<i>Argentipallium niveum</i>						X			X	X
	<i>Olearia ciliata</i>									X	
Casuarinaceae	<i>Allocasuarina campestris</i>							X	X		
Cupressaceae	<i>Callitris roei</i>					X					
Cyperaceae	<i>Gahnia ancistrophylla</i>					X	X			X	
	<i>Lepidosperma</i> aff. <i>brunonianum</i>				X	X	X				
	<i>Lepidosperma drummondii</i>								X		
	<i>Lepidosperma rigidulum</i>							X	X		
	<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)				X	X					
	<i>Lepidosperma tuberculatum</i>					X	X				
	<i>Schoenus breviculmis</i>							X	X		
	<i>Schoenus obtusifolius</i>									X	
	<i>Schoenus racemosus</i>				X					X	
	<i>Schoenus sesquispiculus</i>				X		X			X	
	<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)				X		X			X	
	<i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897)					X					
Dilleniaceae	<i>Hibbertia gracilipes</i>				X		X			X	
	<i>Hibbertia psilocarpa</i>			X							
	<i>Hibbertia pungens</i>						X	X		X	
Ericaceae	<i>Andersonia parvifolia</i>										X
	<i>Astroloma serratifolium</i>					X		X	X		
	<i>Brachyloma geissoloma</i>								X		
	<i>Leucopogon brevicuspis</i>							X			
	<i>Leucopogon concinnus</i>					X	X		X		
	<i>Leucopogon cuneifolius</i>							X	X		
	<i>Leucopogon fimbriatus</i>				X	X	X	X			
	<i>Leucopogon</i> sp. Newdegate (M. Hislop 3585)				X	X	X				
	<i>Leucopogon tamminensis</i> var. <i>australis</i>						X		X		
	<i>Lysinema pentapetalum</i>				X		X	X		X	
Fabaceae	<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>					X			X		
	<i>Acacia assimilis</i> subsp. <i>atroviridis</i>							X	X		
	<i>Acacia curvata</i>						X			X	
	<i>Acacia glaucoptera</i>		X	X							X
	<i>Acacia gonophylla</i>				X						
	<i>Acacia lasiocarpa</i> var. <i>bracteolata</i>									X	
	<i>Acacia octonervia</i>		X								
	<i>Acacia patagiata</i>		X								
	<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>				X	X	X	X	X		
	<i>Chorizema aciculare</i> subsp. <i>aciculare</i>							X			
	<i>Daviesia argillacea</i>		X	X							
	<i>Daviesia lancifolia</i>				X		X			X	
	<i>Daviesia pachyphylla</i>				X			X	X		
	<i>Daviesia teretifolia</i>										X
	<i>Gastrolobium musaceum</i>		X								

FAMILY	SPECIES	CONS	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	OPP
	<i>Gastrolobium nutans</i>				X	X	X				
	<i>Gompholobium baxteri</i>				X		X			X	
	<i>Gompholobium confertum</i>				X		X			X	
	<i>Gompholobium marginatum</i>									X	
	<i>Isotropis drummondii</i>						X				
	<i>Pultenaea adunca</i>	P3		X							
	<i>Pultenaea craigiana</i>	P3	X								
	<i>Pultenaea indira</i> subsp. <i>indira</i>									X	
	<i>Templetonia rossii</i>									X	
Goodeniaceae	<i>Anthotium humile</i>									X	
	<i>Cooperookia polygalacea</i>		X	X							
	<i>Dampiera angulata</i> subsp. <i>angulata</i>					X	X				
	<i>Dampiera angulata</i> subsp. Peak Charles (K.R. Newbey 5402)		X								
	<i>Dampiera lavandulacea</i>				X	X		X			
	<i>Dampiera sacculata</i>							X			
	<i>Goodenia concinna</i>									X	
	<i>Goodenia scapigera</i> subsp. <i>scapigera</i>							X			X
	<i>Goodenia trichophylla</i>				X					X	
Haemodoraceae	<i>Conostylis argentea</i>				X		X	X			
Haloragaceae	<i>Glischrocaryon</i> sp.										X
Hemerocallidaceae	<i>Dianella brevicaulis</i>					X					
Lamiaceae	<i>Hemigenia teretiuscula</i>				X		X				
	<i>Microcorys glabra</i> var. <i>glabra</i>									X	X
Lauraceae	<i>Cassythia glabella</i>				X		X	X		X	
	<i>Cassythia melantha</i>		X	X							
Loganiaceae	<i>Logania buxifolia</i>										X
Malvaceae	<i>Guichenotia micrantha</i>										X
	<i>Lasiopetalum compactum</i>					X					
	<i>Lasiopetalum rosmarinifolium</i>					X				X	
	<i>Thomasia microphylla</i>						X				X
Myrtaceae	<i>Baeckea crispiflora</i>										X
	<i>Baeckea pachyphylla</i>					X	X				
	<i>Beaufortia micrantha</i> var. <i>micrantha</i>										X
	<i>Beaufortia schaueri</i>				X	X				X	
	<i>Calothamnus gibbosus</i>				X					X	
	<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>					X	X	X	X		
	<i>Calytrix leschenaultii</i>				X	X	X	X	X		
	<i>Eucalyptus clivicola</i>					X					
	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>										X
	<i>Eucalyptus flocktoniae</i>		X	X							
	<i>Eucalyptus perangusta</i>										X
	<i>Eucalyptus phaenophylla</i> subsp. <i>interjacens</i>						X			X	
	<i>Eucalyptus platypus</i> subsp. <i>platypus</i>		X	X							
	<i>Eucalyptus pleurocarpa</i>				X		X			X	
	<i>Eucalyptus sporadica</i>					X					
	<i>Eucalyptus stoatei</i>	P4									X
	<i>Eucalyptus suggrandis</i> subsp. <i>suggrandis</i>										X
	<i>Eucalyptus uncinata</i>				X	X	X				
	<i>Kunzea affinis</i>							X	X		
	<i>Kunzea jucunda</i>				X	X					
	<i>Leptospermum maxwellii</i>							X	X		

FAMILY	SPECIES	CONS	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	OPP
	<i>Leptospermum spinescens</i>										X
	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>					X					
	<i>Melaleuca eurystoma</i>					X			X		X
	<i>Melaleuca glaberrima</i>					X	X	X	X		X
	<i>Melaleuca hamata</i>		X		X	X	X		X		
	<i>Melaleuca lateriflora</i>										X
	<i>Melaleuca rigidifolia</i>						X			X	
	<i>Melaleuca sapientes</i>							X			
	<i>Melaleuca societatis</i>			X	X	X		X			
	<i>Melaleuca subfalcata</i>				X	X				X	
	<i>Melaleuca torquata</i>			X							
	<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>				X						
	<i>Melaleuca ulicoides</i>			X							
	<i>Micromyrtus imbricata</i>										X
	<i>Rinzia communis</i>					X					
	<i>Tetrapora verrucosa</i>									X	
	<i>Thryptomene australis</i> subsp. <i>brachyandra</i>							X	X		
	<i>Verticordia acerosa</i> var. <i>preissii</i>						X		X		
	<i>Verticordia chrysantha</i>				X		X	X			
	<i>Verticordia plumosa</i> var. <i>incrassata</i>										X
Pittosporaceae	<i>Cheiranthra filifolia</i>					X	X				
Poaceae	<i>Amphipogon avenaceus</i>									X	
	<i>Amphipogon turbinatus</i>				X		X	X	X	X	
	<i>Austrostipa hemipogon</i>					X					
	<i>Neurachne alopecuroidea</i>				X	X	X	X	X	X	
	<i>Spartochloa scirpoidea</i>							X	X		
Polygalaceae	<i>Comesperma spinosum</i>										X
Proteaceae	<i>Banksia media</i>									X	X
	<i>Grevillea disjuncta</i>				X		X	X			
	<i>Grevillea nudiflora</i>				X	X	X	X		X	
	<i>Grevillea oligantha</i>									X	X
	<i>Grevillea pectinata</i>		X								X
	<i>Grevillea teretifolia</i>							X	X		
	<i>Hakea commutata</i>			X							X
	<i>Hakea corymbosa</i>										X
	<i>Hakea laurina</i>					X					X
	<i>Hakea marginata</i>						X				
	<i>Hakea nitida</i>				X	X					
	<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)					X					X
	<i>Isopogon trilobus</i>										X
	<i>Persoonia helix</i>				X						
	<i>Petrophile fastigiata</i>				X	X		X			
Rhamnaceae	<i>Cryptandra graniticola</i>							X	X		
	<i>Spyridium cordatum</i>						X			X	X
Rubiaceae	<i>Opercularia vaginata</i>					X		X	X		
Rutaceae	<i>Boronia inconspicua</i>		X			X					
Santalaceae	<i>Exocarpos aphyllus</i>		X	X							
	<i>Exocarpos sparteus</i>		X	X	X	X	X			X	
	<i>Santalum acuminatum</i>							X			
Sapindaceae	<i>Dodonaea caespitosa</i>					X		X	X		
	<i>Dodonaea glandulosa</i>			X							
	<i>Dodonaea pinifolia</i>			X							

FAMILY	SPECIES	CONS	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	OPP
Stylidiaceae	<i>Stylidium dichotomum</i>								X		
	<i>Stylidium involucreatum</i>				X						
	<i>Stylidium piliferum</i>				X		X			X	
Thymelaeaceae	<i>Pimelea imbricata</i> var. <i>piliger</i>						X	X	X	X	

Table 33: Flora inventory for study area adjacent to R35659 Nature Reserve

FAMILY	SPECIES	CONS	Q42	Q43	Q44	Q45	OPP	
Aizoaceae	<i>Carpobrotus</i> sp.						X	
Boraginaceae	<i>Halgania andromedifolia</i>			X		X		
Dilleniaceae	<i>Hibbertia psilocarpa</i>		X	X		X		
Fabaceae	<i>Acacia binata</i>		X	X	X			
	<i>Acacia crassulooides</i>			X	X	X		
	<i>Acacia deficiens</i>				X			
	<i>Acacia merrallii</i>						X	
	<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		X					
	<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412)		X					
	<i>Bossiaea leptacantha</i>						X	
	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		X		X	X		
	<i>Daviesia campephylla</i>			X		X		
	<i>Dillwynia divaricata</i>			X				
Lamiaceae	<i>Eutaxia lutea</i>		X					
	<i>Pultenaea ?arida</i>			X	X	X		
	<i>Microcorys glabra</i> var. <i>glabra</i>		X	X				
	<i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i>		X					
	<i>Westringia dampieri</i>			X	X	X		
	Lauraceae	<i>Cassytha glabella</i>				X	X	
		Loganiaceae	<i>Logania stenophylla</i>		X	X		
	Myrtaceae		<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		X	X		
			<i>Eucalyptus flocktoniae</i>		X			X
			<i>Eucalyptus indurata</i>				X	X
<i>Eucalyptus kessellii</i>								X
<i>Eucalyptus leptocalyx</i>								X
<i>Eucalyptus phenax</i> subsp. <i>phenax</i>					X		X	
<i>Eucalyptus platypus</i>					X			X
<i>Eucalyptus uncinata</i>				X				
<i>Eucalyptus valens</i>						X		
<i>Melaleuca cucullata</i>					X	X		
<i>Melaleuca glaberrima</i>		X						
<i>Melaleuca hamata</i>		X	X					
<i>Melaleuca lateriflora</i>			X					
<i>Melaleuca marginata</i>			X					
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>			X	X	X			
<i>Melaleuca podiocarpa</i>		X		X	X			
<i>Melaleuca sapientes</i>		X	X					
<i>Melaleuca societatis</i>		X	X		X			
<i>Melaleuca strobophylla</i>				X	X			

FAMILY	SPECIES	CONS	Q42	Q43	Q44	Q45	OPP
Polygalaceae	<i>Comesperma spinosum</i>		X	X		X	
Proteaceae	<i>Grevillea huegelii</i>						X
	<i>Grevillea oligantha</i>						X
	<i>Grevillea pectinata</i>		X	X	X	X	
	<i>Hakea commutata</i>		X	X			
Rhamnaceae	<i>Spyridium minutum</i>			X		X	
Rutaceae	<i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i>		X				
	<i>Boronia inornata</i> subsp. <i>leptophylla</i>			X		X	
	<i>Microcybe multiflora</i> subsp. <i>multiflora</i>					X	
Santalaceae	<i>Exocarpos aphyllus</i>					X	
	<i>Exocarpos sparteus</i>				X		
	<i>Leptomeria pachyclada</i>						X
Sapindaceae	<i>Dodonaea stenozyga</i>					X	
Scrophulariaceae	<i>Eremophila chamaephila</i>	P3				X	
	<i>Eremophila serpens</i>	P4					X

Table 34: Flora inventory for study area adjacent to Lake Gilmour Nature Reserve

FAMILY	SPECIES	CONS	Q01	Q03	Q04	Q05	Q06	Q07	Q08	OPP
Aizoaceae	<i>Carpobrotus modestus</i>						X			
	<i>Disphyma crassifolium</i>						X			
	<i>Gunnioopsis intermedia</i>						X			
	* <i>Mesembryanthemum nodiflorum</i>					X			X	
Amaranthaceae	<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>			X						
	<i>Ptilotus spathulatus</i>			X		X				
Apiaceae	<i>Daucus glochidiatus</i>			X	X					
Araliaceae	<i>Hydrocotyle callicarpa</i>			X						
	<i>Hydrocotyle pilifera</i> var. <i>glabrata</i>						X			
	<i>Trachymene cyanopetala</i>			X						
Asparagaceae	<i>Thysanotus manglesianus</i>			X		X	X			
Asteraceae	<i>Angianthus preissianus</i>						X			
	<i>Angianthus tomentosus</i>				X	X				
	* <i>Arctotheca calendula</i>						X			
	<i>Blennospora drummondii</i>			X						
	<i>Brachyscome ciliaris</i>					X				
	<i>Calotis hispidula</i>			X						
	* <i>Carthamus lanatus</i>				X					
	* <i>Centaurea melitensis</i>				X	X				
	* <i>Conyza</i> sp.				X		X			
	<i>Cratystylis conocephala</i>		X			X			X	
	<i>Euchiton sphaericus</i>				X		X			
	<i>Helichrysum luteoalbum</i>				X		X			
	<i>Millotia tenuifolia</i>			X						
	<i>Olearia</i> sp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628)							X	X	
	<i>Olearia muelleri</i>							X		
	* <i>Onopordum acaulon</i>				X	X				
	<i>Podolepis capillaris</i>			X			X	X		
	<i>Podolepis tepperi</i>				X					
	<i>Senecio lacustrinus</i>						X			
	<i>Senecio quadridentatus</i>				X					

FAMILY	SPECIES	CONS	Q01	Q03	Q04	Q05	Q06	Q07	Q08	OPP
	<i>*Sonchus oleraceus</i>			X	X	X	X			
	<i>Vittadinia dissecta</i>				X	X	X			
Boraginaceae	<i>Halgania andromedifolia</i>					X				
Brassicaceae	<i>*Brassica tournefortii</i>		X							
	<i>*Sisymbrium irio</i>				X	X				
Campanulaceae	<i>Lobelia cleistogamoides</i>			X			X			
	<i>Wahlenbergia preissii</i>			X						
Caryophyllaceae	<i>Spergularia brevifolia</i>					X	X			
Centrolepidaceae	<i>Centrolepis cephaloformis</i> subsp. <i>cephaloformis</i>						X			
Chenopodiaceae	<i>Atriplex</i> sp.				X	X				
	<i>Enchylaena tomentosa</i>		X				X		X	
	<i>Maireana radiata</i>		X						X	
	<i>Maireana</i> sp.		X							
	<i>Maireana trichoptera</i>					X		X	X	
	<i>Rhagodia crassifolia</i>					X				
	<i>Rhagodia drummondii</i>			X						
	<i>Rhagodia preissii</i>						X	X		
	<i>Sclerolaena diacantha</i>		X	X		X			X	
	<i>Sclerolaena parviflora</i>							X		
	<i>Tecticornia syncarpa</i>						X			
Convolvulaceae	<i>Wilsonia humilis</i>								X	
Crassulaceae	<i>Crassula colorata</i>			X	X		X			
Cyperaceae	<i>Gahnia ancistrophylla</i>							X		
	<i>Lepidosperma drummondii</i>							X		
Fabaceae	<i>Acacia merrallii</i>					X				
	<i>*Medicago minima</i>			X	X	X				
	<i>Pultenaea arida</i>					X				
Geraniaceae	<i>Pelargonium drummondii</i>				X					
Goodeniaceae	<i>Scaevola spinescens</i>		X			X		X		
	<i>Velleia cynopotamica</i>			X						
Malvaceae	Malvaceae sp.			X						
Myrtaceae	<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3								
	<i>Eucalyptus ?spreta</i>					X				
	<i>Eucalyptus diptera</i>			X	X	X				
	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>			X						
	<i>Eucalyptus melanoxylon</i>		X						X	
	<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i>			X						
	<i>Eucalyptus olivina</i>							X		
	<i>Eucalyptus polita</i>				X					
	<i>Eucalyptus quadrans</i>						X			
	<i>Eucalyptus salmonophloia</i>		X							
	<i>Eucalyptus</i> sp.				X					
	<i>Eucalyptus urna</i>								X	
	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>				X					
	<i>Melaleuca exuvia</i>				X		X			
	<i>Melaleuca pauperiflora</i>			X		X				
	<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>				X					
	<i>Melaleuca quadrifaria</i>		X							
	<i>Melaleuca subalaris</i>						X			
	<i>Melaleuca teuthidoides</i>		X		X					

FAMILY	SPECIES	CONS	Q01	Q03	Q04	Q05	Q06	Q07	Q08	OPP
	<i>Melaleuca thyoides</i>						X			
Orchidaceae	<i>Pterostylis roensis</i>				X					
Phyllanthaceae	<i>Poranthera microphylla</i>			X						
Plantaginaceae	<i>Plantago debilis</i>			X						
Poaceae	<i>Austrostipa elegantissima</i>					X				
	<i>Austrostipa hemipogon</i>				X					
	<i>Austrostipa puberula</i>					X	X	X		
	<i>Austrostipa trichophylla</i>			X						
	* <i>Avellinia michelii</i>					X				
	* <i>Bromus rubens</i>					X				
	* <i>Hordeum leporinum</i>					X				
	* <i>Lolium rigidum</i>				X	X				
	<i>Rytidosperma setaceum</i>					X				
Portulacaceae	<i>Calandrinia eremaea</i>			X	X		X			
	<i>Calandrinia granulifera</i>						X			
Primulaceae	* <i>Lysimachia arvensis</i>						X			
Santalaceae	<i>Exocarpos aphyllus</i>					X	X			
Scrophulariaceae	<i>Eremophila decipiens</i> subsp. <i>decipiens</i>					X	X			
	<i>Eremophila ionantha</i>		X		X	X		X		
	<i>Eremophila scoparia</i>		X						X	
	<i>Eremophila</i> sp.				X					
Zygophyllaceae	<i>Zygophyllum billardi</i>						X			
	<i>Zygophyllum glaucum</i>		X						X	

Table 35: Flora inventory for study area adjacent to Salmon Gums Nature Reserve

FAMILY	SPECIES	CONS	Q09	R188	Q10	Q11	R189	Q12	Q31	Q32	Q33	R190
Aizoaceae	<i>Carpobrotus modestus</i>				X			X				
Amaranthaceae	<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>					X			X		X	
	<i>Ptilotus holosericeus</i>		X									
	<i>Ptilotus humilis</i>							X		X		
	<i>Ptilotus seminudus</i>					X		X				
	<i>Ptilotus spathulatus</i>		X					X		X		
Apocynaceae	<i>Alyxia buxifolia</i>							X	X		X	X
Araliaceae	<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P1			X							
	<i>Trachymene cyanopetala</i>									X		
Asparagaceae	<i>Thysanotus manglesianus</i>							X				
Asteraceae	<i>Angianthus tomentosus</i>		X		X	X	X	X				
	<i>Brachyscome ciliaris</i>		X		X			X				
	<i>Gnephosis drummondii</i>				X							
	<i>Helichrysum leucopsidium</i>										X	
	* <i>Hypochaeris glabra</i>									X		
	<i>Olearia exiguiifolia</i>		X			X			X		X	
	<i>Olearia muelleri</i>							X	X	X	X	X
	<i>Podolepis capillaris</i>							X	X	X		
	<i>Podolepis tepperi</i>							X	X			
	<i>Podotroche angustifolia</i>									X		
	<i>Senecio lacustrinus</i>				X	X		X				
	* <i>Sonchus oleraceus</i>				X	X						
	<i>Vittadinia dissecta</i>							X				
	<i>Waitzia suaveolens</i> var. <i>flava</i>		X	X		X		X	X	X	X	

FAMILY	SPECIES	CONS	Q09	R188	Q10	Q11	R189	Q12	Q31	Q32	Q33	R190
Campanulaceae	<i>Lobelia cleistogamoides</i>								X	X	X	
	<i>Wahlenbergia preissii</i>								X			
Chenopodiaceae	<i>Atriplex</i> sp.				X							
	<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>		X					X				
	<i>Maireana erioclada</i>		X									
	<i>Maireana oppositifolia</i>				X							
	<i>Maireana trichoptera</i>		X									
	<i>Rhagodia preissii</i>					X						
	<i>Sclerolaena diacantha</i>				X	X		X				
	<i>Sclerolaena parviflora</i>								X		X	
	<i>Tecticornia</i> sp.				X							
Crassulaceae	<i>Crassula colorata</i>								X			
Cyperaceae	<i>Gahnia</i> sp. L (K.R. Newbey 7888)		X									
Dilleniaceae	<i>Hibbertia psilocarpa</i>		X	X		X			X	X	X	
Euphorbiaceae	<i>Euphorbia</i> sp.								X			
Fabaceae	<i>Acacia enervia</i> subsp. <i>enervia</i>					X						
	<i>Acacia glaucissima</i>	P3	X			X		X	X	X	X	
	<i>Acacia mutabilis</i> subsp. <i>angustifolia</i>		X									
	<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2										
Gentianaceae	<i>Schenkia australis</i>				X							
Goodeniaceae	<i>Cooperookia strophiolata</i>					X						
	<i>Goodenia berardiana</i>								X	X	X	
	<i>Scaevola spinescens</i>							X			X	
Haloragaceae	<i>Glischrocaryon aureum</i>		X			X		X	X	X	X	
Lamiaceae	<i>Westringia rigida</i>		X			X						
Lauraceae	<i>Cassytha melantha</i>									X		
Malvaceae	<i>Commersonia craurophylla</i>		X			X		X	X	X	X	
Myrtaceae	<i>Cyathostemon</i> cf. <i>ambiguus</i>								X		X	
	<i>Cyathostemon</i> cf. <i>blackettii</i>		X			X		X				
	<i>Eucalyptus ?delicata</i>						X					
	<i>Eucalyptus conglobata</i>								X	X	X	
	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>											X
	<i>Eucalyptus olivina</i>											X
	<i>Eucalyptus</i> sp.									X		
	<i>Leptospermum erubescens</i>				X							
	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>		X	X						X	X	
	<i>Melaleuca linguiformis</i>			X			X	X				
	<i>Melaleuca pauciflora</i>											X
	<i>Melaleuca pauperiflora</i>								X		X	
	<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>											X
	<i>Melaleuca societatis</i>											X
	<i>Melaleuca thyoides</i>						X	X	X	X		
<i>Melaleuca undulata</i>										X		
Orchidaceae	<i>Thelymitra</i> sp.								X			
Poaceae	<i>Aristida contorta</i>									X		
	<i>Austrostipa flavescens</i>		X									
	<i>Austrostipa hemipogon</i>		X			X		X	X			
	<i>Austrostipa juncifolia</i>				X							
	<i>Austrostipa trichophylla</i>				X							

FAMILY	SPECIES	CONS	Q09	R188	Q10	Q11	R189	Q12	Q31	Q32	Q33	R190
	<i>Austrostipa variabilis</i>		X			X		X	X	X	X	
	<i>Eragrostis dielsii</i>		X		X				X		X	
	* <i>Hordeum leporinum</i>				X							
	<i>Rytidosperma setaceum</i>		X			X		X	X	X	X	
	<i>Triodia scariosa</i>		X									
Polygalaceae	<i>Comesperma calcicola</i>	P3	X			X				X		
	<i>Comesperma integerrimum</i>										X	
Polygonaceae	<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>		X			X		X	X		X	
Portulacaceae	<i>Calandrinia eremaea</i>					X						
Proteaceae	<i>Grevillea oligantha</i>		X									
	<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>									X		
Rhamnaceae	<i>Cryptandra recurva</i>					X						
Rutaceae	<i>Microcybe multiflora</i> subsp. <i>multiflora</i>					X						
	<i>Phebalium lepidotum</i>									X		
	<i>Phebalium tuberculosum</i>							X				
Santalaceae	<i>Exocarpos aphyllus</i>			X		X	X	X		X		
Sapindaceae	<i>Dodonaea stenozyga</i>		X									
Scrophulariaceae	<i>Eremophila decipiens</i> subsp. <i>decipiens</i>					X		X				
Solanaceae	<i>Duboisia hopwoodii</i>		X					X	X			
	<i>Solanum hoplopetalum</i>							X			X	
Thymelaeaceae	<i>Pimelea erecta</i>									X		
Violaceae	<i>Hybanthus epacroides</i>									X		
Zygophyllaceae	<i>Zygophyllum billardieri</i>		X		X	X						

Table 36: Flora inventory for study area adjacent to Mt Ney Nature Reserve

FAMILY	SPECIES	CONS	Q13	Q14	Q15	Q16	Q17	Q18
Apiaceae	<i>Platysace effusa</i>			X				
Asparagaceae	<i>Laxmannia paleacea</i>						X	
	<i>Lomandra mucronata</i>			X				
	<i>Thysanotus manglesianus</i>							X
Casuarinaceae	<i>Allocasuarina campestris</i>						X	
	<i>Allocasuarina humilis</i>			X				
Convolvulaceae	<i>Wilsonia humilis</i>							X
Cupressaceae	<i>Callitris roei</i>				X			
Cyperaceae	<i>Gahnia ancistrophylla</i>		X					
	<i>Gahnia</i> sp. L (K.R. Newbey 7888)					X		
	<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)					X		X
	<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank KLV 9266)							X
	<i>Lepidosperma ?resinosum</i>						X	
	<i>Lepidosperma</i> aff. <i>brunonianum</i>		X	X	X			
	<i>Lepidosperma gahniioides</i>							X
	<i>Mesomelaena stygia</i> subsp. <i>stygia</i>			X				
	<i>Schoenus breviculmis</i>						X	
	<i>Schoenus pleiostemoneus</i>			X				
	<i>Schoenus racemosus</i>			X				
	<i>Schoenus subflavus</i> subsp. <i>hispid culms</i> (K.R. Newbey 8278)			X				
	<i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897)					X		

FAMILY	SPECIES	CONS	Q13	Q14	Q15	Q16	Q17	Q18
Dilleniaceae	<i>Hibbertia</i> aff. <i>gracilipes</i>				X	X	X	
	<i>Hibbertia exasperata</i>		X					
	<i>Hibbertia psilocarpa</i>							X
Ericaceae	<i>Acrotriche cordata</i>							X
	<i>Leucopogon cuneifolius</i>		X	X			X	
	<i>Leucopogon obtusatus</i>		X		X	X		
	<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)				X	X		X
	<i>Lysinema pentapetalum</i>			X				
Euphorbiaceae	<i>Monotaxis paxii</i>			X				
Fabaceae	<i>Acacia crassuloides</i>					X		X
	<i>Acacia evenulosa</i>				X	X		X
	<i>Acacia glaucissima</i>	P3	X					
	<i>Acacia gonophylla</i>		X	X				
	<i>Acacia mimica</i> var. <i>angusta</i>						X	
	<i>Chorizema aciculare</i> subsp. <i>aciculare</i>			X				
	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		X		X	X		X
	<i>Daviesia lancifolia</i>		X	X		X		
	<i>Dillwynia divaricata</i>				X			
	<i>Eutaxia lutea</i>		X	X		X		
	<i>Gastrolobium discolor</i>						X	
	<i>Gompholobium baxteri</i>		X	X				X
	<i>Gompholobium confertum</i>					X	X	
	<i>Gompholobium marginatum</i>			X				
	<i>Pultenaea indira</i> subsp. <i>indira</i>		X					
	<i>Pultenaea spinulosa</i>					X		X
	Goodeniaceae	<i>Cooperhookea strophiolata</i>				X		
<i>Dampiera lavandulacea</i>			X					
<i>Dampiera sacculata</i>							X	
<i>Goodenia laevis</i> subsp. <i>laevis</i>		P3	X			X		X
<i>Goodenia pterigosperma</i>				X				
Hemerocallidaceae	<i>Dianella brevicaulis</i>							X
Lamiaceae	<i>Microcorys glabra</i> var. <i>glabra</i>							X
Lauraceae	<i>Cassythia</i> sp.		X					X
Malvaceae	<i>Lasiopetalum rosmarinifolium</i>		X	X		X		
Myrtaceae	<i>Baeckea latens</i>		X		X	X		X
	<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>						X	
	<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>			X			X	
	<i>Cyathostemon</i> aff. <i>tenuifolius</i>					X		
	<i>Darwinia</i> sp. Mt Ney Virgate (A.S. George 15837)						X	
	<i>Eucalyptus conglobata</i>				X			X
	<i>Eucalyptus flocktoniae</i>					X		
	<i>Eucalyptus grossa</i>				X			
	<i>Eucalyptus leptocalyx</i>							X
	<i>Eucalyptus pleurocarpa</i>			X				
	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157)						X	
	<i>Eucalyptus tumida</i>		X	X		X		
	<i>Eucalyptus uncinata</i>		X			X		X
	<i>Melaleuca glaberrima</i>		X	X		X		
	<i>Melaleuca hamata</i>			X	X			X
	<i>Melaleuca rigidifolia</i>		X	X		X		
	<i>Melaleuca societatis</i>		X			X		
<i>Melaleuca undulata</i>				X	X		X	
<i>Verticordia eriocephala</i>			X			X		

FAMILY	SPECIES	CONS	Q13	Q14	Q15	Q16	Q17	Q18
Phyllanthaceae	<i>Poranthera microphylla</i>						X	
Poaceae	<i>Amphipogon turbinatus</i>			X				
	<i>Neurachne alopecuroidea</i>		X	X	X		X	
	<i>Rytidosperma setaceum</i>				X	X		X
Polygalaceae	<i>Comesperma spinosum</i>		X			X		X
Proteaceae	<i>Banksia armata</i> var. <i>armata</i>			X				
	<i>Grevillea oligantha</i>		X	X	X	X		X
	<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		X			X		
	<i>Hakea commutata</i>				X	X		X
	<i>Hakea corymbosa</i>			X				
	<i>Hakea laurina</i>		X		X			
	<i>Hakea lissocarpha</i>			X	X			
Restionaceae	<i>Desmocladius myriocladus</i>			X				
	<i>Hypolaena humilis</i>		X	X				
Rhamnaceae	<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>				X			
	<i>Cryptandra myriantha</i>						X	
	<i>Spyridium minutum</i>		X	X	X	X		X
	<i>Stenanthemum ?emarginatum</i>			X				
	<i>Trymalium myrtillus</i> subsp. <i>myrtillus</i>				X			
Rubiaceae	<i>Opercularia vaginata</i>			X				
Rutaceae	<i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i>		X					
	<i>Boronia crassifolia</i>			X				
	<i>Boronia inconspicua</i>				X	X		
	<i>Boronia inornata</i> subsp. <i>inornata</i>							X
	<i>Boronia inornata</i> subsp. <i>leptophylla</i>		X					
	<i>Philotheca gardneri</i> subsp. <i>gardneri</i>						X	
Santalaceae	<i>Exocarpos aphyllus</i>							X
Sapindaceae	<i>Dodonaea bursariifolia</i>							X
	<i>Dodonaea caespitosa</i>				X			
Stylidiaceae	<i>Levenhookia pusilla</i>						X	
	<i>Stylidium breviscapum</i>						X	
	<i>Stylidium piliferum</i>			X				
	<i>Stylidium turleyae</i>					X		
Thymelaeaceae	<i>Pimelea cracens</i>		X					
	<i>Pimelea erecta</i>			X				

Table 37: Flora inventory for study area adjacent to Beaumont Nature Reserve

FAMILY	SPECIES	CONS	Q19	Q20	Q21	Q22	Q23	Q24	Q51	Q52	OPP
Apiaceae	<i>Platysace effusa</i>			X							
Araliaceae	<i>Hydrocotyle rugulosa</i>						X				
	<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3									X
Asparagaceae	<i>Thysanotus brachyantherus</i>	P2									X
Asteraceae	<i>Ozothamnus lepidophyllus</i>									X	
	<i>Rhodanthe laevis</i>						X				
Boraginaceae	<i>Halgania andromedifolia</i>				X	X			X		
Casuarinaceae	<i>Allocasuarina campestris</i>			X							
Convolvulaceae	<i>Wilsonia humilis</i>				X						
Crassulaceae	<i>Crassula colorata</i>						X				
Cupressaceae	<i>Callitris roei</i>			X							
Cyperaceae	<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)							X			

FAMILY	SPECIES	CONS	Q19	Q20	Q21	Q22	Q23	Q24	Q51	Q52	OPP
	<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank K LW 9266)		X					X			
	<i>Lepidosperma</i> ? <i>resinosum</i>			X							
	<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)		X	X							
	<i>Schoenus breviculmis</i>			X							
Dilleniaceae	<i>Hibbertia exasperata</i>		X								
	<i>Hibbertia gracilipes</i>		X	X	X	X					
	<i>Hibbertia psilocarpa</i>		X			X		X	X	X	
Ericaceae	<i>Leucopogon cuneifolius</i>			X							
	<i>Leucopogon obtusatus</i>			X							
	<i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085)			X							
	<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)		X								
	<i>Lissanthe rubicunda</i>					X					
	<i>Lysinema pentapetalum</i>			X							
Fabaceae	<i>Acacia erinacea</i>									X	
	<i>Acacia euthyphylla</i>	P3									X
	<i>Acacia glaucissima</i>	P3	X		X	X		X	X	X	
	<i>Acacia hakeoides</i>				X						
	<i>Acacia sulcata</i> var. <i>platyphylla</i>			X	X	X					
	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>									X	
	<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		X		X	X		X			
	<i>Daviesia lancifolia</i>		X								
	<i>Dillwynia divaricata</i>					X			X	X	
	<i>Eutaxia lutea</i>		X	X						X	
	<i>Gastrolobium musaceum</i>		X								
	<i>Gompholobium baxteri</i>							X			
	<i>Mirbelia granitica</i>			X							
	<i>Pultenaea</i> ? <i>arida</i>				X						
	<i>Pultenaea elachista</i>					X		X			
	<i>Pultenaea purpurea</i>								X	X	
Goodeniaceae	<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3			X						
Hemerocallidaceae	<i>Dianella brevicaulis</i>									X	
Lamiaceae	<i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i>									X	
	<i>Westringia rigida</i>				X						
Lauraceae	<i>Cassytha melantha</i>		X			X			X		
Myrtaceae	<i>Baeckea latens</i>		X	X	X			X			
	<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>			X							
	<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>			X							
	<i>Cyathostemon</i> cf. <i>ambiguus</i>									X	
	<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)	P1									X
	<i>Eucalyptus</i> ? <i>calycogona</i>				X						
	<i>Eucalyptus conglobata</i>					X					
	<i>Eucalyptus dielsii</i>				X						
	<i>Eucalyptus grossa</i>			X							
	<i>Eucalyptus indurata</i>					X					
	<i>Eucalyptus leptocalyx</i>								X	X	
	<i>Eucalyptus luculenta</i>									X	
	<i>Eucalyptus tetraptera</i>							X			
	<i>Eucalyptus tumida</i>		X						X		
	<i>Eucalyptus uncinata</i>		X		X	X		X	X	X	

FAMILY	SPECIES	CONS	Q19	Q20	Q21	Q22	Q23	Q24	Q51	Q52	OPP
	<i>Leptospermum fastigiatum</i>			X							
	<i>Melaleuca brevifolia</i>					X					
	<i>Melaleuca bromelioides</i>							X		X	
	<i>Melaleuca calycina</i>				X	X					
	<i>Melaleuca cucullata</i>							X			
	<i>Melaleuca eximia</i>	P2									X
	<i>Melaleuca fissurata</i>	P4					X				
	<i>Melaleuca glaberrima</i>		X					X			
	<i>Melaleuca hamata</i>		X			X			X		
	<i>Melaleuca rigidifolia</i>		X	X	X						
	<i>Melaleuca societatis</i>					X			X	X	
	<i>Melaleuca subalaris</i>						X				
	<i>Melaleuca teuthidoides</i>				X	X		X		X	
	<i>Melaleuca thyoides</i>		X				X				
	<i>Melaleuca uncinata</i>			X							
	<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3									X
	<i>Verticordia eriocephala</i>			X							
Poaceae	<i>Austrostipa pycnostachya</i>						X				
	<i>Neurachne alopecuroidea</i>		X	X							
Polygalaceae	<i>Comesperma calymega</i>				X						
	<i>Comesperma spinosum</i>							X		X	
Proteaceae	<i>Grevillea oligantha</i>		X			X		X	X		
	<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		X			X		X	X	X	
	<i>Hakea bicornata</i>			X							
	<i>Hakea commutata</i>				X				X		
	<i>Hakea laurina</i>		X								
	<i>Persoonia teretifolia</i>							X			
	<i>Petrophile fastigiata</i>			X							
Rhamnaceae	<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>								X		
	<i>Spyridium minutum</i>				X	X		X		X	
	<i>Spyridium mucronatum</i> subsp. <i>mucronatum</i>								X		
Rutaceae	<i>Boronia inconspicua</i>								X		
	<i>Boronia inornata</i> subsp. <i>inornata</i>					X					
	<i>Boronia inornata</i> subsp. <i>leptophylla</i>							X	X	X	
	<i>Drummondita hassellii</i>			X							
	<i>Microcybe albiflora</i>				X			X			
Santalaceae	<i>Exocarpos aphyllus</i>		X		X						
	<i>Exocarpos sparteus</i>								X	X	
	<i>Leptomeria pachyclada</i>					X		X			
	<i>Santalum acuminatum</i>		X								
Sapindaceae	<i>Dodonaea bursariifolia</i>								X	X	
	<i>Dodonaea stenozyga</i>				X						
Scrophulariaceae	<i>Eremophila dichroantha</i>				X					X	

Table 38: Flora inventory for study area adjacent to Clyde Hill Nature Reserve

FAMILY	SPECIES	CONS	Q25	Q26	Q27	Q28	Q29	Q30	OPP
Asteraceae	<i>Olearia muelleri</i>			X			X		
	<i>Olearia picridifolia</i>						X		
Boraginaceae	<i>Halgania andromedifolia</i>			X			X	X	
Convolvulaceae	<i>Wilsonia humilis</i>			X	X	X		X	
Cyperaceae	<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)				X				

FAMILY	SPECIES	CONS	Q25	Q26	Q27	Q28	Q29	Q30	OPP
Dilleniaceae	<i>Hibbertia psilocarpa</i>		X	X		X		X	
Fabaceae	<i>Acacia brachyclada</i>			X					
	<i>Acacia merrallii</i>						X		
	<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		X	X	X	X			
	<i>Acacia pachypoda</i>							X	
	<i>Acacia pritzeliana</i>			X		X		X	
	<i>Acacia sorophylla</i>		X	X	X	X		X	
	<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412)					X			
	<i>Bossiaea leptacantha</i>			X			X		
	<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		X	X				X	
	<i>Dillwynia divaricata</i>					X			
	<i>Pultenaea purpurea</i>			X	X	X		X	
	<i>Templetonia rossii</i>			X					
Goodeniaceae	<i>Coopernookia strophiolata</i>			X		X		X	
	<i>Goodenia concinna</i>			X				X	
	<i>Scaevola bursariifolia</i>						X		
Hemerocallidaceae	<i>Dianella revoluta</i>			X	X	X			
Lamiaceae	<i>Westringia rigida</i>		X	X	X		X	X	
Myrtaceae	<i>Cyathostemon</i> sp.					X			
	<i>Eucalyptus conglobata</i>							X	
	<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		X	X	X	X		X	
	<i>Eucalyptus gracilis</i>						X		
	<i>Eucalyptus luculenta</i>		X	X	X			X	
	<i>Eucalyptus scyphocalyx</i>				X				
	<i>Eucalyptus</i> sp.						X		
	<i>Eucalyptus uncinata</i>			X		X		X	
	<i>Melaleuca bromelioides</i>		X			X			
	<i>Melaleuca calycina</i>		X					X	
	<i>Melaleuca eleuterostachya</i>		X	X		X			
	<i>Melaleuca glaberrima</i>					X			
	<i>Melaleuca hamata</i>					X			
	<i>Melaleuca teuthidoides</i>		X			X	X		
	<i>Melaleuca undulata</i>					X			
Poaceae	<i>Austrostipa flavescens</i>		X	X	X		X		
Polygalaceae	<i>Comesperma calcicola</i>	P3							X
	<i>Comesperma spinosum</i>		X						
Proteaceae	<i>Grevillea huegelii</i>			X		X			
	<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>			X		X		X	
	<i>Hakea commutata</i>							X	
Rhamnaceae	<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>					X			
	<i>Spyridium minutum</i>				X	X	X	X	
Rutaceae	<i>Boronia fabianoides</i> subsp. <i>fabianoides</i>			X					
	<i>Boronia inconspicua</i>					X			
	<i>Boronia inornata</i> subsp. <i>leptophylla</i>		X				X		
	<i>Microcybe multiflora</i> subsp. <i>baccharoides</i>		X	X					
Santalaceae	<i>Leptomeria pachyclada</i>		X	X		X	X		
Sapindaceae	<i>Dodonaea bursariifolia</i>			X	X			X	
Scrophulariaceae	<i>Eremophila dichroantha</i>						X		

APPENDIX SEVEN: CONSERVATION SIGNIFICANT FLORA LIKELIHOOD ASSESSMENT

Table 39: Conservation significant flora likelihood assessment

- **Known:** it does occur within the study area and was recorded during the field surveys or has recent historical records with co-ordinates that are likely to be accurate
- **Possible:** it may occur within the study area (but was not recorded); broadly, 2-4 of the required attributes (but always including records from nearby) are present in the study area
- **Unlikely:** it could occur but is not expected; 1-3 of the required attributes are present in the study area but it is not known from nearby or is known from nearby but has no other required attributes or one of the attributes is well-defined but not present within the study area (e.g. a specific landform, soil) at least in the vicinity of the known records
- **Highly Unlikely:** the species characteristics include none of the required attributes of soil, landform, associated vegetation and having previously been recorded nearby, and as such it almost certainly does not occur within the study area.

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Acacia amyctica</i>	P2	Sandy loam, clay	Flats	Low trees, mallee, shrubland	Y	Y	Y	Y	Known
<i>Acacia bartlei</i>	P3	Waterlogged sandy loam or clay loam	Depressions	<i>Eucalyptus occidentalis</i>	Y	Y	Y	Y	Known
<i>Acacia diaphana</i>	P1	Wet or waterlogged clay or sandy loam	Depressions		Y	Y	Y	Y	Known
<i>Acacia euthyphylla</i>	P3	Sand, clay loam	Margins of salt lakes & marshes, seasonal swamps	Mallee, low woodland, mallee heath, Myrtaceous shrubland	Y	Y	Y	Y	Known
<i>Acacia glaucissima</i>	P3	Sand or clay	Flats, low-lying areas.	Mallee, mallee heath	Y	Y	Y	Y	Known
<i>Acacia improcera</i>	P3	Sand, loamy clay, clay	Undulating plains, flats	Mallee, mallee regrowth	Y	Y	Y	Y	Known
<i>Acacia nitidula</i>	P2	Granitic sandy gravelly soils	Granite boulder	Shrubland, mallee, woodland, coastal heath	Y	Y	Y	Y	Known
<i>Acacia rhamnophylla</i>	T	Rocky or sandy clay	Upper slopes of low ranges		Y	N	N	Y	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Acacia singula</i>	P3	Sand or gravelly sand over laterite	Rises, hilltops	Shrubland, woodland, mallee, <i>Allocasuarina acutivalvis</i>	Y	Y	Y	Y	Known
<i>Acacia truculenta</i>	P3	Sand or loam		Mallee, woodland, regrowth	Y	?	Y	N	Unlikely
<i>Acrotriche orbicularis</i>	T	Loam, clay loam	Slopes, hills, disturbed areas	Mallee regrowth, woodland	Y	Y	N	Y	Unlikely
<i>Adenanthos ileticos</i>	P4	Sand		Mallee, shrubland, <i>Banksia media</i>	Y	Y	Y	Y	Known
<i>Allocasuarina globosa</i>	T	Greenstone, rocky soils, loams, laterite	Hills, ridges, slopes	Mallee, shrubland, <i>Allocasuarina</i> spp.	Y	Y	Y	N	Unlikely
<i>Allocasuarina hystricosa</i>	P4	Loam, limestone, granite outcropping	Plains, lower slopes, hilltops, granite outcrops	Mallee, <i>Allocasuarina</i> spp. shrubland	Y	Y	Y	Y	Possible
<i>Angianthus micropodioides</i>	P3	Saline sand, clay	River edges, saline depressions, claypans		Y	Y	N	Y	Unlikely
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	T	Sand	Wet areas	Heath, mallee over heath, disturbed areas	Y	Y	Y	Y	Known
<i>Aotus</i> sp. Dundas (M.A. Burgman 2835)	P2	Limestone, saline soils		Shrub mallee, shrubland	Y	Y	Y	Y	Known
<i>Astroloma</i> sp. Grass Patch (A.J.G. Wilson 110)	P2	Sand	Edge of salt lakes	Heathland, low shrubland, mallee	Y	Y	Y	Y	Possible
<i>Astus duomilius</i>	P1	Saline sand	Gentle slope of a lake dune	Woodland	Y	Y	Y	Y	Possible
<i>Baeckea</i> sp. Gibson (K.R. Newbey 11084)	P1	Loam over laterite and granite	Moderately exposed hills, cleared bushland	Shrubland, <i>Acacia lasiocalyx</i> , <i>Calothamnus quadrifidus</i>	Y	Y	Y	Y	Known
<i>Banksia lullfitzii</i>	P3	Yellow sand	Sandplains	Shrubland, mallee shrubland, heath	N	Y	Y	Y	Unlikely
<i>Banksia xylothemelia</i>	P3	Sandy loam, usually over laterite	Sandplains	Low shrubland, regenerating areas, mallee shrubland	Y	Y	Y	Y	Possible
<i>Beyeria cockertonii</i>	T	Clay, basalt, komatiite	Slopes	Mallee heath	N	Y	N	Y	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Beyeria villosa</i>	P4	Rocky sandy clay, loam	Hillslopes	Mallee shrubland, mallee heath	Y	Y	N	Y	Unlikely
<i>Boronia baeckeacea</i> subsp. <i>patula</i>	P1	Clay loam		Mallee	Y	Y	Y	Y	Known
<i>Bossiaea flexuosa</i>	P3	Deep sand	Edges of salt lakes	Shrublands, <i>Melaleuca</i> shrublands, mallee shrublands	Y	Y	Y	Y	Known
<i>Brachyloma nguba</i>	P1	Sandy clay, shallow sandy loam	Flat plains	Open mallee woodland, mallee scrub	Y	Y	Y	Y	Possible
<i>Caladenia graniticola</i> (previously included in <i>Caladenia hoffmanii</i>)	T	Gritty sandy clay, granite	Near low exposed rock outcrops	Woodland (<i>Allocasuarina huegeliana</i> , <i>Eucalyptus loxophleba</i> , <i>Leptospermum erubescens</i>)	Y	Y	N	N	Unlikely
<i>Chamelaucium</i> sp. Mt Heywood (K. Newbey 7954)	P1	Deep sand, gravelly loam	Flat plains	Shrubland	Y	Y	Y	Y	Known
<i>Chorizema circinale</i>	P1	Sand, sandy clay with gravel	Flats, margin of gravel pit	Shrubland, disturbed areas	Y	Y	Y	Y	Possible
<i>Comesperma calcicola</i>	P3	Calcareous or semi-saline clay loams, limestone	Areas around saline water	Woodland, mallee, chenopod shrubland	Y	Y	Y	Y	Known
<i>Commersonia rotundifolia</i>	P3	Sandy clay, clay, loam, sand, granite	Slopes	Mallee, after fire	Y	Y	Y	Y	Possible
<i>Conostephium marchantiorum</i>	P3	Sand	Plains, creeklines, edges of salt lakes	Mallee, shrubland	Y	Y	Y	Y	Highly Unlikely
<i>Conostephium uncinatum</i>	P2	Deep sand	Edges of salt lakes, undulating plains, claypans	Mallee, <i>Melaleuca</i> and <i>Darwinia</i> on edge of salt lakes, <i>Banksia</i>	Y	Y	Y	Y	Possible
<i>Conostylis lepidospermoides</i>	T	Sand over laterite	Flats, slopes	Mallee, shrubland, heathland	Y	Y	Y	Y	Known
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	P3	Sand, laterite	Sandplain	Mallee, shrubland, heathland	Y	Y	Y	Y	Possible
<i>Cyathostemon</i> sp. Dowak (J.M. Fox 86/271)	P1	Sand	Margins of salt lakes	Mallee/ <i>Melaleuca</i>	Y	Y	Y	Y	Possible

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Cyathostemon</i> sp. Esperance (A. Fairall 2431)	P1	Sandy gravel, sandy clay, loam	Saline depressions, near salt pans, lake margins	-	Y	Y	?	Y	Possible
<i>Cyathostemon</i> sp. Jyndabinbin Rocks (K.R. Newbey 7689)	P2	Sand, granitic sandy loam	Aeolian dunes, flat plains	Mallee, <i>Acacia</i> or <i>Melaleuca</i> shrubland	Y	Y	Y	Y	Possible
<i>Cyathostemon</i> sp. Salmon Gums (B. Archer 769)	P3	Sand, sandy clay over granite, light clay with gypsum, saline soils	Flats, dry river beds, near claypans	Shrubland, heathland, mallee, <i>Melaleuca</i>	Y	Y	Y	Y	Known
<i>Dampiera deltoidea</i>	P4	Sand, sandy clay, loam, laterite	Sandplains, around quartzite rocks, slopes	Mallee, shrubland	N	N	Y	Y	Unlikely
<i>Dampiera orchardii</i>	P2	Sand	Margins of salt lakes	Mallee, <i>Melaleuca</i>	Y	Y	Y	Y	Possible
<i>Dampiera sericantha</i>	P3	Sand, sometimes with gravel	Plains	Shrubland, heathland	Y	Y	Y	Y	Possible
<i>Darwinia luehmannii</i>	P2	Sand, sandy loam	Flat depressions, base of granite rocks	Mallee, <i>Banksia media</i>	Y	Y	Y	Y	Known
<i>Darwinia oxylepis</i>	T	Stony, peaty sand	Rocky gullies	Mallee heath	N	N	Y	N	Unlikely
<i>Darwinia polycephala</i>	P4	Sand, clay	Flats, near salt lakes	<i>Melaleuca</i> shrubland, mallee	Y	Y	Y	Y	Known
<i>Darwinia</i> sp. Mt Baring (K.R. Newbey 9775)	P1	Sand	Hill crest	<i>Eucalyptus tetraptera</i>	Y	N	N	Y	Unlikely
<i>Darwinia</i> sp. Mt Burdett (N.G. Marchant 80/42)	P4	Sandy, clay loam, clay, laterite	Flats, near clay pans & salt lakes, hillcrests, road verges	Mallee, <i>Melaleuca</i>	Y	Y	Y	Y	Possible
<i>Darwinia</i> sp. Mt Heywood (R. Davis 11066)	T	Granitic soil	Hills, outcrops	Shrubland	Y	N	Y	Y	Unlikely
<i>Darwinia</i> sp. Mt Ney (M.A. Burgman & S. McNee 1274)	P1	Sand	Slight slope	Shrubland	Y	Y	Y	Y	Known
<i>Darwinia wittwerorum</i>	T	Clay loam, sandy clay	Roadsides, slopes	Mallee heath	Y	Y	Y	N	Highly Unlikely
<i>Daviesia megacalyx</i>	T	Gravelly laterite	Ridges, hillslopes	Mallee shrubland, mallee heath	N	N	Y	N	Highly Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Daviesia newbeyi</i>	P2	Sand, sandy clay over granite	Rocky slopes	Mallee, mallee heath, burnt areas	Y	Y	Y	Y	Known
<i>Daviesia pauciflora</i>	P3	Sand over laterite or limestone	Flats	Shrubland, heathland, <i>Banksia speciosa</i>	Y	Y	Y	Y	Known
<i>Dicrastylis archeri</i>	P1	White sand	Sandplains, near salt lakes	Open mallee woodland	Y	Y	Y	Y	Known
<i>Drosera salina</i>	P2	White sand	Margins of salt lakes	Heathland, chenopod shrubland, samphire	Y	Y	Y	Y	Known
<i>Drummondita longifolia</i>	T	Granitic loam, skeletal sandy loam	Granite outcrops	Shrubland; <i>Acacia</i> , <i>Gastrolobium</i> , <i>Calothamnus</i> spp.	Y	N	N	N	Highly Unlikely
<i>Eremophila biserrata</i>	P4	Sand or sandy clay	Alluvial flats, salt flats & lakes	<i>Melaleuca</i> shrubland, mallee	Y	Y	Y	Y	Possible
<i>Eremophila chamaeophila</i>	P3	Sand, clay	Sandplains, disturbed road verges, wetlands	Mallee, <i>Melaleuca</i> shrubland	Y	Y	Y	Y	Known
<i>Eremophila compressa</i>	P3	Clay, clay loam, sandy loam	Undulating plains	Mallee, woodland, shrubland, disturbed areas	Y	Y	Y	Y	Known
<i>Eremophila denticulata</i> subsp. <i>denticulata</i>	T	Alluvium, sand, sandy clay loam	River beds & plains, laterite breakaways	Mallee, <i>Eucalyptus occidentalis</i>	N	N	Y	Y	Unlikely
<i>Eremophila denticulata</i> subsp. <i>trisulcata</i>	T	Sand or loam over limestone		Woodland, chenopod shrubland	N	?	Y	N	Highly Unlikely
<i>Eremophila lactea</i>	T	Sandy clay loam, calcrete	Open disturbed road verge	<i>Acacia</i> / <i>Melaleuca</i> shrubland, woodland, mallee	Y	Y	Y	Y	Possible
<i>Eremophila racemosa</i>	P4	Sandy or stony loam, clay loam	Undulating plains, roadsides	Woodland, mallee	Y	Y	Y	Y	Possible
<i>Eremophila serpens</i>	P4	Sand, alluvium, loam	Winter-wet depressions, sub-saline flats, drainage lines, salt lakes	<i>Melaleuca</i> /chenopod shrubland, sedgeland, woodland, burnt areas	Y	Y	Y	Y	Known
<i>Eremophila subteretifolia</i>	T	Sand, loam	Edges of salt lakes, sub-saline flats	<i>Melaleuca</i> shrubland, Salmon Gum woodland	Y	Y	Y	Y	Possible
<i>Eremophila verticillata</i>	T	Clay loam, loam over dolomite	Lake edges	Woodland, <i>Melaleuca</i> , chenopods	Y	Y	Y	N	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Eucalyptus creta</i>	P3	Sandy clay or loam	Calcareous plains	Woodland, <i>Melaleuca</i>	Y	N	Y	Y	Unlikely
<i>Eucalyptus dielsii x platypus</i>	P1	Moderately-drained clay loam	Almost flat plains, gilgai plains	<i>Eucalyptus dielsii</i> woodland	Y	Y	Y	Y	Possible
<i>Eucalyptus dolichorhyncha</i>	P4	Sandy clay or clay	Flats	Woodland, mallee, <i>Acacia</i> and <i>Melaleuca</i> spp.	Y	Y	Y	Y	Known
<i>Eucalyptus famelica</i>	P3	Sand	Wet areas, sometimes slightly brackish	Woodland, shrubland	Y	N	Y	Y	Unlikely
<i>Eucalyptus histophylla</i>	P3	Sandy loam on granite or laterite	Granite outcrops	Woodland, mallee	Y	N	Y	Y	Unlikely
<i>Eucalyptus litorea</i>	P2	Calcareous sand, sandy clay loam & stones	Leeward of primary dunes, around salt lakes	Mallee, mallee heath	Y	N	Y	Y	Unlikely
<i>Eucalyptus luculenta</i>	P2	Calcareous sand	Gently undulating	Woodland, mallee	Y	Y	Y	Y	Known
<i>Eucalyptus merrickiae</i>	T	Sand, sandy clay	Near salt lakes	<i>Melaleuca</i> , mallee, chenopods	Y	Y	Y	Y	Known
<i>Eucalyptus misella</i>	P1	Sand	Low-lying sandplains	Mallee shrubland, mallee heathland, <i>Melaleuca</i> spp.	Y	Y	Y	Y	Known
<i>Eucalyptus purpurata</i>	T	White powdery loam, magnesite	Eastern and north-eastern slopes of ridges	Woodland, low forest	N	N	Y	Y	Unlikely
<i>Eucalyptus semiglobosa</i>	P3	Sand over laterite, silty sand near granite, limestone	Hillslopes, gullies, cliffs	Mallee, coastal heath	Y	N	Y	Y	Unlikely
<i>Eucalyptus</i> sp. Esperance (M.E. French 1579)	P1	Sandy loam, loam, calcareous loam	Flats	Woodland, mallee shrubland	Y	Y	Y	Y	Possible
<i>Eucalyptus stoatei</i>	P4	Gravelly sand or clay, sandy loam	Flats, rises	Woodland, mallee heath	Y	Y	Y	Y	Known

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Eutaxia actinophylla</i>	P3	Clay loam, clay loam over granite, gravel	Small depressions	Woodland, <i>Acacia</i> shrubland	Y	Y	Y	Y	Possible
<i>Eutaxia andocada</i>	P1	White sand or brown sandy-clay over granite		Shrubland, mallee shrubland	Y	?	Y	Y	Possible
<i>Frankenia brachyphylla</i>	P2		Salt lake margins.	Chenopods	?	Y	Y	Y	Known
<i>Frankenia drummondii</i>	P3	Sand	Lake edges	Chenopods, <i>Melaleuca</i> spp., woodland	Y	Y	Y	Y	Known
<i>Frankenia glomerata</i>	P3	White sand		Samphire, <i>Melaleuca</i> shrubland, mallee	Y	?	Y	Y	Known
<i>Gastrolobium involutum</i>	P1	Sand over granite	Base of rock outcrops, drainage channels	<i>Acacia</i> , <i>Melaleuca</i> and <i>Allocasuarina</i> spp. shrublands, <i>Eucalyptus occidentalis</i> woodland	Y	Y	Y	Y	Possible
<i>Gonocarpus pycnostachyus</i>	P3	Sand, clay	Wet depressions, granite rocks	Shrubland, <i>Banksia media</i> , after fire	Y	Y	Y	Y	Known
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P3	Sandy loam or laterite		Mallee, woodland, <i>Melaleuca</i> shrubland	Y	Y	Y	Y	Known
<i>Goodenia phillipsiae</i>	P4	Clay, sandy clay, laterite	Flat, hillslopes	Mallee, mallee heath	Y	Y	Y	Y	Possible
<i>Goodenia turleyae</i>	P1	Sand over clay, gravelly clay, granite	Moist sheltered areas, near salt lakes	Samphire, <i>Melaleuca</i> , mallee	Y	Y	Y	Y	Possible
<i>Grammosolen</i> sp. Mt Ridley (W.R. Archer 1210911)	P1	Sand	Salt lake island	Shrubland	Y	Y	Y	Y	Possible
<i>Grevillea aneura</i>	P4	Sand, sandy clay, gravel	Disturbed areas	Shrubland, mallee shrubland	Y	Y	Y	Y	Known
<i>Grevillea baxteri</i>	P4	Sand	Sandplains, disturbed areas	Low heath, woodland, mallee, Proteaceous heath	Y	Y	Y	Y	Known
<i>Grevillea fastigiata</i>	P4	Clay, granite		Mallee	Y	?	Y	Y	Unlikely
<i>Grevillea involucrata</i>	T	Gravelly sand		Proteaceous and Myrtaceous heath and shrublands, mallee	N	?	Y	N	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Grevillea punctata</i>	P3	Stony red loam, red clay		Mallee, mallee regrowth	N	?	Y	Y	Unlikely
<i>Gyrostemon ditrigynus</i>	P4	Sand, sandy clay, loam	Plains, low ironstone ridges	Woodland, mallee, shrubland, following fire	Y	Y	Y	Y	Known
<i>Gyrostemon</i> sp. Ravensthorpe (G. Cockerton & N. Eveleigh 9467)	P1	Loam, clay, quartz	Slopes	Disturbance opportunist. Shrubland, mallee	Y	N	Y	Y	Unlikely
<i>Haegiela tatei</i>	P4	Clay, sandy loam, gypsum	Saline habitats	Chenopods, samphire, woodland	Y	Y	Y	Y	Possible
<i>Halgania</i> sp. Peak Eleanora (M.A. Burgman 3547 B)	P2	Loamy sand, lateritic sand over limestone or granite	Undulating plains	Mallee, mallee heath, shrubland. After fire	Y	Y	Y	Y	Known
<i>Hibbertia abyssa</i>	T	Loam, laterite, sandstone	Hillslopes, soil stockpile	Mallee, mallee shrubland. After disturbance	Y	N	Y	Y	Unlikely
<i>Hibbertia carinata</i>	P1	Gravelly sand	Slopes	Mallee shrubland, <i>Allocasuarina</i> shrubland	N	N	Y	Y	Unlikely
<i>Hibbertia hamata</i>	P3	Granite	Inland outcrops	Shrubland, low shrubs	N	N	Y	Y	Unlikely
<i>Hydrocotyle</i> sp. Coraginaensis (K.R. Newbey 7477)	P2	Granitic loamy sand, sand	Granite outcrop, salt lake edge	<i>Melaleuca</i> shrubland	Y	Y	Y	Y	Known
<i>Hydrocotyle</i> sp. Decipiens (G.J. Keighery 463)	P2		Creek edges, salt lake edges	Mallee shrubland, chenopods	?	Y	Y	Y	Possible
<i>Hypocalymma</i> sp. Cascade (R. Bruhn 20896)	P2	Sandy loam, granite		Shrubland, mallee shrubland, disturbed areas	Y	?	Y	Y	Possible
<i>Isolepis australiensis</i>	P3	Silty sand, sandy clay	Lake margins, pools	<i>Eucalyptus</i> <i>occidentalis</i> , sedges, low Myrtaceous shrubs	Y	Y	Y	N	Unlikely
<i>Isopogon alpicornis</i>	P3	Sand, loam on granite	Sandhills, salt lakes, sandplains, outcrops	Mallee shrubland, shrubland, heathland	Y	Y	Y	Y	Known
<i>Kennedia beckxiana</i>	P4	Sand, loam, granite	Granite hills & outcrops	Shrubland, heathland	Y	N	Y	Y	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Kennedia glabrata</i>	T	Sand, granite	Granite outcrops	<i>Taxandria</i> and <i>Agonis</i> shrublands, low shrubland, moss pads	Y	Y	N	N	Highly Unlikely
<i>Kunzea salina</i>	P3	Sand	Edge of salt lakes	<i>Darwinia diosmoides</i> , <i>Melaleuca</i> , mallee	Y	Y	Y	Y	Possible
<i>Kunzea similis</i> subsp. <i>mediterranea</i>	T	Loam over laterite	Ridge tops	Mallee, mallee shrubland, Proteaceous heath	N	N	Y	Y	Unlikely
<i>Lambertia echinata</i> subsp. <i>echinata</i>	T	Gravelly sandy loam, sandy loam, and, granite, laterite	Below & between rock outcrops, slopes, hill crests	Heath, Proteaceous heath, mallee heath	Y	N	Y	N	Highly Unlikely
<i>Leucopogon apiculatus</i>	P3	Skeletal sandy or stony soils over quartzite or granite	Granite outcrops & hills, quartzite ridges, rocky slopes	Low heath, coastal heath	Y	N	Y	Y	Unlikely
<i>Leucopogon florulentus</i>	P3	Sand, sandy cay, gravelly laterite	Sandplains, gentle slopes	Mallee shrubland	Y	Y	Y	?	Unlikely
<i>Leucopogon remotus</i>	P1	Sand, sandy loam, limestone	Plain, slope, near salt lake	Mallee shrubland, Myrtaceous shrubland, woodland, <i>Banksia</i> shrubland	Y	Y	Y	Y	Known
<i>Leucopogon rotundifolius</i>	P3	Skeletal soils	Granite outcrops, steep hillslopes	Thickets, mixed heath, mallee shrubland	N	N	Y	Y	Unlikely
<i>Leucopogon rugulosus</i>	P1	Sand	Sandplain, creeks, lake edges	Mallee shrubland, low heath	Y	Y	Y	Y	Possible
<i>Leucopogon</i> sp. Bonnie Hill (K.R. Newbey 9831)	P1	Sand	Undulating sandplains	Mallee, mallee heath, heath	Y	Y	Y	Y	Known
<i>Marianthus mollis</i>	P4	Laterite	Hills and ridges	Mallee shrubland, shrubland	N	N	Y	Y	Unlikely
<i>Melaleuca dempta</i>	P3	Sand, clay	Sandplain, near salt lake	Mallee, <i>Melaleuca</i>	Y	Y	Y	N	Unlikely
<i>Melaleuca eximia</i>	P2	Gravelly sand or gravelly clay, granite	Granite outcrops		Y	Y	Y	Y	Known
<i>Melaleuca fissurata</i>	P4	Sand, sandy loam	Samphire flats, salt pans	Shrubland, <i>Melaleuca</i> shrubland, Mallee, near samphires	Y	Y	Y	Y	Known

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Melaleuca penicula</i>	P4	Loamy sand, sandy clay, granite	Granite outcrops, valley slopes	<i>Melaleuca</i> or <i>Allocasuarina</i> shrubland, mallee shrubland	Y	N	Y	Y	Unlikely
<i>Melaleuca similis</i>	P1	Sand	Margins of saline drainage lines	Proteaceous and Myrtaceous shrubland, mallee shrubland	Y	N	Y	Y	Unlikely
<i>Melaleuca viminea</i> subsp. <i>appressa</i>	P2	Shallow sand over clay	Near creeks or wet depressions	Mallee shrubland, <i>Eucalyptus</i> <i>occidentalis</i>	Y	Y	Y	Y	Possible
<i>Microcybe pauciflora</i> subsp. <i>grandis</i>	P1	Clay-loam or loam.		Mallee shrubland, <i>Allocasuarina</i> shrubland	Y	?	Y	Y	Unlikely
<i>Micromyrtus elobata</i> subsp. <i>scopula</i>	P3	Sand, deep aeolian sand, dandy clay	Undulating plains, dunes, hill crests	Mallee, mallee heath	Y	Y	Y	Y	Known
<i>Mirbelia densiflora</i>	P3	Stony loam, loamy sand	Small ridges, breakaways, undulating plains	Mallee shrubland, <i>Acacia</i> shrubland. After fire/disturbance	Y	Y	Y	Y	Possible
<i>Myoporum turbinatum</i>	T	Sand	In moist areas: along creeks & rivers, near pools, margins of saline depressions	<i>Melaleuca</i> shrubland, mallee, halophytes	Y	Y	Y	Y	Possible
<i>Myriophyllum petraeum</i>	P4		Strictly confined to ephemeral rock pools on granite outcrops.	In water	N	N	N	Y	Unlikely
<i>Olearia laciniifolia</i>	P2	Sand	Around playa lakes	Mallee, heath, woodland, after fire	Y	Y	Y	Y	Possible
<i>Opercularia rubioides</i>	P3	Sand, gravelly sandy clay, sandy loam	Floodplains, stony hills, flat plains	Mallee, Myrtaceous and Proteaceous shrubland, <i>Eucalyptus</i> <i>occidentalis</i>	Y	Y	Y	Y	Possible
<i>Paracaleana parvula</i>	P2	Deep sand	Plains	Heath, <i>Banksia</i> woodland, coastal vegetation	Y	Y	Y	Y	Known
<i>Persoonia baeckeoides</i>	P1	Gravelly sand, laterite, sandy clay over sandstone	Undulating plains	Shrubland, mallee shrubland, after fire	Y	Y	Y	Y	Possible

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Persoonia cymbifolia</i>	P3	Sand	On flats or in rock crevices	Mallee shrubland, Proteaceous heath, <i>Melaleuca</i> shrubland	Y	Y	Y	Y	Known
<i>Persoonia scabra</i>	P3	Sand or sandy loam		Shrubland, mallee shrubland, heath	Y	?	Y	Y	Known
<i>Persoonia spathulata</i>	P2	Sand		Low heath, mallee, <i>Banksia</i>	Y	?	Y	Y	Known
<i>Philotheca apiculata</i>	P2	Stony clay loam	Rocky outcrops, hillsides	Woodland, <i>Atriplex</i> , <i>Melaleuca</i>	Y	Y	Y	N	Unlikely
<i>Philotheca gardneri</i> subsp. <i>globosa</i>	P1	Sand		Heathland, woodland, mallee shrubland, <i>Callitris</i> , <i>Melaleuca</i>	Y	Y	Y	Y	Known
<i>Pimelea halophila</i>	P2	Sand	Salt lake	Halophytes, samphire, <i>Melaleuca</i>	Y	Y	Y	Y	Possible
<i>Pimelea pelinos</i>	P1		Sandy clay. Salt lakes.	Shrubland, <i>Melaleuca</i> , <i>Darwinia</i> .	?	Y	Y	Y	Possible
<i>Pityrodia chrysocalyx</i>	P3	Sand	Edge of salt lake	Mallee shrubland, heathland, disturbed areas	Y	Y	Y	Y	Known
<i>Prostanthera carrickiana</i>	P4	Sandy clay, granite	Granite outcrops	Heath, mallee	Y	N	Y	Y	Unlikely
<i>Pterostylis</i> sp. Ongerup (K.R. Newbey 4874)	P4	Stony loamy clay, calcareous sand, spongeolite	Sheltered slopes, base of cliffs and valley floors, in soil pockets	Mallee	Y	N	Y	Y	Unlikely
<i>Pterostylis</i> sp. striped sepal greenhood (G. Brockman GBB355)	P2	Clay loam, ironstone, granite	At the base of boulders, broken outcrops	<i>Allocasuarina</i> , <i>Melaleuca</i> , mallee	Y	N	Y	Y	Unlikely
<i>Pultenaea adunca</i>	P3	White/grey sand		Mallee shrubland, mallee heath, shrubland	Y	Y	Y	Y	Known
<i>Pultenaea brachyphylla</i>	P2	Sandy loam, sandy clay, gravel, granite, quartz, laterite	Gently undulating	Shrubland, mallee heath	Y	Y	Y	Y	Possible
<i>Pultenaea calycina</i> subsp. <i>proxena</i>	P4	Sand, clay, sandy clay or loam, with gravel, over magnesite	Moderate slopes, adjacent to creek beds	Mallee, mallee shrubland, after disturbance	Y	N	Y	Y	Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Pultenaea daena</i>	P3	Sand, sandy loam, sandy or loamy clay, gravel, limestone, dolomite, laterite	Gently undulating plains, adjacent to salt lakes, in disturbed areas	Mallee, <i>Melaleuca</i> shrubland, heathland, disturbed areas	Y	Y	Y	Y	Known
<i>Pultenaea wudjariensis</i>	P1	Gravelly clay	Gently hilly country	Mallee shrubland, mallee heath	Y	N	Y	Y	Unlikely
<i>Rhizanthella gardneri</i>	T	Sand		<i>Melaleuca uncinata</i> , mallee	Y	?	Y	Y	Known
<i>Ricinocarpos trichophorus</i>	T	Sandy clay, loam	Breakaways, among sandstone rocks	Mallee shrubland, <i>Acacia</i> and <i>Melaleuca</i> shrubland	Y	N	Y	Y	Unlikely
<i>Roycea pycnophylloides</i>	T	Sandy soils, clay	Saline flats	<i>Melaleuca</i> , halophytes, samphire	Y	Y	Y	N	Highly Unlikely
<i>Scaevola archeriana</i>	P1	Sandy loam, sandy clay loam	Sandplains, road verges, edge of salt lakes	Low shrubland	Y	Y	Y	Y	Possible
<i>Schoenus benthamii</i>	P3	Sand, sandy clay	Winter-wet flats, swamps	Mallee heathland	Y	N	Y	Y	Unlikely
<i>Sphaerolobium validum</i>	P3	Sand, clayey sand, laterite gravel, quartz pebbles	Gently undulating areas, flats, roadsides	Mallee over Proteaceous shrubland, heathland, disturbed areas	Y	Y	Y	Y	Possible
<i>Spyridium mucronatum</i> subsp. <i>multiflorum</i>	P2	Gravelly loam or clay		Mallee heath, mallee shrubland	Y	?	Y	Y	Possible
<i>Stachystemon vinosus</i>	P4	Fine loamy sand, stones	Sandplains, rock crevices on breakaways	Mallee shrubland, disturbed areas	Y	Y	Y	Y	Possible
<i>Stylidium pulviniforme</i>	P3	Sand	Winter-wet areas	Low heath, halophytes	Y	Y	Y	Y	Possible
<i>Synaphea platyphylla</i>	P3	Sandy loam		Mallee shrubland, disturbed areas	Y	?	Y	Y	Unlikely
<i>Tecticornia indefessa</i>	P2	Sand	Near the edges of salt lakes	Samphire	Y	Y	Y	Y	Possible
<i>Thelymitra psammophila</i>	T	Sandy clay, loam		Mallee heath, heathland, <i>Allocasuarina</i> shrubland	Y	?	Y	N	Highly Unlikely

SPECIES	DPaW CONS. CODE	SOIL	LANDFORM	VEGETATION	SOIL TYPE PRESENT	LANDFORM PRESENT	ASSOCIATED VEGETATION PRESENT	KNOWN FROM NEARBY	LIKELIHOOD OF OCCURRENCE
<i>Thysanotus brachyantherus</i>	P2	Clay, loam, granite	Saline flats, gilgai flats	Woodland	Y	Y	Y	Y	Known
<i>Thysanotus parviflorus</i>	P4	Sand	Near salt lake, hills	Mallee shrubland	Y	Y	Y	Y	Known
<i>Trachymene anisocarpa</i> var. <i>trichocarpa</i>	P3	Sand	Recently disturbed or burnt sites, woodlands, plains	Woodland, mallee	Y	Y	Y	Y	Known
<i>Verticordia penicillaris</i>	P4	Shallow gritty soil, granite	Granite outcrops	Not recorded (collected in 1931)	Y	Y	Y	N	Highly Unlikely
<i>Verticordia verticordina</i>	P3	Sand, clay, granite, limestone		Heathland, mallee heath, sedgeland	Y	Y	Y	Y	Possible

APPENDIX EIGHT: FAUNA INVENTORY

Based on *EPBC Act Protected Matters Search* results (Australian Government & DoE 2013b), DPaW Threatened and Priority fauna database report, *NatureMap* (DPaW 2007-2014) reports, the 2013 reconnaissance survey, and previous desktop and survey reports. Exclusively marine species are omitted as outside the scope of this report.

Orange highlight: conservation significant species. Records denote presence (+) or a number denoting individuals sighted or trapped, number of sites, or number of traces (T) or calls (C), depending on detection method for species. Question mark indicates uncertainty as to species identity.

Taxonomy follows Christidis & Boles (2008) or recent revisions for birds, and the most recent WAM/DPaW lists or published revisions for other taxa.

Protected Matters Search results (Australian Government & DoE 2013b) are indicated by letter codes (K, species or habitat known to occur in area; L, species or habitat likely to occur; M, may occur; BL, breeding likely; RL, roosting likely) or dash (-) for EPBC listed taxon not identified in a particular search.

Table 40: Vertebrate fauna known or potentially present in Esperance Extension study area

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE <i>et al.</i> 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
AMPHIBIANS														
Hylidae	<i>Litoria adelaidensis</i>	Slender Tree Frog					+							
	<i>Litoria cyclorhyncha</i>	Spotted-thighed Frog					+				+			
Limnodynastidae	<i>Heleioporus albopunctatus</i>	Western Spotted Frog					+							
	<i>Heleioporus eyrei</i>	Moaning Frog					+							
	<i>Heleioporus psammophilus</i>	Sand Frog					+							
	<i>Limnodynastes dorsalis</i>	Western Banjo Frog					+				+			
	<i>Neobatrachus albipes</i>	White-footed Trilling Frog					+							
	<i>Neobatrachus kunapalari</i>	Kunapalari Frog					+							
	<i>Neobatrachus pelobatoides</i>	Humming Frog					+				+			
	<i>Neobatrachus sutor</i>	Shoemaker Frog					+							
	Myobatrachidae	<i>Crinia georgiana</i>	Quacking Frog					+						
<i>Crinia glauerti</i>		Clicking Frog					+							
<i>Crinia pseudinsignifera</i>		Bleating Frog					+				+			
<i>Crinia subinsignifera</i>		South Coast Froglet					+							
<i>Metacrinia nichollsi</i>		Forest Toadlet					+							
<i>Myobatrachus gouldii</i>		Turtle Frog					+							
<i>Pseudophryne guentheri</i>		Crawling Toadlet					+							
<i>Pseudophryne occidentalis</i>		Western Toadlet					+				+			
MAMMALS														
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna					+							+
Dasyuridae	<i>Antechinomys laniger</i>	Kultarr					+							
	<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	S1	VU	L	+				+	+		T?

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Ningau yvonnae</i>	Southern Ningau					+							
	<i>Parantechinus apicalis</i>	Dibbler	EN	S1	EN	L	+					-		
	<i>Phascogale calura</i>	Red-tailed Phascogale, Keengoor	EN	S1	EN	K	+					-		
	<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart					+				+			
	<i>Sminthopsis dolichura</i>	Little Long-tailed Dunnart					+							
	<i>Sminthopsis gilberti</i>	Gilbert's Dunnart					+							
	<i>Sminthopsis granulipes</i>	White-tailed Dunnart					+							
	<i>Sminthopsis griseoventer</i>	Grey-bellied Dunnart					+							
Myrmecobiidae	<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	VU	S1	VU	-	+					-		
Peramelidae	<i>Isoodon obesulus fusciventer</i>	Quenda, Southern Brown Bandicoot	-	-	P5		+				+			+
Macropodidae	<i>Macropus eugenii derbianus</i>	Tammar	-	-	P5		+				+			
	<i>Macropus fuliginosus</i>	Western Grey Kangaroo					+						+	+
	<i>Macropus irma</i>	Western Brush Wallaby	-	-	P4		+							+
	<i>Macropus robustus erubescens</i>	Euro, Biggada (mainland)					+							
Tarsipedidae	<i>Tarsipes rostratus</i>	Honey Possum					+				+			
Burramyidae	<i>Cercartetus concinnus</i>	Southwestern Pygmy Possum					+				+			
Phalangeridae	<i>Trichosurus vulpecula</i>	Brush-tailed Possum					+							
Molossidae	<i>Mormopterus</i> sp.	Southwestern Free-tailed Bat					+							
	<i>Tadarida australis</i>	White-striped Free-tailed Bat					+							
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat					+				+			
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat					+				+			
	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat					+							
	<i>Nyctophilus major (ex timoriensis)</i>	Western Long-eared Bat	-	-	P4		+				+			

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat					+							
	<i>Vespadelus regulus</i>	Southern Forest Bat					+							
Muridae	<i>Notomys mitchelli</i>	Mitchell's Hopping-mouse					+				+			
	<i>Pseudomys albocinereus</i>	Ash-grey Mouse					+							
	<i>Pseudomys occidentalis</i>	Western Mouse	-	-	P4		+							
	<i>Pseudomys shortridgei</i>	Heath Mouse, Dayang	VU	S1	VU	-	+					-		
	<i>Rattus fuscipes</i>	Bush Rat					+				+			
	<i>*Rattus rattus</i>	Black Rat			Int	L	+				+	-		
	<i>*Mus musculus</i>	House Mouse	Inv		Int	L	+				+	-		
Leporidae	<i>*Oryctolagus cuniculus</i>	Rabbit	Inv		Int	L	+				+	-	+	+
Camelidae	<i>Camelus dromedaries</i>	Camel	Inv		Int	L						-		+
Bovidae	<i>*Bos taurus</i>	Cow			Int		+							
	<i>*Capra hircus</i>	Goat	Inv		Int	L	+					-		
	<i>*Ovis aries</i>	Sheep			int		+							
Suidae	<i>*Sus scrofa</i>	Pig	Inv		Int	L	+					-		
Equidae	<i>*Equus asinus</i>	Donkey	Inv		Int									+
	<i>*Equus caballus</i>	Horse	Inv		Int		+							
Canidae	<i>Canis lupus dingo</i>	Dingo					+							
	<i>*Canis lupus familiaris</i>	Dog	Inv		Int	L						-		+
	<i>*Vulpes vulpes</i>	Fox	Inv		Int	L	+				+	-	+	+
Felidae	<i>*Felis catus</i>	Cat	Inv		Int	L	+					-		+
REPTILES														
Cheluidae	<i>Chelodina colliei (ex oblonga)</i>	Southwestern Oblong Turtle					+							
Agamidae	<i>Amphibolurus norrisi</i>	Mallee Tree Dragon					+				+			

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Ctenophorus adelaidensis</i>	Western Heath Dragon					+							
	<i>Ctenophorus chapmani</i>	Eastern Heath Dragon												
	<i>Ctenophorus cristatus</i>	Crested Dragon					+				+			+
	<i>Ctenophorus maculatus</i>	Spotted Military Dragon					+				+			+
	<i>Ctenophorus ornatus</i>	Ornate Crevice Dragon					+				+			
	<i>Ctenophorus reticulatus</i>	Western Netted Dragon					+				+			
	<i>Ctenophorus salinarum</i>	Claypan Dragon					+				+			+
	<i>Moloch horridus</i>	Thorny Devil					+				+			
	<i>Pogona minor minor</i>	Western Bearded Dragon					+				+			+
	<i>Tympanocryptis cephalus</i>	Pebble Dragon									+			
Gekkonidae	<i>Christinus marmoratus</i>	Marbled Gecko					+				+			
	<i>Christinus</i> sp. [<i>Phyllodactylus</i> sp.]	Cape Le Grand Gecko	-	-	P2									
	<i>Gehyra variegata</i>	Common Dtella					+				+			
	<i>Heteronotia binoei</i>	Bynoe's Prickly Gecko					+				+			
Carphodactylidae	<i>Underwoodisaurus milii</i>	Barking Gecko					+				+			
Diplodactylidae	<i>Crenadactylus ocellatus</i>	Clawless Gecko					+				+			
	<i>Diplodactylus calcicolus</i>	South Coast Gecko												
	<i>Diplodactylus granariensis</i>	Western Stone Gecko					+							
	<i>Hesperoedura reticulata</i>	Reticulated Velvet Gecko												
	<i>Lucasium maini</i>	Main's Ground Gecko					+				+			
	<i>Strophurus assimilis</i>	Goldfields Spiny-tailed Gecko												
	<i>Strophurus intermedius</i>	Southern Spiny-tailed Gecko												
Pygopodidae	<i>Aprasia repens</i>	Sandplain Worm-lizard					+				+			+

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Aprasia striolata</i>	Lined Worm-lizard					+							
	<i>Delma australis</i>	Southern (Marble-faced) Delma					+				+			
	<i>Delma butleri</i>	Unbanded Delma					+							
	<i>Delma fraseri</i>	Fraser's Delma					+				+			
	<i>Delma grayii</i>	Side-barred Delma					+							
	<i>Lialis burtonis</i>	Burton's Legless lizard					+							
	<i>Pygopus lepidopodus</i>	Common Scaly-foot					+				+			+
Scincidae	<i>Acritoscincus trileatus</i>	Western Three-lined Skink					+							
	<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink					(+)				+			
	<i>Cryptoblepharus plagiocephalus</i>	Péron's Snake-eyed Skink					+							
	<i>Cryptoblepharus pulcher</i>	Elegant Snake-eyed Skink					(+)							
	<i>Ctenotus catenifer</i>	Chain-striped Southwest Ctenotus					+				+			
	<i>Ctenotus gemmula</i>	Jewelled Southwest Ctenotus					+							+
	<i>Ctenotus impar</i>	Southwest Odd-striped Ctenotus					+				+			
	<i>Ctenotus labillardieri</i>	Common Southwest Ctenotus					+				+			
	<i>Ctenotus schomburgkii</i>	Barred Wedgesnout Ctenotus					+				+			
	<i>Ctenotus uber uber</i>	Spotted Ctenotus					+				+			
	<i>Cyclodomorphus melanops</i>	Spinifex Slender Bluetongue					(+)				+			
	<i>Egernia kingii</i>	King's Skink					+				+			
	<i>Egernia napoleonis</i>	Southwestern Crevice Skink					+				+			
	<i>Egernia richardi</i>	Bright Crevice Skink					+				+			
	<i>Hemiergis initialis</i>	Southwestern Earless Skink					+				+			+

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	<i>Hemiergis peronii</i>	Lowlands Earless Skink					+				+			
	<i>Lerista distinguenda</i>	Southwestern Orange-tailed Slider					+				+			
	<i>Lerista dorsalis</i>	Southern Slider					+				+			
	<i>Lerista microtis</i>	Southwestern Slider									+			
	<i>Lerista picturata</i>	Southern Robust Slider									+			
	<i>Lerista viduata</i>	Ravensthorpe Range Slider	-	-	P1		+							
	<i>Liopholis multiscutata</i>	Bull Skink					+							
	<i>Menetia greyii</i> (incl. <i>M. amauro</i>)	Common Dwarf Skink					+				+			
	<i>Menetia surda</i>	Western Dwarf Skink					+							
	<i>Morethia adelaidensis</i>	Saltbush Morethia Skink					+							+
	<i>Morethia butleri</i>	Woodland Morethia Skink					+				+			
	<i>Morethia obscura</i>	Shrubland Morethia Skink					+				+			
	<i>Tiliqua occipitalis</i>	Western Bluetongue					+				+			
	<i>Tiliqua rugosa rugosa</i>	Bobtail					+				+			+
Varanidae	<i>Varanus gouldii</i>	Gould's Sand Monitor					+				+			
	<i>Varanus rosenbergi</i>	Heath Monitor					+				+			+
	<i>Varanus tristis</i>	Black-tailed Monitor					+							
Typhlopidae	<i>Ramphotyphlops australis</i>	Southern Blindsnake					+				+			
	<i>Ramphotyphlops bituberculatus</i>	Prong-snouted Blindsnake									+			
	<i>Ramphotyphlops hamatus</i>	Pale-headed Blindsnake					+							
	<i>Ramphotyphlops leptosoma</i>	Murchison Blindsnaek					+							
	<i>Ramphotyphlops pinguis</i>	Rotund Blindsnake					+							
	<i>Ramphotyphlops waitii</i>	Beaked Blindsnake					+							
Pythonidae	<i>Antaresia stimsoni</i>	Stimson's Python					+							

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	<i>Aspidites ramsayi</i> (southwest)	Woma (southwest)	-	S4	P1		+							
	<i>Morelia spilota imbricata</i>	Southwestern Carpet Python	-	S4	S		+				+			
Elapidae	<i>Acanthophis antarcticus</i>	Southern Death Adder	-	-	P3		+							
	<i>Brachyuropis f. fasciolatus</i>	Narrow-banded Snake					+							
	<i>Brachyuropis semifasciatus</i>	Southern Shovel-snout					+							
	<i>Demansia psammophis reticulata</i>	Yellow-faced Whipsnake					+							
	<i>Drysdalia mastersi</i>	Masters' Snake					+				+			
	<i>Echiopsis curta</i>	Bardick					+				+			
	<i>Elapognathus coronatus</i>	Crowned Snake					+				+			
	<i>Neelaps bimaculatus</i>	Black-naped Snake					+				+			
	<i>Notechis scutatus</i>	Tiger Snake					+							+
	<i>Parasuta gouldii</i>	Gould's Hooded Snake					+				+			
	<i>Parasuta monachus</i>	Monk Snake					+							
	<i>Parasuta nigriceps</i>	Mitchell's Short-tailed Snake					+							
	<i>Parasuta spectabilis bushi</i>	Mallee Black-headed Snake (Esperance area)		-	-	P1		+						
	<i>Paroplocephalus atriceps</i>	Lake Cronin Snake		-	-	P3								
	<i>Pseudechis australis</i>	Mulga Snake, King Brown						+						
	<i>Pseudonaja a. affinis</i>	Dugite (mainland)						+				+		+
	<i>Pseudonaja mengdeni</i> (ex <i>nuchalis</i>)	Gwardar, Western Brown Snake						+				+		
<i>Pseudonaja modesta</i>	Ringed Brown Snake						+							
<i>Rhinoplocephalus bicolor</i>	Square-nosed Snake						+				+			
<i>Simoselaps bertholdi</i>	Jan's Banded Snake						+				+			
BIRDS														

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Casuariidae	<i>Dromaius novaehollandiae</i>	Emu						+	+	+	+		+	+
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl	VU	S1	VU	K		+		+		+		+
Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail						+	+	+	+			
	<i>Coturnix ypsilophora</i>	Brown Quail						+		+				
	* <i>Pavo cristatus</i>	Indian Peafowl												
	* <i>Gallus gallus</i>	Red Junglefowl (Domestic Chicken)												
	* <i>Phasianus colchicus</i>	Common Pheasant												
Anatidae	<i>Biziura lobata</i>	Musk Duck						+	+	+	+			
	<i>Stictonetta naevosa</i>	Freckled Duck						+		+				
	<i>Cereopsis novaehollandiae grisea</i>	Recherche Cape Barren Goose	VU	S1	VU	L				+	+	+		
	<i>Cygnus atratus</i>	Black Swan						+		+	+			
	<i>Tadorna tadornoides</i>	Australian Shelduck						+	+	+	+			
	<i>Chenonetta jubata</i>	Australian Wood Duck						+	+	+	+			
	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck						+		+	+			
	<i>Anas rhynchotis</i>	Australian Shoveler						+		+	+			
	<i>Anas gracilis</i>	Grey Teal						+	+	+	+			
	<i>Anas castanea</i>	Chestnut Teal						+	+	+	+			
	* <i>Anas platyrhynchos</i>	Northern Mallard			int					+				
	<i>Anas superciliosa</i>	Pacific Black Duck						+	+	+	+			
	<i>Aythya australis</i>	Hardhead						+		+				
	<i>Oxyura australis</i>	Blue-billed Duck						+	+	+	+			
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe						+	+	+	+			
	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe						+	+	+	+			

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	<i>Podiceps cristatus</i>	Great Crested Grebe						+		+	+			
Columbidae	* <i>Columba livia</i>	Rock Dove, Feral Pigeon			int				+	+				
	* <i>Streptopelia senegalensis</i>	Laughing Dove			int			+	+	+	+			
	<i>Phaps chalcoptera</i>	Common Bronzewing						+	+	+	+		+	+
	<i>Phaps elegans</i>	Brush Bronzewing						+	+	+	+			
	<i>Ocyphaps lophotes</i>	Crested Pigeon						+	+	+	+			+
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth						+	+	+	+			+
Eurostopodidae	<i>Eurostopodus argus</i>	Spotted Nightjar						+	+	+	+			+
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet Nightjar						+	+	+	+			+
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	M	S3	IA	L		+		+	+	+		
Anhingidae	<i>Anhinga melanogaster</i>	Australasian Darter								+				
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant						+	+	+				
	<i>Phalacrocorax carbo</i>	Great Cormorant						+		+	+			
	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant						+		+	+			
	<i>Phalacrocorax varius</i>	Pied Cormorant						+		+	+			
	<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant				L		+		+	+			
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican						+		+	+			
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	S1	EN	K						+		
	<i>Ardea pacifica</i>	White-necked Heron						+		+	+		+	
	<i>Ardea modesta (ex alba)</i>	Eastern Great Egret	M	S3	IA	K		+		+		+		
	<i>Ardea ibis</i>	Cattle Egret	M	S3	IA	L				+		+		
	<i>Egretta novaehollandiae</i>	White-faced Heron						+	+	+				+
	<i>Nycticorax caledonicus</i>	Nankeen Night-heron						+		+				
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	M	S3	IA	-				+		-		

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	<i>Threskiornis molucca</i>	Australian White Ibis								+	+			
	<i>Threskiornis spinicollis</i>	Straw-necked Ibis						+		+	+			
	<i>Platalea regia</i>	Royal Spoonbill								+				
	<i>Platalea flavipes</i>	Yellow-billed Spoonbill						+		+	+			
Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey				L		+		+				
	<i>Elanus axillaris</i>	Black-shouldered Kite						+	+	+				+
	<i>Lophoictinia isura (ex Hamirostra)</i>	Square-tailed Kite						+	+	+				
	<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	M	S3	IA	K		+		+	+	+		
	<i>Haliastur sphenurus</i>	Whistling Kite						+	+	+				+
	<i>Milvus migrans</i>	Black Kite						+		+				
	<i>Accipiter fasciatus</i>	Brown Goshawk						+	+	+	+			
	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk						+		+				
	<i>Circus assimilis</i>	Spotted Harrier						+		+	+			
	<i>Circus approximans</i>	Swamp Harrier						+		+	+			
	<i>Aquila audax</i>	Wedge-tailed Eagle						+	+	+	+		+	+
<i>Hieraeetus morphnoides</i>	Little Eagle						+	+	+					
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel						+	+	+	+			+
	<i>Falco berigora</i>	Brown Falcon						+	+	+	+			+
	<i>Falco longipennis</i>	Australian Hobby						+	+	+	+			
	<i>Falco peregrinus</i>	Peregrine Falcon	-	S4	S			+	+	+	+			
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen								+				
	<i>Gallirallus philippensis</i>	Buff-banded Rail								+				
	<i>Porzana pusilla</i>	Baillon's Crake												
	<i>Porzana fluminea</i>	Australian Spotted Crake								+	+			

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	<i>Porzana tabuensis</i>	Spotless Crake						+		+					
	<i>Tribonyx ventralis</i> (ex <i>Gallinula</i>)	Black-tailed Native-hen						+		+				+	
	<i>Fulica atra</i>	Eurasian Coot						+	+	+	+			+	
Otididae	<i>Ardeotis australis</i>	Australian Bustard	-	-	P4				+	+	+				
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew													
Haematopodidae	<i>Haematopus longirostris</i>	Australian Pied Oystercatcher						+		+	+				
	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher						+		+	+		+		
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt						+		+	+				
	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet				RK		+	+	+	+	-			
	<i>Cladorhynchus leucocephalus</i>	Banded Stilt						+		+	+				
Charadriidae	<i>Pluvialis fulva</i>	Pacific Golden Plover	M	S3	IA	-		+		+	+	-			
	<i>Pluvialis squatarola</i>	Grey Plover	M	S3	IA	-		+		+	+	-	+		
	<i>Charadrius hiaticula</i>	Ringed Plover	M	S3	IA	-						-			
	<i>Charadrius dubius</i>	Little Ringed Plover	M	S3	IA	-						-			
	<i>Charadrius ruficapillus</i>	Red-capped Plover						+	+	+	+				
	<i>Charadrius bicinctus</i>	Double-banded Plover													
	<i>Charadrius mongolus</i>	Lesser Sand Plover	M	S1, S3	EN, IA	-		+		+		-			
	<i>Charadrius l. leschenaultii</i>	Greater Sand Plover (Mongolian)	M	S1, S3	VU, IA	-						-			
	<i>Charadrius veredus</i>	Oriental Plover	M	S3	IA	-						-			
	<i>Charadrius australis</i>	Inland Dotterel													
	<i>Euseyonis melanops</i>	Black-fronted Dotterel							+		+				+
	<i>Thinornis rubricollis</i> (ex <i>Charadrius</i>)	Hooded Plover	-	-	P4	RK		+	+	+	+	-			

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	<i>Erythronyctes alpinus</i>	Red-kneed Dotterel						+		+				
	<i>Vanellus tricolor</i>	Banded Lapwing						+		+	+			+
	<i>Vanellus miles</i>	Masked Lapwing							+	+	+			
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe	M	S3	IA	-						-		
	<i>Gallinago stenura</i>	Pin-tailed Snipe	M	S3	IA	RL						+		
	<i>Gallinago megala</i>	Swinhoe's Snipe	M	S3	IA	RL						+		
	<i>Limosa limosa</i>	Black-tailed Godwit	M	S3	IA	-		+		+		-		
	<i>Limosa lapponica</i> (2 subspp.)	Bar-tailed Godwit	M	S1, S3	VU, IA	-				+	+	-		
	<i>Numenius arquata</i>	Eurasian Curlew	M	S3	IA	-						-		
	<i>Numenius minutus</i>	Little Curlew	M	S3	IA	RL						+		
	<i>Numenius phaeopus</i>	Whimbrel	M	S3	IA	-		+		+		-		
	<i>Numenius madagascariensis</i>	Eastern Curlew	M	S1, S3	VU, IA	-						-		
	<i>Xenus cinereus</i>	Terek Sandpiper	M	S3	IA	-						-		
	<i>Actitis hypoleucos</i>	Common Sandpiper	M	S3	IA	-		+		+		-		
	<i>Tringa brevipes</i> (ex <i>Heteroscelus</i>)	Grey-tailed Tattler	M	S3	IA	-		+		+		-		
	<i>Tringa nebularia</i>	Common Greenshank	M	S3	IA	-		+		+	+	-		
	<i>Tringa stagnatilis</i>	Marsh Sandpiper	M	S3	IA	-		+		+		-		
	<i>Tringa glareola</i>	Wood Sandpiper	M	S3	IA	-				+		-		
	<i>Arenaria interpres</i>	Ruddy Turnstone	M	S3	IA	-		+		+	+	+		
	<i>Calidris tenuirostris</i>	Great Knot	M	S1, S3	VU, IA	-		+		+	+	-		
<i>Calidris canutus</i> (2 subspp.)	Red Knot	M	S1, S3	VU, IA	-		+		+		-			
<i>Calidris alba</i>	Sanderling	M	S3	IA	-		+		+	+	-			

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	<i>Calidris mauri</i>	Western Sandpiper	M	S3	IA	-						-		
	<i>Calidris minuta</i>	Little Stint	M	S3	IA	-						-		
	<i>Calidris ruficollis</i>	Red-necked Stint	M	S3	IA	-		+		+	+	-		
	<i>Calidris subminuta</i>	Long-toed Stint	M	S3	IA	-				+		-		
	<i>Calidris melanotos</i>	Pectoral Sandpiper	M	S3	IA	-						-		
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	S3	IA	-		+		+	+	-		
	<i>Calidris ferruginea</i>	Curlew Sandpiper	M	S1, S3	VU, IA	-		+	+	+		-		
	<i>Limicola falcinellus</i>	Broad-billed Sandpiper	M	S3	IA	-						-		
	<i>Philomachus pugnax</i>	Ruff	M	S3	IA	-						-		
	<i>Phalaropus lobatus</i>	Red-necked Phalarope	M	S3	IA	-						-		
	<i>Phalaropus fulicarius</i>	Grey Phalarope	M	S3	IA	-						-		
Turnicidae	<i>Turnix varius varius</i>	Painted Button-quail (mainland)						+		+				
	<i>Turnix velox</i>	Little Button-quail								+				
Laridae	<i>Onychoprion anaethetus</i> (ex <i>Sterna</i>)	Bridled Tern	M	S3	IA	FL						-		
	<i>Gelochelidon nilotica</i>	Gull-billed Tern												
	<i>Hydroprogne caspia</i> (ex <i>Sterna</i>)	Caspian Tern	M	S3	IA	FK		+		+	+	+		
	<i>Chlidonias hybrida</i>	Whiskered Tern						+		+				
	<i>Chlidonias leucopterus</i>	White-winged Black Tern	M	S3	IA	-						-		
	<i>Sterna hirundo</i>	Common Tern	M	S3	IA	-						-		
	<i>Thalasseus bergii</i>	Crested Tern						+		+				
	<i>Larus pacificus</i>	Pacific Gull				FK		+		+	+		+	+
	<i>Chroicocephalus novaehollandiae</i>	Silver Gull						+		+	+			

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Cacatuidae (ex Psittacidae)	<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	EN	S1	EN	BL		+		+	+	-	+	
	<i>Eolophus roseicapillus</i> (ex <i>Cacatua</i>)	Galah						+	+	+	+		+	+
	<i>Nymphicus hollandicus</i>	Cockatiel												
Psittacidae	<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet						+	+	+	+			+
	<i>Polytelis anthopeplus</i>	Regent Parrot						+	+	+				
	<i>Platycercus icterotis xanthogenys</i>	Western Rosella (inland)	-	-	P4			+	+	+	+			+
	<i>Barnardius zonarius</i>	Australian Ringneck						+	+	+	+		+	+
	<i>Purpureicephalus spurius</i>	Red-capped Parrot						+		+				
	<i>Psephotus varius</i>	Mulga Parrot							+	+	+			
	<i>Melopsittacus undulatus</i>	Budgerigar							+	+				
	<i>Neophema elegans</i>	Elegant Parrot						+		+				+
	<i>Neophema petrophila</i>	Rock Parrot						+		+	+			
<i>Pezoporus flaviventris</i> (ex <i>wallicus</i>)	Western Ground Parrot	CR	S1	CR	K					+	-			
Cuculidae	<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo						+	+	+				
	<i>Chalcites osculans</i>	Black-eared Cuckoo						+	+	+				+
	<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo						+	+	+	+			+
	<i>Cacomantis pallidus</i>	Pallid Cuckoo						+	+	+	+			+
	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo						+	+	+	+			+
Strigidae	<i>Ninox c. connivens</i>	Barking Owl (southwest)	-	-	P2									
	<i>Ninox novaeseelandiae</i>	Southern Boobook						+	+	+	+			+
	<i>Ninox scutulata</i>	Brown Hawk-Owl												
Tytonidae	<i>Tyto n. novaehollandiae</i>	Masked Owl (southwest)	-	-	P3									
	<i>Tyto javanica</i>	Eastern Barn Owl						+	+	+				
Halcyonidae	<i>*Dacelo novaeguineae</i>	Laughing Kookaburra			Int			+		+				

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Todiramphus pyrrhopygia</i>	Red-backed Kingfisher												
	<i>Todiramphus sanctus</i>	Sacred Kingfisher						+	+	+	+			
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	M	S3	IA	M		+	+	+	+	+		+
Climacteridae	<i>Climacteris rufa</i>	Rufous Treecreeper							+		+			+
Maluridae	<i>Malurus splendens</i>	Splendid Fairy-wren						+	+	+				
	<i>Malurus leucopterus leuconotus</i>	White-winged Fairy-wren							+		+			
	<i>Malurus pulcherrimus</i>	Blue-breasted Fairy-wren						+	+	+	+			+
	<i>Stipiturus malachurus</i>	Southern Emu-wren						+		+	+			
Dasyornithidae	<i>Dasyornis longirostris</i>	Western Bristlebird	VU	S1	VU	-		+		+		-		
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren						+	+	+	+			
	<i>Hylacola cauta whitlocki</i>	Shy Heathwren (western)	-	-	P4			+	+	+				+
	<i>Calamanthus campestris montanellus</i>	Rufous Fieldwren (western Wheatbelt)	-	-	P4			+	+	+				
	<i>Pyrrholaemus brunneus</i>	Redthroat						+	+	+	+			+
	<i>Smicromnis brevirostris</i>	Weebill						+	+	+	+			+
	<i>Gerygone fusca</i> (incl. <i>mungl</i>)	Western Gerygone						+	+	+				+
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill						+	+	+	+			
	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill						+	+	+	+			
	<i>Acanthiza inornata</i>	Western Thornbill						+		+				
	<i>Acanthiza i. iredalei</i>	Slender-billed Thornbill (western)		-	-	L						-		
Pardalotidae	<i>Acanthiza apicalis</i>	Inland (Broad-tailed) Thornbill						+	+	+	+			+
	<i>Pardalotus punctatus</i>	Spotted Pardalote						+	+	+	+			+
	<i>Pardalotus striatus</i>	Striated Pardalote						+	+	+	+			+
Meliphagidae	<i>Acanthorhynchus superciliosus</i>	Western Spinebill						+		+	+			

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
	<i>Certhionyx variegatus</i>	Pied Honeyeater							+					
	<i>Gavicalis virescens</i> (ex Lich.)	Singing Honeyeater						+	+	+	+			+
	<i>Nesoptilotis leucotis</i> (ex Lich.)	White-eared Honeyeater						+	+	+	+			+
	<i>Lichenostomus cratitius</i>	Purple-gaped Honeyeater						+	+	+	+			
	<i>Ptilotula ornatus</i> (ex Lich.)	Yellow-plumed Honeyeater						+	+	+	+			
	<i>Ptilotula plumulus</i> (ex Lich.)	Grey-fronted Honeyeater							+					
	<i>Purnella albifrons</i>	White-fronted Honeyeater							+	+	+			+
	<i>Manorina flavigula</i>	Yellow-throated Miner							+	+	+		+	+
	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater						+	+	+	+			
	<i>Anthochaera lunulata</i> (ex chrysoptera)	Western Wattlebird						+		+	+			+
	<i>Anthochaera carunculata</i>	Red Wattlebird						+	+	+				+
	<i>Epthianura albifrons</i>	White-fronted Chat						+	+	+	+			+
	<i>Glyciphila melanops</i>	Tawny-crowned Honeyeater						+	+	+	+			+
	<i>Lichmera indistincta</i>	Brown Honeyeater						+	+	+	+			+
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater						+	+	+	+		+	+
	<i>Phylidonyris niger</i>	White-cheeked Honeyeater						+		+				
	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater						+	+	+	+			+
	<i>Melithreptus albogularis</i>	White-throated Honeyeater												
	<i>Melithreptus chloropsis</i>	Western White-naped Honeyeater						+		+				
Pomatostomidae	<i>Pomatostomus superciliosus ashbyi</i>	White-browed Babbler (wheatbelt)	-	-	P4			+	+	+				+
Cinclosomatidae (ex Eupetidae)	<i>Cinclosoma castanotum</i>	Chestnut Quail-thrush							+		+			
Psophodidae	<i>Psophodes nigrogularis oberon</i>	Western Whipbird (western)	-	-	P4			+		+				

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
(ex Eupetidae)		mallee)												
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella						+	+	+	+			
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike						+	+	+	+			+
	<i>Lalage sueurii</i>	White-winged Triller						+	+	+				+
Pachycephalidae	<i>Falcunculus frontatus leucogaster</i>	Crested Shrike-tit (south-western)	-	-	P4			+		+				
	<i>Pachycephala inornata</i>	Gilbert's Whistler							+		+			
	<i>Pachycephala pectoralis</i>	Golden Whistler						+	+	+	+			+
	<i>Pachycephala rufiventris</i>	Rufous Whistler						+	+	+	+			
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush						+	+	+	+			+
	<i>Oreoica g. gutturalis</i>	Crested Bellbird (southern)	-	-	P4			+	+	+				+
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow												
	<i>Artamus cinereus</i>	Black-faced Woodswallow						+	+	+	+		+	+
	<i>Artamus cyanopterus</i>	Dusky Woodswallow						+	+	+	+			+
Cracticidae (ex Artamidae)	<i>Cracticus torquatus</i>	Grey Butcherbird						+	+	+	+		+	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird						+	+	+	+			
	<i>Cracticus tibicen</i>	Australian Magpie						+	+	+	+		+	+
	<i>Strepera versicolor</i>	Grey Currawong						+	+	+	+		+	+
Rhipiduridae	<i>Rhipidura albiscapa (ex fuliginosa)</i>	Grey Fantail						+	+	+				
	<i>Rhipidura leucophrys</i>	Willie Wagtail						+	+	+	+		+	+
Corvidae	<i>Corvus coronoides</i>	Australian Raven						+	+	+	+		+	+
	<i>Corvus bennetti</i>	Little Crow							+		+			
	<i>Corvus orru</i>	Torresian Crow												
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher						+	+	+	+			+
	<i>Grallina cyanoleuca</i>	Magpie-lark						+	+	+	+		+	+

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	BIRDATA 6346	BIRDATA 6445	BIRDATA 6450	NATUREMAP (GHD)	EPBC PMST (GHD)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter							+		+			+
	<i>Petroica boodang</i>	Scarlet Robin						+		+				
	<i>Petroica goodenovii</i>	Red-capped Robin						+	+	+	+			+
	<i>Melanodryas cucullata</i>	Hooded Robin						+	+	+	+			
	<i>Eopsaltria griseogularis</i>	Western Yellow Robin						+	+	+	+			+
	<i>Drymodes brunneopygia</i>	Southern Scrub-robin						+	+	+	+			+
Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed-Warbler						+		+				
Megaluridae	<i>Megalurus gramineus</i>	Little Grassbird							+	+				
	<i>Cincloramphus mathewsi</i>	Rufous Songlark						+		+				
	<i>Cincloramphus cruralis</i>	Brown Songlark						+		+				+
Timaliidae	<i>Zosterops lateralis</i>	Silvereye						+	+	+	+			+
Hirundinidae	<i>Cheramoeca leucosterna</i>	White-backed Swallow						+	+	+	+			
	<i>Hirundo neoxena</i>	Welcome Swallow						+	+	+	+			
	<i>Petrochelidon ariel</i>	Fairy Martin						+	+	+				
	<i>Petrochelidon nigricans</i>	Tree Martin						+	+	+	+		+	+
Sturnidae	* <i>Sturnus vulgaris</i>	Common Starling			Int			+		+				
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird							+		+			
Estrildidae	<i>Stagonopleura oculata</i>	Red-eared Firetail						+		+	+			
Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian Pipit						+	+	+	+			+

BL= Breeding likely to occur in the area, RL= Roosting likely to occur, L= Species or species habitat likely to occur in the area K= Species or species habitat known to occur in the area, M=Migratory listed

Table 41: Conservation significant invertebrates known or potentially present in Esperance Extension study area

FAMILY	SPECIES	COMMON NAME	EPBC ACT STATUS	WC ACT STATUS	DPaW STATUS	PMST (12/2013)	BURBIDGE et al. 2004	NATUREMAP (GHD)	EPBC PMST (GHD)	DPaW listing (South Coast)	NATURMEAP RECORD (WITHIN 100KKM)	FIELD SURVEY (GHD)	FIELD SURVEY (ECOSCAPE)
INSECTS													
Flatidae	<i>Budginmaya eulae</i>	Eula's Planthopper	-	-	P3					+	+		
Collettidae	<i>Hylaeus globuliferus</i>	(bee)	-	-	P3					+	+		
CRUSTACEANS													
Daphniidae	<i>Daphnia jollyi</i>	(water flea)	-	-	P1					+	+		
MILLIPEDES													
Iulomorphidae	<i>Atelomastix anancita</i>	(millipede)	-	S1	VU					+	+		
	<i>Atelomastix dendritica</i>	Recherche Atelomastix Millipede	-	S1	VU					+	+		
	<i>Atelomastix grandis</i>	(millipede)	-	S1	VU					+	+		
	<i>Atelomastix melindae</i>	(millipede)	-	S1	VU					+	+		
	<i>Atelomastix priona</i>	(millipede)	-	S1	VU					+	+		
	<i>Atelomastix sarahae</i>	(millipede)	-	S1	VU					+	+		
Sphaerotheriidae	<i>Epicycliosoma sarahae</i>	Sarah's Pill Millipede	-	S1	VU					+	+		
ARACHNIDS													
Archaeidae	<i>Zephyrarchaea marki</i>	Cape Le Grand Assassin Spider	-	S1	VU					+	+		

APPENDIX NINE: SIGNIFICANT FAUNA SPECIES PROFILES

MAMMALS

***Tachyglossus aculeatus* (Short-beaked Echidna)**

Conservation status

Not conservation listed by WA or Commonwealth; 'Least Concern' (IUCN 2014)

Distribution and Preferred habitat

The Short-beaked Echidna (Tachyglossidae) is found throughout mainland Australia and offshore islands including Tasmania, and also southeastern New Guinea. It is not restricted to any particular habitat or range of habitats, occurring from sea level to alpine areas, and from sandy deserts to rainforest, varying in abundance from sparse to common.

Ecology

This species is the largest exclusively insectivorous mammal in Australia (2-7 kg), and like other monotremes (long-beaked echidnas, platypus) has a relatively low and variable metabolic rate, and the young hatch from shelled eggs at an early stage of development, comparable to the stage at birth in marsupials. Echidnas feed on ant and termite adults and brood extracted from nests with the long sticky tongue after excavation with powerful clawed forelimbs; abundant soil and fragments of ant nest material are swallowed with prey, forming distinctive friable scats. Echidnas are solitary except when breeding (July-August), when aggregations or 'trains' of males can be found following adult females. No major threats are known, though vehicle impacts are a significant source of mortality in some areas.

Likelihood of Occurrence

Echidnas are known to occur throughout woodland, agricultural and pastoral zones. Records in *NatureMap* (DPaW 2007-2014) are relatively sparse, with few in the vicinity of the study area, but this is presumably due to underreporting.

Potential Impacts

The fence is likely to be highly effective as a barrier limiting movements of individuals and tending to loss of genetic connectivity. Echidnas are known to be susceptible to entanglement (leading to injury or death) when attempting to pass under wire fences (DAFWA 2012a).

***Dasyurus geoffroii* (Western Quoll, Chuditch)**

Conservation status

EPBC Act 1999 VU, WC Act 1950 S1, DPaW VU

Distribution and Preferred habitat

The Chuditch (Dasyuridae) formerly occurred through most of mainland Australia, but is now known only from Western Australia where it predominantly occurs in Jarrah (*Eucalyptus marginata*) forest in a roughly triangular area bounded by Moora in the north, Cape Arid to the east and Cape Leeuwin in the south (Smith *et al.* 2004). Occasional records are obtained from the Wheatbelt and goldfields, where suitable habitat has

been reduced to scattered fragments but it persists in very low numbers. Formerly utilised a wide variety of habitats including dry sclerophyll forests, beaches and deserts (Van Dyck & Strahan 2008).

Ecology

The largest carnivorous marsupial in Western Australia (males up to 1.5 kg, females to 1 kg), the Chuditch is short-lived (average lifespan two to three years) but highly mobile (individual movements recorded up to 180 km) and utilises large home ranges (DoE 2014b; male average 900 ha, female 400 ha; Smith *et al.* 2004). Chuditch use horizontal hollow logs or earth burrows as dens or refuge, and visit a large number of such sites, averaging over a hundred annually, rather than spending long in any place. Feed mainly on large invertebrates, also reptiles, birds and small mammals. The main threats to the species are from cats and foxes.

Likelihood of Occurrence

There are numerous post-1990 records from the general vicinity of the study area (DPaW 2007-2014), and Chuditch are likely to regularly utilise the wooded habitats of the study area. Tracks recorded during the survey close to a woodland area near the eastern end of the study area possibly represent this species (**Table 15**).

Potential Impacts

The fence does not represent a significant barrier or entanglement hazard for Western Quoll. Due to the low density and large individual ranges in this species, direct impacts of associated clearing on individuals are likely to be minor. More significant would be disruption of den/refuge sites, so care should be taken to minimise disturbance of hollow logs or existing burrows. Road trauma appears to be a significant cause of mortality in this species, so use of access tracks at night should be minimised.

***Parantechinus apicalis* (Dibbler)**

Conservation status

EPBC Act 1999 EN, WC Act 1950 S1, DPaW EN

Distribution and Preferred habitat

Formerly widespread on the mainland of Western Australia, this medium-sized carnivorous marsupial (Dasyuridae) is now restricted to three small offshore islands (Boullanger, Whitlock and Escape) near Jurien on the west coast, and a few scattered sites on the south coast between Denmark and Ravensthorpe. Habitats on the three islands include sand and limestone substrates with vegetation ranging from open heath to dense scrub; mainland sites are characterized by long-unburnt heathland with sand or sometimes lateritic soil (DoE 2014b).

Ecology

Mainly insectivorous, scats containing finely macerated pieces of arthropod exoskeletons, rare remains of small vertebrates (bird feathers and lizard scales) and some plant material including *Rhagodia baccata* (Berry Saltbush) fruit and *Carpobrotus virescens* (Pigface) which may be ingested mainly for water content (Bencini *et al.* 2001). Post-mating male die-off appears to be 'facultative' in this species, as it has been recorded on some island populations but not others, and does not occur on the mainland (Mills & Bencini 2000).

Likelihood of Occurrence

The nearest recent (post-1990) record of the species is approximately 60 km southwest of the study area. It is unlikely to be present as its known range does not overlap with potential disturbance sites.

Potential Impacts

None likely.

***Phascogale calura* (Red-tailed Phascogale)**Conservation status

EPBC Act 1999 EN, WC Act 1950 S1, DPaW EN

Distribution and Preferred habitat

This species (Dasyuridae) was formerly widespread in woodland habitats in inland south and central Australia (also with subfossil records in the north), but is now mainly restricted to remnants of mature Wandoo (*Eucalyptus wandoo*) or Rock Oak (*Allocasuarina huegeliana*) woodland in the south of the Western Australian Wheatbelt where the annual rainfall is 300-600 mm (Menkhorst & Knight 2004). It shows a preference for long unburnt habitat with a continuous canopy, as well as tree hollows (DEC 2011a). Highest densities occur where dense *A. huegeliana* is interspersed with senescent *E. wandoo* to provide nesting sites (Bradley *et al.* 2008; Kitchener 1981; Short *et al.* 2011; Short & Hide 2012). Sparse records in the southeastern Wheatbelt are associated with mallee and heath, indicating a broader range of habitats.

Ecology

Nocturnal, mostly solitary, shy and rarely seen. It is agile, rapid and forages on trees, especially rough-barked Eucalypts and dead branches; and also extensively on the ground. It typically runs down tree trunks head first. Mating occurs in a three-week period in July after which all males die. Known or suspected threatening processes include predation by foxes and cats; presence of poison plants *Gastrolobium* is thought to have been important in survival of those populations still extant (Kitchener 1981).

Likelihood of Occurrence

While the GHD (2012) Flora & Fauna report lists Red-tailed Phascogale among Threatened species that “may occur” in the Recherche Subregion based on Comer *et al.* (2001a), it was not identified in the *PMST/NatureMap* searches, and potential presence and impacts were not discussed in the report text (GHD 2012).

NatureMap (currently) shows two records on the South Coast Hwy east of Ravensthorpe, both opportunistic finds of dead animals from 1997. Both are within 20 km of the western end of the proposed fence alignment, so that similar habitats and potential dispersal routes for this species are likely to exist in the western part of the study area.

Whether a significant population exists has to be considered as unknown, because we know of no evidence that it has been surveyed for in this area (as opposed to other parts of the species range to the west). Using the precautionary principle, it should therefore be assumed to be present where suitable habitat exists (including forest and woodland providing suitable tree hollows, and also mallee and shrubland if dense enough to provide shelter), and that it may be impacted by any clearing that increases fragmentation.

Targeted survey may be considered appropriate, and low-impact spotlighting surveys should be sufficient to demonstrate presence or likely absence of the species in discrete areas.

Potential Impacts

Potential impact on a population of this species would not be due to the fence directly, but fragmentation of suitable habitat (both canopy and shrub layer) and effects via facilitated movement of predators along the fenceline. Any impact is likely to be very minor and limited to the western end of the extension alignment.

***Myrmecobius fasciatus* (Numbat, Walpurti)**

Conservation status

EPBC Act 1999 VU, WC Act 1950 S1, DPaW VU

Distribution and Preferred habitat

Numbats (Myrmecobiidae) once occurred in a wide variety of habitat types including eucalypt forest and woodland, and current populations (mostly reintroduced) occur in upland Jarrah forest, open eucalypt woodland, *Banksia* woodland and tall closed shrubland. Habitats usually have abundant soil termites, hollow logs and branches for shelter (DEC 2011a).

Ecology

Diurnal, shelters in hollow logs and branches, feeds entirely on termites which it obtains by uncovering galleries on the forest floor.

Likelihood of Occurrence

There are *NatureMap* (DPaW 2007-2014) records in the Ravensthorpe area from 1972, but none subsequently except for the 2008 release of 13 individuals in Cocanarup Timber Reserve, 43 km west of the study area. This translocated group was considered to be 'slowly growing' based on aerial radiotelemetry and observations of litters in 2009 (Project Numbat Inc 2014); subsequent information is not available, but it is unlikely that a population has yet been re-established in or near the study area.

Potential Impacts

No impact to existing populations is likely due to local extinction of this species.

***Isoodon obesulus fusciventer* (Southern Brown Bandicoot, Quenda)**

Conservation status

DPaW P5

Distribution and Preferred habitat

Quenda (Peramelidae) are present through much of the humid south-west of Western Australia, with more patchy distribution extending to the Great Western Woodlands and Recherche area. They prefer dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeding in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (DEC 2008b).

Ecology

Quenda are mostly nocturnal, usually solitary, terrestrial and omnivorous, digging into the soil for invertebrates, fungi, edible plant parts and occasional small vertebrates. Breeding occurs at any season with a peak in spring, nesting in litter-covered depressions concealed under logs, shrubs or debris.

Likelihood of Occurrence

Patches of suitable habitat occur in the study area, and the entire area lies within the less-densely-occupied part of the species range. Numerous signs of Quenda presence were observed during the field survey and the species is likely to be present wherever suitable habitat occurs, although their ability to utilise the habitat would be hampered by the presence of predators such as foxes, feral cats and domestic dogs.

Potential Impacts

Known threatening processes include fragmentation of habitat, fire in habitat already fragmented, and predation by cats, dogs and foxes. Disturbance of potential nesting sites (logs, shrubs, debris piles and litter) may impact some individuals, and may cause death or injury directly, or through forced relocation resulting in increased intraspecific competition and exposure to predators. As the proposed action is mainly peripheral to areas already cleared, impacts to populations are likely to be minor.

***Macropus irma* (Western Brush Wallaby)**

Conservation status

DPaW P4

Distribution and Preferred habitat

This grazing kangaroo (Macropodidae) species, also known as the Black-gloved Wallaby, occurs in open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in Karri forest (DEC 2011a).

Ecology

This species avoids pastureland and forests with dense undergrowth. Previous clearing for agriculture has severely fragmented the population and reduced its range. Foxes are thought to have been the major factor in its decline (especially increased fox populations from the 1970s), mainly by predation on juveniles. The species increases in abundance in areas where foxes have been controlled.

Likelihood of Occurrence

The study area is in the easternmost part of the species current distribution, and is likely to be occupied wherever suitable habitat occurs. Three sightings occurred during survey, in mallee shrubland and mallee woodland (**Table 15**).

Potential Impacts

Fragmentation of habitat by fence construction will result in populations north and south of the fence becoming nearly isolated, with potential for limited movement through breaks at major creeklines; however, predator control may allow increased survival in patches of remnant vegetation within the agricultural zone,

so that overall impact is not necessarily negative. Trends in fox abundance in the agricultural zone are likely to be more significant for this species than effects of the barrier fence.

***Macropus eugenii derbianus* (Tammar Wallaby)**

Conservation status

DPaW P5

Distribution and Preferred habitat

The western subspecies of the smallest grazing kangaroo (Macropodidae) uses dense, low vegetation for shelter and open grassy areas for feeding. It occurs in coastal heath, scrub, sclerophyll forest and mallee woodland (DEC 2011a); its common name is derived from thickets of tamma (*Allocasuarina campestris*) used as shelter. Originally widespread through the southwest, but disappeared from agricultural areas early in the last century; persists on islands and some protected mainland sites, remaining locally abundant where foxes are controlled.

Ecology

A grazing species, more strictly nocturnal than many other kangaroos, emerging from shelter only in darkness. Relatively solitary, and strictly seasonal in breeding cycle (young leave pouch in October-November). Reproductive ecology has been studied in the Garden Island population (Schwanz & Robert 2012).

Likelihood of Occurrence

Limited to near-coastal sites, remote from the study area apart from its east and west ends; recorded in recent decades from a few kilometres south of Ravensthorpe, at Cape Le Grand, and on islands of the Recherche Archipelago, but likely extinct in the Cape Arid mainland area.

Potential Impacts

No impact is likely, as the study area does not overlap the current distribution of the species.

***Macropus fuliginosus* (Western Grey Kangaroo)**

Synonym: *M. fuliginosus melanops* (Mainland, vs. *M. f. fuliginosus* Kangaroo Island, SA)

Conservation status

Not conservation listed by WA or Commonwealth; BAM Act 2007 'Declared Pest' throughout WA; 'Least Concern' (IUCN 2014)

Distribution and Preferred habitat

This large (up to 72 kg) grazing kangaroo species (Macropodidae) occurs in open forest or woodland, shrubland and grassland areas (including pasture and agricultural landscapes) across southern Australia from the west coast to central New South Wales and Victoria, where it is broadly sympatric with the closely related Eastern Grey Kangaroo (*M. giganteus*). Genetic diversity is highest in the west and low in eastern populations (and the isolated Kangaroo Island subspecies), indicating a history of relatively recent expansion from southwestern refugia following aridity in the last glacial period (Neaves *et al.* 2012). The area of

occurrence and population size are considered to be increasing due to clearing of unsuitable vegetation and provision of water for stock (IUCN 2014).

Ecology

Grazing kangaroos are dependent on rainfall-stimulated grass growth: population size increases exponentially during intervals when food is abundant, and falls sharply during drought (Arnold *et al.* 1991). The Western Grey appears to be buffered from these fluctuations to some extent, because its diet comprises browse (shrub foliage) as well as grass and herbaceous vegetation (Arnold *et al.* 1994). Individuals are relatively sedentary, particularly in the western part of the species range: in a study of a population associated with a Wandoo remnant in the Wheatbelt, animals spent the day in areas that included cover by a shrub layer, while nocturnal activity (predominantly feeding) occurred within a stable, limited area either in open woodland with herbaceous ground cover or on adjacent farmland; only three shifts of night range (by several hundred metres) were documented among 51 tagged animals in the four-year study (Arnold *et al.* 1992).

In a marking study conducted over two years in New South Wales, it was found that 99% of individuals remained within 20 km of their initial location (92% within 10 km) but a few longer movements up to 85 km were documented (Priddel *et al.* 1988). The same study found that a 1.8 m 'kangaroo deterrent' fence was not a total barrier, but only one Western Grey was recorded to have crossed it (crossings by Red Kangaroos were much more frequent). The Western Grey is likely to have crossed under the wire rather than leaping the fence.

Kangaroos modify their environment in various ways, including the effects of 'hip holes' (shallow depressions created during diurnal resting behaviour, functionally analogous to burrows in other species) which generally increase water infiltration and incorporation of organic carbon, nitrogen and minerals otherwise (locally) lost to runoff, and maintain heterogeneity in woodland habitats (Eldridge & James 2009; Eldridge & Rath 2002). Evaluation of attempts to control or exclude kangaroo populations should therefore involve quantitative assessment of long-term effects of such actions on soils and vegetation, including agricultural/pastoral productivity.

Likelihood of Occurrence

Western Grey Kangaroos are known to occur throughout the woodland, agricultural and pastoral zones.

Potential Impacts

Because of the relatively sedentary nature of this species (at least in the western part of its range) no mass population movements normally occur, and only individuals locally resident in the vicinity of the barrier are likely to be directly affected. Similarly, only those animals resident within or in close proximity to the area to be enclosed can impact on agricultural productivity. Initially, clearing of vegetation and construction of the fence will impact individuals that previously utilised or regularly crossed the fence corridor, and may force a shift to less suitable habitat or result in injury while attempting to cross the fence between regular feeding and resting sites. After an initial period of adjustment to the new conditions, interactions with the fence are most likely to occur when kangaroos are pursued or otherwise disturbed by humans or dogs.

DAFWA (2012a) suggested that Emu-like mass build-ups may occur in Western Grey Kangaroo, citing Hayward & Kerley (2009) for report of such events along the eastern Australian Dingo Fence. However, this was unsubstantiated, the only relevant source cited by Hayward and Keeley, Caughley *et al.* (1987: chapter by D. Priddel, p.118) refers to localised mass mortality due to concentration at remnant food or water sources during drought, not confinement by fences.

Kangaroo abundance tends to be higher in the absence of predators, so exclusion of dingo results in increased kangaroo impact on crops and grasses in the agricultural zone. As the dingo is unlikely to be tolerated in sheep grazing areas, or high kangaroo density in wheat crops, sustained culling or harvesting of kangaroos will presumably continue to occur south of the fence.

One of the common ways in which wire fences (especially but not only barbed wire) impacts kangaroos is described as 'fencehanging'. This occurs "when a kangaroo attempts to jump a fence but misses the top. Instead its leg(s) pass between the top wire and the next one down. The body then flies forward over the top and as it falls towards the ground, the legs act like a stick in the wires, pulling the second wire over the top wire and trapping the leg(s) tight and acting like a tourniquet. If the fence is high or the roo is small the body may be suspended off the ground; if the roo is bigger or the fence is lower, the body may be partially on the ground. Either way the result is the same - no hope of escape without assistance. The animal dies slowly of capture myopathy (fear response) or dehydration, or is eaten alive by predators." (Macedon Ranges Wildlife Network 2014).

URS (2007: Section 7) acknowledged the relatively sedentary nature of this species. They used a cost estimate of crop damage by kangaroos based on the number of animals that would potentially enter agricultural areas from outside, i.e. with home ranges encompassing areas both inside and outside the line of the fence, and explicitly exclude consideration of crop damage by kangaroos resident on the agricultural side of the fence. The estimate of preventable crop damage is a relatively low figure (\$0.6 million; URS 2007, Section 10); additional cost of control required in the absence of natural predators was not estimated.

***Bettongia penicillata ogilbyi* (Brush-tailed Bettong, Woylie)**

Conservation status

EPBC Act 1999 EN, WC Act 1950 S1, DPaW EN

Distribution and Preferred habitat

This small macropod (Potoroidae) formerly occupied a wide range of habitats over most of the continent south of the tropics, but by the 1970s its distribution had been reduced to three locations in Western Australia: Perup Forest, Tutanning NR and Dryandra Woodland. Habitat at these sites is open forest and woodland with a low understorey of tussock grasses or woody scrub. There have been a large number of reintroductions; over 50 in Western Australia (DoE 2014b).

Ecology

Woylies are small nocturnal macropods that shelter during the day in patches of dense undergrowth, logs, rock cavities and occasionally burrows. Thickets of *Gastrolobium* spp. occur at the sites where the species survived, and are thought to provide refuge from introduced predators sensitive to 1080 poisoning (see also Short *et al.* 2005). Other threatened mammal species associated with Woylie habitat include Chuditch, Quenda, Bilby, Numbat, Brush-tailed Phascogale and Western Ringtail Possum. Threatening processes include predation by cats and especially foxes, habitat destruction and alteration, altered fire regimes, competition from domestic and feral herbivores, but rapid decline since 2001 is thought to be largely due to parasitic disease (DEC 2008a).

Likelihood of Occurrence

There is no remnant or free-ranging population of Woylies in the vicinity of the study area, the nearest records from recent decades are about 70 km to the west of Ravensthorpe (DPaW 2007-2014). Habitat in

the study area might well be suitable for future range expansion or translocations, but the species is currently absent.

Potential Impacts

No impact to currently existing populations.

***Nyctophilus major* (Western Long-eared Bat)**

Synonyms: *Nyctophilus timoriensis* (part), *N. major major*, *N. major tor*

Conservation status

DPaW P4 (as *Nyctophilus timoriensis* (central form))

Distribution and Preferred habitat

Formerly treated as part of a widespread 'species' *N. timoriensis* (Vespertilionidae), species taxonomy of this complex was resolved by Parnaby (2009) including separation of *N. major* and description of two subspecies. *Nyctophilus m. major* occurs in the southwest of Western Australia (south from Perth and west from Albany), *N. major tor* is slightly smaller and occurs in lower rainfall areas to the north and east (as far as the Pilbara, and Eyre Peninsula SA), with a narrow zone of intergradation between the forms around the Dryandra Woodlands.

Ecology

Nyctophilus species are insectivorous bats that catch prey in flight or, in some species, by gleaning from surfaces (so that non-flying prey such as caterpillars may be eaten). Roosts and particularly breeding sites are usually in tree hollows, and thus in trees usually over a century old (Abbott & Whitford 2001). There have been few studies of species ecology subsequent to the 2009 taxonomic revision, and it is often unclear whether older results are applicable, but the relative uniformity of echolocation calls across Western Australian *Nyctophilus* (Bullen & McKenzie 2002) suggests relative uniformity of diet and foraging mode.

Likelihood of Occurrence

As mapped by Parnaby (2009), *N. m. major* does not extend east of Albany and *N. major tor* does not occur in coastal areas west of the Nullarbor, but precise distribution is unclear because few other sources have followed the revised taxonomy; there are two records on Atlas of Living Australia (identified as *N. m. major*) from close to Esperance. This species is considered more likely to occur in inland (northern) parts of the study area, and in or close to woodland or forest habitat containing hollow-bearing trees.

Potential Impacts

If the species occurs in the study area, any clearing or pruning of hollow-bearing trees in woodland or forest habitat would represent loss of breeding or roosting habitat. In addition, fences are a collision and entanglement hazard for bats during foraging and other movements; potential impact is much lower if barbed wire is not used.

***Pseudomys occidentalis* (Western Mouse)**Conservation status**DPaW P4**Distribution and Preferred habitat

The Western Mouse (Muridae) was formerly distributed from the west coast to Kangaroo Island, now limited to isolated patches of remnant vegetation in the southern Wheatbelt and south coast of Western Australia. Occupied sites have dense, long-unburnt low vegetation with overstorey of *Eucalyptus*, *Isopogon*, *Acacia*, *Casuarina* or *Melaleuca*, and the presence of Quandong (*Santalum acuminatum*) and sedges are considered important requirements (Van Dyck & Strahan 2008).

Ecology

Nocturnal, sheltering in communal burrows, feeding on varied plant and invertebrate material but particularly kernels of Quandong nuts.

Likelihood of Occurrence

Most or all of the study area is within the species range, so it is likely to occur where suitable habitat is present. Quandongs and sedges occur within shrubland habitat types, and sites with long-unburnt low vegetation may be occupied by this species.

Potential Impacts

Some localised impact will occur due to clearing of foraging and nesting habitat for construction of fence and access roads, and indirect effects may occur via movement of predators. Direct impacts will be limited to a small proportion of the species range in the vicinity of the fence, but reduced habitat connectivity may result in larger-scale population effects (e.g. lower rate of reoccupation after local extinction of isolates).

***Pseudomys shortridgei* (Heath Mouse, Heath Rat, Dayang)**Conservation status**EPBC Act 1999 VU, WC Act 1950 S1, DPaW VU**Distribution and Preferred habitat

This small-rat-sized native rodent (Muridae) has widely disjunct eastern and western populations in southern Australia that have been separated for thousands of years. The western population is now restricted to relatively small areas of the southern wheatbelt and coast northeast of Albany. The following information on habitat is from the EPBC SPRAT (DoE 2014b):

In eastern Australia, the Dayang prefers recently burnt (preferably 7–10 years post fire), floral species-rich, treeless, dry heathlands in an area with 600 mm annual rainfall (Cockburn 1995). The optimum situation for the species appears to be a mosaic of habitats of differing maturity, subject to the disturbance by fire (Cockburn 1978). Some populations occur in Eucalyptus forest with a heathy understorey (Menkhorst 1995).

In WA, the Dayang occurs in mallee scrub over heath and mixed scrub (with *Banksia* spp.) over sedge, unburnt for at least 20 years (Quinlan *et al.* 2004) in areas with 350 mm annual rainfall (Cancilla 2006). Mallee species include *Eucalyptus gardneri ravensthorpensis*. Soils include loamy sands or sandy loams with a lateritic scree and clayey soils with a stony component (Chapman *et al.* unpub. cited in Cooper *et al.* 2003). Records have been made from seasonally damp sites low in the landscape and on top of a rocky ridge, about 40 m high. Most records come from long unburnt sites (between 30 and 70 years), although there may be a lack of survey effort in recently burnt suitable habitat (Cooper *et al.* 2003).

Ecology

See information above on habitat preference; diet and other aspects of biology have not been studied. Populations are inconspicuous (thought to be extinct for many decades after discovery in Western Australia, and discovered in Victoria only in 1961).

Likelihood of Occurrence

The current distribution in Western Australia is considered to be limited to the area northeast of Albany. There are several recent trapping records around Jerdacuttup, approximately 30 km east of Ravensthorpe and within a few km of the western end of the study area. However, *Banksia* shrubland was recorded only in the eastern part of the study area, so that suitable habitat does not appear to be present within the likely range.

Potential Impacts

Unlikely due to probable absence of the species.

***Canis dingo* (Dingo)**

Synonyms: *Canis lupus dingo*, *Canis familiaris dingo*

***Canis dingo* x *Canis familiaris* (Dingo x Domestic Dog hybrids)**

Conservation status

WC Act 1950 'Unprotected native fauna', BAM Act 2007 'Declared Pest'; No listing at Commonwealth level; *C. lupus dingo* globally 'Vulnerable A2e' (IUCN 2014)

Distribution and Preferred habitat

Having been introduced to Australia between 3450 and 5000 years ago from a population earlier domesticated in southern Asia (and of uncertain relationship to existing wild populations of the Grey Wolf *Canis lupus*, Canidae), the dingo is fully naturalised and populations occur (or have occurred until locally extirpated by Europeans) on all parts of the mainland and in essentially all habitats including desert, forest and mountains (Letnic *et al.* 2014). Compared to domestic dogs, dingoes are moderately large (mean ~15 kg) and characterised by a fairly broad head, long and slender muzzle, erect ears and bushy tail, lack of dew-claws on the hind feet, and the pelage may be predominantly yellow, brown, ginger/red, black, or white; 'sable' individuals (yellow with dark fur on the upper dorsum, a common pattern in wolves and other canids) also occur in 'pure' dingo populations (Crowther *et al.* 2014).

Phenotypically similar populations (classified by kennel clubs as 'primitive' or 'pariah' breeds) occur in New Guinea (Singing Dog *Canis hallstromi*), Thailand (previously thought to include 'pure' dingo by e.g. Corbett

2008, but not confirmed by genetic studies), Cambodia, China, Indonesia, Laos, Malaysia, Myanmar, Vietnam, Philippines, North America (Carolina Dog) and Africa (Basenji). Recent studies of Y-chromosome and mitochondrial DNA sequences have shown that all domestic breeds (including these 'primitive' dog populations) are derived from a large number of domestication events of separate wolf ancestors, possibly not all within *C. lupus*; the Australian dingo was subsequently founded by a small number of individuals from within the ancient southeast Asian domestic population (Ding *et al.* 2012; Oskarsson 2012). Crowther *et al.* (2014) conclude that under current recommendations of the International Commission on Zoological Nomenclature (ICZN) there is no justification for considering the dingo as a subspecies of wolf or of domestic dog, but as a distinct species-level taxon endemic to Australia (modern occurrence of hybridisation with domestic dogs is not definitive of being the same species, contrary to what many people learn at school).

Ecology

The dingo differs from most domestic dogs in having annual reproduction rather than oestrus occurring twice per year (mating mostly April/May, births June/July with some geographic variation), and a wolf-like 'pack' social structure (if not solitary) where only a single dominant pair breeds. Unlike wolves, where copulation is suppressed in subordinate females, other dingo females do become pregnant but the dominant female kills all their pups before weaning. Males and females form separate rank hierarchies; changes in status within the pack tend to occur through aggressive interactions in the breeding season (Catling *et al.* 1992; Corbett 1988).

Dingoes are considered to be limited by availability of water, but not absolutely dependent on surface water when fresh food is abundant, and may go for several days without drinking (Allen 2012). This allows individual or pack foraging to extend over large areas, even in regions with few water sources. Dingoes catch large as well as small prey (insects to cattle), hunting alone or in socially integrated groups, and also feed on carrion and small amounts of plant material such as berries. Regional studies of dingo diets based on gut contents or scats show that dietary composition varies temporally and geographically with abundance of different prey types, and may also vary with the abundance of dingoes (more large prey taken when dingo density is high) and season (smaller prey utilised more by pups and lactating females). There is also distinct variation across multi-year drought-flush cycles in central Australia, with large prey forming a minor part of the diet except during drought when kangaroos and cattle (mainly but not exclusively carrion) become important. Medium-sized mammals (only rabbits in the arid-zone study) formed the dominant component (by mass) at all times, even when in low abundance due to drought; small mammals are eaten when abundant after rains, while lizards are utilised most during drought (Corbett & Newsome 1987). The only macropod present in the central arid-zone study area was the large Red Kangaroo, which was not preferred prey; however, Red Kangaroos are frequently killed and eaten by Nullarbor dingoes (Marsack & Campbell 1990), and Grey kangaroos, wallaroos, smaller macropods and other medium-sized marsupials are important parts of the diet elsewhere, and likely to be the preferred prey where available (Allen & Leung 2012; Brook & Kutt 2011; Corbett 1989; Corbett & Newsome 1987; Davis *et al.* 2015; Fillios *et al.* 2010; Marsack & Campbell 1990; Robertshaw & Harden 1985; Thomson 1992; Vernes *et al.* 2001; Whitehouse 1977).

As the largest native or naturalised terrestrial predator in Australia, the dingo is an 'apex predator' able to kill smaller carnivores (mesopredators) as well as large herbivores, and is rarely subject to predation by other species (only crocodiles or very large pythons could kill or eat an adult dingo). However, canids are apex predators only by default, following the extinction of most larger carnivorans in the northern continents in the late Pleistocene (Fleming *et al.* 2012). Dingoes kill (but do not usually eat) foxes and cats when they encounter them, and this is likely to lead to the smaller predators being excluded from or avoiding areas where they are more vulnerable (Glen & Dickman 2014; Moseby *et al.* 2012). The similar-sized marsupial carnivore *Thylacinus* went extinct on the Australian mainland (where body size was smaller than in the Tasmanian population) within a short time of dingo arrival in the Holocene (Fillios *et al.* 2012; Johnson & Wroe 2003); studies have indicated that it is unlikely that dingoes caused the extinction directly by killing

thylacines, or indirectly by competition for prey in the wild, but both these interactions would have contributed along with the main factor of human 'intensification' (population growth and cultural advances, e.g. use of spear-throwers) that occurred at about the same time (Letnic *et al.* 2012a; Prowse *et al.* 2014a; Wroe *et al.* 2007). The only other mainland extinctions potentially attributable to the dingo are those of the Tasmanian Devil *Sarcophilus harrisi* (mesopredator) and flightless Tasmanian Native Hen *Gallinula mortierii* (Letnic *et al.* 2014; Prowse *et al.* 2014a). In contrast, a large majority of vertebrate extinctions in Australia during the Holocene occurred in the 19th-20th centuries, involve mammals between 35 g and 5.5 kg ('critical weight range', CWR) and are attributed to effects of human land-use changes and introduction of sheep, rabbits, cats and/or foxes (Burbidge & McKenzie 1989; Fisher *et al.* 2003; Murphy & Davies 2014).

Dingoes have been subject to 'punitive legislation' (Fleming *et al.* 2014) and lethal control in most parts of the continent since the 1830s. Western Australia's current policy is to control dingoes and wild dogs in and near livestock grazing areas (DAFWA 2014e), where "Control techniques include baiting with meat poisoned with 1080 (sodium fluoroacetate) and to a lesser extent, trapping and shooting" (DAFWA 2014d). Bounties were offered for wild dog scalps over many decades, but "The experience worldwide has been that bounty systems do not deliver effective control of pest populations," encouraging fraud and producing no consistent downward trend in abundance (Thomson & Rose 2006); despite this experience, a bounty has recently been reintroduced in WA's Murchison district (Government of Western Australia 2013b).

Poisoning of wild dogs (dingoes and hybrids) as currently practiced on rangeland cattle properties is ineffective in reducing dingo numbers at timescales of months or years, whatever its impact at very short term and local scales (Allen *et al.* 2014a; Johnson *et al.* 2014). Baiting has been shown not to reduce loss of calves; predation on calves is uncommon, only occurring in seasons with below-average rainfall, and is more likely to occur after baiting (among survivors or recolonising animals) than in intact social groups (Allen 2014b). Similar results have been found in regard to both coyote and wolf control programs in North America, where culling leads to an increase in number of breeding pairs and an increase in livestock predation in the following year (Knowlton *et al.* 1999; Wielgus & Peebles 2014). In each case this is likely due to disruption of pack social structure allowing previously subordinate females to breed, and the fact that younger, inexperienced predators are more likely to attack livestock (Haber 1996; Wallach *et al.* 2009). Similar effects, leading to accelerated population growth and increased hybridisation with domestic dogs, can also be induced by provision of surplus food (including refuse) and water, such as may occur around remote townships (Newsome *et al.* 2013).

Sheep are much more vulnerable to predation than cattle, and large wild canids are usually relentlessly persecuted in sheep-raising country (Fleming *et al.* 2014); it is widely accepted that "dingoes and sheep do not mix" (Newsome 2001). The tendency of some individual dogs (including some dingoes: Thomson 1992) to kill far beyond their ability to eat when prey are abundant occasionally results in devastating stock losses. However, wolf predation on sheep in the northwestern USA (when wolf numbers were relatively low, but increasing under federal protection) was found to be much less costly than wolf exclusion or control programs would be, and efficiently covered by compensation schemes (Muhly & Musiani 2009). Alternatives to lethal control or exclusion fencing of predators can be extremely effective and are increasingly used, particularly specialist dog breeds, llamas/alpacas, or donkeys as guard animals (Jenkins 2003; Sabto 2014; van Bommel 2010; van Bommel & Johnson 2012).

It is generally accepted that introduction or suppression of an apex predator results (other things being equal) in suppression or 'release' (respectively) of both mesopredators and large prey species (Glen & Dickman 2014; Prugh *et al.* 2009; Soulé *et al.* 1988). One consequence of suppression of wild canids is increase (and greater fluctuation) in abundance of their preferred prey such as macropods, deer and rabbits, which compete directly with grazing livestock: this effect has been documented in cases involving dingoes (Prowse *et al.* 2014b), and is likely to be significant in wolves and coyotes (Ranglack *et al.* 2015; Torstenson *et al.* 2006). The positive value of predators to the grazing industry in regulating abundance of (economically

unexploited) competing herbivore species is sometimes recognised (e.g. Thomson & Rose 2006: 42) but rarely calculated explicitly, and may often outweigh costs (Prowse *et al.* 2014b).

Following the identification of the dingo as a ‘trophic regulator’ and suggestion that its reintroduction to mainland areas where it has been extirpated might be an effective means of conserving mammals threatened by fox and cat predation (Dickman *et al.* 2009; Glen *et al.* 2007), there has been considerable controversy in technical journals concerning not so much the occurrence, as the measurability of mesopredator release in relation to dingo control programs. Significantly, factors affecting dingo abundance (e.g. control programs, barriers, prey abundance and habitat conditions) mostly also affect cats, foxes and other vertebrates, so that ‘other things’ (see preceding paragraph) are not equal.

This debate has involved numerous publications by a ‘pro-dingo’ group of wildlife ecologists based at major urban universities (e.g. Colman *et al.* 2014; Letnic *et al.* 2009; Letnic *et al.* 2012b; Letnic *et al.* 2014; Letnic & Koch 2010; Wallach 2011) and an ‘anti-dingo’ group of rural, industry-focused pest-management researchers (e.g. Allen *et al.* 2011a; Allen *et al.* 2011b; Allen *et al.* 2013a; Allen *et al.* 2014a; Allen 2014a; Allen *et al.* 2014b; Allen *et al.* 2014c; Fleming *et al.* 2012; Fleming *et al.* 2014); their views of the dingo might be summarised as ‘endemic keystone species’ and ‘invasive alien pest’, respectively. Because of the different emphases, disentangling the scientific and policy issues from the rhetoric is no easy task (e.g. Newsome 2013). Both groups recently published summary chapters in an edited book (Fleming *et al.* 2014; Letnic *et al.* 2014) so the contentious details of methodology will not be summarised here. One point of difference is that Allen *et al.* (2011b) “recommend that dingo removal experiments are conducted in favour of dingo reintroduction experiments, because it is easier to protect threatened species from generalist predators by preventing their arrival than it is to rescue them once a predator is established.” However, there are very few native species for which dingo (or any ‘wild dog’) predation has been identified as a potential conservation threat (Allen & Leung 2012).

There would presumably be agreement in general terms that: “Free-ranging dogs and foxes potentially have negative, positive or neutral impacts on agricultural and environmental values, all of which affect their management. Where wild canids present a net cost to an industry or ecosystem, control actions are required. Conversely, when the presence of wild canids is of net benefit to industry or ecosystem, conservation actions may be required. Otherwise, impacts are neutral and no intervention is necessary” (Fleming *et al.* 2014). Disagreement is most likely to arise where either the status quo or proposed management actions may have conflicting impacts on ‘industry’ and ‘ecosystem’, e.g. in areas where sheep-raising is marginally productive and its abandonment could have significant conservation benefits. Conflict also arises when government, industry bodies or individual landholders fail to understand or refuse to accept scientific or economic advice, and may act against their own or societal interests.

The most recent reviews of the question (Nimmo *et al.* 2015; Ripple *et al.* 2014) conclude that suppression of fox and cat by dingo has been demonstrated to occur, and that effective, long-term persecution of the apex predator lowers habitat quality and increases extinction risk for native mammals. Before reintroduction proceeds in any particular locality, it will be necessary to evaluate potential conservation and industry benefits as well as risks, e.g. increased predation or ‘fear-effect’ on either livestock or medium-sized marsupials (Glen & Dickman 2014). Ongoing manipulative experiments are likely to produce much greater clarity and better-informed policy regarding dingo control and conservation: very recently, a large-scale experiment has been proposed that would involve realigning part of the dog-proof fence in northwestern New South Wales to allow dingo reoccupation of Sturt NP in order to study interactions with native and exotic fauna (Newsome *et al.* 2015). Construction of new large dingo exclusion fences without such

Introgression with domestic dogs is considered to be the major conservation threat to the dingo (e.g. Corbett 2008; Fleming *et al.* 2001; Stephens 2011), which has led to policies of selectively culling individuals believed to be hybrids based on large or small body size or atypical appearance (particularly sable, but also

red, black or white pelage, or irregular white patches). However, most of these variants are present in museum specimens collected in the 18th and early 19th century that are likely to be genetically 'pure' dingo, and such criteria for selective culling may be unwarranted (Claridge *et al.* 2014; Crowther *et al.* 2014). Applying a 'one-drop rule' where only genetically pure dingoes are acknowledged as members of the taxon is an extreme policy that would lead to extirpation of populations in localities such as Fraser Island and the Australian Alps. Conservation of the dingo through physical separation of wild from domesticated stocks has been identified as a potential benefit of the barrier fence extension (DAFWA 2012a).

Likelihood of Occurrence

The distribution of the dingo is poorly documented in public databases (*NatureMap*, Atlas of Living Australia); this is likely due to underreporting which (for reasons that are not clear) applies to most common and widespread animals. The entire study area and agricultural zone is mapped by Fleming *et al.* (2001: fig. 2) with the attribute "Generally common, but high levels of control within parts of this zone mean that dingoes may be absent in certain areas." High levels of control have been applied in the Esperance agricultural zone, and more detailed maps of the distribution of free-ranging dogs based on Invasive Animals Cooperative Research Centre unpublished data (Fleming *et al.* 2014: fig. 6.2; West 2008: figs 3.41-47) show they are mostly absent, with 'occasional' presence only in the most northerly section (Salmon Gums area).

Potential Impacts

A primary intended function (impact) of the fence extension is to exclude free-ranging dogs including dingoes from sheep-grazing areas; in addition to fence construction and maintenance, proposals include monitoring and continued lethal control to maintain absence south of the fence and a 10-20 km dog-free buffer to the north (URS 2007). The estimate of 2 000 stock lost annually to wild dogs along the boundary of the Esperance area (URS 2007) seems difficult to reconcile with the IACRC mapping of only 'occasional' dog presence, and should not be uncritically accepted. Increased use of guard animals, as an alternative to fencing and lethal control, has not been evaluated in cost-benefit analysis (URS 2007). Continued exclusion of the dingo foregoes potential benefits of its ecological functions in regulating kangaroo and emu abundance in the agricultural zone, leading to ongoing and potentially increasing costs of controlling these species (alternatively, they could be sustainably and profitably harvested rather than culled). Feral cats and foxes are also unregulated except by costly baiting and trapping programs, with high abundance of these mesopredators leading to intense predation on critical-weight-range mammals, reptiles, and birds including threatened species.

REPTILES

Christinus sp. (Cape Le Grand Gecko)

Conservation status

DPaW P2 (as *Phyllodactylus* sp. 'Cape Le Grand')

Distribution and Preferred habitat

The validity of *Christinus* (Gekkonidae) as a distinct genus from New World *Phyllodactylus* is well established (Donnellan *et al.* 2000; Heinicke *et al.* 2014), so the name used by DPaW is corrected here. There is no published information on the Cape Le Grand form, but a CALM document by Aplin & Maryan (2000) and an unpublished thesis by Kay (2008) were consulted for this report.

This gecko is one of several chromosomally distinct forms within the widespread southern Australian *Christinus marmoratus* (Marbled Gecko) species complex. Populations of Marbled Gecko differ in diploid

chromosome number ($2n=32$, 34 or 36, all of which occur in Western Australia) and also in an inversion in one of the sex chromosomes resulting in female heterogamety (distinguishing the Murray/Murrumbidgee '2n=36 ZZ/ZW' form in the eastern states; the ancestral condition is male-heterogametic, XX/XY). Populations on the Nullarbor with $2n=36$ are recognised as a distinct species *C. alexanderi* that is distinct genetically and in reproductive characters (Donnellan *et al.* 2000). The $2n=32$ karyotype is restricted to a small area between the Donnelly River and Walpole, while $2n=34$ occurs through most of southwest Western Australia; but animals with $2n=36$ ZZ/ZW also occur at Cape Le Grand. Morphological variation among these populations is relatively minor, but Aplin & Maryan (2000) developed a working hypothesis that there are two distinct evolutionary lineages in the southwest: one represented by the widespread *C. marmoratus* (type locality Houtman Abrolhos; $2n=34$ in WA, 36 in eastern states) and the other a 'south coast WA' lineage restricted to relatively high rainfall areas (e.g. Karri forest and coastal granite outcrop), including the $2n=32$ population and several outlying populations with $2n=34$ as well as the $2n=36$ ZZ/ZW form at Cape Le Grand. They suggested that allozyme, DNA sequencing and detailed morphological studies be carried out to test these hypotheses.

Kay (2008, unpublished) sequenced multiple genes from specimens throughout the range of *C. marmoratus* and *C. alexanderi* to investigate the phylogenetic history and conservation status of populations in the southwest. The presence of significant phylogeographic structure was confirmed, including four major clades within '*C. marmoratus*' that all occur within WA; the Cape Le Grand population was found to be most closely related to a widespread form in the eastern states, and quite distinct and genetically remote from nearby populations in an 'eastern WA' clade, so it is expected to be described as specifically distinct from other western forms.

Ecology

Christinus geckos are usually associated with rocky outcrop, often granite, in cool southern parts of the continent. Also associated with limestone (including beach rock), tree trunks, dead wood and artificial environments such as wooden buildings and tiled roofs.

Likelihood of Occurrence

The $2n=36$ ZZ/ZW population is said to occupy "a number of major outcrops and appears to be moderately abundant at least two sites (Frenchman's Peak and Mt Le Grand)." On the assumption that the range is limited by microclimate to a small area around Cape Le Grand, as implied by the working hypothesis of Aplin & Maryan (2000), it is unlikely to extend to any part of the study area. Kay's (2008) map confirms the limited range of the Cape Le Grand form and indicates that only the 'eastern Western Australia clade' of Marbled Gecko is recorded in the vicinity of the proposed alignment.

Potential Impacts

None.

***Lerista viduata* (Ravensthorpe Range Slider)**

Conservation status

DPaW P1

Distribution and Preferred habitat

A relatively primitive and generalised *Lerista* species (Scincidae) with well-developed limbs, known from a small number of localities within 20 km of Ravensthorpe.

Ecology

Lerista are typically inhabitants of leaf litter and loose surface layers of the soil, feeding on small invertebrates and active on the surface only at night (Ehmann 1992). Species with well-developed limbs are often associated with exfoliating rock outcrops.

Likelihood of Occurrence

Known sites are entirely west of the study area and in relatively rocky hill country, unlike any part of the study area. It is therefore likely that its range does not overlap with the study area.

Potential Impacts

None likely.

***Aspidites ramsayi* (Woma)**Conservation status**DPaW P1**Distribution and Preferred habitat

This relatively small python occurs in dunefields with spinifex (*Triodia* spp.) in central and northern parts of the continent, and sandplains with myrtaceous heath vegetation in the south-west (Peron Peninsula, Wheatbelt and southern Goldfields to western edge of the Nullarbor). Storr *et al.* (2002) considered north-western and southern Western Australian populations to be geographically disjunct and possibly genetically distinct from the eastern forms.

Ecology

Mainly nocturnal predator on small mammals, ground birds and reptiles; shelters in hollow logs, burrows of other animals, or thick vegetation. Threats include clearing of habitat for agriculture and grazing, and probably introduced predators.

Likelihood of Occurrence

The study area lies entirely south of the Woma's known range. The southwestern population has been declining since the 1940s and was considered close to extinction 30 years ago (Smith 1981); few individuals have been encountered anywhere in southern Western Australia in recent decades, almost all of those few being old adults (Bush *et al.* 1995). There is no indication that the decline has reversed; *NatureMap* (DPaW 2007-2014) has no records from between Merredin and Kalgoorlie later than 1973, and it is likely to be regionally extinct or nearly so. Isolated populations persist around Shark Bay and eastern Goldfields.

Potential Impacts

It is unlikely that any impact will occur due to absence of the species.

***Morelia spilota imbricata* (Southern Carpet Python)**Conservation status**WC Act 1950 S4, DPaW P4**Distribution and Preferred habitat

This moderately large constrictor (Pythonidae) is found along the coast from Geraldton and the Houtman-Abrolhos Islands to Esperance, and in semi-arid habitats as far inland as Yalgoo, Kalgoorlie and the margins of the Nullarbor. Habitats include Banksia woodland, eucalypt forest and woodlands, and grasslands (Bush *et al.* 1995).

Ecology

An ambush predator, feeding on lizards (in juveniles) or warm-blooded vertebrates up to the size of large possums or wallabies, the Carpet Python shelters in hollow logs or branches (preferring those about 150 mm in diameter and at least 1 m long), rock crevices, and burrows made by other animals. Tree hollows are used more in winter in preference to terrestrial sites such as hollow logs (Bryant *et al.* 2012). It declines in areas disturbed for urban and agricultural development and where feral predators are present, but has persisted in relatively undisturbed bushland remnants around Perth and on some offshore islands (DEC 2011a). It is generally considered uncommon where it does occur; unlike eastern subspecies, no cases of spring breeding aggregation or male-male combat have been reported in this form (Shine & Fitzgerald 1995). Individual home ranges average 15-20 ha (Pearson *et al.* 2005).

Likelihood of Occurrence

This species has undergone a similar decline to that in the Woma (Smith 1981) but not to the same extent. There are few recent records from the general vicinity on *NatureMap*, both north and south of the study area; it is likely to persist at low density in rocky and woodland remnant habitats.

Potential Impacts

A small number of individuals might be affected by clearing of vegetation or disruption of refuge sites by excavation, but lasting impact on habitat is likely to be minor. Suitable logs and tree hollows should be retained where possible. Increased exposure to feral predators is possible.

***Acanthophis antarcticus* (Southern Death Adder)**Conservation status**DPaW P3**Distribution and Preferred habitat

This moderately large (to 75 cm), heavily built venomous snake (Elapidae) is locally confined to the Darling Range between Mt Helena and Jarrahdale. Found in Jarrah woodlands adjacent to granite outcrops and along densely vegetated creeks (Bush *et al.* 1995). The Darling Range population is isolated from those along the south coast east of Albany; there are relatively few records inland, but some up to about 50 km from the south coast; habitats in this part of the range have not been well described, but it seems more likely to be associated with heath rather than mallee or woodland habitats.

Ecology

Death Adders are relatively sedentary, feeding by ambush on vertebrate prey that is sometimes attracted by use of the modified tail as a lure. They rarely shelter under hard items of cover (rocks, logs) but mostly remain at least partly covered by leaf litter except when moving between sites.

Likelihood of Occurrence

Potentially suitable habitat occurs throughout the study area and this snake should be considered reasonably likely to inhabit the study area.

Potential Impacts

A small number of individuals might be directly affected during clearing of vegetation or disruption of refuge sites by excavation, but no significant lasting impact on habitat is likely.

***Parasuta spectabilis bushi* (Mallee Black-headed Snake (Esperance area))**

Conservation status

DPaW P1

Distribution and Preferred habitat

In the Esperance area, the only records of this species are in the vicinity of Gibson, about 25 km northwest of Esperance (DPaW 2007-2014). The species and subspecies (not conservation listed at these levels) are more broadly distributed to the east, but the range is apparently disjunct.

Ecology

Cryptic nocturnal lizard-eating snakes.

Likelihood of Occurrence

Unlikely to occur, as the range is apparently very limited and not known to intersect the study area.

Potential Impacts

None.

***Paroplocephalus atriceps* (Lake Cronin Snake)**

Conservation status

DPaW P3

Distribution and Preferred habitat

Occurs in the semi-arid southern inland of WA, around Lake Cronin and Peak Eleanora. Habitat at the type locality is open eucalypt woodland on sandy loam (Storr 1980) near an ephemeral freshwater lake, other sites are associated with granite outcrop.

Ecology

This small venomous snake (total length up to 57 cm) is poorly known, but likely to be mainly nocturnal and a generalist feeder on lizards, frogs and probably small mammals. It is closely related to the eastern Australian species of *Hoplocephalus* (Broad-headed Snakes) and shares with them features of body form and scalation associated with climbing habits, and thus probably uses tree hollows and elevated rock crevices for shelter (Ehmann 1993; Keogh *et al.* 2000). Bites from this species are considered potentially dangerous to humans (Allen *et al.* 2013b).

Likelihood of Occurrence

This snake occurs within about 10 km to the northwest of the study area at Peak Eleanora, but the study area does not overlap with the known range. It should be considered potentially present in nearby sections of the study area with similar landscapes of salt lakes and granite outcrops, regardless of vegetation.

Potential Impacts

Unlikely to be impacted by clearing of mostly low vegetation, but clearing of larger trees and any rock outcrops (especially granite) could affect habitat quality or impact individuals.

BIRDS

***Dromaius novaehollandiae* (Emu)**

Conservation status

Not conservation listed by WA or Commonwealth; *BAM Act 2007* 'Declared Pest' throughout WA; 'Least Concern' (IUCN 2014)

Distribution and Preferred habitat

Emus (Casuariidae) are widely distributed throughout the Australian continent, but generally absent from heavily populated areas and dense forest; in Western Australia, the species occurs in all IBRA subregions with the possible exception of the Great Sandy Desert (DPaW 2007-2014). Mainland populations are sometimes treated as three subspecies (two in WA: *D. n. woodwardi* in the north, *D. n. rothschildi* in the southwest), but this level of classification is not currently used by DPaW. The Tasmanian population, and two 'dwarf' island populations (named as distinct species *D. baudinianus* on Kangaroo Island and *D. ater* on King Island), went extinct less than 200 years ago (Boles 2001; Christidis & Boles 1994). Mitochondrial DNA sequences recovered from specimens of the King Island population fall within the diversity of mainland emus, so it is now considered a subspecies *D. n. ater* (Heupink *et al.* 2011); Kangaroo Island was also connected to the mainland even more recently in the Late Pleistocene (Hope *et al.* 1977) so that the less distinctive island form there was probably also conspecific (mainland emus have subsequently been reintroduced to the island). Emus in Western Australia are considered to be effectively divided into two discrete populations by the existing State Barrier Fence (Riggert 1975). In the Esperance district, emu abundance is generally higher in the agricultural zone than adjacent rangelands, which is consistent with the effects of rainfall and vegetation productivity as well as the suppressing effects of dingoes (Grice *et al.* 1985).

Ecology

Emus are the second-tallest of extant bird species, typically ranging from 1.6 to 1.9 m in height and weighing 30-45 kg (Cassowaries are shorter but often heavier). Females attain larger body sizes than males. They are diurnal omnivores, eating fruits, seeds, growing shoots of plants, insects, small animals, and animal

droppings including those of emus (Davies 1978; Long 1959). Adults require 9-18 litres of water per day (including water content of food); birds may remain within an area if sufficient water and food are present, but move as needed to find suitable conditions where these resources are variable. Normal walking pace is 7 kohl, and emus are known to move hundreds of kilometres (up to 600 km or more), sometimes at rates of 15 km to 25 km per day (Davies 1984). Like the Ostrich and Rheas but unlike the more closely related Cassowaries, Emus show specialisations for cursoriality (particularly, elongate limb bones), and are able to run at 45 kmh (Marchant & Higgins 1990). Due to their broad diet, extensive movements and retention time of food in the gut (and coprophagy), emus are important dispersal agents for many plants, including not only endozoochorous species (those with nutritious flesh and resistant seeds, adapted to dispersal via the guts of herbivores) but also many other species for which this is an infrequent or 'non-standard' mode of dispersal (Calviño-Cancela *et al.* 2006; 2008).

Individuals are usually solitary or occur in small family groups (pairs, or male and offspring; Marchant & Higgins 1990) but larger groups may form in areas of abundant food; signalling within larger groups results in more efficient foraging, with earlier detection of predators despite reduced individual vigilance allowing more time for feeding (Boland 2003). Groups of up to 37 individuals have been reported in free-ranging conditions (Boland 2003; Hough *et al.* 1998); it is inferred that the much larger aggregations that sometimes occur at fencelines are not a natural feature of the species biology, but an artefact of the fence itself.

First breeding takes place in the second year, and nesting takes place in April to June. The male and female remain together for about five months, which includes courtship, nest building and egg-laying. The nest consists of a platform of grass on the ground, about 10 cm thick and 1 m - 2 m in diameter. Only the male is involved in incubation (for about 55 days, without food or water) and parental care of young for four to six months, while the female may breed with two or more males successively in one year (Marchant & Higgins 1990). In captivity, females each year lay an average of 3.4 clutches of 6.7 eggs per clutch, spread over a period of 83.8 days (Sales 2007). This high reproductive rate has the potential to rapidly increase population size during favourable conditions when juvenile mortality is low in successive years.

Due partly to predation pressure but mostly to natural variation in climatic conditions (hence availability of food and water) and their high mobility as individuals or family groups, emu numbers in any particular area can vary from zero to extremely abundant between years or seasons. Populations may currently be limited or regulated to some extent by dingo predation (Grice *et al.* 1985; Pople *et al.* 2000), but the dingo was introduced to Australia only about 5,000 years ago (Gollan 1984; Savolainen *et al.* 2004); it is not known whether the thylacine (the largest non-human mammalian predator extant for the preceding tens of thousands of years) was an effective predator on adult emus, although there are anecdotal records suggesting predation occurred in Tasmania (Paddle 2002; Wroe *et al.* 2007). Humans have probably been the major predator of emus for 60,000 years, following extinction of most large marsupial carnivores in the late Pleistocene (Boland 2003); there is abundant archaeological as well as cultural evidence of hunting for food by aboriginal people, who also traditionally use oil, feathers, and eggs (Carroll & Martine 2011). Overall emu numbers, like those of some large kangaroo species, have probably increased since European settlement due to provision of water in pastoral areas (Riggert 1975) and expansion of open habitat by clearing of forest. Currently, no approved management programs allow harvesting of wild emus: meat, leather, oil etc. are obtained from farmed birds only. However, earlier shooting for food and persecution by both farmers and pastoralists (although emus do not significantly compete with sheep or cattle for food) has led to localised extirpation in some heavily populated or more isolated areas.

This variability in space and time, combined with continuous expansion of human population and agriculture, has led to perceptions of increasing scarcity or long-term decline of emu, with warnings that without protection it would become extinct (Bennett 1860; Gould 1865). In response, the Western Australian *Game Act 1874* made it an offence to kill emus during June to September (breeding season), while the *Game Act 1912* (6(c)) extended protection more generally to "any bird or animal indigenous to Western Australia", but

with provisions for limiting protection to specific portions of the State (Riggert 1975). Emu incursions into wheat-growing areas of Western Australia (following expansion of wheat-growing into more marginal areas facilitated by the *Discharged Soldiers Settlement Act 1919*) then led to their listing as ‘vermin’ in particular districts (from 1922), a bounty system paid on beaks (introduced in 1923, abandoned in about 1970), trapping and poisoning schemes (Donovan & Goodall 2007; Long 1959), and even a campaign involving army units with Lewis machine-guns (Johnson 2006).

Emu migration events resulting in high numbers of emus along the Barrier Fence are stated to correspond to drought conditions that prevail about every ten years (DAWA 2001). Comparison of dates of reported migrations with annual time series rainfall data (BoM 2014a) and maps summarising variation in annual rainfall such as those produced by the Queensland Government (DSITIA Qld 2013) show that migrations towards wheat-growing areas may occur in years with either widespread above-average-rainfall conditions, widespread drought, or a combination of inland drought and coastal rainfall, or the reverse (examples of each in following bulleted paragraphs). This suggests that other factors such as vegetation condition, seasonal variables, or specific weather events may be more important than annual rainfall patterns in determining movements. It is likely that emus detect and move towards rainfall based on visible cloud (Riggert 1975), but possibly also on low-frequency sound or other cues.

- The year 1920-21 (Apr-Mar), just preceding the beginning of official persecution of the species, had average or wetter conditions along the west and south coasts but below-average rainfall inland.
- The 1932 event, when about 20,000 birds were reported in marginal wheat lands around Campion and Walgoolan, does not correspond to a regional drought year, but was the fifth straight year of good rainfall (over 900 mm average in 1926, close to 700 mm in the next four years); indeed, rain during the course of the ‘war’ caused initially large flocks of emus to disperse and was one of the factors leading to its embarrassing failure (Johnson 2006).
- Wheat-growers repeatedly requested (but were not granted) military support against emus in 1934 (continuation of the wet run of years after the moderately dry 1925),
- 1938 (third dry year in a row, but much wetter than the severe 1940 drought when no incursion is mentioned in available sources) and
- 1943 (drought).
- 1969 was a drought year (about 450 mm) following a decade of totals over 600 mm, and “[p]rompted by seasonal conditions, emus were migrating from as far afield as Wiluna in a southwesterly direction in ever-increasing numbers” (DAWA 2001).
- 1976, when over 100,000 emus were estimated to be present along the northern part of the fence and “the official figure for the whole of the fence system that year was over 90,000 emus destroyed”, was relatively dry throughout Western Australia after three wet years.
- A smaller and more localised congregation of about 50,000 emus (on Tardie, Yuin, Woolgorong and Boolardy stations, Murchison district) occurred in 1989, and there was also over 600 mm rainfall for that year.
- 40,000 emus were reported along the eastern section of the fence in 1994, which had coastal drought conditions but relatively high rainfall inland.

See URS (2007: 5.1.4) for additional migration records from DEC.

Likelihood of Occurrence

Emus are known to occur throughout the woodland, agricultural and pastoral zones.

Potential Impacts

One of the main intended functions of the State Barrier Fence is to prevent or limit natural movement of emus from the arid shrubland towards near-coastal croplands during times of peak population pressure and/or drought-induced food and water stress. The economic benefit of reducing crop damage by emus seems obvious, but has not been subject to rigorous measurement (URS 2007). Moreover, unintended consequences of such a large-scale structure also have economic as well as ecological effects which may not be positive, or small (Woodroffe *et al.* 2014). Effects on emu movement – specifically, occurrence of aggregations in the hundreds or thousands of birds – were initially unintended consequences of a fence meant to exclude rabbits. Impacts of the proposed fence extension on target species, and ecological functions ('services') lost thereby, were not accounted as costs in the URS (2007) study.

Several types of events involving emus are potentially significant and undesirable, including: large incursions into wheat crops (where damage may be mainly due to trampling rather than feeding activity); damage to farm fences and stock watering points; vehicle strikes on public roads and other tracks (including property damage and public safety risks); mass deaths of emus due to interaction with the Barrier Fence; and damage to the Barrier Fence and associated infrastructure. All of these are exacerbated or predominantly caused by (usually illegal) attempts to shoot or pursue emus close to the fence (DAFWA 2001; Johnson 2006). Large flocks and high local densities of emus are exceptional in natural conditions, and a high proportion of such events that occur in the vicinity of the Barrier Fence are likely to be the direct result of its presence.

Potential environmental impacts of restricting natural emu movements include effects on seed dispersal reducing population connectivity of emu-dispersed plants, leading to local extinction and failure to adapt to climate change (Lau & Driscoll 2013). Prevention of dingo establishment south and west of the fence, another of its primary intended functions, has the potential to affect the size and stability of emu populations within the agricultural areas (Pople *et al.* 2000), and could lead to increased crop damage and/or necessitate other control measures.

***Leipoa ocellata* (Malleefowl)**

Conservation status

EPBC Act 1999 VU, WC Act 1950 S1, DPaW VU

Distribution and Preferred habitat

Malleefowl (Megapodiidae) occur in semi-arid to arid mallee, mulga or other dense litter-forming shrublands as well as dry forest dominated by other eucalypts, mulga and other *Acacia* species. The species has declined in range and occupancy due to clearing, altered fire regimes, introduced predators, and other local causes (Malleefowl Preservation Group Inc. 2011).

Ecology

Pairs occupy permanent territories, cooperating to build or repair a nesting mound of sand and leaf litter (typically 3-5 m in diameter and 1 m high); after egg-laying, the male alone maintains the mound during incubation, attending it for 9-11 months each year. A sandy substrate is necessary for mound construction. The requirement for abundant litter means that they rarely breed in vegetation that has been burnt within the last 15 years, and the highest breeding densities appear to occur in vegetation that is at least 40 years post fire (Benshemesh 2007; Ecologia Environment 2010). Active mounds are continually modified in shape according to weather conditions and stage of incubation (e.g. figure from Malleefowl Preservation Group Inc.

2011). Malleefowl feed on grain where they occur in agricultural areas, including spillage along roadsides; consequently, populations may become dependent on grain being grown annually (rather than at less frequent intervals) in habitats that would otherwise be marginal, and individuals are also at increased risk of mortality and injury from collision with vehicles (Benshemesh 2007).

Likelihood of Occurrence

Active mounds are usually conspicuous structures that can be readily identified within line of sight. Other indicators of Malleefowl presence, potential presence, and habitat quality are based on substrate and vegetation characteristics as well as listening for calls and observing for birds, moulted feathers, tracks, bones, and inactive mounds that may be much less prominent.

An inactive mound was observed about 4 km from the proposed fenceline, in a mallee remnant to the south. Current presence of the species in part of the study area is indicated by a fresh track. While the presence of foxes and other feral predators reduces suitability of the habitat, this species is likely to be present at low density throughout the general area.

Potential Impacts

No nesting mounds occur in the study area so no resident birds are likely to be affected directly, but clearing will result in marginal reduction of available foraging habitat. The fence may present a collision hazard during flights, but not a significant barrier to movement (adults can easily fly above fence height, juveniles can pass through the mesh) and also provide a corridor facilitating access to occupied habitat by feral predators.

***Cereopsis novaehollandiae grisea* (Recherche Cape Barren Goose)**

Conservation status

EPBC Act 1999 VU, WC Act 1950 S1, DPaW VU

Distribution and Preferred habitat

Endemic to southern Australia, this large goose (Anatidae) feeds by grazing, is able to drink brackish or salt water, and populations are mostly on offshore islands although some coastal grasslands and agricultural areas on the mainland are also used in the eastern states. The western subspecies is almost entirely on the islands and rocks of the Recherche Archipelago and a few other islands to the west, and is considered a 'casual visitor' to coastal sites. Apart from one old record at Lake Grace, inland sites are not used.

Likelihood of Occurrence

Unlikely to occur in the study area due to its distance from the coast.

Potential Impacts

None.

***Apus pacificus* (Fork-tailed Swift)**

Conservation status

EPBC Act 1999 Migratory, WC Act 1950 S1

Distribution and Preferred habitat

In Australia the Fork-tailed Swift mostly occurs over dry and open inland plains, but also over a wide variety of land and marine habitats. In Western Australia, it is considered uncommon to moderately common near the north-west, west and south-east coasts, common in the Kimberley and rare or scarce elsewhere (Johnstone & Storr 1998). Some birds have been sighted in Western Australia arriving from Indonesia between October–November. Flocks have been recorded near Broome on southward passage across the continent. In north and north-west Western Australia, most birds have departed by the end of April.

Ecology

A non-breeding visitor to all states and territories of Australia, this swift (Apodidae) feeds on flying insects and is almost exclusively aerial in habits, flying from less than 1 m to at least 300 m above ground and probably much higher (Simpson & Day 2004). Fork-tailed Swifts are nomadic and typically respond to broad-scale weather pattern changes. They are attracted to thunderstorms and cyclonic disturbances where they can be seen in flocks hawking insects from the storm fronts with numbers ranging from a few individuals to flocks of up to 2 000 birds.

Likelihood of Occurrence

There are a number of sighting records along the coast south of the study area, and also further inland to the north. Fork-tailed Swifts were not observed on this survey but the species is likely to seasonally visit the area to forage.

Potential Impacts

There are no significant threats to the Fork-tailed Swift in Australia (DoE 2014b). As migratory visitors to the project area, little impact is anticipated to this species due to its highly nomadic aerial lifestyle.

***Botaurus poiciloptilus* (Australasian Bittern)**

Conservation status

EPBC Act 1999 EN, WC Act 1950 S1, DPaW EN

Distribution and Preferred habitat

The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands (DoE 2014b; Marchant & Higgins 1990). The total Australian population is estimated to comprise not more than 1000 adults, of which 38-154 occur in Western Australia. The largest concentration in Western Australia occurs in the Albany and Lake Muir wetlands; half the wetlands that supported the species in 1980 now retain no suitable habitat (Birdlife International 2012a). In 2011/12 surveys by Birdlife Western Australia, 26-37 adults were recorded from 18 wetlands (Pickering 2012). Older (up to 1981) records from the Kimberley and recent survey reports from Barrow Island (DPaW 2007-2014) are questionable as no suitable habitat exists there.

Ecology

Like other Bittern species, this is a wading bird of wetland habitats. It feeds mostly at night on fish, frogs, and aquatic invertebrates. Clutches usually contain four eggs, allowing relatively rapid population growth during successive years of good conditions (Birdlife International 2012a).

Likelihood of Occurrence

Only coastal records are known in the area east of Albany, so it is unlikely that any suitable habitat exists in the study area.

Potential Impacts

None.

***Ardea modesta* (Eastern Great Egret)**

Synonym: *Ardea alba*, *Ardea alba modesta*

Conservation status

WC Act 1950 S3

Distribution and Preferred habitat

Eastern Great Egrets (Ardeidae) are widespread in Australia, occurring in a wide range of wetland habitats and breeding (November to April, depending on rainfall) in colonies in wooded and shrubby swamps.

Ecology

They feed on a wide range of invertebrates and small vertebrates including birds, reptiles and small mammals. The species undertakes some regular seasonal movements, mostly to and from breeding colonies, and towards the coast in the dry season. Regional differences in reporting rates suggest that individuals migrate north to winter in tropical northern Australia, consistent with changes in the availability of suitable wetland habitat. Regular migration to locations outside of Australia is suspected but not confirmed. Threats include loss and/or degradation of foraging and especially breeding habitat through alteration of water flows, drainage and/or clearing of wetlands for development, frequent burning of wetland vegetation used as nest sites, salinisation, and invasion by exotic plants or fishes (DoE 2014b).

Likelihood of Occurrence

All records in this part of the species range are coastal; it could occasionally use temporary wetland habitat in the study area (salt lakes and fringing vegetation), but rarely if at all because the species is generally absent from the region during the winter wet season.

Potential Impacts

No impact is likely.

***Ardea ibis* (Cattle Egret)**Conservation status**WC Act 1950 S3**Distribution and Preferred habitat

The Cattle Egret (Ardeidae) is a relatively recent colonist of Australia (from 1948) from Asia, and occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. The main areas of distribution are from Wyndham (WA) to Arnhem Land (NT), and in south-eastern Australia, but there are scattered records in other areas; it remains extremely rare in arid and semi-arid regions (DoE 2014b). It uses predominately shallow, open and fresh wetlands including poorly drained pastures and swamps with tall grass, abundant aquatic flora and emergent vegetation. It has been recorded on earthen dam walls and ploughed fields, and is commonly associated with the habitats of farm animals (particularly cattle, but also pigs, sheep, horses and deer) but avoids low grass pastures.

Ecology

The Cattle Egret feeds mostly on grasshoppers during the breeding season. It is, however, known to consume other insects including cicadas, centipedes, spiders, cattle ticks, frogs (including cane toads), lizards (particularly skinks) and small mammals (Marchant & Higgins 1990). The Cattle Egret is known to follow earth-moving machinery and has been located at rubbish tips. Breeds in colonies in wooded swamps such as mangrove forests (e.g. the lower Adelaide River, Northern Territory), Melaleuca swamps (e.g. Shortland, New South Wales) and the eucalypt/lignum swamps of the Murray-Darling Basin. They may breed in artificial situations or close to urban areas; generally the nesting trees are inundated except where breeding on small islands. Nests are sited usually in middle to upper branches (Marchant & Higgins 1990).

In Australia exotic species, especially Feral Cats (*Felis catus*), are a major threat for many native birds. Cats are distributed across the entire country (including islands off the mainland). Due to their agility, climbing ability and stealthy characteristics they are able to seek prey in a diverse range of habitats. The Cattle Egret roosts both in trees and on the ground in vegetation, making it particularly susceptible to predation by cats.

Likelihood of Occurrence

All records in this part of the species range are coastal; it could occasionally use temporary wetland habitat in the study area (salt lakes and fringing vegetation), but is rare and generally absent from the region during the winter wet season.

Potential Impacts

No impact is likely.

***Plegadis falcinellus* (Glossy Ibis)**Conservation status**EPBC Act 1999 Migratory, WC Act 1950 S3**

Distribution and Preferred habitat

This bird has a nearly global distribution, and in Australia mostly occurs in eastern and northeastern areas, but also patchily in most of Western Australia. It usually occurs in freshwater marshes, floodplains and artificial wetlands, but also uses coastal wetlands including saltmarsh and estuary habitats (DoE 2014b).

Ecology

Migratory and nomadic, moving long distances to breed after good rainfall and to tropical areas in Autumn. Feeds predominantly on aquatic invertebrates and insects, but also small aquatic and terrestrial vertebrates, and seeds of aquatic plants. Roosts in trees or shrubs, usually close to water (DoE 2014b).

Likelihood of Occurrence

Most records are coastal and there are only sparse, scattered inland records in the south of WA, but this species is likely to be an occasional visitor.

Potential Impacts

Negligible or none.

***Haliaeetus leucogaster* (White-bellied Sea-eagle)**Conservation status

EPBC Act 1999 Migratory, WC Act 1950 S3

Distribution and Preferred habitat

A large raptor (Accipitridae) distributed mainly along coastlines, offshore islands and large inland waterways, with breeding only in limited areas of its range; it also occurs around freshwater swamps, lakes, reservoirs etc. It is common and widespread in much of southern Asia, but has declined in some areas including Australia.

Ecology

Feeds on a wide variety of fish, crustaceans, turtles, waterbirds, and terrestrial vertebrates including carrion. Breeding occurs in tall open forest or woodland. The main threats are loss of habitat due to land development, and the disturbance of nesting pairs by human activity (DoE 2014b). Any human activity within sight (approximately 1 km) of nests has a significant impact on breeding success (Dennis *et al.* 2011).

Likelihood of Occurrence

There are very few records in inland areas of Western Australia due to lack of suitable riverine habitat. They are likely to be occasional visitors to parts of the study area when surface water is present, but there is no evidence of a resident population and no breeding activity is likely.

Shephard *et al.* (2005) analysed Australian Bird Atlas records to discover trends in occurrence of this species, and found that changes in distribution and frequency were mainly attributable to climate fluctuation, especially El Niño associated drought. Climate change (such as the reduction in winter rainfall in southwestern Western Australia from the mid-1970s) is likely to produce permanent changes in the pattern of occurrence of this species.

Potential Impacts

No impact is likely, as the only potential foraging habitat is excluded from the study area, and nesting has not been recorded inland in this part of the State.

Conservation status

WC Act S4

Distribution and Preferred habitat

This species (Falconidae) is uncommon but wide-ranging throughout Australia, preferring areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land. Ledges, cliff faces, large tree hollows and spouts, electricity pylons and similar structures, or abandoned nests of other raptors are used for nesting (Debus 2012).

Ecology

Feeds almost exclusively on birds (including pigeons, parrots and passerines) which are captured in flight, but rarely takes mammals (e.g. possums, rabbits), reptiles, fish or carrion (Debus 2012; Olsen *et al.* 2008). Eggshell thickness has returned to normal after the discontinuation of DDT use, but localised threats persist due to illegal persecution by pigeon-fanciers and taking of eggs and nestlings (Debus 2012).

Likelihood of Occurrence

Individual Peregrine Falcons are occasionally sighted throughout the region (DPaW 2007-2014) and individuals would use the general area as part of a large foraging range. Most sightings are associated with cliffs or rocky hills. No suitable roosting or nesting habitat (cliffs, large trees, or stick nests built by other raptors) was recorded within the study areas, but this species may also use artificial structures such as microwave towers (Ecoscape 2012).

Potential Impacts

Impacts on adult individuals or foraging habitat are not likely to be significant, but destruction of tree hollows or existing nests of other birds could affect value of the habitat for breeding, especially if any are in use by this species. Impact is likely to be very minor due to low density of population and ability to relocate to unaffected areas.

***Ardeotis australis* (Australian Bustard)**

Conservation status

DPaW P4

Distribution and Preferred habitat

The Australian Bustard (Otididae) typically occurs in open country, preferring grasslands, low shrublands, grassy woodlands and other structurally similar but artificial habitats such as croplands and airfields. There has been a large historical decline in abundance, particularly south of the tropics, but to a smaller extent across northern Australia where it remains moderately common (Garnett & Crowley 2000).

Ecology

Bustards (Otididae) are large, nomadic, partly nocturnal birds with an omnivorous diet comprising seeds, fruit, vegetation, invertebrates and small vertebrates. Numbers of Australian Bustard present in any particular area fluctuate with the availability of food with seasons and following irregular rainfall, and variation between regions in timing and duration of residence and breeding activity has been documented (Ziembicki & Woinarski 2007). Decline is attributed to hunting, degradation of grassland habitat by sheep and rabbits, predation by foxes and cats, and thickening of vegetation due to overgrazing or lack of fire (Garnett & Crowley 2000; Schodde & Tidemann 1986). As ground nesters, they are particularly vulnerable to fire in the nesting season, and readily desert nests in response to disturbance by humans, sheep or cattle (Garnett & Crowley 2000).

Likelihood of Occurrence

Bustards are occasionally sighted in the general area (DPaW 2007-2014), but mostly in agricultural areas, and no evidence was observed of current or recent presence at the study area. Shrubland adjacent to cleared areas and croplands is likely to be utilised by this species at least occasionally. Presence of this species is likely to be infrequent, as the species is generally a short-term visitor in southern parts of its range (Ziembicki & Woinarski 2007).

Potential Impacts

There is some risk of injury or mortality to bustards due to collision with the fence, most likely to occur when disturbed while foraging on the ground (due to the usually low angle of take-off). No other direct impacts are likely to be significant, and the total impact is considered minor or negligible.

***Burhinus grallarius* (Bush Stone-curlew)**

Conservation status

No current listing (DPaW P4 up to 12/2014)

Distribution and Preferred habitat

While this bird, also known as the Bush Thick-knee (Burhinidae) is found in all mainland states, it is sparsely distributed and continues to decline. Historically the species was widely distributed throughout much of Western Australia but is now considered rare, with a population most recently estimated at 15,000 individuals (Garnett & Crowley 2000). It prefers grassy woodlands with low, sparse grassy or herb understorey.

Ecology

The species is insectivorous, preying primarily upon beetles, although they will also eat seeds and shoots, frogs, lizards and snakes (Marchant & Higgins 1993). Activity is mainly nocturnal, especially on moonlit nights (NSW National Parks and Wildlife Service 1999). Breeding takes place mainly from August to January, but at any time of year depending on local conditions. They are usually seen in pairs, but sometimes form flocks. Branches on the ground are essential for the bird's camouflage, and it is unlikely to attempt nesting without it (Department of Sustainability and Environment (Victoria) 2005). Since Bush Stone-curlews are a ground dwelling and non-migratory species they are quite susceptible to local disturbances by humans and to predation by cats and foxes (Frith 1976; Johnstone & Storr 1998). They are most common where land disturbance is minimal and generally become rare or extinct around human settlements (Johnstone & Storr 1998).

Likelihood of Occurrence

There is a record of this species south of Ravensthorpe (DPaW 2007-2014) but none further east in the south of WA, so the species range does not appear to overlap with the study area and it is unlikely to be present.

Potential Impacts

None likely.

Pluvialis fulva* (Pacific Golden Plover)**Pluvialis squatarola* (Grey Plover)**Conservation status**EPBC Act 1999 Migratory, WC Act 1950 S3**Distribution and Preferred habitat

Most Australian sightings of these two Plover species (Charadriidae) occur on coastal beaches and rocky shorelines; *P. fulva* also with some inland records that are mostly on major river systems, but including Lake Muir in the southwest of Western Australia. Both species occasionally forage in low saltmarsh vegetation (DoE 2014b).

Ecology

Non-breeding in Australia, but may be present between September and May (some remain in northern Australia over winter). Forage by night and day for small terrestrial and aquatic invertebrates, also reported to take plant material and small vertebrates occasionally (DoE 2014b).

Likelihood of Occurrence

Both species are recorded at various coastal sites directly to the south, but the rarity of inland records throughout Australia indicates they are unlikely to use foraging habitats within the study area.

Potential Impacts

None.

***Charadrius mongolus* (Lesser Sand Plover)**Conservation status**EPBC Act 1999 Migratory, WC Act 1950 S1 & S3, DPaW EN**Distribution and Preferred habitat

Breeds in Siberia and migrates via the East Asian – Australian Flyway, some wintering at various sites along the migration route through southern and eastern Asia as well as shores of the Indian Ocean (including eastern and southern Africa), Red Sea, and occurs as a vagrant in Europe and North America. Approximately 7.5% of the global population (>330,000 birds) winters in Australia (DoE 2014b).

Ecology

Non-breeding in Australia, may be present between September and May. Forages by day for small terrestrial and aquatic invertebrates (DoE 2014b). Occurs as several distinct breeding populations in the northern hemisphere (classified as subspecies), but these do not remain distinct in Australia. Not considered globally threatened (Least Concern, IUCN), but recently added to Schedule 1 of the *WC Act 1950* in Western Australia (DEC 2012) based on an inferred population decline.

Likelihood of Occurrence

Recorded at coastal sites to the south, but not from inland localities, so unlikely to be present.

Potential Impacts

None.

***Charadrius leschenaultii leschenaultii* (Greater Sand Plover (Mongolian))**Conservation status

EPBC Act 1999* Migratory, *WC Act 1950* S3 & S5, *DPaW VU

Distribution and Preferred habitat

Almost entirely coastal (littoral and estuarine) in Australia, mainly on beaches but occasionally saltmarsh habitats. Predominantly in northern Australia, a small proportion of the population winters in southern areas (DoE 2014b).

Ecology

Non-breeding in Australia, may be present between September and May. Feed on small terrestrial and aquatic invertebrates, occasionally plant material and small vertebrates (lizards) (DoE 2014b).

Likelihood of Occurrence

Recorded at coastal sites to the south, but not from inland localities, so unlikely to be present.

Potential Impacts

None.

***Thinornis rubricollis* (Hooded Dotterel, Hooded Plover)**Conservation status

***DPaW P4* (as *Charadrius rubricollis*)**

Distribution and Preferred habitat

This medium-sized wader (Charadriidae) is a predominantly marine, non-migratory species endemic to Australia. It occurs on sandy beaches of all southern States, and the Western Australian population winters on inland salt-lakes up to 250 km from the coast (Birds Australia 2011).

Ecology

Feeds on small invertebrates along beaches and lakeshores. Threats include disturbance and disruption of breeding by recreational beachgoers, and possibly predation by foxes. The western subspecies *T. rubricollis tregellasi* is listed as 'in need of monitoring' but does not appear to be in decline (in contrast to the eastern Australian form).

Likelihood of Occurrence

There are numerous records from the general vicinity of the study area, and this species is likely to use any salt lakes and their marginal vegetation during winter.

Potential Impacts

Only very minor impact on winter habitat is likely to occur; there are large numbers of suitable salt lakes to which birds can easily relocate if disturbed, and no ongoing impacts are likely.

SCOLOPACIDAE – Species of *Gallinago*, *Limosa*, *Numenius*, *Actitis*, *Tringa*, *Arenaria*, and *Calidris*Conservation status

EPBC Act 1999 Migratory (& Marine), WC Act 1950 S3 [some also S1, DPaW VU]

Distribution and Preferred habitat

Each of these Wader or Shorebird species (Scolopacidae) breeds in the northern hemisphere (mostly Siberia) and migrates along the East Asian - Australasian Flyway (DoE 2014b). Each of the species listed in the tables has a broad distribution on the north, west and south coasts of Western Australia (beaches, saltmarshes etc), but many are also recorded from inland localities (ephemeral or permanent natural and artificial wetlands such as dams, sewage treatment works, floodplains, salt lakes etc).

Ecology

Most members of this family feed on small invertebrates picked out of mud or soil by pecking or probing, but some catch small fish in shallow water.

Likelihood of Occurrence

The *PMST* indicates 'Roosting likely to occur within area' for Swinhoe's and Pin-tailed Snipe (*Gallinago megala*, *G. stenura*), and Little Curlew (*Numenius minutus*), but only a small number of strictly coastal records are known in the south of WA, and these species are considered unlikely to use habitats in the study area. Some of the other migratory species of Scolopacidae, although not mentioned in the *PMST*, are more widespread and have numerous inland records, and may be expected to occasionally use salt lakes and their margins throughout the study area (*Tringa nebularia*, *T. glareola*, *Calidris ruficollis*, *C. acuminata* and *C. ferruginea*, and to a lesser extent *Actitis hypoleucos*, *Tringa stagnatilis*, and *Calidris canutus* which are known from more distant inland sites). Because they are typically in Australia during the northern winter, potentially suitable inland habitats will mostly be dry at such times due to the Mediterranean (winter wet/summer dry) climate of southern WA.

Potential Impacts

Only very minor impact to habitat of some species is likely to occur; there are large numbers of equally suitable salt lakes to which birds can easily relocate if disturbed, and no ongoing impacts are likely.

Onychoprion anaethetus* (Bridled Tern)**Hydroprogne caspia* (Caspian Tern)**

Synonyms: both species sometimes retained in *Sterna* (e.g. by EPBC Act 1999, NatureMap)

Conservation status

EPBC Act 1999 Migratory (& Marine), WC Act 1950 S3

Distribution and Preferred habitat

Most gulls and terns (Laridae) are entirely marine and coastal in distribution, but some species range widely inland at least occasionally, and utilise inland waters including salt lakes.

Ecology

Terns (Sterninae) are more specialised in feeding ecology than most gulls, taking small (often larval) fish and cephalopods at or close to the sea surface (e.g. Surman & Wooller 2003).

Likelihood of Occurrence

The PMST indicates 'Foraging, feeding or related behaviour likely to occur within area' for the Bridled Tern *Onychoprion anaethetus* (as *Sterna anaethetus*), and '...known to occur' for the Caspian Tern *Hydroprogne caspia* (as *Sterna caspia*). NatureMap has no records of *O. anaethetus* from the south coast or any inland areas, while *H. caspia* is frequently sighted along the coast but has no inland records in the south of Western Australia (DPaW 2007-2014); consequently, the study area is here considered to be out of the normal range of both species and they are unlikely to occur.

Potential Impacts

None.

***Calyptorhynchus latirostris* (Carnaby's Black Cockatoo)**Conservation status

EPBC Act 1999 EN, WC Act 1950 S1, DPaW EN

Distribution and Preferred habitat

Carnaby's Black-Cockatoo (Cacatuidae, or Psittacidae sensu lato) is endemic to southwestern Australia and mainly occurs in uncleared or remnant native eucalypt woodlands, especially those that contain Salmon Gum (*Eucalyptus salmonophloia*) and Wandoo (*E. wandoo*), and in shrubland or kwongan heathland dominated by *Hakea*, *Banksia* and *Grevillea* species (Burbidge 2004; Johnstone *et al.* 2011). It is a seasonal visitor to plantations of exotic pines (**Pinus* spp.), and sometimes occurs in forests containing Marri (*Corymbia calophylla*), Jarrah (*E. marginata*) or Karri (*E. diversicolor*). Nesting occurs in tree hollows and has been recorded in the following species: Salmon Gum (*Eucalyptus salmonophloia*), Wandoo (*E. wandoo*),

Red Morrell (*E. longicornis*), York Gum (*E. loxophleba*), Tuart (*E. gomphocephala*), Swamp Yate (*E. occidentalis*), and Marri (*Corymbia calophylla*) (Johnstone & Storr 1998). DSEWPaC (2012) indicates modelled breeding and non-breeding range, and also lists habitat features (vegetation structures and plant species) associated with breeding, roosting, and foraging. However, the study area lies outside the known breeding range for the Carnaby's Black-Cockatoo and therefore breeding activities are not likely to occur (DSEWPaC 2012).

Ecology

Breeding occurs mainly from early July to mid-December, principally in the wheatbelt, but with a shift in recent decades into the Jarrah-Marri forests of the Darling Scarp and Tuart forests of the Swan Coastal Plain; it may also be expanding its breeding range to the south-east around Lake Cronin, Lake King and Ravensthorpe (Johnstone *et al.* 2002; Johnstone *et al.* 2011). This species is a postnuptial nomad, tending to move west into higher rainfall areas with *Banksia* scrubs or pine plantations after breeding, travelling in pairs or small flocks which may join up into large flocks (up to 10,000) in late spring to midwinter (Johnstone *et al.* 2011). Food includes the flowers, nectar and seeds of *Banksia*, *Dryandra*, *Hakea*, *Eucalyptus*, *Corymbia*, *Grevillea*, also seeds of *Pinus*, fruiting nut trees especially almonds and macadamias, the flesh and juice of apples and persimmons, and insects and larvae from bark, wood, galls and flowers.

Likelihood of Occurrence

The *PMST* search obtained by Ecoscape indicates 'Breeding likely to occur in area', although the search by GHD for nearly the same area did not predict the species. There are some old *NatureMap* (DPaW 2007-2014) records from north of the study area, but in recent decades it appears to be limited to less than 50 km from the coast in this far eastern part of the species range. Carnaby's Black Cockatoo is likely to forage in eucalypt forest, mallee and *Banksia* shrubland habitats where they occur near the eastern and western ends of the study area, but not in the central section which is further from the coast. Roosting and breeding activity is likely to be limited to tall trees, which occur in coastal areas but not within the study area.

Potential Impacts

Minor impact to foraging habitat may occur near the eastern and western ends of the study area, but no impact on roosts or nesting habitat is likely because the study area falls outside of the known breeding range (DSEWPaC 2012). Habitat types 1, 2, 3, 4, 5 and 7 were assessed as potential foraging habitat. The condition of these habitats was typically good (assessed using criteria similar to Keighery (1994), cf. **Table 26**) within the low fuel modified buffer strip and very good within the remaining undisturbed vegetation. However, due to the repeated chaining of vegetation within the low fuel modified buffer strip, trees are typically immature with minimal fruit development. Therefore the value as foraging habitat within this area is considered low.

***Platycercus icterotis xanthogenys* (Western Rosella [inland])**

Conservation status

DPaW P4

Distribution and Preferred habitat

The smallest species of Rosella (*Platycercus* sensu stricto, Psittacidae) occupies eucalypt forests and woodlands in the southwest of Western Australia. Two subspecies are distinguished by minor differences in

colour pattern, the inland form occurring in the Avon wheatbelt, Mallee, Coolgardie and Esperance Plains IBRA subregions.

Ecology

Feeds on seeds of various trees (especially *Allocasuarina* spp.), shrubs, herbs and grasses (including pasture plants and weeds), and some insects collected opportunistically on food plants (Long 1984). Nests are built only in hollows of standing trees, and the minimum size of trees used was recorded as 325 mm and 478 mm DBH in two studies, with mean DBH of 696 mm (inferred age over 400 years) in the most commonly used species, *Eucalyptus wandoo* (Abbott & Whitford 2001; Mawson & Long 1994).

Likelihood of Occurrence

Not recorded east of Esperance (DPaW 2007-2014), but expected to occur throughout the western and central part of the study area, and recorded based on calls during the field survey.

Potential Impacts

No significant impact to this species is likely because of the absence of potential nesting trees within the study area; only minor impact to foraging habitat may occur, which is not a limiting factor due to its diverse diet including pasture and weed species.

***Pezoporus flaviventris* (Western Ground Parrot)**

Synonym: *Pezoporus wallicus flaviventris* (previous EPBC and WC Act listings)

Conservation status

EPBC Act 1999 CR; WC Act 1950 S1, DPaW CR

Murphy *et al.* (2011) found mitochondrial genetic distance between Western and Eastern Ground Parrots (Psittacidae) to be typical of species-level divergence, without shared haplotypes, i.e. much greater than between 'subspecies' in the south-east mainland (*P. w. wallicus*) and Tasmania (*P. w. leachii*). They suggest treating the Western form as a distinct species, and regard it as Critically Endangered under IUCN criteria; these changes have been recently adopted by Commonwealth and State authorities.

Distribution and Preferred habitat

Endemic to near-coastal regions of south-western Western Australia. Historical records suggest that the Western Ground Parrot may have occurred on the coastal plains from the Dongara-Watheroo area (near Geraldton) to Perth, and from Augusta-Flinders Bay to Israelite Bay, approximately 200 km east of Esperance. Most of its original habitat was cleared for agriculture. It was last recorded on the coastal plain north of Perth at the end of the 19th century, west of Albany in 1983, at Waychinicup NP in 2001, and in the south-western parts of Nuytsland NR (NR) in 2006. In 2008, the species was found to occur in only two remnants: Fitzgerald River NP and Cape Arid NP; thus, the entire population is located within DPaW managed estate (DPaW 2007-2014).

Western Ground Parrots occur in long unburnt (5 to 40+ years), floristically diverse, near-coastal dry heath (400-500 mm rainfall). This vegetation is usually <0.5 m high, though often up to 1 m high, with >50% cover. Sedges are generally abundant, making up >40% of total cover. Parrots have been observed to feed in habitats 2-3 years post-fire provided there is older vegetation nearby (Gilfillan *et al.* 2009). A habitat modelling study indicates that the Western Ground Parrot prefers areas relatively high in altitude, distant

from rivers, gently sloping to level habitat, with an intermediate cover of vegetation and where there is a mosaic of vegetation ages (Gibson *et al.* 2007).

Ecology

Western Ground Parrots are rarely seen, and spend much of the day walking, feeding and resting in low heathlands and sedgelands. These parrots eat seeds, fruits and flowers with little specialisation (although they avoid large seeds in woody fruits) and forage on the ground or in low shrubs. Regular flights are not made until after sunset or before sunrise when they fly between feeding and overnight roosting sites (Gilfillan *et al.* 2009).

Western Ground Parrots are generally solitary and are not known to establish territories. The breeding season appears to be from July to December (broadly, 'Spring'), although few nests have ever been observed. Nests are placed on the ground, and clutch size is thought to be 3-4.

The call of the Western Ground Parrot is a distinctive series of high-pitched whistling notes and an occasional buzzing call. Calling generally occurs 20 to 60 minutes after sunset and about 60 to 20 minutes before sunrise (Gilfillan *et al.* 2009).

Gilfillan *et al.* (2009) define habitat critical for the survival of the south coast threatened birds (Western Ground Parrot, Western Bristlebird, Noisy Scrub-bird, Western Whipbird (two subspecies), and Rufous Bristlebird (presumed extinct)) as:

- the current area of occupancy of one or more taxa;
- possible other areas used, e.g. dispersal corridors; and
- potential habitat into which one or more of the taxa could disperse or be translocated.

Surveys have been conducted to establish the area of occupancy of these species, but there is little information available on their dispersal abilities, which appear to be very limited in some cases. The same authors state that "Western Ground Parrots are known to have good dispersal abilities and can fly long distances", without citing data or sources for this statement, but there is more detail in the previous Interim Recovery Plan for this species (Burbidge *et al.* 1997: p.4), citing Meredith *et al.* (1984) and a number of unpublished personal communications. Meredith *et al.* (1984) was mainly a study of Victorian populations of *P. wallicus*, but also reviewed literature and unpublished records providing evidence of natal dispersal, including seasonal (February to August) occurrence of birds in localities that do not support breeding populations, annual arrival of young birds in non-breeding habitat at least 80 km from breeding sites, and other sightings up to 220 km from breeding habitat. No comparable data has been presented for the western species, but it is reasonable to presume their dispersal abilities are similar. There is no data on the height above ground at which Ground Parrots fly when dispersing.

Threats to the last populations of Western Ground Parrot are considered to include fire, predation by foxes and cats, *Phytophthora* dieback, and climate change (DPaW 2007-2014; Gilfillan *et al.* 2009).

Likelihood of Occurrence

The whole population of Western Ground Parrots was estimated in 2004 and 2005 to be fewer than 200 individuals in eight sub-populations, having declined from an estimated 378 birds in 1990 (Gilfillan *et al.* 2009). Presence in Fitzgerald River NP was last confirmed in 2008, despite regular call-based surveys (Friends of the Western Ground Parrot Inc. 2014; Waddington 2013). More recent estimates are less than 140 wild birds in 2010, and approximately 110 in 2012, the majority of the surviving population within Cape Arid NP (Friends of the Western Ground Parrot Inc. 2014). Therefore it potentially occurs in the vicinity of the eastern end of the study area (approximately the easternmost 30 km). All recorded occurrences are

either south or east of the proposed fence extension, so that the study area does not intersect any likely flight paths between occupied sites. However, on the assumption that individuals are able to disperse considerable distances to non-breeding sites as in *P. wallicus* (Meredith *et al.* 1984), there is potential for them to traverse the study area and encounter the fence.

Potential Impacts

The proposed fence extension will not result in habitat fragmentation for this species, or affect habitat quality or likelihood of predation, but would have some potential to cause injury and mortality to dispersing birds: mortality from fence and vehicle collisions are documented in the closely related Night Parrot *Pezoporus occidentalis* (Boles *et al.* 1994; McDougall *et al.* 2009). While the fence does not intersect any occupied habitat or straight-line paths between inhabited sites, and flights are most likely to be above treetop level, actual flight trajectories and heights have never been documented. Risk of impact on populations cannot be quantified but is considered low, particularly because young birds dispersing long distances are likely to be lost to the breeding population in any case, due to the low probability of encountering suitable habitat and mates. Also, any additional risk would be marginal relative to existing agricultural clearance, roads and fences. Effects on fire regimes due to clearing, scrub rolling and controlled burns associated with fence construction and maintenance also have potential to impact quality of (currently unoccupied) habitat in the vicinity, including both negative and positive effects. Dingoes have already been excluded for some decades, so that no initial effect due to mesopredator release of cats and foxes can be expected; unregulated cat and fox populations may fluctuate significantly, and locally or temporarily high mesopredator abundance would entail significant risk to the parrot. As Ground Parrot populations do not currently exist adjacent to the fence alignment, impact through altered behaviour of predators is unlikely to be significant.

Overall effects are likely to be very minor if any (assessed as 'minor/none' in **Table 19**), but any deleterious impact on this Critically Endangered species should not be an acceptable risk. It is expected that visibility-enhancement features (fluorescent orange droppers at regular intervals) will reduce the potential for bird collisions with the fence to an acceptable level.

***Merops ornatus* (Rainbow Bee-eater)**

Conservation status

EPBC Act 1999 Mi, WC Act 1950 S3

Distribution and Preferred habitat

The Rainbow Bee-eater is widespread throughout most of Australia, and does not depend on any particular habitat or vegetation type for feeding or breeding. They are scarce to common throughout much of Western Australia except for the most arid interior, preferring lightly wooded, sandy country near water (DoE 2014b).

Ecology

Bee-eaters feed mainly on insects taken in flight (hawking), but also take prey from the ground and foliage (gleaning). Populations in southern Australia are migratory, wintering in Indonesia and New Guinea, moving south over summer and breeding in Australia between September and February, but the species is resident and present year-round in parts of northern Australia including the Pilbara (DoE 2014b). Nesting occurs in burrows dug in flat or slightly sloping ground, sandy banks or cuttings, and often at the margins of roads or tracks; breeding is often colonial and cooperative (Boland 2004).

Likelihood of Occurrence

Rainbow Bee-eaters are common throughout the region (DPaW 2007-2014) and were sighted or identified from calls on numerous occasions during the survey. Burrows interpreted as Bee-eater nests were observed at numerous sites in cleared sandy areas within the study area, including both apparently active nests and older unoccupied ones.

Potential Impacts

Disturbance to sites utilised by the Rainbow Bee-eater, such as sand banks of creeks and drainage lines used to burrow to create nesting chambers, may have some impact on the breeding success of this species. However, historical disturbance does not represent a major issue to this species and it is common in cleared and semi-cleared habitats (DoE 2014b). No significant impact is likely.

***Dasyornis longirostris* (Western Bristlebird)**

Conservation status

EPBC Act 1999 VU, WC Act 1950 S1, DEC VU

Distribution and Preferred habitat

The Western Bristlebird (*Dasyornithidae*) formerly occurred along the coast of southwestern Australia from Perth to Ravensthorpe. It is now restricted to the Fitzgerald River NP and to a small area just east of Albany, between Two Peoples Bay NR and Cheyne Beach. A small number of birds have recently been translocated to west of Albany. The population was considered stable at 1 500-2 000 mature individuals, until fires in the Two Peoples Bay-Mt Manypeaks area from 2000 to 2004 caused a reduction in the population. In 2005, the known breeding population was estimated at 300-450 pairs, probably equating to a total of 1,000 individuals (Birdlife International 2012b).

Ecology

Forages on the ground for insects and some seeds, nest in shrubs or on ground below dense vegetation. Area of occupancy has declined as direct result of clearing for agriculture, with degradation of remnant habitat fragments by stock and weeds leading to loss of small, isolated sub-populations. Requires remnants at least 40 ha in size (DEC 2010d). This species flies weakly and only for short distances (Gilfillan *et al.* 2009) so that dispersal is extremely limited.

Likelihood of Occurrence

The nearest known population to the study area is the one at Fitzgerald River NP to the south of Ravensthorpe. The bird list obtained from Birddata for postcode 6450 (Esperance to Cape Arid) includes this species, but no other sources indicate presence so far to the east. There are sighting records at Kundip NR, 25 km southeast of Ravensthorpe, from 2003 (DPaW 2007-2014), but not mentioned in the current or draft recovery plans (DPaW 2007-2014; Gilfillan *et al.* 2009), so presence of a population at this locality is not confirmed. It is concluded that the study area does not intersect the range of the species, the nearest localities being approximately 17 km (Kundip) or 50 km southwest (nearest other record) and the species is highly unlikely to occur.

Potential Impacts

None.

***Hylacola cauta whitlocki* (Shy Heathwren [western])**Conservation status**DPaW P4**Distribution and Preferred habitat

This small bird (Acanthizidae, formerly included in *Sericornis* or *Calamanthus*) occurs in southern inland Western Australia, and part of the coast within Fitzgerald River NP, inhabiting dense mallee eucalypt woodland (Garnett & Crowley 2000).

Ecology

Forages on the ground for insects and some seeds, nest in shrubs or on ground below dense vegetation. Area of occupancy has declined as direct result of clearing for agriculture, with degradation of remnant habitat fragments by stock and weeds leading to loss of small, isolated sub-populations. Requires remnants at least 40 ha in size (DEC 2010d).

Likelihood of Occurrence

Recorded from scattered localities throughout the general study area, but most records are from the 1980s so that continued presence is not well documented except to the west (e.g. Kundip NR near Ravensthorpe). Mallee habitat with a shrub understorey, likely to be suitable for this species, is widespread in the study area. This bird is considered to be fairly cryptic, potentially confused with *Malurus* wrens if not sighted clearly, so its absence would be difficult to confirm and it is hence considered likely to occur at these sites with suitable habitat.

Potential Impacts

Significant impact is unlikely, because the proposed fence extension is mostly adjacent to large contiguous areas of bushland containing suitable habitat, and will not result in extensive habitat modification or fragmentation.

***Calamanthus campestris montanellus* (Rufous Fieldwren [western wheatbelt])**Conservation status**DPaW P4**Distribution and Preferred habitat

The fieldwrens *Calamanthus* (Acanthizidae) inhabit mostly dry country with cover of saltbush, bluebush, and other scattered low shrubs on sandplain, gibber or saltmarsh. The taxonomy of the fieldwrens has been contentious and highly variable among authors at subspecies, species and even generic levels (with other species groups sometimes included in *Calamanthus*). As recognised by the Western Australian Museum and DPaW, *C. campestris* comprises a number of subspecies in Western Australia, of which three are not conservation listed (*C. c. campestris*, Nullarbor; *C. campestris rubiginosus*, mid west coast from near Geraldton to North West Cape; *C. campestris wayensis*, salt lakes of the Murchison district and Fortescue valley), two Schedule 1 under the *WC Act 1950*, and DPaW VU (*C. campestris dorrie* and *C. campestris hartogi*, Shark Bay islands). The southwestern form *C. campestris montanellus*, sometimes treated as a distinct species *C. montanellus* (e.g. Schodde & Mason 1999) occurs in the wheatbelt, parts of the Darling

Range (but not the Swan coastal plain or far southwest) and along the south coast between Albany and Cape Arid; its area of occupancy has declined as a direct result of clearing for agriculture, with degradation of remnant habitat fragments by stock and weeds. A large majority of locality records (sightings) in *NatureMap* are not classified to subspecies; morphological distinctions between named forms are subtle (Schodde & Mason 1999) and have apparently not yet been investigated by modern methods (statistical morphometrics and genetics).

Ecology

This species forages on the ground for insects and some seeds; the domed nest is built on the ground below dense vegetation. It is sedentary, so that clearing for agriculture results in small, isolated sub-populations vulnerable to local extinction.

Likelihood of Occurrence

There are numerous records of *C. campestris* both along the coast between Albany and Cape Arid, generally fewer inland due in part to lack of survey, but it is widely distributed in the general area of the proposed fence extension. While none of the *NatureMap* (DPaW 2007-2014) records in this part of the range are identified to subspecies, only *C. c. montanellus* is considered to occur, based on Schodde & Mason (1999). None were identified during the survey.

Potential Impacts

Minor reduction in habitat area will be caused by clearing, but fragmentation is not likely because the species uses low shrubland habitats. Significant impact is unlikely, because the proposed fence extension is mostly adjacent to large contiguous areas of bushland containing suitable habitat, and will not result in extensive habitat modification or further fragmentation.

***Acanthiza iredalei iredalei* (Slender-billed Thornbill (western))**

Conservation status

No current listing (EPBC Act VU prior to 12/2013; not listed by WC Act or DPaW)

Distribution and Preferred habitat

The western subspecies of the Slender-billed or Samphire Thornbill (Acanthizidae) occurs in chenopod shrublands in semi-arid areas of southern Western Australia and South Australia; it is uncommon, rare or locally extinct through most of its range, but remains moderately common on the mid-west coast around Shark Bay (DoE 2014b; Johnstone & Storr 2005; TSSC 2010). It occurs in multiple isolated populations forming a discontinuous band between Shark Bay and the Nullarbor.

Ecology

This species forages and nests in treeless or sparsely wooded shrublands usually including bluebush (*Maireana* spp.), saltbush (*Atriplex* spp.) or samphire (*Halosarcia* spp.), occasionally in *Acacia* shrubs and mangroves adjacent to more preferred habitat. Suitable habitat in inland areas is mostly associated with saltlakes. Feeds on small invertebrates including ants, mostly gleaning from foliage. Life cycle, population structure and movements are poorly known, but not thought to undertake any long-distance movements. The main threat appears to be habitat degradation due to livestock and rabbits.

Likelihood of Occurrence

This species or its habitat is predicted as 'likely' to occur throughout the general study area (*PMST*), but the nearest record is approximately 100 km to the northeast (*NatureMap*) and the study area may thus lie outside the historic range of the species. Chenopod vegetation and salt lakes occur widely throughout the region, so suitable habitat appears to be present and the species should be assumed to occur, despite the lack of nearby records.

Potential Impacts

At most very minor impact is possible (approximately 'none'), the species being either absent or very sparsely distributed despite the abundant apparently suitable habitat. Limitation of stock movements and agricultural clearing by the barrier fence may allow some recovery of habitat to the north, so that positive impact is also possible.

***Pomatostomus superciliosus ashbyi* (White-browed Babbler (western wheatbelt))**Conservation status**DPaW P4**Distribution and Preferred habitat

The smallest of the Babbler species (*Pomatostomidae*) is an Australian endemic that occurs through most of the mainland in dry sclerophyll woodlands, shrublands and scrub including mallee, mulga, and cypress (*Callitris* spp.). Southwestern populations are recognised as the subspecies *P. superciliosus ashbyi*, with a distribution approximating the Wheatbelt, i.e. the area of Western Australia that has been mainly cleared for agriculture and grazing. The listed subspecies grades into the inland form *P. s. superciliosus* across the study area, and it is not generally possible to identify subspecies in the field.

Ecology

Forages in understorey and on ground for insects and seeds. Preferentially uses vegetation corridors, but able to persist in degraded and isolated remnants less than 10 ha in size (DEC 2010d).

Likelihood of Occurrence

This species occurs throughout the general study area, and was sighted during the survey. This is assumed to represent the Wheatbelt subspecies, though it is an area of intergradation with the inland form according to Schodde & Mason (1999).

Potential Impacts

The proposed clearing represents a reduction in habitat area at the margins of large areas with suitable habitat; given the known ability of the species to persist in small and isolated remnants, this is unlikely to have a significant effect on any population.

***Psophodes nigrogularis oberon* (Western Whipbird [western mallee])**Conservation status**DPaW P4**

Distribution and Preferred habitat

The Western Whipbird (Eupetidae) comprises four recognised subspecies, sometimes considered to comprise two distinct species (DoE 2014b; Garnett & Crowley 2000; Schodde & Mason 1991). *Psophodes nigrogularis leucogaster* (Eyre Peninsula, Yorke Peninsula and Ninety Mile Plain, SA; Big Desert and Sunset Country, VIC) is 'VU' under *EPBC Act 1999*; *P. n. oberon* (Western Mallee subspecies, Stirling Range to Ravensthorpe WA) was delisted from 'VU' under the *EPBC Act 1999* in 2009 (now P4), and *P. n. lashmari* (Kangaroo Island, South Australia) is relatively secure and not federally listed. The Western Heath subspecies *P. n. nigrogularis* is smaller and greener than other forms including the parapatric *P. n. oberon* (Schodde & Mason 1991); it formerly occurred on both the west and south coasts of southwestern WA, but is now restricted to a small number of sites east of Albany, notably Two Peoples Bay and Mt Manypeaks (DoE 2014b; Smith 1991). *P. n. oberon* occurs as scattered sub-populations in the southern wheatbelt and central south coast region, in open mallee eucalypt woodland with dense, tall shrub layer up to 1.5 m tall, dominated by taxa such as *Hakea*, *Lambertia*, *Dryandra* or *Banksia* (Gilfillan *et al.* 2009 and references therein).

Ecology

Like other *Psophodes*, this species is insectivorous, mainly active within dense low vegetation and rarely seen, but pairs are stable and sedentary after territory establishment, with a core range size of 0.018 ± 0.003 km², and have a loud, repetitive and distinct territorial song (antiphonal duet) that can be used to localise and census individuals in the field (McGuire *et al.* 2011). Breeding occurs at five years, nests in dense heath adjacent to areas of thick shrubland (thicket). The main threat to most populations of the species is clearance of native vegetation, but protected populations in National Parks are more likely to be impacted by fire, through effects on vegetation structure (DoE 2014b; Smith 1991).

Likelihood of Occurrence

The eastern limit of the recorded distribution of this species coincides, within a few kilometres, with the western end of the proposed fence extension (study area), so that there may be a small overlap, or none. It may be expected to occur in, or have potential to extend its range into, suitable habitat near the western end.

Potential Impacts

The risk of impact to this species is small, because of the limited extent (if any) of range overlap, but some individuals or pairs could potentially be disturbed or displaced by clearing associated with construction and/or maintenance.

***Falcunculus frontatus leucogaster* (Crested Shrike-tit [south-western])**Conservation status**DPaW P4**Distribution and Preferred habitat

This species is endemic to Western Australia, south-west of a line between Geraldton and Point Culver; eucalypt forest and woodland, especially smooth-barked species. It requires continuous wooded habitat, and is unable to persist in isolated remnants of whatever size, so is now absent from the Swan Coastal Plain and Wheatbelt (Garnett & Crowley 2000).

Ecology

Feed on invertebrates taken from under peeling bark, but this resource is relatively scarce in the western part of the species range where most prey is apparently taken by gleaning from foliage; this has been suggested to explain the lower abundance, susceptibility to habitat fragmentation and decline of the southwestern subspecies (Recher 2006). Lay 2-3 eggs in deep cup nest in tree fork. Inconspicuous, unlikely to be detected unless calling or feeding noisily.

Likelihood of Occurrence

Unlikely to occur except in continuous wooded habitat. There are records to the west and north of the study area but none on the coast around Esperance, and the historical range does not appear to overlap, but potential to occur in the western part of the study area.

Potential Impacts

Minor reduction in habitat area if present, or none.

***Oreoica gutturalis gutturalis* (Crested Bellbird [southern])**

Synonym: *Oreoica gutturalis* (subspecies currently not distinguished in DPaW NatureMap)

Conservation status

DPaW P4

Northern and southern subspecies have been distinguished on size, tail/wing ratio and coloration details (Schodde & Mason 1999), but there is a broad zone of hybridization or clinal variation. The southern form was listed as 'Near Threatened a' in the 2000 Action Plan for Australian Birds, but revised to 'Least Concern' in 2010 (Garnett *et al.* 2011; Garnett & Crowley 2000).

Distribution and Preferred habitat

This single species of *Oreoica* (Pachycephalidae) occurs over most of the continent, excluding only the wet areas (in the southwest, southeast, and most of the eastern and northern coast). Crested Bellbirds mainly inhabit tall dry *Acacia* shrublands or thickets, low eucalypt woodlands, including open mallee, with a shrub layer or understorey, or among spinifex, chenopods and sometimes heathland growing on treeless plains or sand-dunes. They usually occur near the ground or in the dense vegetation of the shrub layer of various *Acacia*, *Eremophila*, *Dodonaea*, *Thryptomene*, *Grevillea* or chenopods.

As well as presence of tall or dense dry shrubland, suitable habitat is indicated by sightings or (more likely) the loud and distinctive calls of either Crested Bellbirds or several other species with very similar habitat requirements: Chiming Wedgebill (*Psophodes occidentalis*), Grey Shrike-Thrush (*Colluricincla harmonica*), or Rufous Whistler (*Pachycephala rufiventris*). Comparative recordings of calls of these species are available (Chapman 2011; Plowright 2010) and they are readily identifiable in the field. Any patch of contiguous dense shrubland in which an individual of one of these species is sighted or heard can be regarded as Crested Bellbird habitat.

Ecology

Usually solitary (sometimes pairs or small parties), mostly forage on the ground, among grass, stones or leaf-litter, and less often in low shrubs, but may sing from trees. Feed on a variety of insects and seeds. No distinct breeding season; 2-4 eggs in a cup-shaped nest usually 'decorated' with live, immobilised hairy caterpillars around the rim. Declines and local extinctions at the periphery of the species range are mostly

attributable to clearing and particularly fragmentation of woodland habitat, with isolated areas of apparently suitable habitat as large as 5000 ha now unoccupied.

Likelihood of Occurrence

Recorded as present in mallee woodland and mallee shrubland, based on distinctive call. Likely to occur in most if not all habitats of the study area.

Potential Impacts

Proposed clearing will not lead to fragmentation of habitat, and impact will therefore be limited to loss of the actual cleared area. Large areas of contiguous suitable habitat adjacent to the study area will not be significantly affected, so impact is proportionally very minor.

INVERTEBRATES

***Budginmaya eulae* (Eula's Planthopper)**

Conservation status

DPaW P4

Distribution and Preferred habitat

This species of planthopper bug (Hemiptera, Fulguomorpha, Flatidae) is only recorded from a single locality, Bandalup Hill near Jerdacuttup (southeast of Ravensthorpe), where it is associated with nests of the sugar ant *Camponotus terebrans* (Fletcher & Moir 2009). This is a fairly widespread ant species in southern Australia, usually found in smooth-barked eucalypt woodland (including mallee) on sandy soils.

Ecology

There are many endemic species of Flatidae in Australia including some pests of fruit and other trees, but this is the only member of its family known to live inside ant nests; some of its features are interpreted as adaptations for subterranean life, including reduction in the tegmina, wings and eyes and increased hairiness around the head, body, tegmina and legs. Another sap-sucking hemipteran species that is a commensal of *C. terebrans* (*Pogonoscopus myrmex*, Cicadellidae) also lives within the nests by day and is escorted by worker ants up into nearby vegetation at night to feed, supplying the ants with sweet excess fluids (Ecoscape 2012; Gamblin *et al.* 2010); this may also be the case for *B. eulae* but the details of the relationship have not been described.

Likelihood of Occurrence

The species is most likely a short-range endemic and no populations other than the type locality have been identified. If it does occur more widely, it is likely to be associated with *C. terebrans* in open eucalypt woodland or mallee on sandy soils.

Potential Impacts

Probably none; minor and localised disturbance of host ant nests may occur if there are undiscovered populations within the study area.

***Hylaeus globuliferus* (bee)**

Conservation status**DPaW P3**Distribution and Preferred habitat

This native bee (Colletidae) has been recorded sparsely on the coastal plain between Geraldton and Rockingham, and also a few sites in the southern wheatbelt and at Fitzgerald River NP (Walker 2011).

Ecology

Male *H. globuliferus* are stated to be territorial, found perched on growing tips of *Adenanthos* spp. (*A. flavidiflora*, *A. cygnorum*), *Banksia* spp. (*B. attenuata*, *B. grossa*) or *Jacksonia* species. They are also recorded as visiting flowers of *Grevillea* (*G. erectiloba*, *G. hookerana*) and *Hakea* sp. The Fitzgerald River NP records are from *Grevillea* aff. *hookerana* (Walker 2011).

Likelihood of Occurrence

The species is known to occur along the south coast of WA (DPaW 2013); however the study area does not intersect the known range of this bee (DPaW 2017). The particular plant species with which *H. globuliferus* has been associated on the west coast do not occur on the study area, although diverse species in these genera do occur in the mallee and shrubland habitats. It is likely to be absent from the study area.

Potential Impacts

No impact likely, as the study area is outside the known range.

***Daphnia jollyi* (Water Flea)**Conservation status**DPaW P1**Distribution and Preferred habitat

This crustacean (Daphniidae) lives in shallow, slightly acid (pH 6.0-6.5) freshwater pools over granite bedrock, in a narrow northwest-southeast band along the eastern edge of the Wheatbelt that passes between Merredin and Southern Cross (Benzel & Bayly 1996; DEC 2011a).

Ecology

Daphnia are mainly filter feeders on unicellular algae, protists and bacteria, but may also ingest smaller crustaceans and rotifers. Reproduction is bimodal, parthenogenesis occurring during stable conditions (presumably, winter wet season in *D. jollyi*) but production of males, sexual reproduction and laying of eggs in a protective case (ephippium) late in the season, i.e. August (Benzel & Bayly 1996).

Likelihood of Occurrence

There is a record of this species to the south of the study area between Ravensthorpe and Esperance, about 38 km within the study area (DPaW 2017), so it is considered to be present in the general area. However, no suitable habitat is considered to exist within the study area, as there were no significant granite outcrops

likely to support suitable pools. Granite occurs in the vicinity, but the proposed fenceline is presumably designed to avoid major outcrop.

Potential Impacts

No impact on this species is likely.

***Atelomastix* (6 species)**

Conservation status

WC Act S1, DPAW VU

Distribution and Preferred habitat

A recent taxonomic revision of the millipede genus *Atelomastix* (Iulomorphidae) recognised 27 species in high-rainfall areas of southwestern Australia and one species in the southeast, most of which have been collected from very few localities and are regarded as short-range endemics (Edward & Harvey 2010). Most occur in discontinuous habitats such as mountain ranges, islands, granite outcrops, and patches of wet forest.

Ecology

Millipedes are detritivores, mostly confined to humid habitats, and *Atelomastix* spp. are susceptible to desiccation and have a low potential for dispersal.

Likelihood of Occurrence

Species of *Atelomastix* occur in the Ravensthorpe Range (*A. gibsoni* and *A. psittacina*, not conservation listed), islands and coastal headlands of the Recherche Archipelago (various species), and inland sites within or north of Cape Arid National Park (*A. anancita*, *A. priona*, both VU). There is no overlap between the range of any species and the proposed Barrier Fence corridor.

Potential Impacts

None likely.

Epiclyiosoma sarahae

WC Act S1, DPAW VU

Conservation status

Distribution and Preferred habitat

The only known species of the pill millipede genus *Epiclyiosoma* (Sphaerotheriidae) in Western Australia, recorded from damp coastal gillies and heaths in the vicinity of Cape Le Grand and Cape Arid (Moir & Harvey 2008). It is regarded as a short-range endemic.

Ecology

Millipedes are detritivores, mostly confined to humid habitats, susceptible to desiccation and have a low potential for dispersal.

Likelihood of Occurrence

The species is listed as occurring along the south coast of WA (DPaW 2015); however, there is no overlap between the range of this species and the proposed Barrier Fence corridor (DPaW 2017).

Potential Impacts

None likely.

Zephyrarchaea marki

Conservation status

WC Act S1

Distribution and Preferred habitat

This assassin spider (Archaeidae) is recorded only from Thistle Cove in Cape Le Grand NP, where several specimens were found by sifting leaf litter from a dense coastal thicket of *Banksia speciosa* (Rix & Harvey 2012). It is regarded as a short-range endemic.

Ecology

Assassin spiders are small (2-8 mm) spiders with unusual morphology of the cephalothorax including a more or less elongate 'neck' and long chelicerae; they are specialised predators on other spiders.

Likelihood of Occurrence

The species is known to occur along the south coast of WA (DPaW 2015); however, there is no overlap between the range of this species and the proposed Barrier Fence corridor (DPaW 2017).

Potential Impacts

None likely.

APPENDIX TEN: FAUNA HABITAT PHOTOS



Plate 107: Habitat type 1, Mallee Woodland



Plate 108: Habitat type 2, Mallee Shrubland



Plate 109: Habitat type 3, Shrubland



Plate 110: Habitat type 4, Woodland



Plate 111: Habitat type 5, Banksia Shrubland



Plate 112: Habitat type 6, Salt Lake/Fringe



Plate 113: Habitat type 7, Forest

APPENDIX ELEVEN: FLORA QUADRAT AND RELEVÉ DATA

Q01

Staff LA/AF **Date** 17/10/2013 **Season** E

Revisit SK/AF 5/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 372532 mE 6381593 mN **Lat.** -32.6960 **Long.** 121.6402

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Brown sandy loam

Rock Type Nil

Loose Rock 0% cover ; **Litter** 20 % cover ; <1 cm in depth

Bare ground 70% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus melanoxyylon*,^*Eucalyptus salmonophloia*^tree\7i;M ^*Melaleuca quadrifaria*,
^*Melaleuca teuthidooides*^shrub\4r;G ^*Cratystylis conocephala*^shrub\2i

Veg. Condition Excellent

Disturbance

Fire Age >40 years

Notes

Species	WA Cons.	Height (m)	Cover (%)
* <i>Brassica tournefortii</i>		0.3	<1
<i>Cratystylis conocephala</i>		0.8	20
<i>Enchylaena tomentosa</i>		0.2	<1
<i>Eremophila ionantha</i>		0.8	<1
<i>Eremophila scoparia</i>		0.4	<1
<i>Eucalyptus melanoxyylon</i>		12	15
<i>Eucalyptus salmonophloia</i>		17	1

State Barrier Fence Esperance Extension

<i>Maireana radiata</i>	0.4	<1
<i>Maireana</i> sp.	0.3	<1
<i>Melaleuca quadrifaria</i>	3.5	5
<i>Melaleuca teuthidoides</i>	2.5	3
<i>Scaevola spinescens</i>	0.3	<1
<i>Sclerolaena diacantha</i>	0.2	<1
<i>Zygophyllum glaucum</i>	0.2	<1

Q02

Staff LA/AF **Date** 18/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 379543 mE 6384749 mN **Lat.** -32.6684 **Long.** 121.7154
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 95 % cover ; 3 cm in depth
Bare ground 2% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus oleosa* subsp. *cylindroidea*^tree\7r;M ^^*Alyxia buxifolia*,*Eremophila ionantha*,
Scaevola spinescens^shrub\4r;G ^*Pultenaea arida*^shrub\1r
Veg. Condition Very Good
Disturbance Clearing in past
Fire Age >30 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Alyxia buxifolia</i>		2	2
<i>Austrostipa puberula</i>		0.5	<1
<i>Enchylaena tomentosa</i>		0.3	<1
<i>Eremophila deserti</i>		1	<1
<i>Eremophila ionantha</i>		2	2
<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i>		15	15
<i>Maireana</i> sp.		0.5	<1

State Barrier Fence Esperance Extension

<i>Olearia muelleri</i>	0.3	<1
<i>Pultenaea arida</i>	0.2	2
<i>Rytidosperma setaceum</i>	0.3	<1
<i>Scaevola spinescens</i>	1.1	2

Q03

Staff LA/AF **Date** 18/10/2013 **Season** E

Revisit SK/AF 5/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 370145 mE 6381294 mN **Lat.** -32.6985 **Long.** 121.6147

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light brown loam

Rock Type Nil

Loose Rock 0% cover ; **Litter** 80 % cover ; 1 cm in depth

Bare ground 15% cover **Weeds** 1 % cover

Vegetation U+ ^*Eucalyptus oleosa* subsp. *cylindroidea*, ^*Eucalyptus eremophila* subsp. *eremophila*,
Eucalyptus diptera ^tree\7i; M ^*Melaleuca pauperiflora* ^shrub\4r; G ^*Austrostipa trichophylla*,
^*Ptilotus gaudichaudii* subsp. *eremita* ^other grass, forb\1r

Veg. Condition Very Good

Disturbance Clearing , nearby road

Fire Age >40 years

Notes

Species	WA Cons.	Height (m)	Cover (%)
<i>Austrostipa trichophylla</i>		0.4	2
<i>Blennospora drummondii</i>		0.1	<1
<i>Calandrinia eremaea</i>		0.2	<1
<i>Calotis hispidula</i>		0.1	<1
<i>Crassula colorata</i>		0.1	<1
<i>Daucus glochidiatus</i>		0.1	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus diptera</i>	10	2
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>	12	5
<i>Eucalyptus oleosa</i> subsp. <i>cylindroidea</i>	12	5
<i>Hydrocotyle callicarpa</i>	0.1	<1
<i>Lobelia cleistogamoides</i>	0.2	<1
Malvaceae sp.	0.1	<1
* <i>Medicago minima</i>	0.1	<1
<i>Melaleuca pauperiflora</i>	1.8	2
<i>Millotia tenuifolia</i>	0.2	<1
<i>Plantago debilis</i>	0.1	<1
<i>Podolepis capillaris</i>	0.2	<1
<i>Poranthera microphylla</i>	0.1	<1
<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>	0.2	2
<i>Ptilotus spathulatus</i>	0.1	<1
<i>Rhagodia drummondii</i>	0.1	<1
<i>Sclerolaena diacantha</i>	0.1	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Thysanotus manglesianus</i>	Climber	<1
<i>Trachymene cyanopetala</i>	0.1	<1
<i>Velleia cycnopotamica</i>	0.2	<1
<i>Wahlenbergia preissii</i>	0.1	<1

Q04

Staff LA/AF **Date** 18/10/2013 **Season** E
Revisit SK/AF 5/10/2014 E
Type Q 10 m x 10 m
Location Edge of wetland basin
MGA Zone 51 366521 mE 6380761 mN **Lat.** -32.7028 **Long.** 121.5759
Habitat Open Depression
Aspect N/A **Slope** N/A
Soil Type Brown moist loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 95 % cover ; 1 cm in depth
Bare ground 0% cover **Weeds** 5% cover
Vegetation U+ *Eucalyptus diptera*, *Eucalyptus polita* tree; M *Melaleuca pauperiflora* subsp. *pauperiflora* shrub; G *Helichrysum luteoalbum* forb

Veg. Condition Good
Disturbance Flooding, hydrology change
Fire Age 10-20 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Angianthus tomentosus</i>		0.2	<1
<i>Atriplex</i> sp.		0.3	<1
<i>Austrostipa hemipogon</i>		0.4	<1
<i>Calandrinia eremaea</i>		Prostrate	<1
* <i>Carthamus lanatus</i>		0.5	<1
* <i>Centaurea melitensis</i>		0.4	<1
* <i>Conyza</i> sp.		0.4	<1

State Barrier Fence Esperance Extension

<i>Crassula colorata</i>	0.1	<1
<i>Daucus glochidiatus</i>	0.3	<1
<i>Eremophila ionantha</i>	0.8	<1
<i>Eremophila</i> sp.	1	<1
<i>Eucalyptus diptera</i>	6	5
<i>Eucalyptus polita</i>	6	4
<i>Eucalyptus</i> sp.	2.5	<1
<i>Euchiton sphaericus</i>	0.4	<1
<i>Helichrysum luteoalbum</i>	0.8	10
* <i>Lolium rigidum</i>	0.5	<1
* <i>Medicago minima</i>	0.2	<1
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>	0.8	<1
<i>Melaleuca exuvia</i>	0.6	<1
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>	1.2	12
<i>Melaleuca teuthidoides</i>	1	<1
* <i>Onopordum acaulon</i>	0.1	<1
<i>Pelargonium drummondii</i>	0.5	<1
<i>Podolepis tepperi</i>	0.3	<1
<i>Pterostylis roensis</i>	0.2	<1
<i>Senecio quadridentatus</i>	0.3	<1
* <i>Sisymbrium irio</i>	1	<1
* <i>Sonchus oleraceus</i>	0.4	<1
<i>Vittadinia dissecta</i>	0.3	<1

Q05

Staff LA/AF **Date** 18/10/2013 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 365821 mE 6380691 mN **Lat.** -32.7034 **Long.** 121.5685

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light brown clay

Rock Type Nil

Loose Rock 0% cover ; **Litter** 30 % cover ; 1 cm in depth

Bare ground 65% cover **Weeds** 2% cover

Vegetation U+ ^*Eucalyptus ?spreta*,^*Eucalyptus diptera*^tree\7i;M ^*Melaleuca pauperiflora*^shrub\4bi;G
^*Cratystylis conocephala*,^*Acacia merrallii*,*Halgania andromedifolia*^shrub\2r

Veg. Condition Very Good

Disturbance

Fire Age

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia merrallii</i>		0.4	2
<i>Angianthus tomentosus</i>		0.3	<1
<i>Atriplex</i> sp.		0.1	<1
<i>Austrostipa elegantissima</i>		0.3	<1
<i>Austrostipa puberula</i>		0.5	<1
* <i>Avellinia michelii</i>		0.1	<1
<i>Brachyscome ciliaris</i>		0.1	<1

State Barrier Fence Esperance Extension

* <i>Bromus rubens</i>	0.3	<1
* <i>Centaurea melitensis</i>	0.1	<1
<i>Cratystylis conocephala</i>	0.7	2
<i>Eremophila decipiens</i> subsp. <i>decipiens</i>	0.1	<1
<i>Eremophila ionantha</i>	0.4	<1
<i>Eucalyptus ?spreta</i>	15	5
<i>Eucalyptus diptera</i>	10	2
<i>Exocarpos aphyllus</i>	0.4	<1
<i>Halgania andromedifolia</i>	0.5	2
* <i>Hordeum leporinum</i>	0.1	<1
* <i>Lolium rigidum</i>	0.2	<1
<i>Maireana trichoptera</i>	0.1	<1
* <i>Medicago minima</i>	0.1	<1
<i>Melaleuca pauperiflora</i>	2.6	1
* <i>Mesembryanthemum nodiflorum</i>	0.1	<1
* <i>Onopordum acaulon</i>	0.1	<1
<i>Ptilotus spathulatus</i>	0.1	<1
<i>Pultenaea arida</i>	0.3	<1
<i>Rhagodia crassifolia</i>	0.2	<1
<i>Rytidosperma setaceum</i>	0.2	<1
<i>Scaevola spinescens</i>	0.8	<1
<i>Sclerolaena diacantha</i>	0.2	<1
* <i>Sisymbrium irio</i>	0.1	<1
* <i>Sonchus oleraceus</i>	0.2	<1
<i>Spergularia brevifolia</i>	0.2	<1
<i>Thysanotus manglesianus</i>	Climber	<1
<i>Vittadinia dissecta</i>	0.1	<1

Q06

Staff LA/AF **Date** 18/10/2013 **Season** E
Revisit SK/AF 5/10/2014 E
Type Q 10 m x 10 m
Location Edge of wetland , veg is wetland buffer
MGA Zone 51 365336 mE 6380642 mN **Lat.** -32.7038 **Long.** 121.5633
Habitat Open Depression
Aspect N/A **Slope** N/A
Soil Type Brown clay
Rock Type Nil
Loose Rock 0% cover ; **Litter** 5 % cover ; 1 cm in depth
Bare ground 60% cover **Weeds** 2% cover
Vegetation U+ ^*Eucalyptus quadrans*^tree\6r;M ^*Melaleuca subalaris*^shrub\3c;G ^*Calandrinia eremaea*,
^*Disphyma crassifolium*^forb\2r
Veg. Condition Very Good
Disturbance Clearing, hydrological change, rubbish dumping
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Angianthus preissianus</i>		0.1	<1
* <i>Arctotheca calendula</i>		0.1	<1
<i>Austrostipa puberula</i>		0.5	<1
<i>Calandrinia eremaea</i>		0.3	1
<i>Calandrinia granulifera</i>		0.1	<1
<i>Carpobrotus modestus</i>		Prostrate	<1
<i>Centrolepis cephaloformis</i> subsp. <i>cephaloformis</i>		0.1	<1

State Barrier Fence Esperance Extension

* <i>Conyza</i> sp.	0.3	<1
<i>Crassula colorata</i>	0.1	<1
<i>Disphyma crassifolium</i>	0.1	1
<i>Enchylaena tomentosa</i>	0.3	<1
<i>Eremophila decipiens</i> subsp. <i>decipiens</i>	0.4	<1
<i>Eucalyptus quadrans</i>	8	2
<i>Euchiton sphaericus</i>	0.1	<1
<i>Exocarpos aphyllus</i>	0.4	<1
<i>Gunniopsis intermedia</i>	0.2	<1
<i>Helichrysum luteoalbum</i>	0.4	<1
<i>Hydrocotyle pillifera</i> var. <i>glabrata</i>	0.1	<1
<i>Lobelia cleistogamoides</i>	0.2	<1
* <i>Lysimachia arvensis</i>	0.2	<1
<i>Melaleuca exuvia</i>	1.5	3
<i>Melaleuca subalaris</i>	1.5	20
<i>Melaleuca thyoides</i>	1.5	2
<i>Podolepis capillaris</i>	0.1	<1
<i>Rhagodia preissii</i>	0.8	<1
<i>Senecio lacustrinus</i>	0.2	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Spergularia brevifolia</i>	0.2	<1
<i>Tecticornia syncarpa</i>	0.1	<1
<i>Thysanotus manglesianus</i>	Twining	<1
<i>Vittadinia dissecta</i>	0.2	<1
<i>Zygophyllum billardierei</i>	0.2	<1

Q07

Staff LA/AF **Date** 18/10/2013 **Season** E
Revisit SK/AF 5/10/2014 E
Type Q 10 m x 10 m
Location On lunette near wetland edge
MGA Zone 51 365383 mE 6380654 mN **Lat.** -32.7037 **Long.** 121.5638
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Yellow sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 10 % cover ; 1 cm in depth
Bare ground 80% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus olivina*^tree\7r;G ^^*Olearia muelleri*,*Lepidosperma drummondii*,*Gahnia ancistrophylla*^shrub,sedge\2r
Veg. Condition Very Good
Disturbance Clearing
Fire Age >40 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Austrostipa puberula</i>		0.6	<1
<i>Eremophila ionantha</i>		0.4	<1
<i>Eucalyptus olivina</i>		12	2
<i>Gahnia ancistrophylla</i>		0.5	1
<i>Lepidosperma drummondii</i>		0.8	1
<i>Maireana trichoptera</i>		0.1	<1
<i>Olearia dampieri</i> subsp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628)		0.7	<1

State Barrier Fence Esperance Extension

<i>Olearia muelleri</i>	1.4	2
<i>Podolepis capillaris</i>	0.1	<1
<i>Rhagodia preissii</i>	0.5	<1
<i>Scaevola spinescens</i>	0.6	<1
<i>Sclerolaena parviflora</i>	0.1	<1

Q08

Staff LA/AF **Date** 18/10/2013 **Season** E
Revisit SK/AF 5/10/2014 E
Type Q 10 m x 10 m
Location
MGA Zone 51 364206 mE 6380572 mN **Lat.** -32.7042 **Long.** 121.5512
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 20 % cover ; 1 cm in depth
Bare ground 85% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus melanoxyton*^tree\7r;M ^*Cratystylis conocephala*^shrub\3i;G ^*Wilsonia humilis*,
^*Maireana radiata*^shrub\1r
Veg. Condition Excellent
Disturbance Nil
Fire Age >40 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Cratystylis conocephala</i>		1.5	25
<i>Enchylaena tomentosa</i>		0.2	<1
<i>Eremophila scoparia</i>		0.2	<1
<i>Eucalyptus melanoxyton</i>		15	5
<i>Eucalyptus urna</i>		15	<1
<i>Maireana radiata</i>		0.2	2
<i>Maireana trichoptera</i>		0.4	<1

State Barrier Fence Esperance Extension

* <i>Mesembryanthemum nodiflorum</i>	0.1	<1
<i>Olearia dampieri</i> subsp. <i>Eremicola</i> (Diels & Pritzel s.n. PERTH 00449628)	0.6	<1
<i>Sclerolaena diacantha</i>	0.1	<1
<i>Wilsonia humilis</i>	0.3	3
<i>Zygophyllum glaucum</i>	0.2	<1

Q09

Staff LA/AF **Date** 19/10/2013 **Season** E

Revisit SK/AF **Date** 4/10/2014 **Season** E

Type Q 10 m x 10 m

Location

MGA Zone 51 **400160 mE** **6355798 mN** **Lat.** -32.9315 **Long.** 121.9321

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light brown sandy loam

Rock Type Calcrete

Loose Rock <2% cover ; **Litter** 3 % cover ; 1 cm in depth

Bare ground 80% cover **Weeds** <1 % cover

Vegetation M+ ^*Acacia mutabilis* subsp. *angustifolia*, ^*Duboisia hopwoodii*, *Commersonia kraurophylla* ^shrub\3r;G ^^*Acacia glaucissima*, *Dodonaea stenozyga*, *Triodia scariosa* ^shrub, hummock grass\2r

Veg. Condition Very Good

Disturbance Clearing recently

Fire Age <10 years

Notes

Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.3	3
<i>Acacia mutabilis</i> subsp. <i>angustifolia</i>		1.8	3
<i>Angianthus tomentosus</i>		0.3	<1
<i>Austrostipa flavescens</i>		0.1	<1
<i>Austrostipa hemipogon</i>		0.5	<1
<i>Austrostipa variabilis</i>		0.4	<1

State Barrier Fence Esperance Extension

<i>Brachyscome ciliaris</i>		0.2	<1
<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>		0.2	<1
<i>Comesperma calcicola</i>	P 3	0.1	<1
<i>Commersonia craurophylla</i>		1.2	2
<i>Cyathostemon</i> cf. <i>blackettii</i>		0.2	<1
<i>Dodonaea stenozyga</i>		0.4	3
<i>Duboisia hopwoodii</i>		1.3	2
<i>Eragrostis dielsii</i>		0.5	<1
<i>Gahnia</i> sp. L (K.R. Newbey 7888)		0.5	<1
<i>Glischrocaryon aureum</i>		0.7	<1
<i>Grevillea oligantha</i>		0.7	<1
<i>Hibbertia psilocarpa</i>		0.3	<1
<i>Maireana erioclada</i>		0.4	<1
<i>Maireana trichoptera</i>		0.2	<1
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>		0.4	<1
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>		0.6	<1
<i>Olearia exiguifolia</i>		0.3	<1
<i>Ptilotus holosericeus</i>		0.2	<1
<i>Ptilotus spathulatus</i>		0.1	<1
<i>Rytidosperma setaceum</i>		0.2	<1
<i>Triodia scariosa</i>		0.3	2
<i>Waitzia suaveolens</i> var. <i>flava</i>		0.2	<1
<i>Westringia rigida</i>		0.1	<1
<i>Zygophyllum billardierei</i>		0.1	<1

Q10

Staff LA/AF **Date** 19/10/2013 **Season** E
Revisit SK/AF 4/10/2014 E
Type Q 10 m x 10 m
Location Near edge of salt lake
MGA Zone 51 400528 mE 6357252 mN **Lat.** -32.9184 **Long.** 121.9362
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Cream fine clayey sand , salt scalds in some spots
Rock Type Nil
Loose Rock 0% cover ; **Litter** 5 % cover ; 1 cm in depth
Bare ground 90% cover **Weeds** 1 % cover
Vegetation G+ ^^*Tecticornia* sp.,*Austrostipa juncifolia*,*Maireana oppositifolia*^samphire shrub,hummock grass,shrub\2r
Veg. Condition Very Good
Disturbance Clearing
Fire Age 3-5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Angianthus tomentosus</i>		0.2	<1
<i>Atriplex</i> sp.		0.4	<1
<i>Austrostipa juncifolia</i>		0.7	<1
<i>Austrostipa juncifolia</i>		0.6	2
<i>Austrostipa trichophylla</i>		0.2	<1
<i>Brachyscome ciliaris</i>		0.2	<1
<i>Carpobrotus modestus</i>		0.1	<1

State Barrier Fence Esperance Extension

<i>Eragrostis dielsii</i>		0.1	<1
<i>Gnephosis drummondii</i>		0.1	<1
* <i>Hordeum leporinum</i>		0.2	<1
<i>Hydrocotyle</i> sp. Hexaptera (T. Erickson TEE 173)	P 1	0.1	<1
<i>Leptospermum erubescens</i>		0.2	<1
<i>Maireana oppositifolia</i>		0.3	2
<i>Schenkia australis</i>		0.1	<1
<i>Sclerolaena diacantha</i>		0.1	<1
<i>Senecio lacustrinus</i>		0.1	<1
* <i>Sonchus oleraceus</i>		0.2	<1
<i>Tecticornia</i> sp.		0.5	3
<i>Zygophyllum billardierei</i>		0.1	<1

Q11

Staff LA/AF **Date** 19/10/2013 **Season** E
Revisit SK/AF 4/10/2014
Type Q 10 m x 10 m
Location
MGA Zone 51 400776 mE 6358079 mN **Lat.** -32.9110 **Long.** 121.9389
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 3 % cover ; 1 cm in depth
Bare ground 70% cover **Weeds** <1 % cover
Vegetation M ^*Rhagodia preissii*^shrub\3r;G+ ^^*Commersonia craurophylla*,*Acacia glaucissima*,
Glischrocaryon aureum^shrub,forb\2i
Veg. Condition Good
Disturbance Clearing
Fire Age 3-5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia enervia</i> subsp. <i>enervia</i>		0.6	<1
<i>Acacia glaucissima</i>	P 3	0.3	5
<i>Angianthus tomentosus</i>		0.3	<1
<i>Austrostipa hemipogon</i>		0.5	<1
<i>Austrostipa variabilis</i>		0.4	<1
<i>Calandrinia eremaea</i>		0.1	<1
<i>Comesperma calcicola</i>	P 3	0.1	<1

State Barrier Fence Esperance Extension

<i>Commersonia kraurophylla</i>	1	10
<i>Cooperhooikia stropholata</i>	0.6	<1
<i>Cryptandra recurva</i>	0.3	<1
<i>Cyathostemon</i> cf. <i>blackettii</i>	0.3	<1
<i>Eremophila decipiens</i> subsp. <i>decipiens</i>	0.5	<1
<i>Exocarpos aphyllus</i>	0.1	<1
<i>Glischrocaryon aureum</i>	0.8	2
<i>Hibbertia psilocarpa</i>	0.5	<1
<i>Melaleuca thyoides</i>	0.3	<1
<i>Microcybe multiflora</i> subsp. <i>multiflora</i>	.4	<1
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>	0.4	<1
<i>Olearia exiguifolia</i>	0.3	<1
<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>	0.1	<1
<i>Ptilotus seminudus</i>	0.1	<1
<i>Rhagodia preissii</i>	1.5	2
<i>Rytidosperma setaceum</i>	0.2	<1
<i>Sclerolaena diacantha</i>	0.1	<1
<i>Senecio lacustrinus</i>	0.1	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Waitzia suaveolens</i> var. <i>flava</i>	0.1	<1
<i>Westringia rigida</i>	0.4	<1
<i>Zygophyllum billardierei</i>	0.1	<1

Q12

Staff LA/AF **Date** 19/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 401356 mE 6358912 mN **Lat.** -32.9035 **Long.** 121.9452
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Yellow clayey sand
Rock Type Calcrete
Loose Rock <2% cover ; **Litter** 5 % cover ; 1 cm in depth
Bare ground 70% cover **Weeds** <1 % cover
Vegetation M *Duboisia hopwoodii* shrub; G+ *Acacia glaucissima*, *Commersonia kraurophylla*, *Melaleuca thyooides* shrub
Veg. Condition Good
Disturbance Clearing
Fire Age 3-5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.6	8
<i>Alyxia buxifolia</i>		0.2	<1
<i>Angianthus tomentosus</i>		0.2	<1
<i>Austrostipa hemipogon</i>		0.3	<1
<i>Austrostipa variabilis</i>		0.3	<1
<i>Carpobrotus modestus</i>		0.1	<1
<i>Chenopodium desertorum</i> subsp. <i>microphyllum</i>		0.2	<1

State Barrier Fence Esperance Extension

<i>Commersonia kraurophylla</i>	0.5	8
<i>Cyathostemon</i> cf. <i>blackettii</i>	0.7	<1
<i>Duboisia hopwoodii</i>	1.3	2
<i>Eremophila decipiens</i> subsp. <i>decipiens</i>	0.4	<1
<i>Exocarpos aphyllus</i>	0.2	<1
<i>Glischrocaryon aureum</i>	0.3	<1
<i>Melaleuca linguiformis</i>	0.7	<1
<i>Melaleuca thyoides</i>	0.5	2
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>	0.4	<1
<i>Olearia muelleri</i>	0.5	<1
<i>Phebalium tuberculosum</i>	0.3	<1
<i>Podolepis tepperi</i>	0.2	<1
<i>Ptilotus seminudus</i>	0.1	<1
<i>Rytidosperma setaceum</i>	0.5	<1
<i>Scaevola spinescens</i>	0.6	<1
<i>Sclerolaena diacantha</i>	0.2	<1
<i>Senecio lacustrinus</i>	0.1	<1
<i>Solanum hoplopetalum</i>	0.2	<1
<i>Vittadinia dissecta</i>	0.2	<1
<i>Waitzia suaveolens</i> var. <i>flava</i>	0.3	<1

Q13

Staff LA/AF **Date** 21/10/2013 **Season** E
Revisit SK/AF 3/10/2014 E
Type Q 10 m x 10 m
Location
MGA Zone 51 451297 mE 6305289 mN **Lat.** -33.3906 **Long.** 122.4763
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Grey clayey sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 30 % cover ; 1 cm in depth
Bare ground 60% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus tumida*^mallee shrub\6i;G ^*Melaleuca societatis*,*Acacia gonophylla*,*Grevillea plurijuga* subsp. *plurijuga*^shrub\2i
Veg. Condition Excellent
Disturbance Nil
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.4	<1
<i>Acacia gonophylla</i>		0.4	2
<i>Baeckea latens</i>		0.3	<1
<i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i>		.4	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		.3	<1
<i>Cassytha</i> sp.		Climber	<1
<i>Comesperma spinosum</i>		0.2	<1

State Barrier Fence Esperance Extension

<i>Dampiera lavandulacea</i>		0.2	<1
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		.5	<1
<i>Daviesia lancifolia</i>		0.3	<1
<i>Eucalyptus tumida</i>		3	15
<i>Eucalyptus uncinata</i>		2.5	2
<i>Eutaxia lutea</i>		0.2	<1
<i>Gahnia ancistrophylla</i>		0.3	<1
<i>Gompholobium baxteri</i>		0.3	<1
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P 3	0.1	<1
<i>Grevillea oligantha</i>		0.4	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		0.9	2
<i>Hakea laurina</i>		1	<1
<i>Hibbertia exasperata</i>		0.3	<1
<i>Hypolaena humilis</i>		0.3	<1
<i>Lasiopetalum rosmarinifolium</i>		0.1	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>		0.2	<1
<i>Leucopogon cuneifolius</i>		0.2	<1
<i>Leucopogon obtusatus</i>		0.1	<1
<i>Melaleuca glaberrima</i>		0.8	<1
<i>Melaleuca rigidifolia</i>		0.6	<1
<i>Melaleuca societatis</i>		0.6	6
<i>Neurachne alopecuroidea</i>		0.2	<1
<i>Pimelea cracens</i>		0.6	<1
<i>Pultenaea indira</i> subsp. <i>indira</i>		0.2	<1
<i>Spyridium minutum</i>		0.2	<1

Q14

Staff LA/AF **Date** 21/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 450748 mE 6305613 mN **Lat.** -33.3876 **Long.** 122.4704
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Yellow clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 15 % cover ; 1 cm in depth
Bare ground 35% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus pleurocarpa*,*Eucalyptus tumida*^mallee shrub\6\r;G ^^*Allocasuarina humilis*,
Melaleuca hamata,*Banksia armata* var. *armata*^shrub\2\i
Veg. Condition Excellent
Disturbance Nil
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia gonophylla</i>		0.7	<1
<i>Allocasuarina humilis</i>		1	3
<i>Amphipogon turbinatus</i>		0.1	<1
<i>Banksia armata</i> var. <i>armata</i>		0.7	2
<i>Boronia crassifolia</i>		0.1	<1
<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>		0.2	<1
<i>Chorizema aciculare</i> subsp. <i>aciculare</i>		0.2	<1

State Barrier Fence Esperance Extension

<i>Daviesia lancifolia</i>	0.2	<1
<i>Desmocladius myriocladus</i>	0.2	<1
<i>Eucalyptus pleurocarpa</i>	2.5	10
<i>Eucalyptus tumida</i>	1.9	2
<i>Eutaxia lutea</i>	0.2	<1
<i>Gompholobium baxteri</i>	0.4	<1
<i>Gompholobium marginatum</i>	0.1	<1
<i>Goodenia pterigosperma</i>	0.1	<1
<i>Grevillea oligantha</i>	1	<1
<i>Hakea corymbosa</i>	0.5	<1
<i>Hakea lissocarpha</i>	0.5	<1
<i>Hypolaena humilis</i>	0.3	<1
<i>Lasiopetalum rosmarinifolium</i>	0.2	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>	0.1	<1
<i>Leucopogon cuneifolius</i>	0.4	<1
<i>Lomandra mucronata</i>	0.1	<1
<i>Lysinema pentapetalum</i>	0.3	<1
<i>Melaleuca glaberrima</i>	1	<1
<i>Melaleuca hamata</i>	0.8	2
<i>Melaleuca rigidifolia</i>	0.5	<1
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>	0.3	<1
<i>Monotaxis paxii</i>	0.1	<1
<i>Neurachne alopecuroidea</i>	0.1	<1
<i>Opercularia vaginata</i>	0.1	<1
<i>Pimelea erecta</i>	0.1	<1
<i>Platysace effusa</i>	0.4	<1
<i>Schoenus pleiostemoneus</i>	0.1	<1
<i>Schoenus racemosus</i>	0.3	<1
<i>Schoenus subflavus</i> subsp. <i>hispid culms</i> (K.R. Newbey 8278)	0.2	<1
<i>Spyridium minutum</i>	0.2	<1
<i>Stenanthemum ?emarginatum</i>	0.2	<1
<i>Stylidium piliferum</i>	0.2	<1
<i>Verticordia eriocephala</i>	0.5	<1

Q15

Staff LA/AF **Date** 21/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 449213 mE 6306408 mN **Lat.** -33.3804 **Long.** 122.4540
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Dark brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 10 % cover ; 1 cm in depth
Bare ground 75% cover **Weeds** 0% cover
Vegetation M+ *Eucalyptus grossa*, *Eucalyptus conglobata*, *Hakea laurina* mallee shrub; *Melaleuca hamata*, *Grevillea oligantha* shrub
Veg. Condition Excellent
Disturbance Former clearing
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia evenulosa</i>		0.4	<1
<i>Baeckea latens</i>		0.7	<1
<i>Boronia inconspicua</i>		0.2	<1
<i>Callitris roei</i>		0.9	<1
<i>Coopernookia stropholata</i>		0.1	<1
<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>		.4	<1
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.5	<1

State Barrier Fence Esperance Extension

<i>Dillwynia divaricata</i>	0.3	<1
<i>Dodonaea caespitosa</i>	.3	<1
<i>Eucalyptus conglobata</i>	3	2
<i>Eucalyptus grossa</i>	3	10
<i>Grevillea oligantha</i>	0.7	2
<i>Hakea commutata</i>	0.6	<1
<i>Hakea laurina</i>	2.5	2
<i>Hakea lissocarpha</i>	0.3	<1
<i>Hibbertia</i> aff. <i>gracillipes</i>	0.3	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>	0.1	<1
<i>Leucopogon obtusatus</i>	0.2	<1
<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)	0.4	<1
<i>Melaleuca hamata</i>	1	15
<i>Melaleuca undulata</i>	.9	<1
<i>Neurachne alopecuroidea</i>	0.3	<1
<i>Pultenaea spinulosa</i>	.3	<1
<i>Rytidosperma setaceum</i>	0.2	<1
<i>Spyridium minutum</i>	0.1	<1
<i>Trymalium myrtillus</i> subsp. <i>myrtillus</i>	0.7	<1

Q16

Staff LA/AF **Date** 21/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 448410 mE 6305634 mN **Lat.** -33.3873 **Long.** 122.4453
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Yellow clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 3 % cover ; <1 cm in depth
Bare ground 80% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus tumida*,*Eucalyptus uncinata*,*Eucalyptus flocktoniae*^mallee shrub\6\r;G
^*Melaleuca undulata*,*Gahnia* sp. L (K.R. Newbey 7888),*Gahnia* sp. Ravensthorpe (G.F. Craig
5005)^shrub,sedge\2\r
Veg. Condition Very Good
Disturbance Clearing in past
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia crassuloides</i>		0.2	<1
<i>Acacia evenulosa</i>		0.9	<1
<i>Baeckea latens</i>		0.8	<1
<i>Boronia inconspicua</i>		0.2	<1
<i>Comesperma spinosum</i>		0.1	<1
<i>Cyathostemon</i> aff. <i>tenuifolius</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.2	<1
<i>Daviesia lancifolia</i>		0.2	<1
<i>Eucalyptus flocktoniae</i>		2.3	1
<i>Eucalyptus tumida</i>		3.2	2
<i>Eucalyptus uncinata</i>		2	2
<i>Eutaxia lutea</i>		0.1	<1
<i>Gahnia</i> sp. L (K.R. Newbey 7888)		0.3	2
<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)		1	2
<i>Gompholobium confertum</i>		0.2	<1
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P 3	0.1	<1
<i>Grevillea oligantha</i>		0.4	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		0.3	<1
<i>Hakea commutata</i>		0.2	<1
<i>Hibbertia</i> aff. <i>gracillipes</i>		0.3	<1
<i>Lasiopetalum rosmarinifolium</i>		0.3	<1
<i>Leucopogon obtusatus</i>		0.3	<1
<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)		0.2	<1
<i>Melaleuca glaberrima</i>		0.7	<1
<i>Melaleuca rigidifolia</i>		0.6	<1
<i>Melaleuca societatis</i>		0.6	<1
<i>Melaleuca undulata</i>		0.6	3
<i>Rytidosperma setaceum</i>		0.2	<1
<i>Spyridium minutum</i>		0.1	<1
<i>Stylidium turleyae</i>		0.1	<1
<i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897)		0.1	<1

Q17

Staff LA/AF **Date** 22/10/2013 **Season** E
Revisit SK/AF 3/10/2014 E
Type Q 10 m x 10 m
Location
MGA Zone 51 447576 mE 6304664 mN **Lat.** -33.3960 **Long.** 122.4363
Habitat Upper-Slope
Aspect NW **Slope** Very Gentle
Soil Type Red brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 2 % cover ; <1 cm in depth
Bare ground 60% cover **Weeds** 0% cover
Vegetation M ^*Eucalyptus* sp. Fraser Range (D. Nicolle 2157)\^mallee shrub\6\r;G+ ^*Lepidosperma* ?
resinosum,^*Acacia mimica* var. *angusta*,*Verticordia eriocephala*\^sedge,shrub\2\c
Veg. Condition Excellent
Disturbance Possible clearing in past
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia mimica</i> var. <i>angusta</i>		0.8	3
<i>Allocasuarina campestris</i>		0.6	<1
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>		0.4	<1
<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>		0.4	<1
<i>Cryptandra myriantha</i>		0.2	<1
<i>Dampiera sacculata</i>		0.2	<1
<i>Darwinia</i> sp. Mt Ney Virgate (A.S. George 15837)		0.4	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157)	2.3	2
<i>Gastrolobium discolor</i>	0.4	<1
<i>Gompholobium confertum</i>	0.2	<1
<i>Hibbertia</i> aff. <i>gracillipes</i>	0.3	<1
<i>Laxmannia paleacea</i>	0.1	<1
<i>Lepidosperma</i> ? <i>resinosum</i>	0.6	20
<i>Leucopogon cuneifolius</i>	0.2	<1
<i>Levenhookia pusilla</i>	0.1	<1
<i>Neurachne alopecuroidea</i>	0.1	<1
<i>Philothea gardneri</i> subsp. <i>gardneri</i>	0.6	<1
<i>Poranthera microphylla</i>	0.1	<1
<i>Schoenus breviculmis</i>	0.1	<1
<i>Stylidium breviscapum</i>	0.1	<1
<i>Verticordia eriocephala</i>	0.5	2

Q18

Staff LA/AF **Date** 22/10/2013 **Season** E
Revisit SK/AF 3/10/2014 E
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 447787 mE 6303885 mN **Lat.** -33.4031 **Long.** 122.4385
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 20 % cover ; 1-3 cm in depth
Bare ground 20% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus uncinata*^mallee shrub\6r;G ^^*Acacia crassuloides*,*Gahnia* sp. South West (K.L. Wilson & K. Frank K LW 9266),*Gahnia* sp. Ravensthorpe (G.F. Craig 5005)^shrub,sedge\2i
Veg. Condition Very Good
Disturbance Clearing
Fire Age <5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia crassuloides</i>		0.4	3
<i>Acacia evenulosa</i>		0.4	<1
<i>Acrotriche cordata</i>		0.2	<1
<i>Baeckea latens</i>		0.9	<1
<i>Boronia inornata</i> subsp. <i>inornata</i>		0.3	<1
<i>Cassytha</i> sp.		Climber	<1
<i>Comesperma spinosum</i>		0.2	<1

State Barrier Fence Esperance Extension

<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.4	<1
<i>Dianella brevicaulis</i>		0.4	<1
<i>Dodonaea bursariifolia</i>		.4	<1
<i>Eucalyptus conglobata</i>		1.6	<1
<i>Eucalyptus leptocalyx</i>		1.5	<1
<i>Eucalyptus uncinata</i>		1.8	3
<i>Exocarpos aphyllus</i>		0.7	<1
<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)		0.2	5
<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank K LW 9266)		0.3	3
<i>Gompholobium baxteri</i>		0.2	<1
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P 3	.2	<1
<i>Grevillea oligantha</i>		0.7	<1
<i>Hakea commutata</i>		0.3	<1
<i>Hibbertia psilocarpa</i>		0.4	<1
<i>Lepidosperma gahnioides</i>		0.1	<1
<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)		0.3	<1
<i>Melaleuca hamata</i>		0.4	<1
<i>Melaleuca undulata</i>		0.6	<1
<i>Microcorys glabra</i> var. <i>glabra</i>		0.2	<1
<i>Pultenaea spinulosa</i>		.3	<1
<i>Rytidosperma setaceum</i>		0.3	<1
<i>Spyridium minutum</i>		0.2	<1
<i>Thysanotus manglesianus</i>		0.2	<1
<i>Wilsonia humilis</i>		0.1	<1

Q19

Staff LA/AF **Date** 23/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 469475 mE 6307936 mN **Lat.** -33.3674 **Long.** 122.6719
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 40 % cover ; 1-3 cm in depth
Bare ground 40% cover **Weeds** 0% cover
Vegetation U ^^*Eucalyptus tumida*,*Eucalyptus tumida*,*Eucalyptus uncinata*^mallee shrub\6\r;M+ ^^*Melaleuca rigidifolia*,*Melaleuca hamata*,*Melaleuca glaberrima*^shrub\3\c;G ^*Daviesia lancifolia*,^*Hibbertia gracilipes*^shrub\2\r
Veg. Condition Pristine
Disturbance Nil
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.5	<1
<i>Baeckea latens</i>		0.7	<1
<i>Cassythia melantha</i>		Climber	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		1.5	<1
<i>Daviesia lancifolia</i>		0.5	2
<i>Eucalyptus tumida</i>		3.5	2

State Barrier Fence Esperance Extension

<i>Eucalyptus tumida</i>	3	2
<i>Eucalyptus uncinata</i>	2.8	2
<i>Eutaxia lutea</i>	0.4	<1
<i>Exocarpos aphyllus</i>	1.4	<1
<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank K LW 9266)	0.3	<1
<i>Gastrolobium musaceum</i>	0.5	<1
<i>Grevillea oligantha</i>	0.7	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	1.6	<1
<i>Hakea laurina</i>	2	<1
<i>Hibbertia exasperata</i>	0.4	<1
<i>Hibbertia gracilipes</i>	0.5	2
<i>Hibbertia psilocarpa</i>	0.2	<1
<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)	0.3	<1
<i>Leucopogon</i> sp. Kau Rock (M.A. Burgman 1126)	1.2	<1
<i>Melaleuca glaberrima</i>	0.8	3
<i>Melaleuca hamata</i>	0.7	6
<i>Melaleuca rigidifolia</i>	1	10
<i>Melaleuca thyoides</i>	0.4	<1
<i>Neurachne alopecuroidea</i>	0.1	<1
<i>Santalum acuminatum</i>	1.3	<1

Q20

Staff LA/AF **Date** 23/10/2013 **Season** E

Revisit SK/AF 2/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 469089 mE 6308319 mN **Lat.** -33.3639 **Long.** 122.6677

Habitat Mid-Slope

Aspect NW **Slope** Very Gentle

Soil Type Brown sandy clay

Rock Type Nil

Loose Rock <2% cover ; **Litter** 5 % cover ; 1 cm in depth

Bare ground 75% cover **Weeds** 0% cover

Vegetation M+ *Eucalyptus grossa*, *Melaleuca uncinata*, *Calothamnus quadrifidus* subsp. *quadrifidus*^shrub\3r;G *Acacia sulcata* var. *platyphylla*, *Lepidosperma ?resinosum*, *Lysinema pentapetalum*^shrub,sedge\2r

Veg. Condition Pristine

Disturbance Nil

Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia sulcata</i> var. <i>platyphylla</i>		0.8	4
<i>Allocasuarina campestris</i>		0.6	<1
<i>Baeckea latens</i>		0.4	<1
<i>Callitris roei</i>		0.8	<1
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>		1.4	2
<i>Calytrix breviseta</i> subsp. <i>stipulosa</i>		0.4	<1

State Barrier Fence Esperance Extension

<i>Drummondita hassellii</i>	0.2	<1
<i>Eucalyptus grossa</i>	1.3	2
<i>Eutaxia lutea</i>	0.3	<1
<i>Hakea bicornata</i>	1	<1
<i>Hibbertia gracilipes</i>	0.2	<1
<i>Lepidosperma ?resinosum</i>	0.5	2
<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)	0.2	<1
<i>Leptospermum fastigiatum</i>	0.8	<1
<i>Leucopogon cuneifolius</i>	0.6	<1
<i>Leucopogon obtusatus</i>	0.4	<1
<i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085)	0.3	<1
<i>Lysinema pentapetalum</i>	0.5	2
<i>Melaleuca rigidifolia</i>	0.8	<1
<i>Melaleuca uncinata</i>	2	2
<i>Mirbelia granitica</i>	0.2	<1
<i>Neurachne alopecuroidea</i>	0.1	<1
<i>Petrophile fastigiata</i>	0.6	<1
<i>Platysace effusa</i>	0.6	<1
<i>Schoenus breviculmis</i>	0.1	<1
<i>Verticordia eriocephala</i>	0.6	<1

Q21

Staff LA/AF **Date** 23/10/2013 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 468357 mE 6309040 mN **Lat.** -33.3574 **Long.** 122.6599

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Brown sandy clay

Rock Type Nil

Loose Rock 0% cover ; **Litter** 70 % cover ; 1 cm in depth

Bare ground 15% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus dielsii*,^*Eucalyptus ?calycogona*,*Eucalyptus uncinata*^mallee shrub\6i;M
Daviesia incrassata subsp. *incrassata*,*Dodonaea stenozyga*,*Melaleuca teuthidoides*^shrub\3i;G
Microcybe albiflora,*Spyridium minutum*,*Westringia rigida*^shrub\1r

Veg. Condition Excellent

Disturbance Nil

Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.5	<1
<i>Acacia hakeoides</i>		1.4	<1
<i>Acacia sulcata</i> var. <i>platyphylla</i>		0.6	1
<i>Baeckea latens</i>		0.4	<1
<i>Comesperma calymega</i>		0.3	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		1.3	12

State Barrier Fence Esperance Extension

<i>Dodonaea stenozyga</i>		1	6
<i>Eremophila dichroantha</i>		0.3	<1
<i>Eucalyptus ?calycogona</i>		4	2
<i>Eucalyptus dielsii</i>		6	8
<i>Eucalyptus uncinata</i>		4	2
<i>Exocarpos aphyllus</i>		0.8	<1
<i>Goodenia laevis</i> subsp. <i>laevis</i>	P 3	0.2	<1
<i>Hakea commutata</i>		0.4	<1
<i>Halgania andromedifolia</i>		0.5	<1
<i>Hibbertia gracilipes</i>		0.2	<1
<i>Melaleuca calycina</i>		0.5	<1
<i>Melaleuca rigidifolia</i>		1.2	<1
<i>Melaleuca teuthidoides</i>		1.2	2
<i>Microcybe albiflora</i>		0.2	2
<i>Pultenaea ?arida</i>		0.1	<1
<i>Spyridium minutum</i>		0.1	2
<i>Westringia rigida</i>		0.2	2
<i>Wilsonia humilis</i>		0.3	<1

Q22

Staff LA/AF **Date** 23/10/2013 **Season** E

Revisit SK/AF 2/10/2014

Type Q 10 m x 10 m

Location

MGA Zone 51 467764 mE 6308622 mN **Lat.** -33.3611 **Long.** 122.6535

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Red brown sandy loam

Rock Type Nil

Loose Rock 0% cover ; **Litter** 30 % cover ; 1 cm in depth

Bare ground 20% cover **Weeds** 0% cover

Vegetation U+ ^^*Eucalyptus uncinata*,*Eucalyptus conglobata*,*Eucalyptus indurata*^mallee shrub\6\r;M
^^*Melaleuca teuthidoides*,*Daviesia incrassata* subsp. *incrassata*,*Melaleuca calycina*^shrub\3\i;G
^*Pultenaea elachista*,^*Spyridium minutum*^shrub\2\r

Veg. Condition Pristine

Disturbance Nil

Fire Age No evidence

Notes

Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.5	<1
<i>Acacia sulcata</i> var. <i>platyphylla</i>		0.5	<1
<i>Boronia inornata</i> subsp. <i>inornata</i>		0.4	<1
<i>Cassytha melantha</i>		Climber	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		1.4	10
<i>Dillwynia divaricata</i>		0.9	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus conglobata</i>	2	2
<i>Eucalyptus indurata</i>	3.5	2
<i>Eucalyptus uncinata</i>	6	5
<i>Grevillea oligantha</i>	1.1	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	1.2	<1
<i>Halgania andromedifolia</i>	0.8	<1
<i>Hibbertia gracilipes</i>	0.3	<1
<i>Hibbertia psilocarpa</i>	0.3	<1
<i>Leptomeria pachyclada</i>	1.5	<1
<i>Lissanthe rubicunda</i>	0.2	<1
<i>Melaleuca brevifolia</i>	0.6	<1
<i>Melaleuca calycina</i>	1.3	2
<i>Melaleuca hamata</i>	1.2	<1
<i>Melaleuca societatis</i>	1.5	<1
<i>Melaleuca teuthidoides</i>	1.2	10
<i>Pultenaea elachista</i>	0.8	8
<i>Spyridium minutum</i>	0.5	2

Q23

Staff LA/AF **Date** 23/10/2013 **Season** E
Revisit SK/AF 2/10/2014
Type Q 10 m x 10 m
Location Bottom of basin
MGA Zone 51 465800 mE 6306969 mN **Lat.** -33.3760 **Long.** 122.6323
Habitat Open Depression
Aspect N/A **Slope** N/A
Soil Type Grey sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 20 % cover ; 1 cm in depth
Bare ground 80% cover **Weeds** 0% cover
Vegetation M+ ^*Melaleuca subalaris*, ^*Melaleuca thyoides*^shrub\4\c;
Veg. Condition Excellent
Disturbance Possible hydrology change. maybe due to drying conditions
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Austrostipa pycnostachya</i>		0.4	<1
<i>Crassula colorata</i>		0.1	<1
<i>Hydrocotyle rugulosa</i>		0.1	<1
<i>Melaleuca fissurata</i>	P 4	0.5	<1
<i>Melaleuca subalaris</i>		3.5	25
<i>Melaleuca thyoides</i>		3	5
<i>Rhodanthe laevis</i>		0.1	<1

Q24

Staff LA/AF **Date** 23/10/2013 **Season** E

Revisit SK/AF 2/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 464403 mE 6305735 mN **Lat.** -33.3871 **Long.** 122.6173

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Grey brown sandy loam

Rock Type Nil

Loose Rock 0% cover ; **Litter** 20 % cover ; 1 cm in depth

Bare ground 50% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus uncinata*^mallee shrub\6r;M *Melaleuca teuthidoides*,*Daviesia incrassata* subsp. *incrassata*^shrub\3i;G ^*Pultenaea elachista*,^*Microcybe albiflora*^shrub\2i

Veg. Condition Pristine

Disturbance Nil

Fire Age No evidence

Notes

Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.4	<1
<i>Baeckea latens</i>		0.5	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		1.3	<1
<i>Comesperma spinosum</i>		0.2	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		1.2	5
<i>Eucalyptus tetraptera</i>		1.6	<1
<i>Eucalyptus uncinata</i>		5	3

State Barrier Fence Esperance Extension

<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)	0.1	<1
<i>Gahnia</i> sp. South West (K.L. Wilson & K. Frank K LW 9266)	0.3	<1
<i>Gompholobium baxteri</i>	1.2	<1
<i>Grevillea oligantha</i>	1.2	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	0.9	<1
<i>Hibbertia psilocarpa</i>	0.4	<1
<i>Leptomeria pachyclada</i>	1.2	<1
<i>Melaleuca bromelioides</i>	1	<1
<i>Melaleuca cucullata</i>	1.9	<1
<i>Melaleuca glaberrima</i>	1.5	<1
<i>Melaleuca teuthidoides</i>	1.8	12
<i>Microcybe albiflora</i>	0.1	5
<i>Persoonia teretifolia</i>	0.9	<1
<i>Pultenaea elachista</i>	0.5	10
<i>Spyridium minutum</i>	0.3	<1

Q25

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 497478 mE 6312646 mN **Lat.** -33.3253 **Long.** 122.9729
Habitat Crest
Aspect N/A **Slope** N/A
Soil Type Light brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 2 % cover ; 1 cm in depth
Bare ground 90% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus luculenta*,^*Eucalyptus eremophila* subsp. *eremophila*\^mallee shrub\5\r;G
^^*Boronia inornata* subsp. *leptophylla*,*Microcybe multiflora* subsp. *baccharoides*,*Melaleuca bromelioides*\^shrub\1\r
Veg. Condition Very Good
Disturbance Chaining
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		0.5	<1
<i>Acacia sorophylla</i>		0.4	<1
<i>Austrostipa flavescens</i>		0.3	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.4	5
<i>Comesperma spinosum</i>		0.5	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		1.5	2
<i>Eucalyptus luculenta</i>	P 2	1.5	2
<i>Hibbertia psilocarpa</i>		0.2	<1
<i>Leptomeria pachyclada</i>		0.6	<1
<i>Melaleuca bromelioides</i>		0.4	2
<i>Melaleuca calycina</i>		0.4	<1
<i>Melaleuca eleuterostachya</i>		1.6	<1
<i>Melaleuca teuthidoides</i>		0.6	<1
<i>Microcybe multiflora</i> subsp. <i>baccharoides</i>		0.4	2
<i>Westringia rigida</i>		0.1	<1

Q26

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit SK/AF 1/10/2014 E
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 497199 mE 6312398 mN **Lat.** -33.3276 **Long.** 122.9699
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Orange brown loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 8 % cover ; 1-3 cm in depth
Bare ground 80% cover **Weeds** 0% cover
Vegetation M+ *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus luculenta*, *Eucalyptus uncinata*^mallee shrub\5\r; G *Microcybe multiflora* subsp. *baccharoides*, *Pultenaea purpurea*, *Acacia sorophylla*^shrub\1\r
Veg. Condition Very Good
Disturbance Clearing by chaining
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia brachyclada</i>		0.2	<1
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		0.3	<1
<i>Acacia pritzeliana</i>		0.2	<1
<i>Acacia sorophylla</i>		0.4	1
<i>Austrostipa flavescens</i>		0.3	<1
<i>Boronia fabianoides</i> subsp. <i>fabianoides</i>		0.4	<1

State Barrier Fence Esperance Extension

<i>Bossiaea leptacantha</i>		0.2	<1
<i>Cooperhooikia strophiolata</i>		0.5	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		0.3	<1
<i>Dianella revoluta</i>		0.4	<1
<i>Dodonaea bursariifolia</i>		0.4	<1
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		1.5	8
<i>Eucalyptus luculenta</i>	P 2	1.3	2
<i>Eucalyptus uncinata</i>		1.2	2
<i>Goodenia concinna</i>		0.1	<1
<i>Grevillea huegelii</i>		0.2	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		0.6	<1
<i>Halgania andromedifolia</i>		0.3	<1
<i>Hibbertia psilocarpa</i>		0.2	<1
<i>Leptomeria pachyclada</i>		0.4	<1
<i>Melaleuca eleuterostachya</i>		1.2	<1
<i>Microcybe multiflora</i> subsp. <i>baccharoides</i>		0.3	1
<i>Olearia muelleri</i>		0.1	<1
<i>Pultenaea purpurea</i>		0.2	1
<i>Templetonia rossii</i>		0.8	<1
<i>Westringia rigida</i>		0.1	<1
<i>Wilsonia humilis</i>		0.2	<1

Q27

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit SK/AF 1/10/2014 E
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 496683 mE 6311950 mN **Lat.** -33.3316 **Long.** 122.9644
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 10 % cover ; 1-3 cm in depth
Bare ground 80% cover **Weeds** 0% cover
Vegetation M+ ^^*Eucalyptus eremophila* subsp. *eremophila*,*Eucalyptus luculenta*,*Eucalyptus scyphocalyx*^mallee shrub\5\r;G ^*Gahnia* sp. Ravensthorpe (G.F. Craig 5005),^*Pultenaea purpurea*^sedge,shrub\1\r
Veg. Condition Very Good
Disturbance Clearing
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		0.4	<1
<i>Acacia sorophylla</i>		0.3	<1
<i>Austrostipa flavescens</i>		0.3	<1
<i>Dianella revoluta</i>		0.4	<1
<i>Dodonaea bursariifolia</i>		0.2	<1
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		1.2	5

State Barrier Fence Esperance Extension

<i>Eucalyptus luculenta</i>	P 2	1.4	3
<i>Eucalyptus scyphocalyx</i>		1.2	1
<i>Gahnia</i> sp. Ravensthorpe (G.F. Craig 5005)		0.2	4
<i>Pultenaea purpurea</i>		0.1	2
<i>Spyridium minutum</i>		0.1	<1
<i>Westringia rigida</i>		0.1	<1
<i>Wilsonia humilis</i>		Prostrate	<1

Q28

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 496481 mE 6311782 mN **Lat.** -33.3331 **Long.** 122.9622
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Grey brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 8 % cover ; 1 cm in depth
Bare ground 45% cover **Weeds** 0% cover
Vegetation M+ ^Melaleuca teuthidoides,Eucalyptus uncinata,Eucalyptus eremophila subsp. eremophila\^shrub\3i;G ^Cyathostemon sp.,Melaleuca undulata\^shrub\2r
Veg. Condition Very Good
Disturbance Clearing
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		0.3	<1
<i>Acacia pritzeliana</i>		0.3	<1
<i>Acacia sorophylla</i>		0.3	<1
<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412)		0.2	<1
<i>Boronia inconspicua</i>		0.1	<1
<i>Cooperookia strophiolata</i>		0.3	<1
<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Cyathostemon</i> sp.	0.4	2
<i>Dianella revoluta</i>	0.3	<1
<i>Dillwynia divaricata</i>	0.3	<1
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>	1.2	2
<i>Eucalyptus uncinata</i>	1.1	2
<i>Grevillea huegelii</i>	0.2	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	0.7	<1
<i>Hibbertia psilocarpa</i>	0.2	<1
<i>Leptomeria pachyclada</i>	0.6	<1
<i>Melaleuca bromelioides</i>	0.8	<1
<i>Melaleuca eleuterostachya</i>	1.1	<1
<i>Melaleuca glaberrima</i>	0.8	<1
<i>Melaleuca hamata</i>	0.8	<1
<i>Melaleuca teuthidoides</i>	1.3	20
<i>Melaleuca undulata</i>	0.4	2
<i>Pultenaea purpurea</i>	0.1	<1
<i>Spyridium minutum</i>	0.1	<1
<i>Wilsonia humilis</i>	0.1	<1

Q29

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit SK/AF 1/10/2014 E
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 495958 mE 6311343 mN **Lat.** -33.3371 **Long.** 122.9566
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light brown clayey loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 10 % cover ; 1-3 cm in depth
Bare ground 70% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus urna*,^*Eucalyptus gracilis*^mallee shrub\5\r;G ^*Boronia inornata* subsp. *leptophylla*,^*Westringia rigida*^shrub\1\i
Veg. Condition Very Good
Disturbance Clearing
Fire Age Burnt following chaining ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia merrallii</i>		0.3	<1
<i>Austrostipa flavescens</i>		0.2	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.3	15
<i>Bossiaea leptacantha</i>		0.3	<1
<i>Eremophila dichroantha</i>		0.1	<1
<i>Eucalyptus gracilis</i>		1.2	4
<i>Eucalyptus urna</i>		1.3	4

State Barrier Fence Esperance Extension

<i>Halgania andromedifolia</i>	0.2	<1
<i>Leptomeria pachyclada</i>	0.2	<1
<i>Melaleuca teuthidoides</i>	0.7	<1
<i>Olearia muelleri</i>	1.1	<1
<i>Olearia picridifolia</i>	0.1	<1
<i>Scaevola bursariifolia</i>	0.3	<1
<i>Spyridium minutum</i>	0.1	<1
<i>Westringia rigida</i>	0.2	2

Q30

Staff LA/AF **Date** 24/10/2013 **Season** E
Revisit SK/AF 1/10/2014 E
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 495368 mE 6310823 mN **Lat.** -33.3418 **Long.** 122.9502
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Brown clay loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 6 % cover ; 1-3 cm in depth
Bare ground 75% cover **Weeds** 0% cover
Vegetation M+ ^^*Eucalyptus conglobata*,*Eucalyptus eremophila* subsp. *eremophila*,*Eucalyptus uncinata*^mallee shrub\5\i;G ^^*Acacia sorophylla*,*Pultenaea purpurea*,*Acacia pritzeliana*^shrub\1\r
Veg. Condition Very Good
Disturbance Clearing
Fire Age No evidence

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia pachypoda</i>		0.3	<1
<i>Acacia pritzeliana</i>		0.4	1
<i>Acacia sorophylla</i>		0.4	5
<i>Cooperhooikia strophiolata</i>		0.2	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>		0.6	<1
<i>Dodonaea bursariifolia</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus conglobata</i>		1.3	8
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		1.1	2
<i>Eucalyptus luculenta</i>	P 2	1	5
<i>Eucalyptus uncinata</i>		1.2	2
<i>Goodenia concinna</i>		0.1	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		0.4	<1
<i>Hakea commutata</i>		0.6	<1
<i>Halgania andromedifolia</i>		0.3	<1
<i>Hibbertia psilocarpa</i>		0.3	<1
<i>Melaleuca calycina</i>		0.7	<1
<i>Pultenaea purpurea</i>		0.2	2
<i>Spyridium minutum</i>		0.1	<1
<i>Westringia rigida</i>		0.1	<1
<i>Wilsonia humilis</i>		0.2	<1

Q31

Staff LA/AF **Date** 25/10/2013 **Season** E
Revisit SK/AF 4/10/2014
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 401561 mE 6359368 mN **Lat.** -32.8995 **Long.** 121.9474
Habitat Upper-Slope
Aspect S **Slope** Very Gentle
Soil Type Brown loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 15 % cover ; 1-5 cm in depth
Bare ground 70% cover **Weeds** 0% cover
Vegetation M+ ^*Eucalyptus conglobata*^mallee shrub\5r;G ^*Commersonia craurophylla*,^*Acacia glaucissima*,*Glischrocaryon aureum*^shrub\2i
Veg. Condition Very Good
Disturbance Clearing
Fire Age ~5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.3	4
<i>Alyxia buxifolia</i>		0.3	<1
<i>Austrostipa hemipogon</i>		0.3	<1
<i>Austrostipa variabilis</i>		0.2	<1
<i>Brachyscome ciliaris</i>		0.1	<1
<i>Commersonia craurophylla</i>		0.8	10
<i>Crassula colorata</i>		0.1	<1

State Barrier Fence Esperance Extension

<i>Cyathostemon</i> cf. <i>ambiguus</i>	0.5	<1
<i>Duboisia hopwoodii</i>	0.5	<1
<i>Eragrostis dielsii</i>	0.1	<1
<i>Eucalyptus conglobata</i>	1.2	2
<i>Euphorbia</i> sp.	0.1	<1
<i>Glischrocaryon aureum</i>	0.9	2
<i>Goodenia berardiana</i>	0.1	<1
<i>Hibbertia psilocarpa</i>	0.2	<1
<i>Lobelia cleistogamoides</i>	0.2	<1
<i>Melaleuca pauperiflora</i>	0.9	<1
<i>Melaleuca thyoides</i>	0.6	<1
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>	0.5	<1
<i>Olearia exiguifolia</i>	0.6	<1
<i>Olearia muelleri</i>	0.3	<1
<i>Podolepis capillaris</i>	0.1	<1
<i>Podolepis tepperi</i>	0.1	<1
<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>	0.1	<1
<i>Ptilotus humilis</i>	0.1	<1
<i>Ptilotus spathulatus</i>	0.2	<1
<i>Rytidosperma setaceum</i>	0.2	<1
<i>Sclerolaena parviflora</i>	0.1	<1
<i>Thelymitra</i> sp.	0.1	<1
<i>Thysanotus manglesianus</i>	0.1	<1
<i>Wahlenbergia preissii</i>	0.2	<1
<i>Waitzia suaveolens</i> var. <i>flava</i>	0.1	<1

Q32

Staff LA/AF **Date** 25/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 401661 mE 6359715 mN **Lat.** -32.8963 **Long.** 121.9485
Habitat Crest
Aspect N **Slope** Very Gentle
Soil Type Brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 5 % cover ; 1 cm in depth
Bare ground 75% cover **Weeds** <1% cover
Vegetation M+ ^*Eucalyptus conglobata*^mallee shrub\5\r;G ^*Acacia glaucissima*,^*Commersonia
craurophylla*,*Glischrocaryon aureum*^shrub,forb\2li
Veg. Condition Very Good
Disturbance Clearing
Fire Age 5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.4	5
<i>Aristida contorta</i>		0.1	<1
<i>Austrostipa variabilis</i>		0.3	<1
<i>Cassytha melantha</i>		Climber	<1
<i>Comesperma calcicola</i>	P 3	0.2	<1
<i>Commersonia craurophylla</i>		1	2
<i>Eucalyptus conglobata</i>		1.4	5

State Barrier Fence Esperance Extension

<i>Eucalyptus</i> sp.	0.6	<1
<i>Exocarpos aphyllus</i>	0.5	<1
<i>Glischrocaryon aureum</i>	0.5	2
<i>Goodenia berardiana</i>	0.1	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	0.4	<1
<i>Hibbertia psilocarpa</i>	0.2	<1
<i>Hybanthus epacroides</i>	0.3	<1
* <i>Hypochaeris glabra</i>	0.1	<1
<i>Lobelia cleistogamoides</i>	0.2	<1
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>	0.5	<1
<i>Melaleuca undulata</i>	0.5	<1
<i>Olearia muelleri</i>	0.3	<1
<i>Phebalium lepidotum</i>	0.3	<1
<i>Pimelea erecta</i>	0.7	<1
<i>Podolepis capillaris</i>	0.1	<1
<i>Podotheca angustifolia</i>	0.1	<1
<i>Rytidosperma setaceum</i>	0.3	1
<i>Trachymene cyanopetala</i>	0.2	<1
<i>Waitzia suaveolens</i> var. <i>flava</i>	0.2	<1

Q33

Staff LA/AF **Date** 25/10/2013 **Season** E
Revisit SK/AF 4/10/2014
Type Q 10 m x 10 m
Location In chained area
MGA Zone 51 401812 mE 6360157 mN **Lat.** -32.8924 **Long.** 121.9502
Habitat Mid-Slope
Aspect S **Slope** Very Gentle
Soil Type Brown sandy loam
Rock Type Nil
Loose Rock 0% cover ; **Litter** 5 % cover ; 1-3 cm in depth
Bare ground 70% cover **Weeds** 0% cover
Vegetation G+ *Commersonia kraurophylla*, *Acacia glaucissima*, *Austrostipa variabilis* shrub, tussock grass
Veg. Condition Very Good
Disturbance Clearing
Fire Age 5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.4	3
<i>Alyxia buxifolia</i>		0.6	<1
<i>Austrostipa variabilis</i>		0.4	2
<i>Comesperma integerrimum</i>		0.2	<1
<i>Commersonia kraurophylla</i>		0.8	20
<i>Cyathostemon</i> cf. <i>ambiguus</i>		0.4	<1
<i>Eragrostis dielsii</i>		0.1	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus conglobata</i>	0.7	<1
<i>Glischrocaryon aureum</i>	0.4	<1
<i>Goodenia berardiana</i>	0.2	<1
<i>Helichrysum leucopsideum</i>	0.1	<1
<i>Hibbertia psilocarpa</i>	0.3	<1
<i>Lobelia cleistogamoides</i>	0.1	<1
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>	0.4	<1
<i>Melaleuca pauperiflora</i>	0.3	<1
<i>Muehlenbeckia diclina</i> subsp. <i>diclina</i>	0.3	<1
<i>Olearia exiguifolia</i>	0.5	<1
<i>Olearia muelleri</i>	0.3	<1
<i>Podolepis capillaris</i>	0.1	<1
<i>Ptilotus gaudichaudii</i> subsp. <i>eremita</i>	0.1	<1
<i>Ptilotus humilis</i>	0.1	<1
<i>Ptilotus spathulatus</i>	0.1	<1
<i>Rytidosperma setaceum</i>	0.3	<1
<i>Scaevola spinescens</i>	0.3	<1
<i>Sclerolaena parviflora</i>	0.1	<1
<i>Solanum hoplopetalum</i>	0.1	<1
<i>Waitzia suaveolens</i> var. <i>flava</i>	0.2	<1

Q34

Staff SK/RD **Date** 8/10/2013 **Season** E
Revisit SK/AF 8/10/2014
Type Q 10 m x 10 m
Location
MGA Zone 51 280479 mE 6296533 mN **Lat.** -33.4482 **Long.** 120.6383
Habitat Mid-Slope
Aspect SE **Slope** Gentle
Soil Type Light brown sand
Rock Type Quartz and conglomerate
Loose Rock 2-10% cover ; 6-60 mm in size **Litter** 5 % cover ; 0-4 cm in depth
Bare ground 90% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus platypus* subsp. *platypus*,*Eucalyptus flocktoniae*^tree\6r;M ^*Gastrolobium musaceum*,*Daviesia argillacea*,*Exocarpos sparteus*^shrub\3i;G ^*Grevillea pectinata*,*Pultenaea craigiana*,*Dampiera angulata* subsp. *Peak Charles* (K.R. Newbey 5402)^shrub,forb\1r
Veg. Condition Excellent
Disturbance Scrub rolling
Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucoptera</i>		0.3	<1
<i>Acacia octonervia</i>		0.3	<1
<i>Acacia patagiata</i>		1	<1
<i>Boronia inconspicua</i>		0.4	<1
<i>Cassutha melantha</i>		Cl	<1
<i>Cooperhooikia polygalacea</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Dampiera angulata</i> subsp. Peak Charles (K.R. Newbey 5402)	0.3	1
<i>Daviesia argillacea</i>	1	5
<i>Eucalyptus flocktoniae</i>	4	2
<i>Eucalyptus platypus</i> subsp. <i>platypus</i>	4	5
<i>Exocarpos aphyllus</i>	0.6	<1
<i>Exocarpos sparteus</i>	2	2
<i>Gastrolobium musaceum</i>	1.2	8
<i>Grevillea pectinata</i>	0.5	3
<i>Melaleuca hamata</i>	0.7	<1
<i>Pultenaea craigiana</i>	P 3 0.3	1

Q35

Staff SK/RD **Date** 8/10/2013 **Season** E

Revisit SK/AF 8/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 280146 mE 6296105 mN **Lat.** -33.4520 **Long.** 120.6346

Habitat Mid-Slope

Aspect SE **Slope** Very Gentle

Soil Type Cream sand

Rock Type Quartz

Loose Rock 2-10% cover ; 2-60 mm in size **Litter** 5 % cover ; 0-2 cm in depth

Bare ground 90% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus platypus* subsp. *platypus*,*Eucalyptus flocktoniae*^tree\6r;M ^*Exocarpos aphyllus*,
Daviesia argillacea,*Acacia glaucoptera*^shrub\3i;G ^*Pultenaea adunca*,*Coopernookia polygalacea*,*Dodonaea glandulosa*^shrub\1r

Veg. Condition Excellent

Disturbance Scrub rolling

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucoptera</i>		1	3
<i>Cassythra melantha</i>		Vine	<1
<i>Coopernookia polygalacea</i>		0.3	2
<i>Daviesia argillacea</i>		1.2	4
<i>Dodonaea glandulosa</i>		0.4	2
<i>Dodonaea pinifolia</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus flocktoniae</i>		2	2
<i>Eucalyptus platypus</i> subsp. <i>platypus</i>		2	5
<i>Exocarpos aphyllus</i>		1.2	8
<i>Exocarpos sparteus</i>		3	2
<i>Hakea commutata</i>		0.7	<1
<i>Hibbertia psilocarpa</i>		0.3	<1
<i>Melaleuca societatis</i>		0.6	<1
<i>Melaleuca torquata</i>		1.5	<1
<i>Melaleuca ulicoides</i>		1	<1
<i>Pultenaea adunca</i>	P 3	0.4	3

Q36

Staff SK/RD **Date** 12/10/2013 **Season** E

Revisit

Type Q 10 m x 10 m

Location Cheadanup Nature Reserve

MGA Zone 51 279704 mE 6295484 mN **Lat.** -33.4575 **Long.** 120.6297

Habitat Low rise

Aspect SW **Slope** Very Gentle

Soil Type Cream sand

Rock Type Quartz

Loose Rock 2-10, % cover ; 2-60 mm in size **Litter** 2 % cover ; 1-2 cm in depth

Bare ground 35% cover **Weeds** 0% cover

Vegetation U ^*Eucalyptus pleurocarpa*^tree\6\bi;M ^*Melaleuca hamata*,^*Exocarpos sparteus*^shrub\3\;G+ ^*Beaufortia schaueri*,^*Melaleuca tuberculata* var. *macrophylla*^shrub\1\i

Veg. Condition Excellent

Disturbance Fire and old scrub rolling

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia gonophylla</i>		0.3	<1
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		0.3	<1
<i>Amphipogon turbinatus</i>		0.3	<1
<i>Beaufortia schaueri</i>		0.4	10
<i>Calothamnus gibbosus</i>		0.4	<1
<i>Calytrix leschenaultii</i>		0.3	<1
<i>Cassytha glabella</i>		Vine	<1

State Barrier Fence Esperance Extension

<i>Conostylis argentea</i>	0.1	<1
<i>Dampiera lavandulacea</i>	0.2	<1
<i>Daviesia lancifolia</i>	0.3	4
<i>Daviesia pachyphylla</i>	0.3	<1
<i>Eucalyptus pleurocarpa</i>	2	2
<i>Eucalyptus uncinata</i>	1.5	2
<i>Exocarpos sparteus</i>	1.5	1
<i>Gastrolobium nutans</i>	0.4	4
<i>Gompholobium baxteri</i>	0.4	<1
<i>Gompholobium confertum</i>	0.3	<1
<i>Goodenia trichophylla</i>	0.1	<1
<i>Grevillea disjuncta</i>	0.3	<1
<i>Grevillea nudiflora</i>	0.6	2
<i>Hakea nitida</i>	1.2	<1
<i>Hemigenia teretiuscula</i>	0.2	<1
<i>Hibbertia gracilipes</i>	0.2	<1
<i>Kunzea jucunda</i>	0.3	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>	0.3	8
<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)	0.25	<1
<i>Leucopogon fimbriatus</i>	0.3	2
<i>Leucopogon</i> sp. Newdegate (M. Hislop 3585)	0.25	<1
<i>Lomandra mucronata</i>	0.15	<1
<i>Lysinema pentapetalum</i>	0.5	<1
<i>Melaleuca hamata</i>	1	2
<i>Melaleuca societatis</i>	0.5	<1
<i>Melaleuca subfalcata</i>	0.3	<1
<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>	0.4	5
<i>Neurachne alopecuroidea</i>	0.1	<1
<i>Persoonia helix</i>	0.4	<1
<i>Petrophile fastigiata</i>	0.8	<1
<i>Schoenus racemosus</i>	0.1	<1
<i>Schoenus sesquispiculus</i>	0.05	<1
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)	0.05	<1
<i>Stylidium involucreatum</i>	0.2	<1
<i>Stylidium piliferum</i>	0.05	<1
<i>Verticordia chrysantha</i>	0.4	<1

Q37

Staff SK/RD **Date** 12/10/2013 **Season** E
Revisit SK/AF 8/10/2014 E
Type Q 10 m x 10 m
Location
MGA Zone 51 279445 mE 6295133 mN **Lat.** -33.4606 **Long.** 120.6269
Habitat Drainage
Aspect NW **Slope** Very Gentle
Soil Type Cream clay sand
Rock Type Quartz and various other stones
Loose Rock 2-10% cover ; 2-20 mm in size **Litter** 25 % cover ; 1-5 cm in depth
Bare ground 65% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus sporadica*, ^*Eucalyptus clivicola*^tree mallee,tree\6\c;M ^^*Baeckea pachyphylla*,
Melaleuca eurystoma,*Melaleuca hamata*^shrub\3\i;G ^*Lepidosperma tuberculatum*, ^*Tetraria* sp.
Mt Madden (C.D. Turley 40 BP/897)\^sedge\2\i
Veg. Condition Excellent
Disturbance Fire and old scrub rolling
Fire Age <10 years
Notes East west facing



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>		0.5	<1
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		0.5	<1
<i>Astroloma serratifolium</i>		0.3	<1
<i>Austrostipa hemipogon</i>		0.6	<1
<i>Baeckea pachyphylla</i>		1.5	8
<i>Beaufortia schaueri</i>		0.6	<1

State Barrier Fence Esperance Extension

<i>Boronia inconspicua</i>	0.4	<1
<i>Callitris roei</i>	1	<1
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>	0.8	<1
<i>Calytrix leschenaultii</i>	0.4	<1
<i>Cheiranthra filifolia</i>	0.4	<1
<i>Dampiera angulata</i> subsp. <i>angulata</i>	0.4	<1
<i>Dampiera lavandulacea</i>	0.3	<1
<i>Dianella brevicaulis</i>	0.3	<1
<i>Dodonaea caespitosa</i>	0.4	<1
<i>Eucalyptus clivicola</i>	4	5
<i>Eucalyptus sporadica</i>	5	10
<i>Eucalyptus uncinata</i>	1.5	<1
<i>Exocarpos sparteus</i>	2	2
<i>Gahnia ancistrophylla</i>	0.4	<1
<i>Gastrolobium nutans</i>	1.2	<1
<i>Grevillea nudiflora</i>	0.4	<1
<i>Hakea laurina</i>	2.5	4
<i>Hakea nitida</i>	1	<1
<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)	0.5	<1
<i>Kunzea jucunda</i>	1	2
<i>Lasiopetalum compactum</i>	0.3	<1
<i>Lasiopetalum rosmarinifolium</i>	0.5	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>	0.4	5
<i>Lepidosperma</i> sp. Bandalup Scabrid (N. Eveleigh 10798)	0.6	2
<i>Lepidosperma tuberculatum</i>	0.4	5
<i>Leucopogon concinnus</i>	0.5	<1
<i>Leucopogon fimbriatus</i>	0.5	<1
<i>Leucopogon</i> sp. Newdegate (M. Hislop 3585)	0.4	<1
<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>	0.5	<1
<i>Melaleuca eurystoma</i>	1	10
<i>Melaleuca glaberrima</i>	0.6	5
<i>Melaleuca hamata</i>	1	5
<i>Melaleuca societatis</i>	0.5	<1
<i>Melaleuca subfalcata</i>	0.6	<1
<i>Neurachne alopecuroidea</i>	0.05	<1
<i>Opercularia vaginata</i>	0.2	<1
<i>Petrophile fastigiata</i>	0.6	<1
<i>Rinzia communis</i>	0.3	<1
<i>Tetraria</i> sp. Mt Madden (C.D. Turley 40 BP/897)	0.15	3

Q38

Staff SK/RD **Date** 12/10/2013 **Season** E

Revisit SK/AF 8/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 279323 mE 6295023 mN **Lat.** -33.4615 **Long.** 120.6255

Habitat Low rise

Aspect N **Slope** Very Gentle

Soil Type Cream sandy loam

Rock Type Quartz

Loose Rock 2-10% cover ; 2-60 mm in size **Litter** 15 % cover ; 1-5 cm in depth

Bare ground 40% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus phaenophylla* subsp. *interjacens*, ^*Eucalyptus pleurocarpa* ^tree\6\r; M ^*Melaleuca hamata*, ^*Exocarpos sparteus* ^shrub\3\r; G ^^*Melaleuca rigidifolia*, *Leucopogon fimbriatus*, *Melaleuca glaberrima* ^shrub\2\c

Veg. Condition Excellent

Disturbance Fire and recent scrub rolling

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia curvata</i>		0.5	<1
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		0.3	<1
<i>Amphipogon turbinatus</i>		0.4	<1
<i>Argentipallium niveum</i>		0.2	<1
<i>Baeckea pachyphylla</i>		1	<1
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Calytrix leschenaultii</i>	0.3	<1
<i>Cassytha glabella</i>	Vine	<1
<i>Cheiranthra filifolia</i>	0.1	<1
<i>Conostylis argentea</i>	0.1	<1
<i>Dampiera angulata</i> subsp. <i>angulata</i>	0.3	<1
<i>Daviesia lancifolia</i>	0.4	2
<i>Eucalyptus phaenophylla</i> subsp. <i>interjacens</i>	2	2
<i>Eucalyptus pleurocarpa</i>	4	2
<i>Eucalyptus uncinata</i>	2	2
<i>Exocarpos sparteus</i>	2	1
<i>Gahnia ancistrophylla</i>	0.1	2
<i>Gastrolobium nutans</i>	0.4	5
<i>Gompholobium baxteri</i>	0.4	<1
<i>Gompholobium confertum</i>	0.4	<1
<i>Grevillea disjuncta</i>	0.4	<1
<i>Grevillea nudiflora</i>	0.5	<1
<i>Hakea marginata</i>	0.6	<1
<i>Hemigenia teretiuscula</i>	0.4	<1
<i>Hibbertia gracilipes</i>	0.3	<1
<i>Hibbertia pungens</i>	0.4	<1
<i>Isotropis drummondii</i>	0.3	<1
<i>Laxmannia paleacea</i>	0.3	<1
<i>Lepidosperma</i> aff. <i>brunonianum</i>	0.2	2
<i>Lepidosperma tuberculatum</i>	0.3	1
<i>Leucopogon concinnus</i>	0.4	<1
<i>Leucopogon fimbriatus</i>	0.5	10
<i>Leucopogon</i> sp. Newdegate (M. Hislop 3585)	0.3	<1
<i>Leucopogon tamminensis</i> var. <i>australis</i>	0.2	<1
<i>Lomandra micrantha</i> subsp. <i>teretifolia</i>	0.3	<1
<i>Lysinema pentapetalum</i>	0.4	<1
<i>Melaleuca glaberrima</i>	0.4	10
<i>Melaleuca hamata</i>	1	2
<i>Melaleuca rigidifolia</i>	0.5	15
<i>Neurachne alopecuroidea</i>	0.4	<1
<i>Pimelea imbricata</i> var. <i>piliger</i>	0.2	<1
<i>Schoenus sesquispiculus</i>	0.1	<1
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)	0.15	<1
<i>Spyridium cordatum</i>	0.3	<1
<i>Stylidium piliferum</i>	0.05	<1
<i>Thomasia microphylla</i>	0.3	<1
<i>Verticordia acerosa</i> var. <i>preissii</i>	0.5	<1
<i>Verticordia chrysantha</i>	0.4	<1

Q39

Staff SK/RD **Date** 12/10/2013 **Season** E

Revisit SK/AF 8/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 278916 mE 6294404 mN **Lat.** -33.4670 **Long.** 120.6210

Habitat Low rise

Aspect NW **Slope** Very Gentle

Soil Type Grey brown clay loam

Rock Type Granite

Loose Rock 20-50% cover ; 2-2000 mm in size **Litter** 15 % cover ; 1-10 cm in depth

Bare ground 10% cover **Weeds** 0% cover

Vegetation M+ *Calothamnus quadrifidus* subsp. *quadrifidus*, *Acacia assimilis* subsp. *atroviridis*, *Grevillea teretifolia* \^shrub\3i; G *Acacia pinguiculosa* subsp. *teretifolia*, *Cryptandra graniticola*, *Lepidosperma rigidulum* \^shrub, sedge\2c

Veg. Condition Excellent

Disturbance Fire and scrub rolling

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia assimilis</i> subsp. <i>atroviridis</i>		1.2	5
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		0.5	25
<i>Allocasuarina campestris</i>		1	2
<i>Amphipogon turbinatus</i>		0.4	<1
<i>Astroloma serratifolium</i>		0.3	3
<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>		1	5

State Barrier Fence Esperance Extension

<i>Calytrix leschenaultii</i>	0.3	2
<i>Cassytha glabella</i>	Vine	<1
<i>Chorizema aciculare</i> subsp. <i>aciculare</i>	0.2	<1
<i>Conostylis argentea</i>	0.1	<1
<i>Cryptandra graniticola</i>	0.5	15
<i>Dampiera lavandulacea</i>	0.3	<1
<i>Dampiera sacculata</i>	0.2	<1
<i>Daviesia pachyphylla</i>	1	2
<i>Dodonaea caespitosa</i>	0.4	<1
<i>Goodenia scapigera</i> subsp. <i>scapigera</i>	0.6	<1
<i>Grevillea disjuncta</i>	0.4	<1
<i>Grevillea nudiflora</i>	1	2
<i>Grevillea teretifolia</i>	1	2
<i>Hibbertia pungens</i>	0.5	<1
<i>Kunzea affinis</i>	0.5	<1
<i>Lepidosperma rigidulum</i>	0.5	5
<i>Leptospermum maxwellii</i>	1	2
<i>Leucopogon brevicuspis</i>	0.4	<1
<i>Leucopogon cuneifolius</i>	0.5	<1
<i>Leucopogon fimbriatus</i>	0.3	<1
<i>Lysinema pentapetalum</i>	0.5	<1
<i>Melaleuca glaberrima</i>	0.5	5
<i>Melaleuca sapientes</i>	0.6	<1
<i>Melaleuca societatis</i>	0.6	<1
<i>Neurachne alopecuroidea</i>	0.3	<1
<i>Opercularia vaginata</i>	0.3	<1
<i>Petrophile fastigiata</i>	0.6	<1
<i>Pimelea imbricata</i> var. <i>piligera</i>	0.3	<1
<i>Santalum acuminatum</i>	1	<1
<i>Schoenus breviculmis</i>	0.05	<1
<i>Spartochloa scirpoidea</i>	1	<1
<i>Thryptomene australis</i> subsp. <i>brachyandra</i>	0.7	<1
<i>Verticordia chrysantha</i>	0.4	<1

Q40

Staff SK/RD **Date** 12/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location Cheadanup Nature Reserve
MGA Zone 51 279001 mE 6294553 mN **Lat.** -33.4657 **Long.** 120.6219
Habitat Slightly elevated in undulating landscape
Aspect N **Slope** Gentle
Soil Type Light brown clay loam
Rock Type Granite
Loose Rock 20-50% cover ; 20-200 mm in size **Litter** 10 % cover ; 0-4 cm in depth
Bare ground 50% cover **Weeds** 0% cover
Vegetation M ^*Acacia assimilis* subsp. *atroviridis*, ^*Kunzea affinis*^shrub\3i;G+ ^^*Cryptandra granitica*,
Lepidosperma rigidulum, *Acacia pinguiculosa* subsp. *teretifolia*^shrub,sedge\1c
Veg. Condition Excellent
Disturbance Old scrub rolling
Fire Age ~10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>		0.4	<1
<i>Acacia assimilis</i> subsp. <i>atroviridis</i>		1.5	5
<i>Acacia pinguiculosa</i> subsp. <i>teretifolia</i>		0.5	5
<i>Allocasuarina campestris</i>		0.8	2
<i>Amphipogon turbinatus</i>		0.3	<1
<i>Astroloma serratifolium</i>		0.3	<1
<i>Brachyloma geissoloma</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>	1	2
<i>Calytrix leschenaultii</i>	0.3	2
<i>Cryptandra graniticola</i>	0.4	15
<i>Daviesia pachyphylla</i>	1	1
<i>Dodonaea caespitosa</i>	0.5	<1
<i>Grevillea teretifolia</i>	0.6	3
<i>Kunzea affinis</i>	1.5	2
<i>Lepidosperma drummondii</i>	0.3	<1
<i>Lepidosperma rigidulum</i>	0.5	10
<i>Leptospermum maxwellii</i>	1	<1
<i>Leucopogon concinnus</i>	0.5	<1
<i>Leucopogon cuneifolius</i>	0.4	<1
<i>Leucopogon tamminensis</i> var. <i>australis</i>	0.4	<1
<i>Melaleuca eurystoma</i>	0.5	<1
<i>Melaleuca glaberrima</i>	0.4	<1
<i>Melaleuca hamata</i>	1	10
<i>Neurachne alopecuroidea</i>	0.3	<1
<i>Opercularia vaginata</i>	0.4	<1
<i>Pimelea imbricata</i> var. <i>piliger</i>	0.2	<1
<i>Platysace effusa</i>	0.5	2
<i>Schoenus breviculmis</i>	0.05	2
<i>Spartochloa scirpoidea</i>	0.6	<1
<i>Stylidium dichotomum</i>	0.05	<1
<i>Thryptomene australis</i> subsp. <i>brachyandra</i>	0.5	2
<i>Thysanotus ?patersonii</i>	0.3	<1
<i>Verticordia acerosa</i> var. <i>preissii</i>	0.5	<1

Q41

Staff SK/RD **Date** 12/10/2013 **Season** E

Revisit SK/AF 8/10/2014 E

Type Q 10 m x 10 m

Location

MGA Zone 51 278668 mE 6294097 mN **Lat.** -33.4697 **Long.** 120.6182

Habitat Low rise

Aspect NE **Slope** Very Gentle

Soil Type Cream sandy loam

Rock Type Quartz

Loose Rock 10-20% cover ; 2-20 mm in size **Litter** 10 % cover ; 1-2 cm in depth

Bare ground 35% cover **Weeds** 0% cover

Vegetation U+ ^^*Eucalyptus phaenophylla* subsp. *interjacens*, *Eucalyptus pleurocarpa*, *Exocarpos sparteus*^tree\6\r;G ^^*Melaleuca rigidifolia*, *Daviesia lancifolia*, *Gompholobium baxteri*^shrub\2\c

Veg. Condition Excellent

Disturbance Fire and scrub rolling

Fire Age <10 years

Notes

Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia curvata</i>		0.6	<1
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i>		0.5	<1
<i>Amphipogon avenaceus</i>		0.3	<1
<i>Amphipogon turbinatus</i>		0.2	<1
<i>Anthotium humile</i>		0.1	<1
<i>Argentipallium niveum</i>		0.3	<1
<i>Banksia media</i>		0.4	<1

State Barrier Fence Esperance Extension

<i>Beaufortia schaueri</i>	0.6	1
<i>Calothamnus gibbosus</i>	0.6	<1
<i>Cassytha glabella</i>	Vine	<1
<i>Daviesia lancifolia</i>	1	5
<i>Eucalyptus phaenophylla</i> subsp. <i>interjacens</i>	1.5	3
<i>Eucalyptus pleurocarpa</i>	2.5	3
<i>Exocarpos sparteus</i>	2.5	1
<i>Gahnia ancistrophylla</i>	0.3	3
<i>Gompholobium baxteri</i>	0.5	1
<i>Gompholobium confertum</i>	0.5	<1
<i>Gompholobium marginatum</i>	0.2	<1
<i>Goodenia concinna</i>	0.1	<1
<i>Goodenia trichophylla</i>	0.2	<1
<i>Grevillea nudiflora</i>	0.5	<1
<i>Grevillea oligantha</i>	0.5	<1
<i>Hibbertia gracilipes</i>	0.3	<1
<i>Hibbertia pungens</i>	0.4	<1
<i>Lasiopetalum rosmarinifolium</i>	0.5	<1
<i>Laxmannia paleacea</i>	0.1	<1
<i>Lomandra micrantha</i> subsp. <i>teretifolia</i>	0.3	<1
<i>Lysinema pentapetalum</i>	0.5	<1
<i>Melaleuca rigidifolia</i>	0.5	30
<i>Melaleuca subfalcata</i>	0.5	<1
<i>Microcorys glabra</i> var. <i>glabra</i>	0.2	<1
<i>Neurachne alopecuroidea</i>	0.3	<1
<i>Olearia ciliata</i>	0.3	<1
<i>Pimelea imbricata</i> var. <i>piliger</i>	0.1	<1
<i>Platysace effusa</i>	0.3	<1
<i>Pultenaea indira</i> subsp. <i>indira</i>	0.3	<1
<i>Schoenus obtusifolius</i>	0.2	<1
<i>Schoenus racemosus</i>	0.2	<1
<i>Schoenus sesquispiculus</i>	0.05	<1
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)	0.1	<1
<i>Spyridium cordatum</i>	0.3	1
<i>Stylidium piliferum</i>	0.1	<1
<i>Templetonia rossii</i>	0.4	<1
<i>Tetrapora verrucosa</i>	1	<1

Q42

Staff SK/RD **Date** 14/10/2013 **Season** E

Revisit SK/AF 7/10/2014

Type Q 10 m x 10 m

Location

MGA Zone 51 323595 mE 6318944 mN **Lat.** -33.2541 **Long.** 121.1063

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light grey brown sandy clay loam

Rock Type Nil

Loose Rock 0% cover ; **Litter** 20 % cover ; 0-5 cm in depth

Bare ground 50% cover **Weeds** 0% cover

Vegetation U ^*Eucalyptus eremophila* subsp. *eremophila*^tree\6i;M+ ^^*Melaleuca sapientes*,*Melaleuca societatis*,*Melaleuca podiocarpa*^shrub\3c;G ^^*Comesperma spinosum*,*Aotus* sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412),*Eutaxia lutea*^shrub\1r

Veg. Condition Excellent

Disturbance Scrub rolling

Fire Age

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia binata</i>		0.4	<1
<i>Acacia mutabilis</i> subsp. <i>mutabilis</i>		1.5	<1
<i>Aotus</i> sp. Southern Wheatbelt (C.A. Gardner & W.E. Blackall 1412)		0.2	2
<i>Boronia baeckeacea</i> subsp. <i>baeckeacea</i>		0.4	<1
<i>Comesperma spinosum</i>		0.4	4
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.8	<1

State Barrier Fence Esperance Extension

<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>	2	2
<i>Eucalyptus flocktoniae</i>	2	8
<i>Eucalyptus uncinata</i>	2	8
<i>Eutaxia lutea</i>	0.15	1
<i>Grevillea pectinata</i>	1	1
<i>Hakea commutata</i>	0.8	<1
<i>Hibbertia psilocarpa</i>	0.4	<1
<i>Logania stenophylla</i>	0.4	<1
<i>Melaleuca glaberrima</i>	1.2	2
<i>Melaleuca hamata</i>	0.8	<1
<i>Melaleuca podiocarpa</i>	1.4	5
<i>Melaleuca sapientes</i>	1.4	25
<i>Melaleuca societatis</i>	1.4	15
<i>Microcorys glabra</i> var. <i>glabra</i>	0.3	<1
<i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i>	0.3	<1

Q43

Staff SK/RD **Date** 14/10/2013 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 321599 mE 6318230 mN **Lat.** -33.2602 **Long.** 121.0847

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light grey brown sandy clay loam

Rock Type Quartz

Loose Rock <2% cover ; **Litter** 15 % cover ; 0-4 cm in depth

Bare ground 60% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus eremophila* subsp. *eremophila*, ^*Eucalyptus phenax* subsp. *phenax*^tree\6i;G
^^*Melaleuca societatis*, *Grevillea pectinata*, *Daviesia campephylla*^shrub\2i

Veg. Condition Excellent

Disturbance Scrub rolling (more so than other sites)

Fire Age

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia binata</i>		0.4	3
<i>Acacia crassuloides</i>		0.3	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.3	5
<i>Comesperma spinosum</i>		0.3	<1
<i>Daviesia campephylla</i>		0.5	8
<i>Dillwynia divaricata</i>		0.5	<1
<i>Eucalyptus eremophila</i> subsp. <i>eremophila</i>		3	7

State Barrier Fence Esperance Extension

<i>Eucalyptus phenax</i> subsp. <i>phenax</i>	3	7
<i>Eucalyptus platypus</i>	1.5	<1
<i>Grevillea pectinata</i>	0.5	5
<i>Hakea commutata</i>	0.5	<1
<i>Halgania andromedifolia</i>	0.5	<1
<i>Hibbertia psilocarpa</i>	0.4	<1
<i>Logania stenophylla</i>	0.4	<1
<i>Melaleuca hamata</i>	0.4	<1
<i>Melaleuca lateriflora</i>	0.5	<1
<i>Melaleuca marginata</i>	0.5	<1
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>	1	<1
<i>Melaleuca sapientes</i>	0.2	<1
<i>Melaleuca societatis</i>	0.5	10
<i>Microcorys glabra</i> var. <i>glabra</i>	0.3	<1
<i>Pultenaea ?arida</i>	0.4	<1
<i>Spyridium minutum</i>	0.2	<1
<i>Westringia dampieri</i>	0.3	<1

Q44

Staff SK/RD **Date** 15/10/2013 **Season** E
Revisit SK/AF 7/10/2014
Type Q 10 m x 10 m
Location
MGA Zone 51 322927 mE 6318711 mN **Lat.** -33.2561 **Long.** 121.0991
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light grey brown sandy clay loam
Rock Type Quartz
Loose Rock <2% cover ; 6-20 mm in size **Litter** 15 % cover ; 0-10 cm in depth
Bare ground 75% cover **Weeds** 0% cover
Vegetation U+ ^*Eucalyptus indurata*^tree\6r;G ^^*Melaleuca pauperiflora* subsp. *pauperiflora*,*Melaleuca strobophylla*,*Grevillea pectinata*^shrub\2c
Veg. Condition Excellent
Disturbance Scrub rolling
Fire Age <10 years
Notes Logs and burnt stags in quadrat



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia binata</i>		0.5	2
<i>Acacia crassuloides</i>		0.5	5
<i>Acacia deficiens</i>		0.4	<1
<i>Cassytha glabella</i>		Vine	<1
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.4	<1
<i>Eucalyptus indurata</i>		2	5
<i>Eucalyptus valens</i>		1.5	1

State Barrier Fence Esperance Extension

<i>Exocarpos sparteus</i>	1	<1
<i>Grevillea pectinata</i>	0.5	5
<i>Melaleuca cucullata</i>	0.6	<1
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>	0.6	10
<i>Melaleuca podiocarpa</i>	0.8	<1
<i>Melaleuca strobophylla</i>	0.5	10
<i>Pultenaea ?arida</i>	0.4	<1
<i>Westringia dampieri</i>	0.3	5

Q45

Staff SK/RD **Date** 15/10/2013 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 321963 mE 6318412 mN **Lat.** -33.2586 **Long.** 121.0887

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light grey brown sandy loam

Rock Type Quartz

Loose Rock <2% cover ; 2-20 mm in size **Litter** 15 % cover ; 1-10 cm in depth

Bare ground 65% cover **Weeds** 0% cover

Vegetation U+ ^*Eucalyptus indurata*,^*Eucalyptus phenax* subsp. *phenax*,*Eucalyptus flocktoniae*^tree\6\r;G
^^*Melaleuca pauperiflora* subsp. *pauperiflora*,*Acacia crassuloides*,*Daviesia benthamii* subsp.
acanthoclona^shrub\2\i

Veg. Condition Very Good

Disturbance Scrub rolling

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia crassuloides</i>		0.5	10
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.3	3
<i>Cassytha glabella</i>		Vine	1
<i>Comesperma spinosum</i>		0.3	<1
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		0.5	10
<i>Daviesia campephylla</i>		0.3	2

State Barrier Fence Esperance Extension

<i>Dodonaea stenozyga</i>		0.4	<1
<i>Eremophila chamaephila</i>	P 3	0.25	2
<i>Eucalyptus flocktoniae</i>		2	1
<i>Eucalyptus indurata</i>		3	2
<i>Eucalyptus phenax</i> subsp. <i>phenax</i>		2	2
<i>Exocarpos aphyllus</i>		0.3	<1
<i>Grevillea pectinata</i>		0.5	2
<i>Halgania andromedifolia</i>		0.4	<1
<i>Hibbertia psilocarpa</i>		0.4	<1
<i>Melaleuca cucullata</i>		0.5	2
<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>		0.6	10
<i>Melaleuca podiocarpa</i>		0.5	<1
<i>Melaleuca societatis</i>		0.3	<1
<i>Melaleuca strobophylla</i>		0.4	<1
<i>Microcybe multiflora</i> subsp. <i>multiflora</i>		0.4	3
<i>Pultenaea ?arida</i>		0.3	<1
<i>Spyridium minutum</i>		0.2	1
<i>Westringia dampieri</i>		0.3	2

Q46

Staff SK/RD **Date** 28/10/2013 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 522793 mE 6267894 mN **Lat.** -33.7287 **Long.** 123.2460
Habitat Sandplain
Aspect N/A **Slope** N/A
Soil Type Light grey sand
Rock Type Nil
Loose Rock 0% cover ; 2-6 mm in size **Litter** 10 % cover ; 1-2 cm cm in depth
Bare ground 40% cover **Weeds** 0% cover
Vegetation M+ ^*Hakea cinerea*, ^*Hakea pandanica* subsp. *pandanica*, *Hakea varia* ^shrub\3\i; G
^*Leucopogon crassifolius*, *Melaleuca pulchella*, *Beaufortia empetrifolia* ^shrub\2\c
Veg. Condition Excellent
Disturbance Kangaroo and rabbit grazing and trampling
Fire Age >5 years
Notes Adjacent to Cape Arid national park



Species	WA Cons.	Height (m)	Cover (%)
<i>Adenanthos cuneatus</i>		1.2	2
<i>Anarthria laevis</i>		0.4	3
<i>Andersonia parvifolia</i>		0.3	<1
<i>Anigozanthos rufus</i>		0.4	<1
<i>Banksia obovata</i>		1.2	2
<i>Banksia obtusa</i>		0.15	<1
<i>Banksia petiolaris</i>		0.4	3

State Barrier Fence Esperance Extension

<i>Banksia pulchella</i>		0.6	2
<i>Banksia repens</i>		0.4	2
<i>Beaufortia empetrifolia</i>		0.5	6
<i>Boronia spathulata</i>		0.2	<1
<i>Calothamnus gracilis</i>		0.4	<1
<i>Conospermum distichum</i>		0.5	<1
<i>Dampiera parvifolia</i>		0.35	<1
* <i>Disa bracteata</i>		0.2	<1
<i>Drosera paleacea</i> subsp. <i>trichocaulis</i>		0.4	<1
<i>Eucalyptus extrica</i>		1.4	2
<i>Goodenia pterigosperma</i>		0.4	<1
<i>Grevillea baxteri</i>	P 4	1.3	<1
<i>Hakea cinerea</i>		2	10
<i>Hakea denticulata</i>		1.2	<1
<i>Hakea pandanica</i> subsp. <i>pandanica</i>		2	8
<i>Hakea varia</i>		1.5	4
<i>Hibbertia gracilipes</i>		0.3	<1
<i>Hypolaena exsulca</i>		0.3	5
<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)		0.7	4
<i>Isopogon trilobus</i>		0.5	<1
<i>Lepyrodia macra</i>		0.15	<1
<i>Leucopogon crassifolius</i>		1	10
<i>Lyginia imberbis</i>		0.5	<1
<i>Lysinema ciliatum</i>		0.5	<1
<i>Melaleuca pulchella</i>		0.7	10
<i>Melaleuca scabra</i>		0.5	3
<i>Petrophile teretifolia</i>		0.6	<1
<i>Schoenus subfascicularis</i>		0.4	<1
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)		0.2	<1
<i>Stirlingia anethifolia</i>		0.5	<1
<i>Taxandria spathulata</i>		0.7	3
<i>Tricostularia compressa</i>		0.25	3
<i>Verticordia vicinella</i>		0.5	4

Q47

Staff SK/RD **Date** 28/10/2013 **Season** E
Revisit SK/AF 30/09/2014 E
Type Q 10 m x 10 m
Location Adjacent Cape Arid National Park
MGA Zone 51 522807 mE 6266795 mN **Lat.** -33.7386 **Long.** 123.2462
Habitat Sandplain
Aspect N/A **Slope** N/A
Soil Type Light grey sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 35 % cover ; 1-2% cm in depth
Bare ground 20%% cover **Weeds** <1 % cover
Vegetation M+ ^*Hakea cinerea*,^*Hakea varia*^shrub\3\r;G ^^*Beaufortia empetrifolia*,*Phymatocarpus maxwellii*,*Melaleuca pulchella*^shrub\2\c
Veg. Condition Excellent
Disturbance Kangaroo and rabbit grazing and trampling
Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia cyclops</i>		1.8	<1
<i>Anarthria laevis</i>		0.5	2
* <i>Arctotheca calendula</i>		0.1	<1
<i>Banksia obovata</i>		0.5	<1
<i>Banksia pulchella</i>		0.2	<1
<i>Banksia tenuis</i> var. <i>tenuis</i>		0.6	1
<i>Beaufortia empetrifolia</i>		0.6	30

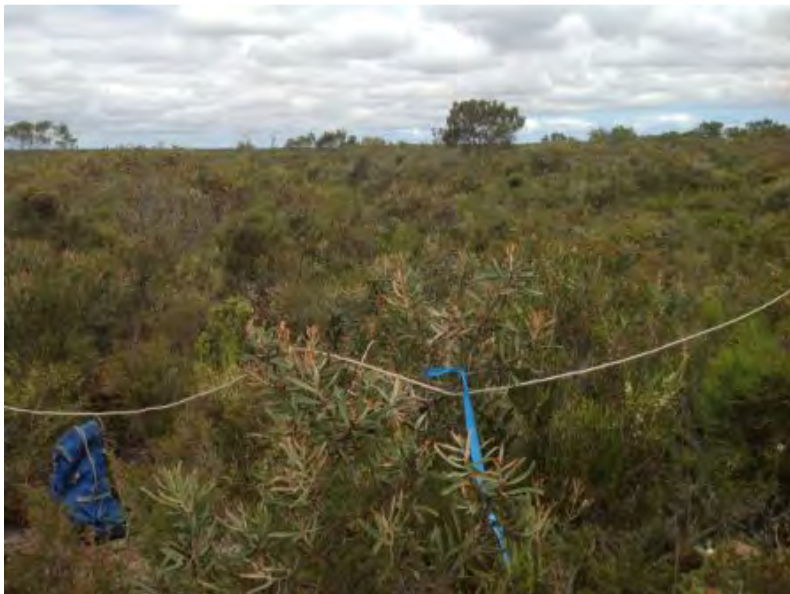
State Barrier Fence Esperance Extension

<i>Bossiaea preissii</i>	0.2	<1
<i>Calothamnus gracilis</i>	0.7	2
<i>Conostylis seorsiflora</i> subsp. <i>seorsiflora</i>	0.2	<1
<i>Dampiera parvifolia</i>	0.3	<1
<i>Diuris concinna</i>	0.3	<1
<i>Drosera paleacea</i> subsp. <i>trichocaulis</i>	0.05	<1
<i>Hakea cinerea</i>	1.2	1
<i>Hakea varia</i>	1.2	1
<i>Hibbertia gracilipes</i>	0.3	3
* <i>Hypochaeris glabra</i>	0.2	<1
<i>Hypolaena exsulca</i>	0.4	5
<i>Lechenaultia formosa</i>	0.3	<1
<i>Lepidosperma squamatum</i>	0.4	<1
<i>Lepyrodia macra</i>	0.2	<1
<i>Leucopogon crassifolius</i>	0.7	2
<i>Levenhookia stipitata</i>	0.05	<1
<i>Lyginia imberbis</i>	0.8	<1
<i>Lysinema ciliatum</i>	0.6	2
<i>Melaleuca calcicola</i>	0.4	<1
<i>Melaleuca pulchella</i>	0.8	8
<i>Melaleuca scabra</i>	1.2	2
<i>Petrophile teretifolia</i>	0.4	<1
<i>Phymatocarpus maxwellii</i>	0.9	10
<i>Schoenus subfascicularis</i>	0.3	<1
<i>Stylidium macranthum</i>	0.05	<1
<i>Taxandria spathulata</i>	0.8	3
<i>Tricostularia aphylla</i>	0.35	<1
<i>Tricostularia compressa</i>	0.2	<1
<i>Verticordia vicinella</i>	2	<1
<i>Xanthosia huegelii</i>	0.3	<1

Q48

Staff SK/RD **Date** 28/10/2013 **Season** E
Revisit SK/AF 30/09/2014 E
Type Q 10 m x 10 m
Location Adjacent Cape Arid National Park
MGA Zone 51 522791 mE 6265490 mN **Lat.** -33.7504 **Long.** 123.2461
Habitat Sandplain
Aspect N/A **Slope** N/A
Soil Type Light grey sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 25 % cover ; 1-2 cm in depth
Bare ground 40% cover **Weeds** <1 % cover
Vegetation M+ *Hakea pandanica* subsp. *pandanica*, *Hakea corymbosa*, *Eucalyptus extrica*^{shrub\3};
G *Beaufortia empetrifolia*, *Melaleuca scabra*, *Leucopogon crassifolius*^{shrub\2}c
Veg. Condition Excellent
Disturbance Kangaroo and rabbit grazing and trampling
Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia pachyphylla</i>		0.3	<1
<i>Adenanthos dobsonii</i>		0.2	<1
<i>Anarthria laevis</i>		0.5	<1
<i>Andersonia macranthera</i>		0.3	<1
<i>Banksia nutans</i> var. <i>nutans</i>		0.7	<1
<i>Banksia obovata</i>		0.8	5
<i>Banksia obtusa</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Banksia petiolaris</i>	0.2	2
<i>Banksia pulchella</i>	0.8	<1
<i>Banksia repens</i>	0.4	2
<i>Beaufortia empetrifolia</i>	0.6	20
<i>Boronia crassifolia</i>	0.2	<1
<i>Boronia spathulata</i>	0.4	<1
<i>Bossiaea preissii</i>	0.4	<1
<i>Calectasia grandiflora</i>	0.4	<1
<i>Calothamnus gracilis</i>	0.5	2
<i>Calytrix decandra</i>	0.5	<1
<i>Calytrix leschenaultii</i>	0.5	<1
<i>Cassytha glabella</i>	Creepers	<1
<i>Chordifex sphacelatus</i>	0.2	<1
<i>Chorizema obtusifolium</i>	0.5	<1
<i>Conostylis setigera</i> subsp. <i>setigera</i>	0.1	<1
<i>Conothamnus aureus</i>	0.3	<1
<i>Dampiera parvifolia</i>	0.25	<1
<i>Daviesia apiculata</i>	1	<1
<i>Drosera menziesii</i> subsp. <i>menziesii</i>	0.05	<1
<i>Drosera paleacea</i> subsp. <i>trichocaulis</i>	0.1	<1
<i>Eucalyptus extrica</i>	1.5	4
<i>Gompholobium baxteri</i>	0.5	<1
<i>Goodenia pterigosperma</i>	0.2	<1
<i>Hakea cinerea</i>	1.5	4
<i>Hakea corymbosa</i>	1.2	4
<i>Hakea obliqua</i> subsp. <i>obliqua</i>	1.5	<1
<i>Hakea pandanica</i> subsp. <i>pandanica</i>	1.5	5
<i>Hibbertia</i> aff. <i>recurvifolia</i>	0.3	3
<i>Hibbertia gracilipes</i>	0.3	<1
<i>Hypolaena exsulca</i>	0.15	2
<i>Isopogon trilobus</i>	0.7	<1
<i>Jacksonia capitata</i>	0.6	<1
<i>Lechenaultia formosa</i>	0.1	<1
<i>Lepidosperma squamatum</i>	0.2	2
<i>Leucopogon crassifolius</i>	0.1	6
<i>Lysinema pentapetalum</i>	0.5	<1
<i>Melaleuca calcicola</i>	0.4	<1
<i>Melaleuca scabra</i>	0.6	10
<i>Melaleuca striata</i>	0.8	2
<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>	0.4	<1
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>	0.1	<1
<i>Oligarrhena micrantha</i>	0.5	<1

State Barrier Fence Esperance Extension

<i>Oxymyrrhine gracilis</i>	0.8	<1
<i>Patersonia lanata</i> forma <i>lanata</i>	0.3	<1
<i>Petrophile teretifolia</i>	0.6	2
<i>Schoenus pleiostemoneus</i>	0.2	<1
<i>Stachystemon brachyphyllus</i>	0.2	<1
<i>Stylidium preissii</i>	0.1	<1
<i>Taxandria spathulata</i>	0.8	2
<i>Tricostularia aphylla</i>	0.4	<1

Q49

Staff SK/AF **Date** 30/09/2014 **Season** E
Revisit
Type Q
Location In Protaceous TEC
MGA Zone 51 511588 mE 6269444 mN **Lat.** -33.7149 **Long.** 123.1251
Habitat Flat
Aspect N/A **Slope** N/A
Soil Type Light grey sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 30 % cover ; 2 cm in depth
Bare ground 20% cover **Weeds** 0% cover
Vegetation M+ ^*Banksia speciosa*^shrub\4i;G ^^*Beaufortia empetrifolia*,*Adenanthos cuneatus*,*Leucopogon crassifolius*^shrub\2c
Veg. Condition Very Good
Disturbance Nearby road
Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Adenanthos cuneatus</i>		1	10
<i>Allocasuarina humilis</i>		0.5	<1
<i>Amphipogon turbinatus</i>		0.1	<1
<i>Anarthria laevis</i>		0.5	5
<i>Andersonia parvifolia</i>		0.3	<1
<i>Aotus</i> sp. Esperance (P.G. Wilson 7904)		0.5	<1
<i>Banksia nutans</i> var. <i>nutans</i>		0.3	<1

State Barrier Fence Esperance Extension

<i>Banksia petiolaris</i>	0.3	<1
<i>Banksia pulchella</i>	0.8	<1
<i>Banksia speciosa</i>	2.5	25
<i>Beaufortia empetrifolia</i>	0.5	15
<i>Bossiaea preissii</i>	0.4	<1
<i>Calothamnus gracilis</i>	0.4	<1
<i>Calytrix leschenaultii</i>	0.5	<1
<i>Caustis dioica</i>	0.6	<1
<i>Chamelaucium megalopetalum</i>	1	<1
<i>Chordifex laxus</i>	0.4	<1
<i>Chordifex sphacelatus</i>	0.4	<1
<i>Conospermum distichum</i>	0.4	<1
<i>Conospermum teretifolium</i>	0.2	<1
<i>Cyathochaeta equitans</i>	0.6	<1
<i>Dampiera parvifolia</i>	0.4	<1
<i>Darwinia vestita</i>	0.6	<1
<i>Daviesia apiculata</i>	1	2
<i>Gompholobium baxteri</i>	0.5	<1
<i>Hibbertia</i> aff. <i>recurvifolia</i>	0.4	<1
<i>Hibbertia gracilipes</i>	0.3	<1
<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)	1	<1
<i>Isopogon trilobus</i>	0.8	<1
<i>Leucopogon carinatus</i>	0.5	<1
<i>Leucopogon crassifolius</i>	0.6	8
<i>Lysinema pentapetalum</i>	0.3	<1
<i>Melaleuca striata</i>	1	<1
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>	0.3	<1
<i>Oligarrhena micrantha</i>	0.4	3
<i>Patersonia lanata</i> forma <i>lanata</i>	0.4	<1
<i>Petrophile teretifolia</i>	0.5	<1
<i>Schoenus brevisetis</i>	0.3	<1
<i>Schoenus obtusifolius</i>	0.4	<1
<i>Schoenus pleiostemoneus</i>	0.1	<1
<i>Stirlingia anethifolia</i>	0.3	2
<i>Synaphea oligantha</i>	0.2	<1
<i>Taxandria spathulata</i>	0.5	3

Q50

Staff SK/AF **Date** 30/09/2014 **Season** E
Revisit
Type Q 10 m x 10 m
Location
MGA Zone 51 499972 mE 6270802 mN **Lat.** -33.7027 **Long.** 122.9997
Habitat Mid-Slope
Aspect W **Slope** Gentle
Soil Type Light grey loamy sand
Rock Type Nil
Loose Rock 0% cover ; **Litter** 25 % cover ; 1 cm in depth
Bare ground 30% cover **Weeds** 0% cover
Vegetation M+ *Banksia armata* var. *armata*, *Taxandria spathulata*, *Beaufortia empetrifolia* \shrub\3\i; G
Lepidosperma brunonianum, *Leucopogon breviflorus*, *Melaleuca tuberculata* var.
macrophylla \sedge,shrub\1\i
Veg. Condition Very Good
Disturbance Chaining
Fire Age >5 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Allocasuarina humilis</i>		0.5	<1
<i>Allocasuarina thuyoides</i>		0.5	<1
<i>Amphipogon turbinatus</i>		0.4	<1
<i>Anarthria laevis</i>		0.2	<1
<i>Banksia armata</i> var. <i>armata</i>		1	15
<i>Beaufortia empetrifolia</i>		0.7	5

State Barrier Fence Esperance Extension

<i>Bossiaea preissii</i>	0.5	<1
<i>Calothamnus gracilis</i>	0.4	2
<i>Chorizema aciculare</i> subsp. <i>aciculare</i>	0.2	<1
<i>Chorizema obtusifolium</i>	0.4	<1
<i>Cryptandra nutans</i>	0.3	<1
<i>Cryptandra pungens</i>	0.4	<1
<i>Daviesia incrassata</i> subsp. <i>incrassata</i>	1	<1
<i>Daviesia teretifolia</i>	0.5	<1
<i>Drosera menziesii</i> subsp. <i>penicillaris</i>	0.2	<1
<i>Hakea prostrata</i>	0.6	<1
<i>Hibbertia gracilipes</i>	0.3	4
<i>Isopogon</i> sp. Fitzgerald River (D.B. Foreman 813)	0.7	<1
<i>Jacksonia venosa</i>	0.5	<1
<i>Lepidosperma brunonianum</i>	0.6	10
<i>Leptospermum spinescens</i>	0.5	<1
<i>Leucopogon breviflorus</i>	0.3	10
<i>Leucopogon cuneifolius</i>	0.6	<1
<i>Leucopogon</i> sp. Coujinup (M.A. Burgman 1085)	0.2	<1
<i>Levenhookia pusilla</i>	0.05	<1
<i>Melaleuca scabra</i>	1	2
<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>	0.6	5
<i>Mesomelaena stygia</i> subsp. <i>stygia</i>	0.3	<1
<i>Neurachne alopecuroidea</i>	0.4	4
<i>Opercularia vaginata</i>	0.1	<1
Orchidaceae sp.	0.05	<1
<i>Oxymyrrhine gracilis</i>	0.1	<1
<i>Petrophile fastigiata</i>	0.8	<1
<i>Pimelea angustifolia</i>	0.1	<1
<i>Schoenus obtusifolius</i>	0.1	<1
<i>Schoenus subflavus</i> subsp. long leaves (K.L. Wilson 2865)	0.1	<1
<i>Stawellia gymnocephala</i>	0.3	<1
<i>Stylidium breviscapum</i>	0.1	<1
<i>Synaphea reticulata</i>	0.2	<1
<i>Taxandria spathulata</i>	1.2	5
<i>Xanthorrhoea platyphylla</i>	1.3	<1
<i>Xanthosia huegelii</i>	0.1	<1

Q51

Staff SK/AF **Date** 2/10/2014 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 471749 mE 6305734 mN **Lat.** -33.3873 **Long.** 122.6962

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Brown loam

Rock Type

Loose Rock 0% cover ; **Litter** 15 % cover ; 1 cm in depth

Bare ground 40% cover **Weeds** 0% cover

Vegetation U+ ^^*Eucalyptus uncinata*,*Eucalyptus tumida*,*Eucalyptus leptocalyx*^mallee shrub\6i;M
^^*Melaleuca hamata*,*Grevillea plurijuga* subsp. *plurijuga*,*Acacia glaucissima*^shrub\3i;G
^^*Pultenaea purpurea*,*Halgania andromedifolia*,*Dodonaea bursariifolia*^shrub\1i

Veg. Condition Excellent

Disturbance Nil

Fire Age <10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia glaucissima</i>	P 3	0.6	5
<i>Boronia inconspicua</i>		0.2	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.3	2
<i>Cassytha melantha</i>		Climber	<1
<i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>		0.3	<1
<i>Dillwynia divaricata</i>		0.5	<1

State Barrier Fence Esperance Extension

<i>Dodonaea bursariifolia</i>	0.4	3
<i>Eucalyptus leptocalyx</i>	3	4
<i>Eucalyptus tumida</i>	4	4
<i>Eucalyptus uncinata</i>	4	5
<i>Exocarpos sparteus</i>	1.5	<1
<i>Grevillea oligantha</i>	0.5	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>	1.5	5
<i>Hakea commutata</i>	0.6	2
<i>Halgania andromedifolia</i>	0.3	5
<i>Hibbertia psilocarpa</i>	0.4	<1
<i>Melaleuca hamata</i>	1.2	8
<i>Melaleuca societatis</i>	1	<1
<i>Pultenaea purpurea</i>	0.2	8
<i>Spyridium mucronatum</i> subsp. <i>mucronatum</i>	0.3	<1

Q52

Staff SK/AF **Date** 2/10/2014 **Season** E

Revisit

Type Q 10 m x 10 m

Location

MGA Zone 51 471186 mE 6306257 mN **Lat.** -33.3826 **Long.** 122.6902

Habitat Flat

Aspect N/A **Slope** N/A

Soil Type Light brown loamy sand

Rock Type

Loose Rock 0% cover ; **Litter** 15 % cover ; 2 cm in depth

Bare ground 50% cover **Weeds** 0% cover

Vegetation U+ *Eucalyptus uncinata*, *Eucalyptus leptocalyx*, *Eucalyptus luculenta* ^mallee shrub\6i; M
Grevillea plurijuga subsp. *plurijuga*, *Melaleuca societatis*, *Melaleuca bromelioides* ^shrub\3i; G
Boronia inornata subsp. *leptophylla*, *Hibbertia psilocarpa*, *Dodonaea bursariifolia* ^shrub\1i

Veg. Condition Excellent

Disturbance Nil

Fire Age >10 years

Notes



Species	WA Cons.	Height (m)	Cover (%)
<i>Acacia erinacea</i>		0.3	<1
<i>Acacia glaucissima</i>	P 3	0.5	<1
<i>Boronia inornata</i> subsp. <i>leptophylla</i>		0.3	10
<i>Comesperma spinosum</i>		0.3	<1
<i>Cyathostemon</i> cf. <i>ambiguus</i>		0.4	<1
<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>		1.5	2

State Barrier Fence Esperance Extension

<i>Dianella brevicaulis</i>		0.2	<1
<i>Dillwynia divaricata</i>		0.5	<1
<i>Dodonaea bursariifolia</i>		0.4	3
<i>Eremophila dichroantha</i>		1.5	<1
<i>Eucalyptus leptocalyx</i>		4	5
<i>Eucalyptus luculenta</i>	P 2	3	3
<i>Eucalyptus uncinata</i>		4	5
<i>Eutaxia lutea</i>		0.3	<1
<i>Exocarpos sparteus</i>		2	<1
<i>Grevillea plurijuga</i> subsp. <i>plurijuga</i>		1.2	20
<i>Hibbertia psilocarpa</i>		0.3	3
<i>Melaleuca bromelioides</i>		1	5
<i>Melaleuca societatis</i>		1	5
<i>Melaleuca teuthidoides</i>		1	<1
<i>Ozothamnus lepidophyllus</i>		0.2	<1
<i>Prostanthera serpyllifolia</i> subsp. <i>microphylla</i>		0.3	<1
<i>Pultenaea purpurea</i>		0.2	<1
<i>Spyridium minutum</i>		0.2	<1

R001

Staff SK/RD **Date** 7/10/2013
MGA Zone 51 257699 **mE** 6281571 **mN**
Latitude -33.5781 **Longitude** 120.3894

Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus phaenophylla*,^*Eucalyptus incrassata*^mallee shrub\6\r;M ^^*Melaleuca calycina*,
Melaleuca societatis,*Melaleuca johnsonii*^shrub\3\r;G
^^*Gahnia ancistrophylla*,*Daviesia lancifolia*,*Gahnia aristata*^sedge,shrub\1\r

Veg. Condition Excellent



Species

Daviesia lancifolia
Eucalyptus phaenophylla
Gahnia aristata
Melaleuca johnsonii

Eucalyptus incrassata
Gahnia ancistrophylla
Melaleuca calycina
Melaleuca societatis

R002

Staff SK/RD **Date** 7/10/2013
MGA Zone 51 258370 **mE** 6281842 **mN**
Latitude -33.5758 **Longitude** 120.3967

Habitat Flat

Soil Type Grey sandy loam

Veg. U+ ^*Eucalyptus phaenophylla*,^*Eucalyptus leptocalyx*^tree mallee\6\r;M ^^*Melaleuca hamata*,
Grevillea pectinata,*Acacia sulcata*^shrub\3\r;G
^^*Melaleuca glaberrima*,*Gahnia ancistrophylla*,*Acacia ingrata*^shrub,sedge\1\r

Veg. Condition Excellent



Species

Acacia ingrata
Eucalyptus leptocalyx
Gahnia ancistrophylla
Melaleuca glaberrima

Acacia sulcata
Eucalyptus phaenophylla
Grevillea pectinata
Melaleuca hamata

R003

Staff SK/AF Date 7/10/2013
 MGA Zone 51 259418 mE 6282256 mN
 Latitude -33.5723 Longitude 120.4081

Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*,^*Eucalyptus falcata* subsp. *falcata*^tree mallee\6r;M ^^*Banksia cirsioides*,
Allocasuarina humilis,*Banksia media*^shrub\3r;G
 ^^*Mesomelaena stygia* subsp. *stygia*,*Beaufortia schaueri*,*Lepidosperma* sp.^sedge,shrub\1i

Veg. Condition Excellent



Species

Allocasuarina humilis

Banksia media

Eucalyptus falcata subsp. *falcata*

Lepidosperma sp.

Banksia cirsioides

Beaufortia schaueri

Eucalyptus pleurocarpa

Mesomelaena stygia subsp. *stygia*

R004

Staff SK/RD Date 8/10/2013
 MGA Zone 51 260406 mE 6282618 mN
 Latitude -33.5692 Longitude 120.4188

Habitat Gentle rise

Soil Type Grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*,^*Eucalyptus incrassata*^mallee shrub\6r;M ^^*Beaufortia micrantha* var. *micrantha*,*Melaleuca rigidifolia*,*Leptospermum erubescens*^shrub\3i;G ^*Mesomelaena stygia* subsp. *stygia*,^*Hibbertia gracilipes*^sedge,shrub\1i

Veg. Condition Excellent



Species

Beaufortia micrantha var. *micrantha*

Eucalyptus pleurocarpa

Leptospermum erubescens

Mesomelaena stygia subsp. *stygia*

Eucalyptus incrassata

Hibbertia gracilipes

Melaleuca rigidifolia

R005

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 264172 **mE** 6284068 **mN**
Latitude -33.5570 **Longitude** 120.4597
Habitat Flat

Soil Type Yellow grey sandy loam

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
Eucalyptus flocktoniae,*Eucalyptus phenax* subsp.
phenax^tree mallee\6\i;M ^*Exocarpos sparteus*,
^*Melaleuca cucullata*^shrub\3\i;G ^^*Boronia inornata*
subsp. *leptophylla*,*Spyridium cordatum*,*Pultenaea*
purpurea^shrub\1\i

Veg. Condition Excellent



Species

Boronia inornata subsp. *leptophylla*
Eucalyptus flocktoniae
Exocarpos sparteus
Pultenaea purpurea

Eucalyptus eremophila subsp. *eremophila*
Eucalyptus phenax subsp. *phenax*
Melaleuca cucullata
Spyridium cordatum

R006

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 268378 **mE** 6285134 **mN**
Latitude -33.5483 **Longitude** 120.5053
Habitat Open Depression

Soil Type Light yellow grey sand

Veg. U+ ^*Eucalyptus occidentalis*^tree\7\i;M ^^*Melaleuca*
pulchella,*Melaleuca calycina*,*Baeckea*
pachyphylla^shrub\3\c;G ^*Schoenus*
subfascicularis^sedge\1\i

Veg. Condition Pristine



Species

Baeckea pachyphylla
Melaleuca calycina
Schoenus subfascicularis

Eucalyptus occidentalis
Melaleuca pulchella

R007

Staff SK/RD Date 8/10/2013
 MGA Zone 51 269289 mE 6285107 mN
 Latitude -33.5488 Longitude 120.5151

Habitat Flat

Soil Type Grey sandy loam

Veg. U+ ^*Eucalyptus platypus* subsp. *platypus*^tree\6;c;M
 ^*Baeckea latens*,^*Melaleuca acuminata* subsp.
acuminata^shrub\3;r;G ^*Grevillea pectinata*,^*Baeckea*
 sp.^shrub\2;r

Veg. Condition Pristine



Species

Baeckea latens

Eucalyptus platypus subsp. *platypus*

Melaleuca acuminata subsp. *acuminata*

Melaleuca undulata

Baeckea sp.

Grevillea pectinata

Melaleuca cucullata

R008

Staff SK/RD Date 8/10/2013
 MGA Zone 51 269605 mE 6285095 mN
 Latitude -33.5490 Longitude 120.5185

Habitat Flat

Soil Type Light grey loamy sand

Veg. U+ ^^*Eucalyptus incrassata*,*Eucalyptus phaenophylla*
 subsp. *interjacens*,*Banksia media*^tree mallee,mallee
 shrub\6;i;M ^^*Melaleuca hamata*,*Calothamnus*
gibbosus,*Melaleuca subfalcata*^shrub\3;r;G ^^*Gahnia*
ancistrophylla,*Spyridium cordatum*,*Boronia*
crassifolia^sedge,shrub\1;r

Veg. Condition Pristine



Species

Banksia media

Calothamnus gibbosus

Eucalyptus phaenophylla subsp. *interjacens*

Melaleuca hamata

Spyridium cordatum

Boronia crassifolia

Eucalyptus incrassata

Gahnia ancistrophylla

Melaleuca subfalcata

R009

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 271554 **mE** 6285761 **mN**
Latitude -33.5434 **Longitude** 120.5396

Habitat Gentle slope

Soil Type Grey sand

Veg. U+ ^*Eucalyptus* sp. Fraser Range (D. Nicolle 2157),
^*Exocarpos sparteus*,*Allocasuarina huegeliana*^mallee shrub,tree\6i;M ^*Melaleuca hamata*,^*Acacia patagiata*,*Acacia mutabilis* subsp.
angustifolia^shrub\3i;G ^*Lepidosperma brunonianum*,
^*Lomandra micrantha* subsp. *teretifolia*^sedge\1r



Veg. Condition Excellent

Species

Acacia mutabilis subsp. *angustifolia*
Allocasuarina huegeliana
Exocarpos sparteus
Lomandra micrantha subsp. *teretifolia*

Acacia patagiata
Eucalyptus sp. Fraser Range (D. Nicolle 2157)
Lepidosperma aff. *brunonianum*
Melaleuca hamata

R010

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 272849 **mE** 6287079 **mN**
Latitude -33.5318 **Longitude** 120.5539

Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus dielsii*,^*Eucalyptus flocktoniae*,
Eucalyptus platypus subsp. *platypus*^tree,tree
mallee\6i;M ^^*Dodonaea stenozyga*,*Exocarpos*
aphyllus,*Acacia binata*^shrub\3r;G ^*Wilsonia*
humilis^shrub\1r



Veg. Condition Excellent

Species

Acacia binata
Eucalyptus dielsii
Eucalyptus platypus subsp. *platypus*
Wilsonia humilis

Dodonaea stenozyga
Eucalyptus flocktoniae
Exocarpos aphyllus

R011

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 274338 mE 6288303 mN
Latitude -33.5211 **Longitude** 120.5702
Habitat Flat

Soil Type Grey brown sand

Veg. U+ ^*Eucalyptus flocktoniae*,^*Eucalyptus eremophila* subsp. *eremophila*^tree mallee\6r;M ^^*Melaleuca societatis*,*Melaleuca cucullata*,*Melaleuca sapientes*^shrub\3i;G ^^*Gahnia ancistrophylla*,*Cooperookia polygalacea*,*Acacia octonervia*^sedge, shrub\1i

Veg. Condition Excellent



Species

Acacia octonervia

Eucalyptus eremophila subsp. *eremophila*

Gahnia ancistrophylla

Melaleuca sapientes

Cooperookia polygalacea

Eucalyptus flocktoniae

Melaleuca cucullata

Melaleuca societatis

R012

Staff SK/RD **Date** 8/10/2013
MGA Zone 51 277046 mE 6291322 mN
Latitude -33.4944 **Longitude** 120.6001
Habitat Flat

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus obesa*,^*Eucalyptus pleurocarpa*^mallee shrub\6i;M ^^*Melaleuca tuberculata* var. *macrophylla*,*Beaufortia micrantha* var. *micrantha*,*Calothamnus gracilis*^shrub\3i;G ^^*Tricostularia compressa*,*Chordifex sphacelatus*,*Schoenus subfascicularis*^sedge,rush\1i

Veg. Condition Excellent



Species

Beaufortia micrantha var. *micrantha*

Chordifex sphacelatus

Eucalyptus pleurocarpa

Schoenus subfascicularis

Calothamnus gracilis

Eucalyptus obesa

Melaleuca tuberculata var. *macrophylla*

Tricostularia compressa

R013

Staff SK/RD Date 8/10/2013
 MGA Zone 51 277703 mE 6292497 mN
 Latitude -33.4840 Longitude 120.6075
 Habitat Flat

Soil Type Yellow brown sandy lom

Veg. U+ ^*Eucalyptus phaenophylla* subsp. *phaenophylla*,
 ^^mallee shrub\6\i;M ^*Melaleuca hamata*,^*Exocarpos*
sparteus^shrub\3\i;G ^^*Spyridium cordatum*,*Acacia*
ohtonervia,*Gahnia aristata*^shrub,sedge\1\i

Veg. Condition Excellent



Species

Acacia octonervia

Eucalyptus phaenophylla subsp. *phaenophylla*

Gahnia aristata

Spyridium cordatum

Eucalyptus eremophila subsp. *eremophila*

Exocarpos sparteus

Melaleuca hamata

R014

Staff SK/RD Date 8/10/2013
 MGA Zone 51 278250 mE 6293489 mN
 Latitude -33.4751 Longitude 120.6136
 Habitat Flat

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*^mallee shrub\6\i;M
 ^^*Adenanthos cuneatus*,*Isopogon trilobus*,*Hakea*
corymbosa^shrub\3\i;G ^^*Tricostularia compressa*,
Beaufortia micrantha var. *micrantha*,*Chordifex*
sphacelatus^sedge,rush\1\i

Veg. Condition Excellent



Species

Adenanthos cuneatus

Calothamnus gracilis

Eucalyptus pleurocarpa

Isopogon trilobus

Petrophile teretifolia

Beaufortia micrantha var. *micrantha*

Chordifex sphacelatus

Hakea corymbosa

Mesomelaena stygia subsp. *stygia*

Tricostularia compressa

R015

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 281511 **mE** 6297944 **mN**
Latitude -33.4357 **Longitude** 120.6498
Habitat Flat

Soil Type Grey sandy clay loam

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
^*Eucalyptus pileata* ^tree mallee\6i;M ^*Melaleuca hamata*,
^*Melaleuca societatis*,*Melaleuca lateriflora* ^shrub\3i;G ^^*Gahnia aristata*,*Boronia inornata* subsp. *leptophylla*,
Pultenaea spinulosa ^sedge,shrub\1i

Veg. Condition Excellent



Species

Acacia patagiata

Eucalyptus eremophila subsp. *eremophila*

Gahnia aristata

Melaleuca cucullata

Melaleuca lateriflora

Pultenaea spinulosa

Boronia inornata subsp. *leptophylla*

Eucalyptus pileata

Grevillea pectinata

Melaleuca hamata

Melaleuca societatis

R016

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 282241 **mE** 6298945 **mN**
Latitude -33.4268 **Longitude** 120.6578

Habitat Flat

Soil Type Grey sandy clay

Veg. U+ ^^*Eucalyptus stoatei*,*Eucalyptus flocktoniae*,
Eucalyptus platypus subsp. *platypus* ^tree,tree
mallee\6i;M ^^*Melaleuca cucullata*,*Melaleuca societatis*,
Melaleuca undulata ^shrub\3i;G ^^*Daviesia benthamii* subsp. *acanthoclona*,
Grevillea pectinata,
Cooperhooikia polygalacea ^shrub\1i

Veg. Condition Excellent



Species

Cooperhooikia polygalacea

Eucalyptus eremophila subsp. *eremophila*

Eucalyptus platypus subsp. *platypus*

Grevillea pectinata

Melaleuca societatis

Westringia rigida

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus flocktoniae

Eucalyptus stoatei

Melaleuca cucullata

Melaleuca undulata

R017

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 284388 mE 6302900 mN
Latitude -33.3916 **Longitude** 120.6819
Habitat Flat

Soil Type Grey sandy clay

Veg. U+ *Eucalyptus suggrandis* subsp. *suggrandis*,
Eucalyptus flocktoniae, *Eucalyptus eremophila* subsp.
eremophila ^mallee shrub, tree mallee\6\i; M
Melaleuca societatis, *Melaleuca hamata*, *Baeckea*
latens ^shrub\3\i; G *Gahnia aristata*, *Daviesia*
lancifolia, *Comesperma spinosum* ^sedge, shrub\1\i

Veg. Condition Excellent



Species

Baeckea latens
Daviesia lancifolia
Eucalyptus flocktoniae
Eucalyptus suggrandis subsp. *suggrandis*
Grevillea pectinata
Melaleuca rigidifolia
Pultenaea spinulosa

Comesperma spinosum
Eucalyptus eremophila subsp. *eremophila*
Eucalyptus platypus subsp. *platypus*
Gahnia aristata
Melaleuca hamata
Melaleuca societatis

R018

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 283384 mE 6304510 mN
Latitude -33.3769 **Longitude** 120.6715
Habitat Flat

Soil Type Grey sand

Veg. U+ *Eucalyptus pleurocarpa*, *Eucalyptus incrassata*,
Eucalyptus sp. Fraser Range (D. Nicolle 2157) ^tree
mallee, mallee shrub\6\i; M *Beaufortia micrantha* var.
micrantha, *Verticordia inclusa*, *Lysinema*
pentapetalum ^shrub\3\i; G *Desmocladius*
myriocladus, *Lepidosperma carphoides*, *Mesomelaena*
stygia subsp. *stygia* ^rush, sedge\1\i

Veg. Condition Excellent



Species

Banksia media
Daviesia teretifolia
Eucalyptus incrassata
Eucalyptus sp. Fraser Range (D. Nicolle 2157)
Isopogon trilobus
Lysinema pentapetalum
Verticordia inclusa

Beaufortia micrantha var. *micrantha*
Desmocladius myriocladus
Eucalyptus pleurocarpa
Hakea corymbosa
Lepidosperma carphoides
Mesomelaena stygia subsp. *stygia*

R019

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 281772 mE 6307885 mN
Latitude -33.3461 **Longitude** 120.6550
Habitat Flat
Soil Type Grey sand

Veg. U+ ^*Eucalyptus incrassata*,*Eucalyptus* sp. Fraser Range (D. Nicolle 2157),*Eucalyptus pleurocarpa*^mallee shrub\6\i;M ^*Banksia media*, ^*Hakea strumosa*^shrub\3\r;G ^^*Calothamnus gibbosus*,*Banksia blechnifolia*,*Beaufortia micrantha* var. *micrantha*^shrub\1\i

Veg. Condition Excellent



Species

Banksia blechnifolia

Beaufortia micrantha var. *micrantha*

Calothamnus gibbosus

Desmocladius myriocladus

Eucalyptus pleurocarpa

Hakea strumosa

Banksia media

Callitris roei

Daviesia teretifolia

Eucalyptus incrassata

Eucalyptus sp. Fraser Range (D. Nicolle 2157)

Melaleuca pulchella

R020

Staff SK/RD **Date** 9/10/2013
MGA Zone 51 283925 mE 6309170 mN
Latitude -33.3350 **Longitude** 120.6784
Habitat crest of low rise
Soil Type Grey sandy loam

Veg. U+ ^*Eucalyptus incrassata*,*Eucalyptus phaenophylla* subsp. *interjacens*,*Eucalyptus uncinata*^mallee shrub\6\i;M ^^*Beaufortia schaueri*,*Calothamnus quadrifidus* subsp. *quadrifidus*,*Gastrolobium nutans*^shrub\3\c;G ^^*Lepidosperma drummondii*, *Conostylis argentea*,*Schoenus brevisetis*^sedge, forb\1\r

Veg. Condition Excellent



Species

Allocasuarina campestris

Calothamnus quadrifidus subsp. *quadrifidus*

Eucalyptus incrassata

Eucalyptus phaenophylla subsp. *interjacens*

Gastrolobium nutans

Lepidosperma drummondii

Schoenus brevisetis

Beaufortia schaueri

Conostylis argentea

Eucalyptus perangusta

Eucalyptus uncinata

Grevillea aneura

Melaleuca hamata

R021

Staff SK/RD Date 9/10/2013
 MGA Zone 51 286758 mE 6310346 mN
 Latitude -33.3249 Longitude 120.7091

Habitat gentle slope

Soil Type Grey brown sandy clay

Veg. U+ ^*Eucalyptus platypus*,^*Eucalyptus densa* subsp. *densa*^tree\6i;M ^^*Melaleuca hamata*,*Beyeria sulcata* var. *gracilis*,*Melaleuca sapientes*^shrub\3c;G ^^*Trymalium elachophyllum*,*Phebalium obovatum*, *Dodonaea bursariifolia*^shrub\1i

Veg. Condition Excellent



Species

Acacia octonervia
Dodonaea bursariifolia
Eucalyptus platypus
Melaleuca hamata
Phebalium obovatum

Beyeria sulcata var. *gracilis*
Eucalyptus densa subsp. *densa*
Goodenia scapigera subsp. *scapigera*
Melaleuca sapientes
Trymalium elachophyllum

R022

Staff SK/RD Date 9/10/2013
 MGA Zone 51 288060 mE 6308762 mN
 Latitude -33.3395 Longitude 120.7227

Habitat Flat

Soil Type Grey brown loamy sand

Veg. U+ ^^*Eucalyptus pileata*,*Eucalyptus flocktoniae*, *Eucalyptus eremophila* subsp. *eremophila*^tree mallee\6i;M ^^*Melaleuca hamata*,*Melaleuca lateriflora*, *Melaleuca societatis*^shrub\3i;G ^^*Boronia inornata* subsp. *leptophylla*,*Gahnia ancistrophylla*,*Acacia octonervia*^shrub,sedge\1i

Veg. Condition Excellent



Species

Acacia octonervia
Dodonaea bursariifolia
Eucalyptus flocktoniae
Eucalyptus stoatei
Melaleuca hamata
Melaleuca sapientes
Phebalium obovatum

Boronia inornata subsp. *leptophylla*
Eucalyptus eremophila subsp. *eremophila*
Eucalyptus pileata
Gahnia ancistrophylla
Melaleuca lateriflora
Melaleuca societatis

R023

Staff SK/RD Date 9/10/2013
 MGA Zone 51 288840 mE 6307770 mN
 Latitude -33.3486 Longitude 120.7308

Habitat Flat

Soil Type Grey sand

Veg. U+ *Eucalyptus kessellii*, *Eucalyptus pileata*,
Eucalyptus flocktoniae tree mallee; M
Phymatocarpus maxwellii, *Melaleuca ?plumea*,
Melaleuca pulchella shrub; G *Restionaceae* sp.,
Banksia blechnifolia, *Gahnia aristata* rush, shrub,
 sedge



Veg. Condition Excellent

Species

Banksia blechnifolia
Eucalyptus flocktoniae
Eucalyptus pileata
Melaleuca ?plumea
Phymatocarpus maxwellii

Darwinia sp. Lake Cobham (K. Newbey 3262)
Eucalyptus kessellii
Gahnia aristata
Melaleuca pulchella
Restionaceae sp.

R024

Staff SK/RD Date 11/10/2013
 MGA Zone 51 290191 mE 6306051 mN
 Latitude -33.3643 Longitude 120.7450

Habitat gentle rise

Soil Type Grey sand

Veg. U+ *Eucalyptus pleurocarpa*, *Eucalyptus kessellii*,
Eucalyptus phaenophylla subsp. *interjacens* mallee
 shrub; M *Melaleuca hamata*, *Acacia assimilis*
 subsp. *atroviridis* shrub; G *Lepidosperma* sp.
 Bandalup Scabrid (N. Eveleigh 10798), *Hemigenia*
teretiuscula, *Neurachne alopecuroidea* sedge, shrub,
 other grass



Veg. Condition Excellent

Species

Acacia assimilis subsp. *atroviridis*
Eucalyptus phaenophylla subsp. *interjacens*
Hemigenia teretiuscula
Melaleuca hamata

Eucalyptus kessellii
Eucalyptus pleurocarpa
Lepidosperma sp. Bandalup Scabrid (N. Eveleigh 10798)
Neurachne alopecuroidea

R025

Staff SK/RD **Date** 11/10/2013
MGA Zone 51 290938 **mE** 6305117 **mN**
Latitude -33.3729 **Longitude** 120.7528

Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*,^*Eucalyptus incassata*^mallee shrub\6\r;M ^*Banksia media*^shrub\3\r;G ^^*Phymatocarpus maxwellii*,
Daviesia lancifolia,*Melaleuca pulchella*^shrub\2\c

Veg. Condition Excellent



Species

Banksia blechnifolia
Daviesia lancifolia
Eucalyptus pleurocarpa
Phymatocarpus maxwellii

Banksia media
Eucalyptus incassata
Melaleuca pulchella

R026

Staff SK/RD **Date** 11/10/2013
MGA Zone 51 291642 **mE** 6305224 **mN**
Latitude -33.3721 **Longitude** 120.7603

Habitat Flat

Soil Type Grey brown sandy loam

Veg. U+ ^*Eucalyptus flocktoniae*,^*Eucalyptus eremophila*
 subsp. *eremophila*^tree mallee\6\r;M ^^*Melaleuca societatis*,*Melaleuca podiocarpa*,*Melaleuca sapientes*^shrub\3\r;G ^*Gahnia ancistrophylla*,
 ^*Comesperma spinosum*^sedge,shrub\1\r

Veg. Condition Excellent



Species

Comesperma spinosum
Eucalyptus flocktoniae
Melaleuca podiocarpa
Melaleuca societatis

Eucalyptus eremophila subsp. *eremophila*
Gahnia ancistrophylla
Melaleuca sapientes

R027

Staff SK/RD **Date** 11/10/2013
MGA Zone 51 293290 **mE** 6305541 **mN**
Latitude -33.3695 **Longitude** 120.7781

Habitat Open Depression

Soil Type Grey sand

Veg. U ^*Eucalyptus* sp. Fraser Range (D. Nicolle 2157)
 \^mallee shrub\6r;M+ ^^*Phymatocarpus maxwellii*,
Adenanthos cuneatus,*Acacia assimilis* subsp.
atroviridis\^shrub\3c;G ^^*Calytrix leschenaultii*,
Lepidosperma carphoides,*Chordifex*
sphacelatus\^shrub,sedge,rush\1i

Veg. Condition Excellent



Species

Acacia assimilis subsp. *atroviridis*

Calytrix leschenaultii

Eucalyptus sp. Fraser Range (D. Nicolle 2157)

Phymatocarpus maxwellii

Adenanthos cuneatus

Chordifex sphacelatus

Lepidosperma carphoides

R028

Staff SK/RD **Date** 11/10/2013
MGA Zone 51 298241 **mE** 6307727 **mN**
Latitude -33.3508 **Longitude** 120.8318

Habitat Mid-Slope

Soil Type Grey sandy loam

Veg. M+ ^^*Acacia singula*,*Calothamnus quadrifidus* subsp.
quadrifidus,*Verticordia chrysantha*\^shrub\3i;G
 ^^*Allocasuarina thuyoides*,*Melaleuca tuberculata* var.
macrophylla,*Lepidosperma* sp.\^shrub,sedge\1i

Veg. Condition Excellent



Species

Acacia singula

Calothamnus quadrifidus subsp. *quadrifidus*

Melaleuca tuberculata var. *macrophylla*

Allocasuarina thuyoides

Lepidosperma sp.

Verticordia chrysantha

R029

Staff SK/RD **Date** 11/10/2013
MGA Zone 51 300686 **mE** 6308163 **mN**
Latitude -33.3473 **Longitude** 120.8581
Habitat Flat

Soil Type Yellow brown sandy clay

Veg. U+ ^*Eucalyptus pleurocarpa*, ^*Eucalyptus phaenophylla* subsp. *interjacens* ^tree mallee\6r;M ^*Beyeria sulcata* var. *gracilis*, ^*Melaleuca hamata* ^shrub\3c;G ^*Schoenus pleiostemoneus* ^sedge\1i

Veg. Condition Excellent



Species

Acacia singula
Beyeria sulcata var. *gracilis*
Eucalyptus pleurocarpa
Melaleuca hamata
Verticordia chrysantha

Allocasuarina spinosissima
Eucalyptus phaenophylla subsp. *interjacens*
Lepidosperma aff. *brunonianum*
Schoenus pleiostemoneus

R030

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 303937 **mE** 6310566 **mN**
Latitude -33.3262 **Longitude** 120.8936
Habitat Flat

Soil Type Light brown sandy clay

Veg. U+ ^*Eucalyptus flocktoniae*, ^*Eucalyptus eremophila* subsp. *eremophila* ^tree mallee\6i;M ^^*Melaleuca societatis*, *Leptomeria pachyclada*, *Melaleuca podiocarpa* ^shrub\3c;G ^^*Gahnia ancistrophylla*, *Comesperma spinosum*, *Bossiaea leptacantha* ^sedge, shrub\1r

Veg. Condition Pristine



Species

Bossiaea leptacantha
Daviesia benthamii subsp. *acanthoclona*
Eucalyptus flocktoniae
Grevillea huegelii
Leptomeria pachyclada
Melaleuca sapientes

Comesperma spinosum
Eucalyptus eremophila subsp. *eremophila*
Gahnia ancistrophylla
Grevillea pectinata
Melaleuca podiocarpa
Melaleuca societatis

R031

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 302381 **mE** 6313731 **mN**
Latitude -33.2974 **Longitude** 120.8776

Habitat Flat

Soil Type Light brown clay loam

Veg. U+ ^*Eucalyptus quadrans*^tree mallee\6i;M
 ^^*Melaleuca pauperiflora* subsp. *pauperiflora*,
Melaleuca acuminata subsp. *acuminata*,*Acacia*
amyctica^shrub\4c;G ^*Olearia muelleri*^shrub\1r

Veg. Condition Excellent



Species

Acacia amyctica

Melaleuca acuminata subsp. *acuminata*

Olearia muelleri

Eucalyptus quadrans

Melaleuca pauperiflora subsp. *pauperiflora*

R032

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 301985 **mE** 6314499 **mN**
Latitude -33.2904 **Longitude** 120.8735

Habitat Flat

Soil Type Light yellow brown sandy clay loam

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*,
 ^*Eucalyptus phaenophylla* subsp. *interjacens*^tree
 mallee\6i;M+ ^*Melaleuca hamata*,*Melaleuca*
lateriflora^shrub\3c;G ^*Cyathostemon* sp.,*Daviesia*
benthamii subsp. *acanthoclona*,*Styphelia*
intertexta^shrub\2i

Veg. Condition Excellent



Species

Cyathostemon sp.

Eucalyptus eremophila subsp. *eremophila*

Melaleuca hamata

Styphelia intertexta

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus phaenophylla subsp. *interjacens*

Melaleuca lateriflora

R033

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 303300 **mE** 6315635 **mN**
Latitude -33.2804 **Longitude** 120.8878

Habitat Flat

Soil Type Light grey brown sand

Veg. M+ *Eucalyptus* sp. Fraser Range (D. Nicolle 2157),
Exocarpos sparteus, *Melaleuca hamata*^shrub\3i;G
Leptomeria pachyclada, *Phymatocarpus maxwellii*,
Dillwynia divaricata^shrub\2i

Veg. Condition Excellent



Species

Dillwynia divaricata

Exocarpos sparteus

Melaleuca hamata

Eucalyptus sp. Fraser Range (D. Nicolle 2157)

Leptomeria pachyclada

Phymatocarpus maxwellii

R034

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 305811 **mE** 6319477 **mN**
Latitude -33.2462 **Longitude** 120.9156

Habitat salt lake

Soil Type Yellow grey clay

Veg. G+ *Tecticornia halocnemoides*, *Tecticornia ?*
loriae^sapphire shrub\1i

Veg. Condition Excellent



Species

Frankenia sessilis

Tecticornia halocnemoides

Tecticornia ?loriae

R035

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 305669 **mE** 6318673 **mN**
Latitude -33.2535 **Longitude** 120.9139
Habitat Flat

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus dissimulata* subsp. *dissimulata*,
^*Eucalyptus scyphocalyx*^tree mallee\6\i;M
^*Melaleuca hamata*,^*Callitris preissii*^shrub\3\i;G
^^*Leptomeria pachyclada*,*Coleanthera myrtoidea*,
Conostephium drummondii^shrub\2\i

Veg. Condition Excellent



Species

Callitris preissii

Conostephium drummondii

Eucalyptus scyphocalyx

Melaleuca hamata

Coleanthera myrtoidea

Eucalyptus dissimulata subsp. *dissimulata*

Leptomeria pachyclada

R036

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 306860 **mE** 6312540 **mN**
Latitude -33.3090 **Longitude** 120.9254

Habitat Drainage

Soil Type Grey sandy clay

Veg. U+ ^*Eucalyptus uncinata*,^*Eucalyptus phaenophylla*
subsp. *interjacens*^tree mallee\6\i;M ^^*Melaleuca*
hamata,*Acacia patagiata*,*Acacia assimilis* subsp.
assimilis^shrub\3\c;

Veg. Condition Excellent



Species

Acacia assimilis subsp. *assimilis*

Eucalyptus phaenophylla subsp. *interjacens*

Melaleuca hamata

Acacia patagiata

Eucalyptus uncinata

R037

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 318519 **mE** 6316609 **mN**
Latitude -33.2743 **Longitude** 121.0514

Habitat Flat

Soil Type Yellow brown clay loam

Veg. M+ ^*Melaleuca uncinata*, ^*Eucalyptus grossa* ^shrub\3i; G ^^*Grevillea aneura*, *Lepidosperma drummondii*, *Calothamnus quadrifidus* subsp. *quadrifidus* ^shrub, sedge\2i

Veg. Condition Excellent



Species

Calothamnus quadrifidus subsp. *quadrifidus*
Eucalyptus perangusta
Lepidosperma drummondii
Olax benthamiana

Eucalyptus grossa
Grevillea aneura
Melaleuca uncinata
Verticordia chrysantha

R038

Staff SK/RD **Date** 14/10/2013
MGA Zone 51 312698 **mE** 6319261 **mN**
Latitude -33.2494 **Longitude** 120.9895

Habitat Low rise

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*, ^*Eucalyptus incrassata* ^tree mallee\6i; M ^^*Banksia media*, *Isopogon trilobus*, *Hakea cinerea* ^shrub\3r; G ^^*Beaufortia micrantha* var. *micrantha*, *Melaleuca* sp., *Lysinema pentapetalum* ^shrub\2c

Veg. Condition Excellent



Species

Banksia media
Eucalyptus incrassata
Hakea cinerea
Lysinema pentapetalum

Beaufortia micrantha var. *micrantha*
Eucalyptus pleurocarpa
Isopogon trilobus
Melaleuca sp.

R039

Staff SK/RD Date 14/10/2013
 MGA Zone 51 312789 mE 6322299 mN
 Latitude -33.2220 Longitude 120.9911

Habitat Flat

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
Eucalyptus stoatei, *Banksia media* ^tree mallee, tree\6\i;
 M ^*Melaleuca hamata*, ^*Melaleuca sapientes*,
Leptomeria pachyclada ^shrub\3\c; G ^*Spyridium*
mucronatum subsp. *mucronatum*, *Hibbertia exasperata*,
Eutaxia lutea ^shrub\2\r

Veg. Condition Excellent



Species

Banksia media
Eucalyptus stoatei
Hibbertia exasperata
Melaleuca hamata
Spyridium mucronatum subsp. *mucronatum*

Eucalyptus eremophila subsp. *eremophila*
Eutaxia lutea
Leptomeria pachyclada
Melaleuca sapientes

R040

Staff SK/RD Date 14/10/2013
 MGA Zone 51 314292 mE 6323003 mN
 Latitude -33.2160 Longitude 121.0073

Habitat Flat

Soil Type Light grey sandy clay loam

Veg. U+ ^*Eucalyptus quadrans*, ^*Eucalyptus*
flocktoniae ^tree mallee\6\i; M ^*Melaleuca cucullata*,
Melaleuca strobophylla, *Dodonaea*
stenozyga ^shrub\4\c; G ^*Acacia crassuloides*, ^*Acacia*
erinacea ^shrub\2\r

Veg. Condition Excellent



Species

Acacia crassuloides
Dodonaea stenozyga
Eucalyptus quadrans
Melaleuca strobophylla

Acacia erinacea
Eucalyptus flocktoniae
Melaleuca cucullata

R041

Staff SK/RD **Date** 13/10/2013
MGA Zone 51 305838 **mE** 6319426 **mN**
Latitude -33.2467 **Longitude** 120.9159

Habitat Banks of salt lake

Soil Type Yellow grey sandy loam

Veg. M+ *Melaleuca hamulosa* shrub; G *Austrostipa juncifolia*, *Gahnia* sp. L (K.R. Newbey 7888) tussock grass, sedge

Veg. Condition Pristine



Species

Austrostipa juncifolia
Melaleuca hamulosa

Gahnia sp. L (K.R. Newbey 7888)

R042

Staff SK/RD **Date** 14/10/2013
MGA Zone 51 316077 **mE** 6316319 **mN**
Latitude -33.2765 **Longitude** 121.0251

Habitat Flat

Soil Type Light brown sandy clay

Veg. U+ *Eucalyptus flocktoniae*, *Eucalyptus dielsii* tree mallee; M *Melaleuca podiocalpa*, *Melaleuca pauperiflora* subsp. *pauperiflora*, *Melaleuca cucullata* shrub; G *Pomaderris rotundifolia*, *Daviesia benthamii* subsp. *acanthoclona*, *Halgania andromedifolia* shrub

Veg. Condition Excellent



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus flocktoniae
Melaleuca cucullata
Melaleuca podiocalpa

Eucalyptus dielsii
Halgania andromedifolia
Melaleuca pauperiflora subsp. *pauperiflora*
Pomaderris rotundifolia

R043

Staff SK/RD **Date** 14/10/2013
MGA Zone 51 321062 **mE** 6317993 **mN**
Latitude -33.2623 **Longitude** 121.0789
Habitat Flat

Soil Type Light grey clay loam

Veg. U+ ^*Eucalyptus extensa*,*Eucalyptus flocktoniae*,
Eucalyptus platypus^tree,tree mallee\6\c;M
 ^^*Melaleuca cucullata*,*Melaleuca podiocalyx*,
Melaleuca pauperiflora subsp. *pauperiflora*^shrub\4\c;
 G ^*Acacia crassuloides*,^*Hakea commutata*^shrub\2\r

Veg. Condition Excellent



Species

Acacia crassuloides

Eucalyptus flocktoniae

Hakea commutata

Melaleuca pauperiflora subsp. *pauperiflora*

Eucalyptus extensa

Eucalyptus platypus

Melaleuca cucullata

Melaleuca podiocalyx

R044

Staff SK/RD **Date** 14/10/2013
MGA Zone 51 326367 **mE** 6319795 **mN**
Latitude -33.2469 **Longitude** 121.1362
Habitat Flat

Soil Type Light yellow brown clay loam

Veg. U+ ^*Eucalyptus leptocalyx*^tree mallee\6\i;M
 ^*Melaleuca podiocalyx*^shrub\3\c;G ^^*Acacia*
crassuloides,*Halgania andromedifolia*,*Microcybe*
multiflora subsp. *multiflora*^shrub\2\r

Veg. Condition Excellent



Species

Acacia crassuloides

Eucalyptus indurata

Halgania andromedifolia

Melaleuca podiocalyx

Eucalyptus diptera

Eucalyptus leptocalyx

Melaleuca pauperiflora subsp. *pauperiflora*

Microcybe multiflora subsp. *multiflora*

R045

Staff SK/RD **Date** 15/10/2013
MGA Zone 51 326980 **mE** 6320542 **mN**
Latitude -33.2402 **Longitude** 121.1429
Habitat Flat

Soil Type Light yellow brown clay loam

Veg. U+ ^*Eucalyptus flocktoniae*, ^*Eucalyptus phenax* subsp. *phenax*, *Eucalyptus leptocalyx* ^tree mallee\6\i;
M ^^*Melaleuca podiocalpa*, *Melaleuca pauperiflora* subsp. *pauperiflora*, *Daviesia benthamii* subsp. *acanthoclona* ^shrub\3\i; G ^*Acacia crassuloides*, *Acacia deficiens* ^shrub\2\i

Veg. Condition Pristine



Species

Acacia crassuloides

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus flocktoniae

Eucalyptus phenax subsp. *phenax*

Melaleuca cucullata

Melaleuca podiocalpa

Acacia deficiens

Eucalyptus eremophila subsp. *eremophila*

Eucalyptus leptocalyx

Eucalyptus platypus

Melaleuca pauperiflora subsp. *pauperiflora*

R046

Staff SK/RD **Date** 15/10/2013
MGA Zone 51 326434 **mE** 6322447 **mN**
Latitude -33.2230 **Longitude** 121.1374

Habitat Low rise

Soil Type Red brown clay loam

Veg. M+ ^*Melaleuca uncinata*, ^*Eucalyptus grossa*, *Banksia elderiana* ^shrub\3\i; G ^*Cryptandra minutifolia* subsp. *brevistyla*, ^*Dodonaea caespitosa*, *Dampiera* sp. ^shrub, forb\1\i

Veg. Condition Excellent



Species

Aluta appressa

Cryptandra minutifolia subsp. *brevistyla*

Dodonaea caespitosa

Melaleuca uncinata

Banksia elderiana

Dampiera sp.

Eucalyptus grossa

R047

Staff SK/RD Date 15/10/2013
 MGA Zone 51 324156 mE 6326366 mN
 Latitude -33.1873 Longitude 121.1138
 Habitat Flat

Soil Type Light grey brown sandy clay loam

Veg. U+ ^*Eucalyptus flocktoniae*,*Eucalyptus eremophila* subsp. *eremophila*,*Eucalyptus phenax* subsp. *phenax*^tree mallee\6\i;M ^*Exocarpos aphyllus*, ^*Melaleuca johnsonii*,*Melaleuca lateriflora*^shrub\3\i;G ^*Halgania* sp. Peak Eleanora (M.A. Burgman 3547 B), ^*Pultenaea ?arida*,*Pomaderris rotundifolia*^shrub\1\i



Veg. Condition Excellent

Species

Eucalyptus eremophila subsp. *eremophila*
Eucalyptus phenax subsp. *phenax*
Halgania sp. Peak Eleanora (M.A. Burgman 3547 B)
Melaleuca johnsonii
Pomaderris rotundifolia

Eucalyptus flocktoniae
Exocarpos aphyllus
Melaleuca cucullata
Melaleuca lateriflora
Pultenaea ?arida

R048

Staff SK/RD Date 15/10/2013
 MGA Zone 51 320437 mE 6328915 mN
 Latitude -33.1637 Longitude 121.0744
 Habitat Flat

Soil Type Light grey sand

Veg. U ^*Eucalyptus dissimulata* subsp. *dissimulata*, ^*Eucalyptus scyphocalyx*^tree mallee\6\i;M+ ^^*Melaleuca plumea*,*Melaleuca hamata*,*Melaleuca sapientes*^shrub\3\c;G ^*Lepidosperma* sp. Bandalup Scabrid (N. Eveleigh 10798), ^*Leucopogon* sp. Coujinup (M.A. Burgman 1085),*Hibbertia* sp.^sedge,shrub\1\i



Veg. Condition Excellent

Species

Eucalyptus dissimulata subsp. *dissimulata*
Hibbertia sp.
Leucopogon sp. Coujinup (M.A. Burgman 1085)
Melaleuca plumea

Eucalyptus scyphocalyx
Lepidosperma sp. Bandalup Scabrid (N. Eveleigh 10798)
Melaleuca hamata
Melaleuca sapientes

R049

Staff SK/RD **Date** 15/10/2013
MGA Zone 51 317712 **mE** 6329637 **mN**
Latitude -33.1567 **Longitude** 121.0453

Habitat Flat

Soil Type Light brown grey clay loam

Veg. U ^*Eucalyptus diptera*,*Eucalyptus extensa*,
Eucalyptus oleosa subsp. *cylindroidea*^tree,tree
mallee\6\i;G+ ^^*Melaleuca cucullata*,*Acacia binata*,
Acacia crassuloides^shrub\2\i

Veg. Condition Excellent

**Species**

Acacia binata

Eucalyptus diptera

Eucalyptus oleosa subsp. *cylindroidea*

Melaleuca pauperiflora subsp. *pauperiflora*

Acacia crassuloides

Eucalyptus extensa

Melaleuca cucullata

Melaleuca podiocalpa

R050

Staff SK/RD **Date** 15/10/2013
MGA Zone 51 316019 **mE** 6329932 **mN**
Latitude -33.1538 **Longitude** 121.0272

Habitat Flat

Soil Type Light red brown lay loam

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
^*Eucalyptus scyphocalyx*^tree mallee\6\i;M
^^*Melaleuca hamata*,*Melaleuca podiocalpa*,*Melaleuca*
sapientes^shrub\3\c;G *Melaleuca johnsonii*,*Hakea*
commutata^shrub\2\i

Veg. Condition Very Good

**Species**

Eucalyptus eremophila subsp. *eremophila*

Hakea commutata

Melaleuca hamata

Melaleuca pauperiflora subsp. *pauperiflora*

Melaleuca sapientes

Eucalyptus scyphocalyx

Melaleuca eleuterostachya

Melaleuca johnsonii

Melaleuca podiocalpa

R051

Staff SK/RD **Date** 15/10/2013
MGA Zone 51 314543 **mE** 6329742 **mN**
Latitude -33.1552 **Longitude** 121.0114

Habitat Banks from salt lake

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus valens*^tree\7i;M ^*Callitris preissii*,
^*Santalum murrayanum*^shrub\4r;G ^^*Lepidosperma
drummondii*,*Lissanthe rubicunda*,*Conostephium
drummondii*^sedge,shrub\2i

Veg. Condition Pristine



Species

Callitris preissii
Eucalyptus valens
Lissanthe rubicunda
Santalum murrayanum

Conostephium drummondii
Lepidosperma drummondii
Melaleuca hamata

R052

Staff SK/RD **Date** 16/10/2013
MGA Zone 51 314543 **mE** 6329742 **mN**
Latitude -33.1552 **Longitude** 121.0114

Habitat Gentle rise

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus transcontinentalis*,^*Eucalyptus urna*,
Eucalyptus eremophila subsp. *eremophila*^tree,tree
mallee\6i;G ^^*Melaleuca sapientes*,*Melaleuca
podocarpa*,*Melaleuca eleuterostachya*^shrub\2c

Veg. Condition Excellent



Species

Eucalyptus eremophila subsp. *eremophila*
Eucalyptus urna
Melaleuca podocarpa

Eucalyptus transcontinentalis
Melaleuca eleuterostachya
Melaleuca sapientes

R053

Staff SK/RD **Date** 16/10/2013
MGA Zone 51 312084 **mE** 6329105 **mN**
Latitude -33.1606 **Longitude** 120.9849
Habitat Low position in undulating landscape
Soil Type Light grey sand

Veg. U+ ^*Eucalyptus spreata*,^*Eucalyptus kumarlensis*^tree\6\i;G ^*Melaleuca thyoides*, ^*Cyathostemon ambiguus*,*Spyridium mucronatum* subsp. *mucronatum*^shrub\2\c

Veg. Condition Excellent



Species

Aotus sp. Dundas (M.A. Burgman 2835)

Eucalyptus kumarlensis

Melaleuca sapientes

Spyridium mucronatum subsp. *mucronatum*

Cyathostemon cf. *ambiguus*

Eucalyptus spreata

Melaleuca thyoides

R054

Staff SK/RD **Date** 16/10/2013
MGA Zone 51 312653 **mE** 6323550 **mN**
Latitude -33.2107 **Longitude** 120.9899
Habitat Flat

Soil Type Light grey sandy loam

Veg. U+ ^*Eucalyptus urna*,^*Eucalyptus valens*^tree\7\c;M ^*Melaleuca pauperiflora* subsp. *pauperiflora*,*Melaleuca brevifolia*,*Melaleuca sapientes*^shrub\3\c;G ^*Daviesia* sp.^shrub\1\r

Veg. Condition Pristine



Species

Daviesia sp.

Eucalyptus valens

Melaleuca pauperiflora subsp. *pauperiflora*

Eucalyptus urna

Melaleuca brevifolia

Melaleuca sapientes

R055

Staff SK/RD **Date** 16/10/2013
MGA Zone 51 312328 **mE** 6325558 **mN**
Latitude -33.1926 **Longitude** 120.9868

Habitat Margins of salt lake

Soil Type Light brown grey sand

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree mallee\6r;M+ ^*Melaleuca thyoides*,^*Melaleuca exuvia*,
Cyathostemon ambiguus^shrub\4i;G ^*Darwinia* sp.
 Karonie (K. Newbey 8503),^*Leucopogon hamulosus*^shrub\2r

Veg. Condition Pristine



Species

Cyathostemon cf. *ambiguus*

Eucalyptus eremophila subsp. *eremophila*

Melaleuca exuvia

Melaleuca thyoides

Darwinia sp. Karonie (K. Newbey 8503)

Leucopogon hamulosus

Melaleuca subalaris

R056

Staff SK/RD **Date** 16/10/2013
MGA Zone 51 311778 **mE** 6327517 **mN**
Latitude -33.1748 **Longitude** 120.9813

Habitat Flat

Soil Type Grey brown loamy sand

Veg. U+ ^*Eucalyptus oleosa* subsp. *cylindroidea*^tree mallee\6i;M ^*Melaleuca pauperiflora* subsp.
pauperiflora,^*Melaleuca quadrifaria*^shrub\3c;G
 ^*Daviesia* sp.,^*Acacia merrallii*^shrub\2bi

Veg. Condition Pristine



Species

Acacia merrallii

Eucalyptus oleosa subsp. *cylindroidea*

Melaleuca quadrifaria

Daviesia sp.

Melaleuca pauperiflora subsp. *pauperiflora*

R057

Staff SK/RD Date 16/10/2013
 MGA Zone 51 328195 mE 6334658 mN
 Latitude -33.1132 Longitude 121.1586

Habitat Flat, slightly elevated

Soil Type Grey brown sand

Veg. U ^^*Eucalyptus dolichorhyncha*,*Eucalyptus perangusta*,*Eucalyptus phaenophylla* subsp. *interjacens*^tree,mallee shrub\6r;M+ ^^*Aluta appressa*,*Calothamnus quadrifidus* subsp. *quadrifidus*,*Acacia multispicata*^shrub\3c;G ^^*Verticordia roei* subsp. *roei*,*Verticordia chrysantha*,*Lepidosperma drummondii*^shrub\2i



Veg. Condition Excellent

Species

Acacia multispicata

Aluta appressa

Calothamnus quadrifidus subsp. *quadrifidus*

Eucalyptus perangusta

Grevillea aneura

Verticordia chrysantha

Allocasuarina campestris

Beaufortia schaueri

Eucalyptus dolichorhyncha

Eucalyptus phaenophylla subsp. *interjacens*

Lepidosperma drummondii

Verticordia roei subsp. *roei*

R059

Staff SK/RD Date 16/10/2013
 MGA Zone 51 329728 mE 6334685 mN
 Latitude -33.1132 Longitude 121.1751

Habitat Almost flat

Soil Type Light grey sand

Veg. U+ ^*Eucalyptus pleurocarpa*,^*Eucalyptus incrassata*^tree mallee\6i;M ^*Leptospermum nitens*^shrub\3r;G ^^*Beaufortia micrantha* var. *micrantha*,*Calytrix duplistipulata*,*Melaleuca tuberculata* var. *tuberculata*^shrub\2i



Veg. Condition Excellent

Species

Beaufortia micrantha var. *micrantha*

Eucalyptus incrassata

Leptospermum nitens

Calytrix duplistipulata

Eucalyptus pleurocarpa

Melaleuca tuberculata var. *tuberculata*

R060

Staff SK/RD Date 28/10/2013
 MGA Zone 51 520129 mE 6270454 mN
 Latitude -33.7057 Longitude 123.2172

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ ^^Grevillea baxteri,Hakea cinerea,Hakea obliqua
 subsp. obliqua\^shrub\3i;G ^^Beaufortia empetrifolia,
 Leucopogon crassifolius,Melaleuca
 pulchella\^shrub\2\c

Veg. Condition Pristine



Species

Adenanthos cuneatus

Beaufortia empetrifolia

Grevillea baxteri

Hakea denticulata

Isopogon sp. Fitzgerald River (D.B. Foreman 813)

Melaleuca pulchella

Banksia petiolaris

Eucalyptus extrica

Hakea cinerea

Hakea obliqua subsp. *obliqua*

Leucopogon crassifolius

Taxandria spathulata

R061

Staff SK/RD Date 28/10/2013
 MGA Zone 51 518218 mE 6269925 mN
 Latitude -33.7105 Longitude 123.1966

Habitat Sandplain

Soil Type Light grey sand

Veg. U+ ^Banksia speciosa,Hakea obliqua subsp.
 obliqua\^tree,shrub\6i;M ^^Beaufortia empetrifolia,
 Melaleuca striata,Leucopogon crassifolius\^shrub\3i;G
 ^^Banksia petiolaris,Stirlingia anethifolia,Anarthria
 laevis\^shrub,sedge\1i

Veg. Condition Excellent



Species

Anarthria laevis

Banksia speciosa

Hakea obliqua subsp. *obliqua*

Melaleuca striata

Banksia petiolaris

Beaufortia empetrifolia

Leucopogon crassifolius

Stirlingia anethifolia

R062

Staff SK/RD Date 29/10/2013
 MGA Zone 51 516470 mE 6268916 mN
 Latitude -33.7196 Longitude 123.1778
 Habitat Sandplain
 Soil Type Light grey loamy sand
 Veg. M ^*Banksia pilostylis*, ^*Adenanthos cuneatus* \shrub\3\i; G+ ^^*Beaufortia empetrifolia*,
Hypolaena humilis, *Melaleuca scabra* \shrub, rush\1\c
 Veg. Condition Excellent



Species

Adenanthos cuneatus
Banksia pilostylis
Eucalyptus extrica
Hypolaena humilis
Melaleuca pulchella
Melaleuca striata

Banksia petiolaris
Beaufortia empetrifolia
Gahnia trifida
Leucopogon crassifolius
Melaleuca scabra

R063

Staff SK/RD Date 29/10/2013
 MGA Zone 51 512865 mE 6269224 mN
 Latitude -33.7169 Longitude 123.1388
 Habitat Sandplain
 Soil Type Light grey sand
 Veg. U+ ^*Banksia speciosa* \tree\6\i; M ^*Acacia nigricans*,
^*Banksia pilostylis*, *Acacia cochlearis* \shrub\3\i; G
^^*Beaufortia empetrifolia*, *Leucopogon crassifolius*,
Anarthria laevis \shrub, sedge\2\i
 Veg. Condition Excellent



Species

Acacia cochlearis
Anarthria laevis
Banksia speciosa
Grevillea baxteri

Acacia nigricans
Banksia pilostylis
Beaufortia empetrifolia
Leucopogon crassifolius

R064

Staff SK/RD **Date** 29/10/2013
MGA Zone 51 510194 **mE** 6268212 **mN**
Latitude -33.7261 **Longitude** 123.1100
Habitat Sandplain
Soil Type Light grey loamy sand
Veg. M+ *Daviesia apiculata*, *Isopogon* sp. Fitzgerald River (D.B. Foreman 813), *Eucalyptus extrica*; *G*
Leucopogon crassifolius, *Melaleuca scabra*, *Anarthria laevis*
Veg. Condition Excellent



Species

Anarthria laevis
Beaufortia empetrifolia
Calytrix decandra
Eucalyptus extrica
Leucopogon crassifolius
Melaleuca striata

Banksia repens
Calothamnus gracilis
Daviesia apiculata
Isopogon sp. Fitzgerald River (D.B. Foreman 813)
Melaleuca scabra
Taxandria spathulata

R065

Staff SK/RD **Date** 29/10/2013
MGA Zone 51 508134 **mE** 6266375 **mN**
Latitude -33.7426 **Longitude** 123.0878
Habitat Sandplain
Soil Type Light grey loamy sand
Veg. M+ *Melaleuca striata*, *Taxandria spathulata*, *Isopogon* sp. Fitzgerald River (D.B. Foreman 813); *G*
Calothamnus gracilis, *Anarthria laevis*, *Beaufortia empetrifolia*
Veg. Condition Excellent



Species

Anarthria laevis
Calothamnus gracilis
Hakea denticulata
Melaleuca striata
Tricostularia aphylla

Beaufortia empetrifolia
Daviesia apiculata
Isopogon sp. Fitzgerald River (D.B. Foreman 813)
Taxandria spathulata

R066

Staff SK/RD Date 29/10/2013
 MGA Zone 51 506504 mE 6266327 mN
 Latitude -33.7431 Longitude 123.0702

Habitat Sandplain

Soil Type Light grey loamy sand

Veg. M ^^*Eucalyptus extrica*,*Grevillea baxteri*,*Daviesia apiculata*^shrub\3r;G+ ^^*Anarthria laevis*,*Banksia repens*,*Mesomelaena stygia* subsp. *stygia*^rush,shrub,sedge\1c

Veg. Condition Excellent



Species

Anarthria laevis
Calothamnus gracilis
Conothamnus aureus
Eucalyptus extrica
Mesomelaena stygia subsp. *stygia*
Xanthorrhoea platyphylla

Banksia repens
Caustis dioica
Daviesia apiculata
Grevillea baxteri
Mesomelaena tetragona

R067

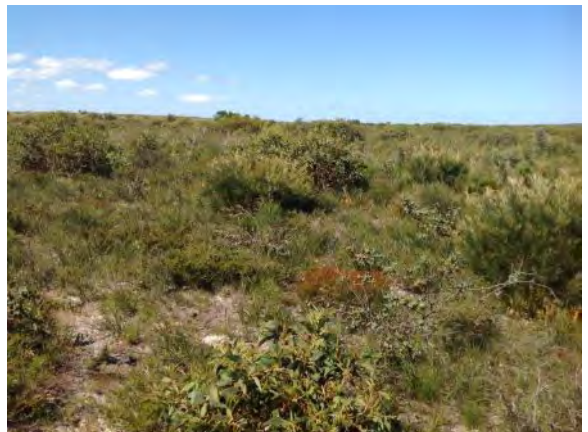
Staff SK/RD Date 29/10/2013
 MGA Zone 51 501511 mE 6267225 mN
 Latitude -33.7350 Longitude 123.0163

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ ^^*Eucalyptus extrica*,*Grevillea baxteri*,*Hakea obliqua* subsp. *obliqua*^shrub\3i;G ^^*Melaleuca scabra*,*Anarthria laevis*,*Mesomelaena stygia* subsp. *stygia*^shrub,rush,sedge\1c

Veg. Condition Excellent



Species

Anarthria laevis
Calothamnus gracilis
Eucalyptus extrica
Hakea cinerea
Hakea prostrata
Melaleuca scabra

Banksia repens
Conothamnus aureus
Grevillea baxteri
Hakea obliqua subsp. *obliqua*
Leptospermum spinescens
Mesomelaena stygia subsp. *stygia*

R068

Staff SK/RD Date 29/10/2013
 MGA Zone 51 501520 mE 6268077 mN
 Latitude -33.7273 Longitude 123.0164

Habitat Depression, seasonally wet

Soil Type Grey loam

Veg. U+ *Eucalyptus occidentalis* tree; M *Acacia rostellifera*, *Acacia cyclops* shrub; G *Tetraria* sp. Mt Madden (C.D. Turley 40 BP/897), *Neurachne alopecuroidea*, *Dodonaea caespitosa* sedge, other grass, shrub

Veg. Condition Excellent



Species

Acacia cyclops
Dodonaea caespitosa
Lepidosperma sp.
Tetraria sp. Mt Madden (C.D. Turley 40 BP/897)

Acacia rostellifera
Eucalyptus occidentalis
Neurachne alopecuroidea

R069

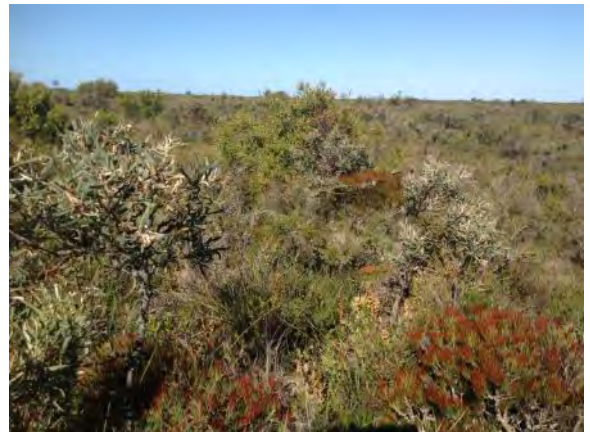
Staff SK/RD Date 29/10/2013
 MGA Zone 51 500822 mE 6270432 mN
 Latitude -33.7061 Longitude 123.0089

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ *Hakea cinerea*, *Hakea pandanica* subsp. *pandanica*, *Eucalyptus extrica* shrub; G *Melaleuca scabra*, *Leucopogon crassifolius*, *Anarthria laevis* shrub, sedge

Veg. Condition Excellent



Species

Anarthria laevis
Calothamnus gracilis
Eucalyptus extrica
Hakea pandanica subsp. *pandanica*
Leucopogon crassifolius
Taxandria spathulata

Banksia repens
Conothamnus aureus
Hakea cinerea
Isopogon sp. Fitzgerald River (D.B. Foreman 813)
Melaleuca scabra

R070

Staff SK/RD **Date** 29/10/2013
MGA Zone 51 500104 **mE** 6270796 **mN**
Latitude -33.7028 **Longitude** 123.0011

Habitat Low sandy rise

Soil Type Light grey sand

Veg. M+ ^^*Banksia armata* var. *armata*, *Melaleuca striata*,
Grevillea baxteri^\shrub\3\i;G ^^*Melaleuca scabra*,
Xanthorrhoea platyphylla, *Lepidosperma* sp.^\shrub,
grass tree, sedge\2\c

Veg. Condition Excellent



Species

Banksia armata var. *armata*

Conothamnus aureus

Grevillea baxteri

Lepidosperma sp.

Melaleuca scabra

Mesomelaena stygia subsp. *stygia*

Xanthorrhoea platyphylla

Beaufortia empetrifolia

Eucalyptus extrica

Hakea prostrata

Leucopogon crassifolius

Melaleuca striata

Taxandria spathulata

R071

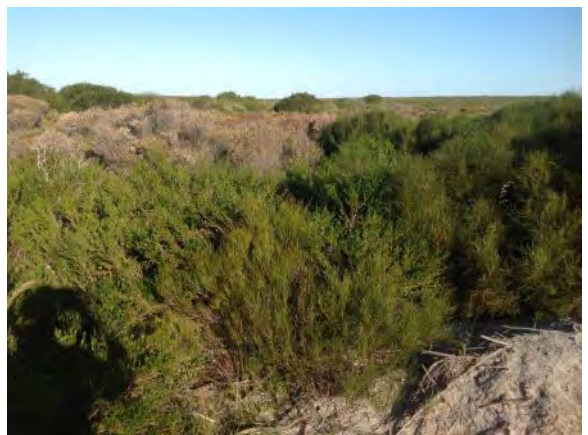
Staff SK/RD **Date** 29/10/2013
MGA Zone 51 499069 **mE** 6272236 **mN**
Latitude -33.6898 **Longitude** 122.9900

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ ^^*Dodonaea ceratocarpa*, *Acacia triptycha*,
Thryptomene australis^\shrub\3\i;G ^^*Trachymene*
pilosa, *Hypochaeris glabra*, *Aira cupaniana*^\forb, other
grass\1\i

Veg. Condition Very Good



Species

Acacia triptycha

Dodonaea ceratocarpa

* *Hypochaeris glabra*

Thryptomene aff. *australis*

* *Aira cupaniana*

* *Ehrharta calycina*

Leptospermum incanum

Trachymene pilosa

R072

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 498226 **mE** 6273157 **mN**
Latitude -33.6815 **Longitude** 122.9809

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ ^*Eucalyptus extrica*, ^*Grevillea baxteri*, *Eucalyptus angulosa* ^shrub\3i; G ^^*Mesomelaena stygia* subsp. *stygia*, *Calothamnus gracilis*, *Anarthria laevis* ^sedge, shrub, rush\1c

Veg. Condition Excellent



Species

Anarthria laevis
Beaufortia empetrifolia
Calytrix decandra
Eucalyptus angulosa
Grevillea baxteri
Melaleuca striata

Banksia repens
Calothamnus gracilis
Conothamnus aureus
Eucalyptus extrica
Isopogon sp. Fitzgerald River (D.B. Foreman 813)
Mesomelaena stygia subsp. *stygia*

R073

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 495100 **mE** 6277209 **mN**
Latitude -33.6449 **Longitude** 122.9472

Habitat Sandplain

Soil Type Light grey sand

Veg. M+ ^*Eucalyptus extrica*, ^*Grevillea baxteri*, *Daviesia apiculata* ^shrub\3i; G ^^*Mesomelaena stygia* subsp. *stygia*, *Conothamnus aureus*, *Beaufortia empetrifolia* ^sedge, shrub\1c

Veg. Condition Excellent



Species

Adenanthos cuneatus
Conothamnus aureus
Eucalyptus extrica
Leucopogon crassifolius
Mesomelaena stygia subsp. *stygia*
Taxandria spathulata

Beaufortia empetrifolia
Daviesia apiculata
Grevillea baxteri
Melaleuca striata
Petrophile teretifolia

R074

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 496138 **mE** 6278152 **mN**
Latitude -33.6364 **Longitude** 122.9584

Habitat Sandplain

Soil Type Light grey loamy sand

Veg. U+ ^*Eucalyptus angulosa*^tree mallee\6\r;M
 ^*Calothamnus quadrifidus* subsp. *quadrifidus*,^*Banksia*
media^shrub\3\i;G ^^*Leucopogon breviflorus*,
Cyathostemon tenuifolius,*Schoenus*
subfascicularis^shrub,sedge\2\i

Veg. Condition Excellent



Species

Banksia media

Cyathostemon aff. *tenuifolius*

Leucopogon breviflorus

Calothamnus quadrifidus subsp. *quadrifidus*

Eucalyptus angulosa

Schoenus subfascicularis

R075

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 498594 **mE** 6280414 **mN**
Latitude -33.6160 **Longitude** 122.9848

Habitat Sandplain

Soil Type Light grey sand

Veg. U ^*Eucalyptus extrica*^mallee shrub\6\r;M+
 ^^*Adenanthos cuneatus*,*Daviesia apiculata*,*Grevillea*
baxteri^shrub\3\i;G ^^*Beaufortia empetrifolia*,
Melaleuca striata,*Leucopogon crassifolius*^shrub\2\c

Veg. Condition Excellent



Species

Adenanthos cuneatus

Beaufortia empetrifolia

Daviesia apiculata

Grevillea baxteri

Melaleuca striata

Petrophile teretifolia

Banksia repens

Calothamnus gracilis

Eucalyptus extrica

Leucopogon crassifolius

Melaleuca tuberculata var. *macrophylla*

Stirlingia anethifolia

R076

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 498087 **mE** 6282237 **mN**
Latitude -33.5996 **Longitude** 122.9794

Habitat Sandplain

Soil Type Grey loamy sand

Veg. U ^*Eucalyptus extrica*^mallee shrub\6r;M
 ^^*Melaleuca striata*,*Melaleuca pulchella*,*Beaufortia
 empetrifolia*^shrub\3c;G+ ^^*Anarthria laevis*,
Mesomelaena stygia subsp. *stygia*,*Banksia
 repens*^sedge,shrub\1i

Veg. Condition Excellent



Species

Anarthria laevis

Beaufortia empetrifolia

Eucalyptus extrica

Melaleuca striata

Banksia repens

Calothamnus gracilis

Melaleuca pulchella

Mesomelaena stygia subsp. *stygia*

R077

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 496357 **mE** 6284050 **mN**
Latitude -33.5833 **Longitude** 122.9607

Habitat Sandplain

Soil Type Grey sandy loam

Veg. U ^^*Eucalyptus extrica*,*Eucalyptus uncinata*,
Eucalyptus angulosa^mallee shrub\6i;M+
 ^^*Beaufortia schaueri*,*Phymatocarpus maxwellii*,
Daviesia apiculata^shrub\3c;G ^^*Mesomelaena
 stygia* subsp. *stygia*,*Neurachne alopecuroidea*,*Acacia
 crispula*^sedge,other grass,shrub\1i

Veg. Condition Excellent



Species

Acacia crispula

Conothamnus aureus

Daviesia apiculata

Eucalyptus extrica

Melaleuca scabra

Neurachne alopecuroidea

Beaufortia schaueri

Dampiera lavandulacea

Eucalyptus angulosa

Eucalyptus uncinata

Mesomelaena stygia subsp. *stygia*

Phymatocarpus maxwellii

R078

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 497356 **mE** 6285063 **mN**
Latitude -33.5741 **Longitude** 122.9715

Habitat Sandplain

Soil Type Grey loamy sand

Veg. U+ ^*Eucalyptus uncinata*,^*Eucalyptus conglobata*^tree
mallee\6\i;M ^^*Acacia cyclops*,*Acacia nitidula*,
Dodonaea amblyophylla^shrub\3\i;G ^^*Schoenus*
subfascicularis,*Gahnia* sp.,*Lepidosperma* sp. Mt
Burdett (M.A. Burgman & C. Layman MAB 3287)
^sedge\1\i



Veg. Condition Excellent

Species

Acacia cyclops
Dodonaea amblyophylla
Eucalyptus uncinata
Lepidosperma sp. Mt Burdett (M.A. Burgman & C. Layman)

Acacia nitidula
Eucalyptus conglobata
Gahnia sp.
Schoenus subfascicularis

R079

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 498267 **mE** 6285852 **mN**
Latitude -33.5670 **Longitude** 122.9813

Habitat Sandplain

Soil Type Light grey loamy sand

Veg. U+ ^*Eucalyptus extrica*,^*Eucalyptus angulosa*^mallee
shrub\6\i;G ^^*Phymatocarpus maxwellii*,*Cyathostemon*
tenuifolius,*Beaufortia empetrifolia*^shrub\1\c



Veg. Condition Excellent

Species

Anarthria laevis
Banksia repens
Calothamnus gracilis
Cyathostemon aff. *tenuifolius*
Eucalyptus extrica
Phymatocarpus maxwellii

Banksia media
Beaufortia empetrifolia
Conothamnus aureus
Eucalyptus angulosa
Isopogon sp. Fitzgerald River (D.B. Foreman 813)

R080

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 498199 **mE** 6286600 **mN**
Latitude -33.5603 **Longitude** 122.9806

Habitat Sandplain

Soil Type Light grey sand

Veg. U ^*Eucalyptus extrica*^mallee shrub\6\r;M+
 ^^*Melaleuca striata*,*Adenanthos cuneatus*,*Grevillea baxteri*^shrub\3\r;G ^^*Beaufortia empetrifolia*,
Calothamnus gracilis,*Banksia repens*^shrub\1\r

Veg. Condition Excellent



Species

Adenanthos cuneatus

Beaufortia empetrifolia

Eucalyptus extrica

Isopogon sp. Fitzgerald River (D.B. Foreman 813)

Petrophile teretifolia

Banksia repens

Calothamnus gracilis

Grevillea baxteri

Melaleuca striata

R081

Staff SK/RD **Date** 30/10/2013
MGA Zone 51 495339 **mE** 6289891 **mN**
Latitude -33.5306 **Longitude** 122.9498

Habitat Flat

Soil Type Yellow grey sandy clay loam

Veg. U+ ^*Eucalyptus leptocalyx*,*Eucalyptus uncinata*^tree
 mallee\6\r;M ^^*Melaleuca societatis*,*Melaleuca glaberrima*,*Melaleuca lateriflora*^shrub\3\r;G
 ^^*Spyridium mucronatum* subsp. *mucronatum*,
Comesperma spinosum,*Boronia inornata* subsp.
leptophylla^shrub\1\r

Veg. Condition Excellent



Species

Boronia inornata subsp. *leptophylla*

Eucalyptus leptocalyx

Grevillea pectinata

Melaleuca hamata

Melaleuca societatis

Comesperma spinosum

Eucalyptus uncinata

Melaleuca glaberrima

Melaleuca lateriflora

Spyridium mucronatum subsp. *mucronatum*

R082

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 496235 **mE** 6290667 **mN**
Latitude -33.5236 **Longitude** 122.9595

Habitat Flat

Soil Type Brown clay loam

Veg. M+ ^*Acacia nitidula*,^*Melaleuca uncinata*,*Melaleuca elliptica*^shrub\3c;G ^^*Spartochloa scirpoidea*,
Thryptomene australis subsp. *brachyandra*,*Platysace effusa*^tussock grass,shrub\2i

Veg. Condition Excellent



Species

Acacia nitidula

Melaleuca uncinata

Spartochloa scirpoidea

Melaleuca elliptica

Platysace effusa

Thryptomene australis subsp. *brachyandra*

R083

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 497559 **mE** 6291673 **mN**
Latitude -33.5145 **Longitude** 122.9737

Habitat Flat

Soil Type Light grey loamy sand

Veg. U ^^*Eucalyptus angulosa*,*Eucalyptus extrica*,
Eucalyptus leptocalyx^mallee shrub\6r;M+
^^*Phymatocarpus maxwellii*,*Melaleuca pulchella*,
Beaufortia empetrifolia^shrub\3c;G ^*Acacia crispula*,
^*Hypolaena humilis*,*Dampiera lavandulacea*^shrub,
rush,forb\1r

Veg. Condition Excellent



Species

Acacia crispula

Beaufortia empetrifolia

Eucalyptus angulosa

Eucalyptus leptocalyx

Hypolaena humilis

Phymatocarpus maxwellii

Banksia media

Dampiera lavandulacea

Eucalyptus extrica

Hakea cinerea

Melaleuca pulchella

R084

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 502056 **mE** 6293065 **mN**
Latitude -33.5019 **Longitude** 123.0221
Habitat Saline depression
Soil Type Grey sandy clay
Veg. M+ ^*Melaleuca brevifolia*,^*Melaleuca subalaris*\^shrub\3\i;G ^^*Tecticornia* sp.,*Sarcocornia quinqueflora*,*Wilsonia humilis*\^sapphire shrub, shrub\1\i
Veg. Condition Very Good



Species

Melaleuca brevifolia
Sarcocornia quinqueflora
Wilsonia humilis

Melaleuca subalaris
Tecticornia sp.

R085

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 503810 **mE** 6294100 **mN**
Latitude -33.4926 **Longitude** 123.0410
Habitat Flat
Soil Type Light grey loamy sand
Veg. U ^*Eucalyptus uncinata*,^*Eucalyptus angulosa*\^tree mallee\6\i;M+ ^^*Phymatocarpus maxwellii*,*Melaleuca pulchella*,*Melaleuca societatis*\^shrub\3\i;G ^^*Hypolaena humilis*,*Micromyrtus elobata* subsp. *scopula*,*Gahnia ancistrophylla*\^rush,shrub,sedge\1\i
Veg. Condition Excellent



Species

Eucalyptus angulosa
Gahnia ancistrophylla
Grevillea pectinata
Melaleuca lateriflora
Melaleuca societatis
Phymatocarpus maxwellii

Eucalyptus uncinata
Grevillea oligantha
Hypolaena humilis
Melaleuca pulchella
Micromyrtus elobata subsp. *scopula*

R086

Staff SK/RD Date 31/10/2013
 MGA Zone 51 502618 mE 6295518 mN
 Latitude -33.4798 Longitude 123.0282
 Habitat Flat

Soil Type Yellow brown sandy clay loam

Veg. U+ ^*Eucalyptus varia* subsp. *varia*, ^*Eucalyptus ? pileata* ^tree mallee\6i;M ^^*Melaleuca societatis*, *Melaleuca glaberrima*, *Grevillea oligantha* ^shrub\3c;G ^^*Gahnia ancistrophylla*, *Pultenaea elachista*, *Boronia inornata* subsp. *leptophylla* ^sedge,shrub\1i

Veg. Condition Excellent



Species

Boronia inornata subsp. *leptophylla*
Eucalyptus ?pileata
Gahnia ancistrophylla
Melaleuca glaberrima
Nematolepis phebaloides

Cyathostemon aff. *tenuifolius*
Eucalyptus varia subsp. *varia*
Grevillea oligantha
Melaleuca societatis
Pultenaea elachista

R087

Staff SK/RD Date 31/10/2013
 MGA Zone 51 504697 mE 6301179 mN
 Latitude -33.4288 Longitude 123.0505
 Habitat Flat

Soil Type Light grey sandy clay loam

Veg. U ^*Eucalyptus leptocalyx*, ^*Eucalyptus conglobata* ^tree mallee\6r;M+ ^^*Melaleuca societatis*, *Melaleuca thyoides*, *Grevillea plurijuga* ^shrub\3i;G ^^*Micromyrtus elobata* subsp. *scopula*, *Spyridium mucronatum* subsp. *mucronatum*, *Gahnia ancistrophylla* ^shrub,sedge\1i

Veg. Condition Excellent



Species

Eucalyptus conglobata
Gahnia ancistrophylla
Melaleuca societatis
Micromyrtus elobata subsp. *scopula*

Eucalyptus leptocalyx
Grevillea plurijuga
Melaleuca thyoides
Spyridium mucronatum subsp. *mucronatum*

R088

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 504490 mE 6305866 mN
Latitude -33.3865 **Longitude** 123.0483
Habitat Flat

Soil Type Brown grey sandy loam

Veg. U ^*Eucalyptus leptocalyx*,^*Eucalyptus varia* subsp. *varia*^tree mallee\6\r;M+ ^^*Melaleuca societatis*,
Melaleuca glaberrima,*Grevillea pectinata*^shrub\3\i;G
 ^^*Gahnia ancistrophylla*,*Comesperma spinosum*,
Eutaxia lutea^sedge,shrub\1\i

Veg. Condition Excellent

**Species**

Boronia inornata subsp. *leptophylla*
Cooperookia strophiolata
Eucalyptus leptocalyx
Eutaxia lutea
Grevillea pectinata
Melaleuca podiocarpa

Comesperma spinosum
Daviesia benthamii subsp. *acanthoclona*
Eucalyptus varia subsp. *varia*
Gahnia ancistrophylla
Melaleuca glaberrima
Melaleuca societatis

R089

Staff SK/RD **Date** 31/10/2013
MGA Zone 51 503637 mE 6304631 mN
Latitude -33.3976 **Longitude** 123.0391
Habitat Depression

Soil Type Dark grey silty loam

Veg. U+ ^*Eucalyptus occidentalis*^tree\7\i;M ^*Melaleuca strobophylla*,^*Acacia diaphana*^shrub\4\i;

Veg. Condition Excellent

**Species**

Acacia diaphana
Melaleuca strobophylla

Eucalyptus occidentalis

R090

Staff SK/RD Date 1/11/2013
 MGA Zone 51 507200 mE 6308373 mN
 Latitude -33.3638 Longitude 123.0774
 Habitat Flat

Soil Type Light grey loamy sand

Veg. U+ ^*Eucalyptus leptocalyx*,^*Eucalyptus angulosa*^tree mallee\6\i;M ^*Melaleuca societatis*,^*Phymatocarpus maxwellii*,*Leptomeria pachyclada*^shrub\3\c;G ^*Spyridium mucronatum* subsp. *mucronatum*, *Microcybe pauciflora* subsp. *pauciflora*,*Gahnia ancistrophylla*^shrub,sedge\1\i



Veg. Condition Excellent

Species

Banksia media
Eucalyptus angulosa
Gahnia ancistrophylla
Melaleuca societatis
Persoonia teretifolia
Spyridium mucronatum subsp. *mucronatum*

Cyathostemon aff. *tenuifolius*
Eucalyptus leptocalyx
Leptomeria pachyclada
Microcybe pauciflora subsp. *pauciflora*
Phymatocarpus maxwellii

R091

Staff SK/RD Date 1/11/2013
 MGA Zone 51 507807 mE 6313644 mN
 Latitude -33.3163 Longitude 123.0839
 Habitat Flat

Soil Type Yellow grey sand

Veg. U ^*Eucalyptus uncinata*,^*Eucalyptus leptocalyx*^tree mallee\6\i;M+ ^^*Phymatocarpus maxwellii*,*Melaleuca plumea*,*Melaleuca societatis*^shrub\3\c;G ^*Spyridium mucronatum* subsp. *mucronatum*,^*Conostephium drummondii*^shrub\1\i



Veg. Condition Very Good

Species

Banksia media
Eucalyptus leptocalyx
Melaleuca plumea
Micromyrtus elobata subsp. *scopula*
Spyridium mucronatum subsp. *mucronatum*

Conostephium drummondii
Eucalyptus uncinata
Melaleuca societatis
Phymatocarpus maxwellii

R092

Staff SK/RD Date 1/11/2013
 MGA Zone 51 508055 mE 6314491 mN
 Latitude -33.3087 Longitude 123.0865

Habitat Slightly undulating

Soil Type Grey loamy sand

Veg. U+ ^*Eucalyptus uncinata*, ^*Eucalyptus leptocalyx* ^tree mallee\7i; M ^^*Melaleuca societatis*, *Melaleuca undulata*, *Banksia media* ^shrub\4c; G ^*Lissanthe rubicunda*, ^*Micromyrtus elobata* subsp. *scopula*, *Spyridium mucronatum* subsp. *mucronatum* ^shrub\1r

Veg. Condition Pristine



Species

Banksia media

Eucalyptus uncinata

Melaleuca societatis

Micromyrtus elobata subsp. *scopula*

Eucalyptus leptocalyx

Lissanthe rubicunda

Melaleuca undulata

Spyridium mucronatum subsp. *mucronatum*

R093

Staff SK/RD Date 1/11/2013
 MGA Zone 51 508217 mE 6316156 mN
 Latitude -33.2936 Longitude 123.0883

Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*, ^*Eucalyptus uncinata* ^tree mallee\6r; M ^*Melaleuca societatis*, ^*Melaleuca glaberrima*, *Grevillea oligantha* ^shrub\3c; G ^^*Micromyrtus elobata* subsp. *scopula*, *Spyridium mucronatum* subsp. *mucronatum*, *Cyathostemon* sp. ^shrub\1i

Veg. Condition Very Good



Species

Cyathostemon sp.

Eucalyptus uncinata

Melaleuca glaberrima

Melaleuca societatis

Micromyrtus elobata subsp. *scopula*

Eucalyptus eremophila subsp. *eremophila*

Grevillea oligantha

Melaleuca hamata

Melaleuca undulata

Spyridium mucronatum subsp. *mucronatum*

R094

Staff SK/RD **Date** 1/11/2013
MGA Zone 51 506667 **mE** 6317804 **mN**
Latitude -33.2788 **Longitude** 123.0716
Habitat Flat

Soil Type Light grey brown clay loam

Veg. U+ ^*Eucalyptus oleosa* subsp. *cylindroidea*^tree
 mallee\6\i;M ^*Melaleuca podiocalpa*,^*Melaleuca*
teuthidoides,*Melaleuca brevifolia*^shrub\3\i;G
 ^^*Microcybe multiflora* subsp. *baccharoides*,*Acacia*
sorophylla,*Boronia inornata* subsp.
leptophylla^shrub\1\i

Veg. Condition Very Good



Species

Acacia sorophylla

Eucalyptus oleosa subsp. *cylindroidea*

Melaleuca brevifolia

Melaleuca teuthidoides

Boronia inornata subsp. *leptophylla*

Halgania andromedifolia

Melaleuca podiocalpa

Microcybe multiflora subsp. *baccharoides*

R095

Staff SK/RD **Date** 1/11/2013
MGA Zone 51 505847 **mE** 6318670 **mN**
Latitude -33.2710 **Longitude** 123.0628
Habitat Flat

Soil Type Brown sandy loam

Veg. M+ ^^*Melaleuca uncinata*,*Thryptomene australis*
 subsp. *brachyandra*,*Acacia nitidula*^shrub\3\c;G
 ^*Trymalium myrtillus* subsp. *myrtillus*,^*Dodonaea*
lobulata^shrub\2\i

Veg. Condition Excellent



Species

Acacia nitidula

Eucalyptus grossa

Melaleuca uncinata

Trymalium myrtillus subsp. *myrtillus*

Dodonaea lobulata

Melaleuca elliptica

Thryptomene australis subsp. *brachyandra*

R096

Staff SK/RD **Date** 1/11/2013
MGA Zone 51 501473 **mE** 6317811 **mN**
Latitude -33.2787 **Longitude** 123.0158
Habitat Flat

Soil Type Light grey brown sandy loam

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*,
^*Eucalyptus scyphocalyx*^tree,tree mallee\6i;M+
^^*Melaleuca societatis*,*Melaleuca bromelioides*,
Melaleuca teuthidoides^shrub\3i;G ^*Pultenaea*
purpurea,^*Spyridium minutum*^shrub\1i

Veg. Condition Excellent



Species

Eucalyptus eremophila subsp. *eremophila*
Melaleuca bromelioides
Melaleuca hamata
Melaleuca societatis
Pultenaea purpurea

Eucalyptus scyphocalyx
Melaleuca glaberrima
Melaleuca podiocarpa
Melaleuca teuthidoides
Spyridium minutum

R097

Staff SK/RD **Date** 1/11/2013
MGA Zone 51 500101 **mE** 6316658 **mN**
Latitude -33.2891 **Longitude** 123.0011
Habitat Flat

Soil Type Brown sandy loam

Veg. U+ ^*Eucalyptus luculenta*,^*Eucalyptus* sp.^tree
mallee\6r;M ^*Melaleuca hamata*,^*Melaleuca*
eleuterostachya^shrub\3i;G ^^*Pultenaea purpurea*,
Acacia sorophylla,*Pomaderris rotundifolia*^shrub\1i

Veg. Condition Very Good



Species

Acacia sorophylla
Eucalyptus sp.
Melaleuca hamata
Pultenaea elachista

Eucalyptus luculenta
Melaleuca eleuterostachya
Pomaderris rotundifolia
Pultenaea purpurea

R098

Staff SK/RD Date 2/11/2013
 MGA Zone 51 447121 mE 6304084 mN
 Latitude -33.4013 Longitude 122.4314
 Habitat Flat

Soil Type Grey brown sandy loam

Veg. U+ ^*Eucalyptus dielsii*,^*Eucalyptus forrestiana*^tree\6\i;M ^^*Melaleuca societatis*,
Melaleuca podiocarpa,*Melaleuca cucullata*^shrub\3\i;
 G ^^*Acacia crassuloides*,*Acacia sorophylla*,
Pultenaea ?arida^shrub\1\i

Veg. Condition Very Good



Species

Acacia crassuloides

Boronia inornata subsp. *leptophylla*

Eucalyptus dielsii

Eucalyptus oleosa subsp. *cylindroidea*

Melaleuca podiocarpa

Melaleuca teuthidoides

Acacia sorophylla

Comesperma spinosum

Eucalyptus forrestiana

Melaleuca cucullata

Melaleuca societatis

Pultenaea ?arida

R099

Staff SK/RD Date 2/11/2013
 MGA Zone 51 444066 mE 6300684 mN
 Latitude -33.4318 Longitude 122.3983
 Habitat Flat

Soil Type Yellow grey sandy loam

Veg. U+ ^*Eucalyptus leptocalyx*,^*Eucalyptus flocktoniae*^tree mallee,tree\6\i;M ^^*Melaleuca societatis*,*Melaleuca hamata*,*Melaleuca undulata*^shrub\4\i;G ^^*Lepidosperma gahnioides*,
Lepidosperma sp. Bandalup Scabrid (N. Eveleigh 10798),
Gahnia ancistrophylla^sedge\1\i

Veg. Condition Pristine



Species

Eucalyptus flocktoniae

Gahnia ancistrophylla

Lepidosperma sp. Bandalup Scabrid (N. Eveleigh 10798)

Melaleuca societatis

Eucalyptus leptocalyx

Lepidosperma gahnioides

Melaleuca hamata

Melaleuca undulata

R100

Staff SK/RD **Date** 2/11/2013
MGA Zone 51 442454 **mE** 6300683 **mN**
Latitude -33.4317 **Longitude** 122.3810
Habitat Flat

Soil Type Yellow grey loamy sand

Veg. U+ ^^*Eucalyptus leptocalyx*,*Banksia media*,*Eucalyptus pleurocarpa*^tree mallee,tree\6\i;M ^^*Phymatocarpus maxwellii*,*Melaleuca plumea*,*Melaleuca pulchella*^shrub\3\c;G ^^*Gahnia ancistrophylla*,*Cyathostemon tenuifolius*,*Boronia crassifolia*^sedge, shrub\1\i



Veg. Condition Pristine

Species

Banksia media
Cyathostemon aff. *tenuifolius*
Eucalyptus pleurocarpa
Hakea cinerea
Melaleuca pulchella

Boronia crassifolia
Eucalyptus leptocalyx
Gahnia ancistrophylla
Melaleuca plumea
Phymatocarpus maxwellii

R101

Staff SK/RD **Date** 2/11/2013
MGA Zone 51 440745 **mE** 6302392 **mN**
Latitude -33.4162 **Longitude** 122.3627

Habitat Very small rise

Soil Type Yellow brown clay loam

Veg. M+ ^^*Allocasuarina campestris*,*Acacia mimica* var. *angusta*,*Calothamnus quadrifidus* subsp. *quadrifidus*^shrub\3\c;G ^^*Lepidosperma drummondii*,*Verticordia eriocephala*,*Philotheca gardneri* subsp. *gardneri*^sedge,shrub\1\i



Veg. Condition Excellent

Species

Acacia mimica var. *angusta*
Calothamnus quadrifidus subsp. *quadrifidus*
Melaleuca uncinata
Spartochloa scirpoidea
Verticordia eriocephala

Allocasuarina campestris
Lepidosperma drummondii
Philotheca gardneri subsp. *gardneri*
Thryptomene australis subsp. *brachyandra*

R102

Staff SK/RD **Date** 2/11/2013
MGA Zone 51 434854 **mE** 6302306 **mN**
Latitude -33.4166 **Longitude** 122.2993
Habitat Flat

Soil Type Grey loamy sand

Veg. U+ ^*Eucalyptus leptocalyx*,*Eucalyptus uncinata*,
Eucalyptus valens^tree mallee,tree\6i;M ^^*Melaleuca societatis*,*Melaleuca thyoides*,*Melaleuca linguiformis*^shrub\3c;G *Microcybe multiflora* subsp.
multiflora,*Micromyrtus elobata* subsp.
scopula^shrub\1r

Veg. Condition Pristine



Species

Eucalyptus leptocalyx
Eucalyptus valens
Melaleuca linguiformis
Melaleuca thyoides
Micromyrtus elobata subsp. *scopula*

Eucalyptus uncinata
Leptomeria pachyclada
Melaleuca societatis
Microcybe multiflora subsp. *multiflora*

R103

Staff SK/RD **Date** 2/11/2013
MGA Zone 51 436906 **mE** 6302077 **mN**
Latitude -33.4188 **Longitude** 122.3214

Habitat gently undulating landscape

Soil Type Yellow brown sandy clay

Veg. M+ ^*Allocasuarina campestris*,^*Melaleuca uncinata*,
Leptospermum incanum^shrub\3c;G ^^*Astus tetragonus*,*Lepidosperma drummondii*,*Platysace effusa*^shrub,sedge\2c

Veg. Condition Pristine



Species

Allocasuarina campestris
Eucalyptus grossa
Leptospermum incanum
Platysace effusa

Astus tetragonus
Lepidosperma drummondii
Melaleuca uncinata
Thryptomene australis subsp. *brachyandra*

R104

Staff SK/RD Date 3/11/2013
 MGA Zone 51 428566 mE 6302381 mN
 Latitude -33.4155 Longitude 122.2317

Habitat Undulating sandplain

Soil Type Light yellow grey sand

Veg. U [^]*Eucalyptus leptocalyx*,*Eucalyptus micranthera*,
Eucalyptus pleurocarpa[^]tree mallee\6\i;M+ [^]*Banksia*
media,*Hakea pandanica* subsp. *pandanica*,
Hakea cinerea[^]shrub\3\i;G [^]*Phymatocarpus*
maxwellii,*Melaleuca plumea*,*Melaleuca*
pulchella[^]shrub\2\c

Veg. Condition Pristine



Species

Banksia media
Eucalyptus micranthera
Hakea cinerea
Melaleuca plumea
Phymatocarpus maxwellii

Eucalyptus leptocalyx
Eucalyptus pleurocarpa
Hakea pandanica subsp. *pandanica*
Melaleuca pulchella

R105

Staff SK/RD Date 3/11/2013
 MGA Zone 51 428205 mE 6302680 mN
 Latitude -33.4128 Longitude 122.2278

Habitat Salt lake

Soil Type Grey sand

Veg. U [^]*Melaleuca brevifolia*[^]tree\6\i;M+ [^]*Baeckea*
uncinella,[^]*Darwinia* sp. Karonie (K. Newbey 8503)
[^]shrub\3\i;G [^]*Austrostipa juncifolia*,*Argentipallium*
tephrodes,*Tecticornia pergranulata*[^]tussock grass,
 shrub,samphire shrub\1\i

Veg. Condition Excellent



Species

Argentipallium tephrodes
Baeckea uncinella
Melaleuca brevifolia

Austrostipa juncifolia
Darwinia sp. Karonie (K. Newbey 8503)
Tecticornia pergranulata

R106

Staff SK/RD Date 3/11/2013
 MGA Zone 51 424475 mE 6304056 mN
 Latitude -33.4002 Longitude 122.1878

Habitat gently undulating landscape

Soil Type Yellow brown sandy loam

Veg. U ^*Eucalyptus tetraptera*, ^*Eucalyptus leptocalyx* ^mallee shrub\6r; M+ ^^*Melaleuca glena*,
Melaleuca rigidifolia, *Melaleuca glaberrima* ^shrub\3c;
 G ^*Lepidosperma drummondii*, ^*Gahnia ancistrophylla* ^sedge\1r

Veg. Condition Pristine



Species

Banksia media

Eucalyptus tetraptera

Lepidosperma drummondii

Melaleuca glena

Melaleuca rigidifolia

Eucalyptus leptocalyx

Gahnia ancistrophylla

Melaleuca glaberrima

Melaleuca hamata

R107

Staff SK/RD Date 3/11/2013
 MGA Zone 51 424661 mE 6304932 mN
 Latitude -33.3923 Longitude 122.1899

Habitat Flat

Soil Type Yellow grey sandy loam

Veg. U+ ^*Eucalyptus forrestiana*, ^*Eucalyptus flocktoniae* ^tree, tree mallee\6i; M ^^*Melaleuca societatis*, *Melaleuca glaberrima*, *Melaleuca bromelioides* ^shrub\3c; G ^^*Comesperma spinosum*,
Daviesia benthamii subsp. *acanthoclona*, *Boronia inornata* subsp. *leptophylla* ^shrub\1r

Veg. Condition Pristine



Species

Boronia inornata subsp. *leptophylla*

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus forrestiana

Melaleuca glaberrima

Comesperma spinosum

Eucalyptus flocktoniae

Melaleuca bromelioides

Melaleuca societatis

R108

Staff SK/RD Date 4/11/2013
 MGA Zone 51 420590 mE 6309091 mN
 Latitude -33.3545 Longitude 122.1465
 Habitat Flat

Soil Type Yellow grey loamy sand

Veg. U ^*Eucalyptus forrestiana*,^*Eucalyptus conglobata*^tree,tree mallee\6\i;M+ ^^*Melaleuca societatis*,*Melaleuca podiocarpa*,*Melaleuca bromelioides*^shrub\3\c;G ^*Daviesia benthamii* subsp. *acanthoclona*,^*Spyridium minutum*^shrub\1\i

Veg. Condition Pristine



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus forrestiana
Melaleuca glaberrima
Melaleuca societatis

Eucalyptus conglobata
Melaleuca bromelioides
Melaleuca podiocarpa
Spyridium minutum

R109

Staff SK/RD Date 4/11/2013
 MGA Zone 51 418789 mE 6310664 mN
 Latitude -33.3401 Longitude 122.1273
 Habitat Flat

Soil Type Grey sand

Veg. U+ ^*Eucalyptus leptocalyx*,^*Eucalyptus uncinata*^tree, tree mallee\7\i;M ^*Melaleuca societatis*,^*Melaleuca teuthidoides*^shrub\4\i;G ^^*Darwinia polycephala*, *Cyathostemon ambiguus*,*Baeckea crassifolia*^shrub\2\i

Veg. Condition Pristine



Species

Baeckea crassifolia
Darwinia polycephala
Eucalyptus uncinata
Melaleuca teuthidoides

Cyathostemon cf. *ambiguus*
Eucalyptus aff. *leptocalyx*
Melaleuca societatis

R110

Staff SK/RD **Date** 5/11/2013
MGA Zone 51 400146 **mE** 6340284 **mN**
Latitude -33.0714 **Longitude** 121.9302

Habitat Gentle sandy hill

Soil Type Yellow brown sand

Veg. U+ ^*Eucalyptus incrassata*,^*Eucalyptus uncinata*^tree
 mallee\7i;M ^*Banksia media*,^*Hakea*
multilineata^shrub\4i;G ^^*Adenanthos ileticos*,
Darwinia polycephala,*Baeckea crassifolia*^shrub\2i

Veg. Condition Excellent



Species

Adenanthos ileticos
Banksia media
Eucalyptus incrassata
Hakea multilineata

Baeckea crassifolia
Darwinia polycephala
Eucalyptus uncinata
Melaleuca plumea

R111

Staff SK/RD **Date** 5/11/2013
MGA Zone 51 402521 **mE** 6341934 **mN**
Latitude -33.0568 **Longitude** 121.9559

Habitat Minor depression

Soil Type Light grey sand

Veg. M+ ^^*Melaleuca fissurata*,*Melaleuca thyoides*,
Melaleuca acuminata subsp. *acuminata*^shrub\4c;G
 ^^*Olearia muelleri*,*Waitzia suaveolens* var. *flava*,
Darwinia polycephala^shrub\1i

Veg. Condition Excellent



Species

Cyathostemon cf. *ambiguus*
Eucalyptus merrickiae
Melaleuca fissurata
Olearia muelleri

Darwinia polycephala
Melaleuca acuminata subsp. *acuminata*
Melaleuca thyoides
Waitzia suaveolens var. *flava*

R112

Staff SK/RD Date 5/11/2013
 MGA Zone 51 403919 mE 6342154 mN
 Latitude -33.0549 Longitude 121.9709
 Habitat Flat

Soil Type Light grey loamy sand

Veg. U ^*Eucalyptus kessellii*,*Eucalyptus balladoniensis* subsp. *balladoniensis*^tree mallee\6i;M+ ^^*Melaleuca sapientes*,*Melaleuca podiocalpa*,*Melaleuca bromelioides*^shrub\3c;G ^^*Westringia cephalantha* var. *caterva*,*Cooperhooia strophilata*,*Spyridium mucronatum* subsp. *mucronatum*^shrub\1i

Veg. Condition Very Good



Species

Cooperhooia strophilata
Eucalyptus eremophila subsp. *eremophila*
Melaleuca bromelioides
Melaleuca podiocalpa
Spyridium mucronatum subsp. *mucronatum*

Eucalyptus balladoniensis subsp. *balladoniensis*
Eucalyptus kessellii
Melaleuca glaberrima
Melaleuca sapientes
Westringia cephalantha var. *caterva*

R113

Staff SK/RD Date 5/11/2013
 MGA Zone 51 407134 mE 6342370 mN
 Latitude -33.0532 Longitude 122.0053
 Habitat Flat

Soil Type Yellow brown loamy sand

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
 ^*Eucalyptus flocktoniae*^tree,tree mallee\6i;M
 ^^*Melaleuca teuthidoides*,*Melaleuca societatis*,
Melaleuca podiocalpa^shrub\3c;

Veg. Condition Excellent



Species

Alyogyne hakeifolia
Eucalyptus eremophila subsp. *eremophila*
Melaleuca podiocalpa
Melaleuca societatis
Westringia cephalantha var. *caterva*

Cooperhooia strophilata
Eucalyptus flocktoniae
Melaleuca sapientes
Melaleuca teuthidoides

R114

Staff SK/RD **Date** 5/11/2013
MGA Zone 51 412714 **mE** 6344270 **mN**
Latitude -33.0366 **Longitude** 122.0653
Habitat Sandplain

Soil Type Light yellow grey sand

Veg. U ^*Eucalyptus* sp.,^*Eucalyptus incrassata*^tree
 mallee\6i;M+ ^^*Melaleuca plumea*,*Phymatocarpus*
maxwellii,*Adenanthos ileticos*^shrub\3c;G
 ^*Micromyrtus elobata* subsp. *scopula*,^*Darwinia*
luehmannii^shrub\1r

Veg. Condition Excellent



Species

Acacia triptycha
Banksia media
Calytrix duplistipulata
Eucalyptus incrassata
Hakea cinerea
Micromyrtus elobata subsp. *scopula*

Adenanthos ileticos
Beaufortia empetrifolia
Darwinia luehmannii
Eucalyptus sp.
Melaleuca plumea
Phymatocarpus maxwellii

R115

Staff SK/RD **Date** 6/11/2013
MGA Zone 51 408017 **mE** 6347548 **mN**
Latitude -33.0066 **Longitude** 122.0153
Habitat Flat

Soil Type Light brown sandy loam

Veg. U+ ^^*Eucalyptus eremophila* subsp. *eremophila*,
Eucalyptus kessellii,*Eucalyptus diptera*^tree,tree
 mallee\6i;M ^^*Melaleuca teuthidoides*,*Melaleuca*
podocarpa,*Melaleuca sapientes*^shrub\3c;G
 ^*Daviesia benthamii* subsp. *acanthoclona*,^*Olearia*
muelleri^shrub\1r

Veg. Condition Excellent



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus eremophila subsp. *eremophila*
Melaleuca podocarpa
Melaleuca teuthidoides

Eucalyptus diptera
Eucalyptus kessellii
Melaleuca sapientes
Olearia muelleri

R116

Staff SK/RD Date 6/11/2013
 MGA Zone 51 406371 mE 6350175 mN
 Latitude -32.9828 Longitude 121.9979
 Habitat Flat

Soil Type Light brown loamy sand

Veg. U+ *Eucalyptus kessellii*, *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus flocktoniae* tree mallee, tree mallee; M *Melaleuca sapientes*, *Melaleuca teuthidoides*, *Melaleuca podiocarpa* shrub; G *Daviesia benthamii* subsp. *acanthoclona*, *Westringia cephalantha* var. *caterva*, *Olearia muelleri* shrub



Veg. Condition Excellent

Species

Cooperhooikia strophiolata

Eucalyptus eremophila subsp. *eremophila*

Eucalyptus kessellii

Melaleuca sapientes

Olearia muelleri

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus flocktoniae

Melaleuca podiocarpa

Melaleuca teuthidoides

Westringia cephalantha var. *caterva*

R117

Staff SK/RD Date 6/11/2013
 MGA Zone 51 405487 mE 6350832 mN
 Latitude -32.9768 Longitude 121.9885
 Habitat Flat

Soil Type Light grey loamy sand

Veg. U+ *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus merrickiae* tree, tree mallee; M *Melaleuca linguiformis*, *Alyxia buxifolia*, *Melaleuca thyoides* shrub; G *Gahnia ancistrophylla*, *Waitzia suaveolens* var. *flava*, *Olearia muelleri* sedge, forb, shrub



Veg. Condition Excellent

Species

Alyxia buxifolia

Eucalyptus merrickiae

Melaleuca linguiformis

Olearia muelleri

Eucalyptus eremophila subsp. *eremophila*

Gahnia ancistrophylla

Melaleuca thyoides

Waitzia suaveolens var. *flava*

R118

Staff SK/RD Date 6/11/2013
 MGA Zone 51 404820 mE 6354011 mN
 Latitude -32.9481 Longitude 121.9817
 Habitat Flat
 Soil Type Light grey loamy sand
 Veg. Degraded
 Veg. Condition



Species

R119

Staff SK/RD Date 6/11/2013
 MGA Zone 51 402468 mE 6355483 mN
 Latitude -32.9346 Longitude 121.9567
 Habitat Flat
 Soil Type Light yellow brown sandy loam
 Veg. U+ *Eucalyptus leptocalyx*, *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus gracilis* tree, tree mallee; *Melaleuca linguiformis*, *Alyxia buxifolia*, *Melaleuca acuminata* subsp. *acuminata* shrub; *Lepidosperma drummondii*, *Waitzia suaveolens* var. *flava*, *Scaevola spinescens* shrub, forb
 Veg. Condition Very Good



Species

Alyxia buxifolia
Eucalyptus eremophila subsp. *eremophila*
Halgania andromedifolia
Melaleuca acuminata subsp. *acuminata*
Melaleuca thyoides
Scaevola spinescens

Eucalyptus aff. *leptocalyx*
Eucalyptus gracilis
Lepidosperma drummondii
Melaleuca linguiformis
Olearia muelleri
Waitzia suaveolens var. *flava*

R120

Staff SK/RD Date 6/11/2013
 MGA Zone 51 400896 mE 6355370 mN
 Latitude -32.9355 Longitude 121.9399

Habitat Flat

Soil Type Light red brown loamy sand

Veg. M+ *Melaleuca acuminata* subsp. *acuminata*,
Melaleuca thyoides, *Melaleuca lanceolata* shrub; G
Triodia scariosa, *Bossiaea leptacantha*, *Westringia*
rigida hummock grass, shrub

Veg. Condition Very Good



Species

Bossiaea leptacantha
Melaleuca lanceolata
Triodia scariosa

Melaleuca acuminata subsp. *acuminata*
Melaleuca thyoides
Westringia rigida

R121

Staff SK/RD Date 7/11/2013
 MGA Zone 51 400896 mE 6355370 mN
 Latitude -32.9355 Longitude 121.9399

Habitat Flat

Soil Type Grey brown sandy clay loam

Veg. U *Eucalyptus oleosa* subsp. *oleosa*, *Eucalyptus*
conglobata, *Eucalyptus dielsii* tree mallee, tree; M+
Melaleuca cucullata, *Melaleuca acuminata* subsp.
acuminata, *Melaleuca podiocalpa* shrub; G
Boronia inornata subsp. *leptophylla*, *Olearia muelleri*,
Acacia profusa shrub

Veg. Condition Pristine



Species

Acacia profusa
Daviesia benthamii subsp. *acanthoclona*
Eucalyptus dielsii
Melaleuca acuminata subsp. *acuminata*
Melaleuca podiocalpa
Melaleuca strobophylla
Olearia muelleri

Boronia inornata subsp. *leptophylla*
Eucalyptus conglobata
Eucalyptus oleosa subsp. *oleosa*
Melaleuca cucullata
Melaleuca societatis
Melaleuca teuthidoides

R122

Staff SOK **Date** 23/11/2013
MGA Zone 51 350148 mE 6358545 mN
Latitude -32.9010 **Longitude** 121.3977
Habitat Flat

Soil Type Brown sandy loam

Veg. U ^*Eucalyptus diptera*,^*Eucalyptus eremophila* subsp. *eremophila*^tree\\;M ^^*Melaleuca podiocalpa*,
Exocarpos aphyllus,*Daviesia benthamii* subsp. *acanthoclona*^shrub\\;G ^*Olearia muelleri*,*Hibbertia psilocarpa*^shrub\\

Veg. Condition Excellent



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus eremophila subsp. *eremophila*
Halgania cyanea var. *cyanea*
Melaleuca podiocalpa
Westringia cephalantha var. *caterva*

Eucalyptus diptera
Exocarpos aphyllus
Hibbertia psilocarpa
Olearia muelleri

R123

Staff SOK **Date** 23/11/2013
MGA Zone 51 350147 mE 6360612 mN
Latitude -32.8824 **Longitude** 121.3981
Habitat Flat

Soil Type Light grey brown sand

Veg. U ^*Eucalyptus valens*,^*Eucalyptus kumarlensis*^tree\\;
M ^^*Exocarpos aphyllus*,*Alyxia buxifolia*,*Melaleuca lanceolata*^shrub\\;G ^^*Phebalium filifolium*,*Bertya virgata*,*Boronia inornata* subsp. *inornata*^shrub\\

Veg. Condition Pristine



Species

Alyxia buxifolia
Boronia inornata subsp. *inornata*
Eucalyptus valens
Melaleuca lanceolata

Bertya virgata
Eucalyptus kumarlensis
Exocarpos aphyllus
Phebalium filifolium

R124

Staff SOK **Date** 23/11/2013
MGA Zone 51 350648 **mE** 6361541 **mN**
Latitude -32.8741 **Longitude** 121.4036
Habitat Flat

Soil Type Light yellow brown sandy loam

Veg. U ^^*Eucalyptus kumarlensis*,*Eucalyptus diptera*,
Eucalyptus quadrans^tree,tree mallee\\;M ^*Melaleuca*
pauperiflora subsp. *fastigiata*,^*Exocarpos*
aphyllus^shrub\\;G ^^*Olearia muelleri*,*Scaevola*
spinescens,*Daviesia benthamii* subsp.
acanthoclona^shrub\\



Veg. Condition Pristine

Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus kumarlensis
Exocarpos aphyllus
Olearia muelleri

Eucalyptus diptera
Eucalyptus quadrans
Melaleuca pauperiflora subsp. *fastigiata*
Scaevola spinescens

R125

Staff SK/RD **Date** 23/11/2013
MGA Zone 51 355026 **mE** 6369867 **mN**
Latitude -32.7996 **Longitude** 121.4516
Habitat Flat

Soil Type Grey clay loam

Veg. U ^*Eucalyptus ovularis*^tree\\;M ^*Melaleuca*
teuthidoides,^*Melaleuca quadrifaria*^shrub\\;G
^*Cratystylis conocephala*^shrub\\



Veg. Condition Pristine

Species

Cratystylis conocephala
Melaleuca quadrifaria

Eucalyptus ovularis
Melaleuca teuthidoides

R126

Staff SOK **Date** 23/11/2013
MGA Zone 51 355078 **mE** 6370446 **mN**
Latitude -32.7944 **Longitude** 121.4523

Habitat Flat

Soil Type Light brown loamy sand

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree\\;M
 ^*Melaleuca exuvia*^shrub\\;G ^^*Cyathostemon*
ambiguus,*Lepidosperma drummondii*,*Microcybe*
multiflora subsp. *baccharoides*^shrub,sedge\\

Veg. Condition Pristine



Species

Aotus sp. Dundas (M.A. Burgman 2835)
Eucalyptus eremophila subsp. *eremophila*
Lomandra effusa
Microcybe multiflora subsp. *baccharoides*

Cyathostemon cf. *ambiguus*
Lepidosperma drummondii
Melaleuca exuvia

R127

Staff SOK **Date** 23/11/2013
MGA Zone 51 355183 **mE** 6371124 **mN**
Latitude -32.7883 **Longitude** 121.4535

Habitat Flat

Soil Type Light brown clay Liam

Veg. U ^*Eucalyptus ovularis*^tree\\;M ^*Melaleuca*
quadrifaria,^*Melaleuca teuthidoides*^shrub\\;G
 ^^*Cratystylis conocephala*,*Atriplex vesicaria*,
Zygophyllum aurantiacum^shrub,chenopod shrub\\

Veg. Condition Pristine



Species

Atriplex vesicaria
Eucalyptus ovularis
Melaleuca teuthidoides

Cratystylis conocephala
Melaleuca quadrifaria
Zygophyllum aurantiacum

R128

Staff SOK **Date** 24/11/2013
MGA Zone 51 387425 mE 6371848 mN
Latitude -32.7855 **Longitude** 121.7978
Habitat Saline Depression
Soil Type Brown clay loam
Veg. G ^^*Surreya diandra*,*Tecticornia moniliformis*,
Maireana oppositifolia^\shrub,samphire shrub,
chenopod shrub\<\
Veg. Condition Excellent



Species

Disphyma crassifolium
Maireana oppositifolia
Tecticornia moniliformis

Frankenia desertorum
Surreya diandra

R129

Staff SOK **Date** 24/11/2013
MGA Zone 51 387762 mE 6371214 mN
Latitude -32.7913 **Longitude** 121.8014
Habitat Flat
Soil Type Brown loam
Veg. U ^^*Eucalyptus diptera*,*Eucalyptus eremophila* subsp.
eremophila,*Eucalyptus spreta*^\tree\<\<;M ^^*Melaleuca*
linguiformis,*Melaleuca acuminata* subsp. *acuminata*,
Santalum acuminatum^\shrub\<\<;G ^^*Olearia muelleri*,
Daviesia sp.,*Microcybe multiflora* subsp.
multiflora^\shrub\<\
Veg. Condition Pristine



Species

Alyxia buxifolia
Eremophila scoparia
Eucalyptus eremophila subsp. *eremophila*
Melaleuca acuminata subsp. *acuminata*
Microcybe multiflora subsp. *multiflora*
Santalum acuminatum

Daviesia sp.
Eucalyptus diptera
Eucalyptus spreta
Melaleuca linguiformis
Olearia muelleri

R130

Staff SOK **Date** 24/11/2013
MGA Zone 51 390102 **mE** 6370659 **mN**
Latitude -32.7965 **Longitude** 121.8263

Habitat Flat

Soil Type Yellow brown sandy loam

Veg. M ^^*Melaleuca linguiformis*,*Melaleuca lateriflora*,
Melaleuca thyoides^\shrub\;G ^^*Bossiaea flexuosa*,
Gahnia ancistrophylla,*Scaevola spinescens*^\shrub,
sedge\

Veg. Condition Pristine



Species

Bossiaea flexuosa
Gahnia ancistrophylla
Melaleuca lateriflora
Melaleuca thyoides
Podolepis capillaris
Waitzia suaveolens var. *flava*

Cyathostemon cf. *ambiguus*
Melaleuca acuminata subsp. *acuminata*
Melaleuca linguiformis
Micromyrtus elobata subsp. *scopula*
Scaevola spinescens
Westringia rigida

R131

Staff JKN **Date** 14/10/2013
MGA Zone 51 344210 **mE** 6330746 **mN**
Latitude -33.1509 **Longitude** 121.3295

Habitat Upper-Slope

Soil Type Brown loamy sand

Veg. M ^*Eucalyptus eremophila* subsp. *eremophila*^\tree
mallee\5\r;G+ ^*Melaleuca hamata*,*Cooperhooikia*
strophiolata,*Halgania andromedifolia*^\shrub\2\i

Veg. Condition Very Good



Species

Cooperhooikia strophiolata
Halgania andromedifolia

Eucalyptus eremophila subsp. *eremophila*
Melaleuca hamata

R132

Staff JKN **Date** 14/10/2013
MGA Zone 51 349002 **mE** 6332874 **mN**
Latitude -33.1324 **Longitude** 121.3813

Habitat Crest

Soil Type Red brown clay loam

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree mallee\5r;M+ ^*Melaleuca marginata*,^*Melaleuca cucullata*^shrub\3i;G ^*Dodonaea stenozyga*,*Acacia crassuloides*^shrub\2i

Veg. Condition Very Good



Species

Acacia crassuloides

Eucalyptus eremophila subsp. *eremophila*

Melaleuca marginata

Dodonaea stenozyga

Melaleuca cucullata

R133

Staff JKN **Date** 15/10/2013
MGA Zone 51 349592 **mE** 6333183 **mN**
Latitude -33.1296 **Longitude** 121.3876

Habitat Upper-Slope

Soil Type Red brown loam

Veg. U ^*Eucalyptus extensa*^tree mallee\6i;M+ ^^*Melaleuca societatis*,*Melaleuca marginata*,
Melaleuca hamata^shrub\3c;

Veg. Condition Excellent



Species

Eucalyptus extensa

Melaleuca marginata

Melaleuca hamata

Melaleuca societatis

R134

Staff JKN Date 15/10/2013
 MGA Zone 51 354961 mE 6341121 mN
 Latitude -33.0588 Longitude 121.4464

Habitat Crest

Soil Type Light brown sand

Veg. M+ ^*Eucalyptus extensa*,^*Eucalyptus cylindriflora*,
Eucalyptus leptocalyx^tree mallee\5r;G ^*Daviesia*
benthamii subsp. *acanthoclona*,*Grevillea plurijuga*
 subsp. *plurijuga*,*Acacia hadrophylla*^shrub\1i

Veg. Condition Very Good



Species

Acacia hadrophylla
Eucalyptus cylindriflora
Eucalyptus leptocalyx

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus extensa
Grevillea plurijuga subsp. *plurijuga*

R135

Staff JKN Date 15/10/2013
 MGA Zone 51 354504 mE 6342497 mN
 Latitude -33.0463 Longitude 121.4418

Habitat Upper-Slope

Soil Type Red brown loam

Veg. M+ ^*Eucalyptus diptera*^tree mallee\5i;G ^^*Acacia*
crassuloides,*Melaleuca johnsonii*,*Melaleuca*
hamata^shrub\1r

Veg. Condition Very Good



Species

Acacia crassuloides
Melaleuca hamata

Eucalyptus diptera
Melaleuca johnsonii

R136

Staff JKN **Date** 16/10/2013
MGA Zone 51 353921 **mE** 6343944 **mN**
Latitude -33.0332 **Longitude** 121.4357
Habitat Upper-Slope
Soil Type Light brown sand
Veg. G+ ^*Acacia assimilis* subsp. *atroviridis*, ^*Melaleuca hamata*, *Verticordia roei* subsp. *roei* ^shrub\2\c
Veg. Condition Very Good



Species

Acacia assimilis subsp. *atroviridis*
Verticordia roei subsp. *roei*

Melaleuca hamata

R137

Staff JKN **Date** 16/10/2013
MGA Zone 51 353241 **mE** 6345617 **mN**
Latitude -33.0180 **Longitude** 121.4287
Habitat Flat
Soil Type Brown loam
Veg. M+ ^*Eucalyptus pileata*, ^*Eucalyptus calycogona* subsp. *calycogona* ^tree mallee\5\i; G ^*Melaleuca hamata* ^shrub\1\r
Veg. Condition Very Good



Species

Eucalyptus calycogona subsp. *calycogona*
Melaleuca hamata

Eucalyptus pileata

R138

Staff JKN **Date** 16/10/2013
MGA Zone 51 351778 **mE** 6349243 **mN**
Latitude -32.9851 **Longitude** 121.4137
Habitat Mid-Slope
Soil Type Brown clay loam
Veg. M ^*Eucalyptus ovularis*,*Eucalyptus platycorys*^tree mallee\5\r;G+ ^*Eremophila ionantha*,^*Eremophila dichroantha*,*Philotheca fitzgeraldii*^shrub\2\c
Veg. Condition Very Good



Species

Eremophila dichroantha
Eucalyptus ovularis
Philotheca fitzgeraldii

Eremophila ionantha
Eucalyptus platycorys

R139

Staff JKN **Date** 16/10/2013
MGA Zone 51 351099 **mE** 6350882 **mN**
Latitude -32.9703 **Longitude** 121.4067
Habitat Crest
Soil Type Light brown loamy sand
Veg. U ^*Eucalyptus flocktoniae*^tree mallee\5\i;M+ ^*Melaleuca marginata*^shrub\3\i;G ^*Boronia inornata* subsp. *inornata*,^*Daviesia benthamii* subsp. *acanthoclona*^shrub\2\i
Veg. Condition Very Good



Species

Boronia inornata subsp. *inornata*
Eucalyptus flocktoniae

Daviesia benthamii subsp. *acanthoclona*
Melaleuca marginata

R140

Staff JKN **Date** 16/10/2013
MGA Zone 51 350248 **mE** 6352992 **mN**
Latitude -32.9511 **Longitude** 121.3979

Habitat Upper-Slope

Soil Type Light brown loamy sand

Veg. M ^*Eucalyptus extensa*,*Eucalyptus kumarlensis*^tree mallee\5\r;G+ ^*Melaleuca sapientes*,*Grevillea plurijuga* subsp. *plurijuga*,*Daviesia benthamii* subsp. *acanthoclona*^shrub\2\c

Veg. Condition Very Good



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus kumarlensis
Melaleuca sapientes

Eucalyptus extensa
Grevillea plurijuga subsp. *plurijuga*

R141

Staff JKN **Date** 16/10/2013
MGA Zone 51 350060 **mE** 6354591 **mN**
Latitude -32.9367 **Longitude** 121.3962

Habitat Flat

Soil Type Light brown sand

Veg. M ^*Eucalyptus conglobata*^tree mallee\5\r;G+ ^^*Pultenaea elachista*,*Grevillea plurijuga* subsp. *plurijuga*,*Westringia rigida*^shrub\1\i

Veg. Condition Very Good



Species

Eucalyptus conglobata
Pultenaea elachista

Grevillea plurijuga subsp. *plurijuga*
Westringia rigida

R142

Staff JKN **Date** 16/10/2013
MGA Zone 51 351038 **mE** 6356068 **mN**
Latitude -32.9235 **Longitude** 121.4068

Habitat Flat

Soil Type Red loam

Veg. U+ ^*Eucalyptus conglobata*^tree mallee\6i;M
 ^*Melaleuca teuthidoides*,^*Melaleuca sapientes*,
Daviesia benthamii subsp. *acanthoclona*^shrub\3r;

Veg. Condition Excellent



Species

Daviesia benthamii subsp. *acanthoclona*
Melaleuca sapientes

Eucalyptus conglobata
Melaleuca teuthidoides

R143

Staff JKN **Date** 17/10/2013
MGA Zone 51 331976 **mE** 6333835 **mN**
Latitude -33.1212 **Longitude** 121.1990

Habitat Flat

Soil Type Light brown sand

Veg. U ^*Eucalyptus flocktoniae*^tree mallee\6r;M+
 ^^*Melaleuca societatis*,*Melaleuca sapientes*,*Melaleuca*
marginata^shrub\3c;

Veg. Condition Excellent



Species

Eucalyptus flocktoniae
Melaleuca sapientes

Melaleuca marginata
Melaleuca societatis

R144

Staff JKN **Date** 17/10/2013
MGA Zone 51 333838 **mE** 6328833 **mN**
Latitude -33.1666 **Longitude** 121.2180

Habitat Flat

Soil Type Light brown sand

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree
 mallee\5\r;M+ ^^*Melaleuca societatis*,*Melaleuca*
teuthidoides,*Melaleuca marginata*^shrub\3\c;

Veg. Condition Very Good



Species

Eucalyptus eremophila subsp. *eremophila*

Melaleuca societatis

Melaleuca marginata

Melaleuca teuthidoides

R145

Staff JKN **Date** 17/10/2013
MGA Zone 51 337377 **mE** 6329898 **mN**
Latitude -33.1575 **Longitude** 121.2562

Habitat Upper-Slope

Soil Type Light brown sand

Veg. U ^*Eucalyptus extensa*,*Eucalyptus*
flocktoniae^tree\6\i;M+ ^^*Melaleuca societatis*,
Melaleuca marginata,*Melaleuca*
teuthidoides^shrub\3\c;

Veg. Condition Excellent



Species

Eucalyptus extensa

Melaleuca marginata

Melaleuca teuthidoides

Eucalyptus flocktoniae

Melaleuca societatis

R146

Staff JKN **Date** 18/10/2013
MGA Zone 51 353714 **mE** 6368058 **mN**
Latitude -32.8157 **Longitude** 121.4374
Habitat Flat

Soil Type Yellow brown sand

Veg. U+ ^*Eucalyptus gracilis*,*Eucalyptus diptera*,
Eucalyptus urna^tree\7i;M ^*Melaleuca lanceolata*^shrub\4r;G ^^*Cratystylis conocephala*,
Boronia inornata subsp. *inornata*,*Eremophila scoparia*^shrub\3r

Veg. Condition Excellent



Species

Boronia inornata subsp. *inornata*
Eremophila scoparia
Eucalyptus gracilis
Melaleuca lanceolata

Cratystylis conocephala
Eucalyptus diptera
Eucalyptus urna

R147

Staff JKN **Date** 18/10/2013
MGA Zone 51 355603 **mE** 6374161 **mN**
Latitude -32.7610 **Longitude** 121.4585
Habitat Salt lake

Soil Type Light brown sand

Veg. U+ ^*Melaleuca subalaris*^mallee shrub\6i;M
^*Cyathostemon* sp. Salmon Gums (B. Archer 769)
^shrub\3i;G ^*Tecticornia moniliformis*^samphire
shrub\1r

Veg. Condition Very Good



Species

Cyathostemon sp. Salmon Gums (B. Archer 769)
Tecticornia moniliformis

Melaleuca subalaris

R148

Staff JKN **Date** 18/10/2013
MGA Zone 51 355608 **mE** 6373959 **mN**
Latitude -32.7628 **Longitude** 121.4585

Habitat Lower-Slope

Soil Type Light brown loam

Veg. U ^*Eucalyptus salmonophloia*^tree\7i;M+ ^*Melaleuca quadrifaria*,^*Melaleuca lanceolata*^shrub\4i;G
 ^*Microcybe multiflora* subsp. *multiflora*^shrub\2i

Veg. Condition Excellent



Species

Eucalyptus salmonophloia

Melaleuca quadrifaria

Melaleuca lanceolata

Microcybe multiflora subsp. *multiflora*

R149

Staff JKN **Date** 18/10/2013
MGA Zone 51 355842 **mE** 6376408 **mN**
Latitude -32.7407 **Longitude** 121.4614

Habitat Salt lake

Soil Type Light brown clay

Veg. G+ ^*Tecticornia moniliformis*,^*Tecticornia lepidosperma*^sapphire shrub\1i

Veg. Condition Very Good



Species

Tecticornia lepidosperma

Tecticornia moniliformis

R150

Staff JKN **Date** 19/10/2013
MGA Zone 51 355041 **mE** 6377594 **mN**
Latitude -32.7299 **Longitude** 121.4530

Habitat Flat

Soil Type Light brown sand

Veg. U+ ^*Eucalyptus urna*,^*Eucalyptus valens*^tree
mallee\6;c;M ^*Melaleuca teuthidoides*^shrub\3i;G
^*Ricinocarpos stylosus*^shrub\2r

Veg. Condition Excellent



Species

Eucalyptus urna

Melaleuca teuthidoides

Eucalyptus valens

Ricinocarpos stylosus

R151

Staff JKN **Date** 19/10/2013
MGA Zone 51 354944 **mE** 6377964 **mN**
Latitude -32.7266 **Longitude** 121.4520

Habitat Flat

Soil Type Light brown sand

Veg. U+ ^*Eucalyptus urna*,^*Eucalyptus gracilis*^tree\7i;M
^*Melaleuca teuthidoides*^shrub\4r;G ^*Scaevola*
spinescens,*Eremophila ionantha*^shrub\2r

Veg. Condition Excellent



Species

Eremophila ionantha

Eucalyptus urna

Scaevola spinescens

Eucalyptus gracilis

Melaleuca teuthidoides

R152

Staff JKN **Date** 19/10/2013
MGA Zone 51 358431 **mE** 6381758 **mN**
Latitude -32.6928 **Longitude** 121.4898

Habitat Flat

Soil Type Red brown loam

Veg. U+ ^*Eucalyptus gracilis*,^*Eucalyptus sprete*,*Eucalyptus kumarlensis*^tree\7r;M ^*Melaleuca quadrifaria*^shrub\4r;G ^*Cratystylis conocephala*^shrub\2i

Veg. Condition Excellent



Species

Cratystylis conocephala
Eucalyptus kumarlensis
Melaleuca quadrifaria

Eucalyptus gracilis
Eucalyptus sprete

R153

Staff JKN **Date** 19/10/2013
MGA Zone 51 359437 **mE** 6381452 **mN**
Latitude -32.6957 **Longitude** 121.5005

Habitat Lower-Slope

Soil Type Red brown loam

Veg. U+ ^*Eucalyptus delicata*^tree mallee\6i;M ^*Melaleuca teuthidoides*^shrub\4r;G ^*Microcybe multiflora* subsp. *multiflora*^shrub\2i

Veg. Condition Excellent



Species

Eucalyptus delicata
Microcybe multiflora subsp. *multiflora*

Melaleuca teuthidoides

R154

Staff JKN **Date** 21/10/2013
MGA Zone 51 414707 **mE** 6317361 **mN**
Latitude -33.2794 **Longitude** 122.0841
Habitat Sandplain

Soil Type Light brown sand

Veg. U ^*Eucalyptus conglobata*,^*Eucalyptus flocktoniae*,
Eucalyptus forrestiana^mallee shrub\5\bi;M+
 ^^*Melaleuca societatis*,*Melaleuca podiocarpa*,
Cyathostemon ambiguus^shrub\4\i;G ^*Daviesia*
benthamii subsp. *acanthoclona*,^*Spyridium*
minutum^shrub\1\r

Veg. Condition Very Good



Species

Cyathostemon cf. *ambiguus*
Eucalyptus conglobata
Eucalyptus forrestiana
Melaleuca societatis

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus flocktoniae
Melaleuca podiocarpa
Spyridium minutum

R155

Staff JKN **Date** 22/10/2013
MGA Zone 51 412226 **mE** 6318682 **mN**
Latitude -33.2673 **Longitude** 122.0576
Habitat Lower-Slope

Soil Type Brown loam

Veg. M+ ^^*Dodonaea amblyophylla*,*Grevillea plurijuga*
 subsp. *plurijuga*,*Melaleuca hamata*^shrub\3\c;

Veg. Condition Very Good



Species

Dodonaea amblyophylla
Melaleuca hamata

Grevillea plurijuga subsp. *plurijuga*

R156

Staff JKN Date 22/10/2013
 MGA Zone 51 412863 mE 6319864 mN
 Latitude -33.2567 Longitude 122.0645
 Habitat Crest

Soil Type Light brown sand

Veg. U ^*Eucalyptus kessellii*^tree mallee\6\i;M+
 ^^*Melaleuca teuthidoides*,*Melaleuca brevifolia*,
Melaleuca podiocarpa^shrub\3\i;G ^*Daviesia*
benthamii subsp. *acanthoclona*,^*Leptomeria*
pachyclada,*Acacia glaucissima*^shrub\2\i

Veg. Condition Excellent



Species

Acacia glaucissima
Eucalyptus kessellii
Melaleuca brevifolia
Melaleuca teuthidoides

Daviesia benthamii subsp. *acanthoclona*
Leptomeria pachyclada
Melaleuca podiocarpa

R157

Staff JKN Date 22/10/2013
 MGA Zone 51 413572 mE 6320993 mN
 Latitude -33.2466 Longitude 122.0722
 Habitat Upper-Slope

Soil Type Orange brown sand

Veg. U ^*Eucalyptus* sp.^mallee shrub\5\i;M+ ^*Melaleuca*
teuthidoides,^*Melaleuca societatis*,*Melaleuca*
societatis^shrub\3\i;G ^*Daviesia benthamii* subsp.
acanthoclona,^*Spyridium minutum*^shrub\2\i

Veg. Condition Very Good



Species

Daviesia benthamii subsp. *acanthoclona*
Melaleuca podiocarpa
Melaleuca teuthidoides

Eucalyptus sp.
Melaleuca societatis
Spyridium minutum

R158

Staff JKN Date 22/10/2013
 MGA Zone 51 414120 mE 6321957 mN
 Latitude -33.2379 Longitude 122.0782

Habitat Lower-Slope

Soil Type Brown loam

Veg. M+ ^*Acacia fragilis*,*Grevillea plurijuga* subsp. *plurijuga*,
Melaleuca pulchella^shrub\3c;G ^*Cryptandra*
recurva^shrub\1r

Veg. Condition Very Good



Species

Acacia fragilis

Grevillea plurijuga subsp. *plurijuga*

Cryptandra recurva

Melaleuca pulchella

R159

Staff JKN Date 23/10/2013
 MGA Zone 51 403163 mE 6329412 mN
 Latitude -33.1698 Longitude 121.9614

Habitat Salt lake

Soil Type Brown clay loam

Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree\6r;
 M+ ^*Melaleuca thyoides*,^*Melaleuca*
linguiformis^shrub\3c;G ^*Carpobrotus*
modestus^forb\1r

Veg. Condition Very Good



Species

Carpobrotus modestus

Melaleuca linguiformis

Eucalyptus eremophila subsp. *eremophila*

Melaleuca thyoides

R160

Staff JKN **Date** 23/10/2013
MGA Zone 51 403186 **mE** 6332556 **mN**
Latitude -33.1414 **Longitude** 121.9620
Habitat Upper-Slope
Soil Type Orange yellow sand
Veg. U ^*Eucalyptus eremophila* subsp. *eremophila*^tree\6\r;
M+ ^^*Melaleuca societatis*,*Melaleuca teuthidoides*,
Melaleuca podiocarpa^shrub\3\c;
Veg. Condition Excellent



Species

Eucalyptus eremophila subsp. *eremophila*
Melaleuca societatis

Melaleuca podiocarpa
Melaleuca teuthidoides

R161

Staff JKN **Date** 23/10/2013
MGA Zone 51 402935 **mE** 6333360 **mN**
Latitude -33.1341 **Longitude** 121.9594
Habitat Crest
Soil Type Light brown sand
Veg. M ^*Eucalyptus eremophila* subsp. *eremophila*,
^*Alyogyne hakeifolia*^mallee shrub,shrub\5\r;G+
^^*Grevillea plurijuga* subsp. *plurijuga*,*Westringia*
cephalantha var. *caterva*,*Cooperookia*
strophiolata^shrub\1\i
Veg. Condition Very Good



Species

Alyogyne hakeifolia
Eucalyptus eremophila subsp. *eremophila*
Westringia cephalantha var. *caterva*

Cooperookia strophiolata
Grevillea plurijuga subsp. *plurijuga*

R162

Staff JKN **Date** 24/10/2013
MGA Zone 51 400509 **mE** 6338615 **mN**
Latitude -33.0865 **Longitude** 121.9340
Habitat Upper-Slope
Soil Type Yellow sand
Veg. M ^*Eucalyptus* sp.\^mallee shrub\5\r;G+
 ^^*Coopermookia strophiolata*,*Westringia cephalantha*
 var. *caterva*,*Grevillea plurijuga* subsp.
plurijuga\^shrub\1i
Veg. Condition Very Good



Species

Coopermookia strophiolata
Grevillea plurijuga subsp. *plurijuga*

Eucalyptus sp.
Westringia cephalantha var. *caterva*

R163

Staff JKN **Date** 31/10/2013
MGA Zone 51 494028 **mE** 6309703 **mN**
Latitude -33.3519 **Longitude** 122.9358
Habitat Upper-Slope
Soil Type Light brown sand
Veg. M+ ^*Eucalyptus scyphocalyx*,*Eucalyptus eremophila*
 subsp. *eremophila*,*Eucalyptus* sp.\^mallee shrub\5\r;G
 ^*Melaleuca societatis*,^*Melaleuca podiocarpa*,
Melaleuca cucullata\^shrub\2i
Veg. Condition Very Good



Species

Eucalyptus eremophila subsp. *eremophila*
Eucalyptus sp.
Melaleuca podiocarpa

Eucalyptus scyphocalyx
Melaleuca cucullata
Melaleuca societatis

R164

Staff JKN **Date** 1/11/2013
MGA Zone 51 491823 **mE** 6307810 **mN**
Latitude -33.3689 **Longitude** 122.9121
Habitat Flat
Soil Type Light brown sand
Veg. G+ ^^*Acacia sorophylla*,*Daviesia benthamii* subsp.
acanthoclona,*Grevillea plurijuga* subsp.
plurijuga^\shrub\1i
Veg. Condition Very Good



Species

Acacia sorophylla
Grevillea plurijuga subsp. *plurijuga*

Daviesia benthamii subsp. *acanthoclona*

R165

Staff JKN **Date** 1/11/2013
MGA Zone 51 489692 **mE** 6306043 **mN**
Latitude -33.3848 **Longitude** 122.8892
Habitat Crest
Soil Type Light brown sand
Veg. U ^*Eucalyptus luculenta*^\mallee shrub\6r;M+
^^*Melaleuca societatis*,*Daviesia benthamii* subsp.
acanthoclona,*Melaleuca podiocalpa*^\shrub\3i;G
^*Pultenaea purpurea*,^*Acacia sorophylla*^\shrub\1r
Veg. Condition Very Good



Species

Acacia sorophylla
Eucalyptus luculenta
Melaleuca societatis

Daviesia benthamii subsp. *acanthoclona*
Melaleuca podiocalpa
Pultenaea purpurea

R166

Staff JKN Date 1/11/2013
 MGA Zone 51 487702 mE 6307097 mN
 Latitude -33.3753 Longitude 122.8678
 Habitat Crest

Soil Type Light orange sand

Veg. U ^*Eucalyptus luculenta*,^*Eucalyptus* sp.\^mallee shrub\6i;M+ ^*Melaleuca societatis*,^*Melaleuca bromelioides*,*Melaleuca podiocarpa*\^shrub\3i;G ^*Boronia inornata* subsp. *leptophylla*,^*Acacia sorophylla*\^shrub\1r

Veg. Condition Very Good



Species

Acacia sorophylla
Eucalyptus luculenta
Melaleuca bromelioides
Melaleuca societatis

Boronia inornata subsp. *leptophylla*
Eucalyptus sp.
Melaleuca podiocarpa

R167

Staff JKN Date 1/11/2013
 MGA Zone 51 486011 mE 6308872 mN
 Latitude -33.3593 Longitude 122.8496
 Habitat Upper-Slope

Soil Type Shallow brown loamy sand

Veg. M+ ^*Melaleuca uncinata*,*Melaleuca glaberrima*,*Callitris preissii*\^shrub\4i;G ^*Lepidosperma drummondii*, ^*Hibbertia* aff. *gracillipes*\^forb,shrub\2i

Veg. Condition Very Good



Species

Callitris preissii
Lepidosperma drummondii
Melaleuca uncinata

Hibbertia aff. *gracillipes*
Melaleuca glaberrima

R168

Staff JKN Date 2/11/2013
 MGA Zone 51 484257 mE 6310641 mN
 Latitude -33.3430 Longitude 122.8310

Habitat Upper-Slope

Soil Type Light orange sand

Veg. U ^*Eucalyptus luculenta*^mallee shrub\5r;M+
 ^^*Melaleuca societatis*,*Melaleuca glaberrima*,
Melaleuca hamata^shrub\3i;G ^*Aotus* sp. Southern
 Wheatbelt (C.A. Gardner & W.E. Blackall 1412)
 ^shrub\1r

Veg. Condition Very Good



Species

Aotus sp. Southern Wheatbelt (C.A. Gardner & W.E.

Melaleuca glaberrima

Melaleuca societatis

Eucalyptus luculenta

Melaleuca hamata

R169

Staff JKN Date 2/11/2013
 MGA Zone 51 482279 mE 6312723 mN
 Latitude -33.3245 Longitude 122.8096

Habitat Upper-Slope

Soil Type Light brown loamy sand

Veg. U+ ^*Eucalyptus luculenta*,*Eucalyptus valens*^mallee
 shrub,tree\5r;M ^*Daviesia benthamii* subsp.
acanthoclona^shrub\3r;G ^*Acacia sorophylla*,
 ^*Grevillea plurijuga* subsp. *plurijuga*^shrub\1r

Veg. Condition Very Good



Species

Acacia sorophylla

Eucalyptus luculenta

Grevillea plurijuga subsp. *plurijuga*

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus valens

R170

Staff JKN **Date** 2/11/2013
MGA Zone 51 480576 **mE** 6312865 **mN**
Latitude -33.3232 **Longitude** 122.7913

Habitat Crest

Soil Type Orange brown loamy sand

Veg. M+ ^^*Acacia mimica* var. *angusta*,*Allocasuarina campestris*,*Melaleuca uncinata*\^shrub\3\c;G
 ^*Hibbertia* aff. *gracillipes*,^*Platysace effusa*\^shrub\1\c

Veg. Condition Good



Species

Acacia mimica var. *angusta*
Hibbertia aff. *gracillipes*
Platysace effusa

Allocasuarina campestris
Melaleuca uncinata

R171

Staff JKN **Date** 2/11/2013
MGA Zone 51 478656 **mE** 6311002 **mN**
Latitude -33.3400 **Longitude** 122.7706

Habitat Sandplain

Soil Type Grey sand

Veg. M+ ^*Eucalyptus luculenta*,^*Eucalyptus valens*\^mallee shrub\5\c;G ^*Dodonaea amblyophylla*,^*Daviesia benthamii* subsp. *acanthoclona*,*Acacia sorophylla*\^shrub\2\c

Veg. Condition Very Good



Species

Acacia sorophylla
Dodonaea amblyophylla
Eucalyptus valens

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus luculenta

R172

Staff JKN **Date** 3/11/2013
MGA Zone 51 459523 **mE** 6302354 **mN**
Latitude -33.4174 **Longitude** 122.5646
Habitat Sandplain
Soil Type Light yellow sand
Veg. U ^*Eucalyptus leptocalyx*,*Eucalyptus uncinata*^mallee shrub\6r;M+ ^*Melaleuca societatis*,*Melaleuca glaberrima*^shrub\3i;
Veg. Condition Excellent



Species

Eucalyptus leptocalyx
Melaleuca glaberrima

Eucalyptus uncinata
Melaleuca societatis

R173

Staff JKN **Date** 2/11/2013
MGA Zone 51 477442 **mE** 6309811 **mN**
Latitude -33.3507 **Longitude** 122.7576
Habitat Sandplain
Soil Type Light yellow sand
Veg. U ^^*Eucalyptus eremophila* subsp. *eremophila*,
Eucalyptus luculenta,*Eucalyptus scyphocalyx*^mallee shrub\6r;M+ ^^*Melaleuca societatis*,*Grevillea plurijuga* subsp. *plurijuga*,*Daviesia benthamii* subsp. *acanthoclona*^shrub\3i;G ^*Acacia sorophylla*^shrub\1r
Veg. Condition Very Good



Species

Acacia sorophylla
Eucalyptus eremophila subsp. *eremophila*
Eucalyptus scyphocalyx
Melaleuca societatis

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus luculenta
Grevillea plurijuga subsp. *plurijuga*

R174

Staff JKN **Date** 3/11/2013
MGA Zone 51 457846 **mE** 6300961 **mN**
Latitude -33.4299 **Longitude** 122.5465
Habitat Sandplain
Soil Type Light yellow sand
Veg. U+ ^*Eucalyptus leptocalyx*^mallee shrub\6\;M
 ^^*Melaleuca societatis*,*Melaleuca glaberrima*,*Banksia*
pilostylis^shrub\3\c;
Veg. Condition Excellent



Species

Banksia pilostylis
Melaleuca glaberrima

Eucalyptus leptocalyx
Melaleuca societatis

R175

Staff JKN **Date** 3/11/2013
MGA Zone 51 455246 **mE** 6302010 **mN**
Latitude -33.4203 **Longitude** 122.5186
Habitat Upper-Slope
Soil Type Light yellow sand
Veg. M ^*Eucalyptus forrestiana*^mallee shrub\5\;G+
 ^^*Melaleuca societatis*,*Baeckea latens*,*Melaleuca*
rigidifolia^shrub\2\i
Veg. Condition Very Good



Species

Baeckea latens
Melaleuca rigidifolia

Eucalyptus forrestiana
Melaleuca societatis

R176

Staff JKN **Date** 3/11/2013
MGA Zone 51 453746 **mE** 6304659 **mN**
Latitude -33.3964 **Longitude** 122.5026

Habitat Flat

Soil Type Light brown sand

Veg. M+ ^*Eucalyptus leptocalyx*,^*Eucalyptus forrestiana*^mallee shrub\5\bi;G ^^*Cooperookia strophiolata*,*Grevillea plurijuga* subsp. *plurijuga*,
Baeckea latens^shrub\2\i

Veg. Condition Very Good



Species

Baeckea latens

Eucalyptus forrestiana

Grevillea plurijuga subsp. *plurijuga*

Cooperookia strophiolata

Eucalyptus leptocalyx

R177

Staff JKN **Date** 4/11/2013
MGA Zone 51 402331 **mE** 6361721 **mN**
Latitude -32.8783 **Longitude** 121.9559

Habitat Upper-Slope

Soil Type Light brown sand

Veg. M ^*Eucalyptus urna*,*Eucalyptus eremophila* subsp. *eremophila*,*Eucalyptus diptera*^mallee shrub\5\r;G+ ^^*Cooperookia strophiolata*,*Olearia muelleri*,
Austrostipa variabilis^shrub,tussock grass\1\i

Veg. Condition Very Good



Species

Austrostipa variabilis

Eucalyptus diptera

Eucalyptus urna

Cooperookia strophiolata

Eucalyptus eremophila subsp. *eremophila*

Olearia muelleri

R178

Staff JKN **Date** 4/11/2013
MGA Zone 51 403757 **mE** 6364935 **mN**
Latitude -32.8494 **Longitude** 121.9715

Habitat Crest

Soil Type Light brown loam

Veg. M+ ^^*Acacia chrysell*, *Commersonia craurophylla*,
Glischrocaryon flavescens^shrub\3\i;G ^*Rytidosperma*
sp., ^*Austrostipa variabilis*^tussock grass\2\i

Veg. Condition Very Good



Species

Acacia chrysell
Commersonia craurophylla
Rytidosperma sp.

Austrostipa variabilis
Glischrocaryon flavescens

R179

Staff JKN **Date** 4/11/2013
MGA Zone 51 404466 **mE** 6367091 **mN**
Latitude -32.8301 **Longitude** 121.9793

Habitat Salt lake

Soil Type Brown sand

Veg. M+ ^*Melaleuca brevifolia*^shrub\3\i;G ^^*Austrostipa*
juncifolia, *Tecticornia moniliformis*, *Tecticornia*
syncarpa^tussock grass, samphire shrub\2\i

Veg. Condition Excellent



Species

Austrostipa juncifolia
Tecticornia moniliformis

Melaleuca brevifolia
Tecticornia syncarpa

R180

Staff JKN Date 5/11/2013
 MGA Zone 51 403580 mE 6367325 mN
 Latitude -32.8279 Longitude 121.9699

Habitat Lower-Slope

Soil Type Yellow sand

Veg. U ^*Eucalyptus kumarlensis*^tree\7\bi;M+ ^^*Melaleuca thyoides*,*Melaleuca linguiformis*,*Alyxia buxifolia*^shrub\4\i;G ^^*Bertya virgata*,*Cyathostemon* sp. Salmon Gums (B. Archer 769),*Scaevola spinescens*^shrub\2\i

Veg. Condition Excellent



Species

Alyxia buxifolia

Cyathostemon sp. Salmon Gums (B. Archer 769)

Melaleuca linguiformis

Scaevola spinescens

Bertya virgata

Eucalyptus kumarlensis

Melaleuca thyoides

R181

Staff JKN Date 5/11/2013
 MGA Zone 51 401668 mE 6368151 mN
 Latitude -32.8203 Longitude 121.9495

Habitat Crest

Soil Type Grey sand

Veg. U+ ^*Eucalyptus urna*,^*Eucalyptus valens*,*Eucalyptus delicata*^tree\7\i;M ^*Melaleuca teuthidoides*,*Melaleuca quadrifaria*^shrub\4\i;G ^*Microcybe multiflora* subsp. *multiflora*,^*Daviesia benthamii* subsp. *acanthoclona*^shrub\2\bi

Veg. Condition Excellent



Species

Daviesia benthamii subsp. *acanthoclona*

Eucalyptus urna

Melaleuca quadrifaria

Microcybe multiflora subsp. *multiflora*

Eucalyptus delicata

Eucalyptus valens

Melaleuca teuthidoides

R182

Staff JKN Date 5/11/2013
 MGA Zone 51 396045 mE 6369229 mN
 Latitude -32.8100 Longitude 121.8896

Habitat Crest

Soil Type Grey sand

Veg. U+ ^*Eucalyptus kessellii*, ^*Eucalyptus leptocalyx*,
Eucalyptus urna ^tree\7r; M ^*Melaleuca teuthidoides*,
 ^*Melaleuca sapientes* ^shrub\4r; G ^*Boronia inornata*
 subsp. *leptophylla* ^shrub\2r

Veg. Condition Excellent



Species

Boronia inornata subsp. *leptophylla*
Eucalyptus kessellii
Melaleuca sapientes

Eucalyptus aff. *leptocalyx*
Eucalyptus urna
Melaleuca teuthidoides

R183

Staff JKN Date 5/11/2013
 MGA Zone 51 393507 mE 6369885 mN
 Latitude -32.8039 Longitude 121.8626

Habitat Salt lake

Soil Type Brown loam

Veg. U ^*Eucalyptus spreta* ^tree\7bi; M ^*Geijera linearifolia*,
Santalum acuminatum, *Dodonaea viscosa* subsp.
angustissima ^shrub\4r; G+ ^^*Westringia rigida*,
Atriplex vesicaria, *Austrostipa variabilis* ^shrub, tussock
 grass\2i

Veg. Condition Excellent



Species

Atriplex vesicaria
Dodonaea viscosa subsp. *angustissima*
Geijera linearifolia
Westringia rigida

Austrostipa variabilis
Eucalyptus spreta
Santalum acuminatum

R184

Staff JKN **Date** 6/11/2013
MGA Zone 51 384761 **mE** 6378515 **mN**
Latitude -32.7251 **Longitude** 121.7702

Habitat Upper-Slope

Soil Type Grey sand

Veg. U ^*Eucalyptus delicata*^tree\7\b;M+ ^*Eucalyptus urna*,
^*Eucalyptus valens*^mallee shrub\5\i;G ^^*Melaleuca*
teuthidoides,*Melaleuca quadrifaria*,*Daviesia benthamii*
subsp. *acanthoclona*^shrub\3\i

Veg. Condition Very Good



Species

Daviesia benthamii subsp. *acanthoclona*
Eucalyptus urna
Melaleuca quadrifaria

Eucalyptus delicata
Eucalyptus valens
Melaleuca teuthidoides

R185

Staff JKN **Date** 6/11/2013
MGA Zone 51 385769 **mE** 6376069 **mN**
Latitude -32.7473 **Longitude** 121.7807

Habitat Flat

Soil Type Light brown sand

Veg. U+ ^*Eucalyptus dundasii*,^*Eucalyptus*
melanoxylon^tree\7\r;M ^*Melaleuca teuthidoides*,
Melaleuca quadrifaria^shrub\4\r;G ^*Cratystylis*
conocephala^shrub\2\r

Veg. Condition Excellent



Species

Cratystylis conocephala
Eucalyptus melanoxylon
Melaleuca teuthidoides

Eucalyptus dundasii
Melaleuca quadrifaria

R186

Staff JKN **Date** 6/11/2013
MGA Zone 51 380434 **mE** 6382301 **mN**
Latitude -32.6905 **Longitude** 121.7245

Habitat Upper-Slope

Soil Type Light brown sand

Veg. U ^*Eucalyptus extensa*^tree\6i;M+ ^^*Dodonaea stenozyga*,*Exocarpos aphyllus*,*Eremophila scoparia*^shrub\3r;G ^^*Pultenaea arida*,*Diocirea violacea*,*Halgania andromedifolia*^shrub\1r

Veg. Condition Excellent



Species

Diocirea violacea
Eremophila scoparia
Exocarpos aphyllus
Pultenaea arida

Dodonaea stenozyga
Eucalyptus extensa
Halgania andromedifolia

R187

Staff JKN **Date** 6/11/2013
MGA Zone 51 380699 **mE** 6381628 **mN**
Latitude -32.6966 **Longitude** 121.7273

Habitat Upper-Slope

Soil Type Orange sand

Veg. U+ ^*Eucalyptus spreata*,*Eucalyptus diptera*,*Eucalyptus prolixa*^tree\7i;M ^*Santalum acuminatum*,*Dodonaea stenozyga*^shrub\3r;G ^*Diocirea violacea*^shrub\1r

Veg. Condition Excellent



Species

Diocirea violacea
Eucalyptus diptera
Eucalyptus spreata

Dodonaea stenozyga
Eucalyptus prolixa
Santalum acuminatum

R188

Staff LA/AF **Date** 19/10/2013
MGA Zone 51 400215 **mE** 6355776 **mN**
Latitude -32.9317 **Longitude** 121.9327

Habitat Flat

Soil Type Yellow brown sandy loam

Veg. M+ ^*Melaleuca acuminata* subsp. *acuminata*,
Melaleuca linguiformis,*Exocarpos aphyllus*^shrub\4\i;
 G ^*Hibbertia psilocarpa*,^*Waitzia suaveolens* var.
flava^shrub,forb\2\r

Veg. Condition Excellent



Species

Exocarpos aphyllus

Melaleuca acuminata subsp. *acuminata*

Waitzia suaveolens var. *flava*

Hibbertia psilocarpa

Melaleuca linguiformis

R189

Staff LA/AF **Date** 19/10/2013
MGA Zone 51 401389 **mE** 6358892 **mN**
Latitude -32.9037 **Longitude** 121.9456

Habitat Flat

Soil Type Yellow clayey sand

Veg. U+ ^*Eucalyptus ?delicata*^tree\6\r;M ^*Melaleuca*
linguiformis,^*Melaleuca thyoides*,*Exocarpos*
aphyllus^shrub\4\i;G ^*Angianthus*
tomentosus^forb\1\r

Veg. Condition Excellent



Species

Angianthus tomentosus

Exocarpos aphyllus

Melaleuca thyoides

Eucalyptus ?delicata

Melaleuca linguiformis

R190

Staff LA/AF **Date** 25/10/2013
MGA Zone 51 401861 **mE** 6360102 **mN**
Latitude -32.8929 **Longitude** 121.9507

Habitat Upper-Slope

Soil Type Brown sandy loam

Veg. U+ ^*Eucalyptus eremophila* subsp. *eremophila*,
^*Eucalyptus olivina*^tree\7r;M ^^*Melaleuca societatis*,
Melaleuca pauciflora,*Alyxia buxifolia*^shrub\4r;G
^*Melaleuca pauperiflora* subsp. *pauperiflora*,^*Olearia*
muelleri^shrub\2r

Veg. Condition Excellent

**Species**

Alyxia buxifolia

Eucalyptus olivina

Melaleuca pauperiflora subsp. *pauperiflora*

Olearia muelleri

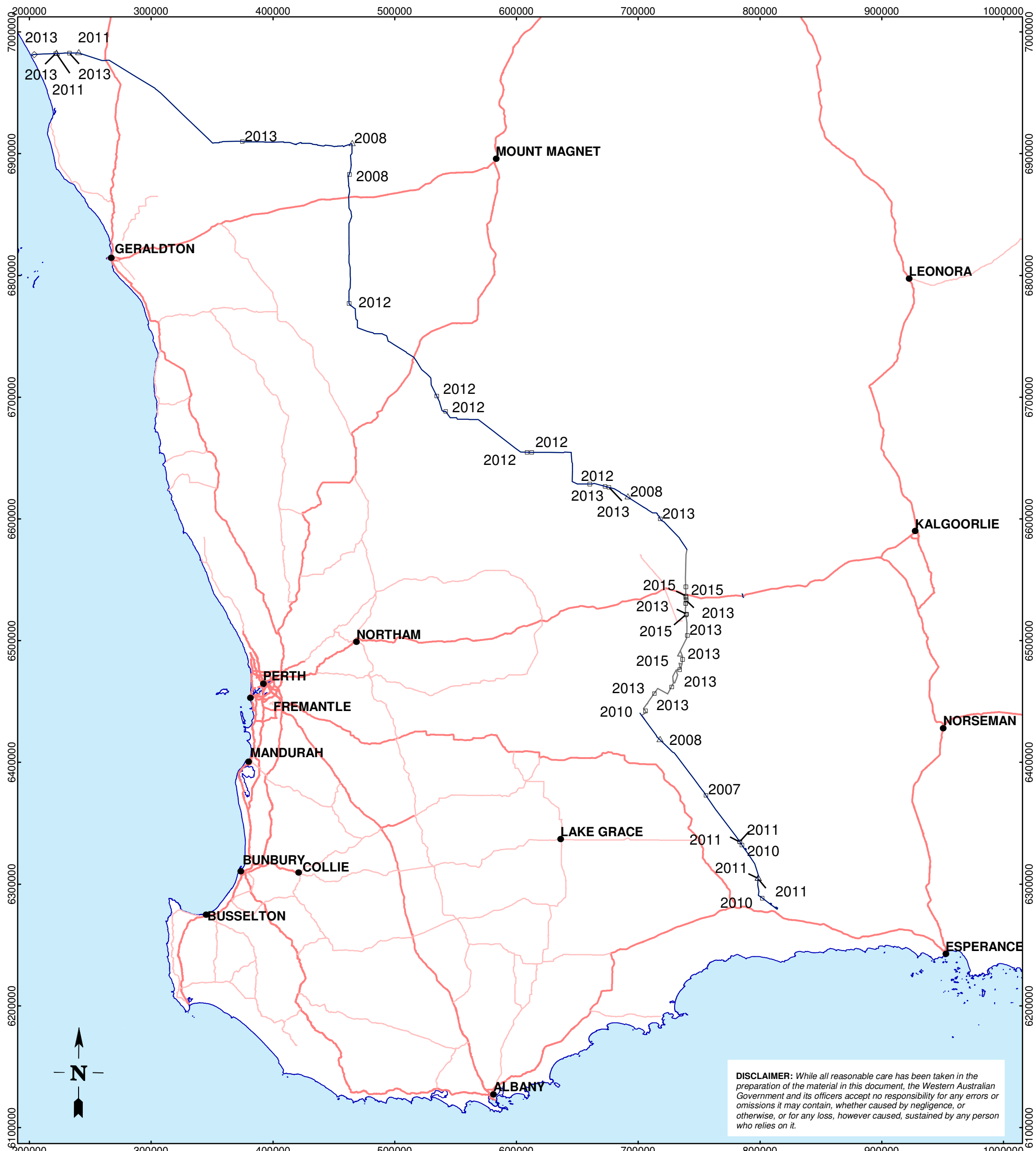
Eucalyptus eremophila subsp. *eremophila*

Melaleuca pauciflora

Melaleuca societatis

APPENDIX TWELVE: SBF WILDLIFE ENTANGLEMENT DATA

State Barrier Fence Wildlife Entanglement data recorded from January 2007 to June 2015



Legend	
● Town	2007 - Total carcass removed = 1
— Yilgarn Gap section of fence	2008 - Total carcass removed = 4
— State Barrier Fence	2010 - Total carcass removed = 3
— Major road	2011 - Total carcass removed = 6
— Highway	2012 - Total carcass removed = 6
◇ Goat carcass removed from fence	2013 - Total carcass removed = 14
△ Emu carcass removed from fence	2014 - Total carcass removed = 1
□ Kangaroo carcass removed from fence	2015 - Total carcass removed = 6

