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**FLINDERS MINES LIMITED**

# **Pilbara Iron Ore Project**

## **Preliminary Desktop Environmental Study at E47/882 (Blacksmith)**

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18-Mar-10

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PRELIMINARY DESKTOP ENVIRONMENTAL STUDY AT E47/882 (BLACKSMITH)**

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### SYNOPSIS

A preliminary study of the natural and social environment at mineral exploration tenement E47/882 (Blacksmith) located approximately 70 km north-north-west of Tom Price and 160 km east-southeast of the Pannawonica township in the Pilbara region of Western Australia.

### Disclaimer

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REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Issued for internal review	<i>D Page</i> D Page B Morna	<i>pp PA.</i> R Anderson M Anderson	N/A	26-Nov-09	N/A	
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**LIST OF ACRONYMS AND ABBREVIATIONS**

BOM	Bureau of Meteorology (Commonwealth)
BID	Bedded Iron Deposit
CID	Channel Iron Deposit
DEC	Department of Environment and Conservation (WA)
DEWHA	Department of the Environment, Heritage, Water and the Arts (Commonwealth)
DMP	Department of Mines and Petroleum (WA)
DRF	Declared Rare Flora
FMS	Flinders Mines Limited
EPA	Environmental Protection Authority (WA)
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
IBRA	Interim Biogeographic Regionalisation for Australia
NTA	<i>Native Title Act 1993 (Commonwealth)</i>
PEC	Potential Ecological Community
SRE	Short Range Endemic species
TEC	Threatened Ecological Community
WA Act	<i>Wildlife Conservation Act 1950 (WA)</i>



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## 1. INTRODUCTION

Flinders Mines Limited (FMS) has commissioned WorleyParsons Services Pty Ltd to complete a preliminary study of the natural and social environment at mineral exploration tenement E47/882. The tenement, named Blacksmith (and herein as the 'site'), is approximately 70 km north-north-west of Tom Price in the Pilbara region of Western Australia.

Figure 1 shows the site location.

The study comprises a search and review of published, publicly available information on:

- environmental reporting for nearby relevant projects; and
- regional surveys, database and online mapping tools for environmental and social factors.

The principal information sources include:

- Commonwealth Department of the Environment, Water, Heritage and the Arts;
- Department of Environment and Conservation;
- Department of Mines and Petroleum;
- Department of Indigenous Affairs; and
- Environmental Assessment reports from stakeholders surrounding the project area.

### 1.1 Related Environmental Legislation

- *Agriculture and Related Resources Protection Act 1976* (WA);
- *Aboriginal Heritage Act 1972* and Regulations 1974 (WA);
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Commonwealth);
- *Environmental Protection Act 1986* (WA);
- *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth);
- Environmental Protection Regulations 1987 (WA);
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA);
- *Heritage of Western Australia Act 1990* (WA);
- *Mining Act 1978* (WA);
- *Native Title Act 1993* (Commonwealth);



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- *Native Title (State Provision) Act 1999 (WA);*
- *Rights in Water and Irrigation Act 1914 (WA);*
- *Wildlife Conservation Act 1950 (WA);*
- *Wildlife Conservation Regulations 1970 (WA);*
- *Wildlife Conservation (Rare Flora) Notice 2008 (WA); and*
- *Wildlife Conservation (Specially Protected Fauna) Notice 2008 (WA).*

## **1.2 State Policies**

The Environmental Protection Authority (EPA) has released the following Guidance and Position Statements which offer advice and the overarching principals used to assess proposals:

- Guidance Statement 41: Assessment of Aboriginal heritage;
- Guidance Statement 51: Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia;
- Guidance Statement 54: Consideration of subterranean fauna in groundwater and caves during environmental impact assessment in Western Australia;
- Guidance Statement 55: Implementing best practice in proposals submitted to the environmental impact assessment process;
- Guidance Statement 56: Terrestrial fauna surveys for environmental impact assessment in Western Australia;
- Position Statement 2: Environmental protection of native vegetation in Western Australia;
- Position Statement 3: Terrestrial biological surveys as an element of biodiversity protection;
- Position Statement 8: Environmental protection in natural resource management; and
- Position Statement 9: Environmental offsets.

The Department of Environment and Conservation (DEC) has released the following Policy Statements which indicate the overarching principals that are used in order to assess proposals. The following Policy Statements have relevance for the Flinders Mines project:

- Policy Statement 9: Conservation of threatened flora in the wild;
- Policy Statement 33: Conservation of threatened fauna in the wild; and
- Policy Statement 50: Setting priorities for the conservation of Western Australia's threatened flora and fauna.



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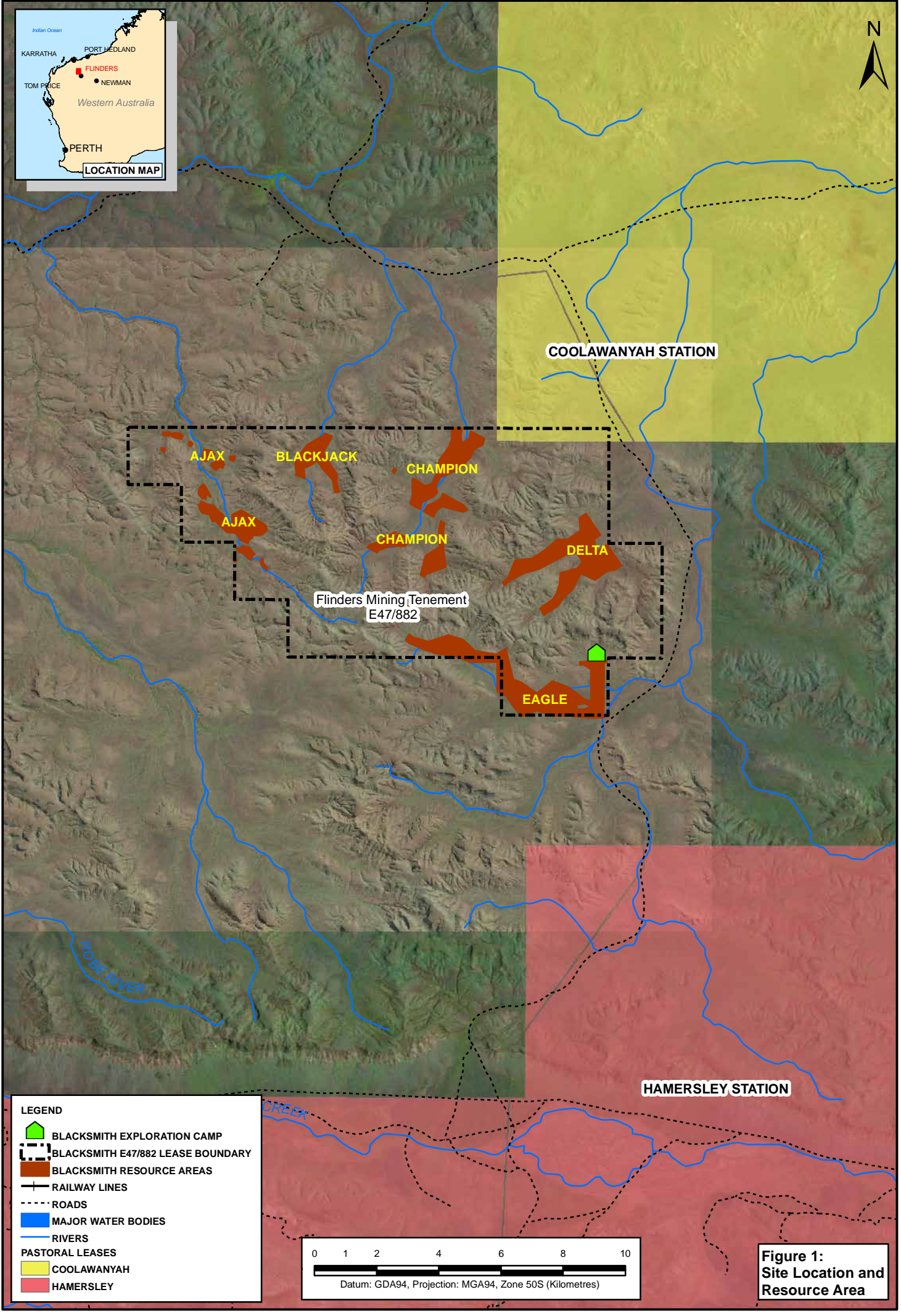
## **2. PROJECT OVERVIEW**

Mining exploration tenement E47/882 is held by Flinders Mines Limited (FMS). It is within the Mt Sheila locality in the Shire of Ashburton, approximately 70 km north-north-west of Tom Price and 160 km east-southeast of the Pannawonica township in the Pilbara region of Western Australia is shown in Figure 1. Exploration activities have identified five areas of inferred iron ore resources, named Ajax, Blackjack, Champion, Delta and Eagle, with the Delta area likely to be the first to be developed. The total inferred resource is 511 million tones (Mt) (at 54% iron content).

The project progressed to pre-feasibility studies in August 2009 to identify the broader 'mine to ship' prospects, including studies on mine and infrastructure development, environmental considerations (including this report), safety considerations, permitting and approvals, marketing, financial modeling, and the establishment of a management team.

FMS also holds nearby tenement E47/1560 (named Anvil) for iron ore exploration approximately 4km southwest of the site and exploration is continuing there to identify the inferred resource in this area.





COOLAWANYAH STATION

AJAX

BLACKJACK

CHAMPION

AJAX

CHAMPION

DELTA

Flinders Mining Tenement  
E47/882

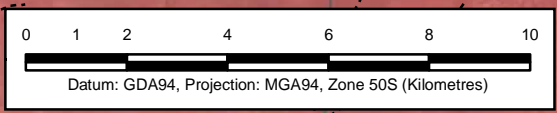
EAGLE

ROBER RIVER

HAMERSLEY STATION

**LEGEND**

-  BLACKSMITH EXPLORATION CAMP
-  BLACKSMITH E47/882 LEASE BOUNDARY
-  BLACKSMITH RESOURCE AREAS
-  RAILWAY LINES
-  ROADS
-  MAJOR WATER BODIES
-  RIVERS
- PASTORAL LEASES**
-  COOLAWANYAH
-  HAMERSLEY



**Figure 1:**  
Site Location and  
Resource Area



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### **3. RELATED ENVIRONMENTAL STUDIES**

The site has been covered in regional surveys such as:

- Van Vreeswyk et. al. (2004) An inventory and condition survey of the Pilbara region, Western Australia; and
- DEC 2009a, Pilbara Region Biological Survey 2002-2009. DEC has surveyed plant and animal communities in the Pilbara region, mapped the inter-relationships and patterns of these communities and documented the way communities are distributed in relation to soil, vegetation, climate, landforms and geology. However at this time only preliminary summary results, and not full reports or guidelines, are available.

The nearest developed resource with publicly available environmental information is Rio Tinto's Brockman /Nammuldi operation approximately 28km south of the site. The following reports have been reviewed and contribute to the information given in Sections 4 to 5:

- EPA 1990, Proposed Brockman No.2 detrital iron-ore mine, Hamersley Iron Pty Ltd, Report and Recommendations of the Environmental Protection Authority, Bulletin 467;
- Hamersley Iron 2005, Brockman Syncline 4 Iron Ore Project, Public Environmental Review;
- EPA 2006, Brockman 4 Syncline Project, Report and Recommendations of the Environmental Protection Authority, Bulletin 1214;
- Brockman Syncline 4 Iron Ore Project - Borefield Management Plan; and
- Brockman Syncline 4 Iron Ore Project - Snail Management Plan.

Further south is Rio Tinto Iron Ore's Western Turner Syncline 10 Iron Ore Project with the following available environmental information:

- Western Turner Syncline Section 10 – Environmental Protection Statement;
- Biota 2009a, West Turner Syncline Section 10 Development Two-Phase Fauna Survey;
- Biota 2007, Vegetation Survey Report;
- Biota 2008a, Subterranean fauna assessment;
- Biota 2009b, SRE Risk Assessment;
- Biota 2008c, Mygalomorph spiders and EIA;
- MWH 2009, Groundwater modeling;
- Pilbara Iron 2008, Botanical survey report;



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- Rio Tinto 2007, SCARD (Spontaneous Combustion and Acid Rock Drainage) Management Plan;
- Rio Tinto 2008, Closure Management Plan; and
- Rio Tinto Iron Ore 2008, Weed Management Plan.

A search of the DEC's Pilbara Biological Survey Database (listing approximately 800 records of biological surveys completed in the Pilbara region) indicates the surveys listed above are the closest to E47/882. This survey list and the DEC catalogue of research papers may be a source to identify and request access to other specialist studies as the on-ground local environment becomes better known during field studies.

There is no published environmental information on the mining exploration areas adjacent to the site, namely Fortescue Metal Group's Solomon exploration area, including the Serenity and Solomon East inferred deposits, or Rio Tinto's Caliwingina North inferred resource.



## **4. BIOPHYSICAL ENVIRONMENT**

### **4.1 Climate**

The Pilbara is a tropical arid region, with hot summers and mild winters. Rainfall is variable and largely falls in the summer months (BOM 2009a). These features are illustrated in Figure 2 and Figure 3 showing rainfall, temperature and evaporation at the nearest comprehensive weather station at Wittenoom (Site 005023 at latitude 22.24°S, longitude 118.34°E). The mean maximum temperature there in January is 39.6°C and the mean minimum temperature is 11.5°C in July. The average annual rainfall is 457 mm while the annual evaporation exceeds 3000 mm.

There is a cyclone season affecting the Pilbara from mid December to April. While the risk of damaging winds decreases with distance from the coast, widespread heavy rainfall and associated flooding can impact inland areas. The flood potential is associated with the track, speed and spatial extent of the tropical low. Rainfall of more than 100 mm is common with systems that move slowly over land over many days. For example in January and February 1961 rainfall totals exceeded 200 mm during two tropical cyclones, and Wittenoom town was isolated with water levels rising to 23 m in sections of the adjacent Gorge. (BOM 2009b).

The climate and possibility of extreme weather conditions is an accepted factor for Pilbara mining projects. For example, flora and vegetation surveys are best carried out following seasonal summer rains when conditions are ideal for annual plants to grow, while some construction activities may be delayed or impossible during the wet season.



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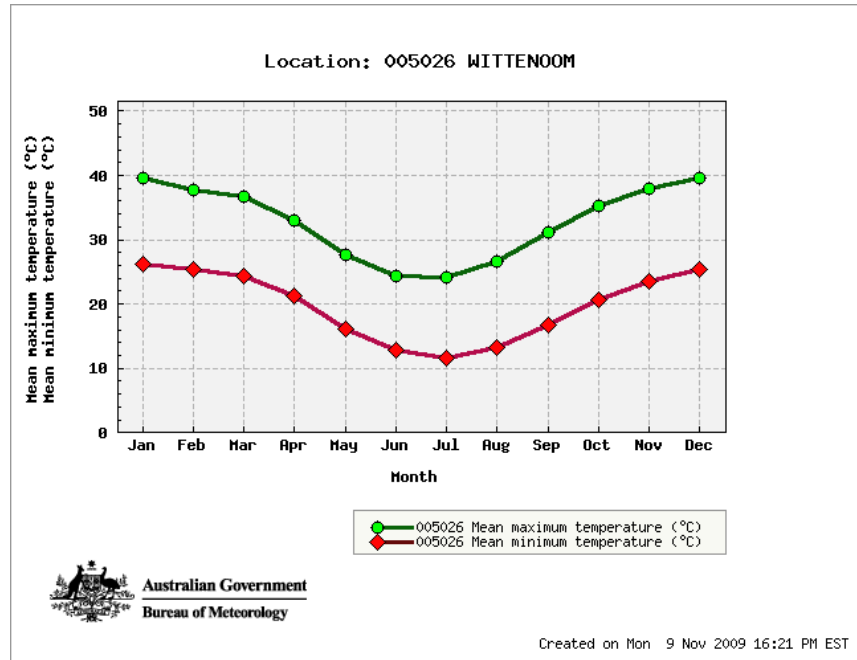


Figure 2: Mean minimum and maximum temperature at Wittenoom between 1951 and 2009

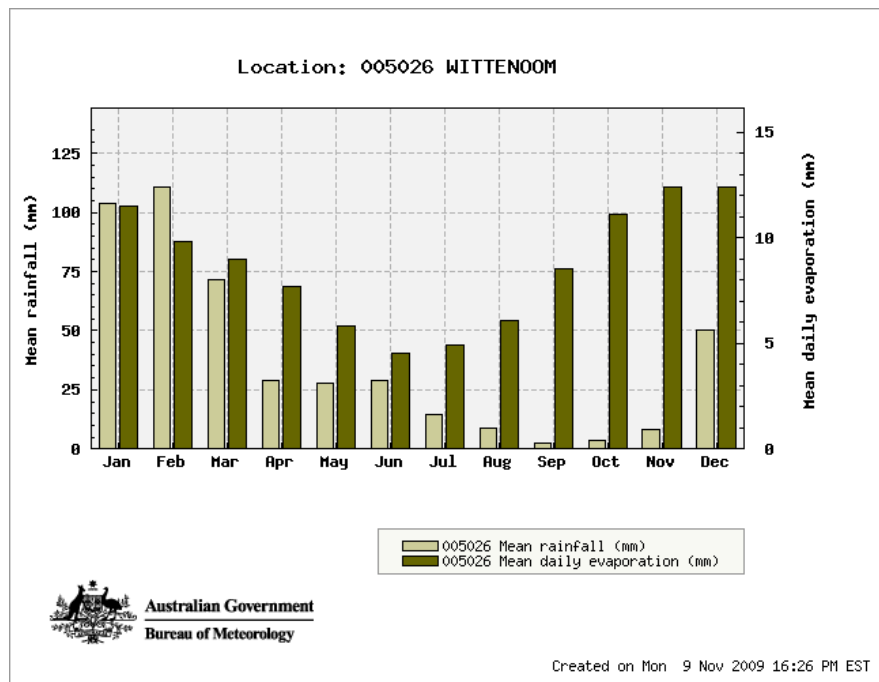


Figure 3: Mean rainfall and evaporation at Wittenoom between 1951 and 2009



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## **4.2 Bioregion**

The site is within the Pilbara bioregion and Hamersley sub-region (PIL3) as described in the Interim Biogeographic Regionalisation for Australia (IBRA) (DEWHA 2009). The region is characterised by mountainous ranges and plateaus, alluvial plains, granite and basalt plains. It is dominated by hummock grasslands and acacia forests and woodlands. *Acacia* shrublands, tussock grasslands, chenopod (saltbush) and samphire shrublands, salt marshes, mangroves and eucalypt woodland occur along water courses (EPA 2004). The planning area falls within the Fortescue, Chichester and Roebourne subregions of the Pilbara Craton Bioregion.

The Hamersley sub-region is a mountainous area on the south side of the Fortescue Valley consisting of Proterozoic (up to 2500 million years old) sedimentary ranges and plateaux, with Mulga (*Acacia aneura*) low woodland on fine textured soil in valleys and Snappy Gum (*Eucalyptus leucophloia*) over *Triodia brizoides* on skeletal soils in the ranges (Van Vreeswyk *et. al.* 2004 and Kendrick 2001).

## **4.3 Geology and Topography**

As described in Section 4.2 the site is within rangelands. The Hamersley Range is said to be the highest range in the Western Australia with 20 of the state's highest peaks including Mt Meharry in Karijini National Park which is 1249 mAHD (Landgate 2009).

The tenement is centrally located within the Hamersley Basin that unconformably overlies the southern margin of the Archaean Pilbara Craton. Geology comprises Brockman Iron Formation and McRae Shale that have been intruded by mafic sills and dykes. The targeted geology in the area is Channel Iron Deposit (CID) and Bedded Iron Deposit (BID). CID is a fluvial sedimentary deposit which has accumulated in ancient river channels (palaeochannels) (Ramanaidou *et. al.*, 2003). The CID overlies parent BID, which is iron-rich due to leaching of non-iron minerals from the original banded iron and silicon-rich sedimentary formations (GSWA 1995). Thus the focus of the mining operations is the lower-lying valley areas of the tenement where these geologies occur (see Figure 1).

Previous diamond exploration surveys of the area have noted Brockman Iron and McRae shale formations of the Hamersley Group along with dolerite of uncertain age, with cover including colluvium and alluvium (GSWA 1997). Any disturbed areas containing pyritic black shale hold the potential to react with air and water to produce acidic drainage water (acid rock drainage). However, as this is not the target ore it is unlikely to be exposed during the mining operation.

## **4.4 Hydrology**

There are no permanent waterways or major rivers in the project area. Drainage from seasonal rainfall forms ephemeral creeks along the flanks of topographic highs that drain into the Weelumurra and Caliwingina Creeks which are tributaries of the Fortescue River. Known interactions between



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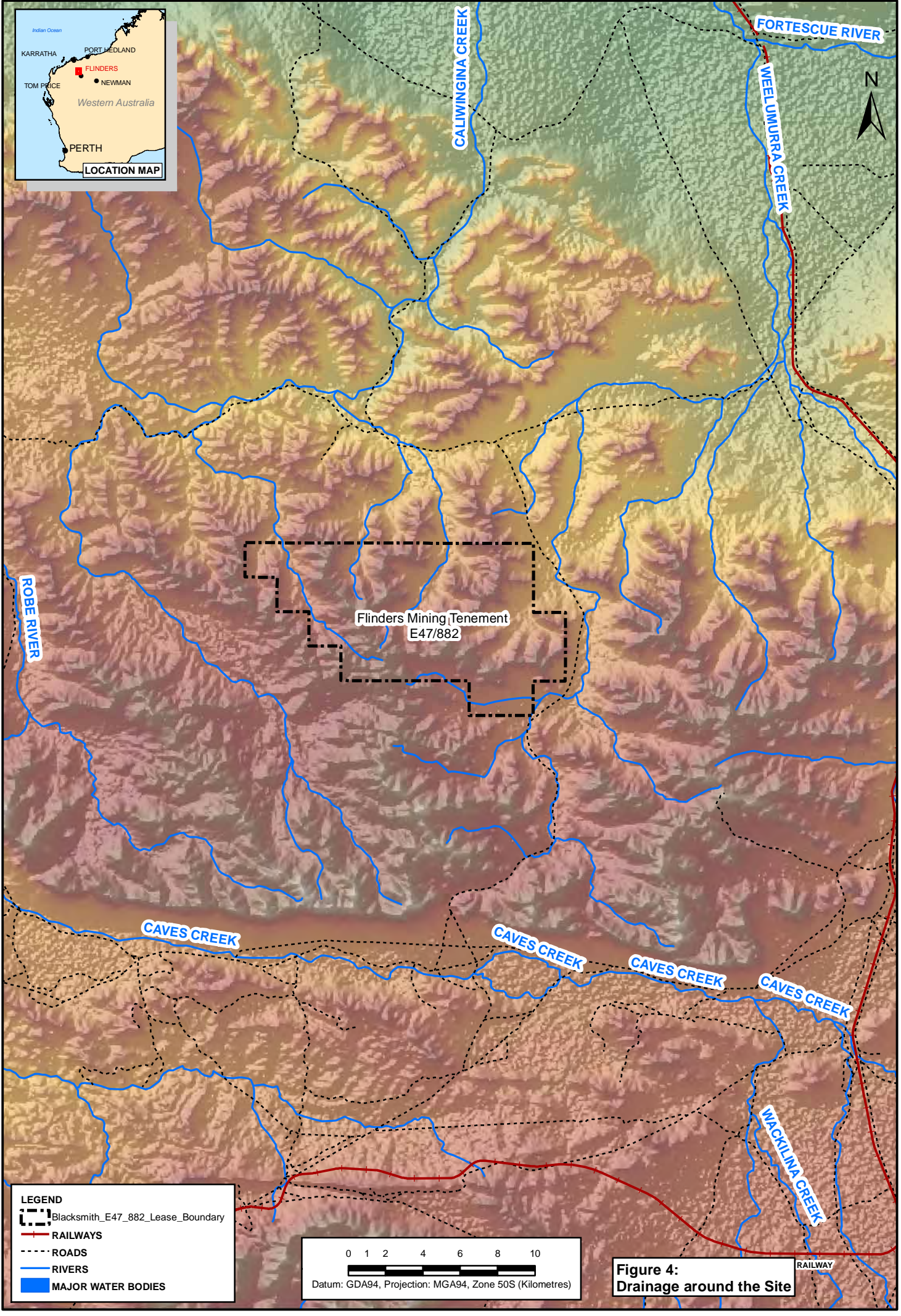
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surface water and groundwater are limited to downward infiltration during periods of high rainfall, particularly around the creeks.

A water hole was observed in the Ajax deposit area during a November 2009 site visit (Golder Associates 2009; pers.comm. G Sutherland, 11 Dec 2009), see Appendix 3. The hydrology of the water hole is unknown although was considered likely to be permanent on initial assessment. Ajax is within a separate surface water catchment to the other deposits.

The site is within the Millstream Priority 2 drinking water catchment (Millstream-West Pilbara Water Supply Scheme)

Golders Associates and WorleyParsons are currently further investigating the surface water hydrology.



**LEGEND**

- Blacksmith\_E47\_882\_Lease\_Boundary
- RAILWAYS
- ROADS
- RIVERS
- MAJOR WATER BODIES

0 1 2 4 6 8 10

Datum: GDA94, Projection: MGA94, Zone 50S (Kilometres)

**Figure 4:**  
Drainage around the Site

RAILWAY





## Groundwater

Initial studies estimate that a large portion of the targeted desposit is above groundwater (Golder Associates 2009). FMS exploration drill holes encountered groundwater at between 30m to 50m below the surface (Golder Associates 2009).

A water hole was observed in the Ajax deposit area during a November 2009 site visit (Golder Associates 2009; pers.comm. G Sutherland, 11 Dec 2009), The hydrology and link to groundwater is unclear at this stage.

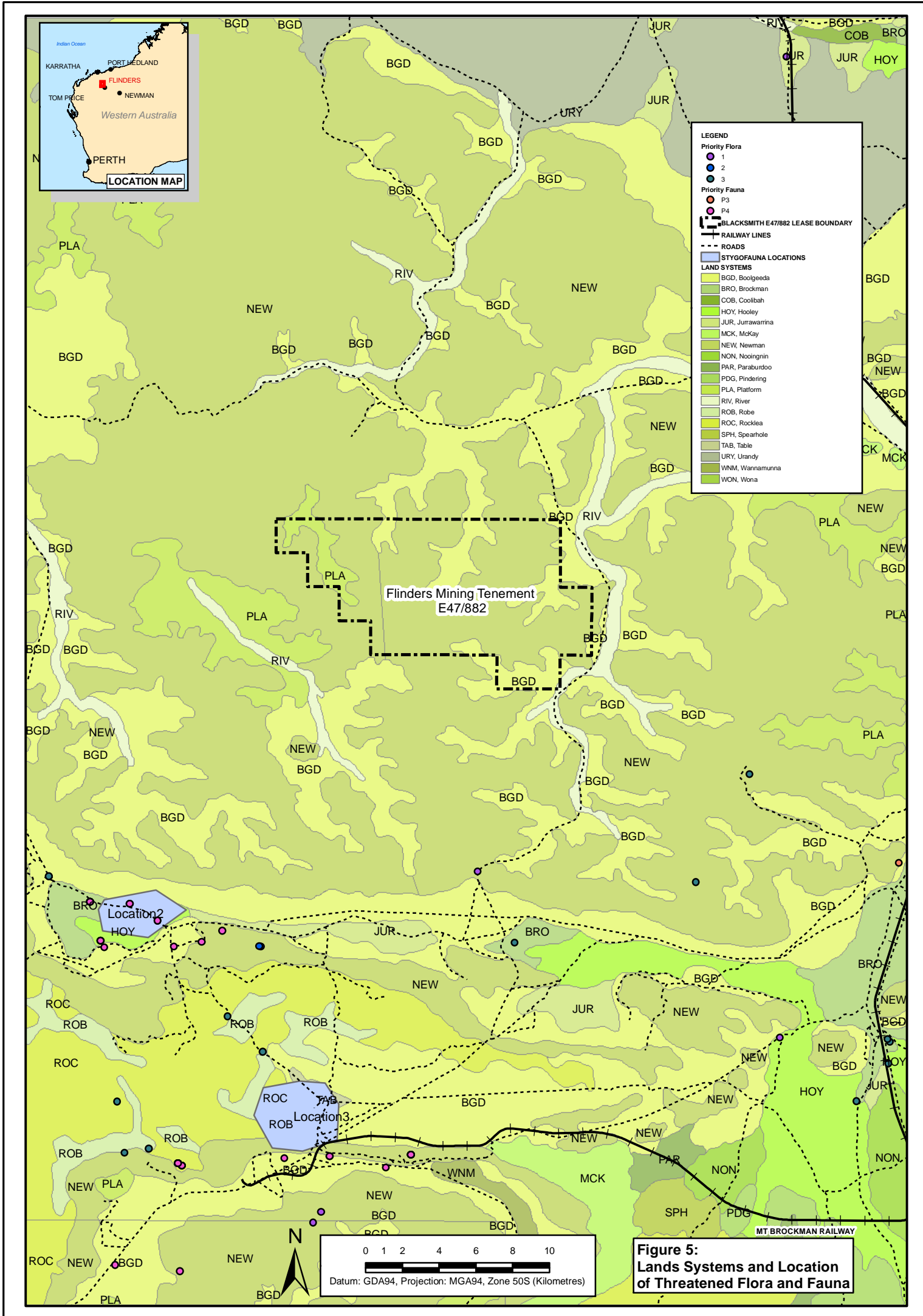
The nature of groundwater at E47/882 will be further studied and reported in the Water Resource Preliminary Studies. It is likely that groundwater abstraction bores will be used to provide project construction and operational water supplies.

Golders Associates and WorleyParsons are currently further studying the site hydrogeology and project water use options.

### 4.5 Land Systems

Land System (rangelands) mapping covering the project area has been prepared by Agriculture Western Australia (Van Vreeswyk *et. al.* 2004). This mapping integrates vegetation, geological and physiographic information. The project area was overlain on this mapping and it intersects Boolgeeda, Newman and Platform land systems.

The area has stony plains with spinifex grasslands and mulga shrublands or hills and ranges with acacia shrublands and lies south of the Millstream-Chichester National Park.





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## 4.6 Flora and Vegetation

The proposal area is located within the Fortescue Botanical District of the Eremaean Botanical Province described by Beard (1980). Beard mapped the vegetation of the Pilbara at a scale of 1:1,000,000. Vegetation in the area typically consists of open Acacia or Eucalypt woodland and Triodia hummock grassland (Australian Natural Resource Atlas 2001, Van Vreeswyk et. al. 2004, Kendrick 2001).

The localised vegetation types will be identified in on-ground flora surveys. As an example 31 vegetation types were defined within the Brockman area surveyed by Biota (2007).

Previous studies show the Hamersley Range (PIL3) IBRA subregion has high species diversity for the genera *Acacia*, *Triodia*, *Ptilotus*, *Corymbia* and *Sida* (Pilbara Iron 2008).

### 4.6.1 DEC Listed Threatened Flora

All native flora species are protected under the Western Australian *Wildlife Conservation Act 1950* (WC Act). Threatened flora species as defined by DEC, are protected species considered to be either Declared Rare Flora (DRF) which are presumed extinct or extant taxa, or Priority Flora, which are poorly known and potentially under threat. These DRF and Priority species have been gazetted by the Minister for Environment and require special management attention. The current list of specially protected flora was published in the *Government Gazette* on 5 August 2008 under the *Wildlife Conservation (Rare Flora) Notice 2008*. Priority Flora do not have the same legal status as DRFs but are still considered during the approvals process.

DEC Policy Statements Nos 9: *Conservation of threatened flora in the wild*, 33: *Conservation of threatened fauna in the wild* and 50: *Setting Priorities for the conservation of Western Australia's threatened flora and fauna* outline the details related to the protection of threatened flora and fauna in Western Australia.

A search of the DEC threatened flora database with current available information showed no DRF species have been recorded within the project area (see Figure 5). Project specific data have been requested from the DEC and further assessment will be conducted when this information is received.

Field flora surveys would be required to verify these results and to ensure that there are no additional impacts to threatened flora. All future flora surveys are required to consider the principles and guidelines outlined in Position Statement 2 *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000), Position Statement 3 *Terrestrial Biological Surveys as an element of Biodiversity Protection* (EPA 2002) and Guidance Statement 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004).



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**4.6.2 Matters of National Environmental Significance**

The Department of the Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool (Department of Environment and Conservation 2008) was used to identify flora of significance in the investigation area. Threatened species categories include endangered, critically endangered, conservation dependant, vulnerable, and species that are extinct in the wild. Nominations for species and ecological communities are assessed by the Threatened Species Scientific Committee (Department of Environment, Water, Heritage and the Arts 2008a).

One flora species protected by the *Environmental Protection and Biodiversity Conservation Act 1999* is recorded as potentially occurring at the site, *Lepidium catapycnon* (see Figure 6). The results are the same for a search buffer of 10 km from the tenement boundaries). This species is noted as occurring on skeletal soil and hillsides (Paczkowska 1996) and is only known in the Hamersley Ranges (Brown *et. al.*, 1998). Previous flora surveys in this area have recorded several populations of the species (Pilbara Iron 3, Pilbara Iron 2008, Biota 2007), although it was not found at the Brockman 4 mine site (Hamersley Iron 2005).

Field surveys would be required to verify the presence of this, or any other, protected species.

**Table 1: Results of EPBC Act protected flora search**

Species	Status	Type of Presence
<i>Lepidium catapycnon</i> Hamersley Lepidium, Hamersley Catapycnon	Vulnerable	Species or species habitat likely to occur



**Figure 6: Declared Rare Flora, Hamersley Lepidium (Florabase undated)**



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## 4.7 Fauna

### 4.7.1 DEC Listed Threatened Fauna

All native fauna species are protected under the Western Australian *Wildlife Conservation Act 1950* (WC Act). Fauna species that are considered rare, threatened with extinction or have a high conservation value are specially protected under the WC Act. The current list of specially protected fauna was published in the *Government Gazette* on 5 August 2008 under the *Wildlife Conservation (Specially Protected Fauna) Notice 2008(2)*.

DEC Policy Statements Nos 33: *Conservation of threatened fauna in the wild* and 50: *Setting Priorities for the conservation of Western Australia's threatened flora and fauna* outline the details related to the protection of threatened fauna in Western Australia.

A search of the DEC threatened fauna database with current available information showed several threatened fauna species are known from the area of interest (see Figure 5). Project specific data have been requested from the DEC and further assessment will be conducted when this information is received.

Three individuals of *Pseudomys chapmani* (Western Pebble-mound Mouse) were recorded by Biota (2009) at two locations inside and one location outside the nearby Rio Tinto Syncline 10 area. This species is listed as 'Priority 4' in the DEC Priority Fauna List. These species or their habitat may also be present in the FMS site.

Short Range Endemic (SRE) species may also be present on site. These are invertebrate species that occur in localised niche habitats such as rock outcrops. Five potential Short Range Endemic (SRE) species were recorded during the Biota (2009) survey of Rio Tinto's nearby resource areas. By the nature of their limited distribution, they are generally identified during more detailed site visits.

Field fauna surveys would verify the presence of protected species or their habitats and consider additional impacts to threatened fauna. Identifying and assessing localised fauna habitats, e.g. caves which may house bats, will be carried out at this stage. Fauna surveys are required to consider the principles and guidelines outlined in Position Statement 3 *Terrestrial Biological Surveys as an element of Biodiversity Protection* (EPA 2002) and Guidance Statement 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004).

### 4.7.2 Matters of National Environmental Significance

The Department of the Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool was used to identify fauna of national and international significance in the investigation area. Threatened species categories include endangered, critically endangered, conservation dependant, vulnerable and species that are extinct in the wild. Nominations for species and



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ecological communities are assessed by the Threatened Species Scientific Committee (DEWHA 2008a). There are nine fauna species protected under various categories under the EPBC Act that may be present on site or use the site (see Table 2). Field surveys would be required to verify these results.

Some of these species, for example the Pilbara Olive Python and Rainbow Bee-eater have been found in Rio Tinto’s Syncline Section 10 study area (Biota 2009). Six individuals of *Merops ornatus* (Rainbow Bee-eater) were recorded by Biota (2009) at one location inside and two locations outside that study area, and this species is listed as ‘Vulnerable’ under the EPBC Act and as ‘rare and likely to become extinct’ under Schedule 1 of the *Wildlife Conservation Act 1950* (WA).

**Table 2: Results of EPBC Act protected fauna search**

<b>Species</b>	<b>Status</b>	<b>Type of Presence</b>
<b>Threatened Species</b>		
<i>Dasyurus hallucatus</i> Northern Quoll	Endangered	Species or species habitat likely to occur within area
<i>Rhinonicteris aurantia</i> (Pilbara form) Pilbara Leaf-nosed Bat	Vulnerable	Species or species habitat likely to occur within area
<i>Liasis olivaceus barroni</i> Olive Python (Pilbara subspecies)	Vulnerable	Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<i>Haliaeetus leucogaster</i> White-bellied Sea Eagle	Migratory	Species or species habitat likely to occur within area
<i>Merops ornatus</i> Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
<b>Migratory Wetland Species</b>		
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
<i>Charadrius veredus</i> Oriental Plover, Oriental Dotteral	Migratory	Species or species habitat may occur within area
<b>Migratory Marine Birds</b>		
<i>Apud pacificus</i> Fork-tailed Swift	Migratory	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i>	Migratory	Species or species habitat may occur within area



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Species	Status	Type of Presence
Cattle Egret		
<b>Other Matters Protected by the EPBC Act</b>		
<i>Apus pacificus</i> Fork-tailed Swift	Listed – overfly marine area	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
<i>Charadrius veredus</i> Oriental Plover, Oriental Dotteral	Migratory	Species or species habitat may occur within area
<i>Haliaeetus leucogaster</i> White-bellied Sea Eagle	Migratory	Species or species habitat likely to occur within area
<i>Merops ornatus</i> Rainbow Bee-eater	Migratory	Species or species habitat may occur within area

**4.7.3 Subterranean Fauna**

Subterranean fauna are mostly invertebrate species (e.g. small crustaceans) and are classified as either stygofauna, which inhabit groundwater aquifers, or troglifauna, which inhabit underground air cavities or caves. The Pilbara is known to be rich in stygofauna species, although each species may only occupy a small niche environment (DEC 2009b).

The presence of subterranean fauna or their habitat on site would be identified during specialist field studies.

**4.8 DEC Listed Threatened and Priority Ecological Communities**

Threatened ecological communities (TECs), as defined by DEC, are a natural biological assemblage of plants, animals, microbes and so forth within a particular habitat, that face destruction or modification by processes such as land clearing or pollution. The communities are presumed totally destroyed, critically endangered, endangered, or vulnerable.

There are no known TECs within or adjacent to the E47/882 project area.

Priority Ecological Communities (PEC) are a further category of ecosystems that may be recognised as TECs but require further study. Possible threatened ecological communities that do not meet survey criteria are listed as Conservation Priorities One, Two and Three. Conservation Priority Four communities are those that are adequately known, rare but not threatened, or meet criteria for near



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threatened, or that have been recently removed from the threatened list.

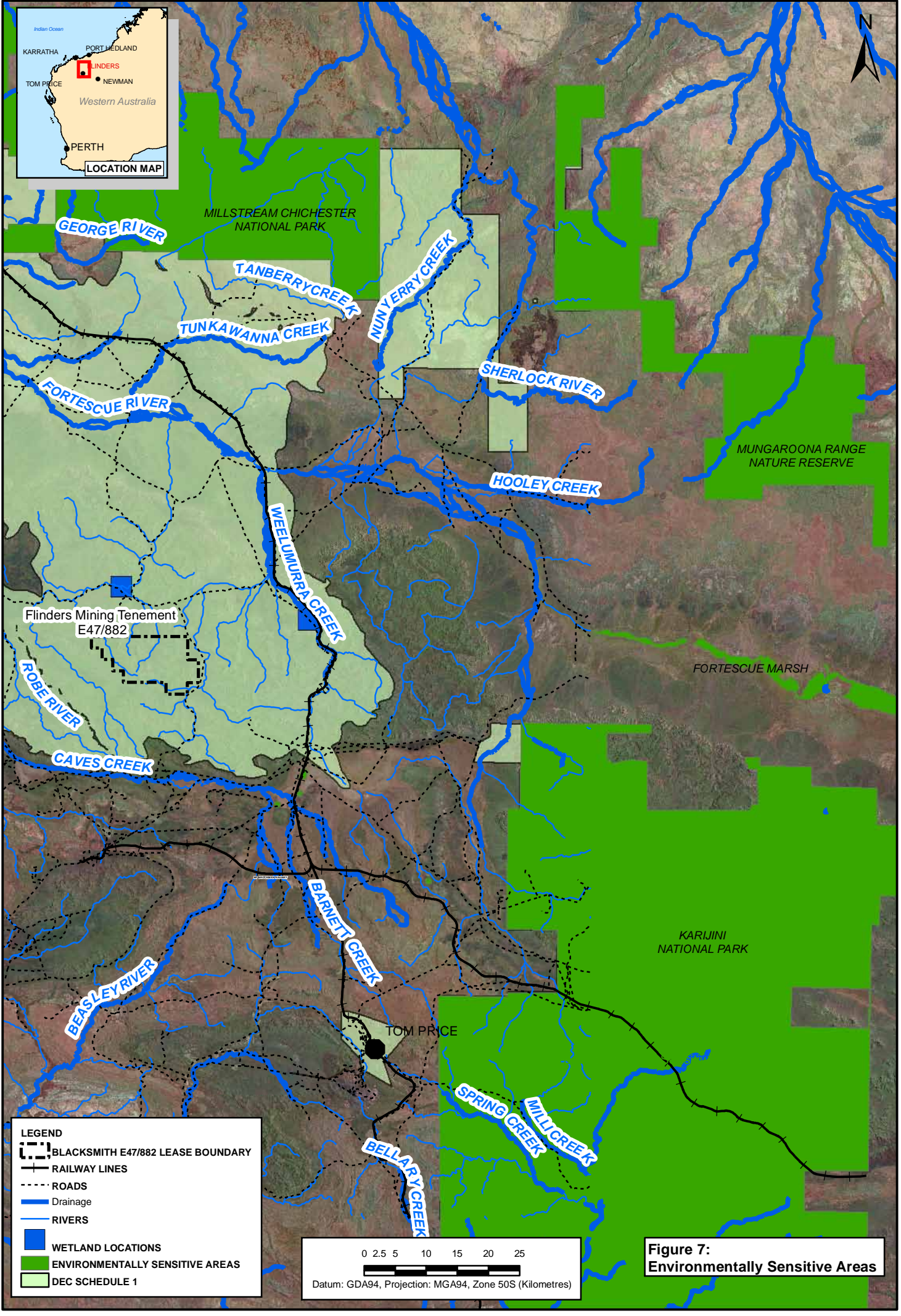
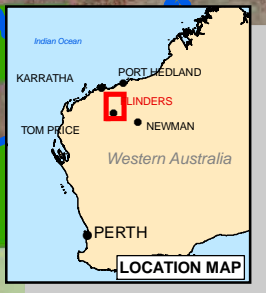
There are no known PECs within or adjacent to the E47/882 project area, with the nearest being the Cracking Clay communities of the Chichester and Mungaroona Range (Mulga Downs Site ID), and *Astrelba lappacea grasslands* on the boundary of Hamersley and Brockman Stations, both with a conservation status of Priority One. The project area is 56km and 85km from the communities respectively.

#### 4.9 Environmentally Sensitive Areas

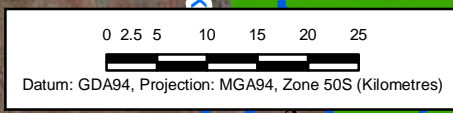
Environmentally Sensitive Areas (ESAs) are declared in Regulation 6 in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Some examples are areas with 50m of Declared Rare Flora, certain wetlands and riparian areas within 50m of the wetland, and World Heritage sites. Threatened Ecological Communities are another type of ESA. There are no known Environmentally Sensitive Areas within or adjacent to E47/882.

The site is within a DEC 'Schedule 1' area based on its location within a water supply area. The *Environmental Protection Act 1986* restricts the clearing of native vegetation in Western Australia. Any vegetation clearing on site must therefore be approved e.g. under an overarching project environmental approval (Part IV of the *Environmental Protection Act 1986*) or with a native vegetation clearing permit (Environmental Protection (Clearing of Native Vegetation) Regulations 2004)) unless the project qualifies to clear under an exemption. Under the regulations, activities can qualify to be exempt from needing approval including 'low impact mining activities' which is described in Schedule 1 of the regulations. However these exemptions do not apply in some zones including water supply areas, town sites and ESAs. Given its location within the Millstream water supply area, vegetation clearing on site for 'low impact mining activities' must be approved e.g. with an overarching project environmental approval under Part IV of the EP Act, Programme of Work or native vegetation clearing permit.





- LEGEND**
- BLACKSMITH E47/882 LEASE BOUNDARY
  - RAILWAY LINES
  - ROADS
  - Drainage
  - RIVERS
  - WETLAND LOCATIONS
  - ENVIRONMENTALLY SENSITIVE AREAS
  - DEC SCHEDULE 1



**Figure 7:**  
Environmentally Sensitive Areas



## 5. SOCIAL ENVIRONMENT

### 5.1 Land Use and Tenure

The north eastern corner of the project area intersects with the pastoral lease of Coolawanyah Station and Hamersley station is approximately 4km to the south.

#### 5.1.1 Conservation Estate

The FMS site is located approximately 45 km from the nearest boundary of the Karijini National Park, 56 km from the nearest boundary of the Millstream-Chichester National Park and 85km from the Mungaroona Range Nature Reserve (see Figure 8). Both of these National Parks and the reserve are managed by the Department of Environment and Conservation (formerly CALM).

### 5.2 Heritage

#### 5.2.1 Indigenous heritage

A search of the Department of Indigenous Affairs Aboriginal Heritage Inquiry System showed no registered site within or adjacent to E47/882. Appendix 2 gives the search results. However all indigenous heritage sites are protected under the *Aboriginal Heritage Act 1972* whether or not they are identified on this register.

An ethnographic survey was carried out of the site in 2003 (reference 21741 HSR P 2000 OCO). Other survey work is presently being carried out to identify indigenous heritage values on site.

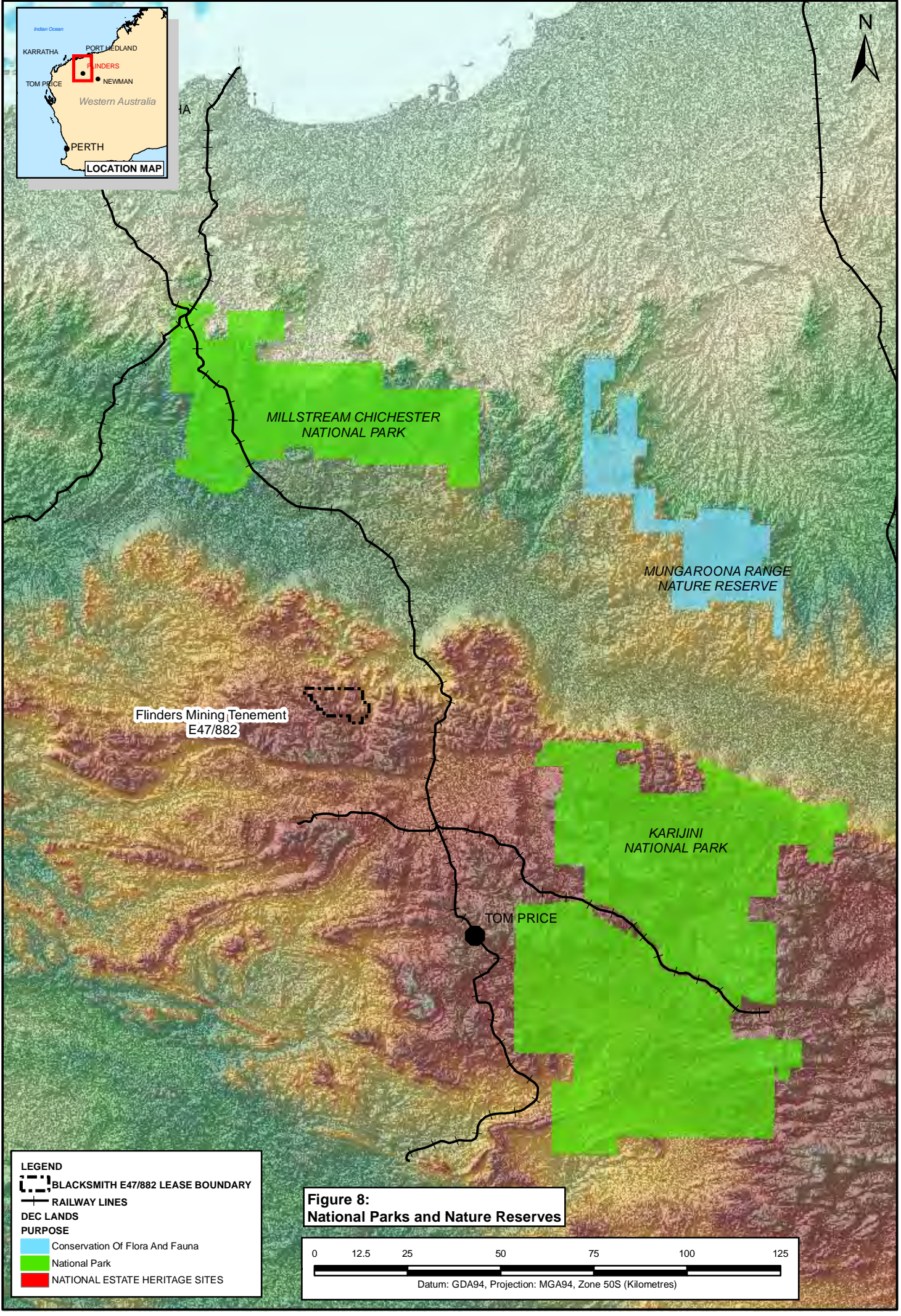
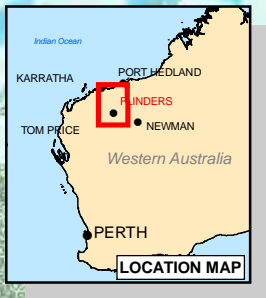
#### 5.2.2 Natural and other historic sites

There are no heritage sites protected under the *Environmental Protection and Biodiversity Conservation Act 1999* that are in or within 10 km of the site (see Appendix 1 for the search report).

The Heritage Council of Western Australia database does not indicate that there are any heritage areas on site, with the nearest sites being the permanent pools of the Ashburton River, Karijini National Park, and the Tom Price school, police station and community centre<sup>1</sup>.

---

<sup>1</sup> Non-indigenous historic sites, including natural heritage sites, are sometimes referred to as 'European heritage'.



MILLSTREAM CHICHESTER  
NATIONAL PARK

MUNGAROOA RANGE  
NATURE RESERVE

Flinders Mining Tenement  
E47/882

KARIJINI  
NATIONAL PARK

TOM PRICE

**LEGEND**

BLACKSMITH E47/882 LEASE BOUNDARY

RAILWAY LINES

**DEC LANDS PURPOSE**

Conservation Of Flora And Fauna

National Park

NATIONAL ESTATE HERITAGE SITES

**Figure 8:**  
**National Parks and Nature Reserves**

0 12.5 25 50 75 100 125

Datum: GDA94, Projection: MGA94, Zone 50S (Kilometres)



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## 5.3 Native Title

The Commonwealth *Native Title Act 1993* (NTA) provides for Aboriginal people to claim native title and a process for negotiation and compensation where the land is leased out by the State. The NTA allows States and Territories to develop their own native title regimes that apply instead of the right to negotiate where the Australian Government Minister determines that the regime complies with criteria set out in the NTA. The *Native Title (State Provisions) Act 1999* represents Western Australia's native title regime. Native title claims ensure that the stated native title rights and interests of the Aboriginal traditional owners of the land are recognised by law. These rights and interests include the continued use and occupation of the land for traditional purposes such as ceremonies, hunting, fishing and procuring ochre and bush foods.

The site falls within the Eastern Guruma native title determination area ratified by the Federal Court in March 2007. The determination area covers approximately 6,024 km<sup>2</sup> of the Pilbara region. It recognises non-exclusive possession native title rights including the right "to enter and remain on the land, camp, erect temporary shelters, and travel over and visit any part of the land and waters; to hunt and fish, gather and use the resources of the land and waters such as food, water and medicinal plants; to engage in ritual and ceremony on and in relation to the land and waters; and to care for, maintain and protect from physical harm, particular objects, sites and areas of significance to the native title holders." (Federal Court 2007)

The determination also means that the Eastern Guruma people must be consulted about development on the land and they have a right to negotiate over mineral exploration and the development of new mines (National Native Title Tribunal 2007)

The second schedule of the determination recognises the interests of other parties including the mining interests related to tenement E47/882. The interrelationship between this interest and the native title interest is defined as follows:

- a) the extent that any of the other rights and interests is inconsistent with the continued existence, enjoyment or exercise of the native title rights and interests, the native title rights and interests continue to exist in their entirety, but the native title rights and interests have no effect in relation to the other rights and interests to the extent of the inconsistency during the currency of the other rights and interests; and otherwise,
- b) the existence and exercise of the native title rights and interests do not prevent the doing of any activity required or permitted to be done by or under the other rights and interests, and the other rights and interests, and the doing of any activity required or permitted to be done by or under the other rights and interests, prevail over the native title rights and interests and any exercise of the native title rights and interests, but do not extinguish them.



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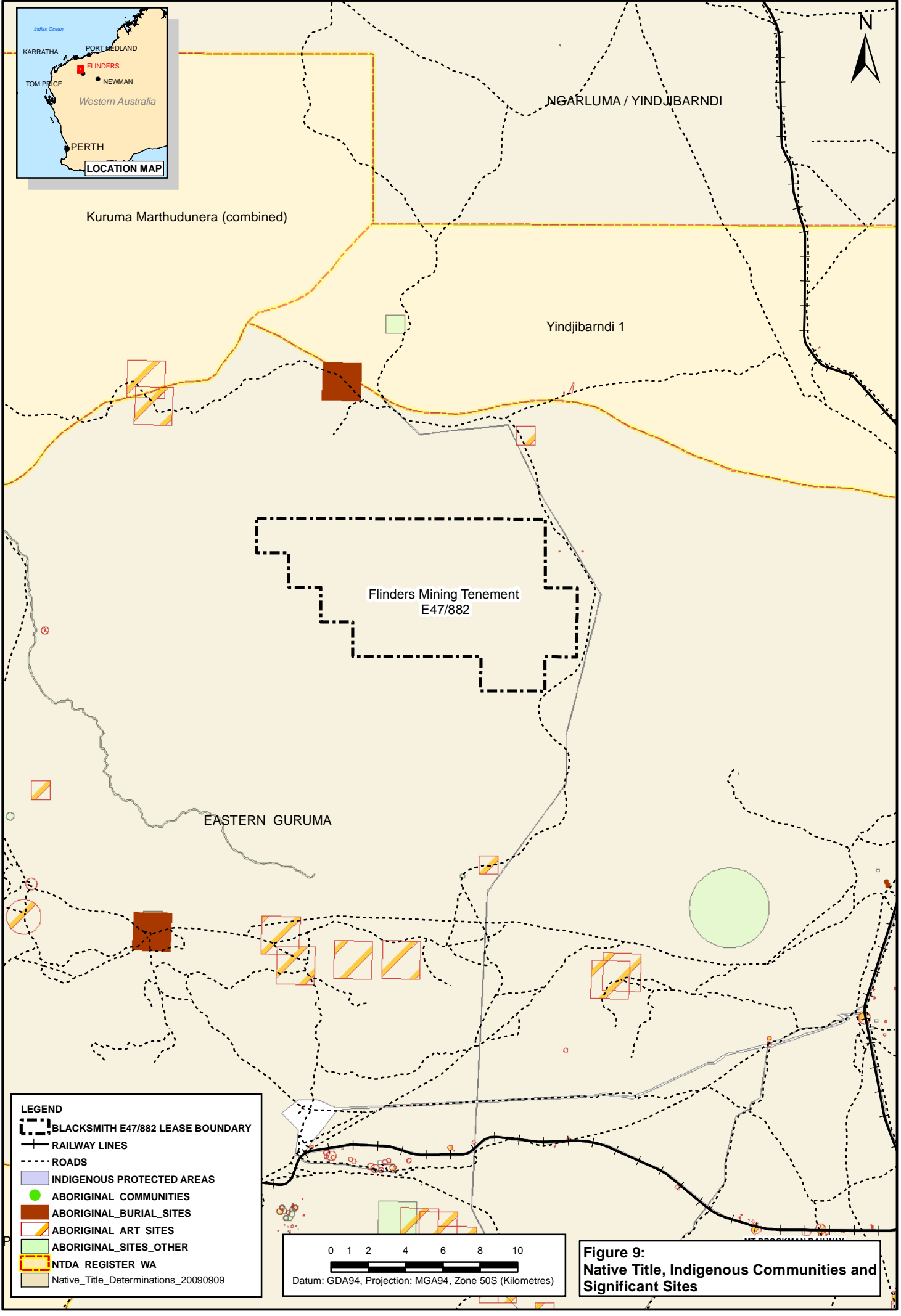
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An Indigenous Land Use Agreement has been signed between the Eastern Guruma people, Hamersley Iron Pty Ltd, Rio Tinto Pty Ltd, and the State of Western Australia relating to exploration, mining and infrastructure development. The Eastern Guruma people also have an Indigenous Land Use Agreement with the Coolawanyah Pastoral Company Pty Ltd.



Kuruma Marthudunera (combined)

NGARLUMA / YINDJIBARNDI

Yindjibarndi 1

Flinders Mining Tenement  
E47/882

EASTERN GURUMA

**LEGEND**

- BLACKSMITH E47/882 LEASE BOUNDARY
- RAILWAY LINES
- ROADS
- INDIGENOUS PROTECTED AREAS
- ABORIGINAL\_COMMUNITIES
- ABORIGINAL\_BURIAL\_SITES
- ABORIGINAL\_ART\_SITES
- ABORIGINAL\_SITES\_OTHER
- NTDA\_REGISTER\_WA
- Native\_Title\_Determinations\_20090909

0 1 2 4 6 8 10

Datum: GDA94, Projection: MGA94, Zone 50S (Kilometres)

**Figure 9:**  
Native Title, Indigenous Communities and  
Significant Sites



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## **6. REFERENCES**

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## **Appendix 1 – EPBC Act Protected Matters Report**



Australian Government

Department of the Environment, Water, Heritage and the Arts

## Protected Matters Search Tool

You are here: [Environment Home](#) > [EPBC Act](#) > [Search](#)

4 November 2009 14:25

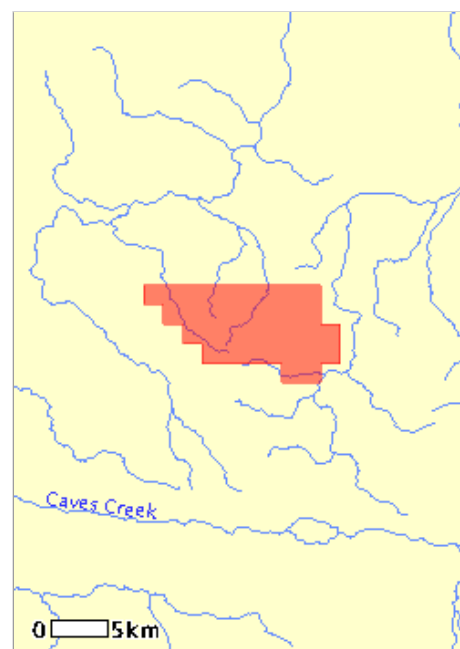
# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the [caveat](#) at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

**Search Type:** Area  
**Buffer:** 10 km  
**Coordinates:** -22.09867,117.3513, -22.09867,117.5013,  
-22.132,117.5013, -22.132,117.518, -22.16533,117.518,  
-22.16533,117.5013, -22.182,117.5013, -22.182,117.468,  
-22.16533,117.468, -22.16534,117.4013,  
-22.14867,117.4013, -22.14867,117.3846,  
-22.132,117.3846, -22.132,117.368, -22.11534,117.368,  
-22.11534,117.3513



This map may contain data which are  
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(Geoscience Australia)  
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**Report Contents:** [Summary](#)  
[Details](#)

- [Matters of NES](#)
- [Other matters protected by the EPBC Act](#)
- [Extra Information](#)

[Caveat](#)  
[Acknowledgments](#)

## Summary

### Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<b>World Heritage Properties:</b>	None
<b>National Heritage Places:</b>	None
<b>Wetlands of International Significance: (Ramsar Sites)</b>	None
<b>Commonwealth Marine Areas:</b>	None
<b>Threatened Ecological Communities:</b>	None
<b><u>Threatened Species:</u></b>	4
<b><u>Migratory Species:</u></b>	8

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

<b>Commonwealth Lands:</b>	None
<b>Commonwealth Heritage Places:</b>	None
<b>Places on the RNE:</b>	None
<b><u>Listed Marine Species:</u></b>	6
<b>Whales and Other Cetaceans:</b>	None
<b>Critical Habitats:</b>	None
<b>Commonwealth Reserves:</b>	None

## Extra Information

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

<b>State and Territory Reserves:</b>	None
<b>Other Commonwealth Reserves:</b>	None
<b>Regional Forest Agreements:</b>	None

## Details

## Matters of National Environmental Significance

Threatened Species [ [Dataset Information](#) ]**Mammals**[Dasyurus hallucatus](#)

Northern Quoll

Status      Type of Presence

Endangered      Species or species habitat likely to occur within area

[Rhinonictis aurantia \(Pilbara form\)](#)

Pilbara Leaf-nosed Bat

Vulnerable      Species or species habitat likely to occur within area

**Reptiles**[Liasis olivaceus barroni](#)

Olive Python (Pilbara subspecies)

Vulnerable      Species or species habitat may occur within area

**Plants**[Lepidium catapycnon](#)

Hamersley Lepidium, Hamersley Catapycnon

Vulnerable      Species or species habitat likely to occur within area

Migratory Species [ [Dataset Information](#) ]

Status      Type of Presence

**Migratory Terrestrial Species****Birds**[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle

Migratory      Species or species habitat likely to occur within area

[Merops ornatus](#)

Rainbow Bee-eater

Migratory      Species or species habitat may occur within area

**Migratory Wetland Species****Birds**[Ardea alba](#)

Great Egret, White Egret

Migratory      Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret

Migratory      Species or species habitat may occur within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel

Migratory      Species or species habitat may occur within area

**Migratory Marine Birds**[Apus pacificus](#)

Fork-tailed Swift

Migratory      Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret

Migratory      Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret

Migratory      Species or species habitat may occur within area

**Other Matters Protected by the EPBC Act**Listed Marine Species [ [Dataset Information](#) ]

Status      Type of Presence

**Birds**[Apus pacificus](#)

Fork-tailed Swift

Listed -  
overfly  
marine  
area      Species or species habitat may occur within area[Ardea alba](#)

Great Egret, White Egret

Listed -  
overfly  
marine  
area      Species or species habitat may occur within area[Ardea ibis](#)

Cattle Egret

Listed -  
overfly  
marine  
area      Species or species habitat may occur within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel

Listed -  
overfly  
marine  
areaSpecies or species habitat may occur within  
area[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle

Listed

Species or species habitat likely to occur  
within area[Merops ornatus](#)

Rainbow Bee-eater

Listed -  
overfly  
marine  
areaSpecies or species habitat may occur within  
area

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## Caveat

The information presented in this report has been provided by a range of data sources as [acknowledged](#) at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the [migratory](#) and [marine](#) provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as [extinct or considered as vagrants](#)
- some species and ecological communities that have only recently been listed
- [some terrestrial species](#) that overfly the Commonwealth marine area
- migratory species that are very [widespread, vagrant, or only occur in small numbers](#).

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Acknowledgments

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- [New South Wales National Parks and Wildlife Service](#)

- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)
- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUcliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

[Department of the Environment, Water, Heritage and the Arts](#)

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**PILBARA IRON ORE PROJECT**

**PRELIMINARY DESKTOP ENVIRONMENTAL STUDY AT E47/882 (BLACKSMITH)**

---

## **Appendix 2– Aboriginal Heritage Inquiry System Report**

## Search Criteria

0 sites in mining tenement 'E 4700882'.

## Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

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## Legend

Restriction	Access	Coordinate Accuracy
N No restriction	C Closed	Accuracy is shown as a code in brackets following the site coordinates.
M Male access only	O Open	[Reliable] The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
F Female access	V Vulnerable	[Unreliable] The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

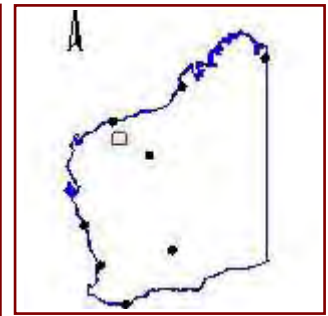
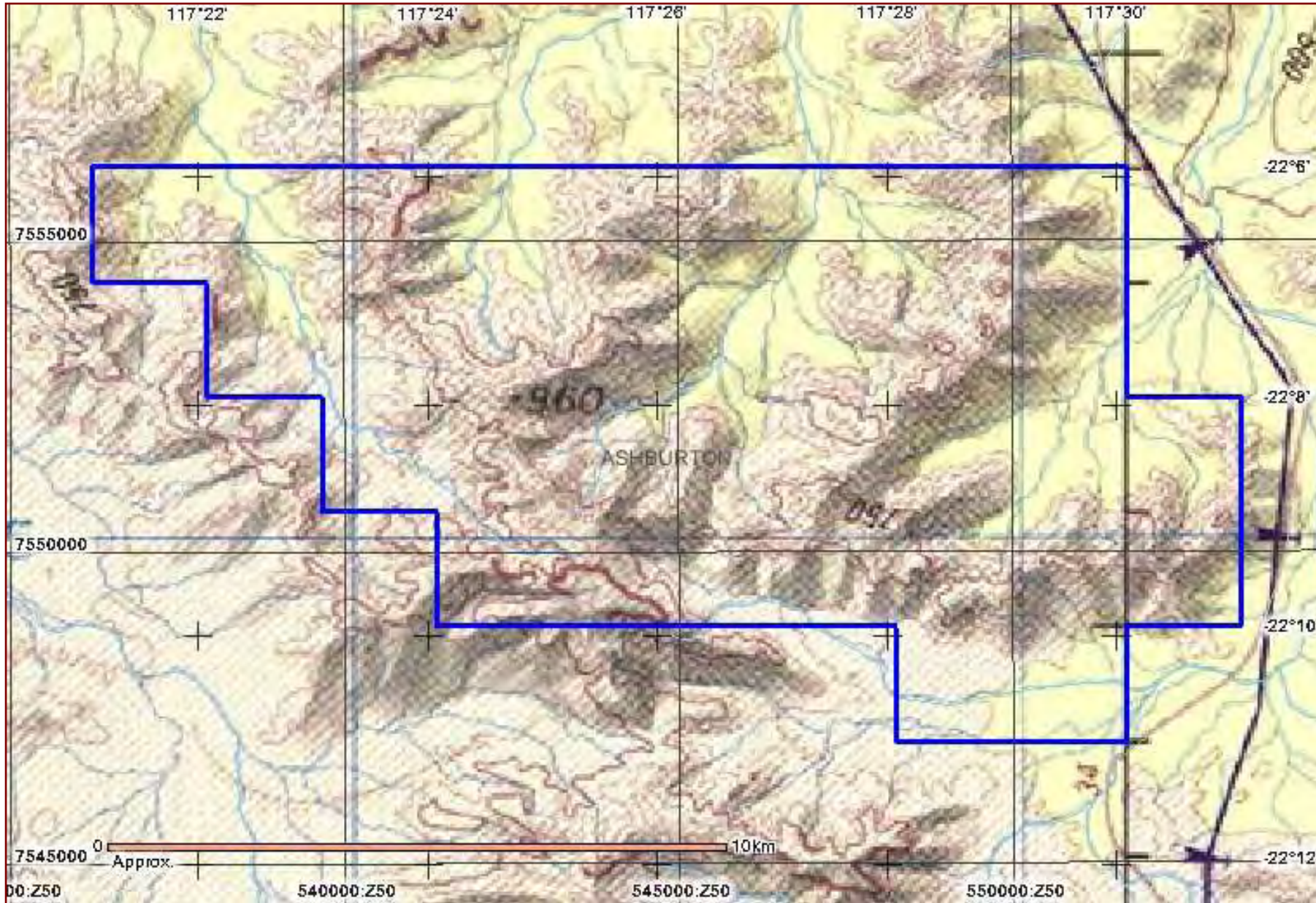
## Status

L Lodged	IR	Insufficient Information (as assessed by Site Assessment Group)	Site Assessment Group (SAG)
I Insufficient Information	PR	Permanent register (as assessed by Site Assessment Group)	Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not to be considered the final assessment.
P Permanent register	SR	Stored data (as assessed by Site Assessment Group)	
S Stored data			Final assessment will be determined by the Aboriginal Cultural Material Committee (ACMC).

## Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code "closed" or "vulnerable". Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.





**Legend**

- Highlighted Area
- Town
- Map Area
- Search Area

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Copyright for Native Title Land Claim, Local Government Authority, Mining Tenement boundaries shall at all times remain the property of the State of Western Australia, All rights reserved.

For further important information on using this information please see the Department of Indigenous Affairs' Terms of Use statement at <http://www.dia.wa.gov.au/Terms-Of-Use/>

## Search Criteria

Survey 3591

## Disclaimer

Heritage Surveys have been mapped using information from the reports and / or other relevant data sources. Heritage Surveys consisting of small discrete areas may not be visible except at large scales. Reports shown may not be held at DIA. Please consult report holder for more information. Refer to [www.dia.wa.gov.au/heritage](http://www.dia.wa.gov.au/heritage) for information on requesting reports held by DIA.

## Copyright

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## Legend

### Access

Some reports are restricted. The type of restriction is shown as a code in brackets following the catalogue number. No code indicates an unrestricted report.

[CLOSED]	Closed
[OWE]	Open with exception
[TBD]	To be determined
[RESTRICTED PENDING]	Restricted pending

### Spatial Accuracy

The following legend strictly applies to the spatial accuracy of heritage survey boundaries as captured by DIA.

Very Good	Boundaries captured from surveyed titles, GPS (2001 onwards) submitted maps georeferenced to within 20m accuracy.
Good	Boundaries captured from GPS (pre 2001) submitted maps georeferenced to within 250m accuracy.
Moderate	
Unreliable	Boundaries captured from submitted maps georeferenced to an accuracy exceeding 250m.
Indeterminate	Surveys submitted with insufficient information to allow boundary capture.

## Survey 3591

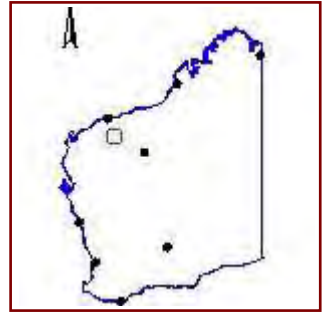
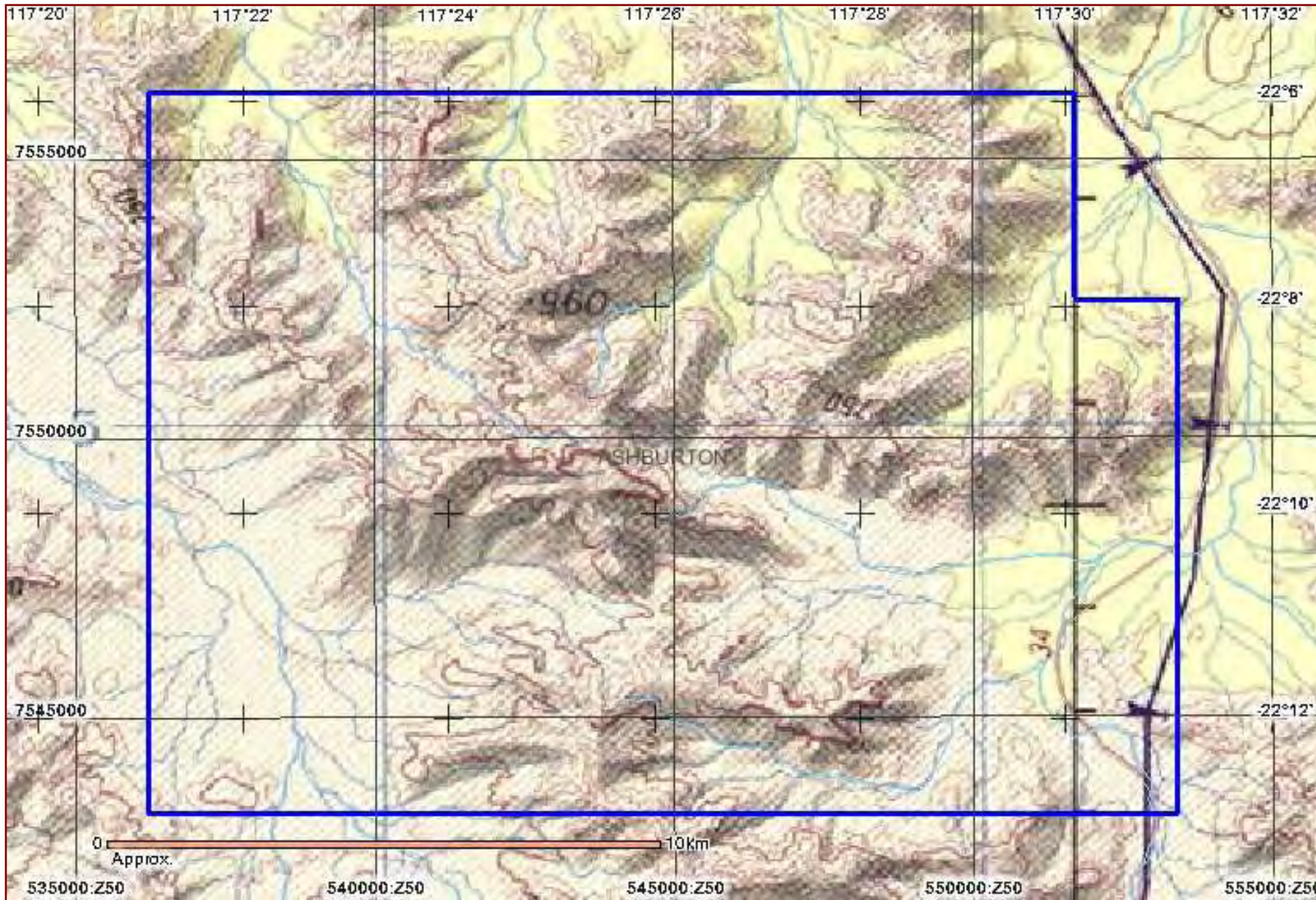
Project EL47/882, Hamersley Station  
 Start Date 19 May 2000  
 Proponents Independent Diamond Laboratories  
 L. A. Field and Associates  
 Consultants R. O'Connor  
 Survey Types Ethnographic  
 Aboriginal People Consulted? Yes

### Related Reports

Report ID	Catalogue Number	Title	Recorders	Held At
21741	HSR P 2000 OCO	Report on an ethnographic survey of EL47/882, Hamersley Station area	Rory O'Connor	

### Related Survey Areas

Area Number	Survey Type	Area Description	Survey Methodology	Spatial Accuracy	Field / Desktop
1	Ethnographic	EL47/882, Hamersley Station area as shown in Figure 1.	Site Identification	Good	Field and Desktop



**Legend**

- Highlighted Area
- Town
- Map Area
- Search Area

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---

## **Appendix 3– Plates**



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PRELIMINARY DESKTOP ENVIRONMENTAL STUDY AT E47/882 (BLACKSMITH)**

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**Plate 1: Waterhole within the Ajax area.**

Source: unknown, November 2009.

## appendix two: definitions and criteria

**Table 12: DEC definitions and criteria for TECs and PECs (DEC 2010a)**

Criteria		Definition
<b>Threatened Ecological Communities</b>		
Presumed Destroyed (PD)	Totally	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies ( A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed</p>
Critically (CR)	Endangered	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>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):</p> <p>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);</p> <p>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.</p> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>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);</p> <p>ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;</p> <p>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.</p> <p>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).</p>
Endangered (EN)		<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting</p>

Criteria	Definition
	<p>any one or more of the following criteria (A, B, or C):</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> <li>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);</li> <li>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.</li> </ul> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> <li>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);</li> <li>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;</li> <li>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.</li> </ul> <p>C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
Vulnerable (VU)	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p>
<b>Priority Ecological Communities</b>	
Priority One	Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and / or are not well defined, and appear to be under threat from known threatening processes.
Priority Three	<ul style="list-style-type: none"> <li>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;</li> <li>ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may</li> </ul>



Criteria	Definition
	<p>occur, much of it not under imminent threat, or;</p> <p>iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.</p>
Priority Four	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>A) 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.</p> <p>B) 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.</p> <p>C) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
Priority Five	<p><i>Conservation Dependent Ecological Communities</i></p> <p>Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

**Table 13: EPBC Act categories for TECs (Australian Government 1999)**

EPBC Act Category	Definition
Critically Endangered (CR)	An ecological community that is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)	An ecological community that is not critically endangered, and is facing a very high risk of extinction in the wild in the new future.
Vulnerable (VU)	An ecological community that is not critically endangered or endangered, and is facing a high risk of extinction in the medium-term future.

**Table 14: DEC conservation codes and definitions for flora (Smith 2010)**

Conservation Code		Definition
X	Declared Rare Flora - Presumed Extinct	Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
R	Declared Rare Flora - Extant	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, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee. ( = Threatened Flora = Endangered + Vulnerable).
P1	Priority One - Poorly Known	Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two - Poorly Known	Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (ie not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3	Priority Three - Poorly Known	Taxa which are known from several populations, at least some of which are not believed to be under immediate threat (ie not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
P4	Priority Four - Rare	Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

**Table 15: EPBC Act categories for flora (Australian Government 1999)**

EPBC Act Category	Definition
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</li> <li>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</li> </ul>
Critically Endangered	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered; and</li> <li>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</li> </ul>
Vulnerable	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) it is not critically endangered or endangered; and</li> <li>(b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.</li> </ul>
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: <ul style="list-style-type: none"> <li>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</li> <li>(b) the following subparagraphs are satisfied:               <ul style="list-style-type: none"> <li>(i) the species is a species of fish;</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>(ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;</li> <li>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</li> <li>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</li> </ul>

## appendix three: protected matters search results



# EPBC Act Protected Matters Report: Coordinates

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

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

You may wish to print this report for reference before moving to other pages or websites.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

**Report created: 13/12/10 19:11:59**

## [Summary](#)

## [Details](#)

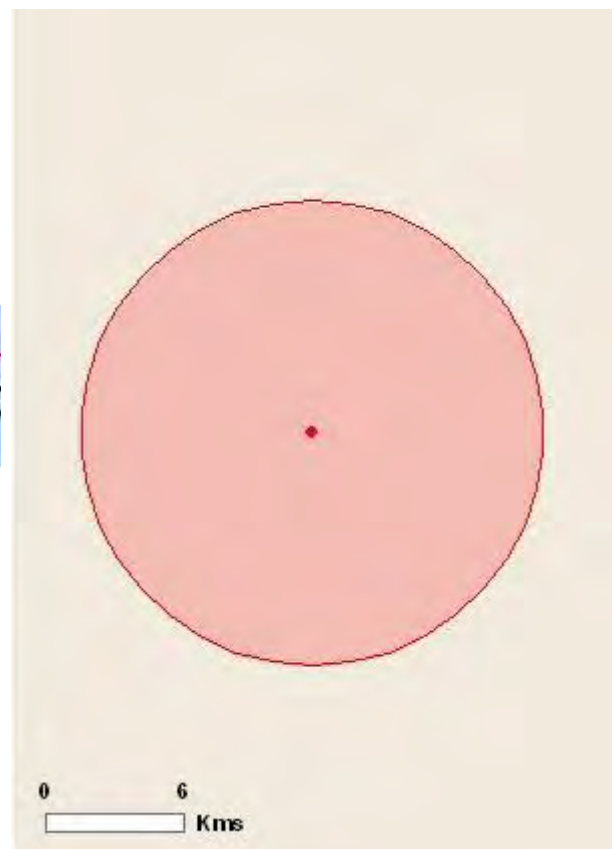
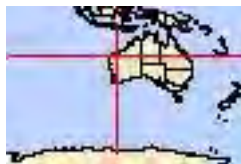
[Matters of NES](#)

[Other matters protected by the EPBC Act](#)

[Extra Information](#)

## [Caveat](#)

## [Acknowledgements](#)



This map may contain data which are  
©Commonwealth of Australia (Geoscience  
Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 10Km

# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Significance (Ramsar Wetlands):</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Areas:</a>	None
<a href="#">Threatened Ecological Communities:</a>	None
<a href="#">Threatened Species:</a>	4
<a href="#">Migratory Species:</a>	8

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	6

<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves:</a>	None

## Report Summary for Extra Information

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

<a href="#">Place on the RNE:</a>	None
<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	5
<a href="#">Nationally Important Wetlands:</a>	None

## Details

### Matters of National Environmental Significance

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

Name	Status	Type of Presence
<b>MAMMALS</b>		
<a href="#">Dasyurus hallucatus</a> Northern Quoll [331]	Endangered	Species or species habitat likely to occur within area
<a href="#">Rhinonicteris aurantia (Pilbara form)</a> Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area

#### PLANTS

<a href="#">Lepidium catapycnon</a> Hamersley Lepidium, Hamersley Catapycnon [9397]	Vulnerable	Species or species habitat likely to occur within area
---	------------	--

#### REPTILES

<a href="#">Liasis olivaceus barroni</a> Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat may occur within area
---	------------	--

#### Migratory Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat may occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area

[Merops ornatus](#)

Rainbow Bee-eater [670] Species or species habitat may occur within area

### **Migratory Wetlands Species**

[Ardea alba](#)

Great Egret, White Egret [59541] Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542] Species or species habitat may occur within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel [882] Species or species habitat may occur within area

### **Other Matters Protected by the EPBC Act**

#### **Listed Marine Species**

**[ Resource Information ]**

Name	Status	Type of Presence
------	--------	------------------

#### **Birds**

[Apus pacificus](#)

Fork-tailed Swift [678] Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret [59541] Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542] Species or species habitat may occur within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel [882] Species or species habitat may occur within area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943] Species or species habitat likely to occur within area

[Merops ornatus](#)

Rainbow Bee-eater [670] Species or species habitat may occur within area

### **Extra Information**

#### **Invasive Species**

**[ Resource Information ]**

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
------	--------	------------------

#### **Mammals**

[Felis catus](#)

Cat, House Cat, Domestic Cat [19] Species or species habitat likely to occur within area

[Oryctolagus cuniculus](#)

Rabbit, European Rabbit [128] Species or species habitat likely to occur within area

[Vulpes vulpes](#)

Red Fox, Fox [18] Species or species habitat may occur within area

#### **Plants**

[Cenchrus ciliaris](#)

Buffel-grass, Black Buffel-grass [20213] Species or species habitat likely to occur within area



## Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Coordinates

117.46017 -22.11885

## Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- Other groups and individuals

Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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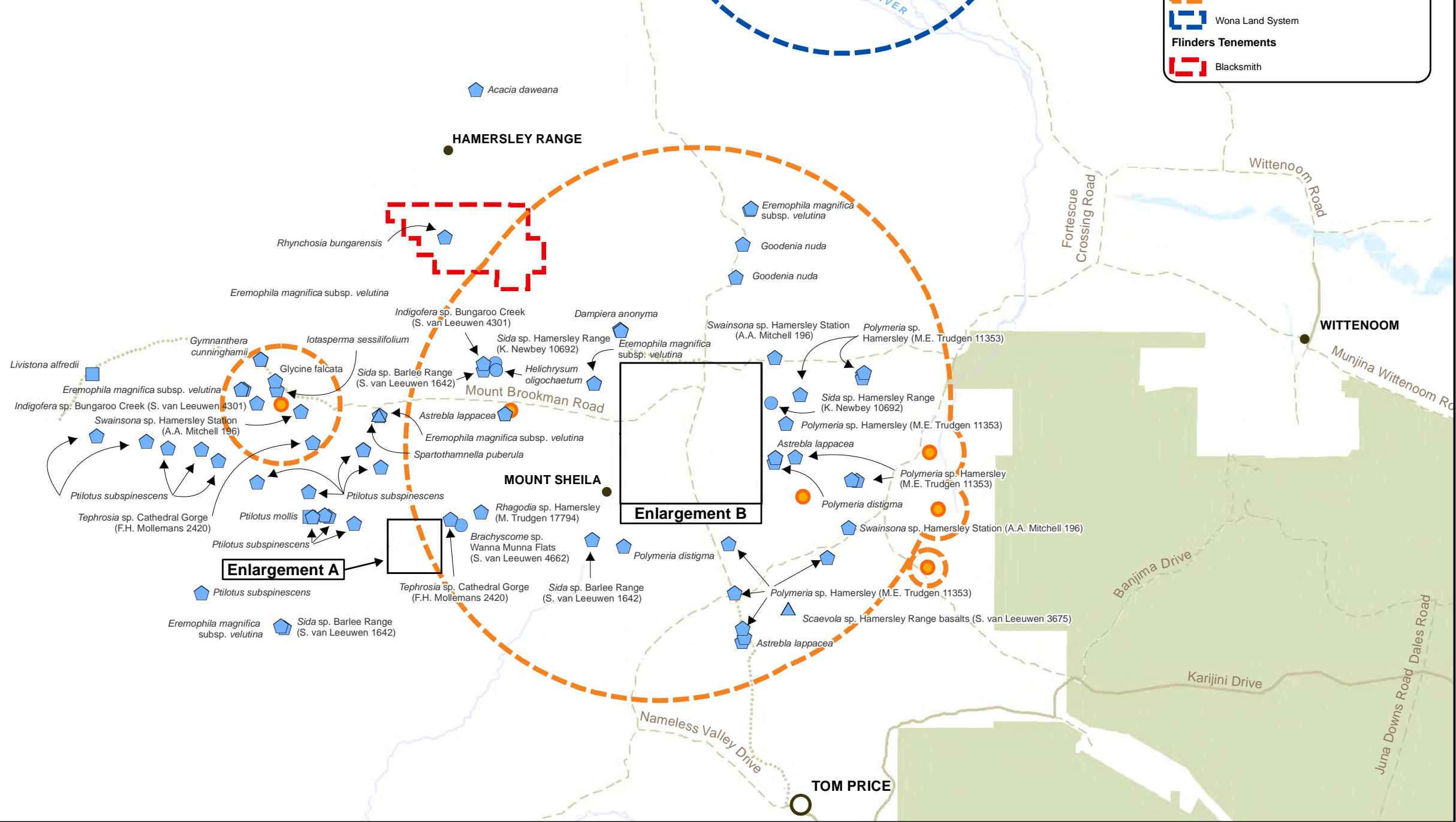
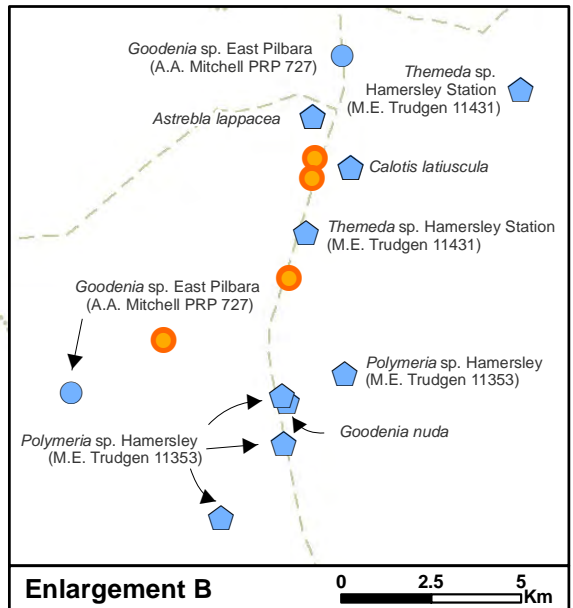
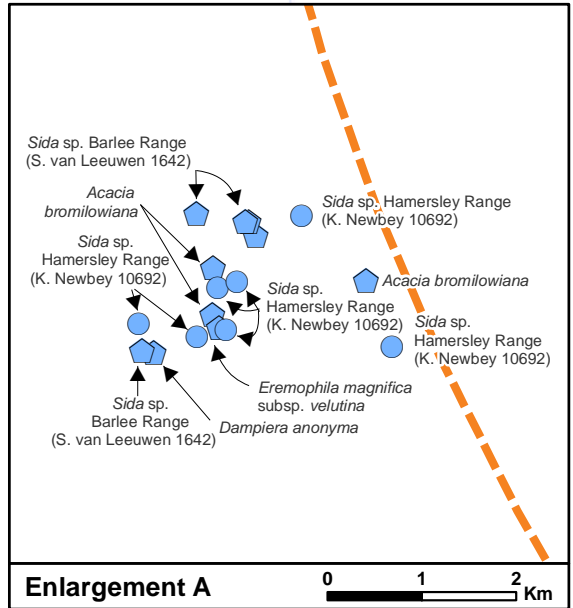
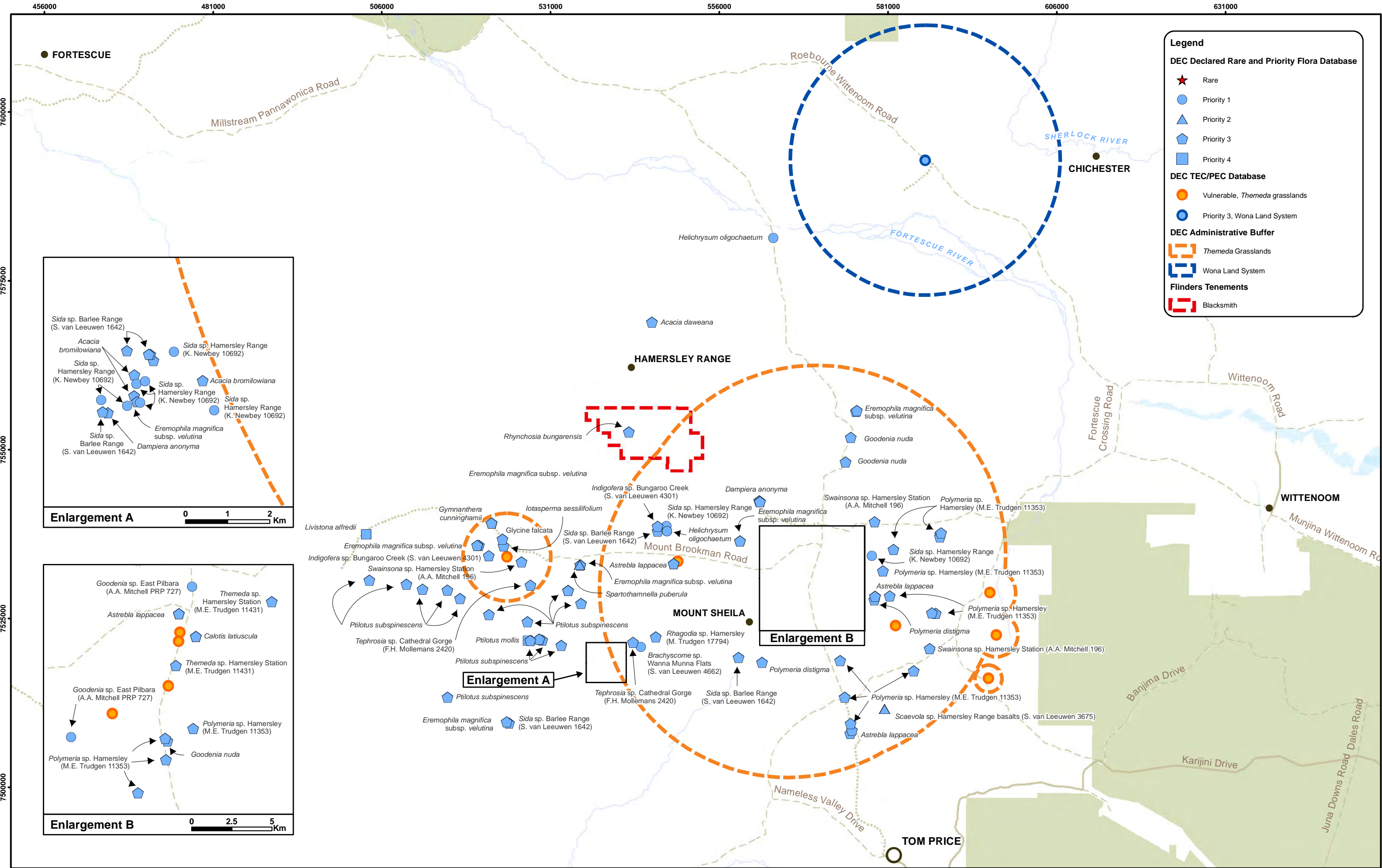
## appendix four: conservation significant flora list

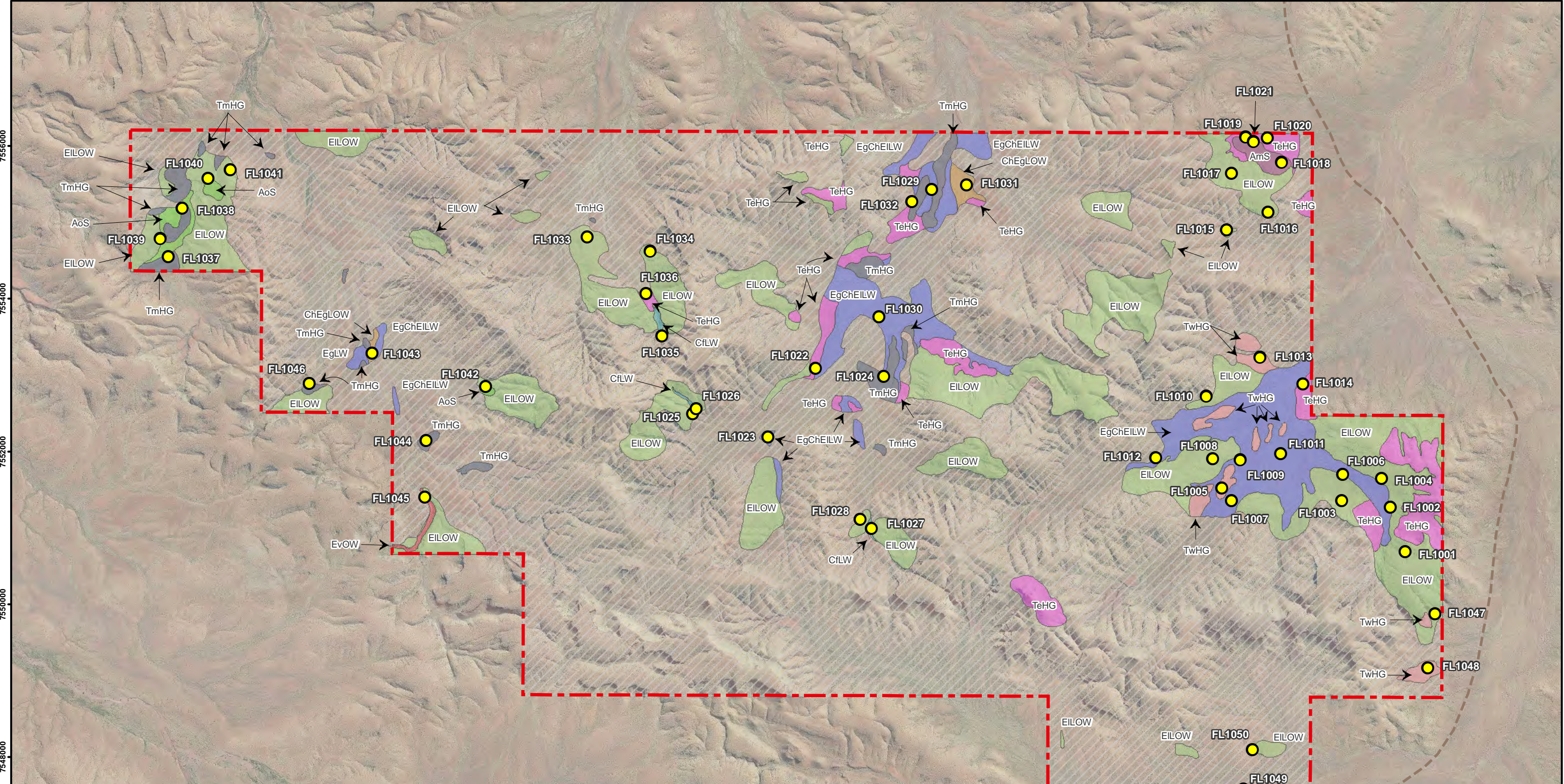
**Table 16: DEC flora database results**

Species	Conservation Code	Habit	Flowering Period	Habitat - Landform
<i>Acacia bromilowiana</i>	P4	Tree or shrub, to 12 m high	Jul-Aug	Red skeletal stony loam, orange-brown pebbly, gravel loam, laterite, banded ironstone, basalt. Rocky hills, breakaways, scree slopes, gorges, creek beds
<i>Acacia dawsoniana</i>	P3	Spreading shrub, 0.3–1.5(–2) m high	Jul-Sep	Stony red loamy soils. Low rocky rises, along drainage lines.
<i>Astrebla lappacea</i>	P3	Tufted perennial, grass-like or herb, 0.3–0.8 m high	Jun–Jul	Clay, loam
<i>Brachyscome</i> sp. Wanna Munna Flats (S. van Leeuwen 4662)	P1	-	-	-
<i>Calotis latiuscula</i>	P3	Erect herb, to 0.5 m high	Jun–Oct	Sand, loam. Rocky hillsides, floodplains, rocky creeks or river beds
<i>Dampiera anonyma</i>	P3	Multistemmed perennial, herb, to 0.5(-1) m high.	Jun-Sep	Skeletal red-brown to brown gravelly soil over banded ironstone, basalt, shale and jaspilite. Hill summits, upper slopes
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	P3	Shrub, 0.5–1.5 m high.	Aug–Sep	Skeletal soils over ironstone. Summits.
<i>Glycine falcata</i>	P3	Mat-forming perennial, herb, to 0.2 m high.	May–Jul	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains
<i>Goodenia nuda</i>	P4	Erect to ascending herb to 0.5 m high	Apr-Aug	Plain. Brown-red sand - loam, river beds
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P1	Open, erect annual or biennial, herb, to 0.2 m high.	Aug	Red brown clay, calcrete pebbles, plains, swamps
<i>Gymnanthera cunninghamii</i>	P3	Erect shrub, 1–2 m high.	Jan–Dec	Sandy soil, limestone, creeklines
<i>Helichrysum oligochaetum</i>	P1	Erect annual, herb, to ca 0.25 m high	Aug–Nov	Red clay. Alluvial plains
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	P3	-	-	-
<i>Iotasperma sessilifolium</i>	P3	Erect herb.		Cracking clay, black loam. Edges of waterholes, plains.
<i>Lepidium catapycnon</i>	T	Open, woody perennial, herb or shrub, 0.2-0.3 m high, stems zigzag	Oct	Skeletal soils. Hillsides
<i>Livistona alfredii</i>	P4	Tree-like monocot (palm), to 10 m high	Jul–Sep	Edges of permanent pools
<i>Polymeria distigma</i>	P3	Prostrate trailing herb.	Apr–Jul.	Sandy soils.
<i>Polymeria</i> sp. Hamersley (M.E. Trudgen 11353)	P3	-	-	-
<i>Ptilotus mollis</i>	P4	Compact, perennial shrub, to 0.5 m high, soft grey foliage	May/Sep	Stony hills and screes

Species	Conservation Code	Habit	Flowering Period	Habitat - Landform
<i>Ptilotus subspinescens</i>	P3	Compact shrub, to 0.8 m high.	sep–Oct	Gentle rocky slopes, screes and the bases of screes.
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	P3	Erect Shrub		Floodplain / lower slopes
<i>Rhynchosia bungarensis</i>	P4	Compact, prostrate shrub, to 0.5 m high.	-	Pebbly, coarse sand, banks of flow line
<i>Scaevola</i> sp. Hamersley Range basalts (S. van Leeuwen 3675)	P2	Shrub, to 1 m high	Jul–Aug.	Skeletal, brown gritty soil over basalt. Summits of hills, steep hills.
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	P3	Spreading shrub, to 0.5 m high	Aug	Skeletal red soils pockets. Steep slope
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	P1	-	-	-
<i>Spartothamnella puberula</i>	P2	Shrub, 0.35–1.5 m high.	Sep–Nov	Rocky loam, sandy or skeletal soils, clay. Sandplains, hills.
<i>Swainsona</i> sp. Hamersley Station (A.A. Mitchell 196)	P3	Prostrate annual, herb, to 0.1 m high	Mar.	Flat crab-holed plain
<i>Tephrosia</i> sp. Cathedral Gorge (FH Mollemans 2420)	P3	Erect shrub, to 0.25 m high	Feb	Clay-sand & pebbles
<i>Themeda</i> sp. Hamersley Station (ME Trudgen 11431)	P3	Tussocky perennial, grass-like or herb, 0.9–1.8 m high.	Aug	Red clay. Clay pan, grass plain.
<i>Thryptomene wittweri</i>	T	Spreading or rounded shrub, 0.5–1.5(–2.1) m high.	Apr/Jul/ Aug	Skeletal red stony soils. Breakaways, stony creek beds.

## appendix five: maps





**Legend**

Quadrats	<b>Vegetation Type</b>	ELOW - <i>Eucalyptus leucophloia</i> Low Open Woodland
Local Roads	AmS - <i>Acacia maitlandii</i> Shrubland	EvOW - <i>Eucalyptus victrix</i> Open Woodland
2010 Burnt Areas	AoS - <i>Acacia orthocarpa</i> Shrubland	TeHG - <i>Triodia epactia</i> Hummock Grassland
<b>Flinders Tenements</b>	CFLW - <i>Corymbia ferritcola/Eucalyptus leucophloia</i> Low Open Woodland	TmHG - <i>Triodia aff. melvillei</i> Hummock Grassland
Blacksmith	ChEgLOW - <i>Corymbia hamersleyana/Eucalyptus gamophylla</i> Low Open Woodland	TwHG - <i>Triodia wiseana</i> Hummock Grassland
	EgChEILW - <i>Eucalyptus gamophylla/Corymbia hamersleyana/E. leucophloia</i> Low Woodland	

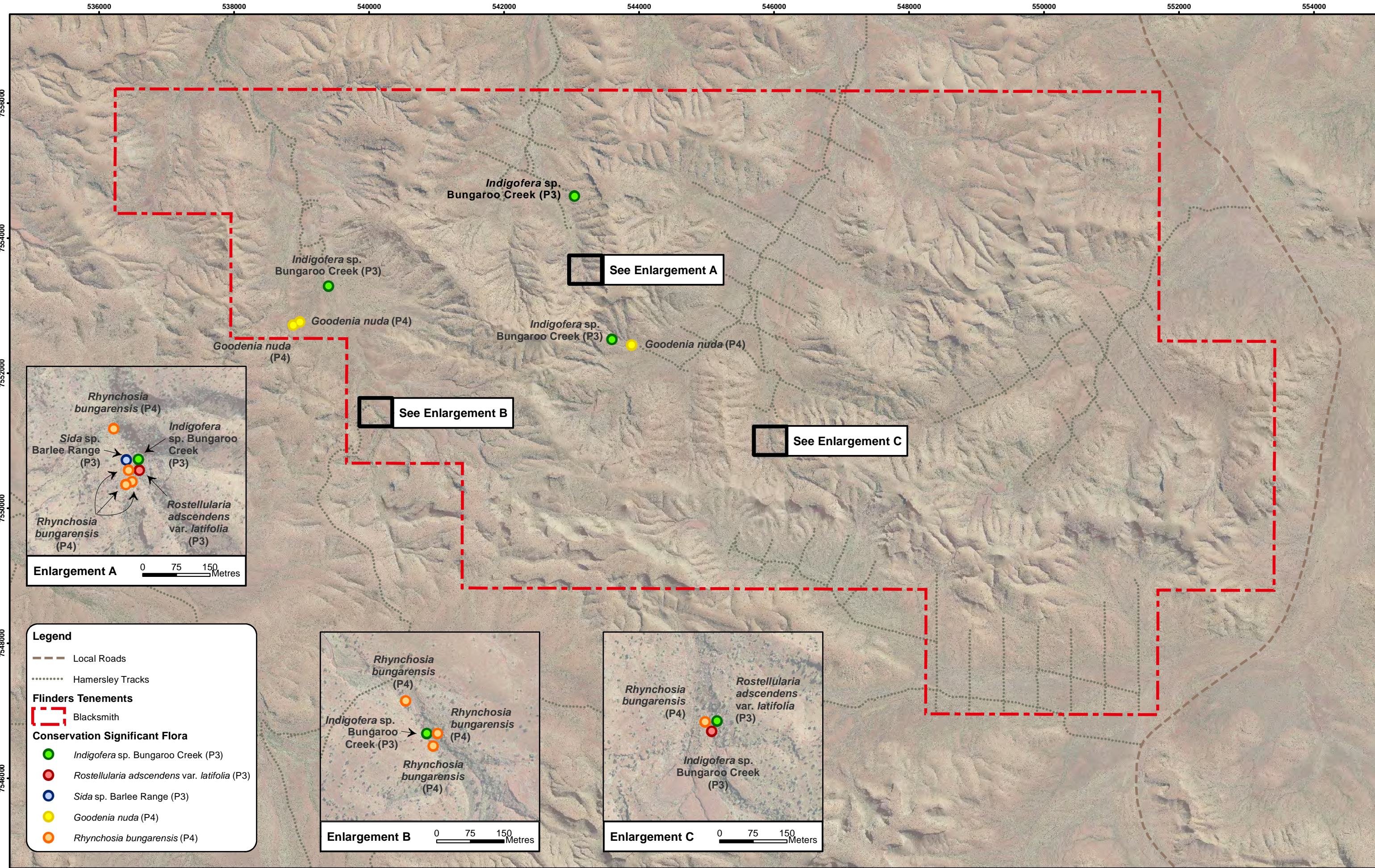
**Map 2**

**Pilbara Iron Ore Project - Blacksmith Flora and Vegetation Survey**  
**Vegetation Types**

Nov 2010

prepared for Flinders Mines Ltd  
0 0.5 1 1.5 2 Km  
1:50,000 @ A3  
Project No. 2463-10





Map 4

**Pilbara Iron Ore Project - Blacksmith Flora and Vegetation Survey**  
**Conservation Significant Flora Locations**

Nov 2010

prepared for Flinders Mines Ltd  
 0 0.5 1 1.5 2 Km  
 1:50,000 @ A3  
 Project No. 2463-10



GDA 1994 MGA Zone 50



## appendix six: floristic quadrat summaries

Site		FL1001	
Described by Re-score	HEH	01/11/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	552928 mE 7550690 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate to steep north-west facing mid slope of high hill arm dissected by minor gullies		
Soil	No exposed soil		
Rock Type	Ironstone. Blackish red rocks of angular to sub-angular shape		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia wiseana</i> mid-dense hummock grassland over <i>Cymbopogon ambiguus</i> open tussock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> tree\6\r;G+ ^ <i>Triodia wiseana</i> , <i>Cymbopogon ambiguus</i> hummock grass, tussock grass\1\i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	2% leaf litter, litter <1 cm deep, 45% bare ground, no weed cover No evidence of human disturbance Shrub layer depleted by drought		



Images: May 2010 (left), March 2011 (right)

#### Species

*Acacia hamersleyensis*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia tenuissima*

*Amaranthus undulatus*

*Aristida holathera* var. *holathera*

*Cleome viscosa*

*Corchorus lasiocarpus*

*Cucumis melo* subsp. *agrestis*

*Cymbopogon ambiguus*

*Dampiera candidans*

*Dysphania rhadinostachya* subsp. *rhadinostachya*

*Eriachne aristidea*

*Eriachne ciliata*

*Eriachne mucronata* (typical form)

*Eucalyptus leucophloia* subsp. *leucophloia*

*Fimbristylis simulans*

*Gomphrena cunninghamii*

#### Cover of dominant species (%)

15

2

**Species****Cover of dominant species (%)**

*Goodenia stobbsiana*

*Gossypium australe* (Whim Creek form)

*Grevillea wickhamii*

*Keraudrenia nephrosperma*

*Oldenlandia crouchiana*

*Paspalidium clementii*

*Polycarpaea corymbosa* var. *corymbosa*

*Polycarpaea longiflora*

*Polygala* aff. *isingii*

*Ptilotus calostachyus*

*Ptilotus fusiformis*

*Ptilotus polystachyus*

*Senna glutinosa*

*Solanum ?lasiophyllum*

*Striga curviflora*

*Trachymene oleracea* subsp. *oleracea*

*Trichodesma zeylanicum* var. *zeylanicum*

*Trichosanthes cucumerina* var. *cucumerina*

*Triodia wiseana*

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*Triumfetta maconochieana*

Site		FL1002	
Described by Re-score	LJA	26/05/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	552736 mE 7551275 mN	
Season	Poor (2010), Good (2011)		
Habitat	Very gently sloping north facing minor drainage channel on valley floor		
Soil	Sandy loam soil with rock fragments		
Rock Type	No exposed rock		
Vegetation Description	<i>Triodia wiseana</i> closed hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\2\d		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 20% bare ground, no weed cover No evidence of human disturbance Areas of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> saplings. Some dead shrubs		



#### Species

#### Cover of dominant species (%)

*?Clerodendrum*  
*Acacia dictyophleba*  
*Acacia pruinocarpa*  
*Acacia pyrifolia* var. *pyrifolia*  
*Amaranthus undulatus*  
*Aristida holathera* var. *holathera*  
*Cleome viscosa*  
*Clerodendrum floribundum* var. *angustifolium*  
*Corymbia hamersleyana*  
*Cucumis melo* subsp. *agrestis*  
*Cymbopogon ambiguus*  
*Dysphania rhadinostachya* subsp. *rhadinostachya*  
*Enneapogon lindleyanus*

Species	Cover of dominant species (%)
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia biconvexa</i>	
<i>Fimbristylis simulans</i>	
<i>Gossypium australe</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1
<i>Grevillea wickhamii</i>	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Oldenlandia crouchiana</i>	
<i>Phyllanthus maderaspatensis</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus polystachyus</i>	
<i>Rhynchosia minima</i>	
<i>Santalum lanceolatum</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Themeda triandra</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	
<i>Triodia wiseana</i>	80

Site		FL1003	
Described by Re-score	HEH	26/05/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	552099 mE 7551360 mN	
Season	Poor (2010), Good (2011)		
Habitat	Steep north facing lower scree slope of low hill		
Soil	No soil exposed		
Rock Type	Ironstone. Red rocks of subrounded to angular shape		
Vegetation Description	<i>Triodia wiseana</i> mid-dense hummock grassland over <i>Cymbopogon ambiguus</i> open tussock grassland with <i>Hakea chordophylla</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> scattered shrubs		
NVIS V	U ^ <i>Hakea chordophylla</i> ^tree\6\r;M ^ <i>Senna glutinosa</i> subsp. <i>glutinosa</i> \^shrub\3\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>2 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 46% bare ground, no weed cover No evidence of human disturbance		



**Species**

**Cover of dominant species (%)**

*Acacia dictyophleba*

*Acacia tenuissima*

*Aristida holathera* var. *holathera*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Bulbostylis barbata*

*Cleome viscosa*

*Cucumis maderaspatanus*

*Cymbopogon ambiguus*

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*Dysphania rhadinostachya* subsp. *rhadinostachya*

*Enneapogon lindleyanus*

*Enneapogon polyphyllus*

*Eriachne aristidea*

<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia australis</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Hakea chordophylla</i>	1-2
<i>Indigofera monophylla</i> (MJOPP-2)	
<i>Mnesithea formosa</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus auriculifolius</i>	8
<i>Ptilotus calostachyus</i>	
<i>Ptilotus clementii</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Ptilotus incanus</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Striga curviflora</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Tribulus hirsutus</i>	
<i>Tribulus platypterus</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia wiseana</i>	40
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1004	
Described by	LJA	26/05/10	Quadrat 50 m x 50 m
Re-score	JKN	30/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	552619 mE 7551648 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate south facing lower slope with minor gully		
Soil	Red skeletal loam		
Rock Type	Banded ironstone		
Vegetation Description	<i>Triodia epactia</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees over <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> scattered tall shrubs		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;M ^ <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> ^shrub\3\r;G+ ^ <i>Triodia epactia</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	5% leaf litter, litter 1-2 cm deep, 80% bare ground, no weed cover No evidence of human disturbance		



#### Species

*Acacia dictyophleba*

*Acacia monticola*

*Acacia orthocarpa*

*Acacia pyrifolia* var. *pyrifolia*

*Aristida holathera* var. *holathera*

*Bidens bipinnata*

*Bulbostylis barbata*

*Cleome viscosa*

*Clerodendrum floribundum* var. *angustifolium*

*Corchorus lasiocarpus*

*Corymbia hamersleyana*

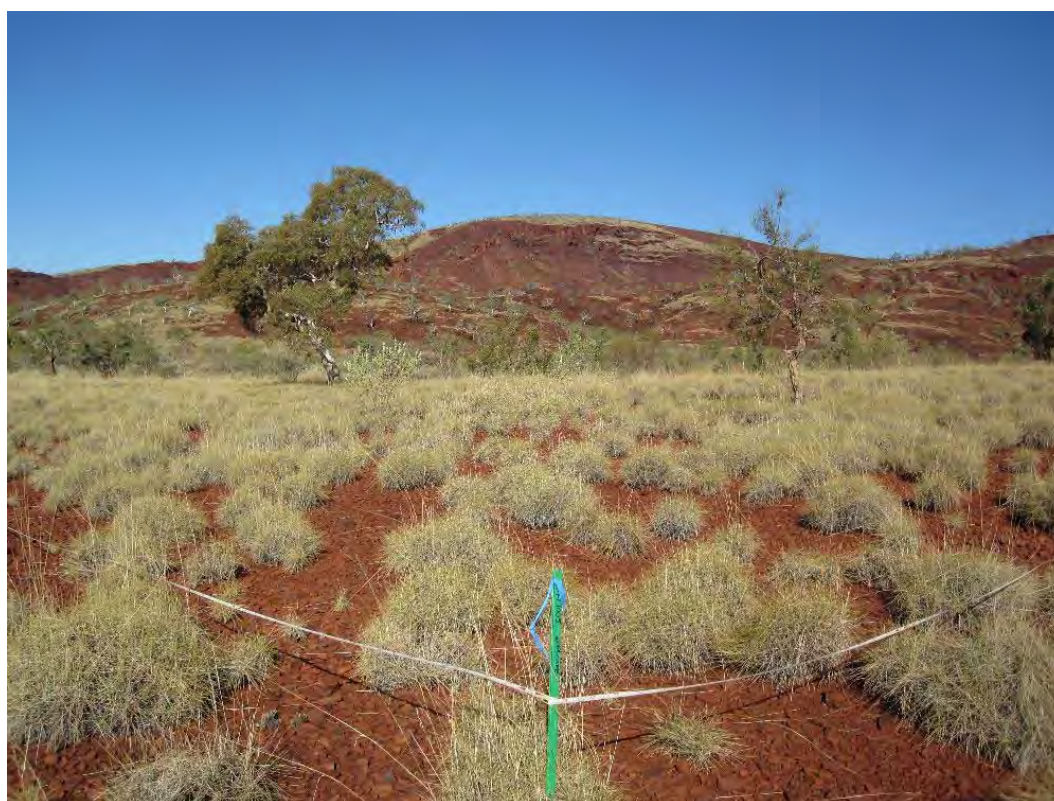
*Cucumis maderaspatanus*

#### Cover of dominant species (%)



Species	Cover of dominant species (%)
<i>Cymbopogon ambiguus</i>	
<i>Dodonaea coriacea</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Ehretia saligna</i> var. <i>saligna</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Euphorbia alsiniflora</i>	
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia muelleriana</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1
<i>Hybanthus aurantiacus</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia</i> sp. (FL1004)	
<i>Mirbelia viminalis</i>	
<i>Mnesithea formosa</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus auriculifolius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna notabilis</i>	
<i>Sida</i> sp. articulation below (A.A. Mitchell PRP 1605)	
<i>Solanum ?lasiophyllum</i>	
<i>Tephrosia spechtii</i>	
<i>Themeda triandra</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	15
<i>Triodia wiseana</i>	
<i>Triumfetta maconochieana</i>	
<i>Waltheria virgata</i>	
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1005	
Described by	HEH	26/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	5502528 mE 7551527 mN	
Season	Poor (2010), Good (2011)		
Habitat	Very gentle, south east facing, upper slope and crest of very low hill		
Soil	No soil exposed		
Rock Type	Ironstone		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>C. hamersleyana</i> low open woodland over <i>Triodia wiseana</i> mid-dense hummock grassland		
NVIS V	U ^ <i>Corymbia deserticola</i> subsp. <i>deserticola</i> , ^ <i>C. hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	5% leaf litter, litter 1-2 cm deep, 80% bare ground, no weed cover No evidence of human disturbance		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	1
<i>Acacia maitlandii</i>	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia retivenea</i>	
<i>Amaranthus undulatus</i>	
<i>Aristida holathera</i> var. <i>latifolia</i>	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	<2
<i>Corymbia hamersleyana</i>	<2
<i>Cucumis maderaspatanus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	

Species	Cover of dominant species (%)
<i>Eriachne aristidea</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Fimbristylis simulans</i>	
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	
<i>Goodenia stobbsiana</i>	
<i>Hakea chordophylla</i>	
<i>Hibiscus leptocladus</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Rhynchosia minima</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Solanum phlomoides</i>	
<i>Themeda triandra</i>	
<i>Triodia wiseana</i>	48

Site		FL1006	
Described by	LJA	26/05/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
Re-score	JKN	26/03/11	
MGA Zone	GDA94 50	552113 mE 7551703 mN	
Season	Poor (2010), Good (2011)		
Habitat	Flat valley floor with some incised minor drainages		
Soil	Red clay loam with loose rock		
Rock Type	Ironstone		
Vegetation Description	<i>Eucalyptus gamophylla</i> low open woodland over <i>Acacia dictyophleba</i> , <i>A. monticola</i> , <i>A. pyrifolia</i> and <i>A. atkinsiana</i> tall open shrubland over <i>Triodia epactia</i> and <i>T. wiseana</i> hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> and <i>Themeda triandra</i> very open tussock grassland with <i>Corymbia hamersleyana</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> , <i>Corymbia hamersleyana</i> \^tree\6r;M ^ <i>Acacia dictyophleba</i> , ^ <i>A. monticola</i> , <i>A. pyrifolia</i> \^shrub\4c;G+ ^ <i>Triodia epactia</i> , <i>T. wiseana</i> , <i>Aristida holathera</i> var. <i>holathera</i> \^hummock grass, tussock grass\2i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	2% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover No evidence of human disturbance		

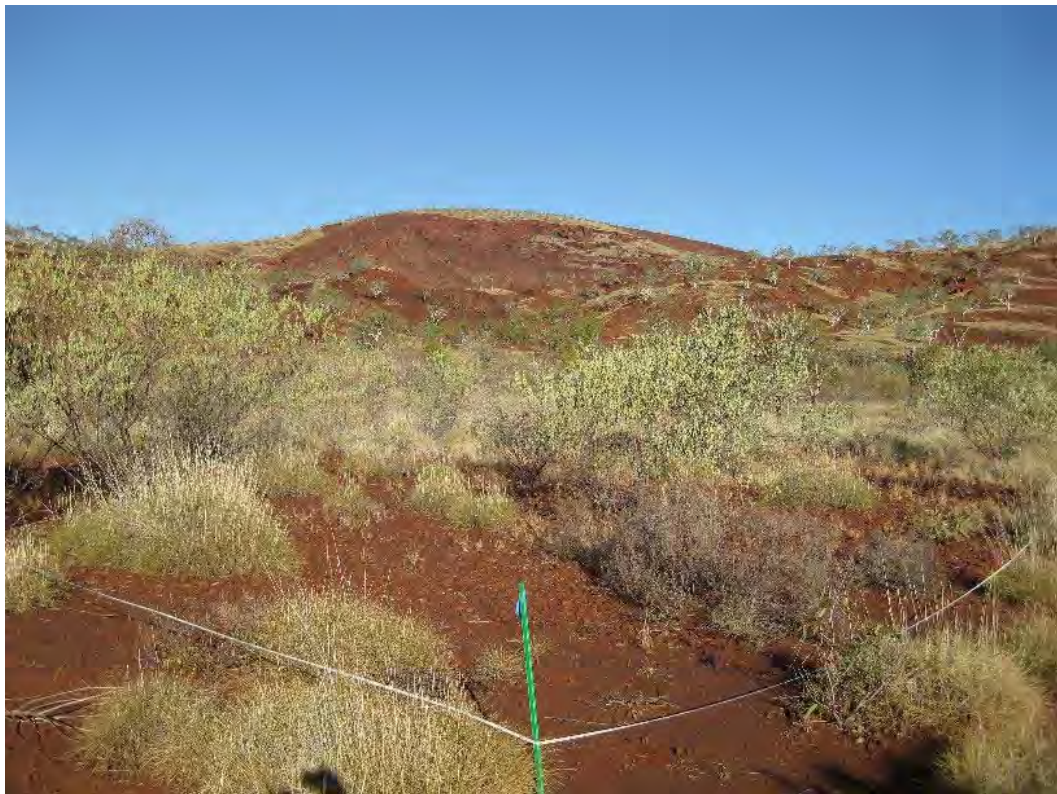


Species	Cover of dominant species (%)
<i>Abutilon dioicum</i>	
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia atkinsiana</i>	
<i>Acacia dictyophleba</i>	1
<i>Acacia monticola</i>	1
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia tenuissima</i>	
<i>Amaranthus undulatus</i>	
<i>Aristida holathera</i> var. <i>holathera</i>	2
<i>Bidens bipinnata</i>	
<i>Bulbostylis barbata</i>	

Species	Cover of dominant species (%)
<i>Cassytha capillaris</i>	
<i>Cenchrus ciliaris</i>	
<i>Cleome viscosa</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	1
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	
<i>Digitaria brownii</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Enneapogon lindleyanus</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus gamophylla</i>	2
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia microptera</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Grevillea wickhamii</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Mirbelia viminalis</i>	
<i>Mnesithea formosa</i>	
<i>Mollugo molluginea</i>	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus auriculifolius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Rhynchosia minima</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	

Species	Cover of dominant species (%)
<i>Solanum diversiflorum</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Themeda triandra</i>	2
<i>Tribulus hirsutus</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	15
<i>Triodia wiseana</i>	2
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1007	
Described by	LJA	26/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	550653 mE 7551357 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor with minor drainage channels		
Soil	Red clay loam		
Rock Type	Ironstone. 50-90% rock cover of sub-angular tabular to sub-rounded tabular shape		
Vegetation Description	<i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>A. retivenea</i> tall open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland		
NVIS V	M ^ <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>A. retivenea</i> \^shrub\4\;G+ ^ <i>Triodia epactia</i> \^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	5% leaf litter, litter <1 cm deep, 60% bare ground, no weed cover No evidence of human disturbance		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	2
<i>Acacia elachantha</i>	
<i>Acacia elachantha</i> (golden hairy variant)	
<i>Acacia maitlandii</i>	
<i>Acacia monticola</i>	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia retivenea</i>	2
<i>Acacia tenuissima</i>	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	2
<i>Amaranthus undulatus</i>	
<i>Aristida holathera</i> var. <i>holathera</i>	
<i>Aristida holathera</i> var. <i>latifolia</i>	

Species	Cover of dominant species (%)
<i>Boerhavia coccinea</i>	
<i>Bonamia rosea</i>	
<i>Cleome viscosa</i>	
<i>Corchorus</i> aff. <i>parviflorus</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	
<i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>	
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eragrostis cumingii</i>	
<i>Eriachne aristidea</i>	
<i>Eucalyptus gamophylla</i>	
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Fimbristylis simulans</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia triodiophila</i>	
<i>Gossypium australe</i>	
<i>Grevillea wickhamii</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Hibiscus leptocladus</i>	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Paspalidium clementii</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Swainsona formosa</i>	
<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	1
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	3.5
<i>Triodia wiseana</i>	1



Site		FL1008	
Described by	LJA	26/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	550406 mE 7551904 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle mostly north facing upper slope to crest of low rise in valley		
Soil	Red skeletal loamy clay with rock fragments		
Rock Type	Ironstone. 70-100% surface rock of rounded to sub-angular shape and 2-10% outcropping		
Vegetation Description	<i>Triodia wiseana</i> hummock grassland with <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees over <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> scattered tall shrubs over <i>Acacia maitlandii</i> scattered shrubs		
NVIS V	U ^ <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6;c;M ^ <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> , ^ <i>Acacia maitlandii</i> ^shrub\4;r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\2 i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover Several seedling <i>Acacia maitlandii</i> and many dead <i>Gompholobium</i> sp. Pilbara		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia dictyophleba*

*Acacia maitlandii*

*Acacia monticola*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Acacia tenuissima*

*Aristida holathera* var. *holathera*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Cassytha capillaris*

*Corymbia hamersleyana*

1

1

Species	Cover of dominant species (%)
<i>Cucumis melo</i> subsp. <i>agrestis</i>	
<i>Cymbopogon ambiguus</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Fimbristylis simulans</i>	
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia stobbsiana</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1
<i>Hakea chordophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus calostachyus</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	
<i>Triodia wiseana</i>	20
<i>Triumfetta maconochieana</i>	

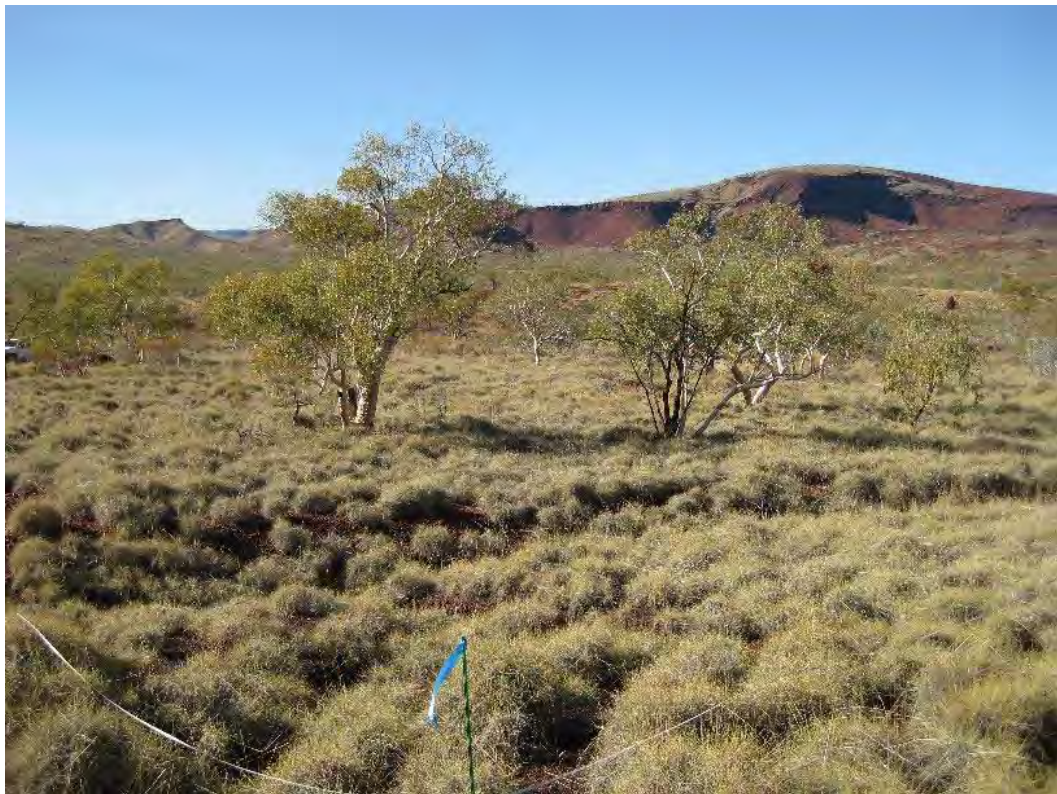
Site		FL1009	
Described by	HEH	26/05/10	Quadrat 40 m x 63 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	550768 mE 7551888 mN	
Season	Poor (2010), Good (2011)		
Habitat	Slightly undulating valley floor		
Soil	Stony silty loam		
Rock Type	Red to dark reddish brown pisolite and lag gravel		
Vegetation Description	<i>Eucalyptus gamophylla</i> and <i>E. leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>A. elachantha</i> tall open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Aristida</i> (FL1009) very open tussock grassland with <i>Acacia dictyophleba</i> and <i>Acacia retivenea</i> scattered shrubs		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\7\r;M ^ <i>Acacia tumida</i> var. <i>pilbarensis</i> , ^ <i>A. elachantha</i> , <i>A. dictyophleba</i> \^shrub\4\r;G+ ^ <i>Triodia epactia</i> , <i>Aristida</i> sp. (FL1009)\^hummock grass, tussock grass\2\i		
Vegetation Condition	Very Good		
Fire Age	>5 years	No evidence of recent fire	
Notes	2% leaf litter, litter 0-2 cm deep, 70% bare ground, no weed cover Disturbance type: Minor clearing (ripped track through quadrat)		



Species	Cover of dominant species (%)
<i>Acacia dictyophleba</i>	1
<i>Acacia elachantha</i> (golden hairy variant)	1
<i>Acacia elachantha</i> (silvery hairy variant)	
<i>Acacia maitlandii</i>	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia retivenea</i>	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	1
<i>Aristida holathera</i> var. <i>latifolia</i>	
<i>Aristida</i> sp. (FL1009)	8
<i>Bonamia rosea</i>	
<i>Cleome viscosa</i>	

Species	Cover of dominant species (%)
<i>Corchorus</i> aff. <i>parviflorus</i>	
<i>Cucumis maderaspatanus</i>	
<i>Eragrostis</i> aff. <i>eriopoda</i>	
<i>Eriachne aristidea</i>	
<i>Eucalyptus gamophylla</i>	7
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Heliotropium ovalifolium</i>	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paspalidium clementii</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna</i> sp.	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Tribulopsis angustifolia</i>	
<i>Tribulus hirsutus</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	20
<i>Triumfetta maconochieana</i>	

Site		FL10010	
Described by	LJA	27/05/10	Quadrat 50 m x 50 m
Re-score	JKN	31/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	550324 mE 7552725 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle south facing footslope of steep hill		
Soil	Red skeletal clay loam		
Rock Type	Ironstone. Continuous lag gravel		
Vegetation Description	<i>Triodia wiseana</i> mid-dense hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\2\c		
Vegetation Condition	Very Good		
Fire Age	>5 years	Adjacent to recently burnt area (Feb/Mar)	
Notes	<1% leaf litter, litter <1 cm deep, 50% bare ground, no weed cover No evidence of human disturbance		



#### Species

#### Cover of dominant species (%)

*Acacia hamersleyensis*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia tenuissima*

*Amyema* sp.

*Aristida holathera* var. *holathera*

*Cassytha capillaris*

*Cleome viscosa*

*Corymbia hamersleyana*

*Crotalaria novae-hollandiae* subsp. *novae-hollandiae*

*Cymbopogon obtectus*

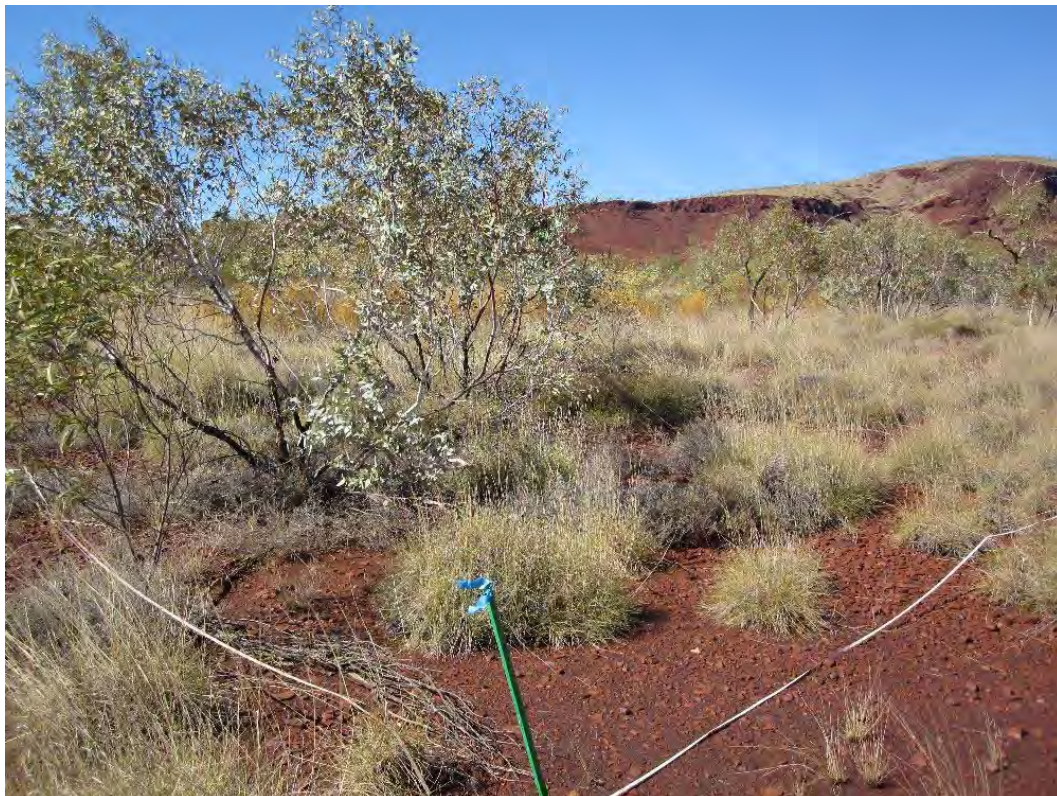
*Dampiera candidans*

*Diplatia grandibractea*

*Dodonaea coriacea*

Species	Cover of dominant species (%)
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1.5
<i>Fimbristylis simulans</i>	
<i>Hakea chordophylla</i>	
<i>Indigofera monophylla</i>	
<i>Isotropis atropurpurea</i>	
<i>Paspalidium clementii</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Setaria surgens</i>	
<i>Themeda triandra</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	
<i>Triodia wiseana</i>	50

Site		FL1011	
Described by	HEH	27/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	551298 mE 7551968 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	No soil exposed		
Rock Type	Ironstone		
Vegetation Description	<i>Eucalyptus gamophylla</i> and <i>E. leucophloia</i> subsp. <i>leucophloia</i> low woodland over <i>Acacia elachantha</i> tall open shrubland over <i>Mirbelia viminialis</i> open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland with <i>Aristida holathera</i> var. <i>holathera</i> scattered tussock grasses		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> , <i>E. leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;M ^ <i>Mirbelia viminialis</i> , <i>Acacia elachantha</i> ^shrub\4\r;G+ ^ <i>Triodia epactia</i> , <i>Aristida holathera</i> var. <i>holathera</i> ^hummock grass, tussock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>2 years	Charred stumps and logs	
Notes	16% leaf litter, litter 1 cm deep, 60% bare ground, no weed cover No evidence of human disturbance Very minor <i>Mirbelia viminialis</i> drainage line		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia ancistrocarpa*

*Acacia arida*

*Acacia dictyophleba*

*Acacia elachantha*

2

*Acacia hamersleyensis*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia tenuissima*

*Aristida holathera* var. *holathera*

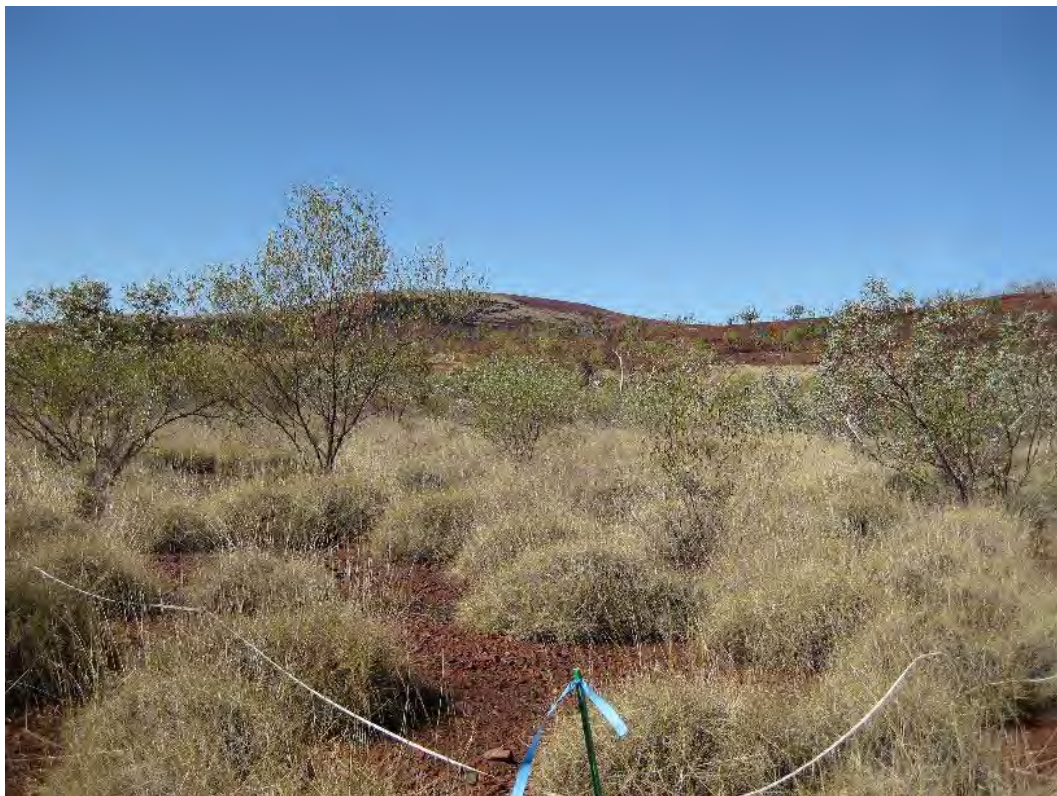
1

*Cleome viscosa*

Species	Cover of dominant species (%)
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	
<i>Corymbia hamersleyana</i>	2
<i>Cucumis melo</i> subsp. <i>agrestis</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus gamophylla</i>	8
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4
<i>Fimbristylis simulans</i>	
<i>Goodenia nuda</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i> (Whim Creek form)	
Indeterminant spp.	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Mirbelia viminalis</i>	2.5
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus fusiformis</i>	
<i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Themeda triandra</i>	
<i>Tribulus hirsutus</i>	
<i>Triodia epactia</i>	32



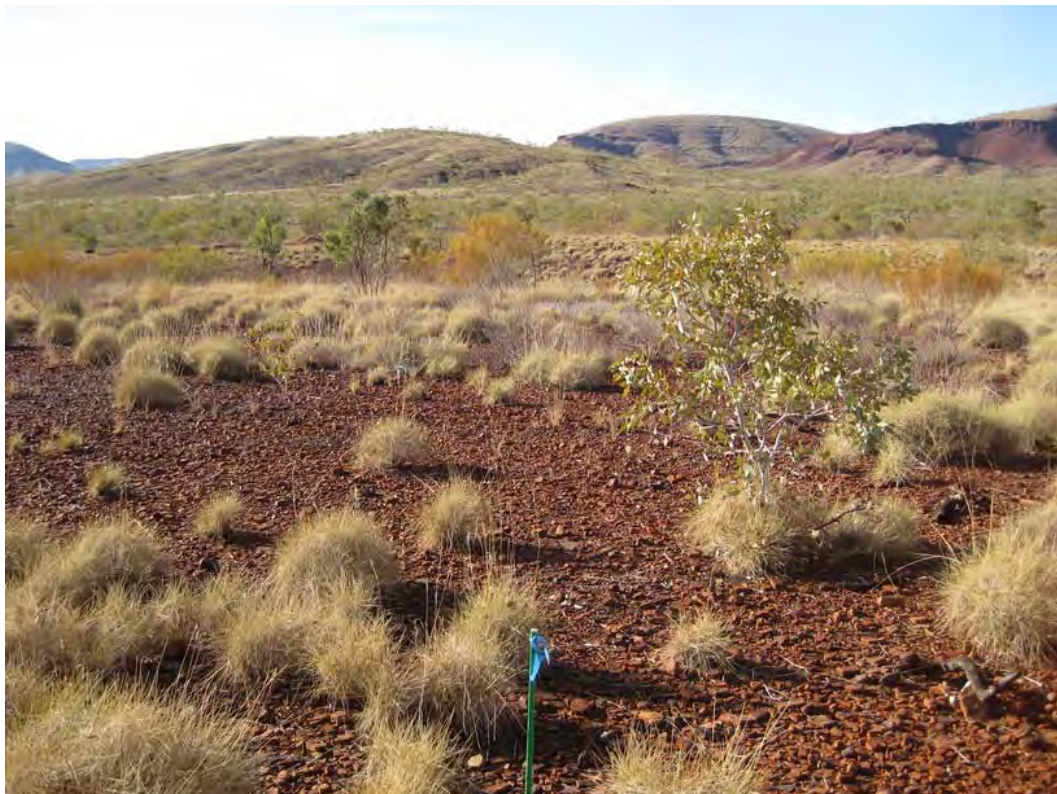
Site		FL10012	
Described by	LJA	27/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	HEH	26/03/11	
MGA Zone	GDA94 50	549664 mE 7551917 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Dark brownish clay loam		
Rock Type	Alluvial. 50-90% pebbles to cobbles, of sub-angular to sub-rounded shape		
Vegetation Description	<i>Eucalyptus gamophylla</i> low open woodland over <i>Acacia dictyophleba</i> and <i>A. retivenea</i> tall open shrubland over <i>Triodia epactia</i> hummock grassland		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> ^tree\6\r;M ^ <i>Acacia dictyophleba</i> , <i>A. retivenea</i> ^shrub\4\r;G+ ^ <i>Triodia epactia</i> ^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5years	No evidence of recent fire	
Notes	5% leaf litter, litter 1-2 cm deep, 75% bare ground, no weed cover No evidence of human disturbance		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	5
<i>Acacia elachantha</i>	
<i>Acacia monticola</i>	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia retivenea</i>	5
<i>Acacia tumida</i> var. <i>pilbarensis</i>	
<i>Amyema</i> sp.	
<i>Aristida holathera</i> var. <i>holathera</i>	
<i>Boerhavia coccinea</i>	
<i>Bonamia rosea</i>	
<i>Cleome viscosa</i>	

Species	Cover of dominant species (%)
<i>Corymbia hamersleyana</i>	
<i>Cucumis melo</i> subsp. <i>agrestis</i>	
<i>Cymbopogon ambiguus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eucalyptus gamophylla</i>	6
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Goodenia microptera</i>	
<i>Hakea chordophylla</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Paraneurachne muelleri</i>	
<i>Paspalidium clementii</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus polystachyus</i>	
<i>Rhynchosia minima</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Senna venusta</i>	
<i>Sida</i> aff. <i>pilbarensis</i> (EOB46-01B)	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia epactia</i>	25

Site		FL10013	
Described by Re-score	HEH	27/05/10	Quadrat 50 m x 50 m
	HEH	30/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	551028 mE 7553232 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle south east facing upper slope to crest of low undulating hill		
Soil	No soil exposed		
Rock Type	Ironstone. Abundant red small to large pebbles of sub-angular tabular to sub-rounded tabular shape		
Vegetation Description	<i>Triodia wiseana</i> mid-dense hummock grassland with <i>Corymbia deserticola</i> subsp. <i>deserticola</i> , <i>C. hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Hakea chordophylla</i> low scattered trees with <i>Acacia tenuissima</i> scattered shrubs		
NVIS V	U ^ <i>Hakea chordophylla</i> , <i>Corymbia deserticola</i> subsp. <i>deserticola</i> , <i>C. hamersleyana</i> ^tree\6\r;M ^ <i>Acacia tenuissima</i> ^shrub\3\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>2 years	Surrounded by recent (Feb/Mar 2010) fire	
Notes	<2% leaf litter, litter <1 cm deep, 55% bare ground, no weed cover No evidence of human disturbance within quadrat, though close to drill lines Old pebble mouse mound. <i>Gompholobium</i> sp. Pilbara would make a shrub layer if alive but the majority was dead at this time.		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	
<i>Acacia elachantha</i>	
<i>Acacia retivenea</i>	
<i>Acacia tenuissima</i>	<2
<i>Aristida holathera</i> var. <i>holathera</i>	
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	1
<i>Corymbia hamersleyana</i>	
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	

<i>Dodonaea coriacea</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Eulalia aurea</i>	
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
<i>Fimbristylis simulans</i>	
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	
<i>Goodenia stobbsiana</i>	
<i>Hakea chordophylla</i>	3
<i>Hybanthus aurantiacus</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	1
<i>Mollugo molluginea</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Sida arenicola</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	
<i>Triodia wiseana</i>	40
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL10014	
Described by Re-score	LJA	27/05/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	551590 mE 7552884 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor (no association with drainage)		
Soil	Red clay loam		
Rock Type	Ironstone. Pebbles to cobbles		
Vegetation Description	<i>Triodia epactia</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees over <i>Eucalyptus gamophylla</i> scattered low mallee over <i>Acacia ancistrocarpa</i> , <i>A. tumida</i> , var. <i>pilbarensis</i> , <i>A. tenuissima</i> and <i>A. pyrifolia</i> scattered shrubs		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Eucalyptus gamophylla</i> ^tree, tree mallee\6\;M ^^ <i>Acacia ancistrocarpa</i> , <i>A. tumida</i> var. <i>pilbarensis</i> , <i>A. tenuissima</i> \shrub\3\;G+ ^ <i>Triodia epactia</i> ^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5 years	Old fire scars on trees	
Notes	2% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover No evidence of human disturbance Several dead <i>Acacia tumida</i> (drought?)		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia ancistrocarpa*

<1

*Acacia dictyophleba*

*Acacia pyrifolia* var. *pyrifolia*

<1

*Acacia tenuissima*

*Acacia tumida* var. *pilbarensis*

<1

*Aristida holathera* var. *holathera*

*Aristida holathera* var. *latifolia*

*Cleome viscosa*

*Corchorus lasiocarpus*

*Eriachne ciliata*

Species	Cover of dominant species (%)
<i>Eucalyptus gamophylla</i>	1
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Goodenia stobbsiana</i>	
<i>Hakea chordophylla</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Paspalidium clementii</i>	
<i>Polycarpaea holtzei</i>	
<i>Polygala</i> aff. <i>isingii</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Rhyncharrhena linearis</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Sida</i> aff. <i>echinocarpa</i> (MET 15,350)	
<i>Solanum ?lasiophyllum</i>	
<i>Solanum diversiflorum</i>	
<i>Themeda triandra</i>	
<i>Triodia epactia</i>	20
<i>Triodia wiseana</i>	

Site		FL10015	
Described by	HEH	27/05/10	Quadrat 50 m x 50 m
Re-score	HEH	28/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	550589 mE	7554900 mN
Season	Poor (2010), Good (2011)		
Habitat	Gentle to moderate east facing mid slope of tall hill		
Soil	No soil exposed		
Rock Type	Ironstone. Blackish red small pebbles to stones of subrounded shape		
Vegetation Description	<i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia epactia</i> hummock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , ^ <i>Corymbia hamersleyana</i> \^tree\6\r; G+ ^ <i>Triodia epactia</i> \^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5 yrs, 5% <1 yr	Feb/Mar 2010 in NW corner (5% of quadrat) . Fire scars through area	
Notes	5% leaf litter, litter 1-2 cm deep (around trees), 83% bare ground, no weed cover No evidence of human disturbance		



**Species**

**Cover of dominant species (%)**

- Aristida holathera* var. *latifolia*
- Bonamia* sp. Dampier (A.A. Mitchell PRP 217)
- Cleome viscosa*
- Corchorus incanus* subsp. *incanus*
- Corchorus lasiocarpus* subsp. *parvus*
- Corymbia hamersleyana*
- Cucumis maderaspatanus*
- Cymbopogon ambiguus*
- Dampiera candidans*
- Dysphania rhadinostachya* subsp. *rhadinostachya*
- Eriachne aristidea*

2

Species	Cover of dominant species (%)
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2
<i>Fimbristylis simulans</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
Indeterminant spp.	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus calostachyus</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Tephrosia</i> aff. <i>supina</i> (HD133-20)	
<i>Triodia epactia</i>	15
<i>Waltheria virgata</i>	



Site		FL10016	
Described by	HEH	27/05/10	Quadrat 50 m x 50 m
Re-score	HEH	28/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	551133 mE 7555133 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate east facing upper slope of east west spur		
Soil	No soil exposed		
Rock Type	Banded Ironstone. 50-90% rock of angular tabular to sub-rounded tabular shape with 10-30% outcropping,		
Vegetation Description	<i>Triodia wiseana</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees over <i>Eriachne mucronata</i> scattered tussock grasses		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r;G+ ^ <i>Triodia wiseana</i> , <i>Eriachne mucronata</i> ^hummock grass, tussock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	Mostly >5 year	5% of quadrat (SW corner) <1 year (Feb/Mar 2010)	
Notes	<1% leaf litter, litter <1 cm deep, 70% bare ground, no weed cover No evidence of human disturbance A few dead low shrubs		



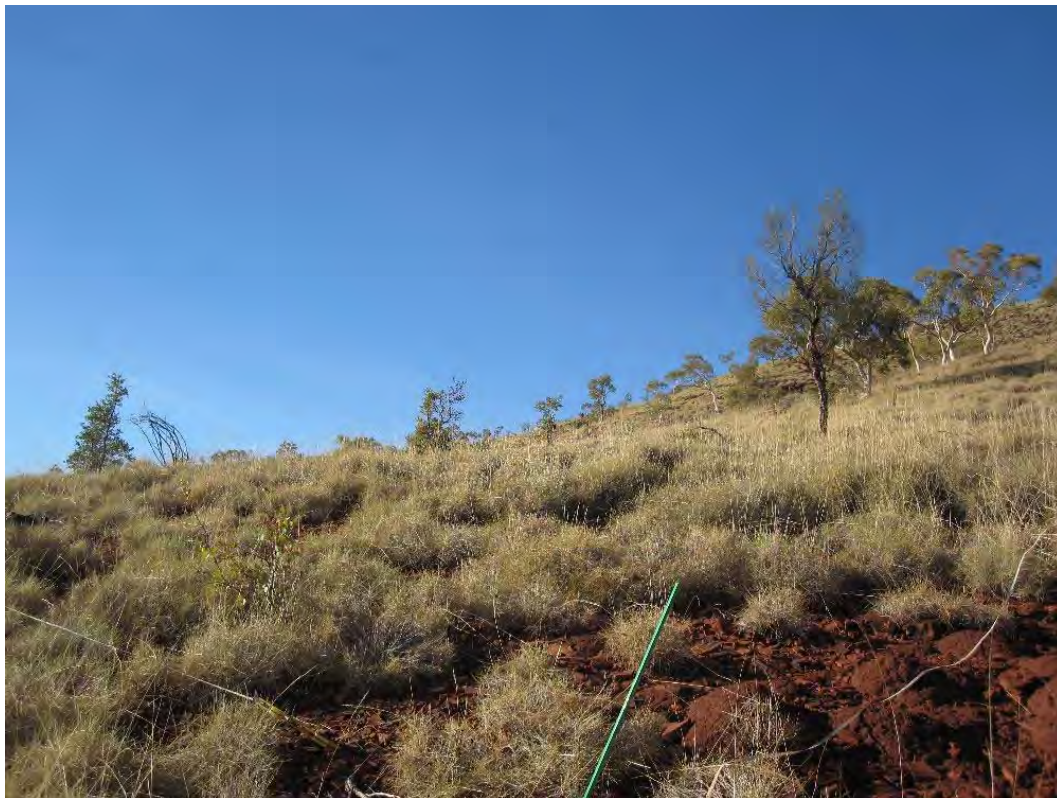
**Species**

**Cover of dominant species (%)**

- Acacia atkinsiana*
- Acacia dictyophleba*
- Acacia maitlandii*
- Acacia monticola*
- Acacia pyrifolia* var. *pyrifolia*
- Acacia tenuissima*
- Acacia tumida* var. *pilbarensis*
- Aristida holathera* var. *latifolia*
- Bonamia* sp. Dampier (A.A. Mitchell PRP 217)
- Bulbostylis barbata*
- Cleome viscosa*

<i>Corchorus incanus</i> subsp. <i>incanus</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	
<i>Cymbopogon ambiguus</i>	
<i>Dampiera candicans</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Euphorbia alsiniflora</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia stobbsiana</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Hakea chordophylla</i>	
<i>Hybanthus aurantiacus</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polygala</i> aff. <i>isingii</i>	
<i>Ptilotus astrolasius</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Tephrosia</i> aff. <i>supina</i> (HD133-20)	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia wiseana</i>	30
<i>Triumfetta maconochieana</i>	
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL10017	
Described by Re-score	HEH	28/05/10	Quadrat 50 m x 50 m
	JKN	28/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	550652 mE 7555642 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate to steep north facing midslope of tall hill		
Soil	No soil exposed		
Rock Type	Banded Ironstone. Red and black small to large pebbles and outcropping		
Vegetation Description	<i>Triodia wiseana</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\r; G+ ^ <i>Triodia wiseana</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>2 years	A few charred stags	
Notes	1% leaf litter, litter <1 cm deep, 30% bare ground, no weed cover No evidence of human disturbance <i>Cymbopogon ambiguus</i> on steeper south east facing slope of quadrat in the north east corner.		



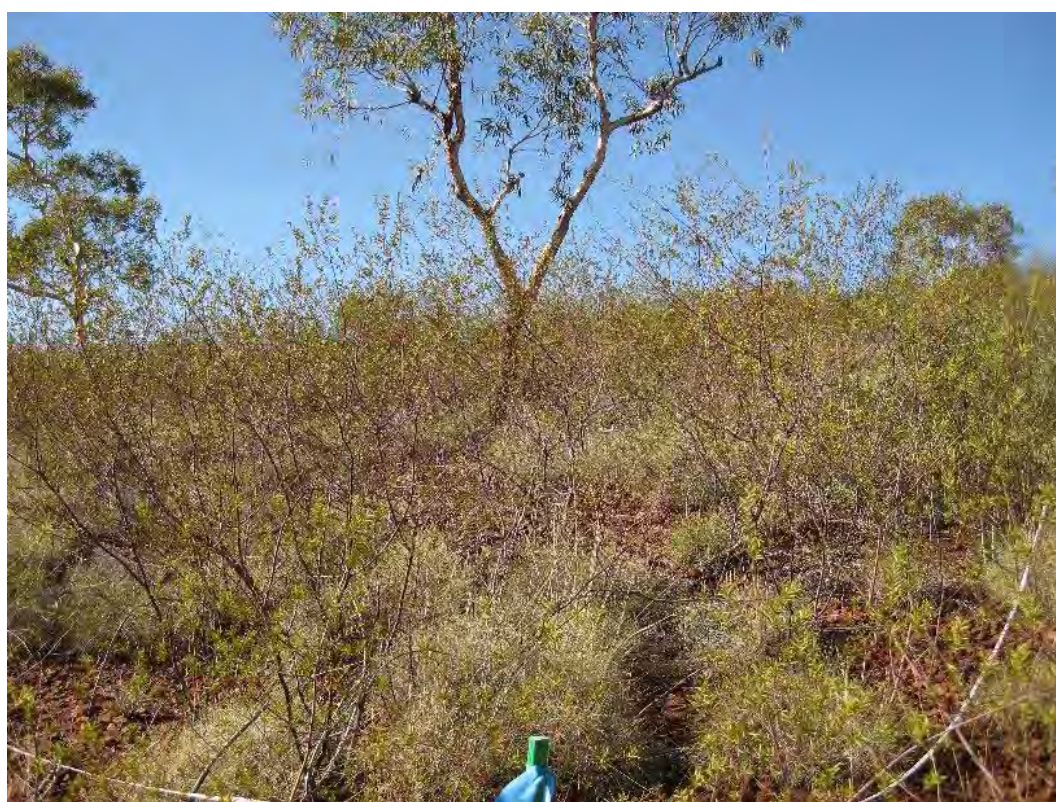
**Species**

**Cover of dominant species (%)**

- Acacia dictyophleba*
- Acacia elachantha*
- Acacia inaequilatera*
- Acacia maitlandii*
- Acacia retivenea*
- Acacia tenuissima*
- Acacia trudgeniana*
- Bonamia* sp. Dampier (A.A. Mitchell PRP 217)
- Cleome viscosa*
- Cucumis maderaspatanus*
- Cymbopogon ambiguus* 3
- Dysphania rhadinostachya* subsp. *rhadinostachya*
- Eriachne aristidea*

Species	Cover of dominant species (%)
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Fimbristylis simulans</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Hakea chordophylla</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna ferraria</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Senna notabilis</i>	
<i>Tephrosia stipuligera</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia wiseana</i>	65
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL10018	
Described by	LJA	28/05/10	Quadrat 50 m x 50 m
Re-score	HEH	28/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	551317 mE 7555785 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle north facing lower slope		
Soil	Red skeletal loam		
Rock Type	Banded Ironstone. <90% Red and black small to large pebbles of angular tabular to sub-rounded tabular shape with 2% outcropping		
Vegetation Description	<i>Acacia maitlandii</i> shrubland over <i>Triodia wiseana</i> open hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\6\;M+ ^ <i>Acacia maitlandii</i> ^shrub\3\;G ^ <i>Triodia wiseana</i> ^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5 years	A few charred stags	
Notes	<1% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover No evidence of human disturbance		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	1
<i>Acacia maitlandii</i>	15
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia trachycarpa</i>	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	
<i>Corymbia hamersleyana</i>	
<i>Dodonaea coriacea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1

**Species****Cover of dominant species (%)***Fimbristylis simulans**Goodenia stobbsiana**Indigofera monophylla**Isotropis atropurpurea**Jasminum didymum* subsp. *lineare**Oldenlandia crouchiana**Paraneurachne muelleri**Polycarpaea corymbosa* var. *corymbosa**Polycarpaea holtzei**Polycarpaea longiflora**Ptilotus astrolasius**Ptilotus calostachyus**Ptilotus fusiformis**Senna glutinosa* subsp. *glutinosa**Senna notabilis**Tephrosia spechtii**Triodia wiseana*

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*Triumfetta maconochieana**Yakirra australiensis* var. *australiensis*

Site		FL1019	
Described by Re-score	HEH	28/05/10	Quadrat 50 m x 50 m
	JKN	28/08/10	
	JKN	26/03/11	
MGA Zone	GDA94 50	550840 mE 7556114 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	No soil exposed		
Rock Type	Ironstone. Blackish red medium pebbles to cobbles		
Vegetation Description	<i>Corymbia hamersleyana</i> low open woodland over <i>Triodia wiseana</i> and <i>T. epactia</i> closed hummock grassland with <i>Acacia inaequilatera</i> tall scattered shrubs over <i>Acacia maitlandii</i> scattered shrubs		
NVIS V	U ^ <i>Corymbia hamersleyana</i> ^tree\6\;M ^ <i>Acacia inaequilatera</i> , ^ <i>A. maitlandii</i> \^shrub\4\;G+ ^ <i>Triodia wiseana</i> , <i>T. epactia</i> ^hummock grass\2\c		
Vegetation Condition	Very Good		
Fire Age	>2 years	Charred stags	
Notes	4% leaf litter, litter 1-10 cm deep, 15% bare ground, no weed cover Disturbance type: Minor clearing (old tracks) <i>Triodia</i> very high. Gully in north west corner (though outside quadrat). Very minor drainages (sinks) throughout quadrat where water would pool.		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia elachantha*

*Acacia inaequilatera*

1

*Acacia maitlandii*

1

*Acacia pyrifolia* var. *pyrifolia*

1

*Acacia retivenea*

*Acacia tenuissima*

*Amaranthus undulatus*

*Aristida holathera* var. *latifolia*

*Boerhavia coccinea*

*Cleome viscosa*

Species	Cover of dominant species (%)
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corymbia hamersleyana</i>	5
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
<i>Cucumis maderaspatanus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus gamophylla</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia alsiniflora</i>	
<i>Fimbristylis simulans</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia nuda</i>	
<i>Gossypium australe</i>	
<i>Gossypium robinsonii</i>	
<i>Indigofera colutea</i>	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Mollugo molluginea</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus clementii</i>	
<i>Ptilotus fusiformis</i>	
<i>Rhynchosia minima</i>	
<i>Santalum lanceolatum</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Tephrosia stipuligera</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	5.5
<i>Triodia wiseana</i>	25



Site		FL1020	
Described by	LJA	28/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	551126 mE 7556101 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Red clay loam with discontinuous lag gravel		
Rock Type	Ironstone.		
Vegetation Description	<i>Triodia wiseana</i> and <i>T. epactia</i> mid-dense hummock grassland with <i>Acacia maitlandii</i> scattered shrubs		
NVIS V	M ^ <i>Acacia maitlandii</i> \^shrub\3\;G+ ^ <i>Triodia wiseana</i> , <i>T. epactia</i> \^hummock grass\2\i		
Vegetation Condition	Very Good		
Fire Age	>5 years	No evidence of recent fire	
Notes	1% leaf litter, litter <1 cm deep, 45% bare ground, no weed cover Disturbance type: Vehicle tyre tracks Most trees and shrubs are in minor drainage channel with <i>Triodia epactia</i>		



#### Species

#### Cover of dominant species (%)

*Acacia ancistrocarpa*  
*Acacia atkinsiana*  
*Acacia maitlandii*  
*Acacia tenuissima*  
*Acacia tumida* var. *pilbarensis*  
*Aristida holathera* var. *holathera*  
*Corymbia hamersleyana*  
*Eriachne mucronata* (typical form)  
*Eriachne pulchella* subsp. *dominii*  
*Eriachne* sp. (FL1020)  
*Eucalyptus gamophylla*  
*Eucalyptus leucophloia* subsp. *leucophloia*  
*Euphorbia australis*

1

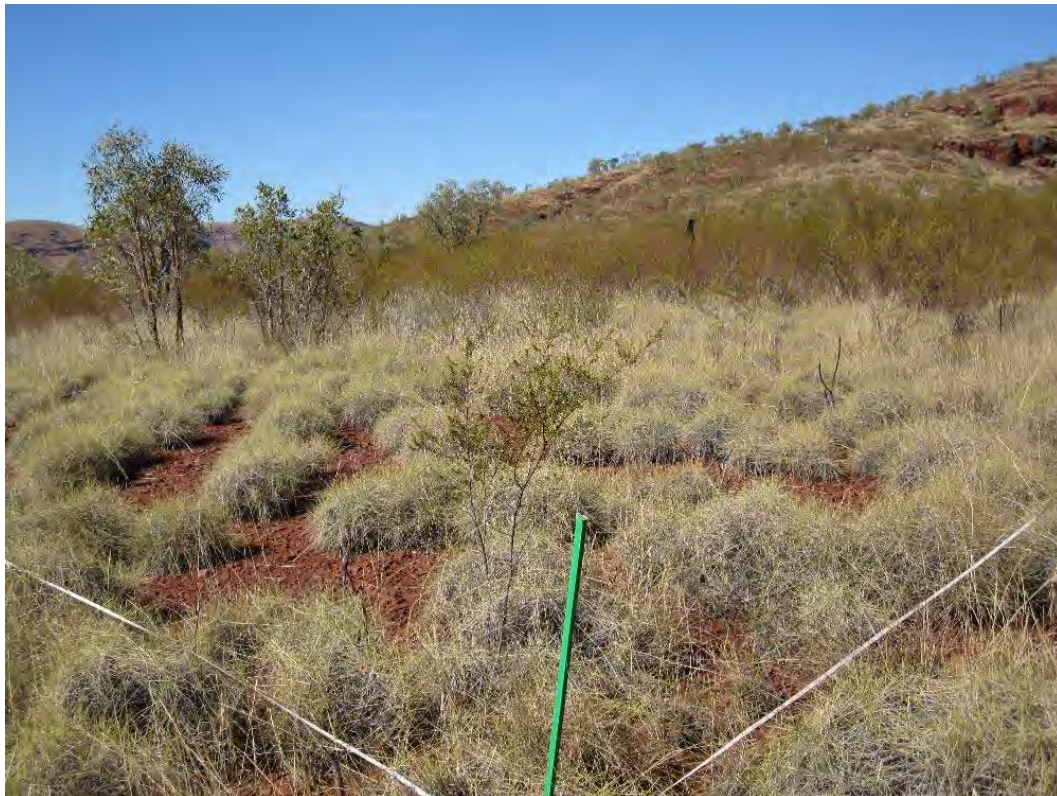
**Species****Cover of dominant species (%)**

*Euphorbia tannensis* subsp. *eremophila*  
*Evolvulus alsinoides* var. *villosicalyx*  
*Fimbristylis simulans*  
*Gompholobium* sp. Pilbara (N.F. Norris 908)  
*Grevillea wickhamii* subsp. *hispidula*  
*Keraudrenia nephrosperma*  
*Keraudrenia velutina* subsp. *elliptica*  
*Mollugo molluginea*  
*Polycarpaea holtzei*  
*Polygala* aff. *isingii*  
*Ptilotus astrolasius*  
*Ptilotus fusiformis*  
*Schizachyrium fragile*  
*Senna artemisioides* subsp. *oligophylla*  
*Senna glutinosa* subsp. *glutinosa*  
*Senna glutinosa* subsp. *pruinosa*  
*Trachymene oleracea* subsp. *oleracea*  
*Trichodesma zeylanicum* var. *zeylanicum*  
*Triodia epactia*  
*Triodia wiseana*  
*Yakirra australiensis* var. *australiensis*

5

15

Site		FL1021	
Described by Re-score	HEH	28/05/10	Quadrat 50 m x 50 m
	HEH	30/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	550942 mE 7556058 mN	
Season	Poor (2010), Good (2011)		
Habitat	Undulating valley floor		
Soil	No soil exposed		
Rock Type	Blackish red Ironstone		
Vegetation Description	<i>Acacia maitlandii</i> shrubland over <i>Triodia wiseana</i> and <i>T. epactia</i> hummock grassland with <i>Corymbia hamersleyana</i> scattered low trees		
NVIS V	U ^ <i>Corymbia hamersleyana</i> ^tree\6\r;M ^ <i>A. maitlandii</i> ^shrub\3\r;G+ ^ <i>Triodia wiseana</i> , <i>T. epactia</i> ^hummock grass\2\i		
Vegetation Condition	Very Good		
Fire Age	>2 years	Charred logs on ground	
Notes	<1% leaf litter, litter <1 cm deep, 75% bare ground, no weed cover No evidence of human disturbance besides the quadrat being situated very closely to a drill line		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia ancistrocarpa*

*Acacia atkinsiana*

*Acacia dictyophleba*

*Acacia maitlandii*

30

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Acacia tenuissima*

*Aristida holathera* var. *holathera*

*Bulbostylis barbata*

*Corymbia deserticola* subsp. *deserticola*

*Corymbia hamersleyana*

1

Species	Cover of dominant species (%)
<i>Cucumis maderaspatanus</i>	
<i>Dodonaea coriacea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
<i>Fimbristylis simulans</i>	
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Tinospora smilacina</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia epactia</i>	8
<i>Triodia wiseana</i>	12
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1022	
Described by	LJA	28/05/10	Quadrat 50 m x 50 m
Re-score	HEH	27/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	545209 mE 7553086 mN	
Season	Poor (2010), Good (2011)		
Habitat	undulating valley floor adjacent to drainage channel		
Soil	Red clay loam with discontinuous lag gravel		
Rock Type	Pebbles to rocks		
Vegetation Description	<i>Acacia elachantha</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> tall open shrubland over <i>Triodia epactia</i> open hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> tussock grass, <i>Paraneurachne muelleri</i> and <i>Themeda triandra</i> very open tussock grassland over Malvaceae sp. (FL1022) very open herbland with <i>Corymbia hamersleyana</i> and <i>C. deserticola</i> subsp. <i>deserticola</i> scattered low trees		
NVIS V	U ^ <i>Corymbia hamersleyana</i> ^tree\6r;M ^ <i>Acacia elachantha</i> , <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> ^shrub\4r;G+ ^ <i>Triodia epactia</i> , <i>Aristida holathera</i> var. <i>holathera</i> , Malvaceae sp. (FL1022) ^hummock grass, tussock grass, forb\2i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	5% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover No evidence of human disturbance		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	
<i>Acacia elachantha</i>	4
<i>Acacia retivenea</i>	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	3
<i>Aristida holathera</i> var. <i>holathera</i>	5
<i>Boerhavia coccinea</i>	
<i>Bonamia rosea</i>	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Cleome viscosa</i>	

Species	Cover of dominant species (%)
<i>Corchorus</i> aff. <i>parviflorus</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	
<i>Corymbia hamersleyana</i>	1
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	
<i>Cymbopogon</i> sp. (FL1022)	2
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eragrostis</i> aff. <i>eriopoda</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus gamophylla</i>	
<i>Eulalia aurea</i>	
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Fimbristylis simulans</i>	
<i>Goodenia forrestii</i>	
<i>Goodenia microptera</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	2
<i>Heliotropium tenuifolium</i>	
<i>Hibiscus sturtii</i> var. <i>platyklamys</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Malvaceae</i> sp. (FL1022)	4
<i>Melhania</i> sp. (CH15-39)	
<i>Mollugo molluginea</i>	
<i>Paraneurachne muelleri</i>	2
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Rhynchosia minima</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna notabilis</i>	
<i>Solanum phlomoides</i>	

Species	Cover of dominant species (%)
<i>Themeda triandra</i>	2
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia epactia</i>	8
<i>Triodia wiseana</i>	
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1023	
Described by	HEH	28/05/10	Quadrat 50 m x 50 m
Re-score	HEH	27/08/10	
	HEH	25/3/11	
MGA Zone	GDA94 50	544588 mE 7552188 mN	
Season	Poor (2010), Good (2011)		
Habitat	Slightly undulating valley floor		
Soil	Stony silty clay loam		
Rock Type	Ironstone. Blackish red small pebbles to cobbles with pisolite layer		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> (trees), <i>E. gamophylla</i> (mallees) and <i>Corymbia hamersleyana</i> (mallees) low open woodland over <i>Triodia epactia</i> hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> very open tussock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>E. gamophylla</i> , <i>Corymbia hamersleyana</i> \^tree, tree mallee\6\r;G+ ^ <i>Triodia epactia</i> , <i>Aristida holathera</i> var. <i>holathera</i> \^hummock grass, tussock grass\2 i		
Vegetation Condition	Excellent		
Fire Age	>2 years	Though the NE corner burnt recently (Feb/Mar)	
Notes	% leaf litter, litter <1 cm deep, 75% bare ground, no weed cover No evidence of human disturbance Minor drainage through quadrat		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia dictyophleba*

*Acacia elachantha*

*Acacia monticola*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Acacia tumida* var. *pilbarensis*

*Aristida holathera* var. *holathera*

*Cleome viscosa*

*Corchorus* aff. *parviflorus*

*Corchorus* sp.



Species	Cover of dominant species (%)
<i>Corymbia hamersleyana</i>	1
<i>Cymbopogon ambiguus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus gamophylla</i>	2
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3
<i>Eulalia aurea</i>	
<i>Euphorbia</i> aff. <i>australis</i>	
<i>Fimbristylis simulans</i>	
<i>Goodenia microptera</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Hakea chordophylla</i>	
<i>Heliotropium tenuifolium</i>	
<i>Indigofera monophylla</i>	
<i>Isotropis atropurpurea</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	1
<i>Polycarpaea holtzei</i>	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Santalum lanceolatum</i>	
<i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Senna glaucifolia</i> x	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Senna notabilis</i>	
<i>Solanum diversiflorum</i>	
<i>Tribulus hirsutus</i>	
<i>Triodia</i> aff. <i>melvillei</i>	1
<i>Triodia epactia</i>	25
<i>Triodia wiseana</i>	

Site		FL1024	
Described by Re-score	HEH	28/05/10	Quadrat 50 m x 50 m
	JKN	27/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	546151 mE 7552937 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle south facing mid to upper slope of low hill		
Soil	No soil exposed		
Rock Type	Ironstone. Continuous brownish red lag gravel		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> mid-dense hummock grassland		
NVIS V	G+ ^ <i>Triodia</i> aff. <i>melvillei</i> ^hummock grass\2\c		
Vegetation Condition	Very Good		
Fire Age	>2 years	Charred logs on ground	
Notes	<1% leaf litter, litter <1 cm, 55% bare ground, no weed cover No evidence of human disturbance though site is surrounded by ripped drill lines, recent drill lines and drill pads.		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia dictyophleba*

*Acacia monticola*

*Acacia retivenea*

*Acacia tenuissima*

*Corymbia deserticola* subsp. *deserticola*

*Cucumis maderaspatanus*

*Cymbopogon ambiguus*

*Evolvulus alsinoides* var. *villosicalyx*

*Fimbristylis simulans*

*Gomphrena cunninghamii*

*Goodenia stobbsiana*

*Grevillea wickhamii* subsp. *hispidula*

**Species****Cover of dominant species (%)***Hakea chordophylla**Heliotropium tenuifolium**Jasminum didymum* subsp. *lineare**Mirbelia viminalis**Polycarpaea holtzei**Polygala* aff. *isingii**Ptilotus fusiformis**Schizachyrium fragile**Senna notabilis**Sida* sp. Pilbara (A.A. Mitchell PRP 1543)*Trachymene oleracea* subsp. *oleracea**Trichodesma zeylanicum* var. *zeylanicum**Triodia* aff. *melvillei*

45

*Triodia wiseana**Yakirra australiensis* var. *australiensis*

Site		FL1025	
Described by	HEH	29/05/10	Quadrat 50 m x 50 m
Re-score	HEH	27/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	543600 mE 7552496 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate to steep mid slope of large hill arm		
Soil	No soil exposed		
Rock Type	Ironstone		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Triodia epactia</i> mid-dense hummock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> ^tree\6r;G+ ^ <i>Triodia epactia</i> ^hummock grass\2\c		
Vegetation Condition	Very Good		
Fire Age	Mostly >2 years	3.5% burnt in Feb/Mar 2010	
Notes	1% leaf litter, litter <1 cm deep, 55% bare ground, no weed cover No evidence of human disturbance Various aspects of slopes		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia maitlandii*

*Acacia monticola*

*Acacia pyrifolia* var. *pyrifolia*

*Alternanthera nana*

*Aristida holathera* var. *latifolia*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Bulbostylis barbata*

*Clerodendrum floribundum* var. *angustifolium*

*Corchorus lasiocarpus* subsp. *parvus*

*Corchorus lasiocarpus* var. *lasiocarpus*

Species	Cover of dominant species (%)
<i>Corymbia hamersleyana</i>	<2
<i>Cymbopogon ambiguus</i>	
<i>Dampiera candidans</i>	
<i>Dodonaea coriacea</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4
<i>Euphorbia alsiniflora</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Goodenia cusackiana</i>	
<i>Goodenia microptera</i>	
<i>Goodenia muelleriana</i>	
<i>Gossypium robinsonii</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Hakea chordophylla</i>	
<i>Hibiscus</i> aff. <i>coatesii</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Mirbelia viminalis</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Senna notabilis</i>	
<i>Sida</i> sp. articulation below (A.A. Mitchell PRP 1605)	
<i>Solanum horridum</i>	
<i>Tephrosia</i> aff. <i>supina</i> (HD133-20)	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia epactia</i>	45
<i>Triodia wiseana</i>	
<i>Triumfetta maconochieana</i>	
<i>Waltheria virgata</i>	
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1026	
Described by	LJA	29/05/10	Quadrat 100 m x 25 m
Re-score	HEH	27/08/10	
	HEH	25/3/11	
MGA Zone	GDA94 50	543616 mE 7552563 mN	
Season	Poor (2010), Good (2011)		
Habitat	Steep to vertical east and west facing gully		
Soil	No soil exposed		
Rock Type	Ironstone		
Vegetation Description	<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Acacia monticola</i> , <i>A. pruinocarpa</i> and <i>Gossypium robinsonii</i> tall open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471) and <i>Cymbopogon ambiguus</i> open tussock grassland		
NVIS V	U ^ <i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\7r;M ^ <i>Acacia monticola</i> , ^ <i>A. pruinocarpa</i> and ^ <i>Gossypium robinsonii</i> \^shrub\2\c;G+ ^ <i>Triodia epactia</i> , <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471), <i>Cymbopogon ambiguus</i> \^hummock grass, tussock grass\3\c		
Vegetation Condition	Very Good		
Fire Age	>2 years	Charred logs on ground	
Notes	<1% leaf litter, litter <1 cm deep, 75% bare ground, no weed cover No evidence of human disturbance.		



Species	Cover of dominant species (%)
<i>Abutilon dioicum</i>	
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia maitlandii</i>	
<i>Acacia monticola</i>	2
<i>Acacia pruinocarpa</i>	2
<i>Acacia pyrifolia</i> var. <i>morrisonii</i>	
<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>	
<i>Aristida nitidula</i>	
<i>Astrotricha hamptonii</i>	
<i>Bidens bipinnata</i>	

Species	Cover of dominant species (%)
<i>Boerhavia coccinea</i>	
<i>Capparis spinosa</i> var. <i>nummularia</i>	
<i>Cheilanthes lasiophylla</i>	
<i>Cleome viscosa</i>	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corchorus crozophorifolius</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i>	1
<i>Corymbia hamersleyana</i>	
<i>Cucumis melo</i> subsp. <i>agrestis</i>	
<i>Cymbopogon ambiguus</i>	2
<i>Cyperus vaginatus</i>	
<i>Duperreya commixta</i>	
<i>Enneapogon intermedius</i>	
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia alsiniflora</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Ficus brachypoda</i>	
<i>Fimbristylis simulans</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
<i>Gomphrena cunninghamii</i>	
<i>Gossypium australe</i> (Whim Creek form)	
<i>Gossypium robinsonii</i>	2
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	
<i>Hakea chordophylla</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera fractiflexa</i>	
<i>Indigofera monophylla</i>	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Isotropis atropurpurea</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Paraneurachne muelleri</i>	
<i>Paspalidium clementii</i>	
<i>Paspalidium tabulatum</i>	
<i>Polycarpha corymbosa</i> var. <i>corymbosa</i>	
<i>Pterocaulon serrulatum</i>	
<i>Ptilotus fusiformis</i>	
<i>Ptilotus obovatus</i>	
<i>Rhagodia eremaea</i>	
<i>Santalum lanceolatum</i>	

Species	Cover of dominant species (%)
<i>Senna ferraria</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	
<i>Senna venusta</i>	
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	5
<i>Tinospora smilacina</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia epactia</i>	10-30
<i>Triodia wiseana</i>	



Site		FL1027	
Described by Re-score	HEH	29/05/10	Quadrat 100 m x 30 m
	JKN	27/08/10	
	HEH	25/3/11	
MGA Zone	GDA94 50	545948 mE 7550902 mN	
Season	Poor (2010), Good (2011)		
Habitat	Slight to steep rocky gorge		
Soil	No soil exposed		
Rock Type	Ironstone. Dark brown, blackish red medium pebbles to boulders of variable shapes		
Vegetation Description	<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Eucalyptus</i> sp. and <i>Brachychiton acuminatus</i> low woodland over <i>Triodia epactia</i> hummock grassland over <i>Eulalia aurea</i> , <i>Cymbopogon ambiguus</i> , <i>Themeda triandra</i> and <i>Eragrostis</i> aff. <i>eripoda</i> open tussock grassland with <i>Acacia monticola</i> scattered tall shrubs		
NVIS V	U ^ <i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Brachychiton acuminatus</i> \^tree\6\r;M ^ <i>Acacia monticola</i> \^shrub\3\r;G+ ^ <i>Triodia epactia</i> , <i>Eulalia aurea</i> , <i>Cymbopogon ambiguus</i> \^hummock grass, tussock grass\3\c		
Vegetation Condition	Excellent		
Fire Age	Mostly >2 years	One third recently burnt in Feb 2010	
Notes	>70% bare ground		



#### Species

#### Cover of dominant species (%)

*Abutilon dioicum*  
*Abutilon* sp. (FL1027)  
*Acacia inaequilatera*  
*Acacia monticola*  
*Acacia pruinocarpa*  
*Acacia pyrifolia* var. *pyrifolia*  
*Achyranthes aspera*  
*Alternanthera nana*  
*Amaranthus undulatus*  
*Amyema benthamii*  
*Aristida nitidula*

1.5

Species	Cover of dominant species (%)
<i>Astrotricha hamptonii</i>	
<i>Bidens bipinnata</i>	
<i>Brachychiton acuminatus</i>	1
<i>Capparis spinosa</i> var. <i>nummularia</i>	
<i>Cleome viscosa</i>	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corchorus crozophorifolius</i>	
<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i>	4
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	10-30
<i>Cyperus hesperius</i>	
<i>Digitaria brownii</i>	10-30
<i>Dodonaea pachyneura</i>	
<i>Duperreya commixta</i>	
<i>Ehretia saligna</i> var. <i>saligna</i>	
<i>Enneapogon lindleyanus</i>	
<i>Eragrostis</i> aff. <i>eripoda</i>	10-30
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2
<i>Eucalyptus</i> sp.	2
<i>Eulalia aurea</i>	15
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Ficus brachypoda</i>	1
<i>Fimbristylis simulans</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
<i>Gossypium australe</i>	
<i>Gossypium robinsonii</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Josephinia</i> sp.	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	10-30
<i>Paspalidium tabulatum</i>	
<i>Phyllanthus maderaspatensis</i>	
<i>Phyllanthus reticulatus</i> var. <i>glaber</i>	
<i>Pluchea dentex</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea involucrata</i>	

Species	Cover of dominant species (%)
<i>Polycarpaea longiflora</i>	
<i>Pomax rupestris</i>	
<i>Pterocaulon ?serrulatum</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus fusiformis</i>	
<i>Ptilotus obovatus</i>	
<i>Rhagodia eremaea</i>	
<i>Rhynchosia bungarensis</i>	
<i>Rhynchosia minima</i>	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna notabilis</i>	
<i>Senna venusta</i>	
<i>Setaria surgens</i>	
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	
<i>Solanum phlomoides</i>	
<i>Streptoglossa decurrens</i>	
<i>Themeda triandra</i>	10-30
<i>Tinospora smilacina</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Trichosanthes cucumerina</i> var. <i>cucumerina</i>	
<i>Triodia</i> aff. <i>melvillei</i>	10-30
<i>Triodia epactia</i>	15
<i>Waltheria virgata</i>	

Site		FL1028	
Described by Re-score	LJA	29/05/10	Quadrat 50 m x 50 m
	JKN	27/08/10	
	HEH	25/3/11	
MGA Zone	GDA94 50	545795 mE 7551114 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle south facing upper slope of medium rise		
Soil	Red skeletal clay loam with surface rocks		
Rock Type	Ironstone		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Triodia epactia</i> mid-dense hummock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> ^tree\6\r;G+ ^ <i>Triodia epactia</i> \hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	1% leaf litter, litter <1 cm deep, 60% bare ground, no weed cover No evidence of human disturbance		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia dictyophleba*

*Acacia maitlandii*

*Acacia monticola*

*Acacia retivenea*

*Acacia tenuissima*

*Aristida holathera* var. *latifolia*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Clerodendrum floribundum* var. *angustifolium*

*Corchorus lasiocarpus* subsp. *parvus*

1

*Corymbia hamersleyana*

1

*Cymbopogon ambiguus*

Species	Cover of dominant species (%)
<i>Dampiera candidans</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1.5
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Fimbristylis simulans</i>	
<i>Gossypium australe</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1
<i>Hakea chordophylla</i>	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Melhania</i> sp. (CH15-39)	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus fusiformis</i>	
<i>Ptilotus incanus</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Tephrosia spechtii</i>	
<i>Themeda triandra</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	35
<i>Triodia wiseana</i>	1
<i>Triumfetta maconochieana</i>	
<i>Waltheria virgata</i>	

Site		FL1029	
Described by	HEH	30/05/10	Quadrat 85 m x 30 m
Re-score	HEH	28/08/10	
	HEH	25/3/11	
MGA Zone	GDA94 50	546729 mE 7555428 mN	
Season	Poor (2010), Good (2011)		
Habitat	Minor drainage line (N-S)		
Soil	Pisolite over stony loam		
Rock Type	Blackish red Ironstone. Lag gravel of angular to sub-rounded shape		
Vegetation Description	<i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> low woodland over <i>Acacia tumida</i> var. <i>pilbarensis</i> tall open scrub over <i>Triodia epactia</i> open hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> and <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471) very open tussock grassland		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> , <i>Corymbia hamersleyana</i> ^tree\6;c;M+ ^ <i>Acacia tumida</i> var. <i>pilbarensis</i> ^shrub\4;c;G ^ <i>Triodia epactia</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)\^hummock grass, tussock grass\1;i		
Vegetation Condition	Very Good		
Fire Age	>5 years	No evidence of recent fire	
Notes	20% leaf litter, litter 1-5 cm deep, 75% bare ground, no weed cover Disturbance type: Clearing (track and pads either side of drainage line)		



Species	Cover of dominant species (%)
<i>Acacia adoxa</i> var. <i>adoxo</i>	
<i>Acacia dictyophleba</i>	
<i>Acacia maitlandii</i>	
<i>Acacia monticola</i>	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	35
<i>Aristida holathera</i> var. <i>holathera</i>	3
<i>Boerhavia coccinea</i>	
<i>Bonamia rosea</i>	
<i>Cleome viscosa</i>	
<i>Corchorus</i> aff. <i>parviflorus</i>	
<i>Corymbia hamersleyana</i>	<2

Species	Cover of dominant species (%)
<i>Cucumis maderaspatanus</i>	
<i>Eragrostis</i> aff. <i>eriopoda</i>	
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus gamophylla</i>	30
<i>Eulalia aurea</i>	
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Fimbristylis simulans</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia microptera</i>	
<i>Hibiscus leptocladus</i>	
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mnesithea formosa</i>	
<i>Mollugo molluginea</i>	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Paraneurachne muelleri</i>	
<i>Phyllanthus erwinii</i>	
<i>Polycarpaea holtzei</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus auriculifolius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus exaltatus</i>	
<i>Rhynchosia minima</i>	
<i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna notabilis</i>	
<i>Solanum diversiflorum</i>	
<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	2
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trianthera pilosa</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	10
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1030	
Described by Re-score	LJA	29/05/10	Quadrat 50 m x 50 m
	JKN	27/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	546038 mE 7553765 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Red and black loamy sand with some rocks		
Rock Type	Unknown		
Vegetation Description	<i>Eucalyptus gamophylla</i> low open woodland over <i>Triodia epactia</i> hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> , <i>Paraneurachne muelleri</i> and <i>Eragrostis eriopoda</i> very open tussock grassland over <i>Bonamia rosea</i> very open herbland		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> ^tree\6\; G+ ^ <i>Triodia epactia</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Bonamia rosea</i> ^hummock grass, tussock grass, forb\2\i		
Vegetation Condition	Excellent		
Fire Age	<5 years	No evidence of recent fire	
Notes	5% leaf litter, litter 1-2 cm deep, 85% bare ground, no weed cover No evidence of human disturbance		



**Species**

**Cover of dominant species (%)**

*Acacia dictyophleba*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Acacia tumida* var. *pilbarensis*

*Aristida holathera* var. *holathera*

3

*Bonamia rosea*

2

*Cleome viscosa*

*Corchorus lasiocarpus*

*Cucumis maderaspatanus*

*Dysphania rhadinostachya* subsp. *rhadinostachya*

*Eragrostis eriopoda*

1



Species	Cover of dominant species (%)
<i>Eucalyptus gamophylla</i>	8
<i>Eulalia aurea</i>	
<i>Euphorbia australis</i>	
<i>Gomphrena cunninghamii</i>	
<i>Goodenia microptera</i>	
<i>Gossypium australe</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	
<i>Heliotropium cunninghamii</i>	
<i>Hibiscus leptocladus</i>	
<i>Indigofera colutea</i>	
<i>Indigofera monophylla</i> (MJOPP-2)	
<i>Keraudrenia nephrosperma</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus exaltatus</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	
<i>Tephrosia</i> sp. Bungaroo Creek (M.E. Trudgen 11601)	
<i>Tribulus hirsutus</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	12
<i>Waltheria virgata</i>	
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1031	
Described by	HEH	28/05/10	Quadrat 50 m x 50 m
Re-score	HEH	30/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	547187 mE 7555490 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Blacky burgundy pisolite with red surface crust over stony loam		
Rock Type	Ironstone. Discontinuous small pebbles to cobbles		
Vegetation Description	<i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Eulalia aurea</i> , <i>Paraneurachne muelleri</i> , <i>Eragrostis</i> aff. <i>eriopoda</i> , <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471) and <i>Aristida</i> sp. tussock grassland with <i>Triodia epactia</i> scattered hummock grasses		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> , <i>Corymbia hamersleyana</i> \^tree\6\r;G+ ^ <i>Eulalia aurea</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)\^tussock grass\2 i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	8% leaf litter, litter 0-10 cm deep, 60% bare ground, no weed cover No evidence of human disturbance apart from being in close proximity to drill lines and pads		



**Species**

**Cover of dominant species (%)**

*Acacia elachantha*

*Acacia inaequilatera*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Amaranthus interruptus*

*Amaranthus undulatus*

*Aristida holathera* var. *holathera*

4

*Bonamia rosea*

*Chrysopogon fallax*

*Cleome viscosa*

*Corchorus lasiocarpus* subsp. *parvus*

Species	Cover of dominant species (%)
<i>Corymbia hamersleyana</i>	2
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
<i>Cucumis maderaspatanus</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eragrostis</i> aff. <i>eriopoda</i>	5
<i>Eragrostis cumingii</i>	
<i>Eragrostis eriopoda</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus gamophylla</i>	6
<i>Eulalia aurea</i>	6
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>	
<i>Goodenia microptera</i>	
<i>Gossypium australe</i>	
<i>Hakea chordophylla</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Heliotropium</i> sp.	
<i>Hibiscus leptocladus</i>	
Indeterminant spp.	
<i>Indigofera colutea</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Paraneurachne muelleri</i>	
<i>Perotis rara</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea longiflora</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus auriculifolius</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna notabilis</i>	
<i>Setaria surgens</i>	
<i>Sida</i> aff. <i>echinocarpa</i> (MET 15,350)	
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	
<i>Solanum horridum</i>	
<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	5
<i>Trianthema pilosa</i>	
<i>Tribulus macrocarpus</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	

**Species**

**Cover of dominant species (%)**

*Triodia epactia*

<2

*Triumfetta maconochieana*

*Yakirra australiensis* var. *australiensis*

Site		FL1032	
Described by	LJA	30/05/10	Quadrat 50 m x 50 m
Re-score	HEH	27/08/10	
	JKN	25/3/11	
MGA Zone	GDA94 50	546473 mE 7555270 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle north and east facing crest of minor rise		
Soil	Red skeletal clay loam with scattered		
Rock Type	Ironstone. > 90% red and black rocks of subrounded to subangular shape		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> and <i>T. wiseana</i> hummock grassland		
NVIS V	G+ ^ <i>Triodia</i> aff. <i>melvillei</i> , <i>T. epactia</i> ^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 85% bare ground, no weed cover No evidence of human disturbance Active mound of a Pebble Mound mouse Dead low shrubs		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia elachantha*

*Acacia maitlandii*

*Acacia monticola*

*Acacia pyrifolia* var. *pyrifolia*

*Aristida holathera* var. *holathera*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Clerodendrum floribundum* var. *angustifolium*

*Corymbia hamersleyana*

*Cucumis maderaspatanus*

*Cymbopogon ambiguus*

*Dampiera candidans*

Species	Cover of dominant species (%)
<i>Dodonaea coriacea</i>	
<i>Enneapogon lindleyanus</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus gamophylla</i>	<2
<i>Euphorbia australis</i>	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
<i>Fimbristylis simulans</i>	
<i>Goodenia stobbsiana</i>	
<i>Hakea chordophylla</i>	
<i>Hibiscus</i> aff. <i>coatesii</i> (site 693)	
<i>Indigofera monophylla</i>	
<i>Mnesithea formosa</i>	
<i>Mollugo molluginea</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus calostachyus</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
<i>Senna notabilis</i>	
<i>Tephrosia</i> aff. <i>supina</i> (HD133-20)	
<i>Tephrosia</i> sp. Bungaroo Creek (M.E. Trudgen 11601)	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia</i> aff. <i>melvillei</i>	10
<i>Triodia wiseana</i>	2
<i>Waltheria virgata</i>	

Site		FL1033	
Described by	HEH	30/05/10	Quadrat 50 m x 50 m
Re-score	HEH	28/08/10	
	JKN	24/3/11	
MGA Zone	GDA94 50	542220 mE 7554811 mN	
Season	Poor (2010), Good (2011)		
Habitat	Very gentle upper slope of knoll		
Soil	No soil exposed		
Rock Type	Ironstone. Continuous red and black gravel of sub-angular to angular tabular shape		
Vegetation Description	<i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia wiseana</i> mid-dense hummock grassland		
NVIS V	U ^ <i>Corymbia hamersleyana</i> , ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\6\;G+ ^ <i>Triodia wiseana</i> \^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	Surrounded by recent fire (Feb/Mar 2010)	
Notes	<1% leaf litter, litter <1 cm deep, 65% bare ground, no weed cover No evidence of human disturbance apart from the recent fire scar from Feb 2010		



**Species**

**Cover of dominant species (%)**

*Acacia adoxa* var. *adoxo*

*Acacia hilliana*

*Acacia pyrifolia* var. *pyrifolia*

*Bonamia* sp. Dampier (A.A. Mitchell PRP 217)

*Bulbostylis barbata*

*Cleome viscosa*

*Clerodendrum floribundum* var. *angustifolium*

*Corymbia hamersleyana*

<2

*Cymbopogon ambiguus*

*Dampiera candidans*

*Eriachne aristidea*

*Eriachne ciliata*

Species	Cover of dominant species (%)
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	<2
<i>Euphorbia alsiniflora</i>	
<i>Fimbristylis simulans</i>	
<i>Goodenia triodiophila</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Keraudrenia nephrosperma</i>	
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	
<i>Mnesithea formosa</i>	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Polygala</i> aff. <i>isingii</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus fusiformis</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia wiseana</i>	35
<i>Triumfetta maconochieana</i>	
<i>Waltheria virgata</i>	



Site		FL1034	
Described by	LJA	30/05/10	Quadrat 50 m x 50 m
Re-score	HEH	28/08/10	
	JKN	24/3/11	
MGA Zone	GDA94 50	543043 mE 7554626 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle to moderate north-west facing lower to midslope of spur below escarpment		
Soil	Red skeletal clay loam		
Rock Type	Ironstone. Red and black rocks of sub-rounded tabular to angular tabular shape with 2-10% outcropping		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Triodia wiseana</i> mid-dense hummock grassland over <i>Cymbopogon ambiguus</i> open tussock grassland		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> \^tree\6\r;G+ ^ <i>Triodia wiseana</i> , <i>Cymbopogon ambiguus</i> \^hummock grass, tussock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 60% bare ground, no weed cover No evidence of human disturbance Dead shrubs		



**Species**

**Cover of dominant species (%)**

- Acacia maitlandii*
- Acacia monticola*
- Acacia pruinocarpa*
- Amyema* sp.
- Bulbostylis barbata*
- Cleome viscosa*
- Corchorus lasiocarpus*
- Corymbia hamersleyana*
- Cucumis maderaspatanus*
- Cymbopogon ambiguus*
- Dampiera candidans*

1

Species	Cover of dominant species (%)
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2
<i>Goodenia cusackiana</i>	
<i>Gossypium australe</i>	
<i>Hakea chordophylla</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mnesithea formosa</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea holtzei</i>	
<i>Polycarpaea longiflora</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna notabilis</i>	
<i>Themeda triandra</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia wiseana</i>	40
<i>Triumfetta maconochieana</i>	

Site		FL1035	
Described by Re-score	HEH	30/05/10	Quadrat 85 m x 30 m
	JKN	28/08/10	
	HEH	25/03/11	
MGA Zone	GDA94 50	543198 mE 7553516 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate to steep gorge		
Soil	Red-black stony soil		
Rock Type	Ironstone		
Vegetation Description	<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> and <i>Ficus brachypoda</i> low open woodland over <i>Triodia epactia</i> and <i>T. wiseana</i> open hummock grassland over <i>Themeda triandra</i> , <i>Enneapogon lindleyanus</i> , <i>Eriachne mucronata</i> and <i>Cymbopogon ambiguus</i> open tussock grassland with <i>Corchorus crozophorifolius</i> , <i>Capparis spinosa</i> var. <i>nummularia</i> scattered shrubs over Indeterminant sp. scattered herbs		
NVIS V	U ^ <i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> , <i>Ficus brachypoda</i> \^tree\6;r;M ^ <i>Corchorus crozophorifolius</i> , <i>Capparis spinosa</i> var. <i>nummularia</i> \^shrub\3\i;G+ ^ <i>Triodia epactia</i> , <i>T. wiseana</i> , <i>Themeda triandra</i> \^hummock grass, tussock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	10% leaf litter, litter 0-60 cm deep, 60% bare ground, no weed cover No evidence of human disturbance		



#### Species

#### Cover of dominant species (%)

*Abutilon dioicum*

*Abutilon* sp. (FL1035)

*Acacia monticola*

*Acacia pruinocarpa*

*Acacia pyrifolia* var. *pyrifolia*

*Alectryon oleifolius* subsp. *oleifolius*

1

*Amaranthus undulatus*

*Astrotricha hamptonii*

*Bidens bipinnata*

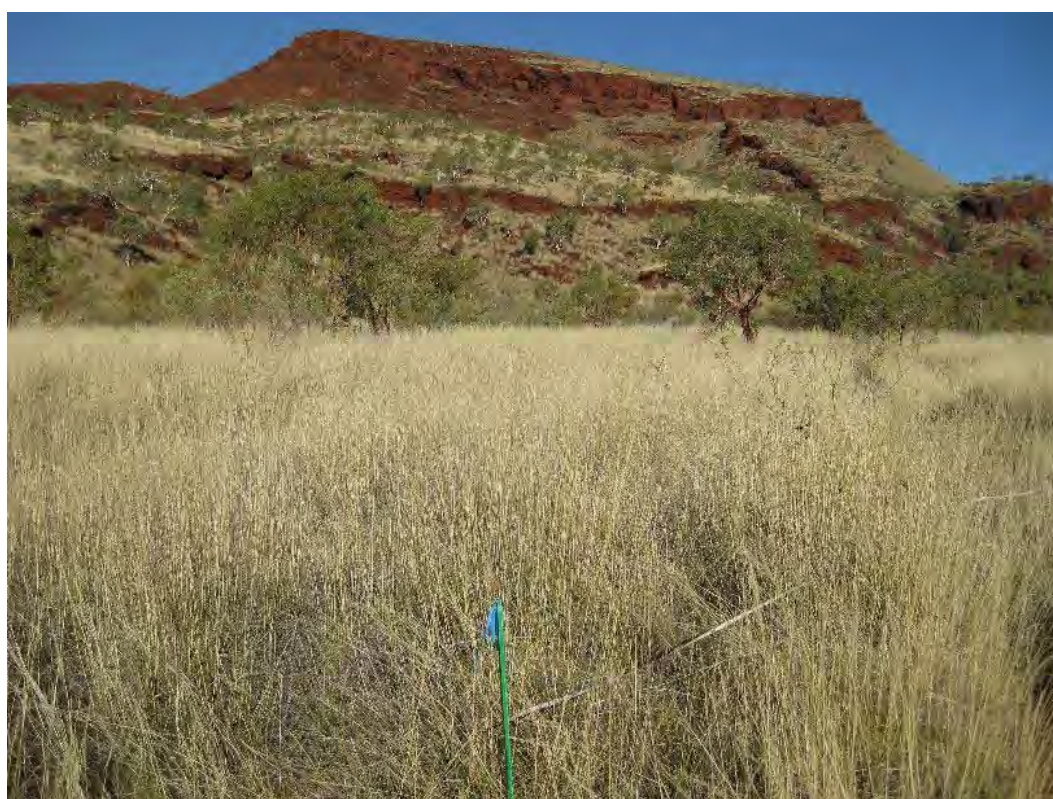
*Capparis spinosa* var. *nummularia*

<2

Species	Cover of dominant species (%)
<i>Cleome viscosa</i>	
<i>Corchorus crozophorifolius</i>	<1
<i>Corymbia ferritcola</i> subsp. <i>ferritcola</i>	7
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	<2
Cyperaceae sp.	
<i>Duperreya commixta</i>	
<i>Ehretia saligna</i> var. <i>saligna</i>	
<i>Enneapogon lindleyanus</i>	
<i>Eriachne mucronata</i> (typical form)	6
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Ficus brachypoda</i>	2
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
<i>Gomphrena cunninghamii</i>	
<i>Gossypium robinsonii</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	<2
<i>Indigofera monophylla</i>	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Marsdenia australis</i>	
<i>Nicotiana</i> sp.	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Oldenlandia crouchiana</i>	
<i>Paspalidium tabulatum</i>	
<i>Phyllanthus maderaspatensis</i>	
<i>Polycarpaea longiflora</i>	
<i>Pterocaulon ?serrulatum</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus obovatus</i>	
<i>Rhagodia eremaea</i>	
<i>Rhynchosia bungarensis</i>	
<i>Rhynchosia minima</i>	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Setaria surgens</i>	
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	
<i>Sigesbeckia orientalis</i>	
<i>Stemodia grossa</i>	
<i>Themeda triandra</i>	6
<i>Tinospora smilacina</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	

Species	Cover of dominant species (%)
<i>Trichosanthes cucumerina</i> var. <i>cucumerina</i>	
<i>Triodia epactia</i>	10
<i>Triodia wiseana</i>	5
<i>Tylophora flexuosa</i>	
<i>Ventilago viminalis</i>	
<i>Wedelia</i> sp. Hamersley (A.S. Weston 8444)	1

Site		FL1036	
Described by	LJA	30/05/10	Quadrat 50 m x 50 m
Re-score	JKN	28/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	542991 mE 7554070 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Red skeletal clay loam with surface stones		
Rock Type	Unknown		
Vegetation Description	<i>Triodia epactia</i> closed hummock grassland over <i>Eriachne mucronata</i> with <i>Corymbia hamersleyana</i> scattered low trees		
NVIS V	U ^ <i>Corymbia hamersleyana</i> ^tree\6\r; G+ ^ <i>Triodia epactia</i> , <i>Eriachne mucronata</i> ^hummock grass, tussock grass\2\d		
Vegetation Condition	Very Good		
Fire Age	>25 years	No evidence of recent fire	
Notes	5% leaf litter, litter <1 cm deep, 2% bare ground, no weed cover Vehicle tyre tracks have had no impact on species composition however there is flagging indicating clearing is likely for a drill line straight through the north west quarter of the quadrat		



#### Species

#### Cover of dominant species (%)

*Abutilon dioicum*

*Acacia dictyophleba*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Amaranthus undulatus*

*Bidens bipinnata*

*Bulbostylis barbata*

*Cleome viscosa*

*Clerodendrum floribundum* var. *angustifolium*

*Corymbia hamersleyana*

1

*Eriachne mucronata* (typical form)

2

**Species****Cover of dominant species (%)***Euphorbia alsiniflora**Euphorbia australis**Evolvulus alsinoides* var. *villosicalyx**Gomphrena cunninghamii**Gossypium australe**Hakea lorea* subsp. *lorea*

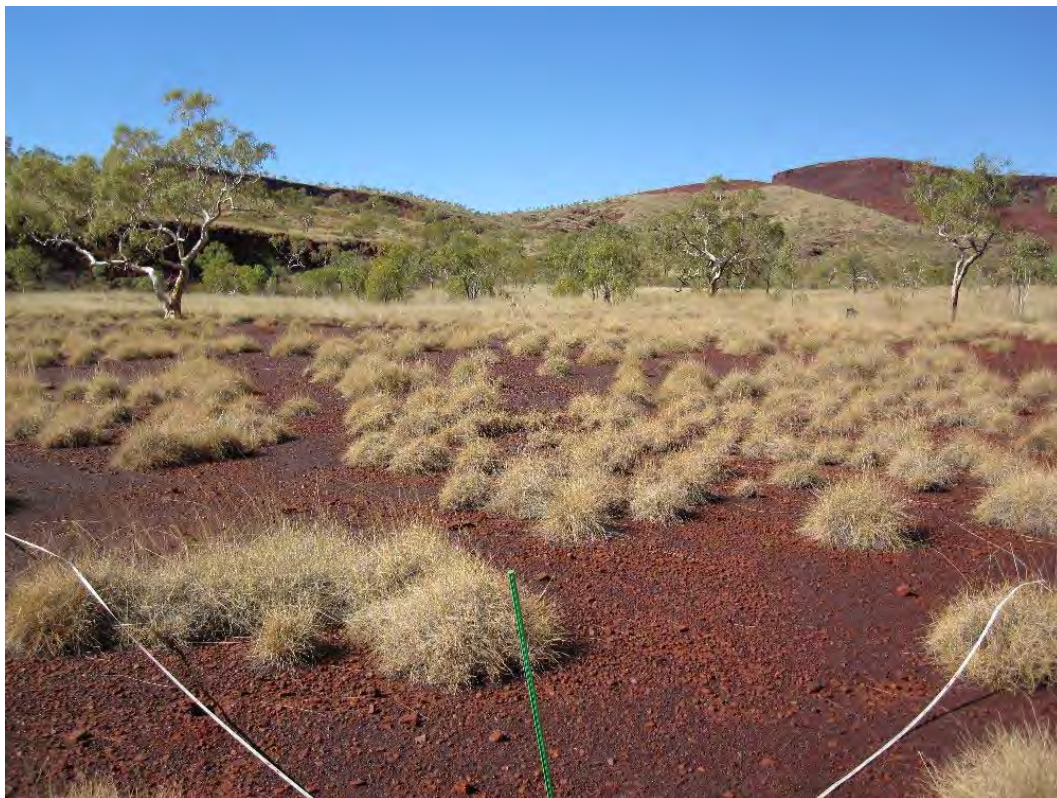
Indeterminant spp.

*Indigofera colutea**Indigofera monophylla**Jasminum didymum* subsp. *lineare**Mnesithea formosa**Oldenlandia crouchiana**Polycarpaea longiflora**Ptilotus astrolasius**Ptilotus fusiformis**Rhynchosia minima**Senna artemisioides* subsp. *oligophylla* x *helmsii**Senna glutinosa* subsp. *glutinosa**Stemodia grossa**Tephrosia densa**Themeda triandra**Trichodesma zeylanicum* var. *zeylanicum**Triodia epactia*

90

*Waltheria virgata*

Site		FL1037	
Described by Re-score	HEH	31/05/10	Quadrat 50 m x 50 m
	JKN	28/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	536786 mE 7554550 mN	
Season	Poor (2010), Good (2011)		
Habitat	Undulating valley floor		
Soil	Dark brown burgundy pisolite over stony soil		
Rock Type	Ironstone. Pisolite with red medium pebbles to large pebbles of subangular to sub angular tabular shape		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> open hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> ^tree\6\; G+ ^ <i>Triodia</i> aff. <i>melvillei</i> ^hummock grass\1\		
Vegetation Condition	Very Good		
Fire Age	>5 years	Small <i>Triodia</i>	
Notes	<1% leaf litter, litter <1 cm deep, 95% bare ground, no weed cover Disturbance type: Grazing and recent fire		



**Species**

**Cover of dominant species (%)**

<i>Acacia hilliana</i>	
<i>Acacia maitlandii</i>	
<i>Acacia tenuissima</i>	
<i>Aristida holathera</i> var. <i>latifolia</i>	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Bulbostylis barbata</i>	
<i>Cleome viscosa</i>	
<i>Corymbia hamersleyana</i>	
<i>Dampiera candidans</i>	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	<2
<i>Euphorbia alsiniflora</i>	



**Species****Cover of dominant species (%)***Fimbristylis simulans**Goodenia microptera**Hakea chordophylla**Indigofera monophylla**Oldenlandia crouchiana**Polycarpaea holtzei**Ptilotus astrolasius**Ptilotus calostachyus**Ptilotus exaltatus**Ptilotus fusiformis**Schizachyrium fragile**Senna glutinosa* subsp. *glutinosa**Senna notabilis**Themeda triandra**Triodia ?pungens**Triodia* aff. *melvillei*

5

*Triodia epactia**Triodia wiseana**Yakirra australiensis* var. *australiensis*

Site		FL1038	
Described by	LJA	28/05/10	Quadrat 50 m x 50 m
Re-score	JKN	30/08/10	
	JKN	24/03/11	
Season	Poor (2010), Good (2011)		
Habitat	Flat to gently sloping valley floor to slope with very minor drainage channel through centre		
Soil	Red clay loam with surface stones		
Rock Type	Unknown		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> mid-dense hummock grassland with <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\6\; G+ ^ <i>Triodia</i> aff. <i>melvillei</i> \^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	2% leaf litter, litter <1 cm deep, 30% bare ground, no weed cover		



Species	Cover of dominant species (%)
<i>Acacia dictyophleba</i>	
<i>Acacia hilliana</i>	
<i>Amaranthus undulatus</i>	
<i>Aristida holathera</i> var. <i>holathera</i>	1
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Bulbostylis barbata</i>	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	1
<i>Cymbopogon ambiguus</i>	
<i>Dampiera candidans</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eriachne mucronata</i> (typical form)	

**Species****Cover of dominant species (%)**

*Eriachne pulchella* subsp. *dominii*

*Eucalyptus leucophloia* subsp. *leucophloia*

*Euphorbia alsiniflora*

*Euphorbia australis*

*Euphorbia* sp. (site 1089)

*Fimbristylis simulans*

*Gompholobium* sp. Pilbara (N.F. Norris 908)

*Goodenia cusackiana*

*Hakea chordophylla*

*Hibiscus leptocladus*

*Hibiscus sturtii* var. *campylochlamys*

*Indigofera monophylla*

*Jasminum didymum* subsp. *lineare*

*Oldenlandia crouchiana*

*Paraneurachne muelleri*

1

*Ptilotus astrolasius*

*Ptilotus fusiformis*

*Senna glutinosa*

*Senna glutinosa* subsp. *glutinosa*

*Senna notabilis*

*Stemodia grossa*

*Themeda triandra*

*Tinospora smilacina*

*Trachymene oleracea* subsp. *oleracea*

*Trichodesma zeylanicum* var. *zeylanicum*

*Triodia ?pungens*

*Triodia* aff. *melvillei*

65

*Triodia epactia*

*Triodia wiseana*

*Yakirra australiensis* var. *australiensis*

Site		FL1039	
Described by Re-score	HEH	31/05/10	Quadrat 50 m x 50 m
	JKN	29/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	536627 mE 7554785 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate east facing lower slope of large hill arm		
Soil	Red brown loam (not exposed)		
Rock Type	Ironstone		
Vegetation Description	<i>Acacia orthocarpa</i> (atypical form) low open shrubland over <i>Triodia wiseana</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\6\r;M ^ <i>Acacia orthocarpa</i> (atypical form)\2\r;G+ ^ <i>Triodia wiseana</i> \^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	<5 years	Mosaic of burn scars including scar from Feb/Mar 2010	
Notes	<1% leaf litter, litter <1 cm deep, 75% bare ground, no weed cover No evidence of human disturbance although cattle were seen in the area (grazing wasn't observed)		



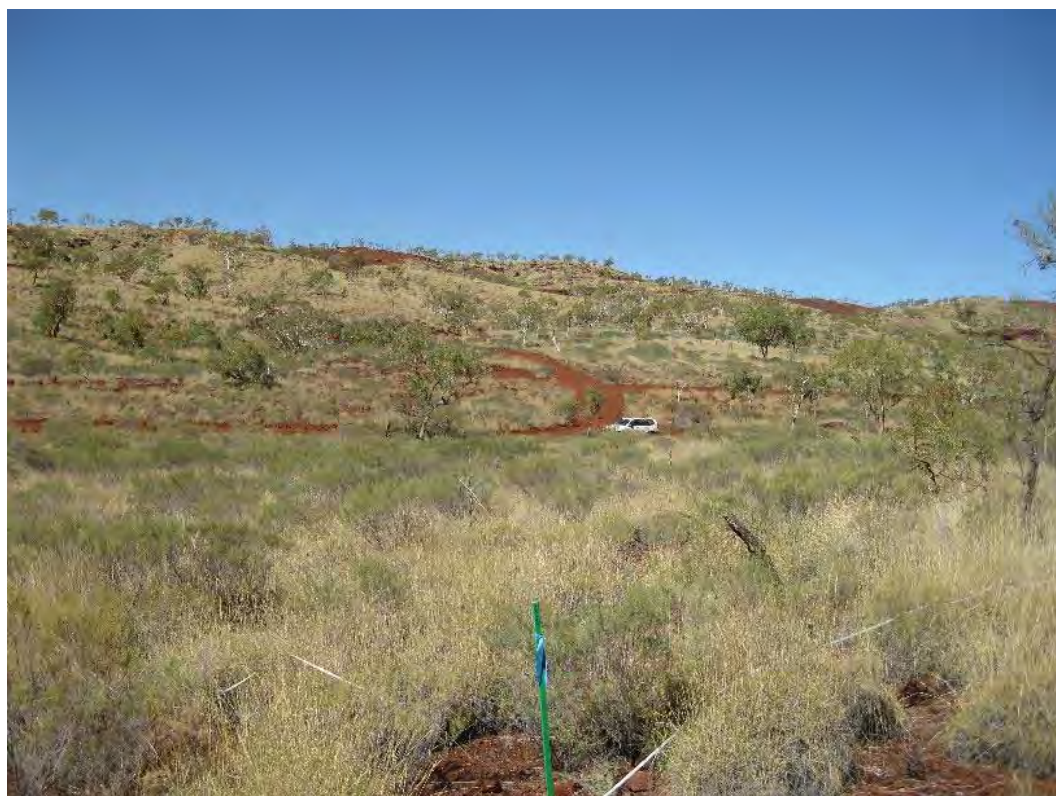
#### Species

#### Cover of dominant species (%)

<i>Acacia arida</i>	
<i>Acacia orthocarpa</i> (atypical form)	5
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Bulbostylis barbata</i>	
<i>Cleome viscosa</i>	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	
<i>Cymbopogon ambiguus</i>	
<i>Dampiera candicans</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eriachne aristidea</i>	

Species	Cover of dominant species (%)
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Euphorbia alsiniflora</i>	
<i>Goodenia cusackiana</i>	
<i>Goodenia microptera</i>	
<i>Goodenia triodiophila</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mirbelia viminalis</i>	
<i>Mitrasacme connata</i>	
<i>Oldenlandia crouchiana</i>	
<i>Poaceae</i> sp. 2 (FL1039)	
<i>Polycarpaea holtzei</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	
<i>Senna notabilis</i>	
<i>Sida pilbarensis</i>	
<i>Solanum horridum</i>	
<i>Tephrosia</i> sp. (FL1039)	
<i>Triodia</i> aff. <i>melvillei</i>	
<i>Triodia wiseana</i>	25
<i>Waltheria virgata</i>	

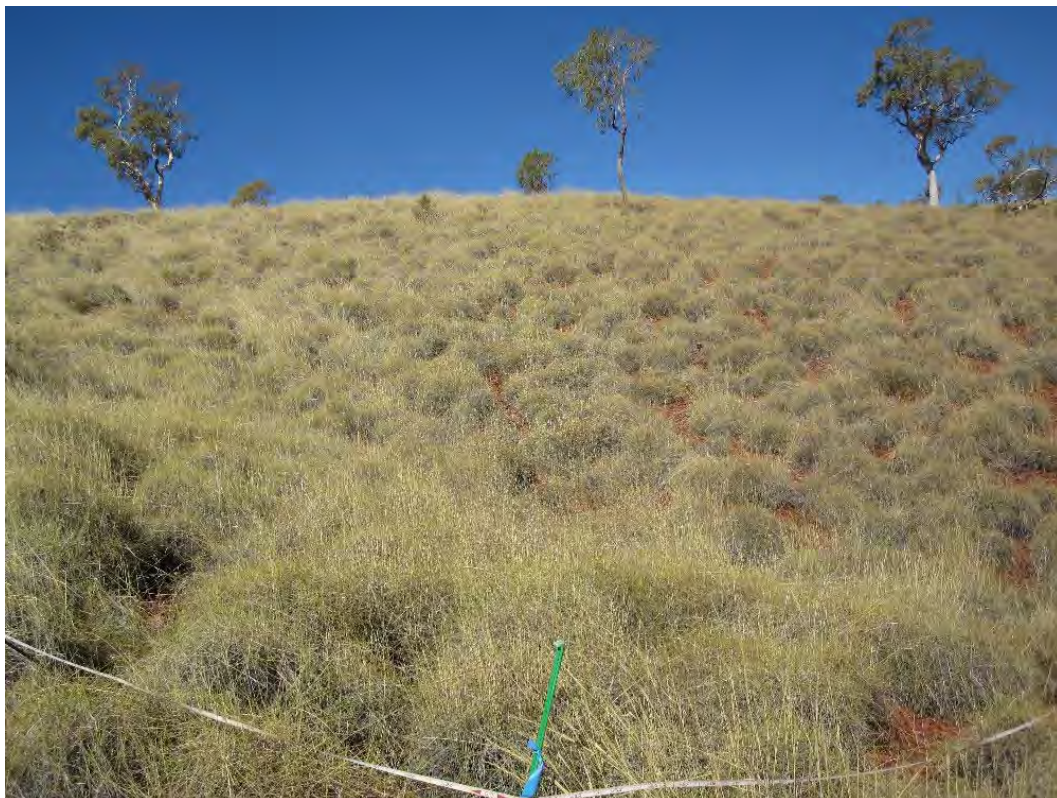
Site		FL1040	
Described by	LJA	31/05/10	Quadrat 50 m x 50 m
Re-score	HEH	29/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	550942 mE	7556058 mN
Season	Poor (2010), Good (2011)		
Habitat	Gentle east facing slope of minor hill within valley		
Soil	Red skeletal clay loam		
Rock Type	Ironstone		
Vegetation Description	<i>Acacia orthocarpa</i> (atypical form) shrubland over <i>Triodia wiseana</i> , <i>T. epactia</i> and <i>T. aff. melvillei</i> mid-dense hummock grassland		
NVIS V	M ^ <i>Acacia orthocarpa</i> (atypical form)\^shrub\3\;G+ ^ <i>Triodia wiseana</i> , <i>T. epactia</i> and <i>T. aff. melvillei</i> \^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	Very old burnt logs	
Notes	5% leaf litter, litter <1 cm deep, 40% bare ground, no weed cover		



Species	Cover of dominant species (%)
<i>Acacia arida</i>	
<i>Acacia orthocarpa</i> (atypical form)	20
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	
<i>Bulbostylis barbata</i>	
<i>Cleome viscosa</i>	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	
<i>Corchorus lasiocarpus</i>	
<i>Corymbia hamersleyana</i>	
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	
<i>Eriachne aristidea</i>	
<i>Eriachne ciliata</i>	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	

Species	Cover of dominant species (%)
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia alsiniflora</i>	
<i>Euphorbia australis</i>	
<i>Goodenia cusackiana</i>	
<i>Goodenia stobbsiana</i>	
<i>Gossypium australe</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Hakea chordophylla</i>	1
<i>Hakea lorea</i> subsp. <i>lorea</i>	1
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Mollugo molluginea</i>	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna notabilis</i>	
<i>Sida</i> sp. articulation below (A.A. Mitchell PRP 1605)	
<i>Solanum diversiflorum</i>	
<i>Solanum horridum</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Triodia</i> aff. <i>melvillei</i>	20
<i>Triodia epactia</i>	3
<i>Triodia wiseana</i>	50
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1041	
Described by Re-score	HEH	31/05/10	Quadrat 50 m x 50 m
	JKN	29/08/10	
	JKN	24/03/11	
Season	Poor (2010), Good (2011)		
Habitat	Moderate to steep west facing upper slope and crest of hill		
Soil	No soil exposed		
Rock Type	Ironstone. Presence of outcropping		
Vegetation Description	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia wiseana</i> mid-dense hummock grassland		
NVIS V	M ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> ^tree\3\i;G+ ^ <i>Triodia wiseana</i> \^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	With recent (Feb/Mar) fire scars nearby	
Notes	<1% leaf litter, litter <1 cm deep		
	No evidence of human disturbance		



**Species**

**Cover of dominant species (%)**

*Acacia dictyophleba*

*Amaranthus undulatus*

*Bulbostylis barbata*

*Cleome viscosa*

*Corymbia hamersleyana*

*Cymbopogon ambiguus*

*Eriachne ciliata*

*Eriachne mucronata* (typical form)

*Eriachne pulchella* subsp. *dominii*

*Eucalyptus leucophloia* subsp. *leucophloia*

<2

*Euphorbia alsiniflora*

*Goodenia triodiophila*

*Gossypium australe*



**Species****Cover of dominant species (%)***Hakea chordophylla**Indigofera monophylla**Mnesithea formosa**Oldenlandia crouchiana**Polycarpaea holtzei**Ptilotus fusiformis**Senna artemisioides* subsp. *oligophylla* x *glutinosa**Senna glutinosa* subsp. *glutinosa**Senna glutinosa* subsp. *pruinosa**Tephrosia stipuligera**Trachymene oleracea* subsp. *oleracea**Triodia wiseana*

65

Site		FL1042	
Described by	LJA	31/05/10	Quadrat 50 m x 50 m
Re-score	HEH	29/08/10	
	HEH	24/03/11	
MGA Zone	GDA94 50	540890 mE 7552849 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate west facing upper slope of spur separated from main slope by gully		
Soil	Red skeletal clay loam with loose stones and large rocks.		
Rock Type	Pisolite/Conglomerate. Blackish red pebbles to rocks of rounded to sub-rounded shape with 20-30% outcropping		
Vegetation Description	<i>Acacia orthocarpa</i> (atypical form) open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland over <i>Triumfetta maconochieana</i> and <i>Corchorus lasiocarpus</i> subsp. <i>parvus</i> low open shrubland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low scattered trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> ^tree\6\bi;M ^ <i>Acacia orthocarpa</i> (atypical form), <i>Triumfetta maconochieana</i> , <i>Corchorus lasiocarpus</i> subsp. <i>parvus</i> \^shrub, forb\2\i;G+ ^ <i>Triodia epactia</i> ^hummock grass\2\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	Old fire scars on trees	
Notes	5% leaf litter, litter <1 cm deep, 60% bare ground, no weed cover Dead Malvaceae species		



Species	Cover of dominant species (%)
<i>Acacia monticola</i>	
<i>Acacia orthocarpa</i> (atypical form)	15
<i>Aristida contorta</i>	
<i>Bidens bipinnata</i>	
<i>Cleome viscosa</i>	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	1
<i>Corymbia hamersleyana</i>	
<i>Cucumis maderaspatanus</i>	
<i>Cymbopogon ambiguus</i>	
<i>Dampiera candidans</i>	
<i>Dodonaea coriacea</i>	

Species	Cover of dominant species (%)
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
<i>Euphorbia alsiniflora</i>	
<i>Fimbristylis simulans</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Hybanthus aurantiacus</i>	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paspalidium clementii</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus fusiformis</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Sida</i> sp. articulation below (A.A. Mitchell PRP 1605)	
<i>Solanum horridum</i>	
<i>Solanum phlomoides</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	35
<i>Triumfetta maconochieana</i>	1
<i>Waltheria virgata</i>	1

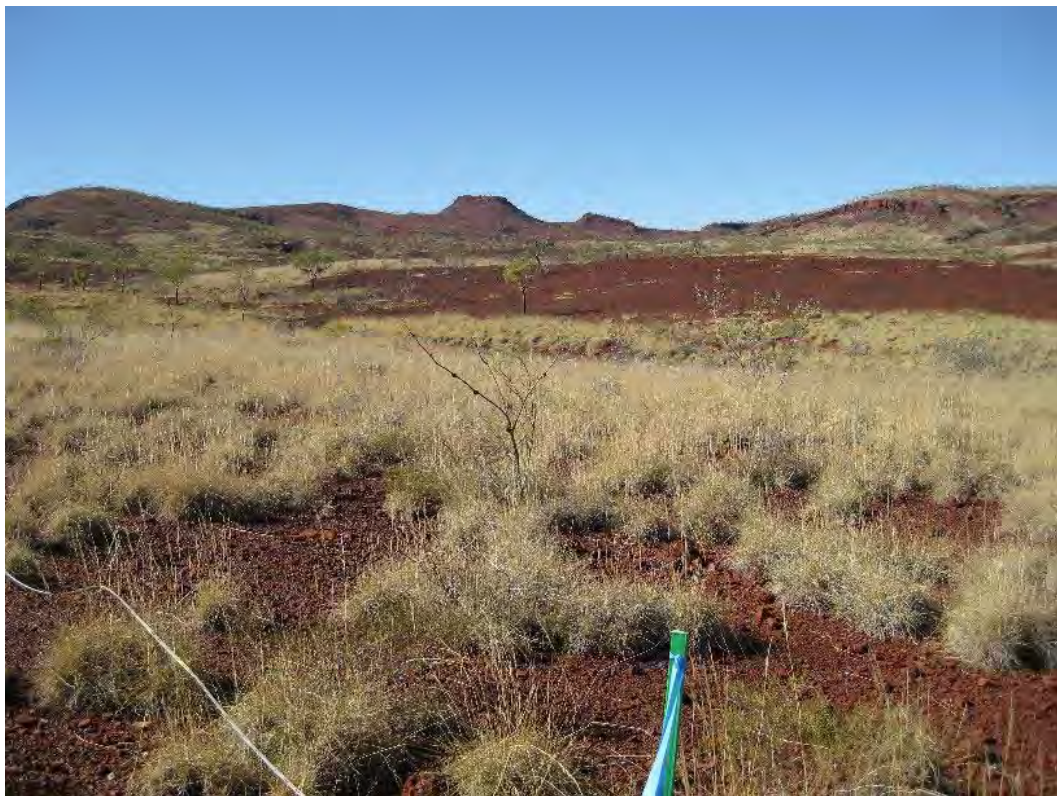
Site		FL1043	
Described by Re-score	HEH	31/05/10	Quadrat 50 m x 50 m
	HEH	29/08/10	
	HEH	24/03/11	
MGA Zone	GDA94 50	539402 mE 753785 mN	
Season	Poor (2010), Good (2011)		
Habitat	Valley floor		
Soil	Sandy loam		
Rock Type	Ironstone. 2-10% pebbles to cobbles on banks and drainage channel floor		
Vegetation Description	<i>Corymbia hamersleyana</i> open woodland over <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> low open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland with <i>Grevillea pyramidal</i> subsp. <i>leucadendron</i> and <i>Gossypium robinsonii</i> scattered tall shrubs over mixed Poaceae spp. scattered tussock grasses		
NVIS V	U ^ <i>Corymbia hamersleyana</i> \^tree\6\r;M ^ <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Grevillea pyramidal</i> subsp. <i>leucadendron</i> and <i>Gossypium robinsonii</i> \^shub\3\r;G+ ^ <i>Triodia epactia</i> , Poaceae spp.\^hummock grass, tussock grass\2\c		
Vegetation Condition	Good		
Fire Age	>5 years	With recent 2010 fire scars nearby	
Notes	15% leaf litter, litter 0-2 cm deep, 60% bare ground, no weed cover Disturbance type: Heavy grazing and fire A lot of dead plants, shrubs and grasses and/or eaten by cattle		



Species	Cover of dominant species (%)
<i>Acacia acradenia</i>	
<i>Acacia dictyophleba</i>	
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	4
<i>Alternanthera nana</i>	
<i>Amaranthus undulatus</i>	
<i>Bidens bipinnata</i>	1
<i>Boerhavia coccinea</i>	
<i>Brachyachne convergens</i>	
<i>Cleome viscosa</i>	
<i>Corchorus crozophorifolius</i>	
<i>Corchorus tridens</i>	

Species	Cover of dominant species (%)
<i>Corymbia hamersleyana</i>	6
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	
<i>Eragrostis cumingii</i>	
<i>Eulalia aurea</i>	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
<i>Fimbristylis simulans</i>	
<i>Goodenia microptera</i>	
<i>Goodenia nuda</i>	
<i>Gossypium australe</i>	
<i>Gossypium robinsonii</i>	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera monophylla</i>	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Melhania</i> sp. (CH15-39)	
<i>Mollugo molluginea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Paraneurachne muelleri</i>	
<i>Perotis rara</i>	
<i>Phyllanthus maderaspatensis</i>	
<i>Pluchea dentex</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polygala</i> aff. <i>isingii</i>	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	
<i>Portulaca oleracea</i>	
<i>Pterocaulon ?serrulatum</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Rhynchosia minima</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	
<i>Senna notabilis</i>	
<i>Setaria surgens</i>	
<i>Stemodia grossa</i>	
<i>Streptoglossa decurrens</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Themeda triandra</i>	
<i>Triodia epactia</i>	35
<i>Triumfetta maconochieana</i>	

Site		FL1044	
Described by	LJA	01/06/10	Quadrat 50 m x 50 m
Re-score	HEH	29/08/10	
	HEH	24/03/11	
MGA Zone	GDA94 50	540109 mE 7552144 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gentle south facing lower slope of minor rise in valley		
Soil	Red skeletal clay loam		
Rock Type	Channel Iron Deposit		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> mid-dense hummock grassland		
NVIS V	G+ ^ <i>Triodia</i> aff. <i>melvillei</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	2% leaf litter, litter <1 cm deep, 50% bare ground, no weed cover No evidence of human disturbance		



**Species**

**Cover of dominant species (%)**

- Acacia adoxa* var. *adoxo*
- Acacia hilliana*
- Clerodendrum floribundum* var. *angustifolium*
- Corymbia hamersleyana*
- Eriachne ciliata*
- Fimbristylis simulans*
- Gompholobium* sp. Pilbara (N.F. Norris 908)
- Goodenia stobbsiana*
- Goodenia triodiophila*
- Grevillea wickhamii* subsp. *hispidula*
- Hakea chordophylla*
- Indeterminant spp.
- Jasminum didymum* subsp. *lineare*

**Species****Cover of dominant species (%)***Mollugo molluginea**Polycarpha holtzei**Ptilotus calostachyus**Senna artemisioides* subsp. *oligophylla**Senna glutinosa* subsp. *pruinosa**Triodia* aff. *melvillei*

50

*Triodia wiseana*

Site		FL1045	
Described by	HEH	01/06/10	Quadrat 85 m x 30 m
Re-score	HEH	29/08/10	
	HEH	24/03/11	
MGA Zone	GDA94 50	540093 mE 7551408 mN	
Season	Poor (2010), Good (2011)		
Habitat	Gorge		
Soil	Stony sandy loam		
Rock Type	Dark red, orangey brown alluvial pebbles to stones of subangular tabular to subrounded tabular shape		
Vegetation Description	<i>Eucalyptus victrix</i> open woodland over <i>Acacia monticola</i> , <i>Dodonaea lanceolata</i> var. <i>lanceolata</i> and <i>Gossypium robinsonii</i> tall shrubland over <i>Stemodia grossa</i> low open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Eulalia aurea</i> , <i>Eriachne mucronata</i> open tussock grassland with <i>Ficus brachypoda</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees over <i>Rhynchosia bungarensis</i> scattered herbs		
NVIS V	U ^ <i>Eucalyptus victrix</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Ficus brachypoda</i> ^tree\7\r;M ^ <i>Acacia monticola</i> , <i>Gossypium robinsonii</i> , <i>Dodonaea lanceolata</i> var. <i>lanceolata</i> ^shrub\4\i;G+ ^ <i>Triodia epactia</i> , <i>Eulalia aurea</i> , <i>Eriachne mucronata</i> ^hummock grass, tussock grass\2\i		
Vegetation Condition	Very Good		
Fire Age	>5 years	Recent fire scar close by. Charred termite mound	
Notes	30% leaf litter, litter 0-5 cm deep, 45% bare ground, no weed cover Disturbance type: Grazing and recent fire		



Species	Cover of dominant species (%)
<i>Abutilon dioicum</i>	
<i>Acacia holosericea</i>	
<i>Acacia maitlandii</i>	
<i>Acacia monticola</i>	10
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
<i>Acacia tenuissima</i>	
<i>Amaranthus undulatus</i>	
<i>Astrotricha hamptonii</i>	
<i>Bidens bipinnata</i>	
<i>Capparis spinosa</i> var. <i>nummularia</i>	



Species	Cover of dominant species (%)
<i>Corchorus crozophorifolius</i>	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	
<i>Corchorus tridens</i>	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
<i>Cucumis melo</i> subsp. <i>agrestis</i>	
<i>Cymbopogon procerus</i>	
<i>Cyperus vaginatus</i>	1
<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>	1
<i>Duperreya commixta</i>	
<i>Eragrostis cumingii</i>	
<i>Eriachne mucronata</i> (typical form)	1
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Eucalyptus victrix</i>	7
<i>Eulalia aurea</i>	12
<i>Euphorbia biconvexa</i>	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	
<i>Ficus brachypoda</i>	<2
<i>Fimbristylis simulans</i>	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
<i>Gomphrena cunninghamii</i>	
<i>Gossypium australe</i>	
<i>Gossypium robinsonii</i>	1
<i>Hakea chordophylla</i>	
<i>Hybanthus aurantiacus</i>	
Indeterminant spp.	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	
<i>Melhania</i> sp. (CH15-39)	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	
<i>Oldenlandia crouchiana</i>	
<i>Perotis rara</i>	
<i>Pluchea dentex</i>	
<i>Polycarpaea holtzei</i>	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	
<i>Rhagodia eremaea</i>	
<i>Rhynchosia bungarensis</i>	<2
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	
<i>Senna notabilis</i>	
<i>Setaria surgens</i>	
<i>Sida</i> sp. articulation below (A.A. Mitchell PRP 1605)	
<i>Solanum phlomoides</i>	
<i>Stemodia grossa</i>	3
<i>Streptoglossa decurrens</i>	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	
<i>Themeda triandra</i>	12

**Species****Cover of dominant species (%)***Trichodesma zeylanicum* var. *zeylanicum**Trichosanthes cucumerina* var. *cucumerina**Triodia epactia*

14

*Triodia wiseana*

&lt;2

*Ventilago viminalis*

Site		FL1046	
Described by	LJA	01/06/10	Quadrat 50 m x 50 m
Re-score	HEH	29/08/10	
	HEH	24/03/11	
MGA Zone	GDA94 50	538583 mE 7552892 mN	
Season	Poor (2010), Good (2011)		
Habitat	Slight east facing crest of minor rise in valley		
Soil	Red skeletal clay loam with surface stones,		
Rock Type	Ironstone. Continuous red rocks of rounded to sub-angular tabular shape with <2% outcropping		
Vegetation Description	<i>Triodia</i> aff. <i>melvillei</i> mid-dense hummock grassland with <i>Corymbia hamersleyana</i> scattered low trees		
NVIS V	U ^ <i>Corymbia hamersleyana</i> ^tree\6\r;G+ ^ <i>Triodia</i> aff. <i>melvillei</i> ^hummock grass\1\c		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	1% leaf litter, litter <1cm deep, 55% bare ground, no weed cover No evidence of human disturbance		



#### Species

#### Cover of dominant species (%)

*Acacia hilliana*  
*Corymbia hamersleyana*  
*Cucumis melo* subsp. *agrestis*  
*Cymbopogon ambiguus*  
*Dampiera candidans*  
*Eriachne ciliata*  
*Eriachne mucronata* (typical form)  
*Eucalyptus leucophloia* subsp. *leucophloia*  
*Fimbristylis simulans*  
*Goodenia stobbsiana*  
*Hakea chordophylla*  
*Mollugo molluginea*  
*Oldenlandia crouchiana*

**Species****Cover of dominant species (%)***Polycarpha holtzei**Polygala* aff. *isingii**Ptilotus fusiformis**Schizachyrium fragile**Senna glutinosa* subsp. *glutinosa**Triodia* aff. *melvillei**Triodia wiseana*

45

Site		FL1047	
Described by Re-score	LJA	28/05/10	Quadrat 50 m x 50 m
	JKN	30/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	553318 mE 7549876 mN	
Season	Poor (2010), Good (2011)		
Habitat	Moderate south facing scree slope		
Soil	Brown skeletal clay loam largely covered with stones		
Rock Type	Unknown		
Vegetation Description	<i>Acacia adoxa</i> var. <i>adoxo</i> low open shrubland over <i>Triodia wiseana</i> hummock grassland		
NVIS V	M ^ <i>Acacia adoxa</i> var. <i>adoxo</i> ^shrub\1\r;G+ ^ <i>Triodia wiseana</i> ^hummock grass\1\i		
Vegetation Condition	Excellent		
Fire Age	~2 years		
Notes	<1% leaf litter, litter <1 cm deep, 75% bare ground, no weed cover No evidence of human disturbance		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

2

*Acacia ancistrocarpa*

*Acacia dictyophleba*

*Acacia maitlandii*

*Acacia monticola*

*Acacia pyrifolia* var. *pyrifolia*

*Acacia retivenea*

*Acacia tenuissima*

*Aristida holathera* var. *latifolia*

*Corchorus lasiocarpus*

*Corymbia hamersleyana*

*Cymbopogon ambiguus*

*Dodonaea coriacea*

**Species****Cover of dominant species (%)**

*Dysphania rhadinostachya* subsp. *rhadinostachya*

*Eriachne mucronata* (typical form)

*Eucalyptus leucophloia* subsp. *leucophloia*

*Evolvulus alsinoides* var. *villosicalyx*

*Fimbristylis simulans*

*Goodenia stobbsiana*

*Gossypium australe*

*Hakea chordophylla*

*Hibiscus* aff. *coatesii*

*Indigofera monophylla*

*Jasminum didymum* subsp. *lineare*

*Oldenlandia crouchiana*

*Polycarpaea holtzei*

*Polycarpaea longiflora*

*Polygala* aff. *isingii*

*Ptilotus astrolasius*

*Ptilotus auriculifolius*

*Ptilotus calostachyus*

*Ptilotus exaltatus*

*Ptilotus fusiformis*

*Schizachyrium fragile*

*Senna glutinosa* subsp. *glutinosa*

*Senna glutinosa* subsp. *glutinosa* x *luerssenii*

*Sida* aff. *pilbarensis* (EOB46-01B)

*Solanum phlomoides*

*Tephrosia supina*

*Trachymene oleracea* subsp. *oleracea*

*Trichodesma zeylanicum* var. *zeylanicum*

*Triodia wiseana*

25

Site		FL1048	
Described by	LJA	01/06/10	Quadrat 50 m x 50 m
	Re-score	JKN	
MGA Zone	GDA94 50	553224 mE 7549171 mN	
Season	Poor (2010), Good (2011)		
Habitat	Lower slope		
Soil	Brown skeletal clay loam with surface stones		
Rock Type	Unknown		
Vegetation Description	<i>Triodia wiseana</i> hummock grassland		
NVIS V	G+ ^ <i>Triodia wiseana</i> ^hummock grass\2\i		
Vegetation Condition	Excellent		
Fire Age	>5 years	No evidence of recent fire	
Notes	<1% leaf litter, litter <1 cm deep, 80% bare ground, no weed cover No evidence of human disturbance <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> characteristic of area despite none being captured within the quadrat		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*

*Acacia dictyophleba*

*Acacia elachantha*

*Acacia retivenea*

*Acacia tenuissima*

*Acacia tumida* var. *pilbarensis*

*Clerodendrum floribundum* var. *angustifolium*

*Corchorus lasiocarpus*

*Corymbia deserticola* subsp. *deserticola*

*Cucumis maderaspatanus*

*Cymbopogon ambiguus*

*Dodonaea coriacea*

*Eriachne ciliata*

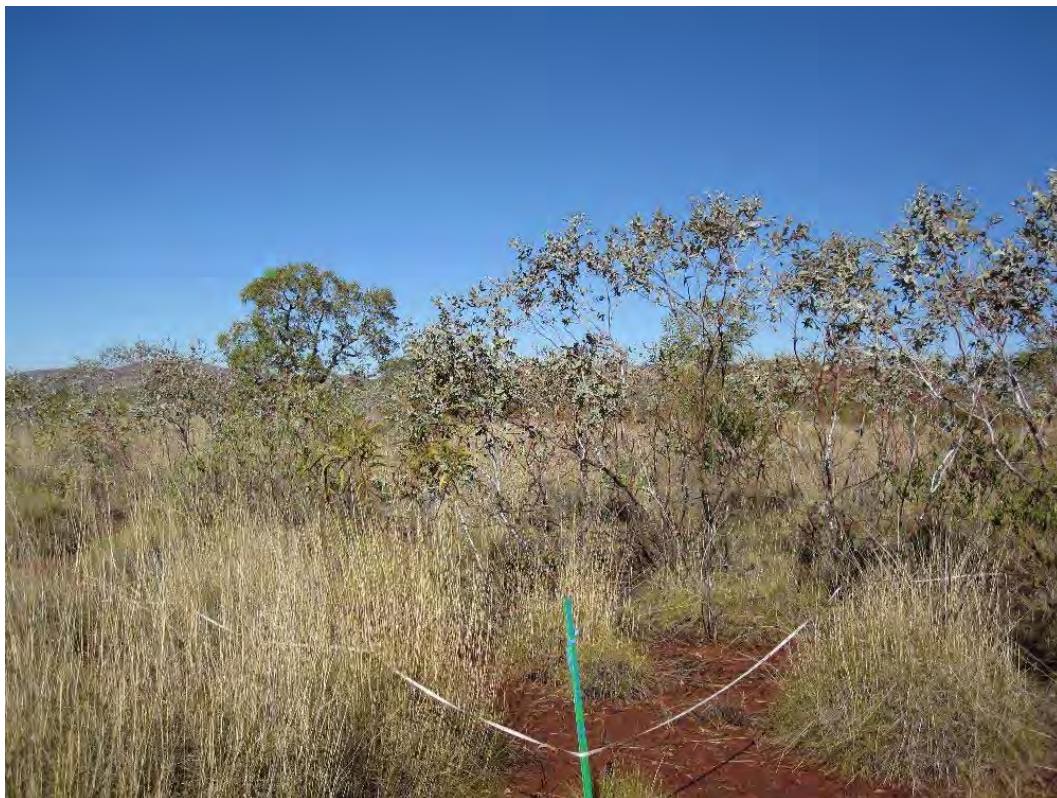
**Species****Cover of dominant species (%)**

*Eriachne mucronata* (typical form)  
*Eriachne pulchella* subsp. *dominii*  
*Euphorbia boophthona*  
*Fimbristylis simulans*  
*Hakea chordophylla*  
*Keraudrenia nephrosperma*  
*Oldenlandia crouchiana*  
*Polycarpaea corymbosa* var. *corymbosa*  
*Polycarpaea holtzei*  
*Polygala* aff. *isingii*  
*Ptilotus calostachyus*  
*Schizachyrium fragile*  
*Senna artemisioides* subsp. *oligophylla*  
*Senna glutinosa* subsp. *glutinosa*  
*Senna glutinosa* subsp. *pruinosa*  
*Sida* aff. *pilbarensis* (EOB46-01B)  
*Tinospora smilacina*  
*Trachymene oleracea* subsp. *oleracea*  
*Trichodesma zeylanicum* var. *zeylanicum*  
*Triodia wiseana*  
*Yakirra australiensis* var. *australiensis*

20



Site		FL1049	
Described by	HEH	01/06/10	Quadrat 50 m x 50 m
Re-score	HEH	26/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	550809 mE	7547584 mN
Season	Poor (2010), Good (2011)		
Habitat	Undulating plain		
Soil	Dark brown burgundy pisolite over sandy clay loam with surface		
Rock Type	Ironstone. Rocks of sub-rounded to subangular shape		
Vegetation Description	<i>Triodia epactia</i> hummock grassland with <i>Eucalyptus gamophylla</i> scattered mallees over <i>Acacia elachantha</i> , <i>A. ancistrocarpa</i> and <i>A. retivenea</i> scattered tall shrubs		
NVIS V	U ^ <i>Eucalyptus gamophylla</i> ^tree mallee\6\r;M ^^ <i>Acacia elachantha</i> , <i>A. ancistrocarpa</i> and <i>A. retivenea</i> ^shrub\4\r;G+ ^ <i>Triodia epactia</i> ^hummock grass\2\i		
Vegetation Condition	Very Good		
Fire Age	<10 years	Burnt logs and stags. Recent fire scar nearby (February/March)	
Notes	1-2% leaf litter, litter <1 cm deep, 70% bare ground, no weed cover Disturbance type: grazing (minimal) and fire		



**Species**

**Cover of dominant species (%)**

- Acacia ancistrocarpa*
- Acacia dictyophleba*
- Acacia elachantha*
- Acacia pyrifolia* var. *pyrifolia*
- Acacia retivenea*
- Aristida holathera* var. *holathera*
- Bonamia rosea*
- Bonamia* sp. Dampier (A.A. Mitchell PRP 217)
- Corymbia deserticola* subsp. *deserticola*
- Corymbia hamersleyana*
- Digitaria brownii*
- Dysphania rhadinostachya* subsp. *rhadinostachya*

Species	Cover of dominant species (%)
<i>Eucalyptus gamophylla</i>	<2
<i>Eulalia aurea</i>	
<i>Euphorbia australis</i>	
<i>Goodenia microptera</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Paraneurachne muelleri</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Pterocaulon sphacelatum</i>	
<i>Ptilotus astrolasius</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus fusiformis</i>	
<i>Ptilotus rotundifolius</i>	
<i>Schizachyrium fragile</i>	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	
<i>Senna notabilis</i>	
<i>Sida</i> aff. <i>echinocarpa</i> (MET 15,350)	
<i>Sida</i> aff. <i>pilbarensis</i> (EOB46-01B)	
<i>Solanum diversiflorum</i>	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia epactia</i>	25
<i>Yakirra australiensis</i> var. <i>australiensis</i>	

Site		FL1050	
Described by	HEH	01/06/10	Quadrat 50 m x 50 m
Re-score	HEH	26/08/10	
	JKN	24/03/11	
MGA Zone	GDA94 50	550931 mE 7548095 mN	
Season	Poor (2010), Good (2011)		
Habitat	Very gentle south facing lower hill slope		
Soil	Stony sandy loam		
Rock Type	Ironstone. Red small pebbles to large pebbles of angular tabular to subrounded tabular shape		
Vegetation Description	<i>Triodia wiseana</i> mid-dense hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees		
NVIS V	U ^ <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> \^tree\6\r; G+ ^ <i>Triodia wiseana</i> \^hummock grass\2\c		
Vegetation Condition	Very Good		
Fire Age	<10 years	Burnt logs and stags. Recent fire scar nearby (February/March)	
Notes	<1% leaf litter, litter <1 cm deep, 55% bare ground, no weed cover Area disturbance types: clearing (drill lines and pads) and fire		



#### Species

#### Cover of dominant species (%)

*Acacia adoxa* var. *adoxo*  
*Acacia dictyophleba*  
*Acacia elachantha*  
*Acacia maitlandii*  
*Acacia monticola*  
*Acacia retivenea*  
*Acacia tenuissima*  
*Bulbostylis barbata*  
*Corymbia deserticola* subsp. *deserticola*  
*Corymbia hamersleyana*  
*Cucumis maderaspatanus*  
*Cymbopogon obtectus*  
*Dysphania rhadinostachya* subsp. *rhadinostachya*

Species	Cover of dominant species (%)
<i>Eriachne ciliata</i>	
<i>Eriachne mucronata</i> (typical form)	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1
<i>Fimbristylis simulans</i>	
<i>Goodenia stobbsiana</i>	
<i>Hakea chordophylla</i>	
<i>Hakea lorea</i> subsp. <i>lorea</i>	
<i>Oldenlandia crouchiana</i>	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	
<i>Polycarpaea holtzei</i>	
<i>Ptilotus calostachyus</i>	
<i>Ptilotus exaltatus</i>	
<i>Ptilotus rotundifolius</i>	
<i>Schizachyrium fragile</i>	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
<i>Triodia wiseana</i>	45

## appendix seven: flora inventory















## appendix eight: threatened and priority flora report forms

# Threatened and Priority Flora Report Form

Version 1.0 January 2010

Please complete as much of the form as possible, with emphasis on those sections bordered in black.

<b>TAXON:</b> <u>Goodenia nuda</u>	<b>TPFL Pop. No.:</b> _____
<b>OBSERVATION DATE:</b> <u>26/05/10</u>	<b>CONSERVATION STATUS:</b> <u>P4</u> <input type="checkbox"/> New population <input type="checkbox"/>
<b>OBSERVER/S:</b> <u>Lyn Atkins</u>	<b>PHONE:</b> <u>08 9430 8955</u>
<b>ROLE:</b> <u>Senior Environmental Scientist</u>	<b>ORGANISATION:</b> <u>Ecoscape</u>

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

approx 70km NW of Tom Price

<b>DEC DISTRICT:</b> _____	<b>LGA:</b> _____	<b>Reserve No.:</b> _____
<b>DATUM:</b>		<b>Method used:</b>
GDA94 / MGA94 <input checked="" type="checkbox"/>	<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input type="checkbox"/>	No. satellites: _____ Map used: _____
WGS84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7552705</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	<b>Long / Easting:</b> <u>538879</u>	
	<b>ZONE:</b> <u>50</u>	
<b>LAND TENURE:</b>		
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input checked="" type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>
		SLK/Pole _____ to _____
		Specify other: _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>

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

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

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

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

Please return completed form to DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

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## appendix nine: regional floristic analysis

**Assignment of  
vegetation quadrats from the  
Flinders Mines' Pilbara Iron Ore Project  
Area – Blacksmith Flora and Vegetation  
survey to a regional floristic classification  
including data from adjoining areas**

**Prepared for**

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**August 2011**

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## 1.0 INTRODUCTION

### *1.1 Purpose of this report*

The purpose of this report is to assign fifty vegetation quadrats (vegetation recording sites) recorded by Ecoscape in the Flinders Mines' Pilbara Iron Ore Project Area (from the Blacksmith leases) to the units defined in the floristic classification in Griffin and Trudgen (2009a and b), which is used as a reference classification. This floristic analysis included earlier data from the nearby Fortescue Metals Group Solomon Project Area and other data from across the Pilbara Bioregion (of Thackway and Cresswell, eds 1995). The presence of a significant number of sites from near the current survey area in the earlier analysis implies that the data the classification is based on should have sites in it that are similar to most of those in the new data, and from this most of the new sites should be able to be placed in the existing classification.

Referring the new sites from the Flinders Mines Pilbara Iron Ore Project Area to the units defined in the floristic classification in Griffin and Trudgen (2009a and b) has the advantage of not starting "from scratch" with a new classification. It also means that the all the sites from the Solomon Project Area and the regional sites referred in another report (Griffin and Trudgen 2010) to this classification can be used to interpret the conservation value of the vegetation of the Flinders Mines Pilbara Iron Ore Project Area as recorded in the new quadrats.

### *1.2 Location of the project area*



**Figure 1.** Location of Flinders Mines Blacksmith Leases vegetation recording sites in the Pilbara Bioregion.

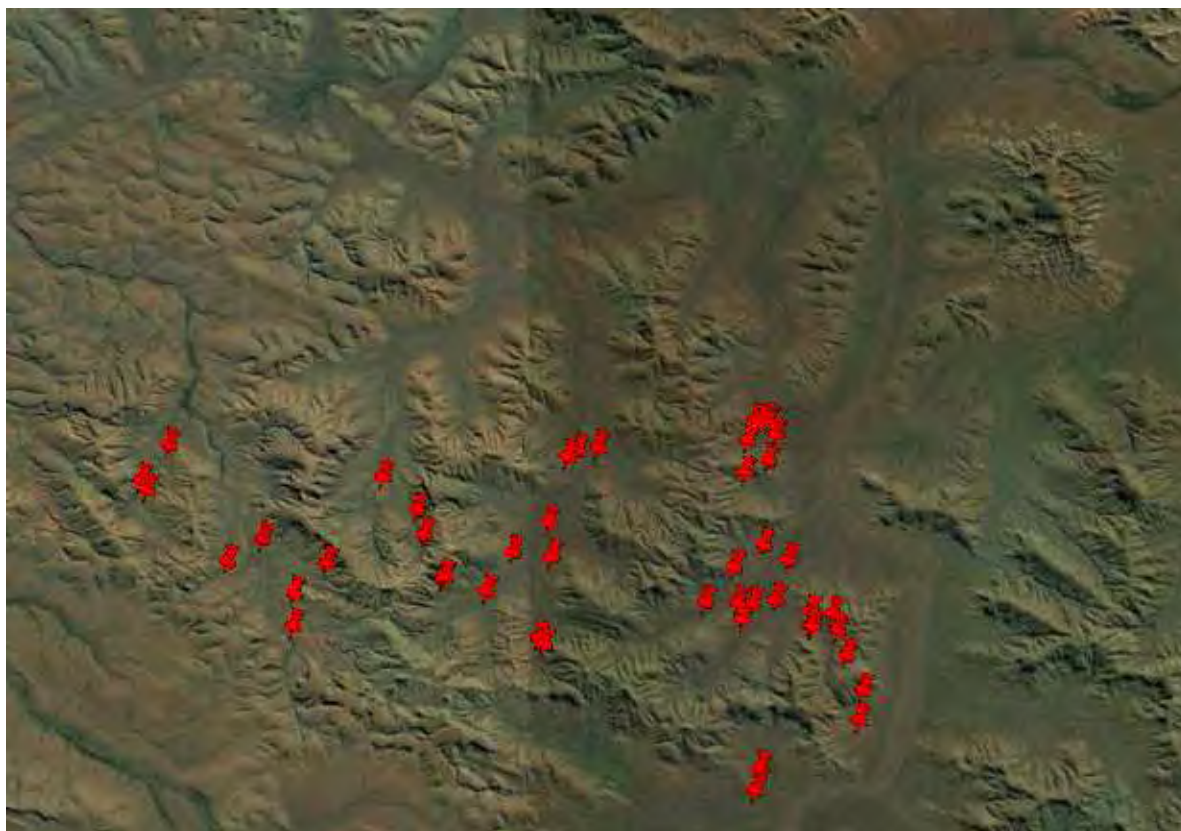
Notes: The sites are marked in red. Karratha is located on Nichol Bay, the bay on the east side of the Burrup Peninsula in the top left hand corner of the image. Image from Google Earth.

The Flinders Mines Pilbara Iron Ore Project Area is located in the Hamersley Ranges in the northwest of Western Australia. It lies to the west of Karijini National Park and about 175 kilometres southeast of the coastal town of Karratha. The general location is shown on Figure 1 on a satellite image.

The project area lies on the eastern side of the "Serenity" sub-area of the Fortescue metals Group "Solomon" project.

### ***1.3 The new sites***

The new sites are from one group and have the codes FL1001 to FL1050. Their distribution in the survey area is shown in Figure 2.



**Figure 2.** Location of vegetation recording sites (quadrats) in the Flinders Mines' Blacksmith Lease area

Notes. Sites marked as red pins. Image from Google Earth. The "Serenity" sub-area of the Fortescue metals Group "Solomon" project is located in the major drainage system immediately to the east of the eastern end of the Flinders Mines survey markers (the red pins).

### ***1.4 Features of the project area***

The Flinders Mines vegetation recording sites are shown on a satellite image in Figure 2. From this image it can be seen that the sites are located in a system of ridges in a fairly rugged part of the Hamersley Range.

While the Flinders Mines Blacksmith Leases Project Area lies on (and adjacent to) the eastern side of the "Serenity" sub-area of the Fortescue metals Group "Solomon" project it occurs on different parts of the landscape. The "Serenity" sub-area is focussed on the large creek system on the east side of the red markers on Figure 2. In contrast, the red markers show that the Flinders Mines project is focussed on lower to mid-slopes of the ranges.

It can also be seen from Figure 2 that the Flinders Mines' Blacksmith Leases Project Area sites are mainly on the valley floors or the lower slopes, rather than on the ridges, although a few are on the ridges. That is it only has a low to moderate range of habitats in a fairly uniform area of landscape.

## **2.0 METHODS**

### ***2.1 Data preparation***

The data from the earlier analysis (Griffin & Trudgen 2009a, b) incorporating sites from the Solomon Project Area and the new data was imported into a Microsoft Access database. The “queries” (short programs written using Microsoft Access) used to carry out the analyses were also incorporated into this database.

To make the data set as compatible as possible across the various projects used, reconciliation of flora species names used in the different projects was undertaken. This was necessary because of the potential for project specific variations in the use of names. To reduce this problem one of us (M.E. Trudgen, who has done the identifications for several of the larger projects in the database) checked the identifications of the specimens collected by Ecoscape.

### ***2.2 Analyses carried out***

Two types of analyses were used for the data from the new sites. Firstly, after data reconciliation, a classification was carried out by adding the new data to the regional data set and using the same steps as used in Griffin & Trudgen (2009a) to generate a dendrogram using the PATN analysis package. Such dendrograms are linear displays of the classification, as such they are limited in that they display in one dimension a much more complex set of relationships (these are indicated by the lines joining the sites, but these have to be understood as not joining the sites in a list from top to bottom).

The sites from the earlier classification (the reference classification) were annotated on this dendrogram with their unit numbers from this earlier classification and the location of the new sites in the dendrogram used to infer a unit for them from the earlier classification. The second analysis used was to identify the most similar sites ("Nearest Neighbour") to each of the new sites in the earlier dataset. The results of the two methods were then used to investigate the best assignment for the new sites.

A nearest neighbour analysis finds the site or sites that a new site is most similar to (in this case in the reference data set). This is done simply through finding the site or sites with the most similar flora list. This is a different procedure to finding related groups of sites through

a classification process. It has the limitation that the most similar sites in flora list may have species present that are not informative in a classification and mask real relationships.

Through the floristic group of each of the “nearest” reference sites, an inference can be made to the most likely floristic group for the new sites. The less similar these reference sites, the less certain the interpretation from this method.

While the reference classification had groups defined at several levels, the intention here is to assign the Flinders sites to the 600-group level of that classification. This is the level that is most appropriate for conservation assessment.

### 3.0 LIMITATIONS

All exercises such as those carried out for this report using the PATN package (Belbin 1987 and later dates) have limitations, including those related to data quality (see below), data density, data distribution and size of the total data set used. Experience with analyses similar to those carried out here has shown that the quality of field observation (which is related to the effort expended and the level of expertise available) has a significant influence on the classification obtained from the analyses, with poor data degrading results. However, the results of any analysis are influenced not only by the data quality, but also by the techniques employed.

Limitations in the quality of data can come about through:

- Deficiencies in site (quadrat) selection and size - poor site selection can mean that the data recorded does not represent one vegetation type, but is mixed, muddying the classification produced. Inadequate quadrat size means that the size of the area sampled is not adequate to get the appropriate data;
- Inadequate numbers of sites or poor sampling strategy, leading to not all types being sampled, or some types appearing less common than they really are, or more common than they really are;
- Inadequate searching of quadrats, leading to only part of the flora present being recorded and poor definition of the groups defined, or poor assignment of sites;
- Inaccurate identification of specimens, leading to poor definition of the groups defined, or poor assignment of sites;
- Over reliance on field identification of species, leading to errors in the species recorded for quadrats and consequent poor definition of the groups defined, or poor assignment of sites;
- Seasonal conditions such as drought can significantly affect the flora that can be recorded and recent fire can also significantly affect the flora that can be recorded.
- How carefully the data was entered into the database, how well the database is maintained over time to keep use of names of species consistent.

Over a number of years, the authors of this report have come to the conclusion that there is a widespread lack of recognition of the level of skill and determination needed to reduce such errors to the point where they do not have an undue effect on the data provided to them to process for reports such as the current report.

A number of these issues are also undoubtedly related to inadequate time being allowed for survey work, we are aware that this comes about partly through underestimation of time required by consultants themselves and partly through the timeframes of proponents and the times they allow for work (ie, the budgets they allow).

Obviously, variations in seasonal conditions at the time of survey can affect the quality of data collected, as less species will be available in dry periods rather than after good rainfall (when better material, enabling better identifications can also be obtained). The new data from the Blacksmith Leases provided for this report was recorded in a good year and has good species richness compared to data from the same general area (see Table 1) and are reasonably consistent with the reference data. If anything, the sites are richer than the reference data (this could cause minor problems for the analysis). Variation in the standard of identifications can also affect data quality between data sets. To reduce the effect of this problem in the current analyses, the identifications of the specimens collected by Ecoscape were checked for identification errors by one of us (MET). However, this checking cannot correct field identification errors.

Other sources of difference in data quality between the projects in the data set are the differences in experience of those undertaking the primary observations. The issue of significance is that data for the sorts of analysis carried out need to be of good quality, or analyses are much more difficult and there is a risk that significant environmental variation relevant to environmental impact assessment may not be discriminated.

**Table 1.** Frequency distribution of species richness at sites by projects

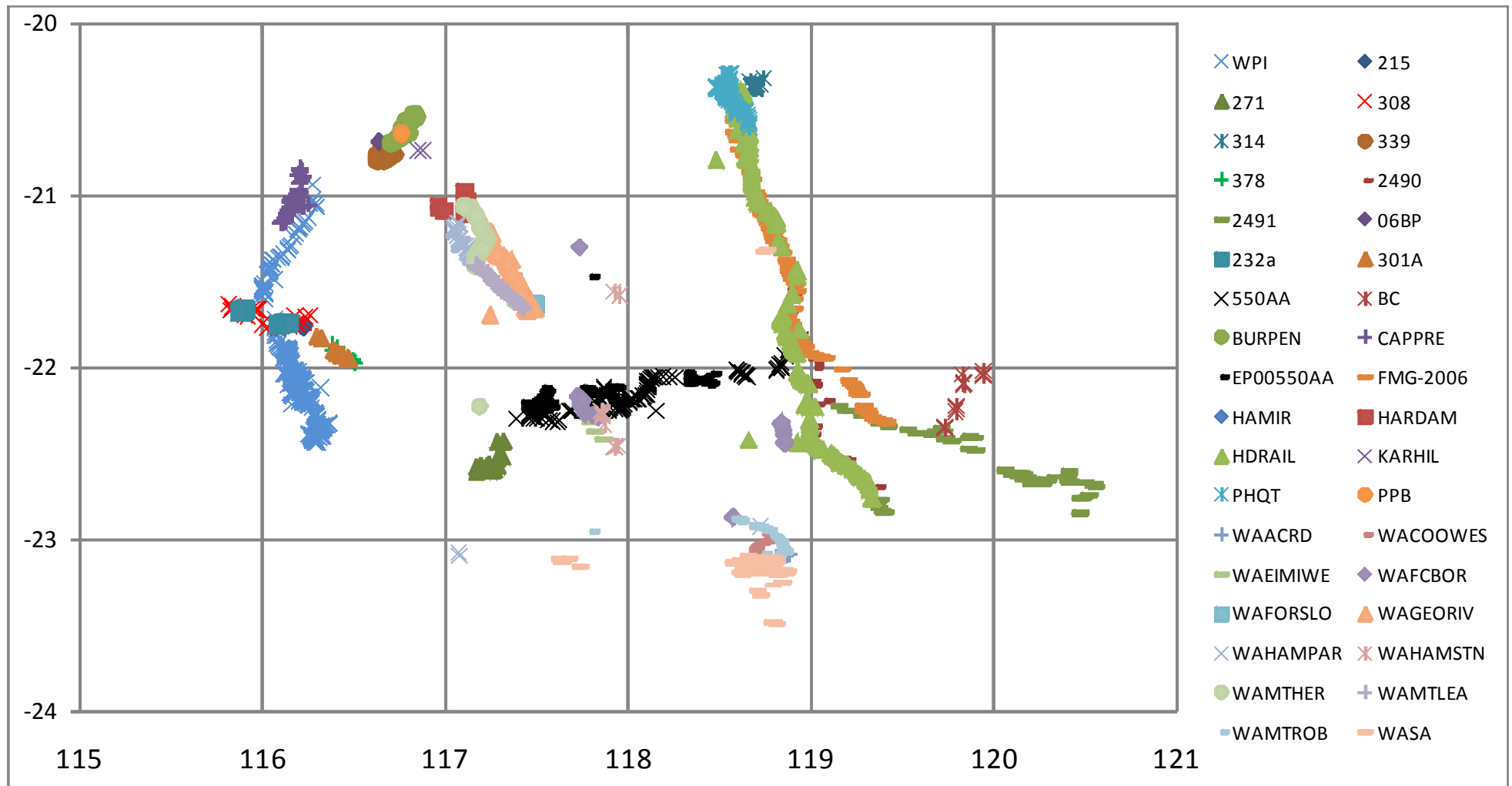
PROJ	Av	sites	% of sites in richness classes									
			0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	100-109
<b>Flinders</b>	<b>42</b>	<b>51</b>			<b>5</b>	<b>18</b>	<b>15</b>	<b>6</b>	<b>6</b>		<b>1</b>	
550AA	25	135	10	45	38	23	12	7				
EP00550AA	29	268	6	68	71	61	43	16	3			
WPI	22	427	13	234	84	45	28	17	5	1		
HDRAIL	33	192	6	20	40	66	42	14	3	1		
FMG-2006	22	151	12	57	50	20	9	2	1			
2490	37	45		5	11	13	8	6		1		1
BC	21	14		6	6	2						
WAFCBOR	29	41		12	9	11	6	3				

An approach sometimes used in an attempt to reduce the impact of differences due to season is to include only the perennial species in the dataset analysis. This has not been done with this case, as it was not used in the analyses for the reference classification.

Limitations in data density and distribution (see Map 1) for the classification from Griffin and Trudgen 2009a & b) used for the analyses carried out for this report are also going to have an impact on the results produced, as there is significant clustering of the data (into project areas) rather than an even spread, and variation in the density (and therefore the number of replicates in different geological/habitat types in different projects) of data in different projects. Such limitations could lead to some of the units defined being poorly sampled and, therefore, appearing to be less common than they actually are, others could be more heavily sampled than in an even spread of sites and appear to be more common than they actually are.

Bearing in mind the limitations in the data discussed above, it is obvious that there must be limitations in the definition of the units defined, as it is acknowledged that the data on which they are based on is not ideal. Further, depending on the level of the group defined it should be recognised that the composition of the groups defined by these analyses should not necessarily be interpreted as communities that can be recognised in the field. This may be possible for a proportion of the lower order groups defined, but an extensive process of review and refinement, aided by field knowledge and checking would be required to extend the analysis to such a point for all such groups at the lowest level.





**Map 1.** Location of the quadrats and releves used in the reference data set and classification used for this report colour coded to show the project they were recorded for.

Note: Degrees of latitude and longitude on the axes, the sites are spread across the Pilbara Bioregion. Abbreviations for projects given in Table 3 of Trudgen and Griffin (2009a). The black sites at about 117.5\* are the sites in the FMG Solomon survey area.

It should be noted that the level of classification used in the reference set (600 groups) is a value judgement, albeit one based on considerable experience. So, too are aspects of the inference of most likely group drawn from the nearest neighbour analysis. This is particularly the case in attempting to distinguish the difference between genuinely new floristic groups and results that appear to be such, but are in fact artefacts caused by poor data.

Experience with a similar situation (Griffin and Trudgen 2010) to the current task (fitting new sites to the reference classification), where sites were referred to the reference classification indicated that under these circumstances that the analyses carried out would give answers that were frequently near (or include) the correct unit to assign a new site to, but that it might be necessary to compare the vegetation descriptions and flora lists for the new sites to a number of the units in the classification to make decision as to which to finally assign each site to. The better quality data in the current case might make this unnecessary.

These limitations in the data mean that the assignment of sites to the previous classification will have a level of error, it is not possible to define this as a proportion of the sites; however it is not thought to be very high.

As the new sites are from outside the immediate area of the Solomon Project Area, the possibility of quadrats representing units not sampled by the classification used is fairly obvious. As the new sites sample different habitat to the adjoining Serenity sub-area of the Solomon Project Area, this reinforces the possibility.

## 4.0 RESULTS

### ***4.1 Results from the classification of the Flinders data with the reference data set***

An important result of the classification of the Flinders data with the data from the reference data set is that virtually all of the new sites join with sites from the Fortescue Metals Group Solomon area projects (projects EP00550AA and 550AA in the reference data set). As the Solomon sites (especially the Serenity sub-area sites) are from close by, this demonstrates that at the regional scale the same floristic groupings are present in both datasets. This shows that any differences in the data quality between the new and reference data sets is not so high that regional patterns are obscured and suggests that the data should be able to give a reasonable result with one or other form of analysis.

The new sites are shown in context with the sites to which they were joined in the dendrogram in Table 2. Most of the new sites group in a single block in the dendrogram, although a few do not. When additional data groups like this in a dendrogram, it can indicate that the new data has a systematic difference from the earlier data. This can either be a real difference (reflecting differences in vegetation sampled) or it can be due to seasonal or other factors (see limitations section above). Given how close the new survey area is to the various FMG Solomon project areas, it is likely that the dendrogram is not a reliable method for assigning the sites that are in the large block. However, for those new sites that occur scattered through the classification (dendrogram) this method is likely to be reasonably reliable in this case.

As with many similar analyses comparing new sites to an existing data set, the new sites tend to be more similar to each other than to the reference sites, due to survey specific factors (season, identification differences, different workers). It is presumed that the large block of sites referred to above has occurred due to such factors. Thus an analysis using nearest neighbour analysis is given in the next section using the inferred groups to help infer the more likely floristic group of some sites, particularly those in the large block.

Table 2. Extracts from the dendrogram showing the classification of the Flinders data with the reference data set

Notes. Only those segments of the dendrogram that show how the new sites join to the reference sites are shown. The pale grey rows indicate breaks in the dendrogram. The column headed "600-gp" has the 600-group level units for the sites in the 2009 classification. The adjacent column (#) is the number of species at each site.

PROJ	site	#	600-gp	data
				0.0000    0.2444    0.4889    0.7333    0.9778    1.2222    1.4667    1.7111    1.9556    2.2000
WAMTLEA	0416	22	196	
550AA	RAIL008b	24	293	
EP00550AA	SERN063	22	293	
EP00550AA	CG004	20	291	
EP00550AA	SERN028	36	293	
EP00550AA	SERN031	40	293	
EP00550AA	SERN042	20	293	
EP00550AA	CG005	18	293	
EP00550AA	SERN046	18	293	
Flinders	FL1014	29		
EP00550AA	SERN043	31	293	
EP00550AA	SERN 101	29	293	
EP00550AA	SERN018	34	293	
EP00550AA	SERN026	28	293	
WAFCBOR	1068	20	282	
550AA	KR004	22	284	
WAFCBOR	1069	13	284	
EP00550AA	VOQ26	20	285	
Flinders	FL1046	20		
EP00550AA	VOQ008	17	284	
550AA	5RAIL033	14	284	
EP00550AA	VOQ21	17	284	
EP00550AA	VOQ30	11	285	
EP00550AA	VOQ39	16	285	
Flinders	FL1024	27		
EP00550AA	VOQ32	19	285	
EP00550AA	VOQ43	22	285	
550AA	5RAIL032	10	284	
EP00550AA	VOK018	15	284	
EP00550AA	SERN019	21	296	

PROJ	site	#	600- gp	data																	
				0.0000	0.2444	0.4889	0.7333	0.9778	1.2222	1.4667	1.7111	1.9556	2.2000								
EP00550AA	SERN106	17	296																		
EP00550AA	SERN-CV1	17	296																		
EP00550AA	VOK027	26	296																		
EP00550AA	TRIN015	29	296																		
550AA	5RAIL034	24	289																		
EP00550AA	VOQ29	15	289																		
EP00550AA	VOK009	23	289																		
EP00550AA	TRIN011	13	290																		
EP00550AA	TRIN011A	24	290																		
WAFCBOR	1065	31	287																		
550AA	7RAIL048	37	287																		
EP00550AA	SERN044	30	295																		
EP00550AA	VOK015	30	295																		
EP00550AA	SERN076	29	288																		
EP00550AA	SERN100	29	288																		
EP00550AA	SERN102	43	288																		
Flinders	FL1001	34																			
Flinders	FL1002	39																			
Flinders	FL1003	41																			
Flinders	FL1017	41																			
Flinders	FL1004	51																			
Flinders	FL1006	62																			
Flinders	FL1015	30																			
Flinders	FL1042	33																			
Flinders	FL1016	42																			
Flinders	FL1025	54																			
Flinders	FL1033	41																			
Flinders	FL1028	39																			
Flinders	FL1034	30																			
Flinders	FL1041	24																			
Flinders	FL1037	30																			
Flinders	FL1038	40																			
Flinders	FL1039	36																			
Flinders	FL1040	43																			
Flinders	FL1005	30																			

PROJ	site	#	600- gp	data																	
				0.0000	0.2444	0.4889	0.7333	0.9778	1.2222	1.4667	1.7111	1.9556	2.2000								
Flinders	FL1008	33																			
Flinders	FL1050	31																			
Flinders	FL1047	38																			
Flinders	FL1018	30																			
Flinders	FL1013	40																			
Flinders	FL1048	33																			
Flinders	FL1021	34																			
Flinders	FL1020	33																			
Flinders	FL1032	43																			
EP00550AA	SERN112	37	293																		
Flinders	FL1010	30																			
Flinders	FL1011	32																			
Flinders	FL1007	52																			
Flinders	FL1019	51																			
Flinders	FL1022	60																			
Flinders	FL1023	45																			
Flinders	FL1029	51																			
Flinders	FL1012	35																			
Flinders	FL1009	37																			
Flinders	FL1030	39																			
Flinders	FL1031	56																			
Flinders	FL1049	36																			
Flinders	FL1036	34																			
EP00550AA	SERN029	41	298																		
EP00550AA	VOK012	50	298																		
EP00550AA	SERN109	47	298																		
EP00550AA	VOK021	45	298																		
EP00550AA	VOK002	29	298																		
EP00550AA	VOK007	36	298																		
EP00550AA	VOK011	42	298																		
WAMTLEA	0489	8	277																		
550AA	KR002	10	277																		
Flinders	FL1044	19																			
EP00550AA	FT13	23	277																		

PROJ	site	#	600- gp	data
				0.0000    0.2444    0.4889    0.7333    0.9778    1.2222    1.4667    1.7111    1.9556    2.2000
EP00550AA	FT17	15	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
EP00550AA	FT05	12	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
EP00550AA	FT12	12	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
EP00550AA	FT19	17	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
EP00550AA	FT20	19	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
EP00550AA	FT18	9	277	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
WPI	BOR095	14	148	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL_RIP	18		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
HDRAIL	H045	25	155	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
HDRAIL	H285	42	126	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
550AA	6RAIL010	44	301	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
550AA	6RAIL011	56	301	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
550AA	7RAIL039	59	172	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
550AA	RAIL007	42	172	_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL1026	63		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL1027	78		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL1035	55		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL1045	57		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
Flinders	FL1043	52		_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
				_____  _____  _____  _____  _____  _____  _____  _____  _____  _____
				0.0000    0.2444    0.4889    0.7333    0.9778    1.2222    1.4667    1.7111    1.9556    2.2000

## 4.2 Results from Nearest Neighbours analysis of the Flinders data with the reference data set

The inferred floristic group from the nearest neighbour analysis tended to be consistent with that of the reference sites to which the joined. The exception to this was a large block of new sites (see above). Table 3 gives the inferred floristic group for each of the new sites. Only a few of the assignments appeared significantly uncertain.

**Table 3.** Allocation of new sites to the 600-group level floristic groups of the reference classification.

Notes. The two left part of the table gives the data in site order, the right hand part in unit order, in the latter case the different units are colour coded. A question mark in the hand columns headed "Q" indicates that the Nearest Neighbours analysis suggests that the assignment is not particularly strong. Column "NNB unit" = unit allocation from Nearest Neighbours analysis.

<b>SITE</b>	<b>ORDER</b>						<b>UNIT</b>	<b>ORDER</b>				
Site	NNB unit	Q	Site	NNB	Q		Site	NNB unit	Q	Site	NNB	Q
FL_RIP	257	?	FL1026	301			FL1043	171		FL1002	299	
FL1001	299		FL1027	301			FL1029	174		FL1003	299	
FL1002	299		FL1028	298			FL1031	174		FL1004	299	
FL1003	299		FL1029	174			FL_RIP	257	?	FL1016	299	
FL1004	299		FL1030	321			FL1044	277		FL1017	299	
FL1005	293		FL1031	174			FL1005	293		FL1034	299	
FL1006	298		FL1032	293			FL1008	293		FL1037	299	
FL1007	321		FL1033	300			FL1010	293		FL1039	299	
FL1008	293		FL1034	299			FL1011	293		FL1040	299	
FL1009	321		FL1035	301			FL1013	293		FL1041	299	
FL1010	293		FL1036	298			FL1014	293		FL1015	300	
FL1011	293		FL1037	299			FL1020	293		FL1018	300	
FL1012	321		FL1038	298			FL1021	293		FL1033	300	
FL1013	293		FL1039	299			FL1024	293		FL1046	300	
FL1014	293		FL1040	299			FL1032	293		FL1026	301	
FL1015	300		FL1041	299			FL1047	293		FL1027	301	
FL1016	299		FL1042	298			FL1048	293		FL1035	301	
FL1017	299		FL1043	171			FL1050	293		FL1045	301	?
FL1018	300		FL1044	277			FL1006	298		FL1007	321	
FL1019	298		FL1045	301	?		FL1019	298		FL1009	321	
FL1020	293		FL1046	300			FL1025	298		FL1012	321	
FL1021	293		FL1047	293			FL1028	298		FL1022	321	
FL1022	321		FL1048	293			FL1036	298		FL1023	321	
FL1023	321		FL1049	321			FL1038	298		FL1030	321	
FL1024	293		FL1050	293			FL1042	298		FL1049	321	
FL1025	298						FL1001	299				



Table 4 (and the second half of Table 3) shows that the fifty-one (51) new sites were allocated to ten floristic groups at the 600-group level of the reference classification. Nearly three-quarters of the sites were allocated to just four of these units. This is considered likely to be due (see Figure 2 above) to the fact that the survey area has a limited range of habitat, being located in a fairly repetitive series of ridges and intervening valleys. Table 4 also shows that of these ten floristic groups only one was not from the Solomon projects (EP00550AA and 550AA) and only two others had sites in the reference set that occurred in other projects. This reaffirms that the new sites are most related to the floristic communities of the Solomon area.

It should be noted that these nine floristic groups represent a small proportion of the 96 groups at the 600 group level that have been recorded in the Solomon projects. About 60 of these rarely if at all are in other projects. Thus, it is reasonable to assume that the current inference process may have “over looked” occurrences of some of these groups. Never the less, the 7 groups (dark highlighting in Table 4) that were only in the Solomon projects are amongst the more common floristic communities so far recognised in the Solomon area.

**Table 4.** Summary of allocation of new sites to the 600-group level of the reference floristic classification

Notes. The table shows all projects from the reference data set to which groups in the new data belong and the number of sites. The shading indicates the relative localisation of the reference sites in the Solomon area (projects EP00550AA and 550AA)

						Reference Sites				
gp50	gp100	gp200	gp400	gp600	Flinders	All	550AA	EP00550AA	WPI	WAMTLEA
10	29	57	110	171	1	32	1	31		
10	29	58	112	174	2	21		21		
17	42	90	170	257	1	18			18	
20	45	96	183	277	1	10	1	7		2
21	46	100	192	293	13	12	1	11		
21	46	101	194	299	11	8	1	7		
21	46	101	194	298	7	7		7		
21	46	101	195	300	4	6		6		
21	47	102	196	301	4	8	5		3	
23	49	107	209	321	7	30	9	21		

An extract of data from the records for each site in each of these groups are provided in Appendix 1. This allows inferences about the vegetation and habitat for each of these groups.

### ***4.3 Distribution of the groups at the 600-group level of the reference classification identified in the Flinders data***

A series of distribution maps of the groups at the 600-group level identified in the Flinders data are given below as Figure 3. These show the Flinders sites in each group as green markers, the reference sites for the group as yellow markers and the other Flinders sites as red markers

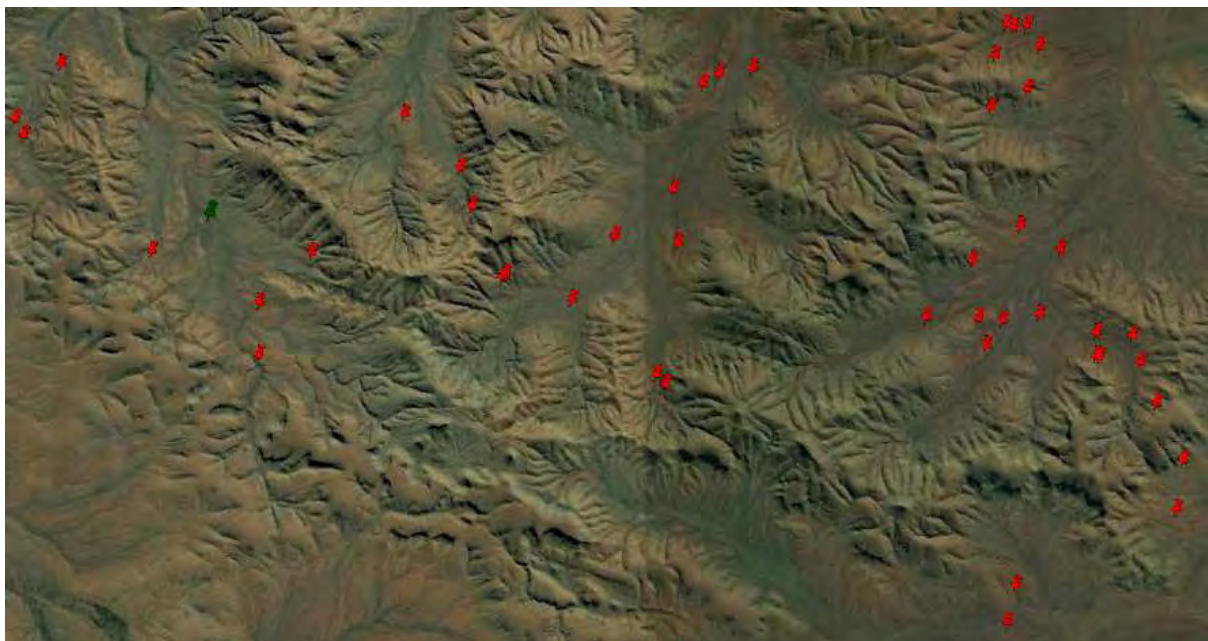
Figure 3. Distribution of sites from the floristic groups (at the 600 group level of the reference classification) in the Flinders data

A regional (all sites) and a local (Flinders sites) map is given for each unit except for units 257, 293 and 299. Images from Google Earth.

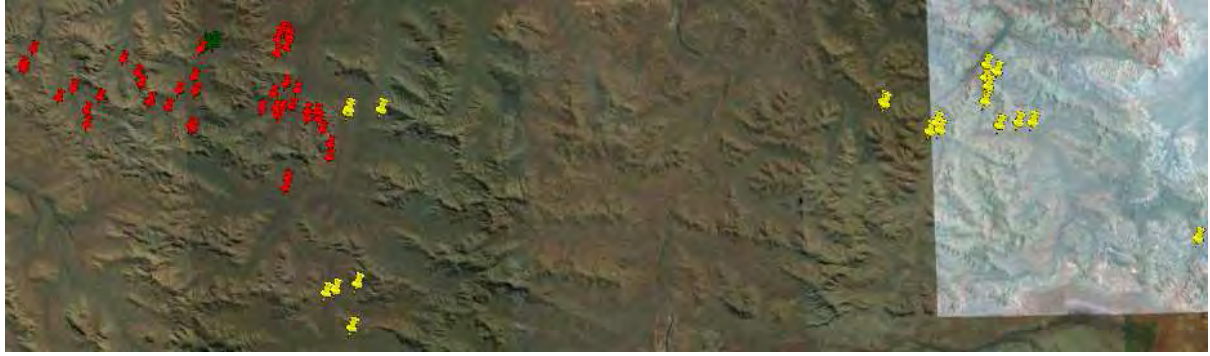
#### **Group 171 regional distribution**



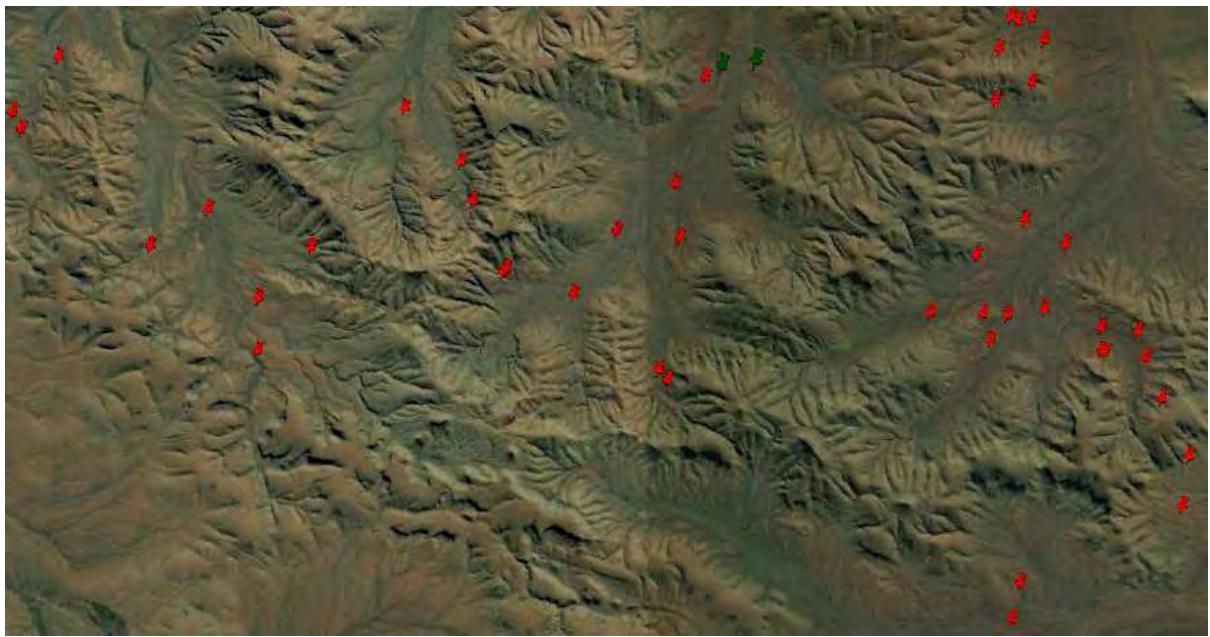
#### **Group 171 local distribution**



**Group 174 regional distribution**

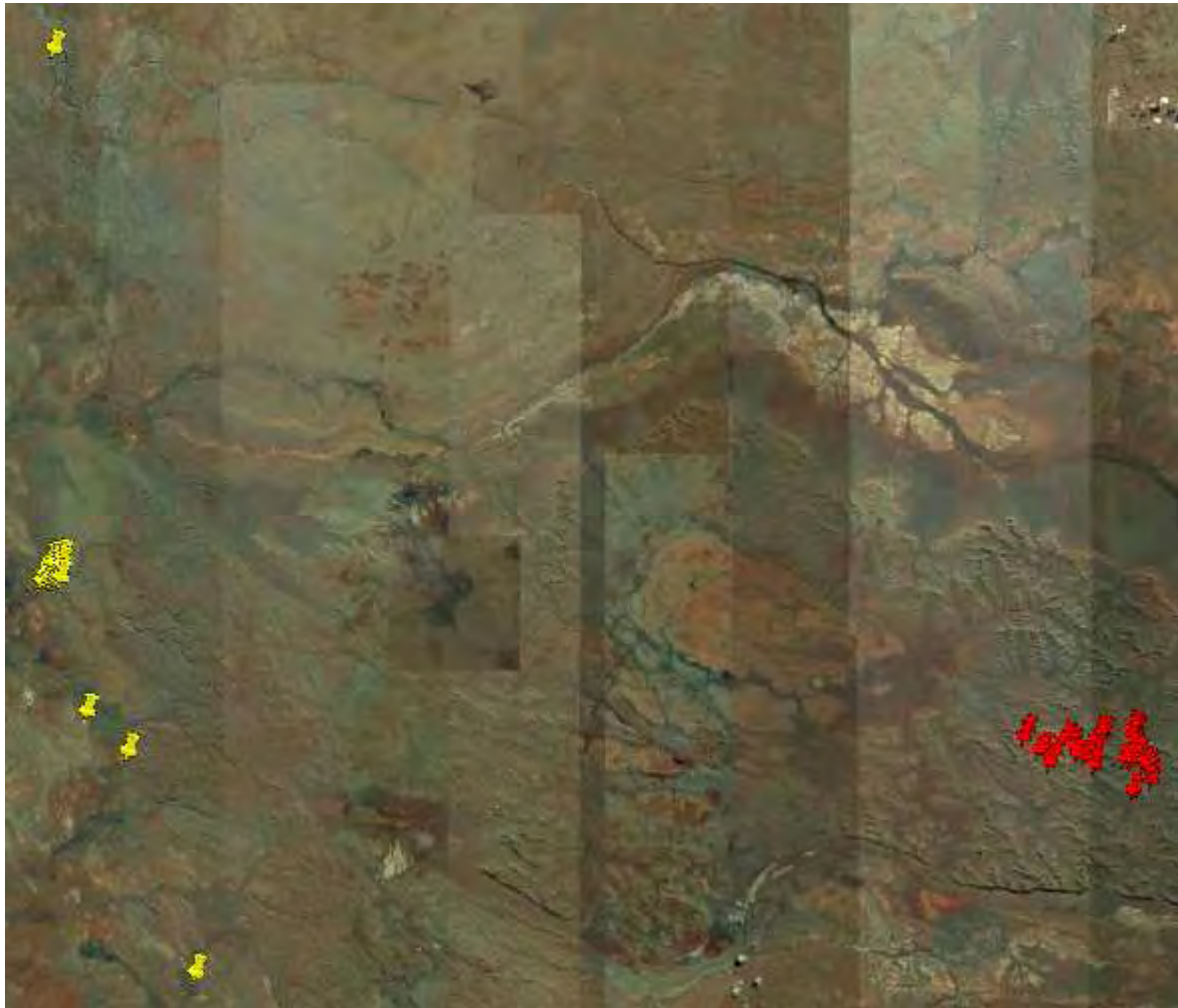


**Group 174 local distribution**

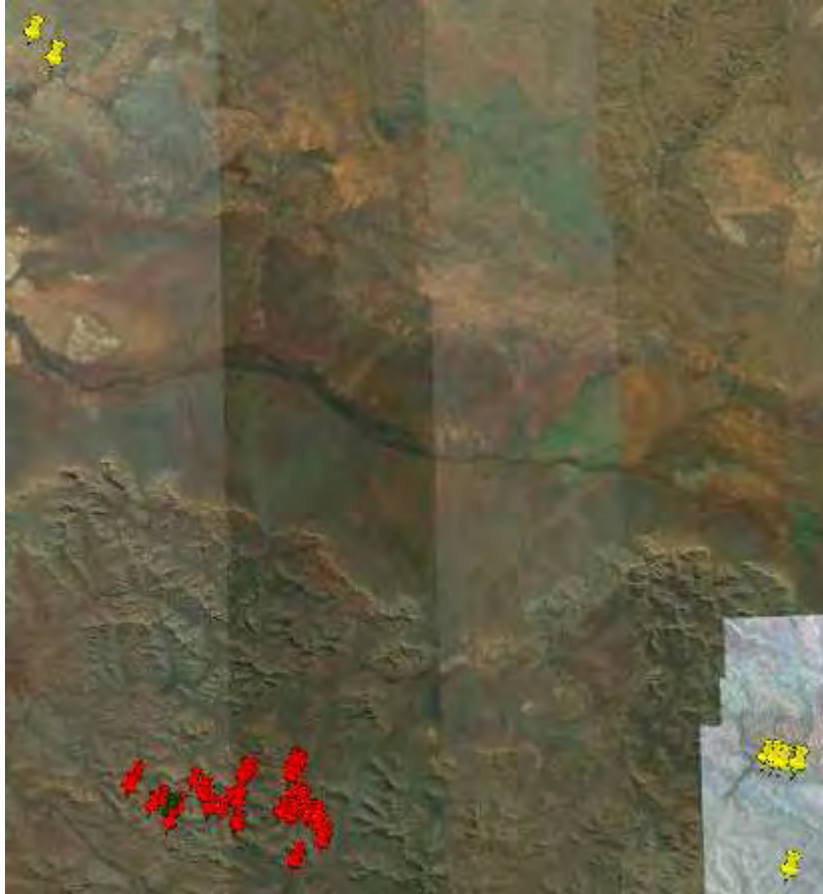


**Group 257 regional distribution**

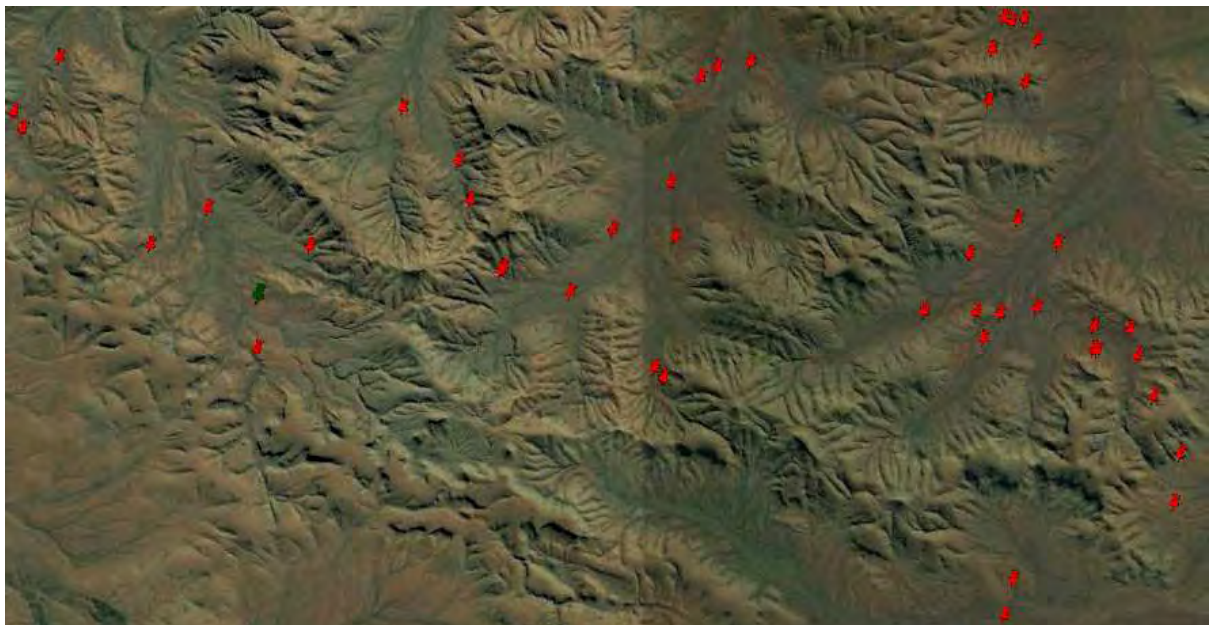
(No coordinates were provided for one of the new sites.)



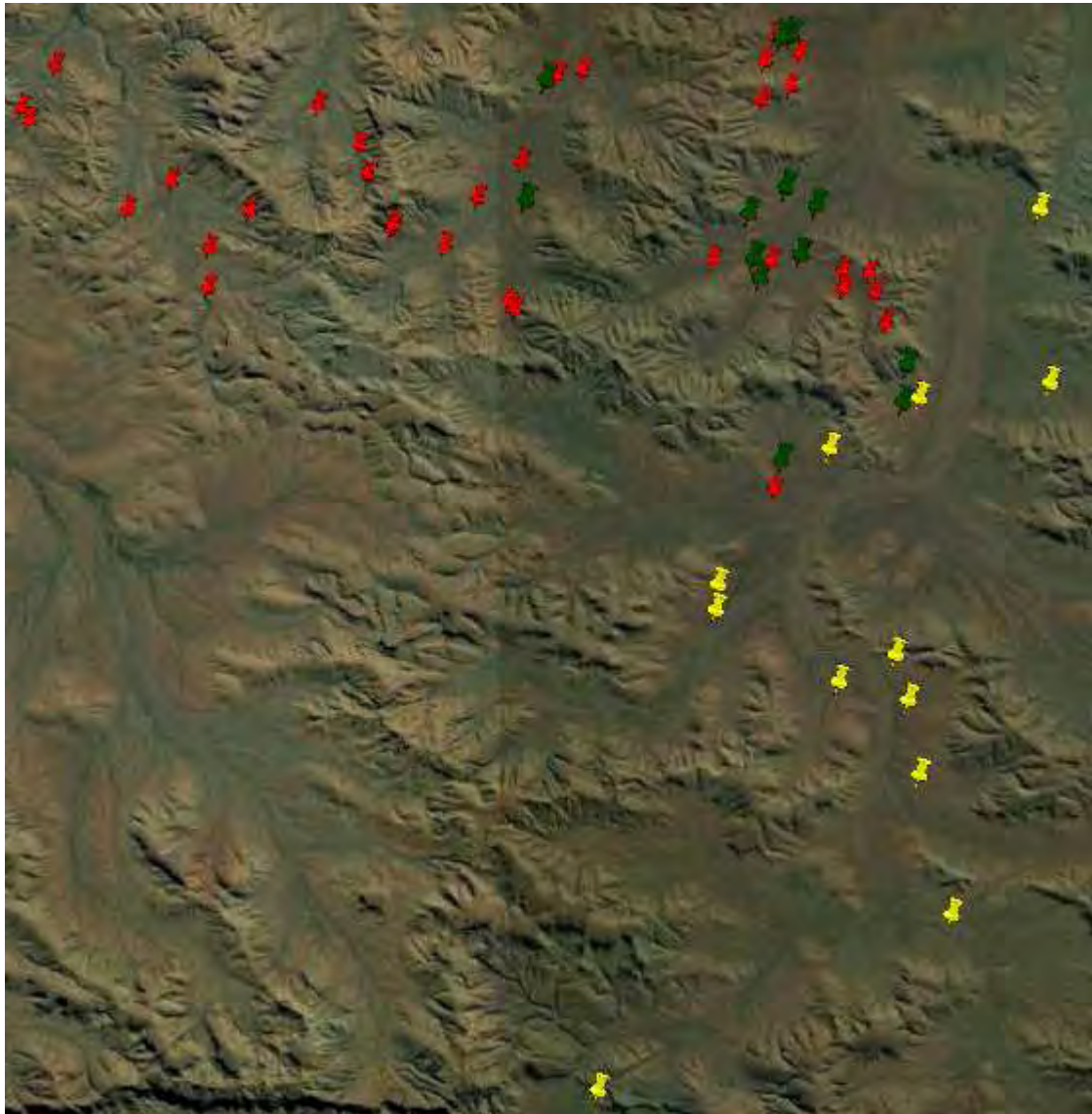
**Group 277 regional distribution**



**Group 277 local distribution**



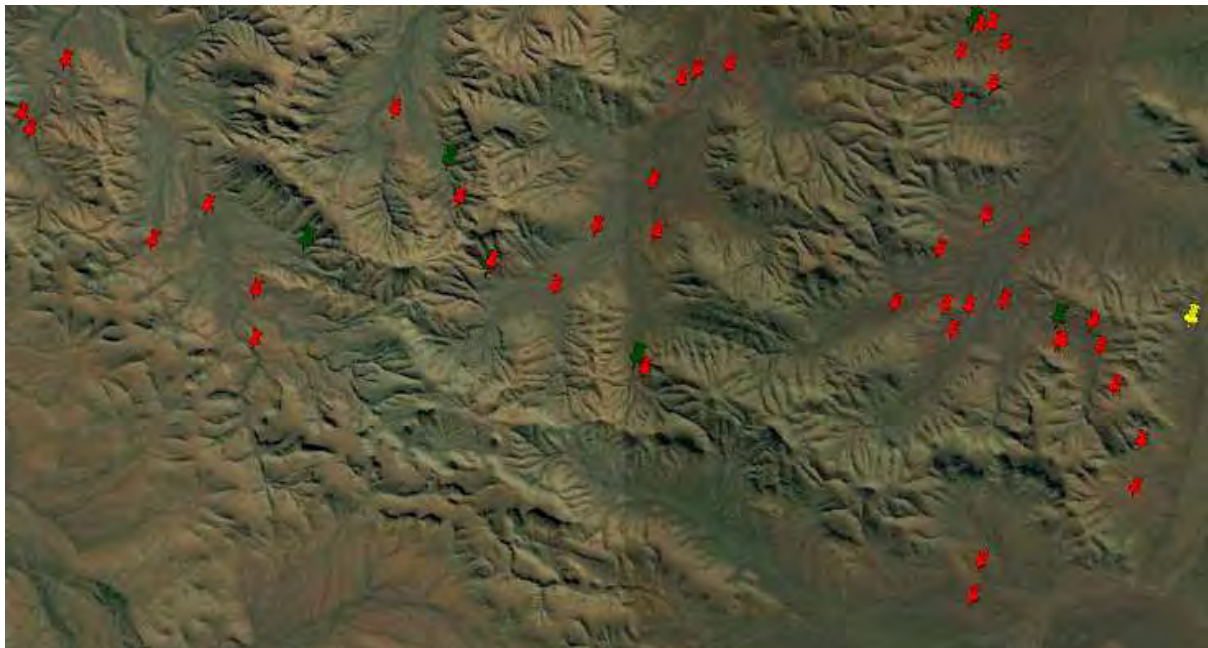
**Group 293 regional distribution**



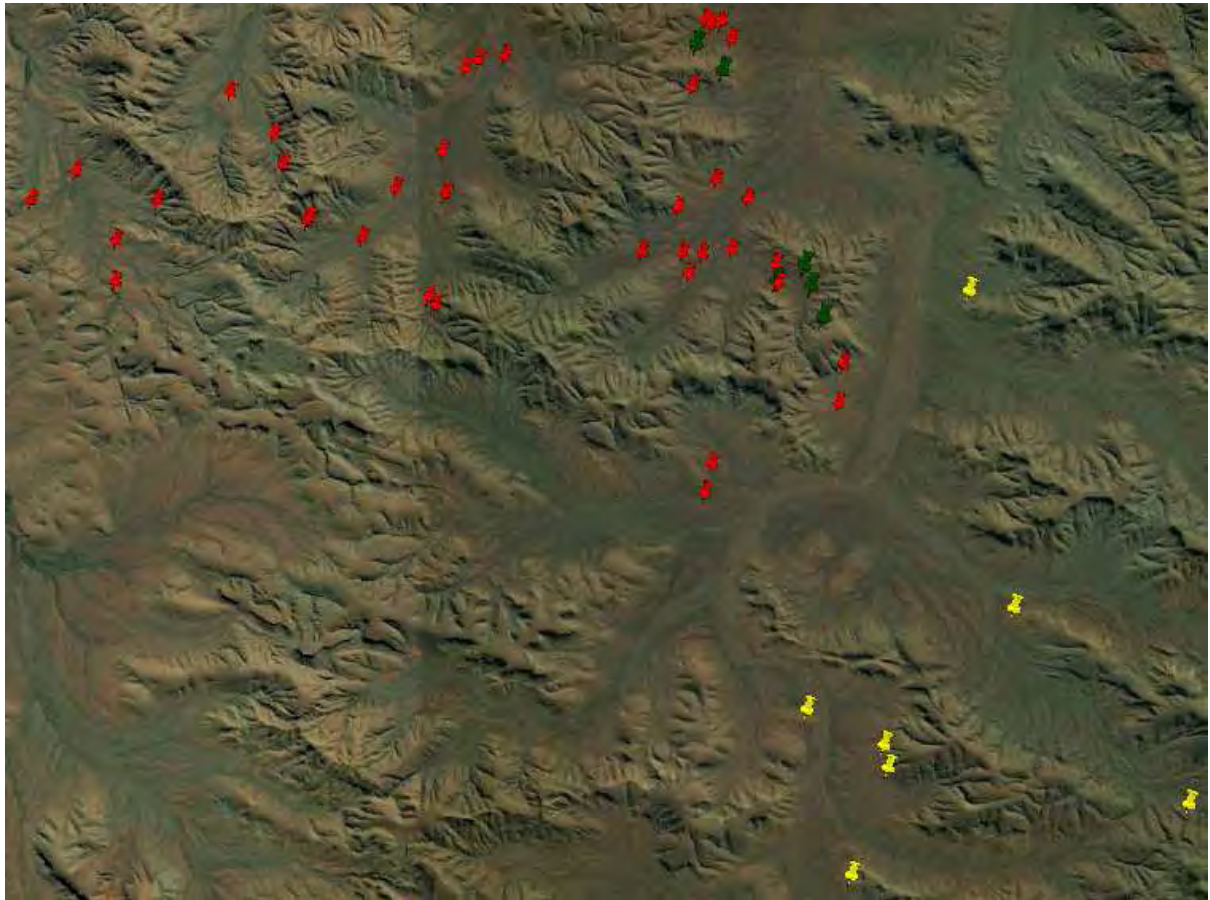
**Group 298 regional distribution**



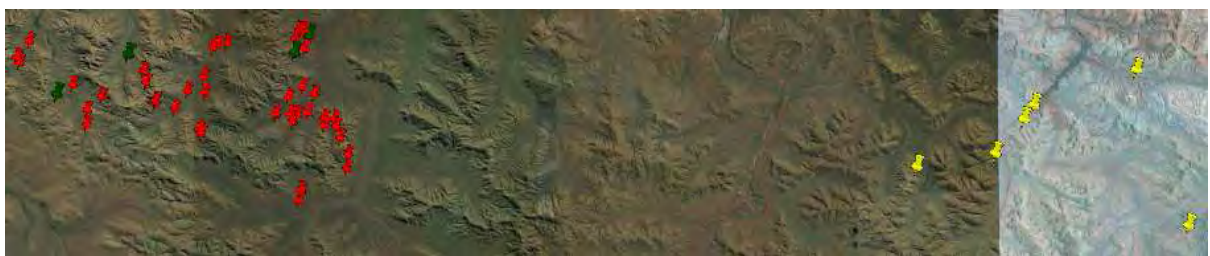
**Group 298 local distribution**



**Group 299 regional distribution**

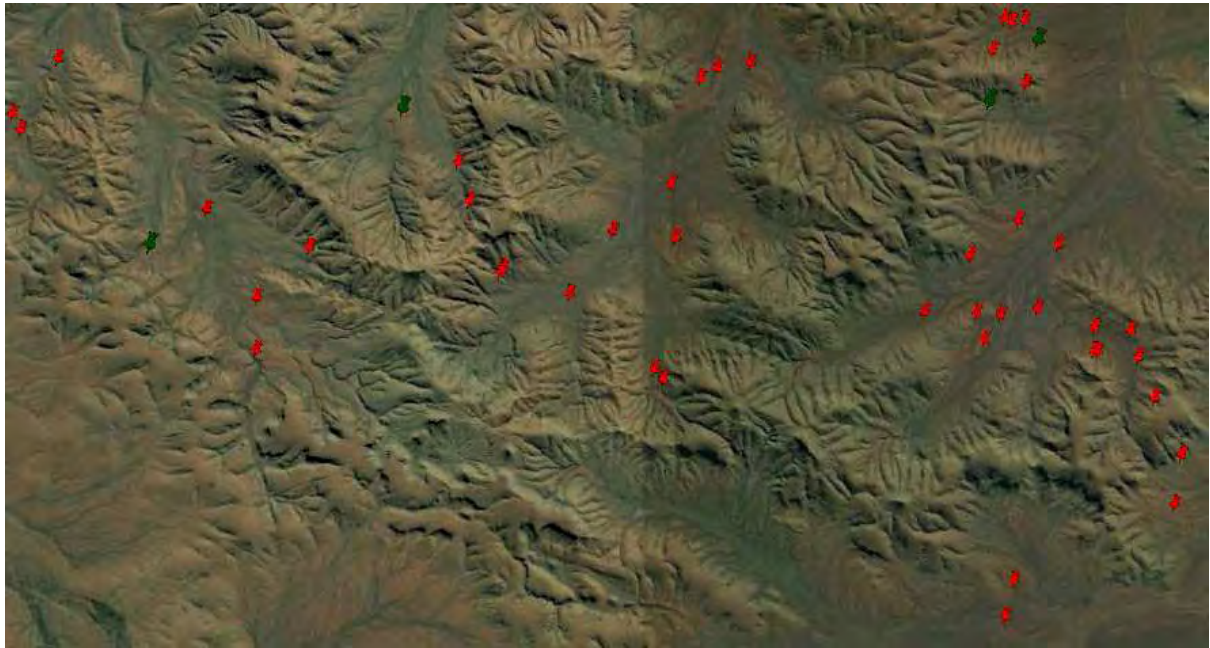


**Group 300 regional distribution**





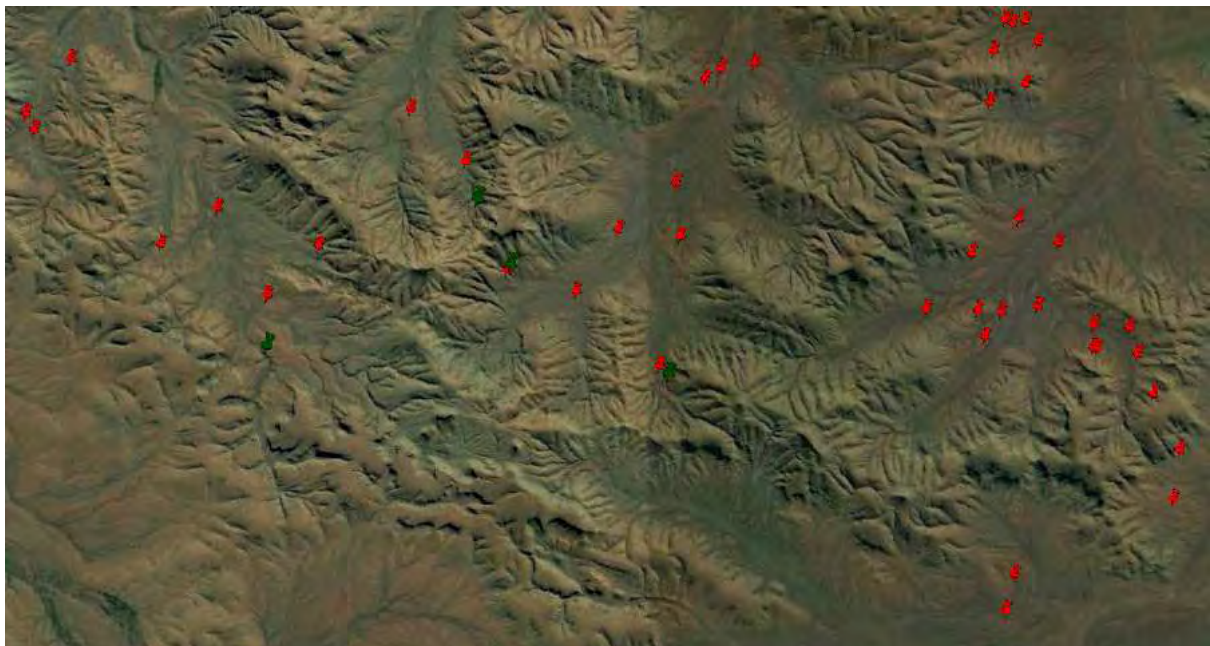
**Group 300 local distribution**



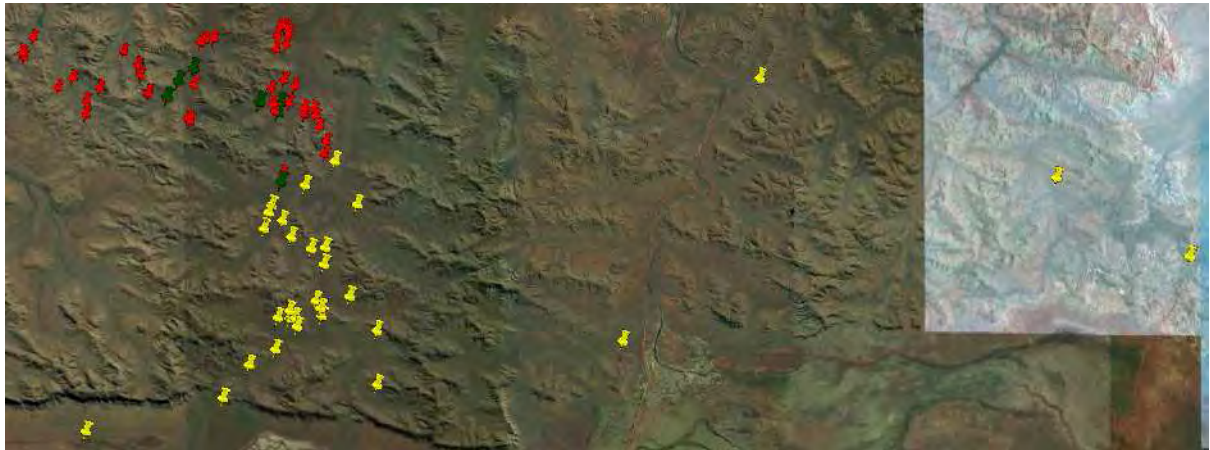
**Group 301 regional distribution**



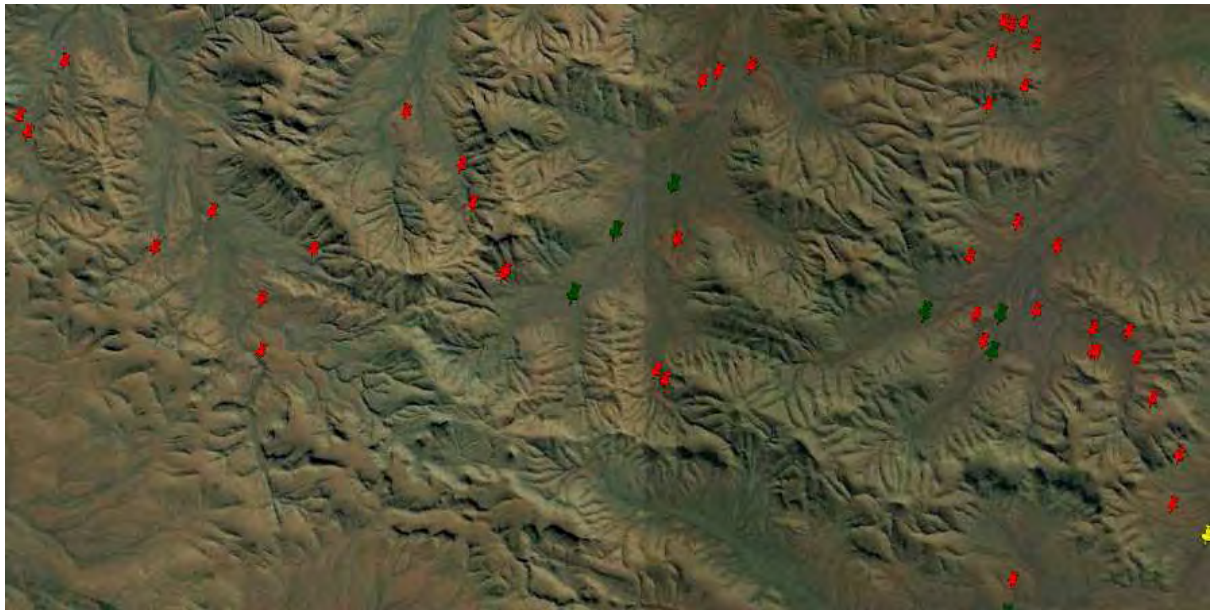
**Group 301 local distribution**



**Group 321 regional distribution**



**Group 321 local distribution**



## 5.0 REFERENCES

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## 6.0 APPENDICES

### ***Appendix 1. Sites recorded in the 600-group floristic groups that are present in the Flinders Mines' Blacksmith leases data with habitat and vegetation descriptions.***

Note the Flinders sites are highlighted and the descriptions are truncated.

600-group number	Site	HABITAT	VEGETATION
171	FL1043	Valley floor	Corymbia hamersleyana open woodland over Acacia pyrifolia low open shrubland over Triodia epactia mid-dense hummock grassland with Corymbia hamersleyana scattered low mallees over Grevillea pyramidalis and Gossypium australe scattered tall shrubs over Poaceae spp. (sp. 1 & aff. Themeda) scattered tussock grasses
171	VOK029	Wide major drainage line	Open Woodland of Corymbia hamersleyana to 12m over Scattered Tall Shrubs of Acacia tumida var. pilbarensis, Grevillea wickhamii subsp. hispidula and Gossypium robinsonii to 4m over Scattered Shrubland of Tephrosia rosea var. glabrior and Santalum lanceolatum to 2m over Open Hummock of Triodia aff. epactia to 1.3m over Very Open Tussock Grassland to Scattered Tussock Grasses of Themeda triandra to 1.2m.
171	SERN103	major creek + 1.0m of upper bank	Scattered Low Shrubs of Tephrosia rosea var. glabrior to 0.45m over Scattered Hummock Grasses of Triodia aff. epactia to 1.35m over Scattered Tussock Grasses of Themeda triandra and Eriachne tenuiculmis to 1.1m over Very Open Herbland of Phyllanthus small, Cleome viscosa and Waltheria indica to 0.7m.
171	SERN104	Valley floor in wetter area next to creek line to the west, in between two creek lines	Scattered Trees of Corymbia hamersleyana and Eucalyptus camaldulensis to 15m over Scattered Shrubs of Acacia pyrifolia var. pyrifolia to 1.1m over Mid Dense Hummock Grassland of Triodia epactia (Form 4) to 1.2m over Scattered Herbs of Cleome viscosa to 0.45m.
171	VOK004	Valley floor sloping gently to	Scattered Trees of Corymbia hamersleyana to 11m over Tall Shrubland of Acacia pyrifolia var. pyrifolia to 4m over Mid-Dense Hummock Grassland of Triodia wiseana to 1.4m over Open Tussock Grassland of

600-group number	Site	HABITAT	VEGETATION
		the north-west	<i>Cenchrus ciliaris</i> , <i>Digitaria brownii</i> and <i>Themeda triandra</i> to 1.2m.
171	TRIN001	Low lying some drainage flat valley floor	Open Woodland of <i>Corymbia hamersleyana</i> to 10m over Tall Open Scrub of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia inaequilatera</i> and <i>Atalaya hemiglauca</i> to 3m over Shrubland of <i>Acacia pruinocarpa</i> , <i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/1990) and <i>Eremophila longifolia</i> to 2m over Low Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Ptilotus obovatus</i> , <i>Indigofera monophylla</i> , <i>Gossypium australe</i> (Burrup Peninsula Form), <i>Sida rohlenae</i> var. <i>rohlenae</i> , <i>Bonamia rosea</i> , <i>Sida</i> sp. verrucose Glands and <i>Solanum lasiophyllum</i> to 1m over Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Open Tussock Grassland of <i>Themeda triandra</i> and <i>Cenchrus ciliaris</i> to 1m over Open Herbland of <i>Cleome viscosa</i> , <i>Indigofera colutea</i> , <i>Crotalaria medicaginea</i> sub. <i>Neglecta</i> , <i>Corchorus tridens</i> , <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> , <i>Malvastrum americanum</i> and <i>Melhania</i> sp. (CH 15-39) to 0.7m.
171	TRIN003a	Major drainage line E-W	Tall Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> to 2.5m over Tussock Grassland of <i>Cymbopogon procerus</i> , <i>Cenchrus ciliaris</i> , <i>Eriachne tenuiculmis</i> and <i>Digitaria ctenantha</i> to 1.2m over Shrubland of <i>Corchorus crozophorifolius</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 1.2m over <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Indigofera monophylla</i> , and <i>Phyllanthus aridus</i> " to 0.5m.
171	TRIN005	Minor drainage/ low lying	Low Open Woodland of <i>Corymbia hamersleyana</i> to 8m over Tall Open Scrub of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Eremophila longifolia</i> and <i>Atalaya hemiglauca</i> to 2m over Low Shrubland of <i>Crotalaria medicaginea</i> var. <i>neglecta</i> , <i>Ptilotus obovatus</i> , <i>Sida</i> sp. verrucose glands, <i>Gossypium australe</i> (Burrup Peninsula Form), <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Indigofera monophylla</i> and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 1m over Closed Tussock Grassland of <i>Cenchrus setiger</i> , <i>Aristida ingrata</i> and <i>Themeda triandra</i> , <i>Urochloa subquadripara</i> and <i>Eragrostis cumingii</i> , <i>Perotis rara</i> and <i>Cymbopogon ambiguus</i> to 1.2m over Open Hummock Grassland of <i>Triodia wiseana</i> to 1m.
171	VOK013	Drainage Line running north-south	Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> to 4.5m over Open Tussock Grassland of <i>Cymbopogon ambiguus</i> , <i>Eriachne tenuiculmis</i> and <i>Themeda triandra</i> to 1.6m over Hummock Grassland of <i>Triodia wiseana</i> to 1.3m over Scattered Low Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 1m.
171	SERN074	Wide drainage line	Low Open Woodland of <i>Corymbia hamersleyana</i> to 6m over Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Acacia pyrifolia</i> subsp. <i>pyrifolia</i> to 1.8m over Scattered Tussock Grasses of <i>Themeda triandra</i> to 1m over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.6m.

600-group number	Site	HABITAT	VEGETATION
171	VOK026	Major drainage line	Open Woodland of <i>Corymbia hamersleyana</i> to 12m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Gossypium robinsonii</i> to 6m over Very Open Tussock Grassland of <i>Themeda triandra</i> to 1.2m over Open Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.1m over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.8m.
171	SERN111	minor/major drainage line in valley	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 3.5m over Tall Shrubland of <i>Grevillea wickhamii</i> subsp. <i>macrodonata</i> to 3m over Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.6m over Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 1.5m over Open Tussock Grassland of <i>Aristida latifolia</i> to 0.6m over Low Shrubland of <i>Indigofera monophylla</i> and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 1m over Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.5m over Open Tussock Grassland of <i>Aristida latifolia</i> to 0.5m.
171	VOQ100	Wide drainage line	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 6m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Acacia pyrifolia</i> subsp. <i>pyrifolia</i> to 4.5m over Hummock Grassland of <i>Triodia wiseana</i> to 1.4m over Open Tussock Grassland of <i>Cymbopogon procerus</i> , <i>Eriachne tenuiculmis</i> , <i>Digitaria brownii</i> and <i>Themeda triandra</i> to 1m over Low shrubland of <i>Corchorus crozophorifolius</i> , <i>Indigofera monophylla</i> , <i>Tephrosia rosea</i> var. <i>glabrior</i> and <i>Cleome viscosa</i> to 0.5m
171	VOQ22	Wide shallow drainage line	Open Woodland of <i>Corymbia hamersleyana</i> to 6m over Tall Open Shrubland of <i>Grevillea wickhamii</i> subsp. ?, <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 3m over Tussock Grassland of <i>Cymbopogon procerus</i> , <i>Cenchrus ciliaris</i> , <i>Eriachne tenuiculmis</i> and <i>Aristida holathera</i> var. <i>latifolia</i> to 1.3m over Scattered Hummock Grasses of <i>Triodia wiseana</i> to 1m
171	VOQ23	Valley floor, gently undulating with very minor gullies	Open Woodland of <i>Corymbia hamersleyana</i> to 4m over Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 2m over Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.2m
171	VOQ24	Drainage line	Open Woodland of <i>Corymbia hamersleyana</i> to 6m over Tall Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 4m over Scattered Hummock Grasses of <i>Triodia wiseana</i> to 1m over Open Tussock Grassland of <i>Digitaria ctenantha</i> , <i>Cymbopogon ambiguus</i> , <i>Themeda triandra</i> and <i>Aristida holathera</i> var. <i>holathera</i> to 0.8m.
171	VOQ27	Wide drainage line	Scattered Low Trees of <i>Corymbia ham</i> to 4.5m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 3.5m over Low Open Shrubland of <i>Tephrosia rosea</i> var.

600-group number	Site	HABITAT	VEGETATION
			glabrior and <i>Corchorus crozophorifolius</i> to 1m over Very Open Tussock Grassland of <i>Eriachne tenuiculmis</i> and <i>Cymbopogon procerus</i> to 0.8m over Open Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 0.6m.
171	VOQ44	Drainage line	Open Woodland of <i>Corymbia hamersleyana</i> to 7m over Tall Shrubland of <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> , <i>Acacia pyrifolia</i> subsp. <i>pyrifolia</i> , <i>Acacia dictyophleba</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Acacia monticola</i> and <i>Gossypium robinsonii</i> to 2.5m over Open Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.2m over Tussock Grassland of <i>Themeda triandra</i> , <i>Eriachne tenuiculmis</i> , <i>Paraneurachne muelleri</i> , <i>Cymbopogon procerus</i> and <i>Digitaria brownii</i> to 1m over Low Open Shrubland of <i>Indigofera monophylla</i> and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.8m.
171	VOQ45	Valley floor, low lying, gently sloping South, drainage line/floodplain	Open Woodland of <i>Corymbia hamersleyana</i> to 6m over Tall Open Shrubland of <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Acacia elacantha</i> (golden hairy variant) to 4.5m over Low Open Shrubland of <i>Indigofera monophylla</i> , <i>Sida</i> sp. (spiciform panicles), <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> and <i>Hibiscus sturtii</i> var. <i>platyklamys</i> to 1m over Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1m over Very Open Tussock Grassland of <i>Eriachne tenuiculmis</i> to 0.4m.
171	VOK023	Major drainage line	Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 11m over Tall Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Santalum lanceolatum</i> to 4.5m over Scattered Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 2m over Mid-dense Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.5m.
171	SERN004	Drainage line	Low Open Woodland of <i>Corymbia hamersleyana</i> to 10m over Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Rulingia luteiflora</i> to 2m over Open Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.3m over Scattered Hummock Gasses of <i>Themeda triandra</i> to 0.8m.
171	TRIN003	low lying flat nex to drainage line	Tall Open Scrub of <i>Acacia inaequilatera</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Grevillea pyramidalis</i> to 6m over Closed Hummock Grassland of <i>Triodia wiseana</i> to 1.5m over Low Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Pentalepis trichodesmoides</i> , <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Ptilotus obovatus</i> , <i>Indigofera monophylla</i> , <i>Gossypium australe</i> (Burrup Peninsula from), <i>Hibiscus sturtii</i> var. <i>platyklamys</i> <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Solanum lasiophyllum</i> , <i>Pimelea ammocharis</i> , <i>Corchorus crozophorifolius</i> , <i>Sida</i> sp. verrucose glands, <i>Eremophila longifolia</i> , <i>Crotalaria medicaginea</i> var. <i>neglecta</i> , "Hibiscus pink" and <i>Ptilotus astrolasius</i> var. <i>astrolasius</i> to 1m over Very Open Herbland of <i>Bidens bipinnata</i> to 0.3m.
171	SERN011	Drainage line	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 6m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Gossypium robinsonii</i> to 3m over Very Open Tussock

600-group number	Site	HABITAT	VEGETATION
			Grassland of <i>Cymbopogon procerus</i> , <i>Eriachne tenuiculmis</i> and <i>Digitaria brownii</i> to 1.3m over Open Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1m over Low Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> and <i>Corchorus crozophorifolius</i> to 0.5m.
171	SERN037	Major drainage line with a bare creek bed.	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 8m (outside) over Scattered Tall Shrubs of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Gossypium robinsonii</i> and <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> to 3.8m over Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> and <i>Triodia wiseana</i> to 1.1m over Very Open Tussock Grassland of <i>Themeda triandra</i> to 1m over Scattered Low Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.8m.
171	SERN009	Drainage line	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 10m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> to 2.5m over Scattered Hummock Grasses of <i>Triodia epactia</i> (Form 4) to 1m over Scattered Tussock Grasses of <i>Digitaria brownii</i> , <i>Themeda triandra</i> and <i>Cymbopogon procerus</i> to 1m over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.6m.
171	SERN008	Wide shallow drainage	Open Woodland of <i>Corymbia hamersleyana</i> to 7m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 2.5m over Very Open Tussock Grassland of <i>Cymbopogon procerus</i> and <i>Digitaria brownii</i> to 1.4m over Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.2m over Low Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> and <i>Corchorus incanus</i> to 0.8m.
171	SERN016	Valley floor with minor drainage lines/flowlines running north-south through quadrat	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 6m over Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 2m over Mid-Dense Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.5m over Open Tussock Grassland of <i>Digitaria brownii</i> , <i>Paranuerachne muellerii</i> , <i>Themeda triandra</i> , <i>Cenchrus ciliaris</i> and <i>Setaria verticillata</i> to 1m over Low Open Shrubland of <i>Indigofera monophylla</i> and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.8m.
171	SERN003	Drainage line approximately 15m wide	Woodland of <i>Corymbia hamersleyana</i> to 8m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 2.5m over Scattered Shrubs of <i>Acacia inaequilatera</i> and <i>Gastrolobium grandiflorum</i> to 1.6m over Scattered Low Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> and <i>Dodonaea lanceolata</i> var. <i>lanceolata</i> to 1m over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon ambiguus</i> and <i>Eulalia aurea</i> to 1.2m over Open Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 0.8m.
171	FT02	Upper bank/part flow line of	Scattered Tall Shrubs of <i>Gossypium robinsonii</i> to 3m over Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 2m over Scattered Hummock Grasses of <i>Triodia wiseana</i> to 1.3m over Very Open Tussock Grassland of



600-group number	Site	HABITAT	VEGETATION
		major flood plain	Cenchrus ciliaris and Cymbopogon ambiguus to 1.2m over Low Open Shrubland of Tephrosia rosea var. glabrior to 0.5m.
171	FT01	flow lines/valley floor/major flood plain plus some upper slope of flow line	Open Shrubland of Acacia pyrifolia var. pyrifolia to 2m over Low Shrubland of Tephrosia rosea var. glabrior to 0.75m over Scattered Hummock Grassland of Triodia wiseana to 1.3m over Open Tussock Grassland of Cenchrus ciliaris to 0.5m.
171	CG002	Drainage line	Open Woodland of Corymbia hamersleyana to 10m over Scattered Shrubs of Gossypium robinsonii, Acacia elacantha (golden hairy variant), Acacia pyrifolia var. pyrifolia and Santalum (32) to 2m over Open Tussock Grassland of Themeda triandra, Cymbopogon procerus and Eulalia aurea to 1.4m over Open hummock Grassland of Triodia wiseana to 1.2m over Low Open Shrubland of Tephrosia rosea var. glabrior and Cleome viscosa to 0.5m.
171	SERN021	Major drainage line	Tall Shrubland of Acacia tumida var pilbarensis to 2.2m over Shrubland of Acacia pyrifolia var. pyrifolia and Corchorus sp. (HD260) and Eremophila longifolia to 1.6m over Open Hummock Grassland of Triodia epactia (Form 3) to 1.6m over Very Open Tussock Grassland of Cymbopogon procerus and Aristida contorta to 1.4m over Low Open heath of Tephrosia rosea var. glabrior to 0.6m
171	7RAIL036	Major drainage line running east-west	Scattered Low Trees of Eucalyptus victrix to 9m over Tall Open Shrubland of Acacia citrinoviridis and Grevillea wickhamii subsp. hispidula to 4.5m over Open Hummock Grassland of Triodia epactia (Form 3) to 1.4m over Scattered Low Shrubs of Tephrosia rosea var. glabrior to 0.8m over Scattered Tussock Grassland of Cenchrus ciliaris to 0.6m.
174	FL1031	Valley floor	Eucalyptus gamophylla and Corymbia hamersleyana low open woodland over Eulalia aurea, Paraneurachne muelleri, Eragrostis aff. eriopoda, Themeda sp. and Aristida sp tussock grassland with Triodia epactia scattered hummock grasses
174	FL1029	Minor drainage line (N-S)	Eucalyptus gamophylla and Corymbia hamersleyana low woodland over Acacia tumida var. pilbarensis tall open scrub over Triodia epactia open hummock grassland over Aristida sp. and Themeda sp. very open tussock grassland
174	VOK005	Gently sloping up to the west	Open Woodland of Eucalyptus leucophloia subsp. leucophloia to 11m over Scattered Tall Shrubs of Acacia tumida var. pilbarensis and Acacia inaequilatera to 3m over Mid-Dense Hummock Grassland of Triodia

600-group number	Site	HABITAT	VEGETATION
		to the base of the ranges. Minor drainage lines running east down the slope.	wiseana to 1.6m over Very Open Tussock Grassland of Themeda triandra, Digitaria brownii and Cenchrus ciliaris to 1.1m.
174	VOK022	Valley floor with small flowline running east-west	Open Woodland of Corymbia hamersleyana and Eucalyptus gamophylla to 10m over Tall Open Shrubland of Acacia tumida var. pilbarensis, Acacia dictyophleba and Eremophila longifolia to 4m over Hummock Grassland of Triodia aff. epactia to 1.4m over Tussock Grassland of Eulalia aurea, Themeda triandra, Chrysopogon fallax and Cenchrus ciliaris to 1.3m.
174	VOQ011	Drainage line, lower slope, valley floor, sloping South	Open Woodland of Corymbia hamersleyana to 7m over Tall Shrubland of Acacia tumida var. pilbarensis and Acacia inaequilatera to 3.5m over Open Hummock of Triodia epactia to 1.3m over Open Tussock Grassland of Paraneurachne muelleri, Aristida holathera var. latifolia, Cymbopogon obtectus, Themeda triandra and Setaria surgens to 1.2m
174	VOQ010	Valley floor, relatively flat, moderately lying	Open Woodland of Corymbia hamersleyana and Eucalyptus gamophylla to 5m over Open Shrubland of Acacia ancistrocarpa and Acacia pruinocarpa to 2m over Low Open Shrubland of Senna artemisioides subsp. oligophylla and Senna artemisioides subsp. helmsii to 2m over Hummock Grassland of Triodia epactia (Form 4) to 1.2m over Very Open Tussock Grassland of Paraneurachne muelleri, Aristida holathera var. latifolia and Eragrostis aff. eriopoda (WAS site 963) to 0.6m
174	SERN006	Valley floor, flat	Low Open Woodland of Corymbia hamersleyana to 6m over Open Shrubland of Acacia pyrifolia var. pyrifolia and Hakea lorea subsp. lorea to 2m over Hummock Grassland of Triodia epactia (Form 4) to 1.2m
174	VOK020	Valley floor, very gently sloping down to the south-west	Woodland to Open Woodland of Corymbia hamersleyana to 11m over Low Open Woodland of Eucalyptus gamophylla and Eucalyptus leucophloia subsp. leucophloia to 4m over Tall Shrubland of Acacia tumida var. pilbarensis, Acacia pyrifolia subsp. pyrifolia and Acacia dictyophleba to 4m over Tussock Grassland of Themeda triandra, Eulalia aurea and Paraneurachne muelleri to 1.3m over Open Hummock Grassland of Triodia aff. epactia to 1.1m.
174	VOK017	Major drainage line, runs east west.	Woodland to Open Woodland of Corymbia hamersleyana to 10m Tall Open Shrubland of Acacia tumida var. pilbarensis, Acacia dictyophleba and Gossypium robinsonii to 4m over Hummock Grassland of Triodia epactia (Form 3) to 1.6m over Open Tussock Grassland of Themeda triandra, Eulalia aurea to 1.2m over

600-group number	Site	HABITAT	VEGETATION
			Scattered Low Shrubs of <i>Tephrosia</i> var. <i>glabrior</i> to 1m.
174	VOK010	Valley floor, very gently sloping north-west	Open Woodland of <i>Corymbia hamersleyana</i> to 11m over Tall Open Shrubland of <i>Acacia inaequilatera</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> to 4m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.6m over Scattered Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> to 1.5m.
174	TRIN014	Flat low lying in valley same as TRIN012	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 5m over Tall Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia inaequilatera</i> and <i>Acacia ancistrocarpa</i> to 5m over Open Heath of <i>Eremophila longifolia</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Gossypium australe</i> (Burrup Peninsula form) and <i>Sida</i> sp. spiciform panicles to 1.5m over Open Tussock Grassland of <i>Aristida ingrata</i> and <i>Aristida holathera</i> var. <i>holathera</i> to 1m over Low Open Shrubland of <i>Ptilotus obovatus</i> " <i>Ptilotus astrolasius</i> var. <i>astrolasius</i> to 0.4m over Mid Dense Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 0.4 over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.3m.
174	TRIN013	Low lying in Valley flat	Low Open Woodland of <i>Corymbia</i> to 8m over Tall Open Scrub of <i>Acacia dictyophleba</i> and <i>Acacia inaequilatera</i> to 3m over Open Shrubland of <i>Eremophila longifolia</i> and <i>Capparis umbonata</i> to 2m over Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.1m over very Open Herbland of <i>Cleome viscosa</i> to 0.4m over Open Tussock Grassland of <i>Aristida ingrata</i> , <i>Themeda triandra</i> , <i>Eragrostis cummingii</i> , <i>Cenchrus ciliaris</i> and <i>Perostis rara</i> to 1m.
174	TRIN012	low lying flat in valley	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 6m over Tall Open Scrub of <i>Acacia dictyophleba</i> and <i>Acacia inaequilatera</i> to 3m over Open Heath of <i>Atalaya hemiglauca</i> , <i>Eremophila longifolia</i> , <i>Capparis umbonata</i> , <i>Sida</i> sp. spiciform panicles and <i>Gossypium australe</i> (Burrup Peninsula form) to 2m over Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.4m over Open Tussock Grassland of <i>Aristida ingrata</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Aristida contorta</i> and <i>Eulalia aurea</i> to 1.2m over Low Shrubland of <i>Ptilotus obovatus</i> , <i>Ptilotus astrolasius</i> var. <i>astrolasius</i> , <i>Sida</i> aff. <i>echinocarpa</i> (MET 15,350) and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 1m.
174	TRIN010	low lying flat in valley	Tall Open Scrub of <i>Acacia pruinocarpa</i> to 3m, <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Gossypium robinsonii</i> and <i>Acacia inaequilatera</i> to 3m over Open Heath of <i>Eremophila longifolia</i> , <i>Gossypium australe</i> (Burrup Peninsula Form), <i>Acacia tumida</i> var <i>pilbarensis</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 2m over Open Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Tussock Grassland of <i>Aristida ingrata</i> , <i>Themeda triandra</i> ,

600-group number	Site	HABITAT	VEGETATION
			Digitaria brownii, Eragrostis cumingii and Perotis rara to 1.1m over Low Open Heath of Senna artemisioides subsp. oligophylla x helmsii, Senna artemisioides subsp. oligophylla and Jasminum didyum subsp. linear to 1m.
174	TRIN009	low lying in valley, flat	OW of Corymbia hamersleyana to 11m over Tall Closed Scrub of Acacia pyrifolia var. pyrifolia, Acacia dictyophleba and Acacia tumida var. pilbarensis to 3m over Open Heath of Eremophila longifolia Gossypium australe (Burrup Peninsula) and Capparis umbonata to 1.5m over Hummock Grassland of Triodia aff. epactia to 1.3m over Low Open Heath of Bonamia rosea, Ptilotus astrolasius var. astrolasius, Sida sp. verrucose Glands, "Senna art oligo" Sida aff. fibulifera (oblong; MET 15 220), Hibiscus sturtii var. aff. grandiflorus, Crotalaria medicaginea var. neglecta to 1m over Very Open Tussock Grassland of Eulalia aurea and Chrysopogon fallax to 1m over Herbland of Goodenia forrestii and Malvastrum americanum to 0.4m.
174	SERN017	low lying in valley, flat	Low Woodland of Corymbia hamersleyana and Eucalyptus xerothermica to 3.1m over Mid Dense Hummock Grassland of Triodia wiseana and Triodia aff. epactia to 1.5m over Very Open Tussock Grassland of Aristida holathera var. latifolia and Themeda triandra to 1.1m over Shrubland of Acacia pruinocarpa and Hakea lorea subsp. lorea Senna glutinosa subsp. glutinosa and Acacia pyrifolia var. pyrifolia to 2m over Acacia dictyophleba, Bonamia rosea and Scaevola acacioides to 1m.
174	ZION033	Valley floor, very gently sloping down to the east with a slight rise in the north-west.	Low Open Woodland of Corymbia hamersleyana and Eucalyptus gamophylla to 6m over Tall Open Shrubland of Acacia pyrifolia var. pyrifolia to 4m over Open Shrubland of Acacia bivenosa and Eremophila longifolia to 2m over Closed Hummock Grassland of Triodia epactia (Form 4) to 1.6m over Very Open Tussock Grassland of Themeda triandra and Cenchrus ciliaris to 1.1m.
174	SERN020	Valley floor, very gently sloping to the east.	Scattered Low Trees of Corymbia hamersleyana and Eucalyptus xerothermica to 4.5m over Tall Open Shrubland of Gossypium robinsonii, Hakea lorea subsp. lorea, Acacia pyrifolia var. pyrifolia and Acacia inaequilatera to 4m over Scattered Shrubs of Gossypium australe (Burrup Peninsula Form) to 1.4m over Closed Hummock Grassland of Triodia wiseana to 1.1m.
174	SERN110	low lying/ drainage in valley	Low Woodland of Corymbia hamersleyana to 6m over Shrubland of Senna artemisioides subsp. oligophylla, Gossypium australe (Burrup peninsula) and Acacia elacantha (golden hairy variant) and Sida sp. Spiciforme panicles to 1.5m over Mid Dense Hummock Grassland of Triodia aff. epactia to 1.3m over Open Tussock Grassland of Eulalia aurea, Themeda triandra, Aristida holathera var. latifolia and

600-group number	Site	HABITAT	VEGETATION
			Paraneurachne muelleri to 1m over Low Open Shrubland of Indigofera monophylla, Crotalaria medicaginea var. neglecta, Bonamia rosea to 0.5m over Scattered Herbs of Swainsona formosa to 0.2m.
174	SERN107	flat low lying in valley	Low Open Forest of Woodland of Corymbia hamersleyana and Corymbia hamersleyana and Eucalyptus gamophylla to 5m over Tall Open Shrubland of Hakea lorea subsp. lorea to 2.1m over Scattered Shrubs of Gossypium australe (Burrup Peninsula Form) to 1.2m over Low Shrubland of Crotalaria medicaginea var. neglecta, Sida sp. Verrucose glands and Bonamia rosea to 0.5m over Closed Tussock Grassland of Eulalia aurea, Chrysopogon fallax, Cymbopogon obtectus, Aristida holathera var. holathera and Digitaria brownii to 1.1m over Very Open Herbland of Swainsona formosa, Indigofera linnaei and Indigofera colutea to 0.3m.
174	SERN101	Valley floor, relatively flat	Low Open Woodland of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia to 8m over Tall Open Woodland of Acacia elacantha (golden hairy variant), Acacia pyrifolia var. pyrifolia and Acacia dictyophleba to 3m over Hummock Grassland of Triodia aff. epactia to 1m (inferred veg type as burnt).
174	SERN015	low lying flat in valley	Woodland of Eucalyptus xerothermica and Corymbia hamersleyana to 6m over Open Heath of Acacia pyrifolia var. pyrifolia and Eremophila longifolia, Santalum lanceolata Hakea lorea subsp. lorea and Acacia inaequilatera to 2m over Mid-dense Hummock Grassland of Triodia epactia (Form 3) to 1.4m over Open Tussock Grassland of Themeda triandra, Chrysopogon fallax, Digitaria brownii and Eulalia uarea to 1m.
174	VOK003	Valley floor, very gently sloping east	Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana and Corymbia deserticola subsp. deserticola to 6.5m over Tall Open Shrub of Acacia tumida var. pilbarensis, Acacia ancistrocarpa and Acacia pruinocarpa to 4m over Open Tussock Grassland of Themeda triandra and Digitaria brownii to 1.5m over Closed Hummock Grassland of Triodia wiseana to 1.2m over Low Open Shrub of Bonamia rosea, Senna artemisioides subsp. helmsii, Senna artemisioides subsp. oligophylla, Ptilotus rotundifolius and Indigofera monophylla to 1m.
257	CR008	Southwest facing creekline in between Cochrane and Farnum mesa	Eucalyptus leucophloia ssp leucophloia and Corymbia hamersleyana low open woodland over Acacia ancistrocarpa open shrubland over Triodia wiseana and T. sp. Robe River hummock grassland

600-group number	Site	HABITAT	VEGETATION
257	TR087	Gully	Acacia tumida high shrubland over Petalostylis labicheoides open shrubland over Triodia wiseana open hummock grassland
257	CR014	Upper slope, near to the top of the mesa on a southwest facing aspect	Eucalyptus leucophloia ssp. leucophloia scattered low trees over Acacia pruinocarpa high open shrubland over A. bivenosa open shrubland over Triodia wiseana and open hummock grassland
257	TsRR016	Mesa top	Acacia atkinsiana open scrub over A. bivenosa low open shrubland over Triodia sp. Robe River open hummock grassland
257	CR012	South southeast facing upper slope of mesa from a rounded crest to the beginning of a gully head	Eucalyptus leucophloia ssp. leucophloia low open woodland over Acacia bivenosa and Petalostylis labicheoides open shrubland over Triodia wiseana and T. sp. Robe River open hummock grassland
257	JW005	Drainage in gully on pediment/debris slope	Eucalyptus leucophloia ssp. leucophloia scattered low trees over Acacia bivenosa and Petalostylis labicheoides shrubland over Triodia wiseana hummock grassland
257	JW004	Upper slope	Eucalyptus leucophloia ssp. leucophloia low open woodland over Acacia bivenosa scattered shrubs over Triodia wiseana and T. sp. Robe River hummock grassland
257	FM020	Minor drainage line on mesa crest	2008: Acacia atkinsiana open shrubland over Triodia sp. Robe River and T. wiseana open hummock grassland 2009: Acacia atkinsiana and Acacia pruinocarpa open heath over Triodia sp. Robe River and Triodia wiseana open hummock grassland
257	JW001r	Mesa free face	Eucalyptus leucophloia ssp. leucophloia low open woodland over Acacia atkinsiana high open shrubland over Petalostylis labicheoides shrubland over Triodia wiseana and T. sp. Robe River open hummock grassland

600-group number	Site	HABITAT	VEGETATION
257	JW007	Drainage gully on mesa debris slope	Eucalyptus leucophloia ssp. leucophloia low woodland over Abutilon dioicum and Abutilon aff. dioicum open shrubland over Triodia sp. Robe River and Triodia wiseana hummock grassland
257	JW003	Flat top/crest of Jewel mesa, on the eastern end	Eucalyptus leucophloia ssp. leucophloia scattered low trees over Acacia pruinocarpa open shrubland over Triodia sp. Robe River and T. wiseana hummock grassland
257	CN006	Sloping mesa top	Triodia sp. Robe River open hummock grassland
257	CP199	Valley, dissected by an incised drainage line	Eucalyptus leucophloia sp. leucophloia low open woodland over Acacia ancistrocarpa, A. bivenosa and A. maitlandii open shrubland over Triodia wiseana and T. sp. Robe River hummock grassland
257	CP474	Base of gorge	Ficus brachypoda low open woodland over Triodia wiseana and T. sp. Robe River hummock grassland
257	CR001r	Southwest facing break away (free face)	Eucalyptus leucophloia ssp. leucophloia low open woodland over Acacia pruinocarpa high open shrubland over A. bivenosa open shrubland over Triodia sp. Robe River and T. wiseana open hummock grassland and Eriachne mucronata very open tussock grassland
257	CR003	Upper slope of mesa with a north facing slight slope	Acacia bivenosa open shrubland over Dampiera candidans low scattered shrubs over Triodia sp. Robe River and T. wiseana hummock grassland
257	CR006	South face of upper most debris slope, immediately below the first free face down to the mid slope of the mesa	Acacia bivenosa open shrubland over Triodia wiseana and T. sp. Robe River hummock grassland

600-group number	Site	HABITAT	VEGETATION
257	JW002r	Free face and debris slope	Eucalyptus leucophloia ssp. leucophloia low open woodland over Acacia pruinocarpa high open shrubland over Triodia sp. Robe River and T. wiseana very open hummock grassland and Eriachne mucronata (typical form) open tussock grassland
277	FL1044	Gentle south facing lower slope of minor rise in valley	Triodia aff. melvillei mid-dense hummock grassland
277	FT18	side of hill next to gully/ravine (cliff)	Scattered Hummock Grasses of Triodia aff. melvillei (10, 114) to 0.8m over Low Open Shrubland of Gompholobium sp. Hamersley and Acacia hilliana to 0.4m over Tussock Grassland of Amphipogon sericeus (Hamersley form) to 0.35m.
277	FT12	midslope hill	Scattered Low Trees of Eucalyptus leucophloia subsp. leucophloia to 4m over Mid Dense Hummock Grassland of Triodia aff. melvillei (MET 10, 114) and Triodia wiseana to 1m over Scattered Low Shrubs of Acacia hilliana and Acacia adoxa var. adoxa to 0.5m.
277	FT17	hilltop to upper slope	Scattered Low Trees of Eucalyptus leucophloia subsp. leucophloia to 4m over Low Shrubland of Acacia hilliana to 1m over Mid Dense Hummock Grassland of Triodia aff. melvillei (10, 114) and Triodia wiseana to 1m.
277	FT05	hilltop and midslope	Scattered Low Trees of Corymbia hamersleyana to 3.4m over Mid Dense Hummock Grassland of Triodia aff. melvillei (10, 114) and Triodia wiseana to 1m over Scattered Low Shrubs of Gompholobium sp. Hamersley to 1m.
277	FT19	lower slope next to major gully (cliff)	Low Open Woodland of Corymbia hamersleyana to 5m over Scattered Shrubs of Gompholobium sp. Hamersley to 1.2m over Hummock Grassland of Triodia aff. melvillei (MET 10, 114) and Triodia wiseana to 1.1m over Low Open Shrubland of Acacia hilliana to 0.6m
277	FT20	mid slope next to gully	Scattered Tall Shrubs of Hakea chordophylla to 4m over Low Open Shrubland of Acacia hilliana to 0.5m over Scattered hummock grasses of Triodia aff. melvillei (MET 10, 114) and Triodia wiseana to 1m over Grassland of Amphipogon sericeus (Hamersley Form) to 0.45
277	FT13	minor creekline/ slight gully running north to south	Scattered Low Trees of Corymbia hamersleyana to 5m over Mid Dense Hummock Grassland of Triodia wiseana to 1.1m.



600-group number	Site	HABITAT	VEGETATION
277	501	Flat-gently sloping hilltop.	Eucalyptus leucophloia scattered low trees over Acacia ancistrocarpa scattered shrubs over Plectrachne sp. (MET 10,114) open hummock grassland.
277	489	Flat topped hill.	Acacia hilliana low open shrubland over Plectrachne sp. (MET 10,114) open hummock grassland.
277	KR002	Hillslope, gently sloping eastward	Scattered Low Trees of Corymbia hamersleyana to 2.5m over Low Open Shrubland of Gompholobium karijini, Acacia hilliana and Mirbelia viminalis to 0.8m over Hummock Grassland of Triodia wiseana to 0.6m over Tussock Grassland of Eriachne sp. to 0.4m
293	FL1013	Gentle south east facing upper slope to crest of low undulating hill	Triodia wiseana mid-dense hummock grassland with Corymbia deserticola subsp. deserticola, C. hamersleyana, Eucalyptus leucophloia subsp. leucophloia and Hakea chordophylla low scattered trees with Acacia tenuissima scattered shrubs
293	FL1032	Gentle north and east facing crest of minor rise	Triodia aff. melvillei and T. wiseana hummock grassland
293	FL1005	Very gentle, south east facing, upper slope and crest of very low hill	Eucalyptus leucophloia subsp. leucophloia, Corymbia deserticola subsp. deserticola and C. hamersleyana low open woodland over Triodia wiseana mid-dense hummock grassland
293	FL1021	Undulating valley floor	Acacia maitlandii shrubland over Triodia wiseana and T. epactia hummock grassland with Corymbia hamersleyana scattered low trees
293	FL1014	Valley floor (no association with drainage)	Triodia epactia hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees over Eucalyptus gamophylla scattered low mallee over Acacia ancistrocarpa, A. tumida, A. tenuissima and A. pyrifolia scattered shrubs
293	FL1011	Valley floor	Eucalyptus gamophylla and E. leucophloia subsp. leucophloia low woodland over Acacia elachantha tall open shrubland over Mirbelia viminalis open shrubland over Triodia epactia mid-dense hummock grassland with Aristida holathera var. holathera scattered tussock grasses

600-group number	Site	HABITAT	VEGETATION
293	FL1010	Gentle south facing footslope of steep hill	Triodia wiseana mid-dense hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees
293	FL1008	Gentle mostly north facing upper slope to crest of low rise in valley	Triodia wiseana hummock grassland with Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia scattered low trees over Grevillea wickhamii subsp. hispidula scattered tall shrubs over Acacia maitlandii scattered shrubs
293	FL1024	Gentle south facing mid to upper slope of low hill	Triodia aff. melvillei mid-dense hummock grassland
293	FL1020	Valley floor	Triodia wiseana and T. epactia mid-dense hummock grassland with Acacia maitlandii scattered shrubs
293	FL1050	Very gentle south facing lower hill slope	Triodia wiseana mid-dense hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees
293	FL1047	Moderate south facing scree slope	Acacia adoxa low open shrubland over Triodia wiseana hummock grassland
293	FL1048	Lower slope	Triodia wiseana hummock grassland
293	SERN043	Lower slope with series of small flow lines dissecting site	Scattered Low Trees of Eucalyptus gamophylla to 2.2m over Tall Shrubland of Acacia monticola to 2.5m over Hummock Grassland of Triodia shinzi to 1.2m.
293	SERN028	flat plain side valley gently sloping SW	Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana to 6m over Tall Open Shrubland of Hakea chordophylla, Acacia cowleana and Grevillea wickhamii subsp. aprica to 3m over Acacia maitlandii and Acacia tenuissima to 1.5m over Closed Hummock Grassland of Triodia

600-group number	Site	HABITAT	VEGETATION
			wiseana to 1.5m over Low Shrubland of <i>Ptilotus rotundifolius</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> and <i>Ptilotus calostachyus</i> var. <i>calostachyus</i> to 1m.
293	RAIL008b	Lower slope of hillside with breakaway, moderately to steep sloping facing south	Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 7m over Scattered Tall Shrubs of <i>Hakea chordophylla</i> to 3m over Open Shrubland of <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia tenuissima</i> and <i>Ptilotus rotundifolius</i> to 1.5m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> to 1m.
293	SERN 101	lower slope valley floor near site SERN 100 with minor flow line running roughly E-W in southern corner of quadrat	Low Open Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> to 6m over Open Shrubland of <i>Acacia tenuissima</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Mirbelia viminalis</i> to 1.7m over Hummock Grassland of <i>Triodia wiseana</i> to 1.4m
293	SERN112	flat low lying plain in valley	Scattered Low Trees of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> to 2m over Tall Shrubland of <i>Acacia monticola</i> and <i>Acacia ancistrocarpa</i> to 3m over Open Shrubland of <i>Acacia tenuissima</i> , <i>Acacia elacantha</i> (golden hairy variant), <i>Acacia dictyophleba</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 2m over Mid Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.1m over Scattered Herbs of <i>Ptilotus calostachyus</i> var. <i>calostachyus</i> to 1m over Scattered Sedges of <i>Fimbristylis simulans</i> 0.1m.
293	CG005	Valley floor, near base of hills, gently sloping South	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Euc gamophylla</i> to 8m over Tall Open Shrubland of <i>Acacia monticola</i> , <i>Acacia elacantha</i> (golden hairy variant) and <i>Hakea chordophylla</i> to 3m over Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.2m over Low Open Shrubland of <i>Gompholobium karrijini</i> , <i>Ptilotus rotundifolius</i> and <i>Acacia adoxa</i> var. <i>adoxo</i> to 0.8m.
293	SERN031	Flat low hill sloping down to the east and west	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Corymbia deserticola</i> subsp. <i>deserticola</i> to 5m over Tall Open Shrubland of <i>Acacia ancistrocarpa</i> to 2.1m over Open Shrubland of <i>Senna symonii</i> , <i>Ptilotus rotundifolius</i> and <i>Acacia tenuissima</i> to 1.5m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.4m

600-group number	Site	HABITAT	VEGETATION
293	SERN046	flat plain on valley	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 7m over Tall Shrubland of <i>Acacia dictyophleba</i> to 3m over Open Shrubland of <i>Acacia monticola</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Acacia elachantha</i> (golden hairy variant) to 2m over Closed Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.2m.
293	SERN042	flat in valley	Low Open Woodland of <i>Corymbia hamersleyana</i> to 5m over Shrubland of <i>Acacia ancistrocarpa</i> and <i>Acacia tenuissima</i> to 1.6m over Closed Hummock Grassland of <i>Triodia wiseana</i> to 1.4m.
293	SERN018	Valley floor, very gently sloping to the east.	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Corymbia deserticola</i> subsp. <i>deserticola</i> to 5.5m over Tall Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> to 2.2m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia epactia</i> (Form 4) to 1.6m.
293	SERN026	low lying flat in valley	Low Woodland of <i>Corymbia deserticola</i> subsp.; <i>Deserticola</i> , <i>Eucalyptus gamophylla</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 4m over Open Heath of <i>Acacia ancistrocarpa</i> , <i>Acacia elachantha</i> (golden hairy variant) and <i>Acacia tenuissima</i> to 2m over Closed Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> and <i>Triodia wiseana</i> to 1.4m over <i>Mirbelia viminalis</i> , <i>Keraudrenia nephrosperma</i> , <i>Ptilotus astrolasius</i> var. <i>astrolasius</i> and <i>Acacia adoxa</i> var. <i>adoxo</i> to 1m
293	SERN063	Valley slope, sloping up to the south	Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 12m over Open Shrubland of <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Mirbelia viminalis</i> , <i>Acacia tenuissima</i> and <i>Acacia maitlandii</i> to 2m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.3m over Scattered Low Shrubs of <i>Ptilotus rotundifolius</i> and <i>Acacia adoxa</i> var. <i>adoxo</i> to 0.6m.
298	FL1025	Moderate to steep mid slope of large hill arm	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Triodia epactia</i> mid-dense hummock grassland
298	FL1019	Valley floor	<i>Corymbia hamersleyana</i> low open woodland over <i>Triodia wiseana</i> and <i>T. epactia</i> closed hummock grassland with <i>Acacia inaequilatera</i> tall scattered shrubs over <i>Acacia maitlandii</i> scattered shrubs
298	FL1006	Flat valley floor with some incised minor drainages	<i>Eucalyptus gamophylla</i> low open woodland over <i>Acacia melleodora</i> , <i>A. monticola</i> , <i>A. pyrifolia</i> and <i>A. atkinsiana</i> tall open shrubland over <i>Triodia epactia</i> and <i>T. wiseana</i> hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> and <i>Themeda</i> sp. very open tussock grassland with <i>Corymbia hamersleyana</i> scattered low trees

600-group number	Site	HABITAT	VEGETATION
298	FL1028	Gentle south facing upper slope of medium rise	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low open woodland over <i>Triodia epactia</i> mid-dense hummock grassland
298	FL1042	Moderate west facing upper slope of spur separated from main slope by gully	<i>Acacia orthocarpa</i> open shrubland over mixed <i>Eriachne mucronata</i> , <i>Triumfetta maconochieana</i> and <i>Corchorus lasiocarpus</i> low open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low scattered trees
298	FL1036	Valley floor	<i>Triodia epactia</i> closed hummock grassland over <i>Eriachne mucronata</i> with <i>Corymbia hamersleyana</i> scattered low trees
298	SERN109	minor drainage line running E-W	Low Woodland of <i>Corymbia hamersleyana</i> to 6m over Tall Shrubland of <i>Acacia monticola</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Gossypium robinsonii</i> to 3m over Scattered Shrubs of <i>Santalum lanceolatum</i> to 2m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> to 1.4m over Low Shrubland of <i>Indigofera monophylla</i> to 1m over Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon ambiguus</i> and <i>Paraneurachne muelleri</i> to 1m over Herbland of <i>Bidens bipinnata</i> and <i>Cleome viscosa</i> to 0.4m.
298	VOK011	Small gully off the ranges	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 6m over Tall Open Shrubland of <i>Acacia inaequilatera</i> , <i>Acacia dictyophleba</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 4.5m over Closed Hummock Grassland of <i>Triodia wiseana</i> to 1.3m.
298	VOK021	Minor drainage line running east-west	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> to 8m over Tall Shrubland of <i>Acacia monticola</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 5.5m over Mid-Dense Hummock Grassland to Hummock Grassland of <i>Triodia wiseana</i> to 1.5m over Very Open Tussock Grassland of <i>Themeda triandra</i> and <i>Cymbopogon ambiguus</i> to 1m.
298	SERN029	Valley floor, very gently sloping up to the west	Low Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 6m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia dictyophleba</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 3.2m over Mid-Dense Hummock Grassland of <i>Triodia epactia</i> (Form 4) and <i>Triodia wiseana</i> to 1.4m.

600-group number	Site	HABITAT	VEGETATION
298	VOK012	Flowline/gully between two small hills	Low Open Woodland to Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 5m over Tall Open Shrubland of <i>Gossypium robinsonii</i> and <i>Acacia pruinocarpa</i> to 4m over Open Shrubland of <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 2m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.6m.
298	VOK007	Small drainage line/gully, moderately sloping to the east and the west. The drainage line/gully runs north-south.	Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 11m over Tall Open Shrubland of <i>Acacia inaequilatera</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 3.5m over Closed Hummock Grassland of <i>Triodia wiseana</i> to 1.3m.
298	VOK002	Gully/drainage line off the ranges, running down to the east	Scattered Low Trees of <i>Corymbia hamersleyana</i> to 5m over Tall Open Shrubland of <i>Acacia inaequilatera</i> to 4.5m over Shrubland of <i>Gossypium australe</i> (Whim Creek form) to 1.8m over Closed Hummock Grassland of <i>Triodia wiseana</i> to 1.5m.
299	FL1039	Moderate east facing lower slope of large hill arm	<i>Acacia orthocarpa</i> low open shrubland over <i>Triodia wiseana</i> hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> scattered low trees
299	FL1037	Undulating valley floor	<i>Triodia</i> aff. <i>melvillei</i> open hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> scattered low trees
299	FL1040	Gentle east facing slope of minor hill within valley	<i>Acacia orthocarpa</i> shrubland over <i>Triodia wiseana</i> , <i>T. epactia</i> and <i>T. aff. melvillei</i> mid-dense hummock grassland

600-group number	Site	HABITAT	VEGETATION
299	FL1004	Moderate south facing lower slope with minor gully	Triodia epactia hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees over Grevillea pyramidalis subsp. leucadendron scattered tall shrubs
299	FL1003	Steep north facing lower scree slope of low hill	Triodia wiseana mid-dense hummock grassland over Cymbopogon ambiguus open tussock grassland with Hakea chordophylla and Senna glutinosa subsp. glutinosa x luerssenii scattered shrubs
299	FL1016	Moderate east facing upper slope of east west spur	Triodia wiseana hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees
299	FL1017	Moderate to steep north facing midslope of tall hill	Eucalyptus leucophloia ssp. leucophloia low open woodland over Triodia wiseana hummock grassland
299	FL1002	Very gently sloping north facing minor drainage channel on valley floor	Triodia wiseana closed hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered trees
299	FL1001	Moderate to steep north-west facing mid slope of high hill arm dissected by minor gullies	Eucalyptus leucophloia subsp. leucophloia low open woodland over Triodia wiseana mid-dense hummock grassland over Cymbopogon ambiguus open tussock grassland

600-group number	Site	HABITAT	VEGETATION
299	SERN082	Steep rocky hillside facing north-east	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 9m over Tall Open Shrubland of <i>Acacia pruinocarpa</i> , <i>Tephrosia spechtii</i> , <i>Acacia monticola</i> , <i>Gossypium robinsonii</i> and <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> to 4m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.1m over Low Open Shrubland of <i>Eremophila macmillaniana</i> , <i>Corchorus</i> sp. (HD260) and <i>Sida</i> sp. Barlee Range to 1m.
299	SERN025	moderately sloping hillside, sloping upwards to the east	Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 7m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Tephrosia spechtii</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 2.9m over Scattered Shrubs of <i>Sida hackettiana</i> to 1.2m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Scattered Low Shrubs of <i>Corchorus incanus</i> subsp. <i>incanus</i> to 0.8m.
299	SERN024	hill top	Low Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 6m over Scattered Tall Shrubs of <i>Hakea chordophylla</i> to 2.5m over Shrubland of <i>Acacia monticola</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 1.8m over Mid Dense Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> and <i>Triodia wiseana</i> to 1.5m over Low Open Shrubland of <i>Acacia "spondio"</i> and <i>Keraudrenia nephrosperma</i> to 1m.
299	SERN022	sloping SW on side/bottom hill	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 6m over Tall Shrubland of <i>Acacia monticola</i> , <i>Acacia dictyophleba</i> , <i>Hakea chordophylla</i> , <i>Acacia dictyophleba</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3m over Shrubland of <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 1.8m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Low Shrubland of <i>Gompholobium karijini</i> and <i>Goodenia stobbsiana</i> to 1m over Very Open Tussock Grassland of <i>Paraneurachne muelleri</i> to 0.8m.
299	SERN012	Hillside, moderately sloping, facing in a westerly	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 5.5m over Scattered Tall Shrubs of <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> , <i>Hakea chordophylla</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 3.5m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Scattered Low Shrubs of <i>Acacia hilliana</i> to 0.8m.
299	SERN081	Hillside sloping moderately down to the west.	Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 10m over Scattered Shrubs of <i>Gossypium robinsonii</i> and <i>Acacia monticola</i> to 2m over Mid-Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.3m.
299	SERN105	RIDGE TO MID SLOPE BENEATH HILL	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 7m over Tall Open Shrubland of <i>Acacia monticola</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> to 2.5m over Mid Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Very Open Tussock Grassland of <i>Eriachne mucronata</i> (typical form) and



600-group number	Site	HABITAT	VEGETATION
			Eriachne ciliata to 0.25m.
299	RAIL008a	Hill slope, moderately sloping north-west, mid to lower slope	Low Open Woodland of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia to 8m over Open Shrubland of Tephrosia spechtii and Senna glutinosa subsp. glutinosa, to 1.6m over Low Open Shrubland of Acacia adoxa var. adoxa, Indigofera monophylla and Corchorus sp. (HD260) to 1.6m over Mid-dense Hummock Grassland of Triodia wiseana and Triodia aff. epactia to 1m
300	FL1015	Gentle to moderate east facing mid slope of tall hill	Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia low open woodland over Triodia epactia hummock grassland
300	FL1018	Gentle north facing lower slope	Acacia maitlandii shrubland over Triodia wiseana open hummock grassland with Eucalyptus leucophloia subsp. leucophloia scattered low trees
300	FL1033	Very gentle upper slope of knoll	Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia low open woodland over Triodia wiseana mid-dense hummock grassland
300	FL1046	Slight east facing crest of minor rise in valley	Triodia aff. melvillei mid-dense hummock grassland with Corymbia hamersleyana scattered low trees
300	VOK008	Hilltop and slopes, with a breakaway along the southern edge.	Scattered Low Trees of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia to 6m over Scattered Tall Shrubs of Acacia inaequilatera, Acacia pruinocarpa and Grevillea wickhamii subsp. aprica to 3m over Closed Hummock Grassland to Mid-Dense Hummock Grassland of Triodia wiseana to 1.2m.
300	ZION007	sloping north on side hill, gently undulating	Low Woodland of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia to 6m over Tall Open Shrubland of Grevillea wickhamii subsp. hispidula to 3m over Shrubland of Acacia retivena subsp. clandestina and Tephrosia spechtii to 2m over Mid-dense Hummock Grassland of Triodia wiseana to 1.1m over Low Open Heath of Acacia hilliana, Dampiera candidans, Indigofera monophylla, Corchorus

600-group number	Site	HABITAT	VEGETATION
			lasiocarpus var. parvus and Goodenia stobbsiana to 0.8m over Very Open Tussock grassland of Eriachne mucronata (typical From) and Eriachne pulchella subsp. dominii to 0.3m.
300	TRIN002	Mid-top of ridge-sloping greatly to north	Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana to 7m over Shrubland of Acacia arida, Sida subspicata, Senna glutinosa subsp. glutinosa to 1.8m over Mid-dense Hummock Grassland of Triodia wiseana to 1.2m over Corchorus lasiocarpus var. parvus, Dampiera candicans, and Triumphetta maconochieana to 1m over Very Open Tussock Grassland of Aristida holathera var. latifolia, Aristida ingrata and Cymbopogon procerus to 0.8m.
300	TRIN007	hill side slope facing north	Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana to 7m over Tall Open Scrub of Acacia inaequilatera and Tephrosia spechtii to 2.8m over Closed Heath of Senna glutinosa subsp. glutinosa, Acacia arida and Ptilotus rotundifolius, Gossypium australe (Burrup Peninsula form) and Acacia pyrifolia var. pyrifolia to 2m over Low Open Heath of Corchorus lasiocarpus var. parvus, Ptilotus astrolasius var. astrolasius and "hibiscus scented" over Hummock Grassland of Triodia wiseana and Triodia epactia (Form 3) to 1.4m. over Open Tussock Grassland of Enneapogon polyphyllus, Digitalia ctenantha, Enneapogon lindleyanus and Enneapogon caerulescens var. caerulescens to 0.3m.
300	VOQ40	Steep hill side, lower part of ranges, sloping North	Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia to 6m over Scattered Tall Shrubs of Acacia trudgeniana and Grevillea wickhamii subsp. ? To 3m over Hummock Grassland of Triodia wiseana over Scattered Low Shrubs of Acacia hilliana and Corchorus lasiocarpus var. parvus to 0.6m.
300	FT32	hill top flat	Scattered Low Trees of Corymbia hamersleyana to 5m over Mid Dense Hummock Grassland of Triodia aff. melvillei (MET 10, 114) to 0.9m over Scattered Low Shrubs of Acacia hilliana to 0.5m.
301	FL1045	Gorge	Eucalyptus victrix open woodland over Acacia monticola, Dodonaea lanceolata var. lanceolata and Gossypium robinsonii tall shrubland over Stemodia grossa low open shrubland over Triodia epactia hummock grassland over Eulalia aurea, Themeda sp. and Eriachne mucronata open tussock grassland with Ficus brachypoda and Eucalyptus leucophloia subsp. leucophloia scattered low trees over Rhynchosia bungarensis scattered herbs
301	FL1035	Moderate to steep gorge	Corymbia ferriticola subsp. ferriticola and Ficus brachypoda low open woodland over Triodia epactia and T. wiseana open hummock grassland over Themeda sp., Enneapogon lindleyanus, Eriachne mucronata and Cymbopogon ambiguus open tussock grassland with Corchorus crozophorifolius, Capparis spinosa var. nummularia and Capparis spinosa scattered shrubs over HHF057 scattered herbs

600-group number	Site	HABITAT	VEGETATION
301	FL1027	Slight to steep rocky gorge	<i>Corymbia ferriticola</i> subsp. <i>ferriticola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>E. small</i> aff. <i>ghost</i> HHF045 and <i>Brachychiton gregorii</i> low woodland over <i>Triodia epactia</i> hummock grassland over <i>Eulalia aurea</i> , <i>Cymbopogon ambiguus</i> , <i>Themeda</i> sp. and <i>Eragrostis</i> aff. <i>eriopoda</i> open tussock grassland with <i>Acacia monticola</i> scattered tall shrubs
301	FL1026	Steep to vertical east and west facing gully	<i>Eucalyptus ferriticola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Acacia monticola</i> , <i>A. pruinocarpa</i> and <i>Gossypium robinsonii</i> tall open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Themeda</i> small CM037 and <i>Cymbopogon ambiguus</i> open tussock grassland
301	7RAIL038	Minor gully/drainage line/flow line	Tall Shrubland to Tall Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia inaequilatera</i> and <i>Acacia pruinocarpa</i> to 6m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> to 1.4m
301	TR021	Rocky gully	<i>Acacia citrinoviridis</i> low open forest over <i>Indigofera monophylla</i> , <i>Gossypium robinsonii</i> and <i>Senna glutinosa</i> ssp. <i>glutinosa</i> open shrubland over mixed very open herbs over <i>Triodia wiseana</i> very open hummock grassland
301	TR024	Minor drainage line on upper slope of mesa	Drainage line; <i>Corymbia hamersleyana</i> low open woodland over <i>Acacia adsurgens</i> and <i>Grevillea wickhamii</i> ssp. <i>hispidula</i> high open shrubland over <i>Acacia maitlandii</i> and <i>Senna artemisioides</i> ssp. <i>oligophylla</i> shrubland over <i>Triodia wiseana</i> hummock grassland Gully; <i>Eucalyptus leucophloia</i> ssp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> low woodland over <i>Acacia citrinoviridis</i> and <i>A. pruinocarpa</i> high open shrubland over <i>Triodia wiseana</i> open hummock grassland
301	6RAIL011	Gorge/gully approximately 12m high wall	Open Woodland of <i>Eucalyptus xerothermica</i> to 15m over Low Woodland of <i>Acacia citrinoviridis</i> , <i>Ehretia saligna</i> var. <i>saligna</i> and <i>Corymbia hamersleyana</i> to 10m over Tall Open Shrubland of <i>Gossypium robinsonii</i> , <i>Petalostylis labicheoides</i> and <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> to 4m over Open Tussock Grassland of <i>Cymbopogon ambiguus</i> and <i>Themeda triandra</i> to 1m over Scattered Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> and <i>Triodia wiseana</i> to 0.8m.
301	6RAIL010	Minor creek and flood plain	Low Open Woodland of <i>Eucalyptus xerothermica</i> to 8m over Tall Open Scrub of <i>Acacia bivenosa</i> , <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 4m over Mid-Dense Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.4m over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> to 1m
301	6RAIL008	Hilltop sloping down on all	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 5.5m over Tall Shrubland of <i>Acacia acradenia</i> , <i>Acacia arida</i> , <i>Grevillea wickhamii</i> subsp. <i>macrodonata</i> and <i>Acacia bivenosa</i> to 3.5m over Mid-

600-group number	Site	HABITAT	VEGETATION
		sides, approximately 630m above sea level	Dense Hummock Grassland of <i>Triodia wiseana</i> to 1.6m.
301	6RAIL07a	Gully/gorge feeding into Rio Gorge, running east-west	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 8m over Tall Open Scrub of <i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259), <i>Acacia bivenosa</i> , <i>Petalostylis labicheoides</i> , <i>Acacia maitlandii</i> , <i>Gossypium robinsonii</i> and <i>Acacia monticola</i> to 4m over Hummock Grassland of <i>Triodia wiseana</i> to 1.2m over Scattered Tussock Grassland of <i>Cymbopogon ambiguus</i> to 0.9m.
301	CW018	Gully (dissected drainage) running south west between two parts of the mesa	<i>Eucalyptus leucophloia</i> ssp. <i>leucophloia</i> low woodland over <i>Acacia citrinoviridis</i> and <i>A. tumida</i> var. <i>pilbarensis</i> high shrubland over <i>Triodia wiseana</i> hummock grassland
321	FL1049	Undulating plain	<i>Triodia epactia</i> hummock grassland with <i>Eucalyptus gamophylla</i> scattered mallees over <i>Acacia elachantha</i> , <i>A. ancistrocarpa</i> and <i>A. acradenia</i> scattered tall shrubs
321	FL1030	Valley floor	<i>Eucalyptus gamophylla</i> low open woodland over <i>Ptilotus astrolasius</i> low open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Aristida holathera</i> var. <i>holathera</i> tussock grass, <i>Paraneurachne muelleri</i> , JNFL079, JNFL080 very open tussock grassland over JNFL075 very open herbland
321	FL1023	Slightly undulating valley floor	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> (trees), <i>E. gamophylla</i> (mallees) and <i>Corymbia hamersleyana</i> (mallees) low open woodland over <i>Triodia epactia</i> hummock grassland over <i>Triodia</i> aff. <i>melvillei</i> , <i>Aristida holathera</i> var. <i>holathera</i> and <i>Poaceae</i> sp. very open tussock grassland
321	FL1007	Valley floor with minor drainage channels	<i>Acacia tumida</i> and <i>A. melleodora</i> tall open shrubland over <i>Triodia epactia</i> mid-dense hummock grassland
321	FL1009	Slightly undulating valley floor	<i>Eucalyptus gamophylla</i> and <i>E. leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>A. elachantha</i> (silvery hairy variant) tall open shrubland over <i>Triodia epactia</i> hummock grassland over <i>Aristida</i> sp. very open tussock grassland with <i>Acacia melleodora</i> scattered shrubs

600-group number	Site	HABITAT	VEGETATION
321	FL1012	Valley floor	Eucalyptus gamophylla low open woodland over Acacia melleodora and A. retivenea tall open shrubland over Triodia epactia hummock grassland
321	FL1022	undulating valleyfloor adjacent to drainage channel	Acacia tumida and Grevillea wickhamii tall open shrubland over Triodia epactia open hummock grassland over Aristida holathera var. holathera tussock grass, Paraneurachne muelleri and Themeda triandra very open tussock grassland with Corymbia hamersleyana and C. deserticola subsp. deserticola scattered low trees
321	VOQ33	Valley floor, undulating with very minor gullies	Low Open Woodland of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia to 8m over Tall Open Shrubland of Acacia elacantha (golden hairy variant), Acacia monticola and Acacia pyrifolia var. pyrifolia to 3m over Mid-dense Hummock Grassland of Triodia epactia (Form 4) and Triodia wiseana to 1.2
321	RAIL005	undulating in valley	Low Woodland of Eucalyptus gamophylla, Eucalyptus xerothermica and Corymbia hamersleyana to 5m over Tall Open Scrub of Acacia dictyophleba, Acacia inaequilatera and Acacia monticola to 5m over Open Shrubland of Acacia tenuissima and Acacia pyrifolia var. pyrifolia to 2m over Closed Hummock Grassland of Triodia wiseana and Triodia aff. epactia to 1.2m.
321	ZION040	Valley floor, very gently sloping downwards to the east.	Low Open Woodland of Eucalyptus xerothermica and Corymbia hamersleyana to 7m over Closed Hummock Grassland of Triodia aff. epactia to 1.6m over Scattered Shrubs of Acacia pyrifolia var. pyrifolia to 1.4m over Low Shrubland of Acacia adoxa var. adoxa and Indigofera monophylla to 0.8m.
321	SERN023	Valley floor, very gently sloping to the west	Low Open Woodland of Corymbia hamersleyana and Eucalyptus xerothermica to 7m over Tall Open Shrubland of Acacia pyrifolia var. pyrifolia and Acacia inaequilatera to 3.6m over Open Shrubland of Eremophila longifolia and Rhagodia eremaea to 1.6m over Mid-Dense Hummock Grassland of Triodia aff. epactia to 1.2m over Open Tussock Grassland of Chrysopogon fallax, Eulalia aurea and Themeda triandra to 1.2m.
321	RAIL009	Minor gully, valley floor	Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana to 6m over Open Shrubland of Acacia cowleana, Acacia dictyophleba and Senna glutinosa subsp. glutinosa to 1.8m over Scattered Low Shrubs of Gompholobium karjini, Ptilotus rotundifolius and Indigofera monophylla to 1m over Mid-dense Hummock Grassland of Triodia wiseana and Triodia epactia (Form 3) to

600-group number	Site	HABITAT	VEGETATION
			1m.
321	4RAIL121	Valley floor	Low Open Woodland of <i>Corymbia hamersleyana</i> to 9m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 2.5m over Mid Dense Hummock Grassland of <i>Triodia epactia</i> (Form 4) and <i>Triodia wiseana</i> to 1.6m.
321	SERN013	Valley floor, lowlying, gently undulating	Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 6m over Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia elacantha</i> (golden hairy variant) to 1.5m over Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.3m over Very Open Tussock Grassland of <i>Chrysopogon fallax</i> and <i>Themeda triandra</i> to 1.1m.
321	SERN027	Valley floor	Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>Eucalyptus gamophylla</i> to 8m over Tall Open Shrubland <i>Gastrolobium grandiflorum</i> and <i>Acacia elacantha</i> (Golden Hairy Variant) to 2.8m over Mid-Dense Hummock Grassland <i>Triodia epactia</i> (Form 3 ) and <i>Triodia wiseana</i> to 1.2m over Scattered Tussock Grassland <i>Eulalia aurea</i> and <i>Themeda triandra</i> to 0.9m.
321	SERN030	flat plain in valley	Low Open Forest of <i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> to 5m over Scattered Tall Shrubs of <i>Hakea lorea</i> subsp. <i>lorea</i> to 4m over Open Heath of <i>Acacia ancistrocarpa</i> , <i>Acacia tumida</i> and <i>Acacia dictyophleba</i> to 2m over Mid Dense Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.5m over Low Shrubland of <i>Bonamia rosea</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Senna symonii</i> and <i>Keraudrenia velutina</i> subsp. <i>elliptica</i> to 1m.
321	SERN010	Valley Floor	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Eucalyptus xerothermica</i> to 3.5m over Tall Open Shrubland of <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Acacia inaequilatera</i> to 3m over Mid-Dense Hummock Grassland of <i>Triodia epactia</i> (Form 4) to 1.4m over Low Open Shrubland of <i>Ptilotus rotundifolius</i> , <i>Ptilotus astrolasius</i> var. <i>astrolasius</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> to 1.1m.
321	SERN032	low lying vegetation/semi drainage	Low Open Forest of <i>Eucalyptus gamophylla</i> , <i>Corymbia hamersleyana</i> and <i>Eucalyptus xerothermica</i> to 7m over Tall Open Scrub of <i>Acacia inaequilatera</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3m over Mid Dense Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> and <i>Triodia wiseana</i> to 1.5m over Tussock Grassland of <i>Eulalia aurea</i> and <i>Themeda triandra</i> to 1.3m over Low Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Ptilotus rotundifolius</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Gompholobium karjini</i> , and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> to 1m.

600-group number	Site	HABITAT	VEGETATION
321	SERN033	Minor drainage line running east-west over the valley floor	Low Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 6m over Tall Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia inaequilatera</i> to 4.5m over Closed Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.3m over Very Open Tussock Grassland of <i>Eulalia aurea</i> and <i>Themeda triandra</i> to 1.2m.
321	BD002	Flat in valley	Low Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 5m over Low Open Shrubland of <i>Acacia dictyophleba</i> and <i>Acacia ancistrocarpa</i> to 1.8m over Closed Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.2m over Low Shrubland of <i>Bonamia rosea</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Senna glutinosa</i> subsp. <i>luerssenii</i> to 1m
321	RAIL002	relatively flat in valley	Low Open Forest of <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Eucalyptus xerothermica</i> to 6m over Tall Open Scrub of <i>Acacia monticola</i> , <i>Acacia elachantha</i> (golden hairy variant) and <i>Acacia dictyophleba</i> to 3.5m over Shrubland of <i>Gastrolobium grandiflorum</i> to 1.8m over Closed Hummock Grassland of <i>Triodia epactia</i> (Form 4) and <i>Triodia wiseana</i> to 1.1m over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>Paraneurachne muelleri</i> and <i>Eulalia aurea</i> to 1m over Low Open Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Bonamia rosea</i> to 1m over Very Open Herbland of <i>Goodenia stellata</i> to 0.3m.
321	BD004	Flat in valley	Low Open Woodland of <i>Corymbia hamersleyana</i> to 5m over Tall Shrubland of <i>Acacia dictyophleba</i> , <i>Acacia inaequilatera</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> to 2.2m over Open Shrubland of <i>Acacia ancistrocarpa</i> to 1.6m over Closed Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1m over Scattered Tussock Grasses of <i>Themeda triandra</i> to 0.8m over Low Open Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> , <i>Bonamia rosea</i> and <i>Tephrosia rosea</i> var. <i>glabrior</i> to 0.8m
321	SERN080	Valley Floor, very gently sloping up to the north.	Low Woodland of <i>Eucalyptus gamophylla</i> , <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>Corymbia opaca</i> to 7m over Tall Shrubland of <i>Acacia elachantha</i> (Golden Hairy Variant) and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3.2m over Tussock Grassland of <i>Eulalia aurea</i> and <i>Themeda triandra</i> to 1.1m.
321	KR009	Valley floor with minor flow lines. Site lies in a slight depression	Scattered Low Shrubs of <i>Acacia inaequilatera</i> to 3m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> to 1m

600-group number	Site	HABITAT	VEGETATION
321	KR010	Valley floor at base of range	Scattered Low Trees of <i>Eucalyptus gamophylla</i> to 3.5m over Open Shrubland of <i>Acacia atkinsiana</i> and <i>Acacia dictyophleba</i> to 2m over Mid Dense Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.2m
321	BD005	Sloping south into low lying area	Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Eucalyptus gamophylla</i> and <i>Eucalyptus xerothermica</i> to 5m over Open Heath of <i>Acacia elachantha</i> (golden hairy variant), <i>Gastrolobium grandiflorum</i> and <i>Acacia dictyophleba</i> to 2m over Closed Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.2m over Low Open Shrubland of <i>Acacia adoxa</i> var. <i>adoxo</i> to 0.4m.
321	VOK030	Valley Floor	Low Open Woodland of <i>Eucalyptus xerothermica</i> to 8m over Tall Open Shrubland of <i>Acacia dictyophleba</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Acacia atkinsiana</i> to 4m over Mid-Dense Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.6m.
321	CG003	Valley floor, low lying, gently sloping south	Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 10m over Open Shrubland of <i>Gastrolobium grandiflorum</i> and <i>Acacia elachantha</i> (golden hairy variant) to 2m over Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia epactia</i> (Form 5) to 1.2m over Low Open Shrubland of <i>Indigofera monophylla</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> to 0.8m over Very Open Tussock Grassland of <i>Paraneurachne muelleri</i> , <i>Themeda triandra</i> and <i>Eulalia aurea</i> to 0.6m.
321	SERN007	Valley floor, low lying, very gently sloping south, floodplain	Open Woodland of <i>Corymbia hamersleyana</i> to 7m over Tall Open Shrubland of <i>Acacia inaequilatera</i> , <i>Acacia dictyophleba</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3.5m over Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.3m over Very Open Tussock Grassland of <i>Themeda triandra</i> and <i>Chrysopogon fallax</i> to 1.1m over Low Open Shrubland of <i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous) and <i>Ptilotus obovatus</i> to 1m.
321	SERN056	Valley Floor	Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Eucalyptus gamophylla</i> to 5m over Tall Open Shrubland of <i>Acacia elachantha</i> (golden hairy variant) and <i>Hakea lorea</i> subsp. <i>lorea</i> to 3m over Scattered Shrubs of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> to 1.4m over Mid-dense Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1.4m over Very Open Tussock Grassland of <i>Paraneurachne muelleri</i> , <i>Digitaria brownii</i> and <i>Themeda triandra</i> to 1m.
321	SERN036	small rise in valley/plain	Low Open Forest of <i>Eucalyptus gamophylla</i> , <i>Corymbia hamersleyana</i> and <i>Eucalyptus xerothermica</i> to 7m over Tall Shrubland of <i>Acacia inaequilatera</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3m over Open Shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>glutinosa</i> and



600-group number	Site	HABITAT	VEGETATION
			<i>Senna glutinosa</i> subsp. <i>luerssenii</i> to 2m over Closed Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.2m over Very Open Tussock Grassland of <i>Cymbopogon obtectus</i> to 1m over Low Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> to 1m.
321	SERN039	Lower slope leading onto a valley floor	Low Woodland of <i>Eucalyptus gamophylla</i> to 3m over Scattered Shrubs of <i>Acacia atkinsiana</i> to 1.3m over Mid Dense Hummock grassland of <i>Triodia epactia</i> (Form 3) to 1.3m.
321	SERN049	Valley floor	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> to 6m over Tall Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> to 3m over Mid Dense Hummock Grassland of <i>Triodia epactia</i> (Form 3) to 1.35m.
321	SERN002	Valley floor, relatively flat	Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Corymbia deserticola</i> subsp. <i>deserticola</i> to 6m over Tall Open Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia dictyophleba</i> to 3m over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia elacantha</i> (golden hairy variant) and <i>Acacia tenuissima</i> to 2m over Hummock Grassland of <i>Triodia</i> flat (1) to 1.3m
321	SERN001	Valley floor, gently undulating	Open Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> to 8m over Tall Open Shrubland of <i>Acacia dictyophleba</i> , <i>Acacia cowleana</i> , <i>Acacia inaequilatera</i> and <i>Acacia ancistrocarpa</i> to 2.5m over Mid-dense Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1m.
321	SERN-CV2	Valley floor	Low Open Woodland of <i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> to 5.5m over Tall Open Shrubland of <i>Acacia inaequilatera</i> to 5m over Mid-Dense Hummock Grassland of <i>Triodia</i> aff. <i>epactia</i> to 1.3m over Scattered Tussock Grasses of <i>Themeda triandra</i> to 1m over Low Open Shrubland of <i>Bonamia rosea</i> , <i>Indigofera monophylla</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> to 0.8m.
321	BD003	Low-lying flat in valley	Low Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> , <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> to 6m over Tall Closed Scrub of <i>Acacia cowleana</i> and <i>Gastrolobium grandiflorum</i> to 3m over Scattered Shrubs of <i>Acacia tenuissima</i> to 2m over Closed Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia</i> aff. <i>epactia</i> to 1m over Scattered Tussock Grasses of <i>Themeda triandra</i> to 1m over Scattered Low Shrubs of <i>Acacia adoxa</i> var. <i>adoxo</i> to 0.6m