Evolution Mining

Edna May and Greenfinch Project

Level 2 Flora and Vegetation Assessment

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Level 2 Flora and Vegetation Assessment

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Executive Summary

Evolution Mining commissioned Outback Ecology, a division of MWH Australia Pty Ltd, to complete Phase 1 of a Level 2 Vegetation and Flora Assessment of remnant vegetation surrounding and within the tenements of the Edna May Project and Greenfinch Project. Additional areas were added to the field survey by Evolution Mining at the time of the field visit. The original Study Area comprised approximately 88 hectares and an additional 120 hectares was surveyed. The additional survey area included 71 ha of Level 2, 37 ha of Level 1 and 12 ha of targeted searching.

A total of 193 plant taxa from 112 plant genera and 44 plant families were recorded for the Study Area. Three plant taxa of conservation significance were recorded within the Study Area;

- Sixty seven individuals of the Threatened Flora species *Eremophila resinosa* in Morrel Woodland.
- A single individual of the Priority 3 species *Austrostipa blackii* in the *Melaleuca* and *Acacia* Scrub; and
- A single individual of *Acacia ancistrophylla* var. *perarcuata* in Gimlet Woodland.

Twenty two weed (exotic or naturalised) species were recorded throughout the Study Area. Of these, the Declared Pest species; *Emex australis* was recorded at a single location in Quadrat W11.

Six Vegetation Units were recorded across the Study Area;

- *Melaleuca* and *Acacia* Scrub
- Gimlet Woodland
- Morrel Woodland
- Rough-Fruited Mallee Woodland
- York Gum Woodland
- Granite Monolith

Three Woodland Vegetation Units of the Study Area; Morrell, Gimlet and York Gum represent Priority Ecological Community Types. These vegetation types are also encompassed by the Threatened Ecological Community nomination; *Eucalypt Woodlands of The Western Australian Wheatbelt.*

A locally significant vegetation type and landform; Granite Monolith was the most floristically diverse of the Study Area and included a large number of ephemeral herbs surrounding the rock pools/ granite apron runoff areas.

All intact vegetation of the Study Area is part of Vegetation Association 536 (Red Morrell and Rough-Fruited Mallee) which is close to the 30% threshold for biodiversity conservation (EPA Position Statement 2).

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1. INTRODUCTION

1.1. Study Background and Location

Evolution Mining commissioned Outback Ecology, a division of MWH Australia Pty Ltd, to complete Phase 1 of a Level 2 Vegetation and Flora Assessment of remnant vegetation surrounding and within the tenements of the Edna May Project and Greenfinch Project (**Figure 1**). Additional areas were added to the field survey by Evolution Mining at the time of the field visit. The original Study Area comprised approximately 88 hectares and an additional 120 hectares was surveyed. The additional survey area included 71 ha of Level 2, 37 ha of Level 1 and 12 ha of targeted searching (**Figure 2**).

1.2. Report Scope and Objectives

The primary objective of this flora and vegetation assessment is to provide data for regulator assessment of the Evolution Mining Projects that will satisfy the requirements of Guidance Statement 51, assist with selection of preferred disturbance footprint areas where feasible, and to manage potential impacts of the Project on the flora and vegetation.

The specific objectives of this assessment are to:

- develop an inventory of the terrestrial vascular flora occurring within the Study Area;
- quantify the extent of populations of conservation significant species and any ground water dependent flora species within the Study Area;
- identify any known or potentially occurring conservation significant flora (including Threatened Flora, Priority Flora) occurring within the Study Area and adjacent land, with a focus on the proposed disturbance footprint;
- identify any known or potentially occurring conservation significant ecological communities (Threatened Ecological Communities [TECs] and Priority Ecological Communities [PECs]) occurring within the Study Area and surrounds, with a focus on proposed disturbance footprint;
- delineate, characterise and map vegetation associations across the Study Area;
- assess and map vegetation condition across the Study Area;
- identify and specify locations of any introduced species including any exotic or declared weeds; and
- assess the potential impacts of the Project on flora and vegetation within the Study Area.

The objectives and methods adopted for this survey and assessment are aligned with:

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

1.3. Approach

Given the high floristic diversity, fragmentation and likelihood of conservation significant flora in the Study Area, a Level 2 survey is required under the EPA's Guidance Statement No. 51, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004).

The scope of works for flora and vegetation assessment of the Study Area incorporated:

- a desktop review to ascertain what significant flora species and vegetation had been recorded, or may occur in the Study Area;
- a field survey (see **Figure 2** for survey treatment areas):
  - Level 1; subsampling of dominant plant strata to delineate on a map broad Vegetation Units and Condition
  - Level 2; establish quadrats in each Vegetation Unit, to undertake detailed floristic analysis over multiple seasons;
  - and/or targeted searches for conservation significant flora and vegetation (identified in the desktop review), particularly in areas identified by the desktop assessment as likely habitat for these;
- a report:
  - presenting key data with emphasis on the significant environmental aspects; and
  - an impact assessment of the Project on conservation significant flora and vegetation in the Study Area and recommendations to manage these impacts.

This survey is considered a 'Phase 1' or first visit of a Level 2 Survey. A second field visit would be required to strictly meet Guidance Statement 51 requirements. This is in order to provide a complete picture of floristic diversity (seasonal fluctuations) at the locality and provide context. According to Guidance Statement 51:

"*A Level 2 survey is a 'Detailed Survey' with one or more visit/s in the main flowering season and visit/s in other seasons; and ii) replication of plots in vegetation units, and greater coverage and displacement of plots over the target area*."

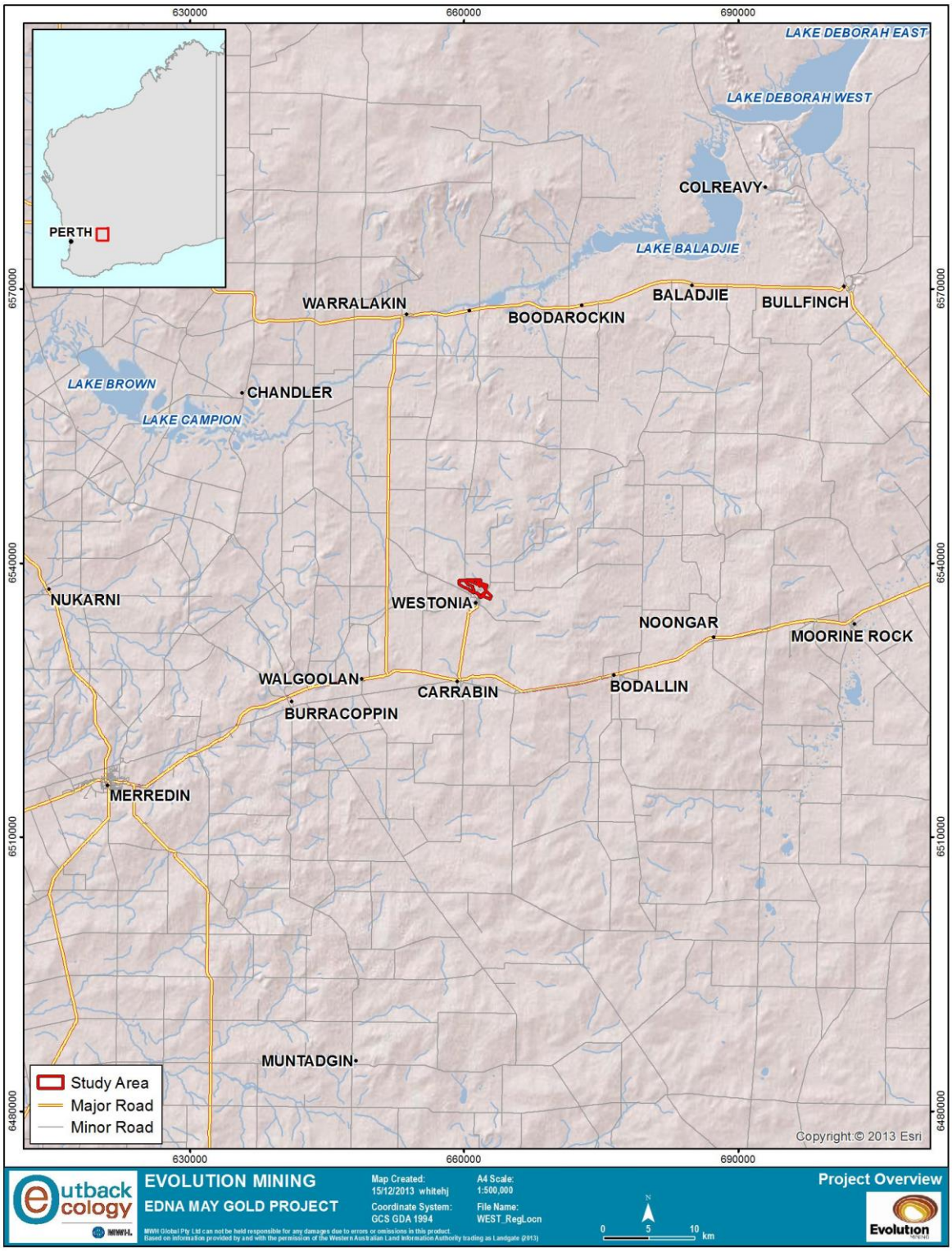

Figure 1: Regional location of the Edna May Study Area

Figure 2: The Edna May Study Area

2. EXISTING ENVIRONMENT

2.1. Biogeographic Region

Thackway and Cresswell (1995) describe a refined system of 85 'biogeographic regions' (bioregions) and 403 biological subregions covering the whole of Australia; resulting from a collaboration between all state conservation agencies and coordinated by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna. The Study Area is located in the Avon Wheatbelt bioregion (AW) and the Avon Wheatbelt 1 subregion (AW1) in Western Australia (Beecham 2001) (**Figure 3**). The Avon Wheatbelt is an area of active drainage dissecting a Tertiary plateau of the Yilgarn Craton. Within the bioregion AW1 is an ancient peneplain with low relief and a gently undulating landscape. There is no connected drainage; salt lake chains occur as remnants of ancient drainage systems that only function in high rainfall years. Lateritic uplands of the subregion are dominated by yellow sandplain (Beecham 2001).

2.2. LAND USES

The bioregion lies within the Avon Wheatbelt of Western Australia. The primary land use is dryland agriculture and grazing. There are lesser areas of Crown and Conservation reserves, rural residential and mining activities. (Beecham 2001) (**Figure 4**). There are three Nature Reserves within 10km of the Study Area, including Sandford Rocks and Carrabin Nature Reserves, along with remnant vegetation surrounding Westonia (Town Reserve).

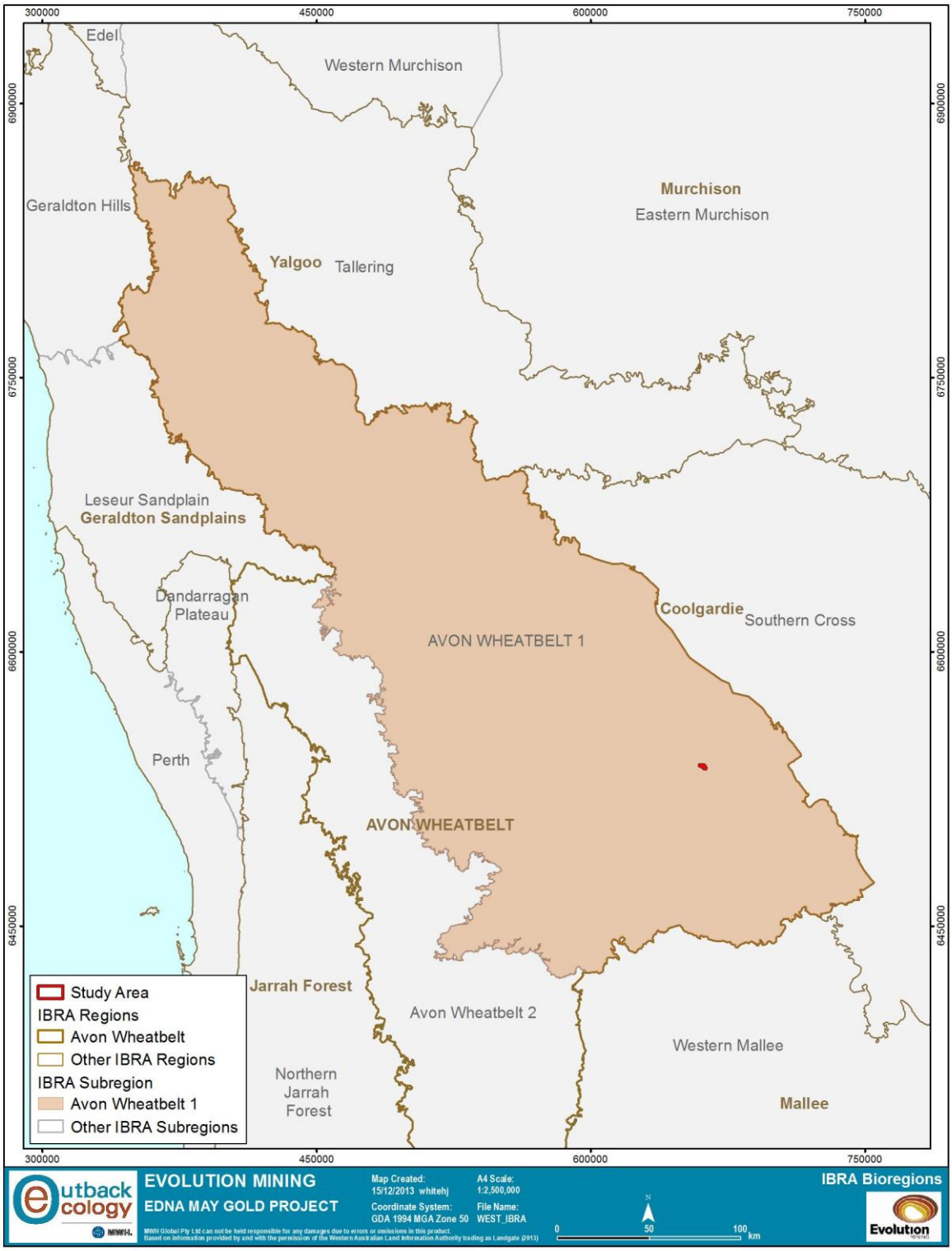

Figure 3: IBRA Subregions within and surrounding the Edna May Study Area

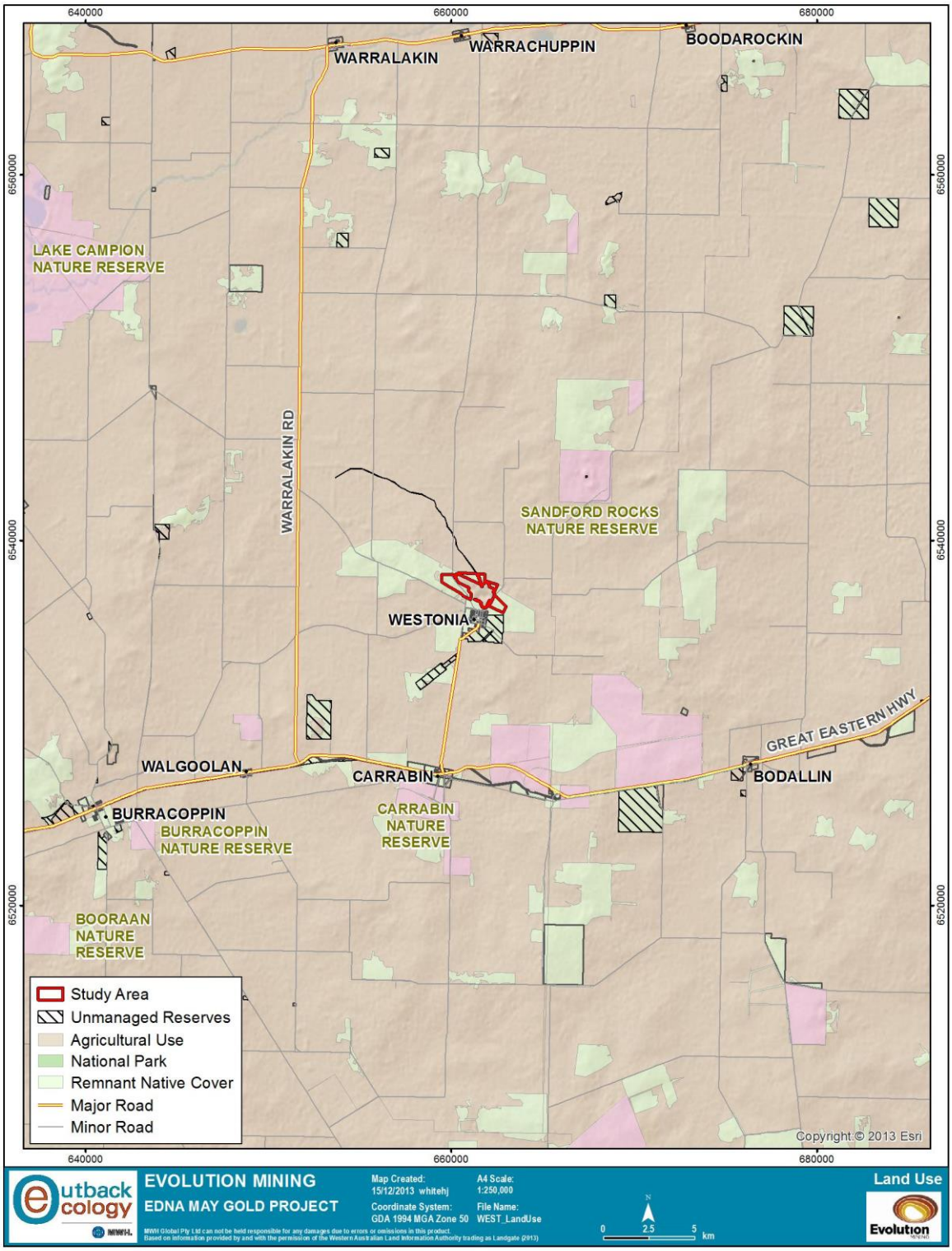

Figure 4: Land Uses surrounding the Edna May Study Area

2.3. Climate

The Avon Wheatbelt bioregion has a semi-arid (dry) warm Mediterranean climate. The nearest weather station to the Study Area with long term climate statistics is Merredin (44 km to the west of the Study Area). The long term mean average annual rainfall is 326 mm. Data collected from Merredin indicates that rainfall falls predominantly in the winter months **(Figure 5)** (BOM 2013). Highest average monthly temperatures for Merredin are recorded from November to March, with the hottest month being January (mean daily maximum temperature 34 °C). The coolest month is July when the mean daily maximum temperature is 16°C (BOM 2013). Westonia had received 264 mm (of an average of 332 mm) in in the months prior to the survey in 2013 (In both August and September above average rainfall was received; 42.8mm and 52 mm). (BOM 2013).

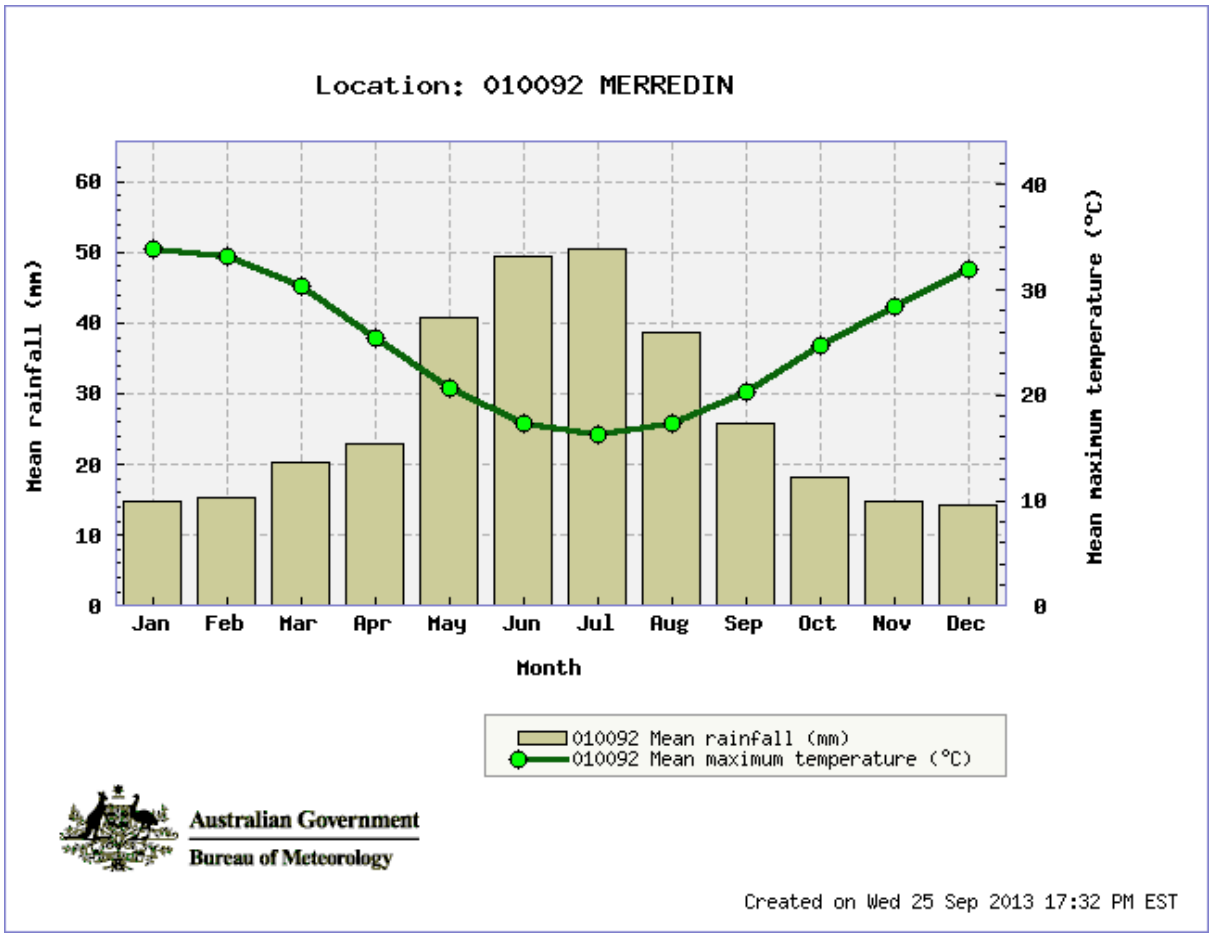

Figure 5: Mean Monthly Rainfall and Temperature for Merredin Weather Station.

2.4. Land Systems of the Project Area

A land system includes a number of land units and is classified by the recurring pattern of topography, soils and vegetation. These recurring patterns can be seen using aerial photography or other remotely sensed imagery and are typically confirmed with field surveys. Land systems across the Eastern Goldfields and Wheatbelt have been mapped by the Natural Resources Assessment Group of the Department of Agriculture. There are two land systems present within the Study Area **(Table 1** and **Figure 6**). The majority of the Project area (65 %) falls within the Holleton Land System which is characterised by lateritic sandplain.

Table 1: Land systems within and surrounding the Study Area.

Land System	Description	Hectares (% of Study Area)
Baladjie Land System	Valley floors and lower slopes, in the northern Zone of Ancient Drainage, with calcareous loamy earth and alkaline red loamy duplex (mostly shallow). Woodland.	72.3 ha (34.6%)
Holleton Land System	Lateritic sandplain and other soil formations on low isolated often mafic hills. Isolated low hills and rises with yellowish red sandplain and Mallee and Gimlet duplexes on lower slopes.	136.6 ha (65.4%)

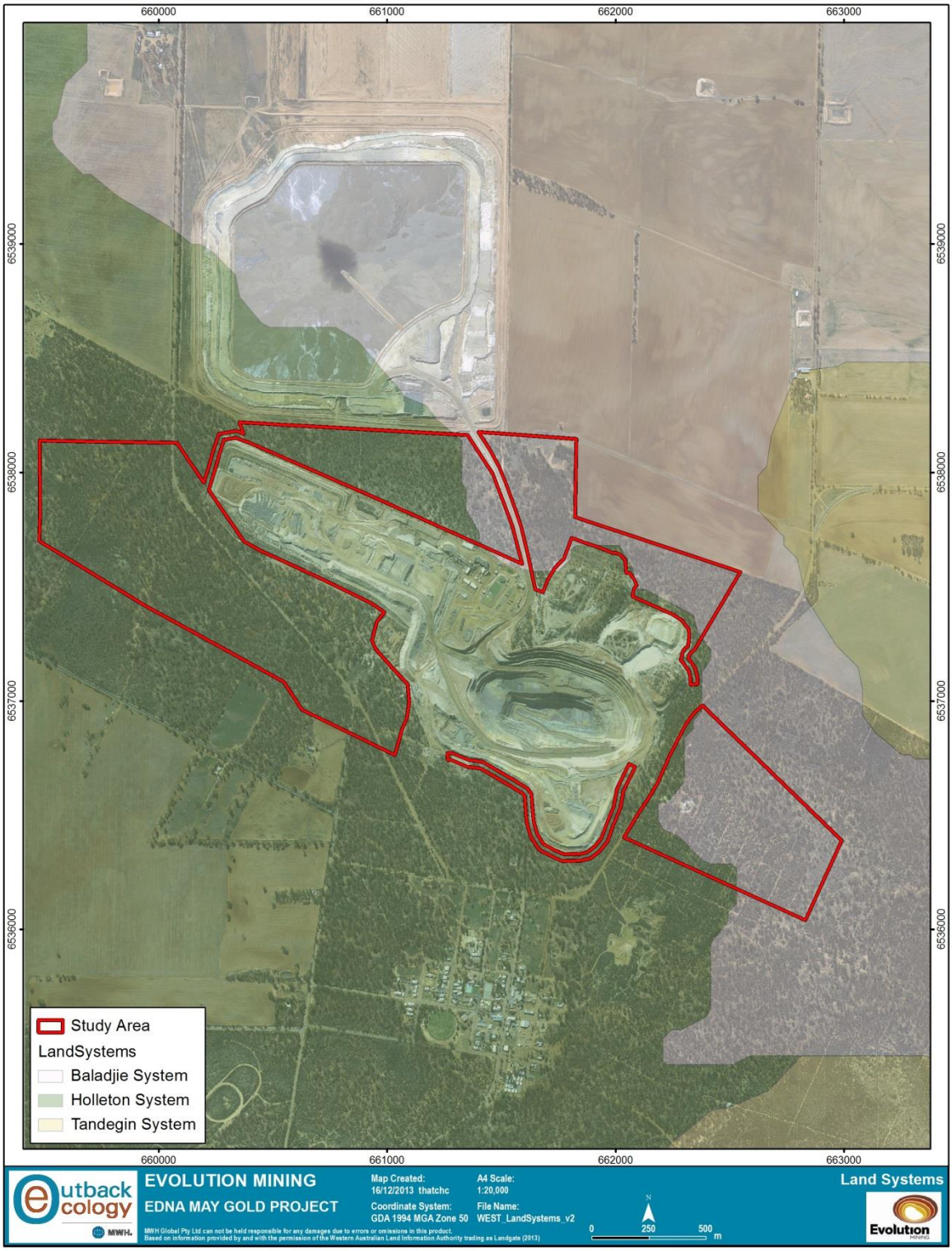

Figure 6: Land Systems within and surrounding the Edna May Study Area

2.5. Beard Vegetation Mapping

Beard mapped the vegetation of Western Australia at a scale of 1:1,000,000 (Beard 1972) and Wheatbelt region, including the Study Area, at 1:250,000 (Beard 1975). The Study Area is mapped (**Figure 7**) as:

- Vegetation Association 536 – Medium woodland; Morrell (*Eucalyptus longicornis*) and Rough-fruited Mallee (*Eucalyptus corrugata*) and;
- Vegetation Association 1057 – Mosaic: Shrublands; Medium woodland; Salmon Gum & Gimlet / York gum & *Eucalyptus sheathiana* Mallee scrub.

The majority of the Study Area (98%) is mapped as Vegetation Association 536 of which there is 35% remaining in the bioregion (Government of Western Australia 2013) (**Table 2**). The small area of Vegetation Association 1057 is located within the cleared paddock of the Study Area (**Figure 7**). It is important to note that "Vegetation Associations" may contain complexes or groupings of different floristic communities of which more detailed representation and reservation is not known. The condition of the vegetation throughout the extent of each vegetation complex is also not taken into consideration in these reported figures.

Woodland communities in the Wheatbelt have generally been extensively cleared and poorly conserved (Harvey and Keighery 2012). Only 13% of vegetation remains in the Avon Wheatbelt Bioregion with only 2.5% within secure reserves (EPA Position Statement 2, 2000). Vegetation Association 536 is of high reservation priority due to the remaining extent being close to the 'threshold level' of 30% for biodiversity conservation (EPA 2000).

Due to the extensive clearing in the agricultural areas or Intensive Landuse Zone, the EPA published Position Statement 2 *Environmental Protection of Native Vegetation in Western Australia* which states that *"…the EPA is of the view that it is unreasonable to expect to be able to continue to clear native vegetation from land within the agricultural area other than relatively small areas and where alternative mechanisms for protection biodiversity are addressed."*

Within the Westonia area there are 85 patches of Woodland of Morrel and Rough-fruited Mallee (Vegetation Association 536) or 3946 ha which represents 99% of the remaining extent of this vegetation type (Greening Australia 2009).

Table 2: Beard Vegetation Associations mapped within the Study Area and their extent within the Avon Wheatbelt AW1 subregion.

Beard Vegetation Association	Pre-European extent (hectares) in all subregions	Study Area (hectares) [%]	Avon Wheatbelt 01 Subregion		
			Area (hectares)	Percentage of pre-European extent still extant (2009)	Percentage of pre-European extent in DPaW managed lands
536	13177.52	206 [98.6]	3970.04	35.54	11.44
1057	145310.83	3 [1.4]	17637.36	12.14	1.96

Figure 7: Beard Vegetation Associations within and surrounding the Edna May Study Area

2.6. Database Searches

A desktop review of the Study Area was undertaken in October 2013. The following database searches were undertaken using the shape file of the Study Area and an appropriate buffer:

- EPBC Protected Matters (DoE 2013b) (20km radius);
- DPaW Priority and Threatened Flora (DPaW 2013b) (20km radius);
- DPaW Threatened and Priority Ecological Communities (DPaW 2013c) (50km radius); and
- NatureMap (DPaW 2013d) (20km radius).

The findings from the database searches are presented below:

2.6.1. Conservation Significant Flora

The Department of Parks and Wildlife (DPaW) definitions for flora of conservation significance (Threatened and Priority Flora) are provided in **Appendix A.** (DPaW 2010, 2013a).

The Edna May and Greenfinch Study Area lies in the Avon Wheatbelt bioregion, in which 5,415 vascular flora taxa are listed (FloraBase 2013). Of these 147 are Threatened (Declared Rare) species, 569 are Priority Flora and two are presumed extinct species. In the Avon Wheatbelt 1 subregion 543 species are considered to be of conservation significance (FloraBase 2013) including 101 Threatened species.

A search for Threatened (Declared Rare) and Priority Flora within 20 km of the Edna May Study Area was conducted (26th of August 2013 – Ref: 15-0913FL) of the following databases:

- DPaW Threatened (Declared Rare) and Priority Flora database (TPFL)
- Western Australian Herbarium Specimen database (WAHERB) and
- DPaw Threatened and Priority Flora List - Place Names – (TP).

The results are listed in **Table 3** and shown in **Figure 8**. Those species also listed under the EPBC Act are identified in **Table 3.**

The database review identified 31 species of Conservation Significance that had previously been recorded within 20 km of the Study Area (**Figure 8**). Five of the 31 conservation significant flora species have been previously recorded within 10 km of the Study Area (**Figure 10**).

Habitat information for each of the Priority Flora species was obtained from *FloraBase* (Western Australian Herbarium 2013) to determine the likelihood of their occurrence within the Study Area (**Table 3**)**.** Aerial photographs were interpreted to assess the types of landforms and soil types within the Study Area (**Table 3**).

The Database search results area regarded as an indication only of the Threatened and Priority Flora that may be present and may be used as a Target list in any surveys undertaken.

The Threatened (Declared Rare) flora species *Eremophila resinosa* is known to occur in the Study Area (Outback Ecology 2013) (**Figure 10**). This species is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is currently ranked as Endangered (EN) under World Conservation Union (IUCN 1994) Red List criterion C2a due to population size being less than 2500 mature individuals, with continuing decline observed and no subpopulation estimated to contain more than 250 mature individuals. No populations have shown significant signs of recruitment since 1993. An Interim Recovery Plan (April 2008 to March 2013) is in operation for the species (DEC 2009).

2.6.2. Conservation Significant Vegetation

In general the Woodland communities of the Wheatbelt have been extensively cleared and poorly conserved (Harvey and Keighery 2012). The Study Area lies in a highly fragmented landscape with limited remnant vegetation (**Figure 4**).

A search of the DPaW Threatened Ecological Communities Database was requested on 23rd August 2013 (Ref: 56-0813EC) for the Study Area and a 50 km buffer. The six Priority Ecological Communities identified within the Westonia area are presented in **Table 2** and are shown in **Figure 10.**

Red Morrel, Gimlet, Salmon and York Gum Woodlands of the Wheatbelt are currently on the *Finalised Priority Assessment List* for consideration by the Threatened Species Scientific Committee for inclusion as Threatened Ecological Communities under the Commonwealth Environment Protection and *Biodiversity Conservation Act*; *Eucalypt Woodlands of the WA Wheatbelt* (Department of Environment 2013a).

These four woodland types were considered by the World Wildlife Fund Australia (WWF) to be amongst the *most threatened* Eucalypt woodland communities of the Avon Wheatbelt and Western Mallee bioregions and were selected for the Woodland Watch Study, the survey data of which can be accessed on the Department of Environment's *Florabase* website.

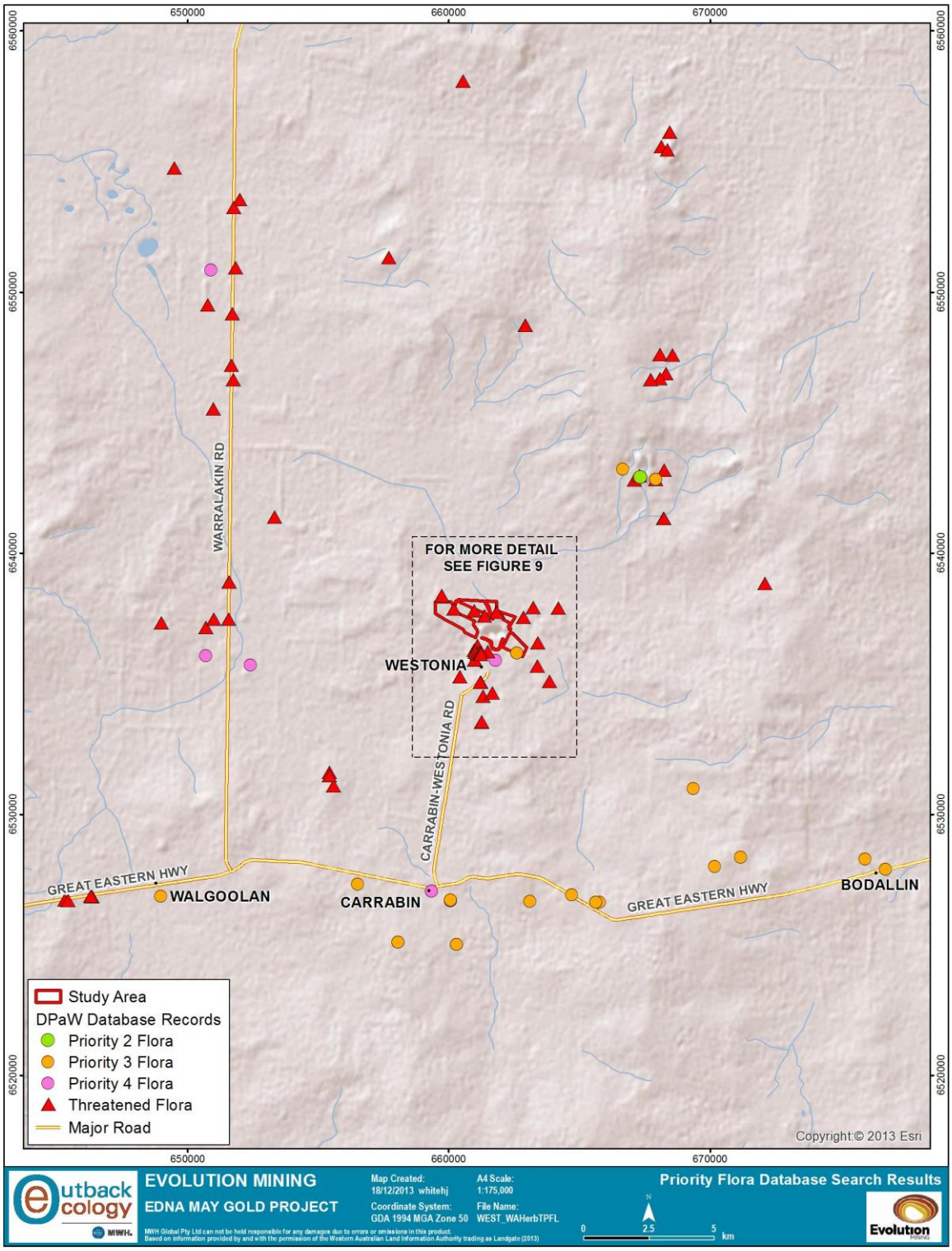

Figure 8: DPaW Threatened and Priority Flora Records within 20 km of the Edna May Study Area.

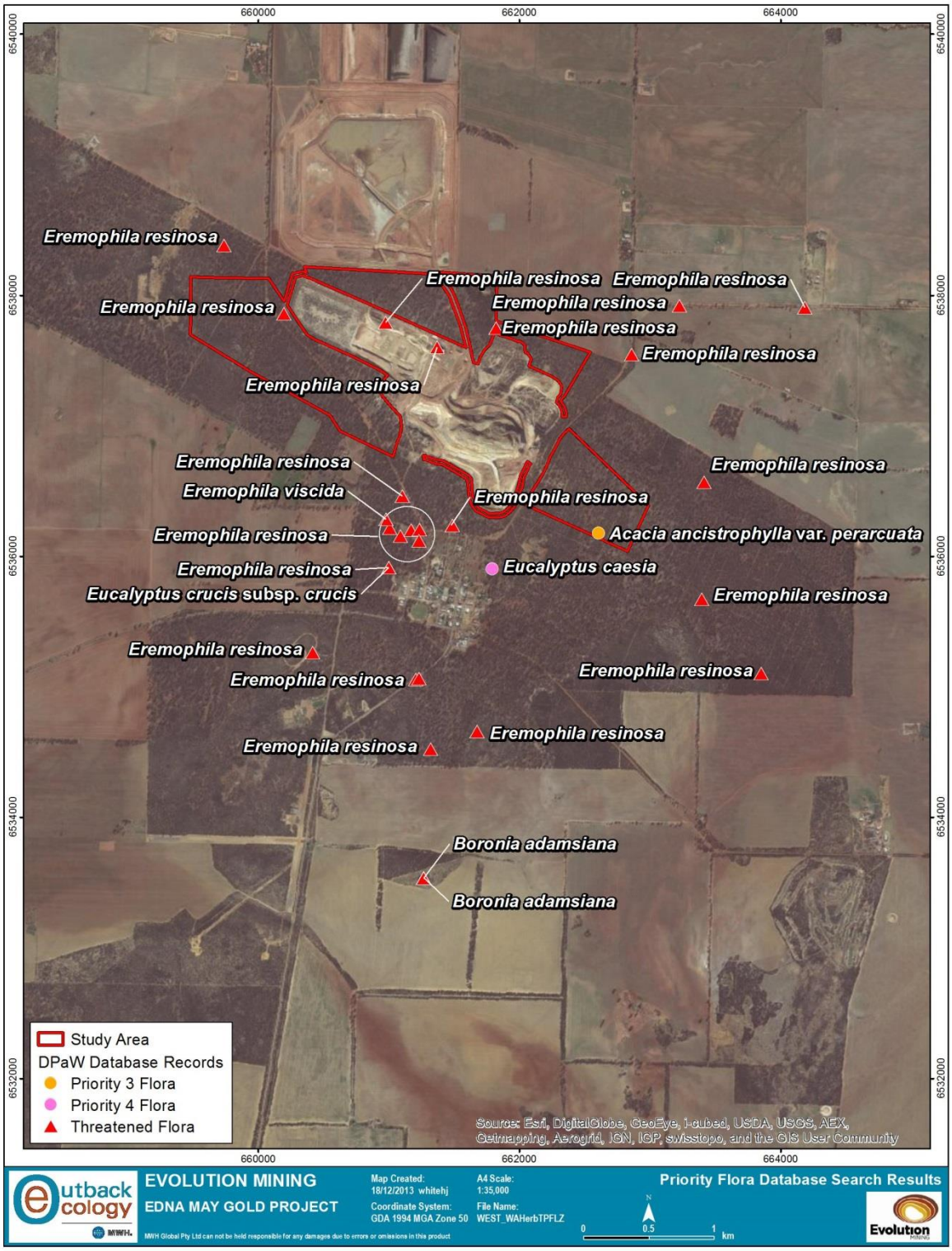

Figure 9: Detailed view of DPaW Threatened and Priority Flora Records in the immediate region of the Project area, as part of those within 20 km of the Edna May Study Area (see Figure 8).

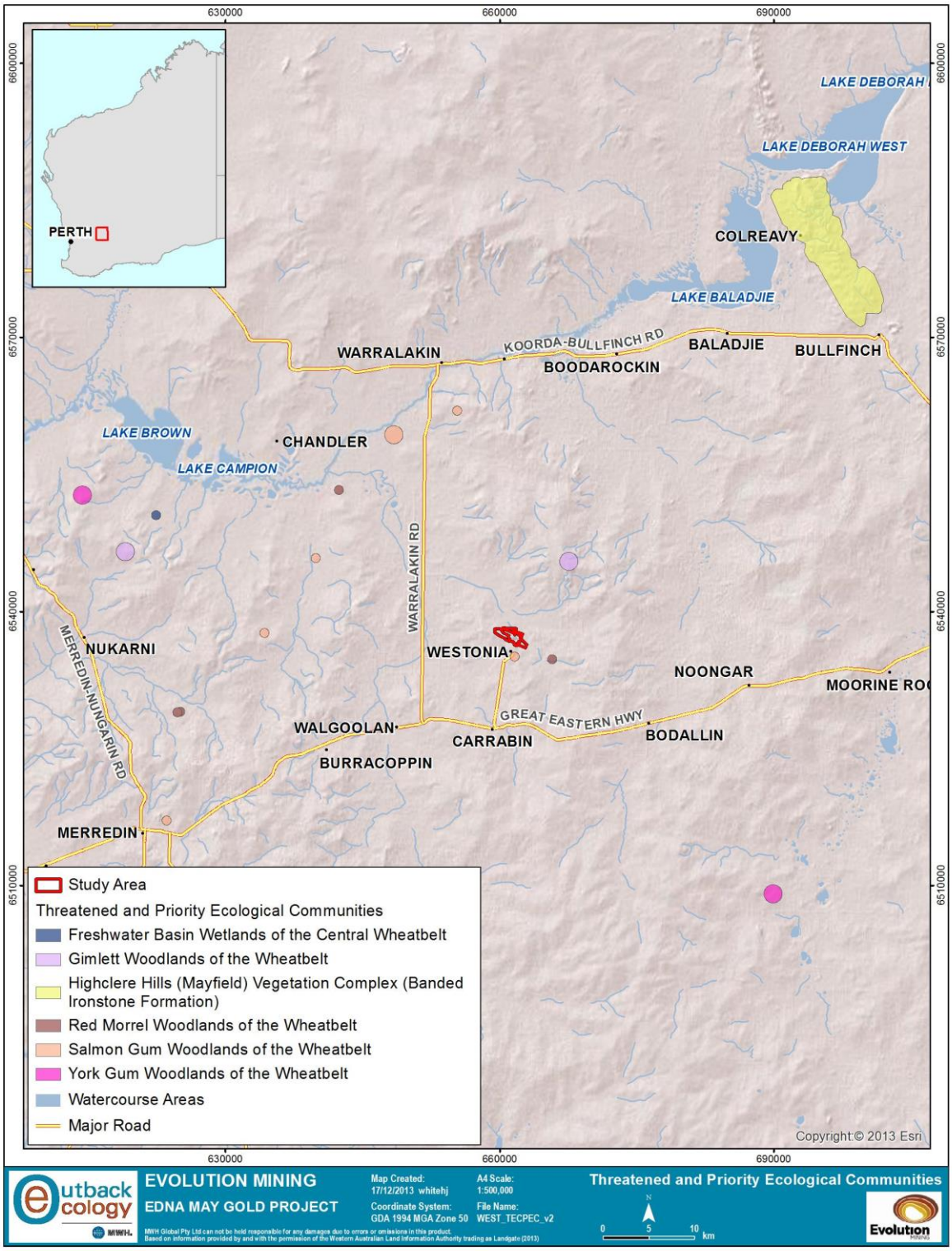

Figure 10: DPaW Threatened and Priority Ecological Community records within 50km of the Edna May Study Area.

Table 3: Conservation significant flora species recorded within 20 km of the Edna May Study Area

TAXON	STATUS *EPBC Act Listing	Database	HABIT, FLOWERING TIME AND KNOWN PREFERRED HABITAT
Acacia lobulata	Threatened/Endangered*	EPBC	Erect, open, often spindly shrub, 1-2 m high. Fl. yellow, Jul. Gritty loam or sand. Low granitic breakaways.
Boronia adamsiana	Threatened/ Vulnerable*	NatureMap TPFL WAHerb EPBC	Erect shrub, 0.3-1.0 m high, flowers pink-white between July and October. Yellow sand/loam over laterite on flats and road verges.
Eremophila resinosa	Threatened/ Endangered*	NatureMap TPFL WAHerb EPBC	Spreading shrub, 0.4-0.8 m high, and flowers blue-purple-white in April or October to November. Clay loam gravelly sandy clay on road verges.
Eremophila virens	Threatened/ Vulnerable*	TP List EPBC	Erect, slender shrub, 1.5-5 m high. Fl. green, Aug to Oct. Red/brown sand. Granite hillsides.
Eremophila viscida	Threatened/ Vulnerable*	NatureMap WAHerb EPBC	Shrub with 1.2-4 m high, flowers green-white-yellow between September to November. Granitic soils, sandy loam on stony gullies and sand plains.
Eucalyptus brevipes	Threatened/ Endangered*	WAHerb EPBC	Mallee, 3-5(-6) m high, bark rough. Fl. white-cream, Oct. White or yellow sand, sandy loam. Granite outcrops.
Eucalyptus crucis subsp. *crucis*	Threatened/ Vulnerable*	NatureMap TP List TPFL WAHerb EPBC	Mallee 2-8 m high, bark rough, 'minni-ritchi' with white flowers in October, December or January to March. Sand, loam on granite outcrops.
Gastrolobium diabolophyllum	Threatened/ Critically Endangered*	NatureMap WAHerb EPBC	Erect, open robust shrub to 1.5 m high. Orange, yellow, red and pink flowers in September. Yellow –brown sand over laterite on broadly undulating dunes.
Grevillea dryandroides subsp. *hirsuta*	Threatened/Endangered*	EPBC	Prostrate, vigorously suckering shrub, 0.05-0.3 m high. Fl. red/pink-red, May or Sep to Nov. White or yellow sand, laterite.
Roycea pycnophylloides	Threatened/Endangered*	EPBC	Perennial, herb, forming densely branched, silvery mats to 1 m wide. Fl. Sep. Sandy soils, clay. Saline flats.
Symonanthus bancroftii	Threatened/Endangered*	EPBC	Shrub, 0.15-0.25 m high. Fl. white, Sep.

TAXON	STATUS *EPBC Act Listing	Database	HABIT, FLOWERING TIME AND KNOWN PREFERRED HABITAT
Baeckea sp. Baladjie	Priority 1	TP List	Compact, domed shrub, to 0.3 m high, bark grey, fissured. Fl. white, Jun or Oct. Quartz sand, brown loam, brown sandy clay over crusty clay, granite. Gently undulating terrain.
Westringia acifolia	Priority 1	TP List	No Information available
Goodenia granitica	Priority 2	NatureMap TP List TPFL WAHerb	Annual herb, 0.05-0.35 m high. Brown sandy clay or loam over granite on bases of outcrops near water sources and valley floors.
Hibbertia chartacea	Priority 2	TP List	Shrub, to 0.5 m high. Fl. yellow, Sep. Sand, laterite. Sandplain with breakaways.
Acacia ancistrophylla var. *perarcuata*	Priority 3	NatureMap TP List TPFL WAHerb	Rounded or obconic shrub 0.6-1.6 m high and 6 m wide. Flowers yellow between August and September. Red sand, clay loam, loam on undulating plains.
Acacia crenulata	Priority 3	NatureMap TP List TPFL WAHerb	Bushy shrub or tree, 0.7-3 m high. Yellow flowers. Clay, sandy clay, yellow sand on rocky rises, granite outcrops and breakaways.
Acacia filifolia	Priority 3	NatureMap TP List WAHerb	Wispy, spindly single-stemmed shrub or tree, 1.2-3 m high. Flowers yellow between May and September. Yellow sand, gravelly lateritic sand on sand plains.
Baeckea sp. *Merredin*	Priority 3	TP List	Low, spreading shrub, 0.3-1.2 m high, to 0.7 wide. Fl. white/pink, Aug to Sep. Well-drained gravelly sand, yellow loamy sand, laterite. Sandplains, slightly undulating sites, near creeks, on exposed small rises.
Banksia horrida	Priority 3	NatureMap WAHerb	Upright, lignotuberous shrub 0.6-1.6 m high with yellow-orange flowers in April to June or August. Sand, sometimes with gravel.
Banksia rufa subsp. *flavescens*	Priority 3	TP List	Prostrate, ?lignotuberous shrub, to 0.45 m high. Fl. cream-yellow, Jul to Aug. Sandy loam or sand with gravel.
Dicrastylis reticulata	Priority 3	NatureMap	Woolly shrub, (0.15)0.6-1.2(-1.5) m high with white flowers between September and December. Sandy soils, often over granite amongst granite rock, hills and flats.
Eutaxia acanthoclada	Priority 3	NatureMap TP List	Compact mat-forming, prostrate shrub to 0.3 m high. Flowers yellow/orange/red between October and November. Light brown sandy clay, shallow sandy loam, red clay over banded ironstone, gravel

TAXON	STATUS *EPBC Act Listing	Database	HABIT, FLOWERING TIME AND KNOWN PREFERRED HABITAT
		TPFL	on gently undulating plains.
Guichenotia impudica	Priority 3	TP List	Shrub, 0.25-1 m high. Fl. pink-purple, Aug to Oct. Laterite.
Hibbertia glabriuscula	Priority 3	NatureMap TP List WAHerb	Erect, spindly shrub, 0.2-0.5 m high with yellow flowers in September. Yellow sand over laterite on sand plains with some laterite breakaways.
Leucopogon sp. Ironcaps	Priority 3	TP List	Slender, open shrub, to 1 m high, to 0.6 m wide. Fl. white, Aug. Skeletal sand, yellow sandy loam, rocky loam, gravel, laterite, ironstone. Gentle lower slopes, flat uplands, hill tops.
Verticordia mitodes	Priority 3	NatureMap WAHerb	Spreading shrub 0.15-0.7 m high with pink-purple flowers between October to December or January in yellow sand on undulating plains.
Verticordia stenopetala	Priority 3	NatureMap TP List WAHerb	Shrub, 0.2-0.6(-1.3) m high with pink/pink-purple-red flowers between October to December or January. Yellow sand sometimes with gravel on undulating plains.
Banksia shanklandiorum	Priority 4	NatureMap TP List TPFL WAHerb	Upright, lignotuberous shrub 0.4-2.5 m high to 3 m wide. Flowers June to August in white/yellow sand with lateritic gravel.
Eucalyptus caesia	Priority 4	NatureMap WAHerb	Mallee, 1.8-14 m high with 'minni-ritchi' bark. Flowers pink-red between May and September in loam on granite outcrops.
Myriophyllum petraeum	Priority 4	NatureMap TPFL WAHerb	Aquatic annual, herb, stems 0.15-0.3 m long, flowers white between August and December. Strictly confined to ephemeral rock pools on granite outcrops.

Table 4: Priority Ecological Communities recorded within 20 km of the Edna May Study Area

Occurrence ID	Community ID	Community Name	Status	Buffer (m)	Occurrence Confirmed
2372	Central freshwater basin wetlands (SPS092A)	Freshwater basin wetlands of the central Wheatbelt	Preliminary	500	No
2261	Gimlet Woodlands (Gimlet102)	Gimlet Woodlands of the Wheatbelt	Preliminary	1000	No
2267	Gimlet Woodlands (Gimlet126)	Gimlet Woodlands of the Wheatbelt	Preliminary	1000	No
2255	Gimlet Woodlands (Gimlet57)	Gimlet Woodlands of the Wheatbelt	Preliminary	1000	No
2279	Gimlet Woodlands (GimMix126)	Gimlet Woodlands of the wheatbelt	Preliminary	1000	No
2273	Gimlet Woodlands (GimYor101)	Gimlet Woodlands of the Wheatbelt	Preliminary	1000	No
5253	Highclere Hills (Highclere)	Highclere Hills (Mayfield) Vegetation Complex (BIF)	Priority 1	500	No
2137	Red Morrel Woodland (WW100)	Red Morrel Woodlands of the Wheatbelt	Priority 1	500	Yes
2123	Red Morrel Woodland (WW2)	Red Morrel Woodlands of the Wheatbelt	Priority 1	500	Yes
2129	Red Morrel Woodland (WW58)	Red Morrel Woodlands of the Wheatbelt	Priority 1	500	Yes
2134	Red Morrel Woodland (WW82)	Red Morrel Woodlands of the Wheatbelt	Priority 1	500	Yes
2135	Red Morrel Woodland (WW86)	Red Morrel Woodlands of the Wheatbelt	Priority 1	500	Yes
2145	Salmon Gum Woodlands (WoodW1)	Salmon Gum Woodlands of the wheatbelt	Preliminary	500	No
2179	Salmon Gum Woodlands (WoodW83)	Salmon Gum Woodlands of the wheatbelt	Preliminary	500	No
2181	Salmon Gum Woodlands (WoodW85)	Salmon Gum Woodlands of the wheatbelt	Preliminary	500	No
2339	Salmon Gum Woodlands (WoodW86)	Salmon Gum Woodlands of the wheatbelt	Preliminary	1000	No
2183	Salmon Gum Woodlands (WoodW98)	Salmon Gum Woodlands of the wheatbelt	Preliminary	500	No
2184	Salmon Gum Woodlands (WW99)	Salmon Gum Woodlands of the wheatbelt	Preliminary	500	No
2307	York Gum Woodlands (YorkGum84)	York Gum Woodlands of the wheatbelt	Preliminary	1000	No
2310	York Gum Woodlands (YorkGum94)	York Gum Woodlands of the wheatbelt	Preliminary	1000	No

3. FIELD METHODOLOGY

3.1. Level 2 Vegetation Survey

The field survey was conducted on the 8th to 11th of October 2013. Botanists Vanessa Yeomans (SOPP License SL010736), Alex Sleep (SOPP License SL010658) and Cate Tauss conducted the survey. Twenty four quadrats and three relevés were established throughout the Study Area (**Figure 11**). The quadrats (floristic sampling plots) were established in the Level 2 treatment areas and represent the first visit (phase 1) of a Level 2 Survey (**Figure 2**). The coordinates of all sites are listed in the detailed descriptions in **Appendix D**.

Any intact native vegetation throughout the Level 2 Study Area was sampled using quadrats (20 m by 20m) and the vegetation type and condition was mapped on foot. Whilst traversing the Study Area on foot, the Botanists undertook subsampling for targeted conservation significant flora species (those with the potential to be found in the Study Area as shown in Section 2.6)**.**

For each quadrat, the following information was recorded:

- GPS Location (recorded in GDA94 UTM 50K);
- a photograph taken of the vegetation;
- habitat type;
- vegetation condition, using the Keighery Scale (Keighery 1994) (**Appendix B**);
- vegetation description, based on the vegetation structural table of Keighery (1994) (**Appendix B**);
- all species present with the quadrat, the height and % cover of each;
- topographic position;
- slope and aspect;
- soil type;
- presence of outcropping and exposed rock type;
- bare ground and litter percentages;
- estimated time since fire; and
- disturbance level and description.

3.2. Level 1 Flora Survey

A Level 1 survey is a “target area visit by suitably qualified personnel to undertake selective low intensity sampling of the flora and vegetation to produce maps of vegetation units and vegetation condition at an appropriate scale” (EPA, 2004). The Level 1 survey was conducted in the areas as shown in **Figure 2**.

3.3. Targeted Flora Survey

The Study Area (including Level 1 and Level 2 survey treatment areas) was surveyed in a systematic grid based pattern (50m spacing) searching for all the conservation significant flora species as identified by the DPaW database search in Section 2.6.1.

3.4. Constraints and Limitations

A number of factors can influence the design and intensity of a flora survey. All flora surveys are limited to some degree by time and seasonal factors, and ideally a number of surveys should be undertaken over a number of years and appropriately timed with the flowering seasons. Possible survey constraints as identified by the EPA were addressed **(Table 5)** and no significant constraints were identified for the Survey as undertaken.

Table 5: Summary of Survey Constraints

Aspect	Constraint	Comment regarding the flora and vegetation survey
Competency/experience of consultants	No	Members of the survey team were flora specialists employed by Outback Ecology, and have many years' experience undertaking flora surveys of this kind within WA.
Scope	No	The scope was clearly defined.
Proportion of flora identified	No	Of the 193 taxa detected during this survey, 14 species (7%) could not be identified with confidence, due to inadequate specimen material (sterile). Unidentified specimens were compared to known conservation significant species to ensure conservation significant species were identified.
Information sources (e.g. historic or recent)	No	Available data was reviewed prior to commencement of the survey.
Completeness	No	The survey of the Study Area was completed as a first visit (Phase 1) of a Level 2 survey (EPA, 2004). A proportion was only completed to the intensity of a Level 1 or a targeted search. These areas are outlined in Figure 2.
Timing / weather / season / cycle	No	The survey was undertaken within approximately 4 weeks after the seasonal rainfall in August-September. Ephemeral flora and flowering of plant taxa would be expected.
Disturbances	No	Mine workings have disturbed the vegetation units in the Study Area but all area were able to be accessed.
Intensity	No	The survey of Study Area was completed as a first visit (Phase 1) of a Level 2 survey (EPA, 2004). A proportion was only completed to the intensity of a Level 1 or a targeted search. These areas are outlined in Figure 2.
Resources	No	WA Herbarium specimens, taxonomic guides, DPaW database searches and the *Florabase* database were all used to prepare for the survey and used for the confirmation of any species where their identification was uncertain.
Remoteness / access problems	No	All parts of the Study Area were able to be accessed
Availability of contextual information	No	Information was available for the Interim Biogeographic Regionalisation for Australia (IBRA) Avon Wheatbelt 01 subregion, from FloraBase, DPaW and BoM. No Floristic Community Type data (Vegetation status more detailed than Beard Vegetation Associations) is available at the regional/local level. The PECs of the region are well defined.

4. RESULTS

4.1. Field Survey

4.2. Flora

A total of 193 plant taxa from 112 plant genera and 44 plant Families were recorded for the Study Area. This species list is shown in Appendix C. A total of fourteen of these species could not be positively identified to taxa level (indicated by '?' or 'sp.' in **Appendix C**), representing 7% of the total plant taxa. The Asteraceae, Fabaceae, Myrtaceae and Poaceae Families were most species rich within the Study Area, which is consistent with the description of flora for the Wheatbelt.

4.2.1. Flora of Conservation Significance

Three plant taxa of conservation significance were recorded within the Study Area. *Eremophila resinosa* (Threatened Flora), *Austrostipa blackii* (Priority 3) and *Acacia ancistrophylla* var. *perarcuata* (Priority 3) were recorded within the Study Area. The locations and population sizes of these species within the Study Area are described in more detail below.

4.2.2. Eremophila resinosa

Several populations of *Eremophila resinosa*, a Threatened Flora taxon have been previously mapped in and adjacent to the Study Area, and are subject to a monitoring program (Outback Ecology 2013). Sixty seven individuals were recorded in the Study Area (**Figure 12**). These locations are already documented in the monitoring program and no new populations were identified. The habit and flowers of *Eremophila resinosa* are shown in **Plate 1**. This species is known from 26 natural populations (i.e not translocated) and 1418 plants in the central eastern Wheatbelt within the Local Government Areas of Koorda, Mount Marshall, Westonia and Wyalkatchem. Within the Study Area, *E. resinosa* is found within Morrel Woodland.

Plate 1: *Eremophila resinosa*

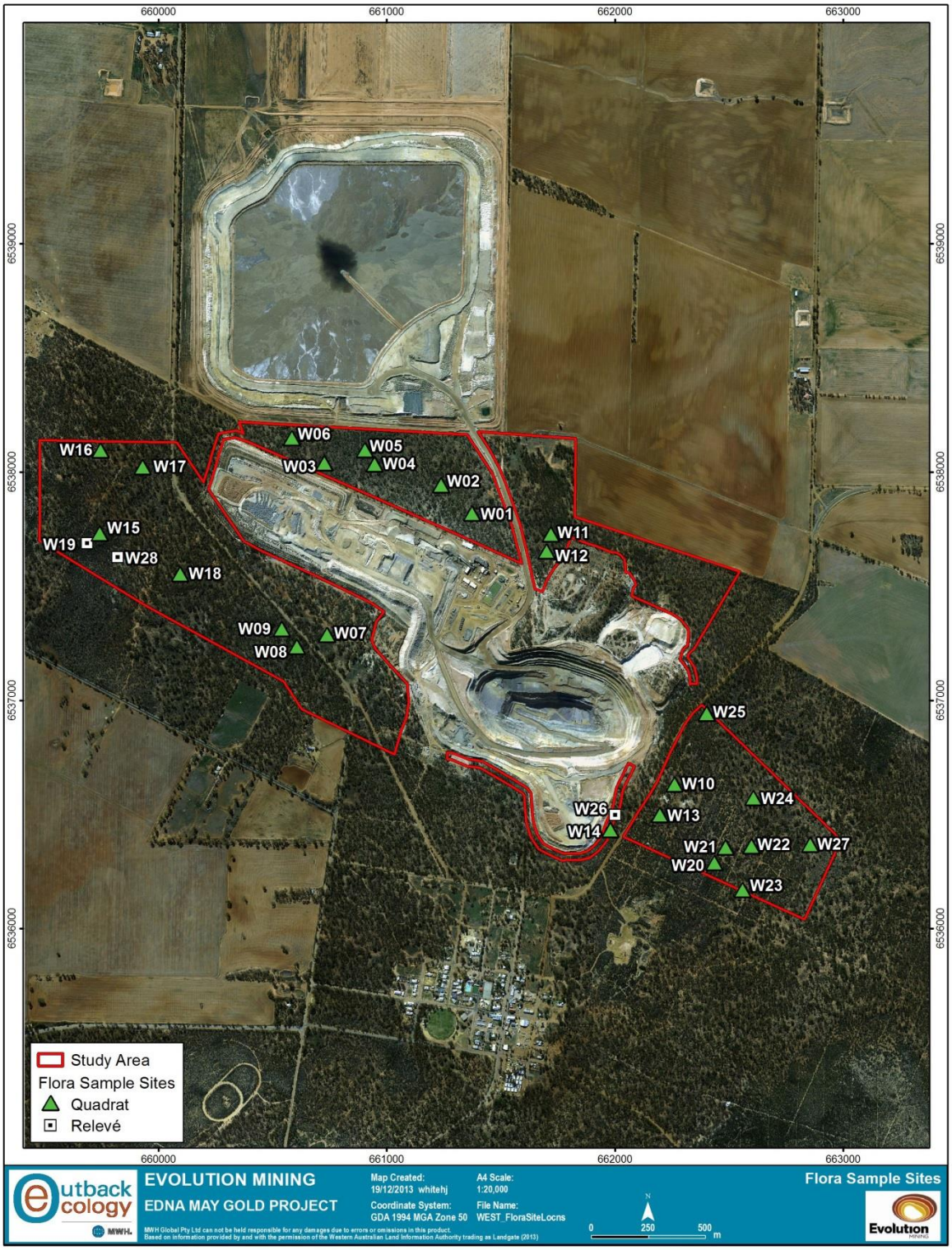

Figure 11: Flora Sampling Quadrats and Vegetation Relevés within the Edna May Study Area

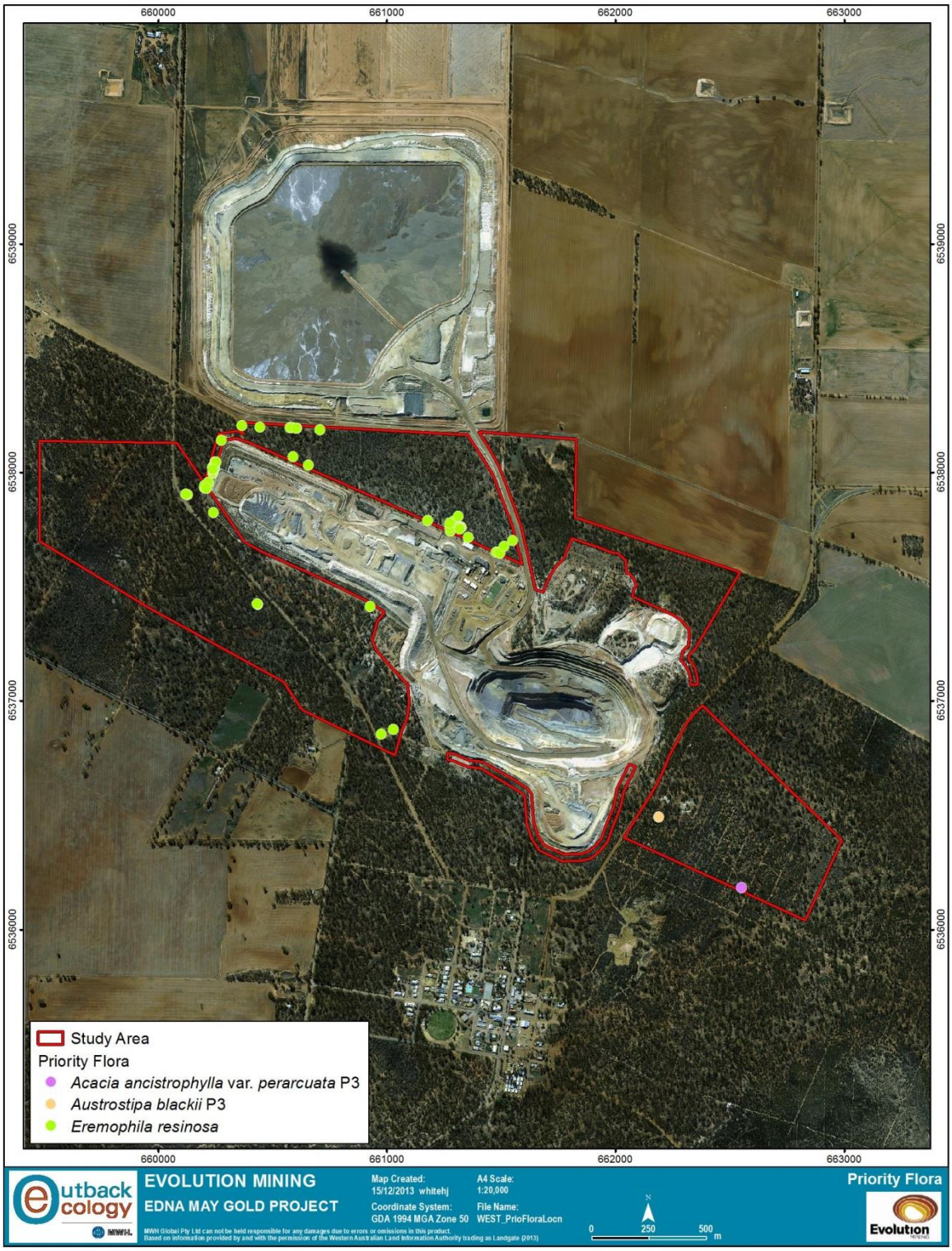

Figure 12: Threatened and Priority Flora of the Edna May Study Area.

4.2.3. Austrostipa blackii

Austrostipa blackii is a Priority Three tufted perennial grass that may grow up to 1.3m tall. It occurs in Open Woodland of the Eastern Goldfields and the Avon Wheatbelt. This species was collected at a single location within the Study Area at Quadrat W13 (**Figure 12**). It was found within the *Melaleuca* and *Acacia* Scrub Vegetation Unit. Only a single individual was noted at this location. There are 36 collections lodged with the Herbarium for Western Australia. It is considered a poorly known (collected) species, in Western Australia but it is widely distributed (including in Victoria, NSW, and Tasmania) and is not under imminent threat. One of the reason why it may be under-collected in Western Australia is that superficially the species could be confused with the several other *Austrostipa* specimens (such as those recorded in the Study Area). A complete census and distribution of *A. blackii* within the survey area, would require repeated additional collections throughout the Study Area and on the spot examination of the seeds of *A. blackii* under a hand lens or microscope to identify the distinctive patterning of hairs (**Plate 3**).

Plate 2: *Austrostipa blackii* – Habit

(Charles Sturt University Virtual Herbarium 2013)

Plate 3: *Austrostipa blackii* - Seed

(Simon and Alfonso, 2011)

4.2.4. Acacia ancistrophylla var. *perarcuata*

The Priority 3 *Acacia* species; *Acacia ancistrophylla* var. *perarcuata*, was recorded at a single location in the Study Area at Quadrat W23 as a single individual, which corresponds to the previous known location of this species on the DPaW database (**Figure 9**). The habitat was described as the Gimlet Woodland vegetation unit (**Figure 12)**. This species is a rounded Shrub to 1.6 m tall and up to six metres across. It occurs mainly within a 70 km radius of Merredin, mainly in Gimlet or Salmon Gum Woodland on red sandy or clay loams. The species is shown in **Plate 4** and **Plate 5**. There are 23 collections of this poorly-known (collected) species lodged with the Western Australian Herbarium, collected mainly from the eastern Wheatbelt and the Eastern Mallee region.

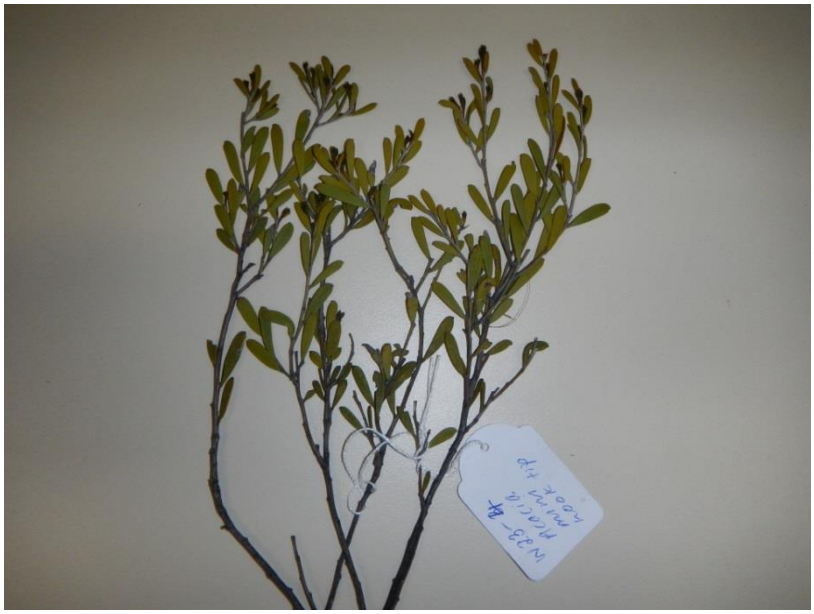

Plate 4: *Acacia ancistrophylla* var. *perarcuata* - Collection

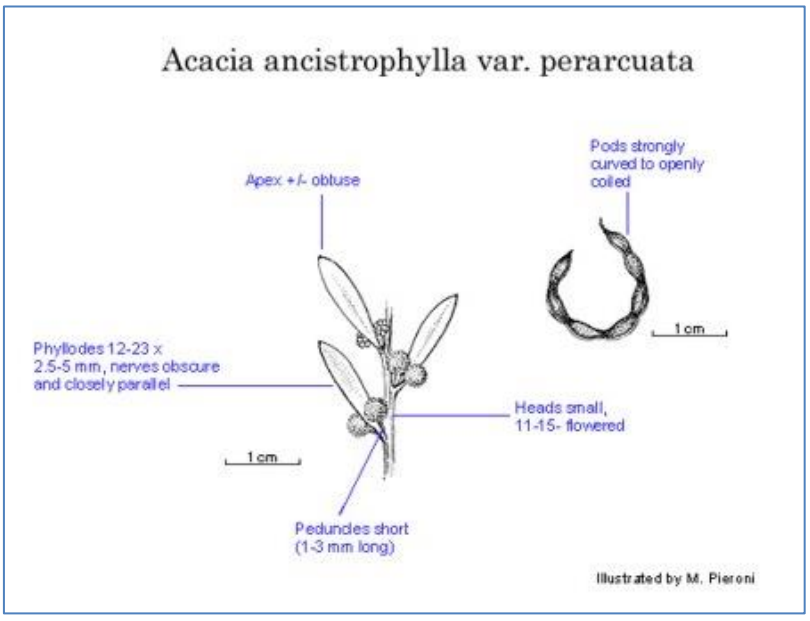

Plate 5: *Acacia ancistrophylla* var. *perarcuata* – Diagnostics (Maslin 2001)

4.3. Weeds

Twenty two weed (exotic or naturalised) species were recorded throughout the Study Area as listed in **Appendix C**. One of these species; *Emex australis* (Doublegee) is a Declared Pest listed under the *Biosecurity and Agriculture Management Act 2007* as a species requiring C3 Management (**Plate 6**). *Emex australis* was recorded adjacent to Quadrat W11 at low density.

A species requiring C3 Management is '… *established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest'.*

Where the DPaW state-wide environmental weed rating is available it is listed in **Appendix C** for all recorded weed species of the Study Area (DPaW 2013d). All recorded weeds are rated as Low (L) or Negligible (N) in DPaW Weed Prioritisation Rankings. Weed management actions include monitor (B), improve weed management (C) or protect priority sites (D).

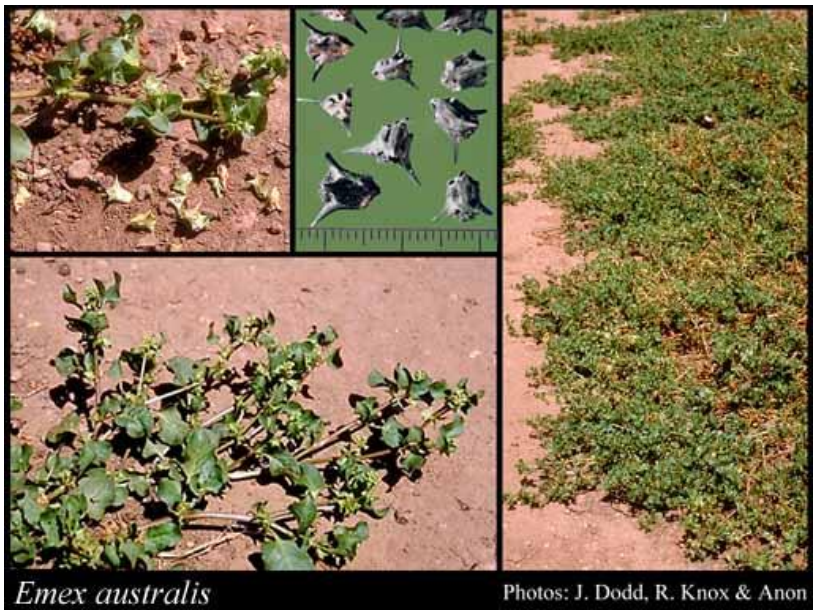

Plate 6: *_Emex australis_ "Doublegee"

4.4. Vegetation Units

Six Vegetation Units or Associations were recorded across the Study Area as shown in **Figure 13**. A description of each unit is provided in **Table 6**. Detailed quadrat data is provided in **Appendix D**.

4.5. Vegetation of Conservation Significance

Three Woodland Vegetation Units of the Study Area; Morrell, Gimlet and York Gum represent Priority Ecological Community Types. These vegetation types are also encompassed by the Threatened Ecological Community nomination; *Eucalypt Woodlands of The Western Australian Wheatbelt.* These units together represent 173.2 ha or 82.9% of the Study Area.

A locally significant vegetation type and landform (due to its small extent with the Study Area; 1.5ha or 0.7%); the unit Granite Monolith was the most floristically diverse of the Study Area and included a large number of ephemeral herbs surrounding the rock pools/ granite apron runoff areas (**Table 6**).

Plate 7: Herbfield of the Granite Monolith Vegetation Unit

Table 6: Vegetation Units of the Edna May Study Area

Unit	Description	Quadrats/Relevés	Photo
***Melaleuca* and *Acacia* Scrub**	Scattered *Eucalyptus celastroides* subsp. *virella* over a Tall Shrubland of *Acacia rigens, Acacia resinimarginea,* and/or *Acacia* sp. narrow phyllode with *Hakea multilineata* and Patches of *Melaleuca* Scrub including *Melaleuca eleuterostachya* and *Melaleuca acuminata* over a Shrubland of *Prostanthera grylloana* and *Rinzia carnosa* over a Grassland of *Amphipogon caricinus* var. *caricinus* in orange clay loam in a winter wet depression.	13, 14, 26, 21, 22	
Gimlet Woodland	Low Woodland of *Eucalyptus salubris* (with patches of *E. salmonophloia*) over patches of Tall Open Shrubland of *Melaleuca sheathiana* or *Melaleuca pauperiflora* subsp. *fastigiata* over an Open Shrubland of *Exocarpos aphyllus, Templetonia ceracea, Acacia merrallii, Acacia erinacea* and *Maireana* spp. over Very Open Tussock Grassland of *Austrostipa eremophila* on red loam plains	4, 10, 11, 16, 23, 24, 25, 27	

Unit	Description	Quadrats/Relevés	Photo
Morrel Woodland	Woodland of *Eucalyptus longicornis* with patches of *Eucalyptus celastroides* subsp. *virella* and very occasional *E. salubris or E. salmonophloia* over Tall Open Scrub (Patches of) *Melaleuca sheathiana* over Low Open Shrubland of *Olearia muelleri* over Low Scattered Chenopods; *Atriplex ?vesicaria* and *Maireana georgei* over Very Open Tussock Grassland of *Austrostipa* spp. on red brown cracking clay loam plain	1, 2, 6, 7, 8, 12, 17, 18	
Rough Fruited Mallee Woodland	Open woodland of *Eucalyptus corrugata* over a Mixed Shrubland including *Senna artemisioides* subsp. *filifolia, Eremophila ionantha, Acacia ligulata*, *Exocarpos aphyllus and/or Dodonaea microzyga* var. *acrolobata* over a sparse Low Shrubland of *Grevillea ?acuaria*, *Olearia muelleri, Maireana radiata* and *Enchylaena tomentosa* with scattered tussocks of *Austrostipa trichophylla/eremophila* and numerous small annual herbs (sparse) on orange clay loam plain	3, 15	

Unit	Description	Quadrats/Relevés	Photo
York Gum Woodland	Low Mallee Woodland of *Eucalyptus loxophleba* subsp. *lissophloia* over Tall Shrubland of *Allocasuarina helmsii* and *Acacia* sp. narrow phyllode over Low Open Shrubland of *Prostanthera grylloana, Rinzia carnosa, Hibbertia exasperata* and *Philotheca tuberculata* over Very open Tussock Grassland of *Amphipogon caricinus* var. *caricinus* on rocky laterite hillslopes,	5, 19	
Granite Monolith	Scattered Low Trees of *Eucalyptus ewartiana* and *Eucalyptus loxophleba* subsp. *lissophloia* with Open Shrubland of *Acacia* sp. narrow phyllode *, Malleostemon tuberculatus, Senna pleurocarpa* var. *angustifolia* and *Melaleuca radula* with Low Shrubland of *Grevillea ?paniculata* over Open Sedgeland of *Lepidosperma costale* with patches of Annual Herbs and Grasses: *Cheilanthes sieberi* subsp. *sieberi, Stylidium dielsianum, Borya sphaerocephala, Waitzia acuminata* var. *acuminata, Amphipogon caricinus* var. *caricinus, Aristida contorta* and *Monachather paradoxus* on the skeletal soils and apron of granite outcropping.	28	

Figure 13: Vegetation Units of the Edna May Study Area.

4.6. Vegetation Condition

The majority of the Study Area is in Good to Very Good or Very Good condition. There are numerous old exploration tracks and mine workings throughout the Study Area with the associated disturbance to understorey stratum and introduction of weeds. The disturbed areas are mapped as Good to Degraded or Degraded Condition and are shown in **Figure 14**. The northwest corner of the study area is an old stock paddock with a small dam that contains the most rubbish and weeds (**Plate 8**).

The Morrel Woodland to the south of the mine administration buildings has been subject to ongoing disturbance over the history of the mine and is currently in a Degraded condition due to the concentration of tracks and historical clearing (**Plate 9** and **Plate 10**).

Plate 8: Degraded Gimlet Woodland

Plate 9: Degraded Morrel Woodland

Plate 10: Degraded Morrel Woodland

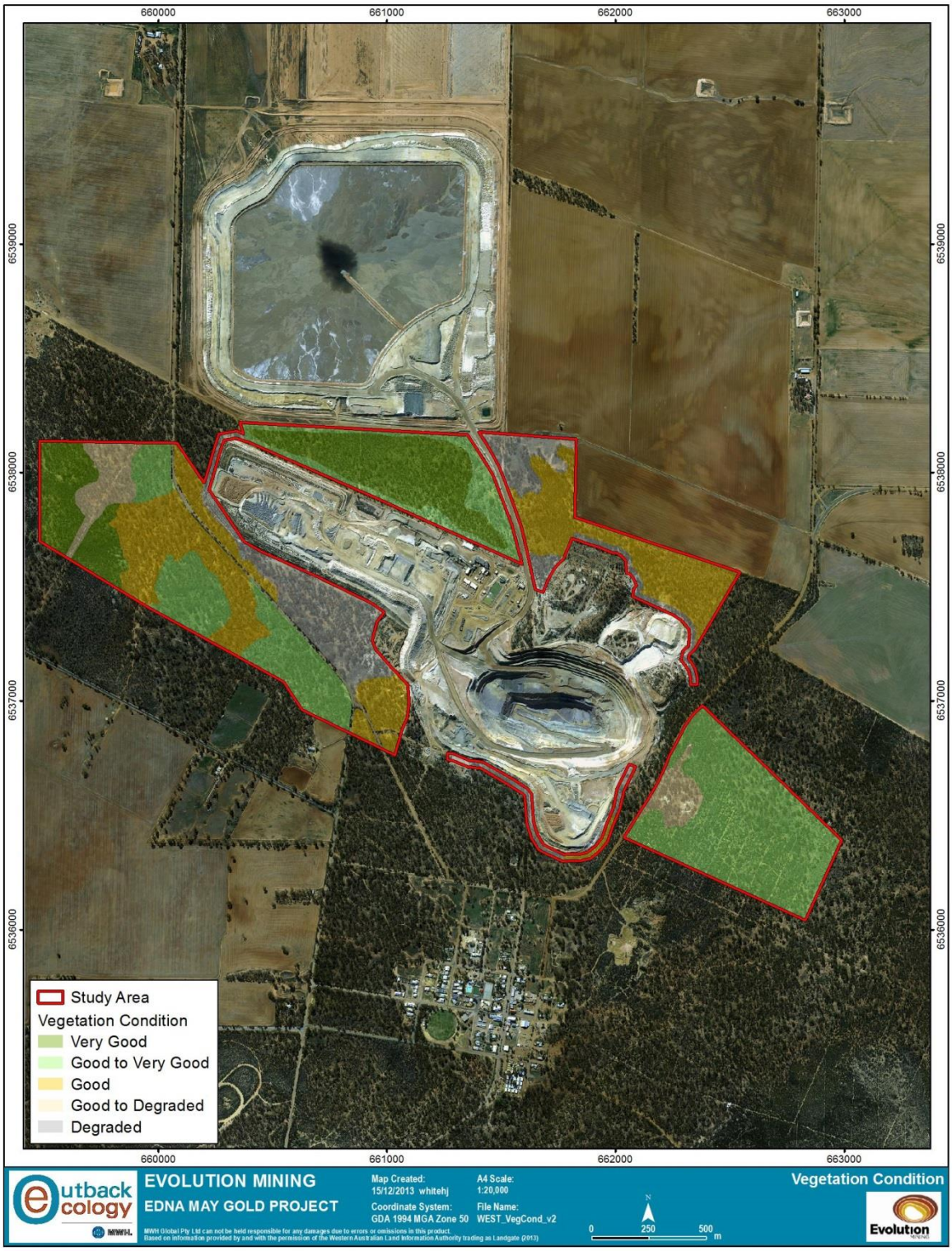

Figure 14: Vegetation Condition of the Edna May Study Area.

5. DISCUSSION AND RECOMMENDATIONS

The Level 2 Survey of the Edna May and Greenfinch tenements recorded the following conservation significant flora and vegetation values:

- Sixty-seven individuals of the Threatened Flora species *Eremophila resinosa* in Morrel Woodland.
- A single individual of Priority 3 *Austrostipa blackii* in the *Melaleuca* and *Acacia* Scrub;
- A single individual of *Acacia ancistrophylla* var. *peracuata* in Gimlet Woodland;
- Woodland Vegetation Units and Priority Ecological Community Types: Morrell, Gimlet and York Gum; which are included in the Threatened Ecological Community nomination; *Eucalypt Woodlands of The Western Australian Wheatbelt.*
- A locally significant vegetation type and landform; Granite Monolith which was the most floristically diverse of the Study Area, including a great number of ephemeral herbs surrounding the rock pools/ granite apron runoff areas; and
- All intact vegetation of the Study Area is part of Vegetation Association 536 (Red Morrell and Rough-Fruited Mallee) which is close to the 30% threshold for biodiversity conservation (EPA Position Statement 2).

Biodiversity conservation measures will need to be addressed for the above significant flora and vegetation values in any proposed development. The following recommendations are suggested;

- Continue the translocation program of *Eremophila resinosa* to offset any individual that may be impacted in any mine works proposal.
- Ensure that populations of the Priority species are retained in the area.
- Preferentially develop degraded areas of any Woodland and restore other unused degraded areas to original Woodland state by planting Morrel.
- Retain connectivity within the Town Reserve bushland areas for fauna movement, pollination and genetic exchange to ensure ongoing biodiversity conservation of Eucalypt Woodland communities in the Westonia area. and
- Undertake control measures for Declared Pests and other weeds within mining tenements.

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APPENDIX A

Definitions Of Codes And Terms Used To Describe Conservation Significance Of Flora And Vegetation

Definitions of Codes and Terms used to Describe Conservation Significance of Flora

Status	Code	Description
Schedule 1 of the Wildlife Conservation (Rare Flora) Notice under the Wildlife Conservation Act 1950		
Threatened	T	Taxa 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
Schedule 2 of the Wildlife Conservation (Rare Flora) Notice under the Wildlife Conservation Act 1950		
Presumed Extinct Flora	X	Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such
Threatened Flora (Schedule 1) are further ranked by DPaW according to their level of threat using IUCN Red List criteria:		
Critically Endangered	CR	considered to be facing an extremely high risk of extinction in the wild
Endangered	EN	considered to be facing a very high risk of extinction in the wild
Vulnerable	VU	considered to be facing a high risk of extinction in the wild.
DPAW Priority List		
Priority One (Poorly known taxa)	P1	Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
Priority Two (Poorly known taxa)	P2	Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
Priority Three (Poorly known taxa)	P3	Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

Status	Code	Description
Priority Four (Near threatened or other taxa in need of monitoring)	P4	1. Rare. Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. 2. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. 3.Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Priority Five (Conservation dependent taxa)	P5	Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years.

Definitions for Threatened Ecological Communities (TEC)

TECs are indirectly protected under the Western Australian *Environmental Protection Act 1986* and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Presumed Totally Destroyed (PD)

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. 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):

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)

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. 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):

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):

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):

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).

Endangered (EN)

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. 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):

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):

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.

B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

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.

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).

Vulnerable (VU)

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. 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):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

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.

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.

Definitions for Priority Ecological Communities (PEC)

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities that are known from very few occurrences with a very restricted distribution (generally =5 occurrences or a total area of = 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. 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.

Priority Two: Poorly-known ecological communities

Communities that are known from few occurrences with a restricted distribution (generally =10 occurrences or a total area of =200ha). At least some occurrences are not believed to be under immediate 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.

Priority Three: Poorly known ecological communities

(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 with 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. 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.

Priority Four:

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***.

These communities require regular monitoring.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX B

Vegetation Condition Scale

Vegetation Condition Scale (Keighery 1994)

Code	Description
Pristine	Pristine or nearly so. No obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.

Vegetation Structure Classification (Keighery 1994)

Life Form/ Height Class	Canopy Cover (percentage)			
	100% - 70%	70% - 30%	30% - 10%	10% - 2%
Trees over 30m Trees 10-30m Trees < 10m	Tall Closed Forest Closed Forest Low Closed Forest	Tall Open Forest Open Forest Low Open Forest	Tall Woodland Woodland Low Woodland	Tall Open Woodland Open Woodland Low Open Woodland
Tree Mallee	Closed Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2m Shrubs 1-2m Shrubs <1m	Closed Tall Scrub Closed Heath Closed Low Heath	Tall Open Scrub Open Heath Open Low Heath	Tall Shrubland Shrubland Low Shrubland	Tall Open Shrubland Open Shrubland Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

APPENDIX C

Edna May Study Area Species List

FAMILY	Weed	*Species*
AIZOACEAE		
	*	*Mesembryanthemum nodiflorum L (D)*
AMARANTHACEAE		
		Ptilotus aervoides
		Ptilotus carlsonii
		Ptilotus fusiformis
		Ptilotus holosericeus
		Ptilotus nobilis
		Ptilotus polystachyus
APIACEAE		
		Daucus glochidiatus
APOCYNACEAE		
		Alyxia buxifolia
		Rhyncharrhena linearis
ARALIACEAE		
		Hydrocotyle pilifera var. *glabrata*
		Trachymene cyanopetala
		Trachymene ornata
ASPARAGACEAE		
		Chamaexeros fimbriata
		Thysanotus manglesianus
		Thysanotus ?patersonii
		Thysanotus ?tenellus
		Thysanotus sp. *Twining Wheatbelt (N.H. Brittan 81/29)*
		Thysanotus sp.
ASTERACEAE		
	*	*Arctotheca calendula L (D)*
		Asteraceae sp.
		Asteridea athrixioides
	*	*Centaurea melitensis L (B,C)*
		Cephalipterum drummondii
		Erymophyllum ramosum subsp. *ramosum*
		Gilberta tenuifolia
		Hyalosperma glutinosum subsp. *glutinosum*
	*	*Hypochaeris glabra N (B)*
		Isoetopsis graminifolia

FAMILY	Weed	*Species*
ASTERACEAE		*Lawrencella rosea*
(Cont..)		*Millotia myosotidifolia*
	*	*Monoculus monstrosus L (B, C)*
		Olearia muelleri
		Olearia pimeleoides
		Podolepis capillaris
		Podolepis lessonii
		Podotheca gnaphalioides
		Quinetia urvillei
		Rhodanthe citrina
		Rhodanthe manglesii
		Rhodanthe sp.
		Schoenia cassiniana
		Senecio glossanthus
	*	*Sonchus oleraceus N (B)*
	*	*Taraxacum officinale*
	*	*Ursinia anthemoides N (B)*
		Vittadinia gracilis
		Waitzia acuminata var. *acuminata*
BORAGINACEAE		
		Halgania integerrima
BORYACEAE		
		Borya sphaerocephala
BRASSICACEAE		
	*	*Carrichtera annua*
	*	*Sisymbrium irio L (B, C, D)*
CAMPANULACEAE		
		Wahlenbergia gracilenta
CASUARINACEAE		
		Allocasuarina acutivalvis subsp. *acutivalvis*
		Allocasuarina campestris
		Allocasuarina helmsii
CHENOPODIACEAE		
		Atriplex codonocarpa
		Atriplex quadrivalvata var. *quadrivalvata*
		Atriplex stipitata
		Atriplex ?vesicaria
		Dysphania cristata

FAMILY	Weed	*Species*
CHENOPODIACEAE		*Enchylaena tomentosa*
(Cont..)		*Enchylaena tomentosa* var. *tomentosa*
		Eriochiton sclerolaenoides
		Maireana brevifolia
		Maireana georgei
		Maireana radiata
		Maireana sp.
		Maireana trichoptera
		Rhagodia drummondii
		Rhagodia preissii subsp. *preissii*
		Salsola australis
		Sclerolaena diacantha
		Sclerolaena drummondii
		Sclerolaena fusiformis
CONVOLVULACEAE		
		Wilsonia humilis
CRASSULACEAE		
		Crassula colorata var. *colorata*
CYPERACEAE		
		Lepidosperma costale
		Lepidosperma drummondii
DILLENIACEAE		
		Hibbertia exasperata
		Hibbertia glomerosa var. *glomerosa*
DROSERACEAE		
		Drosera andersoniana
FABACEAE		
		Acacia ancistrophylla var. *perarcuata (P3)*
		Acacia colletioides
		Acacia deficiens
		Acacia erinacea
		Acacia hemiteles
		Acacia ligulata
		Acacia merrallii
		Acacia resinimarginea
		Acacia rigens
		Acacia sp. *narrow phyllode (B.R. Maslin 7831)*

FAMILY	Weed	*Species*
FABACEAE		*Senna artemisioides* subsp. *filifolia*
(Cont..)		*Senna pleurocarpa* var. *angustifolia*
		Templetonia ceracea
	*	*Trifolium* sp.
GERANIACEAE		
	*	*Erodium aureum N (B)*
	*	*Erodium cicutarium N (B)*
		Erodium cygnorum
GOODENIACEAE		
		Brunonia sp. *Goldfields (K.R. Newbey 6044)*
		Goodenia havilandii
		Scaevola spinescens
HALORAGACEAE		
		Gonocarpus nodulosus
HEMEROCALLIDACEAE		
		Dianella revoluta var. *divaricata*
LAMIACEAE		
		Prostanthera grylloana
		Westringia cephalantha
		Westringia rigida
LOGANIACEAE		
		Phyllangium sulcatum
MALVACEAE		
		Abutilon cryptopetalum
	*	*Malva parviflora N (A)*
		Sida calyxhymenia
MYRTACEAE		
		Baeckea crispiflora
		Calothamnus quadrifidus subsp. *seminudus*
		Eucalyptus celastroides subsp. *virella*
		Eucalyptus corrugata
		Eucalyptus ewartiana
		Eucalyptus longicornis
		Eucalyptus loxophleba subsp. *lissophloia*
		Eucalyptus salmonophloia
		Eucalyptus salubris
		Malleostemon tuberculatus

FAMILY	Weed	*Species*
MYRTACEAE		*Melaleuca acuminata* subsp. *acuminata*
(Cont..)		*Melaleuca eleuterostachya*
		Melaleuca hamata
		Melaleuca lateriflora
		Melaleuca pauperiflora subsp. *fastigiata*
		Melaleuca radula
		Melaleuca sheathiana
		Melaleuca vinnula
		Rinzia carnosa
ORCHIDACEAE		
		Prasophyllum gracile
		Pterostylis mutica
		Pterostylis spathulata
PITTOSPORACEAE		
		Cheiranthera filifolia
POACEAE		
		Amphipogon caricinus var. *caricinus*
		Aristida contorta
		Austrostipa blackii (P3)
		Austrostipa elegantissima
		Austrostipa eremophila
		Austrostipa flavescens
		Austrostipa hemipogon
		Austrostipa platychaeta
		Austrostipa tenuifolia
		Austrostipa trichophylla
	*	*Avena barbata L (D)*
	*	*Avena fatua L (D)*
	*	*Bromus rubens*
		Chloris truncata
	*	*Ehrharta longiflora N (B)*
	*	*Lolium rigidum N (B)*
		Monachather paradoxus
	*	*Pentameris airoides N (B)*
		Rhytidosperma caespitosum
	*	*Vulpia* sp. *N (B)*

FAMILY	Weed	*Species*
POLYGALACEAE		
		Comesperma integerrimum
POLYGONACEAE		
		Comesperma integerrimum
POLYGONACEAE		
	*	*Emex australis* Declared Pest (C3)
		Muehlenbeckia adpressa
PORTULACACEAE		
		Calandrinia eremaea
PRIMULACEAE		
		Lysimachia arvensis
PROTEACEAE		
		Grevillea ?acuaria
		Grevillea ?paniculata
		Grevillea sp.
		Hakea invaginata
		Hakea multilineata
PTERIDACEAE		
		Cheilanthes lasiophylla
		Cheilanthes sieberi subsp. *sieberi*
RHAMNACEAE		
		Cryptandra wilsonii
		Trymalium daphnifolium
RUTACEAE		
		Phebalium tuberculosum
		Philotheca tomentella
SANTALACEAE		
		Exocarpos aphyllus
		Exocarpos sparteus
		Santalum acuminatum
		Santalum spicatum
SAPINDACEAE		
		Dodonaea bursariifolia
		Dodonaea inaequifolia
		Dodonaea microzyga var. *acrolobata*
		Dodonaea stenozyga

FAMILY	Weed	*Species*
SCROPHULARIACEAE		
		Eremophila decipiens subsp. *decipiens*
		Eremophila drummondii
		Eremophila granitica
		Eremophila ionantha
		Eremophila oppositifolia subsp. *angustifolia*
		Eremophila resinosa (T)
SOLANACEAE		
		Lycium australe
		Nicotiana rotundifolia
		Nicotiana sp.
		Solanum orbiculatum
STYLIDIACEAE		
		Stylidium dielsianum
THYMELAEACEAE		
		Pimelea sp.
ZYGOPHYLLACEAE		
		Zygophyllum apiculatum
		Zygophyllum eremaeum
		Zygophyllum ovatum

APPENDIX D

Edna May Study Area Detailed Site Data

Westonia Level 2 **Site** W26
Described by Alex Sleep **Date** 8/10/2013 **Type** Relevé
Season Excellent
Location *Melaleuca* and *Acacia* Scrub

31.294603	118.70209

Soil Orange brown clay loam
Vegetation Scattered *Eucalyptus celastroides* subsp. *virella* over a Tall Shrubland of *Acacia rigens, Acacia* sp. narrow phyllode and *Hakea multilineata* over a Shrubland of *Prostanthera grylloana* and *Rinzia carnosa*
Veg Condition Excellent
Fire Age **?**

SPECIES LIST:

Acacia rigens	*Acacia* sp. *narrow phyllode (B.R. Maslin 7831)*
Allocasuarina acutivalvis subsp. *acutivalvis*	*Alyxia buxifolia*
Amphipogon caricinus var. *caricinus*	*Austrostipa hemipogon*
Austrostipa trichophylla	*Baeckea crispiflora*
Comesperma integerrimum	*Dianella revoluta* var. *divaricata*
Dodonaea microzyga var. *acrolobata*	*Eucalyptus celastroides* subsp. *virella*
Hakea invaginata	*Hakea multilineata*
Halgania integerrima	*Hibbertia glomerosa* var. *glomerosa*
Lepidium drummondii	*Melaleuca acuminata* subsp. *acuminata*
Melaleuca eleuterostachya	*Melaleuca hamata*
Prostanthera grylloana	*Rinzia carnosa*
Stylidium dielsianum	*Thysanotus manglesianus*
Trachymene ornata	

Westonia Level 2 **Site** W28
Described by CT **Date** 11/10/2013 **Type** Relevé
Season Excellent
Location Granite Monolith

-31.284716	118.679013

Soil Grantite Outcrop. Skeletal Red Sandy Loam to Clay over Granite - Including the apron of the granite monolith
Rock Type Granite
Vegetation Scattered Low Trees of *Eucalyptus ewartiana* and *Eucalyptus loxophleba* subsp. *lissophloia* with Open Shrubland of *Acacia* sp. narrow phyllode , *Malleostemon tuberculatus, Senna pleurocarpa* var. *angustifolia* and *Melaleuca radula* with Low Shrubland of *Grevillea ?paniculata* over Open Sedgeland of *Lepidosperma costale* with patches of Annual Herbs and Grasses: *Cheilanthes sieberi* subsp. *sieberi, Stylidium dielsianum, Borya sphaerocephala, Waitzia acuminata* var. *acuminata, Amphipogon caricinus* var. *caricinus, Aristida contorta* and *Monachather paradoxus.*
Veg Condition Excellent
Fire Age **?**

SPECIES LIST:

Abutilon cryptopetalum	*Acacia* sp. *narrow phyllode (B.R. Maslin 7831)*
Alyxia buxifolia	*Amphipogon caricinus* var. *caricinus*
Arctotheca calendula	*Aristida contorta*
Austrostipa platychaeta	*Austrostipa tenuifolia*
Austrostipa trichophylla	*Avena barbata*
Borya sphaerocephala	*Bromus rubens*
Brunonia sp. *Goldfields (K.R. Newbey 6044)*	*Calandrinia eremaea*
Calothamnus quadrifidus subsp. *seminudus*	*Carrichtera annua*
Cheilanthes lasiophylla	*Cheilanthes sieberi* subsp. *sieberi*
Comesperma integerrimum	*Daucus glochidiatus*
Dianella revoluta var. *divaricata*	*Dodonaea inaequifolia*
Ehrharta longiflora	*Enchylaena tomentosa* var. *tomentosa*
Erodium aureum	*Eucalyptus ewartiana*
Eucalyptus loxophleba subsp. *lissophloia*	*Gilberta tenuifolia*
Gonocarpus nodulosus	*Goodenia havilandii*
Grevillea paniculata	*Hyalosperma glutinosum* subsp. *glutinosum*
Hypochaeris glabra	*Isoetopsis graminifolia*

Lawrencella rosea	*Lepidosperma costale*
Malleostemon tuberculatus	*Melaleuca hamata*
Mesembryanthemum nodiflorum	*Melaleuca radula*
Millotia myosotidifolia	*Millotia myosotidifolia*
Monoculus monstrosus	*Monachather paradoxus*
Nicotiana rotundifolia	*Muehlenbeckia adpressa*
Phebalium tuberculosum	*Pentameris airoides*
Podolepis lessonii	*Podolepis capillaris*
Prasophyllum gracile	*Podotheca gnaphalioides*
Rhodanthe manglesii	*Ptilotus polystachyus*
Rhyncharrhena linearis	*Rhodanthe* sp.
Senna pleurocarpa var. *angustifolia*	*Santalum spicatum*
Solanum orbiculatum	*Sida calyxhymenia*
Trachymene ornata	*Trachymene cyanopetala*
Ursinia anthemoides	*Trymalium daphnifolium*
Wahlenbergia gracilenta	*Vulpia* sp.
Westringia rigida	*Waitzia acuminata* var. *acuminata*

Westonia Level 2 **Site** W1
Described by AS **Date** 8/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Morrel Woodland

NW	-31.282664	118.695224
	-31.282681	118.695383
	-31.282881	118.69539
	-31.282856	118.695177

Soil Brown loamy clay
Vegetation Woodland of *Eucalyptus longicornis* over a Tall Open Shrubland to Tall Shrubland (patchy) of *Melaleuca pauperiflora* subsp. *fastigiata* over a very sparse understorey
Veg Condition Very Good
Fire Age **?**

SPECIES LIST:

Name	Cover	Height
Acacia deficiens	*opp*	
Acacia hemiteles	*opp*	
Acacia merrallii	*opp*	
Asteridea athrixioides	*<1*	*0.50*
Atriplex stipitata	*<1*	*0.25*
Austrostipa trichophylla	*<1*	*0.40*
Eremophila ionantha	*opp*	
Eremophila resinosa	*opp*	
Eriochiton sclerolaenoides	*<1*	*0.30*
Eucalyptus longicornis	*30*	*15*
Eucalyptus salubris	*opp*	
Exocarpos aphyllus	*opp*	
Maireana radiata	*1*	*0.20*
Maireana trichoptera	*<1*	*0.30*
Melaleuca pauperiflora subsp. *fastigiata*	*40*	*3*
Rhagodia drummondii	*<1*	*0.50*
Santalum acuminatum	*<1*	*2.5*
Sclerolaena diacantha	*<1*	*0.15*
Templetonia ceracea	<1	0.30

Westonia Level 2 **Site** W10
Described by CT **Date** 9/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.293367	118.704672
	-31.293219	118.704783
	-31.293522	118.704836
	-31.293304	118.704949

Soil Brown Clay Loam Plain
Vegetation Low Woodland of *Eucalyptus salubris* over Open Shrubland of *Exocarpos aphyllus, Acacia erinacea* and *Maireana* spp. over Very Open Tussock Grassland of *Austrostipa eremophila*.
Veg Condition Very Good
Fire Age **?**
Notes Weeds at Low Cover. Historical Mine Workings and Tracks

SPECIES LIST:

Name	Cover	Height
Acacia erinacea	*<1*	*1.1*
Acacia merrallii	*<1*	*0.8*
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*<1*	*2*
Asteraceae sp.	*<1*	*0.1*
Asteridea athrixioides	*<1*	*0.05*
Austrostipa elegantissima	*<1*	*0.5*
Austrostipa eremophila	*<1*	*0.3*
Austrostipa eremophila	*<1*	*0.4*
Avena fatua	*Opp*	
Bromus rubens	*Opp*	
Carrichtera annua	*<1*	*0.1*
Centaurea melitensis	*Opp*	
Cephalipterum drummondii	*<1*	*0.05*
Daucus glochidiatus	*<1*	*0.1*
Dianella revoluta var. *divaricata*	*<1*	*0.5*
Enchylaena tomentosa var. *tomentosa*	*Opp*	
Eremophila drummondii	*<1*	*0.4*
Erodium aureum	*<1*	*0.05*

Eucalyptus salubris	*15*	*10*
Exocarpos aphyllus	*<1*	*2*
Hyalosperma glutinosum subsp. *glutinosum*	*Opp*	
Lawrencella rosea	*<1*	*0.1*
Maireana georgei	*<1*	*0.5*
Maireana sp.	*<1*	*0.05*
Melaleuca acuminata subsp. *acuminata*	*Opp*	
Pentameris airoides	*Opp*	
Pterostylis mutica	*Opp*	
Pterostylis spathulata	*<1*	*0.1*
Ptilotus holosericeus	*<1*	*0.05*
Ptilotus nobilis	*<1*	*0.2*
Quinetia urvillei	*Opp*	
Rhagodia drummondii	*<1*	*0.4*
Rhytidosperma caespitosum	*<1*	*0.2*
Santalum acuminatum	*<1*	*1.2*
Schoenia cassiniana	*Opp*	
Sclerolaena diacantha	*<1*	*0.1*
Senna artemisioides subsp. *filifolia*	*<1*	*1*
Sisymbrium irio	*Opp*	
Sonchus oleraceus	*Opp*	
Taraxacum officinale	*Opp*	
Templetonia ceracea	*<1*	*1*
Thysanotus sp.	*Opp*	
Trifolium sp.	*<1*	*0.05*
Vittadinia gracilis	*Opp*	
Vittadinia gracilis	*Opp*	

Westonia Level 2 **Site** W11
Described by CT **Date** 9/10/2013 **Type** Quadrat 20 x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.283469	118.699026
	-31.283509	118.698849
	-31.283636	118.698839
	-31.283627	118.699029

Soil Brown Clay of Valley Floor
Vegetation Woodland of *Eucalyptus salubris* over Scattered Shrubs *Acacia merrallii* and *Maireana georgei* with patches of ephemeral herbs and grasses.
Veg Condition Very Good
Notes No Observable Disturbance

SPECIES LIST:

Name	Cover	Height
Acacia colletioides	*Opp*	
Acacia erinacea	*<1*	*0.5*
Acacia hemiteles	*Opp*	
Acacia ligulata	*Opp*	
Acacia merrallii	*1*	*0.5*
Asteraceae sp.	*<1*	*0.05*
Atriplex codonocarpa	*Opp*	
Atriplex quadrivalvata var. *quadrivalvata*	*Opp*	
Atriplex stipitata	*<1*	*0.2*
Austrostipa elegantissima	*<1*	*0.5*
Bromus rubens	*<1*	*0.1*
Cephalipterum drummondii	*<1*	*0.1*
Chloris truncata	*Opp*	
Daucus glochidiatus	*<1*	*0.05*
Dysphania cristata	*Opp*	
Emex australis	*Opp*	
Enchylaena tomentosa var. *tomentosa*	*<1*	*0.3*
Eremophila drummondii	*<1*	*0.3*

Eremophila ionantha	*Opp*	
Eriochiton sclerolaenoides	*<1*	*0.2*
Erymophyllum ramosum subsp. *ramosum*	*<1*	*0.1*
Eucalyptus celastroides subsp. *virella*	*Opp*	
Eucalyptus longicornis	*Opp*	
Eucalyptus salmonophloia	*Opp*	
Eucalyptus salubris	*20*	*10*
Exocarpos aphyllus	*Opp*	
Grevillea acuaria	*<1*	*1*
Lolium rigidum	*Opp*	
Lycium australe	*<1*	*1*
Maireana brevifolia	*Opp*	
Maireana georgei	*1*	*1*
Maireana sp.	*<1*	*0.2*
Maireana trichoptera	*<1*	*0.1*
Maireana trichoptera	*<1*	*0.2*
Malva parviflora	*Opp*	
Melaleuca acuminata subsp. *acuminata*	*<1*	*1*
Melaleuca pauperiflora subsp. *fastigiata*	*Opp*	
Mesembryanthemum nodiflorum	*Opp*	
Olearia aff muricata	*Opp*	
Ptilotus holosericeus	*<1*	*0.05*
Ptilotus nobilis	*<1*	*0.3*
Rhagodia drummondii	*<1*	*0.4*
Rhytidosperma caespitosum	*<1*	*0.2*
Salicornia australis	*Opp*	
Sclerolaena diacantha	*<1*	*0.2*
Sclerolaena drummondii	*<1*	*0.2*
Senecio glossanthus	*<1*	*0.1*
Senna artemisioides subsp. *filifolia*	*Opp*	
Sisymbrium irio	*Opp*	
Sonchus oleraceus	*<1*	*0.1*
Templetonia ceracea	*Opp*	
Thysanotus manglesianus	*Opp*	
Trifolium sp.	*<1*	*0.1*

Westonia Level 2 **Site** W12
Described by CT **Date** 9/10/2013 **Type** Q 20m x 20m
Season Excellent **Uniformity**
Location Morrel Woodland

NW	-31.284123	118.69864
	-31.284289	118.69861
	-31.284341	118.698916

Soil Orange Brown Clay Loam on Valley Floor
Vegetation Woodland of *Eucalyptus longicornis* with *Eucalyptus celastroides* subsp. *virella* over Tall Open Shrubland of *Melaleuca pauperifolia* subsp. *fastigiata* and *Exocarpos aphyllus* over Open Shrubland of *Acacia merralli, Lycium asutrale* and *Eremophila ionantha* over Scattered Low Chenopds.
Veg Condition Very Good to Excellent

SPECIES LIST:

Name	Cover	Height
Acacia hemiteles	*<1*	*0.4*
Acacia ligulata	*<1*	*2*
Acacia merrallii	*<1*	*1*
Asteraceae sp.	*<1*	*0.02*
Atriplex stipitata	*<1*	*0.3*
Atriplex vesicaria	*<1*	*0.1*
Austrostipa elegantissima	*<1*	*0.1*
Austrostipa flavescens	*<1*	*1.2*
Enchylaena tomentosa var. *tomentosa*	*<1*	*0.2*
Eremophila ionantha	*2*	*2*
Eriochiton sclerolaenoides	*<1*	*0.05*
Erodium aureum	*<1*	*0.05*
Erodium cicutarium	*<1*	*0.1*
Eucalyptus celastroides subsp. *virella*	*8*	*10*
Eucalyptus longicornis	*2*	*15*
Exocarpos aphyllus	*<1*	*2.5*
Grevillea sp.	*<1*	*1.1*
Lycium australe	*2*	*1*
Maireana brevifolia	*Opp*	
Maireana georgei	*<1*	*0.3*

Maireana trichoptera	*<1*	*0.4*
Melaleuca pauperiflora subsp. *fastigiata*	*2*	*4*
Mesembryanthemum nodiflorum	*Opp*	
Ptilotus holosericeus	*<1*	*0.05*
Ptilotus nobilis	*<1*	*0.2*
Rhytidosperma caespitosum	*<1*	*0.2*
Sclerolaena diacantha	*<1*	*0.2*
Sclerolaena drummondii	*<1*	*0.1*
Senna artemisioides subsp. *filifolia*	*<1*	*1*
Sisymbrium irio	*<1*	*0.1*
Templetonia ceracea	*<1*	*0.5*

Westonia Level 2 **Site** W13
Described by CT **Date** 9/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Melaleuca and Acacia Scrub

NW	-31.2945	118.7040

Soil Orange Clay Loam in a Winter Wet Depression
Vegetation Tall Open Scrub of *Acacia resinimarginea* and *Acacia* sp. narrow phyllode over Low Open Shrubland of *Prostanthera grylloana* and *Rinzia carnosa* over Open Tussock Grassland of *Amphipogon caricinus* var. *caricinus* and *Austrostipa* spp., with patches of Annual Herbs.
Veg Condition Very Good To Excellent
Notes Small % of Weeds, Old Drill Tracks.

SPECIES LIST:

Name	Cover	Height
Acacia resinimarginea	*3*	*8*
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*20*	*4*
Amphipogon caricinus var. *caricinus*	*6*	*0.4*
Austrostipa blackii	*<1*	*0.3*
Austrostipa elegantissima	*<1*	*0.5*
Austrostipa hemipogon	*<1*	*0.5*
Carrichtera annua	*<1*	*0.1*
Cheilanthes sieberi subsp. *sieberi*	*1*	*0.3*
Cheiranthera filifolia	*<1*	*cr*
Comesperma integerrimum	*<1*	*1.5*
Crassula colorata var. *colorata*	*<1*	*0.05*
Dianella revoluta var. *divaricata*	*<1*	*0.8*
Drosera andersoniana	*Opp*	
Erodium aureum	*<1*	*0.05*
Hakea multilineata	*<1*	*0.15*
Hydrocotyle pilifera var. *glabrata*	*<1*	*0.02*
Isoetopsis graminifolia	*<1*	*0.04*
Lawrencella rosea	*Opp*	
Melaleuca acuminata subsp. *acuminata*	*<1*	*2*
Melaleuca vinnula	*Opp*	
Olearia pimeleoides	*Opp*	
Pentameris airoides	*<1*	*0.1*
Phyllangium sulcatum	*<1*	*0.1*

Pimelea sp.	*<1*	*0.3*
Podolepis lessonii	*<1*	*0.2*
Prasophyllum gracile	*<1*	*0.02*
Prostanthera grylloana	*2*	*1.2*
Rhodanthe citrina	*<1*	*0.2*
Rinzia carnosa	*<1*	*1*
Stylidium dielsianum	*<1*	*0.05*
Thysanotus sp. *Twining Wheatbelt (N.H. Brittan 81/29)*	*Opp*	
Trachymene cyanopetala	*Opp*	
Trachymene ornata	*<1*	*0.05*
Trifolium sp.	*<1*	*0.05*
Wahlenbergia gracilenta	*<1*	*0.1*
Waitzia acuminata var. *acuminata*	*<1*	*0.1*

Westonia Level 2 **Site** W14
Described by AS **Date** 9/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Melaleuca and Acacia Scrub

NW	-31.295119	118.701783
	-31.295309	118.701775
	-31.295283	118.701981
	-31.295097	118.701982

Soil Orange brown clay
Rock Type Fine mantle of quartz fragments
Vegetation Scattered trees of *Eucalyptus celastroides* subsp. *virella* over a tall patchy scrub of *Acacia* sp. narrow phyllode, *Acacia rigens* and *Hakea multilineata* with patches of *Melaleucas* over a low open shrubland of *Rinzia carnosa* and *Prostanthera grylloana* over an Open Grassland of *Amphipogon*
Veg Condition Excellent
Notes Some ground disturbance, drainage channel, adjacent to waste dump

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia sp. *narrow phyllode*	*30*		*4-6*		
Acacia colletioides	*<1*		*0.4*		
Acacia rigens	*15*				
Alyxia buxifolia	*<1*		*2*		
Amphipogon caricinus	*10*		*0.3*		
Austrostipa hemipogon	*<1*		*0.40*		
Borya sp.	*opp*				
Chamaexeros fimbriata	*<1*		*0.30*		
Cheiranthera filifolia	*<1*		*cr*		
Comesperma integerrimum	*<1*		*cr*		
Dianella revoluta	*1*		*0.4*		
Eucalyptus celastroides subsp. *virella*	*1*		*9*		
Rinzia carnosa	*10*		*1.1*		
Hakea multilineata	*5*		*4*		
Lepidosperma drummondii	*<1*		*0.5*		
Melaleuca eleuterostachya	*<1*		*3*		
Melaleuca vinnula	*<1*		*2*		

Olearia pimeleoides	*<1*	*0.6*
Prostanthera grylloana	*8*	
Pterostylis spathulata	*<1*	*0.10*
Rhagodia drummondii	*<1*	*50*
Rhodanthe citrina	*<1*	*0.50*
Stylidium dielsianum	*<1*	*0.5*
Thysanotus manglesianus	*<1*	*cr*
Trachymene ornata	*<1*	*0.5*

Westonia Level 2 **Site** W15
Described by AS **Date** 10/10/2013 **Type** Relevé
Season
Location Rough-fruited Mallee Woodland

NW	-31.283705	118.678064
	-31.283701	118.678285
	-31.283874	118.67829
	-31.283884	118.678082

Soil Orange clay loam
Rock Type Granite
Vegetation Open woodland of *Eucalyptus corrugata* over a Tall Shrubland of *Dodonaea microzyga* var. *acrolobata* and *Eremophila* spp. over a sparse Low Shrubland of *Grevillea ?acuaria* and *Olearia muelleri* with scattered tussocks of Austrostipa trichophylla and numerous small annual herbs (sparse)
Veg Condition Very Good to Excellent
Notes Vegetation appears mostly intact, long time without fire, some senescence of *Acacias*, old exploration dist.

SPECIES LIST:

Name	Cover	Height
Acacia erinacea	*<1*	*0.50*
Acacia hemiteles	*<1*	*1.2*
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*<1*	*4*
Alyxia buxifolia	*<1*	*0.50*
Austrostipa trichophylla	*<1*	*0.45*
Comesperma integerrimum	*<1*	*cr*
Dianella revoluta	*<1*	*0.50*
Dodonaea microzyga var. *acrolobata*	*30*	*2-4*
Dodonaea stenozyga	*<1*	*2*
Eremophila drummondii	*<1*	*1*
Eremophila granitica	*<1*	*1*
Eremophila oppositifolia subsp. *angustifolia*	*2*	*1.5*
Eucalyptus corrugata	*40*	*12*
Grevillea ?acuaria	*5*	*0.50*
Hyalosperma glutinosum subsp. *glutinosum*	*<1*	*0.04*

Lawrencella rosea	*<1*	*0.02*
Maireana trichoptera	*<1*	*0.15*
Olearia muelleri	*3*	*0.50*
Phebalium tuberculosum	*4*	*1*
Podolepis lessonii	*<1*	*0.1*
Ptilotus carlsonii	*opp*	
Ptilotus nobilis	*<1*	*0.30*
Santalum acuminatum	*<1*	*2.2*
Scaevola spinescens	*<1*	*0.60*
Sclerolaena diacantha	*<1*	*0.10*
Senna artemisioides subsp. *filifolia*	*5*	*1.6*
Trachymene ornata	*<1*	*0.30*
Trifolium sp.	*<1*	*0.05*
Waitzia acuminata	*<1*	*0.10*

Westonia Level 2 **Site** W16
Described by CT **Date** 10/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.28042	118.6780

Soil Red brown sandy loam, ironstone pebbles
Rock Type Laterite/ironstone/quartz
Vegetation Woodland of *Eucalyptus salubris with E. salmonophloia and Eucalyptus longicornis* over sparse shrubs of *Eremophila oppositifolia* subsp. *angustifolia*
Veg Condition Very good to excellent. Intact soil structure
Notes A few tracks and log chopping (minor)

SPECIES LIST:

Name	Cover	Height
Acacia erinacea	*<1*	*<0.5*
Acacia merrallii	*<1*	*<0.5*
Atriplex vesicaria	*<1*	*<0.4*
Austrostipa platychaeta	*<1*	*<0.5*
Eremophila ionantha	*<1*	*1.2*
Eremophila oppositifolia subsp. *angustifolia*	*<1*	*<2*
Eucalyptus celastroides	*2*	*<8*
Eucalyptus longicornis	*2*	*<12*
Eucalyptus salmonophloia	*6*	*<15*
Maireana georgei	*<1*	*<0.6*
Maireana trichoptera	*<1*	*<0.2*
Olearia muelleri	*<1*	*<0.5*
Ptilotus holosericeus	*<1*	*<0.05*
Ptilotus nobilis	*<1*	*<0.2*
Scaevola spinescens	*<1*	*<1*
Sclerolaena diacantha	*<1*	*<0.1*
Sclerolaena fusiformis	*<1*	*<0.2*
Templetonia ceracea	*<1*	*<1.2*
Wilsonia humilis	*<1*	*<0.2*

Westonia Level 2 **Site** W17
Described by CT **Date** 10/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Morrel Woodland

NW	-31.2811	118.6800

Soil Red Brown Cracking Clay Loam Plain
Vegetation Woodland of *Eucalyptus longicornis* with patches of *Eucalyptus celastroides* subsp. *virella* and very occasional *Eucalyptus salubris* over Tall Open Scrub (Patches of) *Melaleuca sheathiana*, over Low Scattered Chenopods; *Atriplex ?vesicaria* and *Maireana georgei* over Very Open Tussock Grassland of *Austrostipa trichophylla*
Veg Condition Excellent
Fire Age Long Unbrunt
Notes No weeds. No soil disturbance evident.

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Atriplex vesicaria	<1		0.4		
Austrostipa trichophylla	<1		0.3		
Calandrinia eremaea	Opp				
Eremophila ionantha	<1		1.5		
Eriochiton sclerolaenoides	<1		0.1		
Eucalyptus celastroides subsp. virella	<1		8		
Eucalyptus longicornis	25		15		
Eucalyptus salubris	Opp				
Exocarpos aphyllus	Opp				
Maireana georgei	<1		0.4		
Maireana trichoptera	<1		0.3		
Melaleuca sheathiana	Opp				
Olearia muelleri	<1		0.4		
Ptilotus carlsonii	Opp				
Santalum acuminatum	Opp				
Sclerolaena diacantha	<1		0.2		
Templetonia ceracea	<1		0.6		
Zygophyllum apiculatum	<1		0.1		
Zygophyllum eremaeum	Opp				

Westonia Level 2 **Site** W18
Described by VY **Date** 10/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Morrel Woodland

NW	-31.285214	118.681936
	-31.28541	118.682041
	-31.285474	118.681892
	-31.285337	118.681759

Soil Red Brown Clay Loam Slopes
Rock Type
Vegetation Open Forest of Eucalyptus longicornis (with patches of *Eucalyptus salmonophloia*, E. *celastroides* subsp. *virella* and *E. salubris*) over Scattered Shrubs of *Eremophila ionantha*, *Acacia ligulata* over Scattered Low Shrubs of *Maireana trichoptera* and *Sclerolaena diacantha.*
Veg Condition Good
Fire Age
Notes Previous Logging and Historical mine workings

SPECIES LIST:

Name	*Cover*	*Height*
Acacia colletioides	*<1*	*1.5*
Acacia erinacea	*Opp*	
Acacia ligulata	*Opp*	*2*
Acacia merinthophora	*Opp*	
Arctotheca calendula	*Opp*	
Atriplex stipitata	*<1*	*0.3*
Austrostipa elegantissima	*<1*	*0.3*
Austrostipa eremophila	*Opp*	
Carrichtera annua	*Opp*	
Centaurea melitensis	*Opp*	
Eremophila ionantha	*Opp*	*1.5*
Eucalyptus celastroides subsp. *virella*		
Eucalyptus longicornis	*45*	*15*
Eucalyptus salmonophloia		
Eucalyptus salubris		
Exocarpos sparteus	*Opp*	
Grevillea acuaria	*Opp*	

Lysimachia arvensis	*Opp*	
Maireana georgei	*<1*	*0.4*
Maireana trichoptera	*1*	*0.3*
Olearia muelleri	*Opp*	
Ptilotus holosericeus	*<1*	*0.1*
Ptilotus polystachyus	*Opp*	
Rhagodia drummondii	*<1*	*0.6*
Santalum acuminatum	*Opp*	
Sclerolaena diacantha	*2*	*0.2*
Taraxacum officinale	*Opp*	
Templetonia ceracea	*<1*	*0.6*
Zygophyllum eremaeum	*<1*	*0.2*

Westonia Level 2 **Site** W19
Described by AS **Date** 10/10/2013 **Type** Relevé
Season Excellent
Location York Gum with Heathland

-31.28419	118.677593

Soil Orange clay with lichen crusting
Rock Type Granite
Vegetation Scrub of *Allocasuarina campestris* and *Acacia* sp. narrow phyllode with occasional *Malleostemon tuberculatus*
Veg Condition Very good - death of vegetation due to senescence
Notes Long time without fire

SPECIES LIST:

Name	Cover	Height
Acacia sp. narrow phyllode		
Allocasuarina campestris		
Austrostipa platychaeta		
Brunonia sp. *Goldfields (K.R. Newbey 6044)*		
Goodenia havilandii		
Malleostemon tuberculatus		

Westonia Level 2 **Site** W2
Described by CT **Date** 8/10/2013 **Type** Quadrat 20 m x 20m
Season Excellent
Location Morrel Woodland

NW	-31.28161	118.6937

Soil Red Loam Plain
Rock Type
Vegetation Open Forest of *Eucalyptus longicornis* with some *E. celastroides* subsp. *virella* over Tall Open Shrubland of *Melaleuca sheathiana* over Low Open Shrubland of *Olearia muelleri* over Open Tussock Grassland of *Austrostipa flavescens*
Veg Condition Very Good
Fire Age Long Unburnt

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia colletioides	*<1*		*1.2*		
Asteridea athrixioides	*<1*		*0.1*		
Atriplex vesicaria	*<1*		*0.2*		
Austrostipa flavescens	*2*		*0.5*		
Austrostipa platychaeta	*<1*		*1.3*		
Austrostipa trichophylla	*<1*		*0.8*		
Eriochiton sclerolaenoides	*<1*		*0.05*		
Eucalyptus celastroides subsp. *virella*	*15*		*8*		
Eucalyptus longicornis	*10*		*15*		
Exocarpos aphyllus	*<1*		*1*		
Maireana trichoptera	*<1*		*0.3*		
Melaleuca sheathiana	*Opp*		*4*		
Olearia muelleri	*2*		*0.4*		
Ptilotus holosericeus	*<1*		*0.05*		
Rhagodia drummondii	*<1*		*0.4*		
Santalum acuminatum	*<1*		*0.4*		
Sclerolaena diacantha	*<1*		*0.2*		
Westringia rigida	*<1*		*0.5*		
Zygophyllum apiculatum	*<1*		*0.1*		

Westonia Level 2 **Site** W20
Described by CT **Date** 10/10/2013 **Type** Quadrat 20 m x 20m
Season Excellent
Location Melaleuca and Acacia Scrub

NW	-31.296430	118.706610

Soil Red, coarse sandy loam
Rock Type
Vegetation *Eucalyptus celastroides* subsp. *virella* over *Acacia* sp. narrow phyllode over shrubland of *Rinzia carnosa*
Veg Condition Excellent to very good
Fire Age Long Unburnt

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia colletioides	*1*		*<3*		
Acacia resinimarginea	*4*		*<8*		
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*6*		*<6*		
Amphipogon caricinus	*4*		*<0.20*		
Austrostipa elegantissima	*<1*		*0.5*		
Austrostipa hemipogon	*<1*		*<0.5*		
Chamaexeros fimbriata	*<1*		*0.3*		
Cheiranthera filifolia	*<1*		*<0.5*		
Comesperma integerrimum	*<1*		*2*		
Cryptandra wilsonii	*<1*		*<0.5*		
Eucalyptus celastroides subsp. *virella*	*1*		*6*		
Exocarpos aphyllus	*<1*		*<1.5*		
Hakea multilineata	*<1*		*5*		
Melaleuca acuminata	*2*		*4*		
Philotheca tomentella	*<1*		*<1*		
Rhodanthe citrina	*<1*		*<0.1*		
Rinzia carnosa	*7*		*<1.5*		
Stylidium dielsianum	*<1*		*0.05*		
Thysanotus manglesianus	*<1*		*<1*		
Trachymene ornata	*<1*		*<0.05*		

Westonia Level 2 **Site** W21
Described by CT **Date** 10/10/2013 **Type** Quadrat 20 m x 20m
Season Excellent
Location Melaleuca and Acacia Scrub

NW	-31.295792	118.707014
	-31.295729	118.707213
	-31.295839	118.707348
	-31.295932	118.707219

Soil Red sandy loam, coarse
Rock Type Nil
Vegetation Tall Open Shrubland of *Melaleuca eleuterostachya* and *Melaleuca acuminata* over Low Open Shrubland of *Rinzia carnosa* over Open Grassland of *Amphipogon caricinus*
Veg Condition Good
Fire Age Long Unburnt
Notes Some compact of soil due to old diggings/survey/tracks. Rabbit scats present

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia colletioides	*5*		*2*		
Acacia hemiteles	*<1*		*<1*		
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*1*		*<2*		
Amphipogon caricinus	*<1*		*0.2*		
Austrostipa platychaeta	*<1*		*0.5*		
Exocarpos aphyllus	*<1*		*<1*		
Melaleuca acuminata	*20*		*4*		
Melaleuca eleuterostachya	*20*		*4*		
Rinzia carnosa	*1*		*<1.2*		

Westonia Level 2 **Site** W22
Described by CT **Date** 10/10/2013 **Type** Quadrat 20 m x 20m
Season Excellent
Location Melaleuca and Acacia Scrub

	-31.295632	118.708332
NW	-31.295766	118.708244
	-31.295741	118.708516

Soil Red brown sandy loam, clay loam, coarse sand
Rock Type Nil
Vegetation Scrubland of *Melaleuca acuminata*, *Acacia* sp. narrow phyllode, over Low Open Shrubland of Acacia colletioides and Olearia pimelioides over Grassland of Amphipogon caricinus
Veg Condition Excellent
Fire Age Long Unburnt
Notes All intact no weeds

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia colletioides	*2*		*<3*		
Acacia hemiteles	*<1*		*<1.2*		
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*5*		*<4*		
Amphipogon caricinus	*12*		*<0.3*		
Austrostipa elegantissima	*<1*		*<1*		
Austrostipa trichophylla	*<1*		*<0.4*		
Daucus glochidiatus	*<1*		*0.1*		
Dianella revoluta	*<1*		*<0.8*		
Enchylaena tomentosa	*<1*		*<0.4*		
Eremophila ionantha	*<1*		*1*		
Erodium cygnorum	*<1*		*<0.05*		
Eucalyptus salubris	*4*		*<8*		
Exocarpos aphyllus	*<1*		*<2*		
Melaleuca acuminata	*3*		*<5*		
Nicotiana sp.	*<1*		*<0.2*		
Olearia pimeleoides	*1*		*1*		
Pentameris airoides	*<1*		*0.05*		
Rhagodia drummondii	*<1*		*<0.4*		
Rinzia carnosa	*<1*		*<1.2*		

Santalum acuminatum	*1*	*<4*
Sisymbrium irio	*<1*	*0.05*
Sonchus oleraceus	*<1*	*0.1*
Thysanotus manglesianus	*<1*	*<0.5*
Trachymene cyanopetala	*<1*	*<0.05*
Trachymene ornata	*<1*	*<0.05*
Trifolium sp.	*<1*	*0.05*

Westonia Level 2 **Site** W23
Described by AS **Date** 10/10/2013 **Type** Quadrat 20 m x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.297394	118.70792
	-31.297402	118.708135
	-31.297589	118.708112
	-31.297557	118.70789

Soil Orange loamy clay
Rock Type None
Vegetation Open woodland of *Eucalyptus salmonophloia* over a scrub of *Melaleuca leiocarpa* and *Melaleuca sheathiana* over a mostly bare ground
Veg Condition Very good but with Tracks
Fire Age Long Unburnt

SPECIES LIST:

Name	Cover	Height
Acacia ancistrophylla var. *perarcuata*	*<1*	*3*
Eremophila drummondii	*<1*	*1*
Eucalyptus salmonophloia	*20*	*1.3*
Eucalyptus salubris	*opp*	
Templetonia ceracea	*opp*	
Maireana georgei	*<1*	*0.40*
Melaleuca lateriflora	*40*	*3*
Melaleuca pauperiflora subsp. *fastigiata*	*40*	*3.2*
Ptilotus nobilis	*<1*	*0.2*
Santalum acuminatum		
Sclerolaena diacantha	*<1*	*0.25*

Westonia Level 2 **Site** W24
Described by AS **Date** 10/10/2013 **Type** Quadrat 20 x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.293766	118.708322
	-31.293723	118.708525
	-31.293914	118.708575
	-31.29396	118.70836

Soil Orange loamy clay
Vegetation Open woodland of *Eucalyptus salubris* with occasional *Eucalyptus salmonophloia* over Open Shrubland of *Templetonia ceracea* and *Grevillea ?acuaria*
Veg Condition Good to Very good
Fire Age Unburnt
Notes Old workings around here, understory quite disturbed

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia hemiteles	*<1*		*1.2*		
Austrostipa platychaeta	*<1*		*0.4*		
Austrostipa trichophylla	*<1*		*0.20*		
Bromus rubens	*<1*		*0.3*		
Centaurea melitensis	*<1*		*0.10*		
Daucus glochidiatus	*<1*		*0.5*		
Eucalyptus celastroides subsp. *virella*	*<1*		*10*		
Eucalyptus salubris	*30*		*14*		
Grevillea ?acuaria	*10*		*0.8*		
Templetonia ceracea	*20*		*1*		
Maireana trichoptera	*<1*		*0.3*		
Melaleuca acuminata subsp. *acuminata*	*<1*		*3*		
Podolepis sp.	*<1*		*0.5*		
Ptilotus holosericeus	*<1*		*pr*		
Ptilotus nobilis	*<1*		*0.3*		
Rhagodia drummondii	*<1*		*0.30*		
Rhytidosperma caespitosum	*<1*		*0.25*		
Santalum acuminatum	*<1*		*1.2*		
Trifolium sp.	*<1*		*0.03*		

Westonia Level 2 **Site** W27
Described by VY **Date** 10/10/2013 **Type** Quadrat 20 x 20m
Season Excellent
Location Gimlet Woodland

NW	-31.29554	118.71109
	-31.29567	118.710923
	-31.2958	118.711096
	-31.295653	118.711236

Soil Pale Orange Sand of an Alluvial Plain with Dissecting Drainage Line
Rock Type
Vegetation Woodland of *Eucalyptus salubris* over patches of Tall Open Shrubland of *Melaleuca acuminata* subsp. *acuminata* and *Melaleuca pauperiflora* subsp. *fastigiata* over Low Shrubland of *Santalum acuminatum, Templetonia ceracea, Grevillea ?acuaria*, over Scattered Herbs and Grasses of *Ptilotus nobilis* and *Austrostipa elegantissima*.
Veg Condition Good to Degraded - Tracks
Fire Age Unburnt
Notes Drilling

SPECIES LIST:

Name	Cover	C Class	Height	Specimen	Notes
Acacia erinacea	*Opp*		*0.6*		
Acacia merinthophora	*Opp*		*0.6*		
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*Opp*		*2*		
Austrostipa elegantissima	*Opp*		*0.3*		
Eucalyptus salubris	*25*		*12*		
Grevillea ?acuaria	*5*		*0.8*		
Maireana sp.	*Opp*		*0.1*		
Maireana trichoptera	*Opp*		*0.2*		
Melaleuca acuminata subsp. *acuminata*	*10*		*2.5*		
Melaleuca pauperiflora subsp. *fastigiata*	*10*		*2.5*		
Ptilotus holosericeus	*Opp*		*0.1*		
Ptilotus nobilis	*<1*		*0.2*		
Rhagodia drummondii	*<1*		*0.3*		
Santalum acuminatum	*2*		*2*		
Sclerolaena diacantha	*Opp*		*0.2*		
Templetonia ceracea	10		0.8		
Thysanotus tenellus	<1		0.1		

Westonia Level 2 **Site** W3
Described by VY **Date** 8/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Rough-fruited Mallee Woodland

	-31.280834	118.6886
NW	-31.280767	118.688417
	-31.280932	118.688344
	-31.281019	118.688509

Soil Red Brown Lateritic Clay Loam
Rock Type Iron Stone Mantle
Vegetation Low Woodland of *Eucalyptus corrugata* over Low Shrubland of *Acacia hemiteles*, *Olearia muelleri*, *Olearia pimeleoides, Phebalium tuberculosum, Allocasuarina helmsii* and *Dodonaea bursariifolia* over Open Tussock Grassland of *Austrostipa eremophila.*
Veg Condition Very Good to Excellent
Fire Age Unburnt

SPECIES LIST:

Name	Cover	Height
Acacia hemiteles	*10*	*1.3*
Allocasuarina helmsii	*1*	*2.5*
Austrostipa eremophila	*10*	*0.4*
Cryptandra wilsonii	*<1*	*0.5*
Dianella revoluta var. *divaricata*	*<1*	*0.6*
Dodonaea bursariifolia	*1*	*0.3*
Eremophila drummondii		
Eucalyptus corrugata	*45*	*12*
Hibbertia exasperata	*<1*	*0.5*
Olearia muelleri	*5*	*0.4*
Olearia pimeleoides	*1*	*0.8*
Phebalium tuberculosum	*1*	*1.2*
Prostanthera grylloana	*<1*	*0.4*
Rinzia carnosa	*Opp*	*1.5*
Santalum acuminatum	*<1*	*1.5*
Thysanotus manglesianus	*<1*	*cr*
Westringia rigida	*Opp*	*0.4*

Westonia Level 2 **Site** W4
Described by CT **Date** 8/10/2013 **Type** Quadrat 20m x 20m
Season
Location Gimlet Woodland

NW	-31.28086	118.6907

Soil Red, loamy sand with small pebbles (ironstone)
Rock Type Laterite
Vegetation Woodland of *Eucalyptus salmonophloia* and *Eucalyptus salubris* woodland over Shrubland of *Melaleuca acuminata* var. *acuminata* and *Acacia merrallii* over Low Open Shrubland of *Acacia erinacea*
Veg Condition Very good to Excellent
Fire Age
Notes Some old diggings nearby

SPECIES LIST:

Name	Cover	Height
Acacia erinacea	*<1*	*0.5*
Acacia merrallii	*<1*	*0.6*
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*<1*	*<2*
Austrostipa platychaeta	*<1*	*0.8*
Austrostipa trichophylla	*<1*	*0.3*
Eremophila drummondii	*<1*	*0.6*
Eremophila oppositifolia	*<1*	*1.2*
Eucalyptus loxophleba subsp. *lissophloia*	*<1*	*6*
Eucalyptus salmonophloia	*10*	*15*
Eucalyptus salubris	*15*	*10*
Exocarpos aphyllus	*<1*	*1*
Grevillea acuaria	*<1*	*<0.4*
Maireana sp.	*<1*	*0.05*
Maireana trichoptera	*<1*	
Melaleuca acuminata subsp. *acuminata*	*2*	*<5.5*
Olearia muelleri	*<1*	*0.4*
Olearia pimeleoides	*<1*	*0.6*
Ptilotus holosericeus	*<1*	*0.05*
Ptilotus nobilis	*<1*	*0.2*
Rhagodia drummondii	*<1*	*0.4*
Rhytidosperma caespitosum	*<1*	*<0.3*
Sclerolaena diacantha	*<1*	*0.2*
Senna artemisioides subsp. *filifolia*	*<1*	*1.2*

Templetonia ceracea	*<1*	*1*
Thysanotus patersonii	*<1*	*<0.4*
Westringia cephalantha	*<1*	*0.4*
Zygophyllum ovatum	*<1*	*0.05*

Westonia Level 2 **Site** W5
Described by CT **Date** 8/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location York Gum Woodland

NW	-31.28027	118.690

Soil Red Sandy Loam with Ironstone mantle over lateritic bedrock on a small rise.
Rock Type Laterite
Vegetation Low Mallee Woodland of *Eucalyptus loxophleba* subsp. *lissophloia* over Tall Shrubalnd of *Allocasuarina helmsii* and *Acacia* sp. narrow phyllode over Low Open Shrubland of *Prostanthera grylloana, Rinzia carnosa, Hibbertia exasperata* and *Philotheca tuberculata* over Very open Tussock Grassland of *Amphipogon caricinus* var. *caricinus.*
Veg Condition Excellent
Fire Age Long Unburnt
Notes No Disturbance Evident

SPECIES LIST:

Name	Cover	Height
Acacia sp. *narrow phyllode (B.R. Maslin 7831)*	*2*	*3*
Allocasuarina helmsii	*15*	*4*
Amphipogon caricinus var. *caricinus*	*3*	*0.4*
Asteridea athrixioides	*<1*	*0.1*
Austrostipa platychaeta	*<1*	*0.8*
Austrostipa trichophylla	*<1*	*0.5*
Borya sphaerocephala	*<1*	*0.1*
Eucalyptus loxophleba subsp. *lissophloia*	*10*	*8*
Hibbertia exasperata	*<1*	*0.6*
Melaleuca acuminata subsp. *acuminata*	*<1*	*2*
Olearia pimeleoides	*1*	*1*
Phebalium tuberculosum	*<1*	*1*
Prostanthera grylloana	*1*	*0.4*
Rinzia carnosa	*2*	*1*
Santalum acuminatum	*<1*	*2.5*
Senna artemisioides subsp. *filifolia*	*<1*	*1*
Thysanotus manglesianus	*<1*	*0.5*

Westonia Level 2 **Site** W6
Described by AS **Date** 8/10/2013 **Type** Quadrat 20 x 20 m
Season Excellent
Location Morrel Woodland

NW	-31.2798	118.686861
	-31.279989	118.686814
	-31.280009	118.687032
	-31.279826	118.687068

Soil Orange brown loamy clay
Rock Type None
Vegetation Open woodland of *Eucalyptus longicornis* over a Tall Open Shrubland (patchy) of *Melaleuca sheathiana* over a sparse understorey dominated by *Maireana* spp.
Veg Condition Good to Very Good (drilling disturbance in the vicinity)
Fire Age Long Unburnt

SPECIES LIST:

Name	Cover	Height
Acacia colletioides	*opp*	
Atriplex stipitata	*1*	*0.5*
Austrostipa trichophylla	*<1*	*0.4*
Eremophila ionantha	*<1*	*1*
Eriochiton sclerolaenoides	*2*	*0.2*
Eucalyptus longicornis	*25*	*12*
Exocarpos aphyllus	*1*	*3*
Maireana radiata	*5*	*0.3*
Maireana trichoptera	*2*	*0.2*
Melaleuca sheathiana	*30*	*0.3*
Olearia muelleri	*<1*	*0.4*
Ptilotus aervoides	*opp*	
Ptilotus fusiformis	*opp*	
Rhagodia drummondii	*<1*	*0.45*
Scaevola spinescens	*opp*	
Sclerolaena diacantha	*<1*	*0.2*
Senna artemisioides subsp. *filifolia*	*opp*	

Westonia Level 2 **Site** W7
Described by CT **Date** 8/10/2013 **Type** Quadrat 20 x 20 m
Season Excellent
Location Morrel Woodland

NW	-31.287621	118.688623
	-31.28755	118.688709
	-31.28777	118.688642

Soil Orange Brown Sandy Loam Flats
Rock Type None
Vegetation Woodland of *Eucalyptus longicornis* over Low Open Shrubland of *Atriplex ?vesicaria*, *Maireana radiata* over Open Grassland of *Austrostipa* spp.
Veg Condition Small Good Patch in otherwise Degraded area
Fire Age Long Unburnt

SPECIES LIST:

Name	Cover	Height
Atriplex quadrivalvata var. *quadrivalvata*	*Opp*	
Atriplex ?vesicaria	*<1*	*0.4*
Austrostipa platychaeta	*<1*	*0.5*
Austrostipa trichophylla	*<1*	*0.4*
Bromus rubens	*Opp*	
Carrichtera annua	*Opp*	
Enchylaena tomentosa var. *tomentosa*	*<1*	*0.4*
Eriochiton sclerolaenoides	*<1*	*0.1*
Eucalyptus longicornis	*20*	*15*
Exocarpos aphyllus	*<1*	*1.2*
Maireana radiata	*<1*	*0.3*
Maireana trichoptera	*<1*	*0.3*
Melaleuca sheathiana	*<1*	*4*
Ptilotus holosericeus	*<1*	*0.05*
Rhagodia drummondii	*<1*	*0.5*
Rhagodia preissii subsp. *preissii*	*<1*	*1*
Sclerolaena diacantha	*<1*	*0.1*
Vittadinia gracilis	*Opp*	

Westonia Level 2 **Site** W8
Described by CT **Date** 8/10/2013 **Type** Quadrat 20m x 20m
Season Excellent
Location Morrel Woodland

	-31.288302	118.687371
NW	-31.288139	118.687179
	-31.288018	118.68733
	-31.288117	118.687443

Soil Brown Loam Plain
Rock Type None
Vegetation Woodland of *Eucalyptus longicornis* with occasional patches of *Eucalyptus celastroides* subsp. *virella* over Tall Open Shrubland of *Melaleuca sheathiana* over Scattered Chenopods; *Maireana* spp. and *Eriochiton sclerolaenoides.*
Veg Condition Excellent
Fire Age Long Unburnt
Notes No Disturbance Evident

SPECIES LIST:

Name	Cover	Height	Specimen
Acacia colletioides	*<1*		*1*
Acacia merrallii	*<1*		*0.5*
Alyxia buxifolia	*<1*		*2*
Atriplex vesicaria	*<1*		*0.5*
Austrostipa flavescens	*<1*		*0.4*
Austrostipa platychaeta	*<1*		*0.4*
Eremophila ionantha	*<1*		*2*
Eriochiton sclerolaenoides	*<1*		*0.1*
Eucalyptus celastroides subsp. *virella*	*3*		*10*
Eucalyptus longicornis	*18*		*12*
Exocarpos aphyllus	*<1*		*3*
Maireana radiata	*<1*		*0.2*
Melaleuca sheathiana	*6*		*4*
Olearia muelleri	*<1*		*0.4*
Rhagodia drummondii	*<1*		*0.5*
Santalum acuminatum	*<1*		*1.5*
Senna artemisioides subsp. *filifolia*	*<1*		*0.8*
Zygophyllum apiculatum	*<1*		*0.1*

Westonia Level 2 **Site** W9
Described by VY **Date** 8/10/2013 **Type** Quadrat 20 x 20
Season Excellent **Uniformity**
Location Rough-fruited Mallee Woodland

	-31.287313	118.686654
NW	-31.287451	118.686479
	-31.287611	118.686588
	-31.287503	118.686761

Soil Light Brown Sandy Loam
Rock Type None
Vegetation Woodland of *Eucalyptus corrugata* over Mixed Shrubland including *Senna artemisioides* subsp. *filifolia, Eremophila ionantha, Acacia ligulata* and *Exocarpos aphyllus* over Low Open Shrubland of *Maireana radiata* and *Enchylaena tomentosa* with Open Tussock Grassland of *Austrostipa eremophila* and patches of Ward's Weed (*Carrichtera annua*).
Veg Condition Very Good
Fire Age?

SPECIES LIST:

Name	Cover	Height	Specimen
Acacia colletioides	*Opp*		
Acacia erinacea	*<1*	*0.3*	
Acacia ligulata	*Opp*		
Acacia merrallii	*Opp*		
Asteridea athrixioides	*<1*	*0.1*	
Austrostipa elegantissima	*<1*	*1*	
Austrostipa eremophila	*20*	*0.3*	
Bromus rubens	*1*	*0.2*	
Carrichtera annua	*1*	*0.2*	
Enchylaena tomentosa	*1*	*0.3*	
Eremophila decipiens subsp. *decipiens*	*Opp*		
Eremophila ionantha	*Opp*		
Eriochiton sclerolaenoides<1	*0.2*		
Eucalyptus corrugata	*25*	*12*	
Exocarpos aphyllus	*5*	*3*	
Grevillea acuaria	*<1*	*0.4*	
Maireana radiata	*1*	*0.2*	
Olearia muelleri	*<1*	*0.3*	
Ptilotus holosericeus	*Opp*		

Ptilotus nobilis	*<1*	*0.3*
Rhodanthe citrina	*Opp*	
Rhytidosperma caespitosum	*<1*	*0.1*
Santalum acuminatum	*Opp*	
Senna artemisioides subsp. *filifolia*	*10*	*2*
Thysanotus tenellus	*Opp*	
Waitzia acuminata var. *acuminata*	*Opp*	
Westringia rigida	*<1*	*0.4*

Westonia Level 2 **Site** W25
Described by VY **Date** 10/10/2013 **Type** Quadrat 20 x 20
Season Excellent
Location Gimlet Woodland

	-31.287313	118.686654
NW	-31.287451	118.686479
	-31.287611	118.686588
	-31.287503	118.686761

Soil Light Brown Sandy Loam
Rock Type None
Vegetation Woodland of *Eucalyptus salubris* with *Eucalyptus celastroides* var. *virella* over Tall Open Shrubland of *Melaleuca lateriflora, Santalum acuminatum, Senna artemisioides* var. *filifolia,* over Low Open Shrubland of *Acacia merrallii* over Scattered *Maireana* spp. With Open Grassland of *Austrostipa trichophylla* and *Rhytidosperma caespitosum.*
Veg Condition Very Good
Fire Age?

SPECIES LIST:

Name	Cover	Height	Specimen
Acacia merrallii	*1*	*1*	
Austrostipa trichophylla	*1*	*1*	
Eriochiton sclerolaenoides	*<1*	*0.2*	
Eucalyptus celastroides var. *virella*	*25*	*8*	
Eucalyptus salubris	*10*	*10*	
Exocarpos aphyllus	*1*	*2*	
Maireana radiata	*<1*	*0.2*	
Melaleuca lateriflora	*2*	*2*	
Olearia muelleri	*<1*	*0.3*	
Ptilotus holosericeus	*Opp*		
Santalum acuminatum	*1*	*2*	
Senna artemisioides var. *filifolia*	*1*	*1*	