



CHRISTMAS CREEK LIFE OF MINE FLORA AND VEGETATION ASSESSMENT



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Prepared for

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Document Version	Author/s and Editor/s	Reviewer/s	Endorsed for Release by:	Date
Rev. A	Julia Mattner Hayden Ajduk	Bridget Watkins Denise True Teresa Gepp	Denise True	12/07/2011
Rev. B	Julia Mattner Hayden Ajduk	Damian Buller Denise True Kellie McMaster	Denise True	27/10/2011
Final	Julia Mattner Hayden Ajduk	Denise True Kellie McMaster	Denise True	27/07/2012
Final v2	Kellie McMaster	Damian Buller	Kellie McMaster	27/08/2012
Final v3	Kellie McMaster		Denise True	4/09/2012
Final v4	Kellie McMaster Julia Mattner	Peter Jobson	Denise True	6/02/2013
Final v5	Hayden Ajduk	Kellie McMaster	Kellie McMaster	27/02/2013
Update 2013 Draft	Julia Mattner	Kellie McMaster	Eugene Enzweiler	20/09/2013
Final	Julia Mattner	Kellie McMaster John Trainer	Jim Singleton	21/11/2013
Final v2	Julia Mattner	Kellie McMaster John Trainer	Phil Bourgault	2/12/2013

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PERMITS

This flora survey was undertaken under the following licences issued by the Department of Environment and Conservation: SL009415 issued to Julia Mattner, SL009377 issued to James Sansom, SL009400 issued to Lucy Dadour, SL009373 issued to Hayden Ajduk, SL010458 issued to Kellie McMaster and SL009905 issued to Damian Buller.

STATEMENT OF LIMITATIONS

Scope of Services

This environmental site assessment report ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) ('scope of services'). In some circumstances the scope of services may have been limited by factors such as time, budget, access and/or site disturbance constraints.

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The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

EXECUTIVE SUMMARY

ENV.Australia Pty Ltd was commissioned by Fortescue Metals Group Limited, to undertake an assessment of the flora and vegetation of the Life of Mine area at Christmas Creek. Christmas Creek is located 100 km north of Newman and is 701.44 km² (70,144 ha) in size. The purpose of the assessment is to provide documentation to support the environmental impact assessment of the Christmas Creek Life of Mine project under the *Environmental Protection Act 1986*.

This assessment consisted of a compilation and analysis of the results of previous surveys, and additional surveys conducted in March and April 2011, April / May 2012, June 2012 and May 2013. The additional surveys comprised:

- a single season Level 2 survey of supplementary areas not previously surveyed within the Christmas Creek Life of Mine area;
- delineation of mulga communities, based on existing information and additional survey;
- mapping of potential Groundwater Dependent Ecosystems along creeks and rivers, based on existing information and additional quadrat and relevé data;
- a single season Level 2 survey, of the Fortescue Marsh, designed in consultation with the Department of Environment and Conservation and Fortescue Metals Group; and
- targeted searches for Priority flora listed by the Department of Environment and Conservation within 50 km of the survey area and recorded in the area during previous surveys, focussing on anticipated impact areas (ore bodies) and adjacent areas.

A total of 124 quadrats and 54 relevés were assessed.

Vegetation mapping was based on the vegetation mapping completed by Mattiske Consulting Pty Ltd in 2007 and updated where appropriate. Data from the 2011 survey and previous surveys were combined with 2883 sites from a private database in order to undertake a comprehensive bioregional floristic analysis.

A total of 485 taxa, including 13 Priority Flora and 19 introduced species were recorded during the surveys from 2011 to 2013, reflecting good seasonal conditions and intrinsically high species diversity, particularly of mulga and riparian vegetation. Species richness ranged from four to 73 taxa per quadrat, and averaged 30.6 taxa.

In total, 541 taxa, including 14 Priority Flora and 20 weed species have been recorded from the survey area. No species listed by the *Environment Protection and Biodiversity Conservation Act 1999*, or gazetted as Declared Rare Flora pursuant to the *Wildlife Conservation Act 1950* were recorded.

The majority of the flora is common and widespread in the Pilbara region of Western Australia.

Fifteen broad vegetation types (*sensu* Matiske 2007) and 11 vegetation associations were mapped. Statistical analysis of floristic data identified 16 vegetation groups at 30% similarity, which partially coincide with the vegetation mapping. While the majority of the vegetation was mapped and defined based on floristic data or previous mapping, a proportion of Fortescue Marsh (below 405.5 m above sea level) was extrapolated due to inundation limiting access.

None of the vegetation types or vegetation associations correspond to a known Threatened Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* or as an Environmentally Sensitive Area under the *Environmental Protection Act 1986*.

The Priority One Ecological Community “Fortescue Marsh” is located along the southern part of the survey area. The survey area straddles the Fortescue Marsh Priority Ecological Community and the buffer zone as mapped by the Department of Environment and Conservation.

Vegetation condition ranged from Completely Degraded (in areas associated with mining, exploration and infrastructure) to Excellent (in the hills in the northern and eastern parts of the survey area, and in the lower Marsh), with most of the survey area in Very Good condition. Disturbances include tracks and roads, clearing for mining activities and exploration, grazing by cattle, as well as presence of weeds, particularly buffel grass (**Cenchrus ciliaris*) and birdwood grass (**Cenchrus setiger*) along river frontages.

Potential Groundwater Dependent Ecosystems associated with creeks and rivers were characterised by a vegetation type dominated by *Eucalyptus victrix* and *E. camaldulensis*. No obligate phreatophytes such as *Melaleuca argentea*, which is highly sensitive to changes in groundwater tables, were observed. Within the Fortescue Marsh, some samphires (*Tecticornia* spp.), particularly those growing towards the centre of the Marsh, may be groundwater dependent, based on preliminary studies.

Five Mulga dominated vegetation types occur in the survey area including: VT2 (Low Woodland to Low Open Forest of *Acacia aneura* var. *aneura*, *A. citrinoviridis*, *A. pruinocarpa*), VT3 (Low Woodland to Low Open Forest of *Acacia aneura* var. *aneura*, *A. pruinocarpa*, *A. tetragonophylla*, *A. tenuissima*, *Grevillea wickhamii* subsp. *aprica*, *Psyrax latifolia*), VT4 (Low Open Woodland of *Acacia aneura* var. *aneura*, *A. pruinocarpa*, *A. xiphophylla*, *A. victoriae*), VT10.1 (Low Open Woodland of *Acacia xiphophylla*, *A. victoriae*, *A. aneura* var. *aneura* over *A. tetragonophylla*, *Ptilotus obovatus* and mixed *Senna*, *Maireana* and *Sclerolaena* species) and VT10.2 (Low Open Woodland of *Acacia xiphophylla*, *A. victoriae*, *A. aneura* var. *aneura*). In addition, there are two vegetation mosaics (VT03.1/10.1 and VT30.1/4) that contain a small proportion of Mulga. Mulga communities north of the Fortescue Marsh are considered significant because they:

- represent the northern limit of the distribution
- are floristically diverse and contains floristic elements of both southern and northern vegetation types
- are generally in very good condition, due to low grazing pressure and low impact from changed fires regimes.

The survey area comprises nine land systems, four of which (Warrie, Cowra, Turee and Marsh) are endemic to the Fortescue Marsh area and/or are poorly represented within the Pilbara conservation estate.

1 INTRODUCTION

1.1 THE PROJECT

1.1.1 Objectives

ENV.Australia Pty Ltd (ENV) was commissioned between 2011 and 2013 by Fortescue Metals Group Limited (Fortescue) to undertake an assessment of the flora and vegetation of the Life of Mine (LOM) footprint at Christmas Creek (the survey area).

The assessment consisted of a compilation and analysis of the results of previous surveys (ENV 2010a and 2010b; Mattiske 2007 and Biota 2004a, and additional surveys conducted in 2011, 2012 and 2013 by ENV).

The objectives of the assessment were to:

- conduct a Level 2 single season survey of flora and vegetation in areas not previously surveyed;
- map the vegetation of additional areas surveyed in accordance with Mattiske vegetation mapping (Mattiske 2005a and 2007);
- further delineate the Mulga communities, based on existing information and additional survey;
- further delineate potential Groundwater Dependent Ecosystems (GDE) along creeks and rivers, based on existing information and additional survey;
- conduct a Level 2 single season survey of the *Tecticornia*-dominated vegetation of the Fortescue Marsh;
- map the vegetation condition of the survey area; and
- conduct targeted searches for Priority Flora focussing on impact areas (ore bodies) and adjacent areas, as well as habitats likely to support Priority Flora.

1.1.2 Location

The survey area is 701.44 km² (70,144 ha) in size and is located 110 km north of Newman, in the Pilbara region of Western Australia; it includes northern areas of the Fortescue Marsh and adjacent plains and hills to the north of the Marsh (Figure 1).

1.2 BACKGROUND TO THE PROTECTION OF FLORA AND VEGETATION

Flora is protected formally and informally by the following legislative and non-legislative measures:

Legislative Protection

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*;
- *Wildlife Conservation Act 1950 (WC Act)*;
- *Agriculture and Related Resources Protection Act 1976 (WA) (ARRP Act)*; and
- *Environmental Protection Act 1986 (EP Act)*.

Non-Legislative Protection

Note that the Department of Parks and Wildlife (DPaW) and the Department of Environment Regulation (DER) commenced operations on 1 July 2013 following the separation of the former Department of Environment and Conservation (DEC). The entity for the 2011 to 2013 surveys was DEC; the new relevant entity is DPaW

- Western Australian Department of Environment and Conservation (DEC) / Department of Parks and Wildlife (DPaW) Priority Flora lists;
- Recognition of locally significant populations by the DEC / DPaW;
- Priority Ecological Communities (PECs);
- Environmental Weed Strategy (Department of Conservation and Land Management [CALM] 1999); and
- International Union for Conservation of Nature (IUCN) Red List criteria.

A short description of each protective mechanism is given below. Other definitions, including species conservation categories are provided in Appendix A. Conservation categories for ecological communities are provided in Appendix B.

EPBC Act

The *EPBC Act* aims to protect matters of national environmental significance. Under the *EPBC Act*, the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) lists threatened species and communities in categories determined by criteria set out in the Act (www.environment.gov.au/epbc/index.html). See Appendix A and Appendix B.

Projects likely to cause impacts on matters of national environmental significance should be referred to DSEWPaC for assessment under the *EPBC Act*.

WC Act

The DEC lists flora under the provisions of the *WC Act* as protected according to their need for protection (see Appendix A).

Flora is afforded Declared Rare Flora / Threatened (DRF/T) status when populations are geographically restricted or are threatened by local processes. In addition, under the *WC Act*, by Notice in the Western Australian Government Gazette of 9 October 1987, all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) is protected throughout the State.

EP Act

DRF/T and TECs are given special consideration in environmental impact assessment, and have special status as Environmentally Sensitive Areas (ESAs) under the *EP Act* and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Exemptions for a clearing permit do not apply in an ESA.

ARRP Act

Plants may be 'Declared' by the Agriculture Protection Board under the *Agriculture and Related Resources Protection Act 1976* (WA) (ARRP Act). Declared Plants are gazetted under five categories (P1-P5), which define the action required. Details of the definitions of these categories are provided in Appendix C. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties (Department of Agriculture and Food Western Australia [DAFWA] 2011).

The Environmental Weed Strategy for Western Australia (CALM 1999) contains criteria for the assessment and ranking of weeds in terms of their environmental impact on biodiversity (see Appendix C). The Strategy defines environmental weeds as 'plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade.'

DEC / DPaW Priority Lists

The DEC / DPaW lists 'Priority' flora that have not been assigned statutory protection under the *WC Act*, but which are under consideration for declaration as DRF.

Flora assessed as Priority 1-3 (see Appendix A) are in urgent need of further survey. Priority 4 flora requires monitoring every 5-10 years (see Appendix A for definitions).

Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using the IUCN Red List criteria:

- CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild

- EN: Endangered – considered to be facing a very high risk of extinction in the wild
- VU: Vulnerable – considered to be facing a high risk of extinction in the wild.

In addition, the DPaW maintains a list of Priority Ecological Communities (PECs) which identifies those communities that need further investigation before possible nomination for TEC status.

Informal Recognition of Flora

Certain populations or communities of flora may be of local significance or interest because of their patterns of distribution and abundance. For example, flora may be locally significant because they are range extensions to the previously known distribution or are newly discovered taxa (and therefore have the potential to be of more than local significance). The taxonomy of some species, particularly some members in the Fabaceae and Malvaceae families, is ambiguous, as there appear to be several forms within the one species (for example, Mulga complex, *Indigofera*, *Tephrosia*, *Sida*, *Hibiscus*). In addition, many species are in decline as a result of threatening processes (primarily land clearing), and relict populations of such species assume local importance for the DPaW. It is not uncommon for the DPaW to comment on these species of interest.

Significant Flora

The EPA (2004), in Guidance Statement No. 51, defines significant flora as flora (species, subspecies, varieties, hybrids, and ecotypes) being significant for a range of reasons, other than as Declared Rare Flora or Priority flora, and may include the following:

- a keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species;
- relic status;
- anomalous features that indicate a potential new discovery;
- being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- the presence of restricted subspecies, varieties, or naturally occurring hybrids;
- local endemism/a restricted distribution; and
- being poorly reserved.

Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the *Environmental Protection (Clearing of Native Vegetation) Regulation 2004* and are selected for their environmental values at state or national levels. They include:

- Defined wetlands and riparian vegetation within 50 m;
- Areas covered by Threatened Ecological Communities;

- Area of vegetation within 50 m of Declared Rare Flora;
- Bush Forever sites; and
- Declared World Heritage property sites.

1.3 ENVIRONMENTAL ATTRIBUTES

1.3.1 Climate

The survey area is located in the Pilbara region of Western Australia. The nearest Bureau of Meteorology (BoM) station providing long-term climate data is Newman Aero weather station, located approximately 110 km southeast of the survey area.

The Pilbara has an arid-tropical climate with two distinct seasons, a hot summer from October to April and a mild winter from May to September, with a mean maximum temperature of 31.4°C and mean minimum temperature of 17.3°C. In summer, maximum daytime temperatures may reach 46°C, whilst in winter, minimum night time temperatures may fall to -2°C (BoM 2013), experiencing a temperature range of 48°C.

Rainfall in the Pilbara is often sporadic and may occur throughout the year (in summer and winter). Summer rainfall is typically associated with tropical storms in the north, or tropical cyclones that cross the coast and move inland. Winter rainfall is commonly the result of cold fronts moving north-easterly across the State. The Newman area has a mean annual rainfall of 325.9 mm (BoM 2013) with the majority of rainfall occurring during the summer months (Figure 2).

For the three months preceding the first survey (at the end of March 2011), Newman received above average rainfall of 230.8 mm (Jan to Mar 2011), compared with the long-term average of 179.1 mm for the same period (BoM 2013). For the three months preceding the second survey (beginning of May 2011) Newman received 203.2 mm (Feb-Apr 2011), compared with the long-term average of 135.8 mm. Rainfall for the 12 months prior to the initial 2011 survey (April 2010 to March 2011) was 420.4 mm, which is 29% above the long term average for the same period (1971-2013).

For the three months preceding the survey in May 2012, Newman received 87.4 mm of rain (Feb-Apr 2012) compared to the long-term average of 135.8 mm for the same period (BoM 2013). Similarly, the three months prior to June 2012 (Mar-May 2012) had below average rainfall of 67 mm compared to the average of 76.6 mm for the same period (BoM, 2013). Rainfall for the 12 months preceding the 2012 surveys (May 2011 to Apr 2012) was 471.6 mm, 45% above the long term average for the same period (1971-2013).

For the three months prior to the survey in 2013 (May 2013), Newman received 66.2 mm (Feb-Apr 2013) compared to the long-term average of 135.8 for the same period. Rainfall for the 12 months prior to the 2013 survey (May 2012 to Apr 2013) was 277.4 mm, 15% below the long-term average for the same period (BoM, 2013).

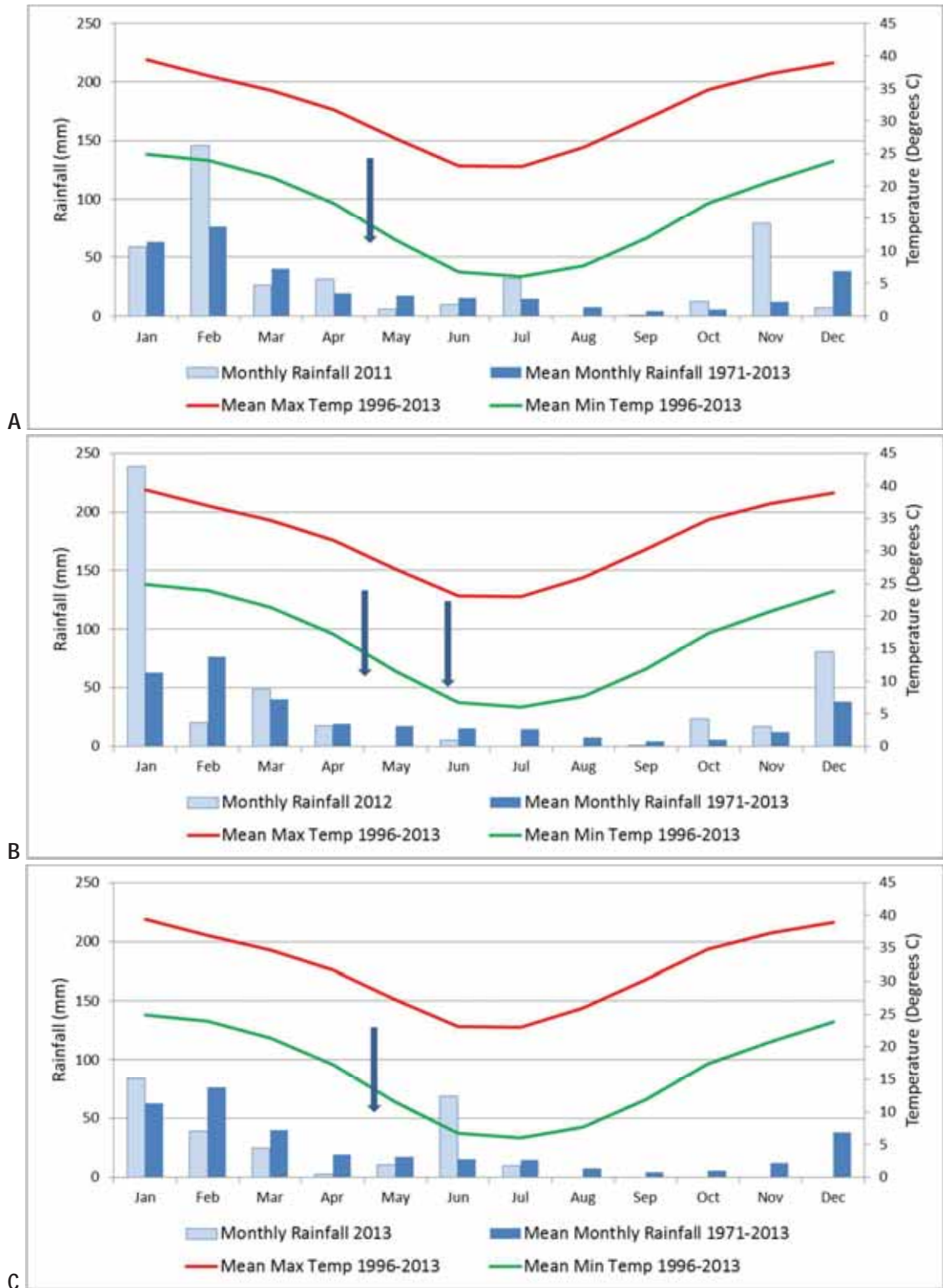


Figure 2: Comparison of long-term mean monthly rainfall (1971-2013) and observed monthly rainfall for 2011 (A), 2012 (B) and 2013 (C); also showing average monthly maximum and minimum temperatures at Newman Airport (BoM 2013). Arrows indicate survey times.

1.3.2 Biogeographic Regionalisation for Australia

The Biogeographic Regionalisation for Australia (IBRA) divided Australia into 89 bioregions based on major biological and geographical/geological attributes (Thackway and Cresswell 1995). These bioregions were further subdivided into 419 subregions, as part of a refinement of the IBRA framework (DSEWPac 2011a). Western Australia contains 26 bioregions and 53 subregions.

The survey area is located in the Pilbara bioregion, predominantly in the Fortescue Plains subregion (692.73 km²), with a small part in the northeast of the survey area being situated in the Chichester subregion (8.71 km²). The Fortescue Plains subregion is characterised by alluvial plains and river frontage. It includes extensive salt marsh, Mulga-bunch grass and short grass communities on alluvial plains supporting Mulga in the east. The plains represent the northern limit of Mulga (*Acacia aneura*) vegetation. Deeply incised gorge systems in the western (lower) part of the drainage are fringed by *Eucalyptus camaldulensis* woodlands (Kendrick 2001).

The Chichester subregion comprises the northern section of the Pilbara craton which consists of Archaean granite and basalt plains and ranges. The plains support a shrub steppe of *Acacia inaequilatera* over *Triodia wiseana* hummock grassland, while *Eucalyptus leucophloia* tree steppe occurs on the ranges (Kendrick and McKenzie 2001).

The Pilbara is one of Australia's 15 National Biodiversity Hotspots, eight of which are located in Western Australia (DSEWPac 2011b) and is a secondary centre of species richness for *Acacia* in Western Australia (Maslin & van Leeuwen 2008).

1.3.3 Land Systems

Land system mapping is based on regional patterns in topography, soils and vegetation. The land system mapping classifies the Pilbara region into 102 land systems (van Vreeswyk *et al.* 2004). The survey area comprises nine land systems which are summarised below (Table 1).

Table 1: Land Systems of the Survey Area (data from van Vreeswyk *et al.* 2004)

Land System	Description	Extent in Pilbara Bioregion (km ²)	Proportion in the Pilbara Bioregion (%)	Area in the Christmas Creek LOM Survey Area		
				Extent (km ²)	Proportion (%)	% of total in Pilbara Bioregion
Boolgeeda	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and Mulga shrublands	7,748	4.3	4.06	0.6	<0.1
Calcrete	Low calcrete platforms and plains supporting shrubby hard spinifex grasslands on alluvial plain	1,444	0.02	1.32	0.2	<0.1
Cowra	Plains fringing the Marsh land system and supporting snakewood and Mulga shrublands with some halophytic undershrubs. Restricted geographically.	203	0.1	51.85	7.4	25.5
Jamindie	Stony hardpan plains and rises supporting groved Mulga shrublands, occasionally with spinifex understorey	2,074	1.1	139.85	19.9	6.7
Marsh	Lakebeds and flood plains subject to regular inundation, supporting samphire shrublands, salt water couch grasslands and halophytic shrublands. Restricted to the Fortescue March.	977	0.5	143.16	20.4	14.7
McKay	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands	4,202	2.3	21.49	3.1	0.5
Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands	14,580	8.0	145.54	21.7	1.00
Turee	Stony alluvial plains with gilgaied and non-gilgaied surfaces supporting tussock grasslands and grassy shrublands	581	0.3	187.42	27.7	32.3
Warri	Low calcrete platforms and plains supporting Mulga and <i>Senna</i> shrublands	305	0.2	6.75	1.0	2.2

1.3.4 Geology

The following nine geological units occur in the survey area (Geological Survey of Western Australia 1990, captured at a scale of 1:250,000):

- AFj: Jeerinah Formation – pelite, chert, and thin-bedded meta sandstone; intruded by Metadolerite sills in the Hamersley Range
- AFm: Maddina Basalt: amygdaloidal metabasaltic flows and breccia
- Qa: Alluvium – unconsolidated silt, sand and gravel: in drainage channels and on adjacent floodplains
- Qw: Alluvium and colluvium – red-brown sandy and clayey soil; on low slopes and sheetwash areas
- Qc: Colluvium – unconsolidated quartz and rock fragments in soil; locally derived soil, and scree, and talus deposits
- AHm: Marra Mamba Formation: Chert, banded ironstone formation, and pelite
- Czr: Hematite – goethite deposits on banded iron-formation and adjacent scree deposits
- Czk: Calcrete – sheet carbonates; found along major drainage lines
- Czc: Colluvium – partly consolidated quartz and rock fragments in silt and sand matrix; old valley-fill deposits

1.3.5 Soils

The following two soil units occur in the survey area (Tille 2006):

- 284-Fortescue Valley: Alluvial plains, hardpan wash plains and sandplains (with stony plains, floodplains and some salt lakes) on alluvial deposits over sedimentary rocks of the Hamersley Basin. Red deep sands, red loamy earths and red/brown non-cracking clays with some red shallow loams and hard cracking clays. Mulga shrublands and spinifex grasslands (with some tussock grasslands and halophytic shrublands).
- 282-Chichester Ranges: Hills and dissected plateaux (with some stony plains) on basalt and sedimentary rocks of the Hamersley Basin. Stony soils with some red shallow loams and hard cracking clays. Spinifex grasslands with Kanji and Snappy Gum (and some tussock grasslands).

1.3.6 Vegetation Mapping

Vegetation mapping of the Pilbara region was completed on a broad scale (1:1,000,000) by Beard (1975). These vegetation units were re-assessed by Shepherd *et al.* (2001) to account for clearing in the intensive land use zone, and to divide some larger vegetation units into smaller units. The survey area is situated predominantly in the Fortescue Valley (692.74 km²) and to a small extent in the Chichester Plateau (8.7 km²), which form part of the Fortescue Botanical District in the Eremaean Botanical Province of Western Australia (Beard 1975). Four Beard vegetation units fall within the survey area (Table 2).

Table 2: Beard (1975) and Shepherd *et al.* (2001) Vegetation Units Occurring in the Survey Area and their Reservation Priority.

Beard/ Shepherd Vegetation Units	Description	Extent in Survey Area (km ²)	Extent in Fortescue Subregion (km ²)	Reservation Priority (Kendrick 2001)
a ₁ Lp / 29	Sparse low woodland; mulga, discontinuous in scattered groups	417.45	8945.7	Low
a ₂ Sr.t ¹ ₃ Hi / 173	Hummock grasslands, shrub steppe; kanji over soft spinifex & <i>Triodia wiseana</i> on basalt	8.12	43.2*	Medium
a ₁ Li/e ₁₆ Lr.t ₃ Hi / 562	Mosaic: Low woodland; mulga in valleys / Hummock grasslands, open low tree-steppe; snappy gum over <i>Triodia wiseana</i>	146.05	997.8	Medium
k ₃ Ci / 676	Succulent steppe; samphire	129.82	820.5	High

*this unit is widely distributed at the bioregional level and the Chichester subregional level.

1.4 ECOLOGICAL OVERVIEW OF THE SURVEY AREA

1.4.1 Fortescue Marsh

The Fortescue Marsh is an extensive, episodically inundated samphire marsh, approximately 100 km long and 10 km wide. Constricted at the western (downstream) end by the Goodiadarrie Hills, it is possible that the upper Fortescue River is prevented from flowing through into the lower Fortescue drainage, except in extreme rainfall events. These hills effectively separate the Fortescue River into two separate drainages. The Fortescue Marsh represents the terminus for the upper Fortescue River. The Marsh episodically supports immense water-bird breeding (Kendrick 2001), an event that was observed during the time of the survey in April and May 2011, and again in 2012.

The Marsh is listed on the Australian Heritage Commission Register of the National Estate as an 'Indicative Place', and as a 'Nationally Important Wetland' in the Directory of Important Wetlands in Australia (DSEWPaC 2011c). Both of these databases list

threats to the flora, vegetation and ecology of the Fortescue Marsh, including the introduction of exotic fodder trees, and pollution and disruption to surface water sheet flow and associated Mulga vegetation from nearby mining infrastructure (Environment Australia 2001).

The Fortescue Marsh system includes the following wetland types (Environment Australia 2001):

- Riverine floodplains; includes river flats, flooded river basins, seasonally flooded grassland, savannah and palm savannah; and
- Seasonal/intermittent freshwater lakes (> 8 ha), floodplain lakes.

The listing of Fortescue Marsh as a Nationally Important Wetland is based on four criteria (Department of Environment and Water Resources 2007):

- being a good example of a wetland type occurring within a biogeographic region in Australia;
- playing an important ecological or hydrological role in the natural functioning of a major wetland system/complex;
- being important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail; and
- having outstanding historical or cultural significance.

The vegetation associated with the Fortescue Marsh has developed in response to hydrological regimes as determined by local topography and soils. Changes to water flow, drainage patterns, water quality or soils could potentially change the distribution and composition of the flora and vegetation of the Fortescue Marsh (Mattiske 2007).

213,049 ha of the Marsh extent were proposed by the DEC (now DPaW) for incorporation into the Fortescue Marsh Conservation Reserve (FMCR) following expiration of pastoral leases in 2015. The total area to be relinquished from pastoral leases is 180,057 ha. The FMCR will include land systems that are not currently represented or are poorly represented in the Pilbara conservation estate and / or geographically restricted, including Cowra, Turee, Marsh and Warri land systems.

1.4.2 Mulga Vegetation

Mulga (*Acacia aneura* and close relatives) is a keystone group of trees and shrubs that dominate a large portion of the Western Australian rangelands including the Pilbara bioregion in the north, Gascoyne and Murchison bioregions in the centre, and Nullarbor bioregion to the southeast. At a continental scale, Mulga occupies about 20% of arid Australia. Mulga communities are critically important to the ecology, functioning and viability of rangeland landscapes, as they represent resource hotspots as a consequence of their inherent ability to capture, retain and cycle sediments, nutrients and water resources. Consequently, Mulga are repositories of significant productivity and biodiversity (Maslin 2006).

Mulga is a complex dominated by *Acacia aneura* and closely related species which share a high proportion of morphological and molecular similarities (Miller *et al.* 2002; Andrew *et al.* 2003; Miller & Bayer 2003; Murphy *et al.* 2003; Brown *et al.* 2008; Maslin & Reid 2012; Maslin *et al.* 2012). Mulga includes numerous species, informal variants, putative hybrids and intergrades, including:

- *Acacia aneura*
- *A. aneura* var. *aneura*
- *A. pteraneura* (formerly known as *A. aneura* var. *conifera*),
- *A. macraneura* (formerly known as *A. aneura* var. *macrocarpa*)
- *A. aptaneura* (formerly known as *A. aneura* var. *tenuis* and *A. aneura* var. *pilbarana*)
- *A. fuscaneura* (formerly known as *A. aneura* var. *fuliginea*)
- *A. caesaneura* (formerly known as *A. aneura* var. *argentea*)
- *A. incurvaneura* (formerly known as *A. aneura* var. *microcarpa*)
- *A. mulganeura* (provisionally conspecific with *A. aneura* var. *intermedia*)
- *A. ayersiana*
- *A. brachystachya*
- *A. catenulata* subsp. *occidentalis*
- *A. craspedocarpa*
- *A. minyura*
- *A. paraneura*
- *A. ramulosa* and
- *A. sibirica*

For details of the taxonomic revision of Mulga in Western Australia, based on morphological characters such as growth form, branchlets, new shoots, phyllodes, glands, inflorescences and flowers, pods and seeds, see Maslin & Reid (2012).

Mulga grows on a range of different landforms, including rocky hill slopes, lower slopes and rock outcrops, in groves on alluvial plains, generally on light textured red earths with a hard coherent subsoil. Mulga is characterised by shallow root systems and relies on soil water from sheetflow to meet its water requirement (Williams 2002).

Mulga woodlands on plains are often organised into patterns of alternating mulga groves and intergroves. The densely vegetated mulga groves develop in “run-on” areas arising from sparsely vegetated “run-off” areas in the intergroves. Groving Mulga has been well studied and documented since the 1970’s (Winkworth 1973; Dawson & Ahern 1973; Williams 2002). The groves act as a sink for water and nutrients, particularly organic carbon and nitrogen. Groves intercept sheet flow, thus increasing soil moisture and making nutrients available for plant uptake. Due to high biological activity, Mulga vegetation creates fertile patches in a landscape that is generally impoverished in terms of soil nutrients (Ludwig *et al.* 1997; Anderson & Hodgkinson 1997; Pate *et al.* 1998; English 1998; Noble *et al.* 1998; Dunkerley 2002; Berg & Dunkerley 2004; Dalal *et al.* 2005; Jalota *et al.* 2006; Saco *et al.* 2007; Kirschbaum *et al.* 2008; Bowman *et al.* 2008; Treagust 2008).

Mulga serves as a valuable habitat and refuge, including for soil fauna (arthropods) and flora (lichens) (Greene & Ringrose-Voase 1994; Robinson *et al.* 2002; Williams *et al.* 2008), insects (Recher & Davis 1997; Morris *et al.* 2000; Kearney & Moussalli 2003; Gunawardene & Majer 2005), reptiles (Aplin *et al.* 2006.), birds (Recher & Davis 1997; Craig & Chapman 2003; Burbidge & Fuller 2007; Biota 2004a) and mammals (Bester & Rusten 2009; Noble *et al.* 2007). Some of these organisms are highly or fully dependent on intact stands of Mulga.

Threatening processes to Mulga in the Pilbara include grazing pressure, feral animals (stock), changed fire regimes and changes to natural surface hydrology (Kendrick 2001).

Overgrazing leads to removal of perennial grasses and shortens the period of water supply to mulga groves, which then die prematurely during periods of prolonged drought. Overgrazing also reduces species richness of the native flora, particularly grasses which are most palatable to cattle, and encourages the spread of weeds (Anderson & Hodgkinson 1997).

Mulga is sensitive to fire, particularly where it grows in association with highly flammable spinifex (*Triodia*) hummock grasslands. The fire regime, in terms of size, intensity and frequency, in Mulga communities has increased in the last 100 years, coinciding with the development of the pastoral industry. Since Mulga requires 5-15 years to reach the reproductive stage (seed set), fires at frequent intervals may remove Mulga individuals or stands of single cohorts, thereby altering vegetation structure (Williams 2002).

Sheetflow dependent vegetation occurs on gently sloping plains (<2°) in arid and semi-arid areas of Australia (Ludwig *et al.* 1997; Reaney *et al.* 2007). Mulga in plains relies on sheetflow, typical of the natural surface hydrology of gently undulating plains. Sheetflow occurs when the soil is saturated and excess water from rain is shed as a thin film of water (run-off) that moves across the gently undulating plains. Sheetflow characteristics depend on a range of factors, including rainfall duration, rainfall intensity, variability, temporal structure, and soil physical and chemical properties. Interruptions to the natural surface hydrology by linear infrastructure such as roads, rail, and pipelines may result in water shadows and water starvation. These impacts can be mitigated by environmentally sensitive design, thus reducing the severity and extent of impact on sheetflow dependent Mulga (Muller 2005).

The Mulga vegetation types (woodlands and shrublands) to the north of the Fortescue Marsh and at the foot slopes of the Chichester Ranges, including the survey area, are considered significant because:

- At a continental scale, this is the northern limit of the distribution of Mulga dominated vegetation; *Acacia aneura* and close relatives occur as subdominant components in *Triodia* hummock grasslands to the north (Kendrick 2001; van Vreeswyk *et al.* 2004; Maslin 2006).

- Typically, vegetation types at the edge of their distribution are floristically diverse and distinct, with floristic elements of adjacent zones co-occurring, therefore, representing a transitional vegetation community (van Leeuwen & Bromilow 2002; Crisp *et al.* 2001).
- Some areas, particularly on the Jamindie land system, and to a lesser extent on the Cowra land system, are in Very Good to Good condition, with condition of similar land systems south of the Marsh being in lesser condition (van Vreeswyk *et al.* 2004).
- Land systems dominated by Mulga on the north side of the Marsh, including Turee and Jamindie, are less extensive south of the Marsh (van Vreeswyk *et al.* 2004).

Mulga on the plains is sheetflow dependent and occurs as groves, or as isolated trees to low woodlands. In major storm events, sheetflow can become an important source of inflow into the Fortescue Marsh (Gilbert and Associates 2009). The extensive areas of Mulga groves in the Fortescue Valley serve to concentrate sediment and nutrients that may otherwise be released to the Fortescue Marsh system (Biota 2004a, 2004b).

1.4.3 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDE) comprise of vegetation communities that requires access to groundwater to meet all or some of their water requirements so as to maintain their biological composition, ecological processes and ecosystem services (Hatton and Evans 1998; Murray *et al.*, 2003; O'Grady *et al.*, 2007; Walker and Salt 2006). Ecosystem that contain GDV can often contain high biodiversity. These ecosystems include fauna that utilise the habitat formed by the vegetation community. Key factors affecting GDE include groundwater level, groundwater flux and groundwater quality. The health and longevity of GDE can be impacted by changes to the natural groundwater levels (Sinclair Knight Merz [SKM] 2007).

There are three broad types of GDE, the characteristics of which are summarised below (SKM 2007).

1. Wetland GDE that occur around ephemeral or permanent wetland systems that receive seasonal or continuous groundwater contribution to water ponding or shallow water tables. These can include fringing (riparian) vegetation and aquatic flora.
2. River systems with a baseflow component can support GDE that occupy fringe ephemeral or permanent streams to which there is a continuous or seasonal groundwater contribution to flow. In many cases, the GDE interact with groundwater in a similar manner to Wetland GDE, except that water turnover is quicker.

3. Terrestrial (phreatophytic) vegetation communities are terrestrial GDE that include deep and/or shallow rooted vegetation communities that use groundwater to meet some or all of their water requirements.

GDE includes phreatophytic plants (SKM 2007; Murray *et al.* 2003).

There are two categories of phreatophytes:

- **Obligate phreatophytic plants** are highly dependent on groundwater sources to survive. In the Australian arid zone this includes trees such as *Melaleuca argentea*. The reliance can be continual, seasonal or episodic and such plants are highly sensitive to changes in groundwater regimes.
- **Facultative phreatophytic plants** utilise groundwater opportunistically or during times of limited water supply and/or drought-like conditions. Species include *Eucalyptus camaldulensis* and *E. victrix* (Froend 2009; EPA 2009; 2011; Ecoscape 2010; Grierson 2010; O'Grady *et al.* 2007; O'Grady *et al.* 2010; Loomes 2010, DoW 2010). Facultative phreatophytes have physiological and/or morphological adaptations to reduce their water demands during drought-like conditions, but they remain susceptible to extended periods of water stress.

There are several environmental factors that influence the degree of groundwater dependence of a plant at a particular point in time and space. Methods such as stable isotopes (^2H and ^{18}O) and artificial labelling with tracers such as lithium have been used to identify potential groundwater dependency (Eamus *et al.* 2006).

Vegetation which is dominated by River Red Gum (*Eucalyptus camaldulensis*) and/or Coolabah (*Eucalyptus victrix*) potentially represent GDE. This vegetation encompasses that found on the creeks and rivers which enter the Marsh from the Chichester Range and dissect the plains of the Cowra, Turee, Jamindie and Boolgeeda land systems.

In addition, the Samphire (*Tecticornia* spp.) vegetation characteristic of the Fortescue Marsh may have some reliance on groundwater for ecosystem function. Samphire vegetation typically occurs in areas where saline or sub-saline groundwater is close to the surface (Mattiske 2005a). Some researchers anticipate that there are species in the genus that may depend on groundwater and would therefore be sensitive to water table fluctuations. Samphire species at low elevations in Fortescue Marsh (towards the centre of the marsh) are highly tolerant of waterlogging and are more likely to be groundwater dependent than samphires towards the fringes of the Marsh. Preliminary studies of soil moisture present in zones occupied by *T. auriculata*, *T. indica*, and *T. medusa* at Fortescue Marsh suggest that these species access moisture from deeper than 0.5 m in the soil profile to meet their water use. However, overall, the degree of groundwater dependency for this community remains unknown. Groundwater dependency of *Tecticornia* species is still a matter of conjecture, and further studies in this area are currently being undertaken at the University of Western Australia (Astron 2011).

1.5 PREVIOUS BIOLOGICAL STUDIES

The flora and vegetation of the Pilbara has been recorded at a large scale by Burbidge (1959) and Beard (1975). More recently, the Department of Agriculture (van Vreeswyk *et al.* 2004) compiled an inventory and condition survey of the Pilbara which provides inventory of flora and a description of land resources in terms of land systems. Data from the Pilbara Region Biological Survey 2002-2009 by the DEC / DPaW are currently being analysed; however, with the exception of weeds (Keighery 2010), vegetation and flora data is not yet publicly available. The DEC / DPaW survey will provide a regional context that will assist in assessing the likely impact of future development proposals. It is anticipated that the survey will provide information on patterns in the distribution of flora and fauna to help the community make decisions about conservation requirements and the sustainable use of natural resources.

In recent decades, a boom in large-scale regional resource development projects has resulted in a significant amount of site-specific biological survey work being carried out in the region, most of which is undertaken for formal environmental impact assessment.

Those studies most relevant to the current survey, and which are within the vicinity of the survey area are:

- *Christmas Creek Airstrip Flora, Vegetation and Fauna Assessment* (ENV 2011);
- *Christmas Creek Flora and Vegetation Assessment* (ENV 2010a);
- *Cloudbreak Flora and Vegetation Assessment* (ENV 2010b);
- *Christmas Creek Mine Area Flora Ground Truthing Assessment* (ENV 2009);
- *Flora and Vegetation Assessment for the Cloudbreak to Christmas Creek Rail Corridor* (Coffey Environments 2008);
- *Flora and Vegetation Near Fortescue Marshes* (Mattiske 2007);
- *Proposed Cloudbreak Access Road Vegetation Assessment – Eastern End* (ATA Environmental 2006);
- *Flora and Vegetation on the Cloudbreak and White Knight Leases* (Mattiske 2005a);
- *Review of Vegetation Condition on the Cloud Break Lease Area* (Mattiske 2005b)
- *Vegetation and Flora survey of the proposed FMG Stage A Rail Corridor* (Biota 2004a);
- *Fortescue Metals Group Stage B Rail Corridor, Christmas Creek, Mt Lewin, Mt Nicholas and Mindy Mindy Mine Areas* (Biota 2004b).

- *Literature Review on Samphire Vegetation Focussing on the Water Requirements of the Community Associated with Fortescue Marsh* (Astron 2011);
- *Flora and Vegetation Survey of Roy Hill Infrastructure Railway – Bonney Downs Alignment* (Mattiske 2011); and
- *Roy Hill 1 Iron Ore Mining Project Stage 1. Report and recommendations of the Environmental Protection Authority* (EPA 2009).

A comprehensive bibliography of biological survey work undertaken in the Pilbara is available at the DEC website (DEC 2011a).

The results of previous flora and vegetation surveys conducted in the vicinity of the survey area are summarised in Table 3.

Table 3: Summary of Survey Results from Previous Flora and Vegetation Surveys Conducted Near and In the Survey Area

Title of Survey (Author, year)	Area (km ²)	Sampling Density (plots/km ²)	Number of Taxa	Conservation Significant Taxa Recorded	Introduced Taxa	No. of Land Systems	No. of Vegetation Units
<i>Christmas Creek Airstrip Flora, Vegetation and Fauna Assessment</i> (ENV 2011)	5.98	3.01	116	n/a	* <i>Aerva javanica</i> * <i>Bidens pilosa</i> * <i>Cenchrus ciliaris</i> * <i>Citrullus colocynthis</i> * <i>Cucumis melo</i> subsp. <i>agrestis</i> * <i>Portulaca oleracea</i>	2	10
<i>Christmas Creek Flora and Vegetation Assessment</i> (ENV 2010a)	493.53	0.07	71	<i>Eremophila spongiorcarpa</i> (P1) <i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) (P1) <i>Tecticornia globulifera</i> (P1) <i>Atriplex flabelliformis</i> (P3) <i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3) <i>Tecticornia medusa</i> (P3)	n/a	7	17
<i>Cloudbreak Flora and Vegetation Assessment</i> (ENV 2010b)	468.38	0.06	62	n/a	n/a	7	21

Title of Survey (Author, year)	Area (km ²)	Sampling Density (plots/km ²)	Number of Taxa	Conservation Significant Taxa Recorded	Introduced Taxa	No. of Land Systems	No. of Vegetation Units
<i>Flora and Vegetation Near Fortescue Marsh</i> (Mattiske 2007)	n/a	n/a	92	<i>Eremophila spongiorcarpa</i> (P1) <i>Nicotiana heterantha</i> (P1) <i>Eremophila youngii</i> subsp. <i>lepidota</i> (P4)	* <i>Aerva javanica</i> * <i>Cenchrus ciliaris</i> * <i>Chloris barbata</i> * <i>Malvastrum americanum</i>	4	29
<i>Flora and Vegetation on the Cloudbreak and White Knight Leases</i> (Mattiske 2005a)	553.73	0.10	234	<i>Eremophila spongiorcarpa</i> (P1) <i>Eremophila youngii</i> subsp. <i>lepidota</i> (P4) <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3) <i>Themeda</i> sp. Hamersley Station (ME Trudgen 11,431) (P3)	* <i>Biden pilosa</i> * <i>Cenchrus ciliaris</i> * <i>Cenchrus setiger</i> * <i>Malvastrum americanum</i>	8	18
<i>Fortescue Metals Group Stage B Rail Corridor, Christmas Creek, Mt Lewin, Mt Nicholas and Mindy Mindy Areas</i> (Biota 2004b)	888.94	0.23	599	<i>Abutilon trudgenii</i> ¹ <i>Eremophila pilosa</i> (P1) <i>Goodenia nuda</i> (P4) <i>Hibiscus brachysiphonius</i> ¹ <i>Sida</i> sp. Wittenoom (WR Barker 1962) ¹ <i>Themeda</i> sp. Hamersley Station (ME Trudgen 11,431) (P3)	* <i>Acetosa vesicaria</i> * <i>Aerva javanica</i> * <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i> * <i>Bidens bipinnata</i> * <i>Cenchrus ciliaris</i> * <i>Cenchrus setiger</i> * <i>Chloris virgata</i> * <i>Citrullus colocynthis</i> * <i>Echinochloa colona</i> * <i>Malvastrum americanum</i> * <i>Sigesbeckia orientalis</i> * <i>Sonchus oleraceus</i>	13	81

¹ Taxon no longer listed as Priority Flora (WAH 2013)

2 METHODS

2.1 GENERAL

The survey was consistent with a single season Level 2 survey as per EPA requirements for environmental surveying and reporting for flora and vegetation in Western Australia, as set out in the following documents:

- *Environmental Protection of Native Vegetation in Western Australia: Clearing of Native Vegetation with Particular Reference to Agricultural Areas. Position Statement No. 2* (EPA 2000);
- *Terrestrial Biological Surveys as an Element of Biodiversity Protection. Position Statement No. 3* (EPA 2002); and
- *EPA Guidance for the Assessment of Environmental Factors: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia No. 51* (EPA 2004).

2.1.1 Desktop Survey

The desktop assessment involved a search of the following sources:

- *EBPC Act* search (Protected Matters);
- International Union for Conservation of Nature (IUCN) Red List for chordate animals only and all plants in terrestrial and freshwater systems of WA for habitats typical of the arid zone;
- *NatureMap* combined biological database (DEC 2011b, 2012);
- DEC databases, including Threatened Flora Database (DEFL), the Western Australian Herbarium database (WAH) and the DEC Priority Flora List were interrogated for Priority and DRF for the survey area with a 50 km buffer (DEC 2011c, 2012);
- DEC Threatened and Priority Ecological Communities (TECs and PECs) database for the survey area (DEC 2011d, 2012);
- Environmentally Sensitive Area (ESA) listings (DEC 2011e, 2012); and
- Previous flora surveys (refer to Section 1.3).

These sources were reviewed to compile a list of expected DRF/T and Priority species, and TECs or PECs that may occur on the relevant habitats in the survey areas.

2.1.2 Previous Field Surveys

Vegetation surveys of the wider Christmas Creek area have been completed by Biota in 2004 (Biota 2004a, 2004b, 2005) and Mattiske in 2004, 2005 and 2006 (Mattiske 2005a, 2007). These are detailed below.

Biota Environmental Sciences

Biota was commissioned by Fortescue in 2004 to undertake a flora and vegetation survey of the proposed rail corridor and Mindy Mindy, Christmas Creek, Mt Lewin and Mt Nicholas mine site areas during Stage B of the Chichester Operation Project (Biota 2004b).

A total of 206 quadrats were assessed and 81 broad vegetation types were defined. Of these 206 quadrats, 16 occurred within the Christmas Creek LOM survey area (Table 4).

Table 4: Previously Surveyed Quadrats and Relevés within the Survey Area

Survey	Site Quadrat	Relevés	Survey	Site Quadrat
Biota (2004b)	C01	R15	Mattiske (2007)	41
	C02	R16		42
	C03	R17		43
	C04	R18		44
	C06	R37		45
	C07	R38		46
	C11	R39		47
	C12	R40		48
	C13	R41		49
	C14	R42		50
	C15	R44		51
	C16	R45		52
	C17	R46		
	C18			
	C19			
	C20			

Mattiske Consulting

Mattiske was commissioned by Fortescue in 2004 and 2005 to undertake a flora and vegetation survey of the Cloudbreak and White Knight mine site areas (Mattiske 2005a). Mattiske was further commissioned to undertake a flora and vegetation survey of the northern Fortescue Marsh associated with the Christmas Creek and Cloudbreak mine site areas (Mattiske 2007).

A total of 56 quadrats were assessed during the 2004 and 2005a surveys of Cloudbreak and White Knight, resulting in the description of 18 vegetation types. An additional 52 quadrats were assessed during the 2007 survey of the Fortescue Marsh vegetation associated with the Christmas Creek and Cloudbreak mine site areas. A further 11 vegetation types were described in Mattiske (2007). A total of 29 vegetation types were described by Mattiske during these surveys (Mattiske 2005a and 2007).

Twelve of the quadrats surveyed during the Mattiske surveys occur within the boundary of the Christmas Creek LOM survey area (Table 4).

Fortescue Metals Group Database

Records of Priority Flora and weeds recorded during surveys undertaken for Fortescue are compiled and stored on the Fortescue Database (Fortescue 2010). This database provides information on Priority Flora locations, date of collection, consultant who recorded data, conservation status, and can display relevant information regarding soil and landform associated with records.

The Fortescue Database provided ENV with a comprehensive list of Priority Flora and weed locations from the White Knight, Cloudbreak and Christmas Creek areas recorded during 2002 to 2010 by various consultants. The records extracted from the FMG Database that are located within the survey area are included in this report.

2.1.3 ENV Field Surveys 2011 to 2013

The 2011 ENV survey was undertaken over two trips, the first from 16- 24 March 2011 and the second from 28 April - 6 May 2011, representing a single season, Level 2 survey. Seventy-two person-days were invested in the survey.

The 2012 ENV survey focussed on the Marsh vegetation in the southern part of the LOM survey area and was conducted over two trips, from 26 April - 6 May 2012, and 5 - 10 June 2012, representing a single season Level 2 survey. Thirty person days were invested in the Marsh survey.

The 2013 ENV survey focussed on the transition zone between Marsh vegetation and the vegetation adjoining it to the north. This survey was conducted from 7 -9 May 2013, with a total of six person days invested.

Overall, a total of 108 person days were invested in the survey of the Christmas Creek LOM survey area.

The field surveys were undertaken to record and describe the flora and vegetation of the survey area to assist in the verification, extension and completion of vegetation types previously mapped by Mattiske (2007).

Flora richness, vegetation composition and structure were recorded, and vegetation condition (Trudgen 1991, see Appendix D) was assessed, using quadrat data and traverses. Field staff collected flora information using 50 m x 50 m vegetation survey plots, as per the Fortescue Guidelines (Fortescue 2011), relevés and opportunistic collections. For areas in which a 50 m x 50 m quadrat was not possible, suitable quadrat dimensions were used, whilst maintaining the same total search area of 2500 m². Quadrat locations are illustrated in Figure 3.

In 2011, a total of 73 quadrats, 11 relevés and seven sites (mapping notes=MN) were assessed to describe the vegetation associations. Thirteen quadrats and three relevés were established in previously unsurveyed portions of the survey area. A further 60 quadrats and eight relevés were established to assist in the verification and delineation of Mulga communities previously mapped by Mattiske (2007).

In 2012, a total of 43 quadrats and 39 relevés were assessed in the Fortescue Marsh vegetation. The survey method consisted of eight transects located in *Tecticornia*-dominated vegetation, oriented approximately north – south, with quadrats and relevés installed in the different vegetation associations as observed on the ground; this approach was agreed on with the then-DEC and Fortescue.

In 2013, a total of eight quadrats and four relevés were assessed in the transitional area between Marsh vegetation and vegetation adjoining it to the north.

Quadrats are vegetation survey plots which are accurately measured out as 50 x 50 m (or an area equivalent to 2500 m²) and marked at all four corners. Relevés are traditionally ‘unmarked quadrats’, where a centre point is captured on a handheld GPS and an area equivalent to that of a quadrat is visually approximated around this point for the purpose of estimating species composition and cover. Vegetation mapping notes are taken to assist in the finalisation of vegetation mapping in the office and included recording of dominant species to determine the vegetation association present *sensu* NVIS (Hierarchical Level V) and the landform.

Data was recorded using standardised field sheets designed in accordance with FMG Guidelines (Fortescue 2011). The information recorded at each quadrat and relevé included landform, surface soils, percentage of bare ground and litter cover, fire age and vegetation condition (the Condition Scale is presented in Appendix D). Each species of plant at each quadrat was recorded, including information on height and percentage cover. Vegetation of each quadrat was described at the vegetation sub-association level, as per National Vegetation Information System (NVIS) guidelines (Department of Environment & Heritage 2003), using up to five species for each of the strata present; the corresponding Mattiske vegetation unit was also indicated. Opportunistic collections focused mainly on the location of new flora not recorded in the quadrats, introduced species, and in particular, Declared Rare and Priority Flora, and flora not well known or not currently described. Mapping notes were less detailed and consisted of a vegetation description at the vegetation association NVIS Level V.

The locations of all quadrats, relevés and mapping notes are shown in Figure 3.

2.1.4 Targeted Searches for Conservation Significant Species

Targeted searches were completed in habitats known to support significant flora in the proposed LOM disturbance area. Areas surrounding known populations of significant flora were also searched. Based on previous surveys, the targeted species included *Rhagodia* sp. Hamersley (M. Trudgen 17794), *Themeda* sp. Hamersley Station (M.E.

Trudgen 11431), *Phyllanthus aridus* and *Rostellularia adscendens* var. *latifolia*. These species have been recorded previously close to or within the impact area. Extant known locations were revisited (unless they were already disturbed and covered with mining-associated infrastructure such as workshops and lay-down areas). Taxa returned from the DEC database searches that were likely or possible to occur, based on habitat and distance, were included in the targeted searches.

At locations where conservation significant flora was identified, their location was recorded by GPS, a photograph was taken and the number of individuals or the percentage cover, if present in large numbers or recorded within a quadrat was recorded.

2.1.5 Taxonomic Identification

At least one specimen of each taxon was collected during the 2011 to 2013 surveys. In addition, where field identification of taxa was not possible, specimens were collected systematically for later identification by taxonomists utilising the resources of the Western Australian Herbarium (WAH), through comparison with the reference collection and use of identification keys. All specimens were verified by Malcolm Trudgen (Consulting Botanist) to ensure consistency with his Pilbara database and to facilitate subsequent PATN analysis. For the purpose of the PATN analysis, some species were classified to a finer level by M. Trudgen. These species included taxa in the Fabaceae (*Acacia aneura* and associated taxa, *Indigofera monophylla*, several *Tephrosia* species, *Senna* species), Malvaceae (*Sida fibulifera*, several *Hibiscus* and *Abutilon* species, *Gossypium*), Poaceae (*Eriachne*), Caryophyllaceae (*Polycarpaea*), Convolvulaceae (*Polymeria*), Scrophulariaceae (*Eremophila*), Rubiaceae (*Oldenlandia*) and Goodeniaceae (*Scaevola*) families and several *Euphorbia* species.

All mulga specimens were determined by M. Trudgen. This nomenclature is not congruent with the nomenclature used at the WA Herbarium. This was required for the regional PATN analysis to be consistent with the dataset which is based on M. Trudgen's mulga nomenclature.

The species list for the survey area, including relevant quadrats from previous surveys, was verified against FloraBase (WAH 2013) to determine whether any of the species are currently gazetted as DRF, listed as Priority Flora or as introduced species. Declared Rare and Priority Flora were also verified against the *EPBC Act* listing of threatened species to determine whether any were listed under Commonwealth legislation. Introduced species were checked against the Environmental Weed Strategy for Western Australia (CALM 1999), to determine the criteria and ranking in terms of their environmental impact, and the *ARRP Act* to determine whether any were listed as Declared Plants.

The list of flora recorded was interrogated as to whether any taxa represented significant flora including the following (EPA 2004):

- A keystone role in particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species;
- Relic status;
- Anomalous features that indicate a potential new discovery;
- Representing extremes of range, recently discovered range extensions, or isolated outliers of the main range;
- The presence of restricted subspecies, varieties, or naturally occurring hybrids;
- Local endemism/a restricted distribution; and
- Being poorly reserved.

2.1.6 Vegetation Mapping

Vegetation was mapped based on the broad vegetation types identified by Mattiske (2005a, 2007). Nineteen Mattiske Vegetation Types (VTs) were previously mapped.

The vegetation types of Mattiske do not correspond to the NVIS hierarchy; however, they appear to vary between detailed Level VI: Sub-Association to the intermediate Level V: Association to the broader Level IV: Sub-Formation.

All 2011 mapping of the LOM survey area was captured on high resolution aerial photography at a scale of 1:15,000. The numbering and descriptions of the VTs follows Mattiske (2005a and 2007).

In the field, existing mapping was ground-truthed and corrected on field maps where discrepancies were observed, additional areas were mapped following Mattiske, allowing for interpretation in terms of the absence of some species, or the presence of other species. Field maps were digitised using ArcGIS 9.3 to produce a digital map.

Fortescue Marsh, as delineated by the samphire vegetation, was mapped separately in 2012 and 2013, using the NVIS level V of Vegetation Association (VA) as the mapping unit (ENV 2013). However, it should be noted that two of the vegetation associations described in ENV (2013) and delineated as vegetation associations 12 and 13, have in this report been subsumed into the Mattiske (2007) unit VT 30, as VT 30.2 and VT30.3 respectively, while the originally described unit VT 30 is now referred to as VT 30.1. This is because the vegetation of all three units is dominated by *Acacia synchronicia*, on the plains to the north of Fortescue Marsh.

Floristic data was collected from quadrats including a list of all taxa recorded, with percentage cover and height of each), relevés (with records of all taxa as in the quadrats) and mapping notes (a description of the vegetation at the NVIS Level VI Sub-Association, focussing on the dominant five taxa only in each stratum).

Note that the mapped vegetation types do not necessarily reflect the vegetation description in the quadrat, relevé or mapping notes; here, the vegetation is described according to NVIS, based on structure and dominance of the taxa present, which may be an artefact of fire history, disturbance by grazing and other factors. Vegetation mapping attempts to reflect the vegetation at a mature stage, not at the early stages of succession, as would be the case during the first few years following fire or disturbance.

Generally, the prefix “VT” was used to signify vegetation type mapping units related to the Matiske (2007) mapping, including flats, broad plains, creeks and hills, north of Fortescue Marsh; for the Marsh, the prefix “VA” was adopted, to signify mapping at NVIS level V: vegetation association. Note that the Marsh mapping is independent of the Matiske (2007) units.

2.1.7 Conservation Significant Vegetation

Vegetation types and associations were assessed against the listing of Federal and State TECs and State PECs. The vegetation types were also assessed against regional databases, such as Shepherd *et al.* (2001) and the Comprehensive Adequate and Representative (CAR) Reserve Analysis (Government of Western Australia 2011), to determine their regional representation.

2.1.8 Vegetation Condition

Vegetation condition was rated at each quadrat using the vegetation condition rating scale by Trudgen (1991), ranging from Excellent, Very Good, Good, Poor, Very Poor and Completely Degraded (Appendix D). The basis for the rating is the presence of weeds and their degree of invasiveness and/or aggressiveness. Fire is considered a natural occurrence and is not regarded as impacting on vegetation condition. However, increase in fire frequency due to anthropogenic influences is considered. Drought is considered a natural agent which at this stage is not considered to impact vegetation.

Vegetation condition was extrapolated from each quadrat to the entire vegetation type or vegetation association or polygon within which the quadrat was located. It should be noted that vegetation condition is subject to local variation, and that the vegetation condition is accurate at the quadrat itself, whereas it may be different at a distance from the quadrat.

The method and scale of rating vegetation condition employed in this survey is consistent with previous surveys by ENV and Biota, but differs from the methods of Matiske (2005a, 2005b and 2007), who assessed vegetation condition on the adjacent Cloudbreak and White Knight leases, and the nearby Fortescue Marsh. Matiske (2005a) rated the vegetation condition of the Cloudbreak and White Knight leases between Good (4) to Degraded (5), and in Matiske (2005b) condition was ranked from Pristine (1) to Completely Degraded (6), both based on the six point scale of Keighery (1994). In both cases Matiske (2005a and 2005b) considered fire, drought and grazing as key

factors on their condition rating. Mattiske (2007) rated the condition of the vegetation near Fortescue Marsh as either high, medium or low, with the majority of the survey area having low levels of disturbance (48 out of 52 sites); however, no definition of the three levels of disturbance was provided.

To better reflect these historic surveys and to be more consistent with adjacent and previous work, vegetation condition was rated Good to Very Good. This included areas which were identified as having a higher condition rating during the current survey, yet were identified as having a poorer condition in past surveys.

2.1.9 Mapping of Mulga Vegetation Types

Areas previously mapped as mulga, including VT 3, VT 4, and VT 10 of the flats and broad plains, and adjacent areas, were ground-truthed, and revised where required by visual assessment and by installation of 60 quadrats. Data was not available prior to the field work to allow for the re-scoring of quadrats from previous surveys; however, previously described communities were re-sampled. Mapping of mulga was extended to areas not previously surveyed, in the southeast of the survey area. In the field, Mulga VTs were delineated on high resolution aerial photographic maps, which were digitised and produced as electronic mapping data using ArcGIS 9.3.

2.1.10 Groundwater Dependent Ecosystem Mapping

Vegetation supporting *Eucalyptus victrix* and/or *E. camaldulensis* was deemed to indicate the presence of a potential GDV (see section 1.4.3). Most of the rivers, creeks and drainage lines mapped by Mattiske (2005a, 2007) as the potentially groundwater dependent communities VT1 (characterised by *Eucalyptus camaldulensis* and *E. victrix*), and as non-groundwater dependent VT2 and VT8, were ground-truthed, and the mapping was revised where necessary. Creeks and rivers in areas not previously surveyed were inspected and mapped. Eleven relevés and seven mapping notes were used to identify and delineate potential GDV in the survey area. In the field, boundaries of potential GDV were drawn over high resolution aerial photographs. Potential GDV were digitised and produced as electronic mapping data using ArcGIS 9.3.

2.1.11 Statistical Analysis of Site Floristic Data

To provide a bioregional perspective, statistical analysis was carried out on all quadrat floristic data collected from the survey area in 2011, the adjacent Cloudbreak area, and an additional 2883 quadrats in the Pilbara bioregion (Griffin and Trudgen 2011), using M. Trudgen's mulga nomenclature, which is different from the nomenclature used by the WA Herbarium. Multivariate analysis of the floristics (presence or absence of species in quadrats) was performed using PATN software. PATN generates estimates of association (here: similarity) between any set of objects (here: quadrats, sites) described by a suite of variables (here: species recorded). It then classifies the objects into groups and displays the patterns in the data graphically.

The dataset used for the bioregional analysis has been compiled over time by M. Trudgen (Griffin and Trudgen 2011). While every effort has been made to incorporate data collected in the best seasons, by the most experienced botanists and with consistency of survey design and specimen identification, there are noted limitations to the use of the data set which are identified in Griffin and Trudgen (2011). However, the regional dataset is recognised to provide adequate sampling of Pilbara vegetation from a very wide range of underlying geological types, geomorphological types, soil types and climatic variations (Griffin and Trudgen 2011).

To ensure the data set from various projects utilised for the bioregional analysis was as compatible as possible, a reconciliation of nomenclature used in the different projects was undertaken prior to analysis (Griffin and Trudgen 2011). This included: updating nomenclature from older projects for species names that have changed over time; combining infra-specific names to a relevant species name where necessary; combining some easily confused taxa; and omitting ambiguous records.

The standard of identifications from different data sets is a limitation to the quality of the data analysis. Of note in this current analysis is that while the Christmas Creek identifications were checked for errors, this could not be done for most of the Cloudbreak specimens or for any of the Mattiske Consulting collections (Griffin and Trudgen 2011). For example, the Mulga group of *Acacia* species was identified in all Mattiske Consulting data as "*Acacia aneura*" rather than the infra-specific forms identified for the Christmas Creek data and in the rest of the regional reference data set. The absence of this finer level of taxonomic identification of *Acacia aneura* (and sister species) in previous studies surrounding the survey area, increases the likelihood of these finer level taxa being recognised as restricted (and thus significant) to the survey area. Therefore, the data analysis has an undefinable level of identification error that is likely to be significant (Griffin and Trudgen 2011).

For further details of all the limitations, methods, results and interpretation of the bioregional analysis, please refer to Griffin and Trudgen (2011) in Appendix E.

Separate multivariate analysis was conducted on data from all quadrats, relevés and vegetation descriptions (mapping notes) of the 2011, 2012 and 2013 surveys. Percentage foliage cover of each species from the quadrats was transformed (square root) to improve normality, and a similarity matrix based on Bray-Curtis similarities was calculated. A dendrogram was computed, using hierarchical agglomerative cluster analysis. The strength of the analysis was checked using multidimensional scaling (MDS), which produced a cluster diagram and quantified stress. A 2D stress of less than 0.2 is considered a good fit. The separate multivariate statistical analysis was performed with *Primer-E* version 6.1.5 (Clarke & Gorley 2006). Completeness of survey was tested by computing a species accumulation curve, and comparing averages of a set of estimators (Chao1, Chao2, Jackknife1, Jackknife2, Michaelis Menton (MM) Runs) against actual observed richness.

3 RESULTS

3.1 VARIABLES INFLUENCING THE FLORA AND VEGETATION SURVEY

There are always variables associated with individual surveys and it is often difficult to predict the extent to which they influence survey outcomes. Table 5 outlines the key variables identified during this survey.

Table 5: Variables Associated with the current Flora and Vegetation Survey

Variable	Impact on Survey Outcomes
Access	Most areas of the survey area were accessible and adequately surveyed. The samphire communities of Fortescue Marsh were sampled as far as possible. However, areas below 405.5 m ASL were inaccessible due to inundation.
Experience	<p>The scientists who conducted these surveys were practitioners suitably qualified in their respective fields.</p> <ul style="list-style-type: none"> • Co-ordinating Botanist: Dr Julia Mattner (Principal Botanist); • Field Staff: Dr Julia Mattner, Hayden Ajduk (Environmental Biologist), James Sansom (Environmental Biologist), Lucy Dadour (Environmental Biologist), Damian Buller (Environmental Biologist) and Dr Kellie McMaster (Senior Ecologist); • Taxonomy: Peter Jobson, Malcolm Trudgen, Dr Kelly Shepherd (DPaW Tecticornia expert) (Taxonomists); • Data Analysis, Interpretation and Reporting: Malcolm Trudgen, Ted Griffin (Appendix E), Dr Julia Mattner, Dr Kellie McMaster.
Timing ¹ , weather, season.	<p>Flora composition changes with time, particularly over the seasons and with seasonal conditions. A large proportion of arid flora is annual and ephemeral which have specific growing periods and rainfall requirements. In the Pilbara, fire history also influences floristics. Therefore, botanical surveys completed at different times will have varying results.</p> <p>Rainfall for the three months preceding the surveys as well as rainfall for the 12 months prior to the surveys was above the long term average (see section 1.3.1).</p>
Life forms	Since the surveys were undertaken after periods of relatively high rainfall, most perennial species exhibited identifiable features (<i>i.e.</i> flowers, fruits and vegetative material). Many perennial and annual species were present.

¹ EPA Guidance Statement No. 51 (2004) stipulates that flora and vegetation surveys should be undertaken following the season that contributes the greatest rainfall in the region. In the Eremaean Province, within which this survey area is situated, rainfall is sporadic (although the Pilbara is considered a summer rainfall bioregion). Short-term variations in normal weather patterns (e.g. drought) may necessitate supplementary survey work at other times of year or in later years to take into account temporal changes in diversity.

Variable	Impact on Survey Outcomes
Taxonomy	<p>Some conservation significant taxa were not easily differentiated from their common congeners, including</p> <ul style="list-style-type: none"> • <i>Rhagodia</i> sp. Hamersley (P3) vs. <i>R. eremaea</i> • <i>Goodenia nuda</i> (P4) vs. <i>G. triodiophila</i> • <i>Phyllanthus aridus</i> (P3) vs. <i>P. maderaspatensis</i> • <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3) vs. <i>R. adscendens</i> var. <i>clementii</i> <p>The survey team collected multiple specimens of these taxa for definitive identification in Perth.</p>
Sources of information	<p>At the bioregion level, the Pilbara has been well studied in recent years. Numerous project-specific flora surveys have been undertaken in the area as part of environmental impact assessment processes. Those most relevant to the current study are listed in Section 1.3.</p> <p>Previous mapping in the survey area was revised where required.</p>
Completeness	<p>During the 2011 - 2013 surveys, 485 taxa (published species, subspecies, variants; and entities recognised by M.E. Trudgen) were recorded, with an average richness of 30.6 taxa per quadrat, which is intermediate when compared with similar surveys conducted in the eastern Pilbara region, e.g. 45 taxa in Biota (2004a) and 16.2 taxa in Mattiske (2005a).</p> <p>Species accumulation curves from quadrat and releve data indicated that 557 taxa are expected to occur, compared to 485 taxa recorded from quadrats, relevés, mapping notes and opportunistic collections, indicating that 87.1% of flora was recorded.</p> <p>A total of 541 taxa, including 14 priority and 20 introduced taxa, were recorded for the survey area from all combined data.</p>

3.2 DESKTOP SURVEY

3.2.1 EPBC Act Protected Matters Search Results

No TECs, World Heritage Properties, National Heritage Places, or Wetlands of International Significance listed under the *EP Act* have been recorded within a 50 km radius of the survey area. Six Threatened Fauna and nine Migratory Species were listed. Fortescue Marsh is listed as an indicative place on the Register of the National Estate.

3.2.2 IUCN Red List

The IUCN Red List noted six species, including *Ammannia auriculata*, *Cyperus michelianus*, *Drosera burmanni*, *Drosera peltata*, *Elythrophorus spicatus* and **Juncus bufonius*, all in the assessment category of Least Concern, and only one species, the

grass *E. spicatus* recorded in the Pilbara bioregion. The IUCN Red List is designed for global taxon assessments and when applied, a global category may not be indicative of a national or regional category for a particular taxon. For example **Juncus bufonius* has been rated a least concern at a global level; however, it is considered alien to Western Australia; there is no record of this species for the Pilbara, with most occurrences recorded in the Southwest Botanical Province (WAH 2013).

3.2.3 Environmentally Sensitive Areas

ESAs in the survey area are represented by Fortescue Marsh, including the nine samphire vegetation associations VA1 to VA9. NatureMap Viewer indicated that approximately 150.2 km² of the survey area are categorised as an ESA.

3.2.4 NatureMap Flora Summary

The NatureMap search resulted in 341 plant taxa, including 12 Priority taxa and 10 introduced taxa (Table 6). In contrast to the DEC database searches (see section 3.2.5), no DRF were listed.

Table 6: Summary of Priority and Introduced Flora Results from NatureMap Search

Priority Taxon and Status in ()	Name of Introduced Taxon
<i>Atriplex flabelliformis</i> (P3)	* <i>Aerva javanica</i> (Kapok Bush)
<i>Eremophila spongiorcarpa</i> (P1)	* <i>Asphodelus fistulosus</i> (Onion Weed)
<i>Eremophila youngii</i> subsp. <i>lepidota</i> (P4)	* <i>Cenchrus ciliaris</i> (Buffel Grass)
<i>Goodenia nuda</i> (P4)	* <i>Chloris virgata</i> (Feathertop Rhodes Grass)
<i>Myriocephalus scalpellus</i> (P1)	* <i>Citrullus colocynthis</i>
<i>Nicotiana heterantha</i> (P1)	* <i>Flaveria trinervia</i> (Speedy Weed)
<i>Peplidium</i> sp. Fortescue Marsh (S. van Leeuwen 4865) (P1)	* <i>Malvastrum americanum</i> (Spiked Malvastrum)
<i>Ptilotus mollis</i> (P4)	* <i>Parkinsonia aculeata</i> (Parkinsonia)
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	* <i>Portulaca oleracea</i> (Purslane)
<i>Tecticornia globulifera</i> (P1)	* <i>Tribulus terrestris</i> (Caltrop)
<i>Tecticornia medusa</i> (P3)	
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) (P1)	

3.2.5 Potentially Occurring Flora of Conservation Significance

In the Pilbara bioregion, there are three taxa, *Lepidium catapycnon* (Hamersley Lepidium), *Aluta quadrata* and *Thryptomene wittweri* (Mountain Thryptomene) listed as Threatened under the *EPBC Act* and gazetted as DRF (Threatened) pursuant to the *WC Act*. Additionally, according to FloraBase (WAH 2013) as of August 2013 there are 167 Priority Flora known from the Pilbara bioregion. The desktop assessment (DEC database searches and previous surveys) identified known records for 43 Priority and Threatened flora within 50 km of the survey area, and two taxa just beyond 50 km. The likelihood of these 45 taxa occurring in the survey area is assessed in Table 7.

Table 7: The Likelihood of DRF and Priority Flora Occurring in the Survey Area

Priority Taxon	Status	Annual or Perennial	Habitat Preference (WAH 2013)	Suitable Habitat Present	Number of Records ¹	Closest Record ²	Source	Likelihood in the Survey Area ³
<i>Acacia aphanoclada</i>	P1	Perennial	Skeletal stony soils. Rocky hills, ridges & rises.	Yes	29	Within 25 km	DEC Database	Possible
<i>Acacia cyperophylla</i> var. <i>omearana</i>	P1	Perennial	Stony & gritty alluvium along drainage lines.	Yes	16	Within 25 km	DEC Database	Possible
<i>Acacia effusa</i>	P3	Perennial	Stony red loam. Scree slopes of low ranges.	No	1	n/a	DEC Database	Unlikely
<i>Acacia fecunda</i>	P3	Perennial	Grey-red skeletal soil. Along shallow creeks and drainage lines, hills.	Yes	9	Within 25 km	DEC Database	Possible
<i>Acacia</i> sp. Nullagine (B.R. Maslin 4955)	P1	Perennial	Rocky clay. Low-lying areas between rocky hills	Yes	1	Within 25 km	DEC Database	Possible
<i>Acacia subtiliformis</i>	P3	Perennial	Rocky calcrete plateaus	No	1	Within 25 km	DEC Database	Unlikely
<i>Amaranthus centralis</i>	P3	Annual	Low in the landscape, alluvial flats. River banks. Mulga woodlands	Yes	4	Within 25 km	DEC Database	Possible
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P1	Perennial	Hard pan plains. Mulga woodlands.	Yes	7	Within 25 km	DEC Database	Possible
<i>Atriplex spinulosa</i>	P1	Annual	Creek banks. Clay flats. Foot slopes of low hills. Saline areas.	Yes	12	Within 25 km	DEC Database	Possible
<i>Atriplex flabelliformis</i>	P3	Perennial	Clay loam, loam. Saline flats or marshes	Yes	1	In Survey Area	ENV 2010b	Recorded

Priority Taxon	Status	Annual or Perennial	Habitat Preference (WAH 2011)	Suitable Habitat Present	Number of Records ¹	Closest Record ²	Source	Likelihood in the Survey Area ³
<i>Brachyscome</i> sp. Wanna Munna Flats (S. van Leeuwen 4662)	P1	Annual	Clayey loams and loamy plains. Mulga woodlands	Yes	10	Within 25 km	DEC Database	Possible
<i>Brunonia</i> sp. Long Hairs (D.E Symon 2440)	P1	Annual	Along creeklines. Floodplains.	Yes	3	Within 25 km	DEC Database	Possible
<i>Bulbostylis burbridgeae</i>	P4	Annual	Granitic soils. Granite outcrops. Cliff bases.	No	1	Within 50 km	DEC Database	Unlikely
<i>Calotis squamigera</i>	P1	Annual	Plains. Pebbly loam.	Yes	1	In Survey Area	ENV 2011	Recorded
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	P3	Perennial	Skeletal soils over ironstone. Summits. Base of cliffs. Rocky outcrops.	No	12	Within 25 km	DEC Database	Unlikely
<i>Eremophila pilosa</i>	P1	Perennial	Red-brown clay loams on sandy plains	Yes	5	Within 38 km	DEC Database	Possible
<i>Eremophila spongiorcarpa</i>	P1	Perennial	Weakly saline alluvial plain on margins of marsh.	Yes	16	In Survey area	DEC Database	Recorded
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4	Perennial	Stony red sandy loam. Flats plains, floodplains, semi-saline and clay	Yes	25	In Survey area	DEC Database	Recorded
<i>Glycine falcata</i>	P3	Perennial	Black clayey sand. Along drainage depressions in plains, river floodplains.	No	5	Within 25 km	DEC Database	Unlikely
<i>Goodenia lyrata</i>	P1	Perennial	Red sandy loam. Near claypan.	No	6	Within 25 km	DEC Database	Unlikely

Priority Taxon	Status	Annual or Perennial	Habitat Preference (WAH 2011)	Suitable Habitat Present	Number of Records ¹	Closest Record ²	Source	Likelihood in the Survey Area ³
<i>Goodenia nuda</i>	P4	Annual	Flood plains. Drainage lines.	Yes	20	In Survey area	DEC Database	Recorded
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	Biennial	Low undulating plain, swampy plains.	No	14	Within 25 km	DEC Database	Unlikely
<i>Helichrysum oligochaetum</i>	P1	Annual	Red clay. Alluvial plains.	Yes	2	Within 42 km	DEC Database	Possible
<i>Indigofera ixocarpa</i>	P2	Perennial	Skeletal red soils over massive ironstone.	No	12	Within 25 km	DEC Database	Unlikely
<i>Iotasperma sessilifolium</i>	P3	Annual	Cracking clay. Black loam. Edges of waterholes, plains.	Yes	2	Within 50 km	DEC Database	Possible
<i>Lepidium catapycnon</i>	Threatened	Perennial	Skeletal soils. Hillsides.	No	12	39 km	DEC Database	Unlikely
<i>Myriocephalus scalpellus</i>	P1	Annual	Clay. Depression on flood plain.	Yes	2	Within 25 km	DEC Database	Possible
<i>Nicotiana heterantha</i>	P1	Annual / Perennial	Black clay. Seasonally wet flats	Yes	17	In Survey area	DEC Database	Recorded
<i>Nicotiana umbratica</i>	P3	Annual / Perennial	Rocky outcrops	No	12	Within 25 km	DEC Database	Unlikely
<i>Peplidium</i> sp. Fortescue Marsh (S. van Leeuwen 4865)	P1	Annual	Saline flats	No	1	21 km	DEC Database	Unlikely
<i>Ptilotus mollis</i>	P4	Perennial	Stony hills and screes	Yes	1	Within 29 km	DEC Database	Possible

Priority Taxon	Status	Annual or Perennial	Habitat Preference (WAH 2011)	Suitable Habitat Present	Number of Records ¹	Closest Record ²	Source	Likelihood in the Survey Area ³
<i>Phyllanthus aridus</i>	P3	Perennial	Sandstone, gravel, red sand.	Yes	24	In Survey area	FMG database	Recorded
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	P3	Perennial	Clay pans. Mulga plains	Yes	11	18 km	DEC Database	Recorded
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3	Perennial	Creeks and rocky hills with stony soils	Yes	12	In Survey area	Mattiske 2005a	Recorded
<i>Rhynchosia bungarensis</i>	P4	Perennial	Coarse sand, rocky creeks and gullies	No	1	Within 53 km	DEC Database	Unlikely
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	P3	Perennial	Skeletal red soils pockets. Steep slope.	No	2	Within 53 km	DEC Database	Unlikely
<i>Stemodia</i> sp. Battle Hill (A.L.Payne 1006)	P1	Annual / perennial	Cracking clay. Flood plain.	Yes	2	Within 37 km	DEC Database	Possible
<i>Stylidium weeliwolli</i>	P2	Annual	Gritty sand soil, sandy clay. Edge of watercourses.	Yes	3	Within 32 km	DEC Database	Possible
<i>Tecticornia globulifera</i> (formerly <i>T. sp.</i> Fortescue Marsh)	P1	Perennial	Moderately saline flats, red-brown gritty clay	Yes	5	In Survey area	DEC Database, ENV 2013	Recorded
<i>Tecticornia medusa</i> (formerly <i>T. sp.</i> Roy Hill)	P3	Perennial	Floodplains. Dry lake beds. Saline lake edges	Yes	13	In Survey area	DEC Database, ENV 2013	Recorded
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer <i>et al.</i> KS 1063)	P1	Perennial	Plains. Salt flats	Yes	5	In Survey area	ENV 2010 ENV 2013	Recorded
<i>Teucrium pilbaranum</i>	P1	Perennial	Crab hole drainage floor on margin of calcrete table	Yes	1	n/a	DEC Database	Possible

Priority Taxon	Status	Annual or Perennial	Habitat Preference (WAH 2011)	Suitable Habitat Present	Number of Records ¹	Closest Record ²	Source	Likelihood in the Survey Area ³
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	P3	Perennial	Claypans and grass plains	Yes	13	In Survey area	Mattiske 2005	Recorded
<i>Tribulus minutus</i>	P1	Annual	Stony rises. Calcrete.	No	1	Within 25 km	DEC Database	Unlikely
<i>Triodia triticoides</i>	P1	Perennial	Sandstone hills	No	6	Kimberley record ⁴	DEC Database	Unlikely

¹ Number of records from the Western Australian Herbarium (WAH 2011), prior to the surveys

² Closest records from DEC flora database search results (DEC 2011c)

³ Likely – suitable habitat, close (<10 km) records and/or field survey completed in sub-optimal season, suggest species is likely to occur;

Possible – suitable habitat, records (<50 km) and/or field survey completed in sub-optimal season, suggests species possibly occurs;

Unlikely – lack of suitable habitat, no records (<50 km) and/or field survey completed in optimal season, suggest species is unlikely to occur;

Recorded – taxon recorded in 2011 - 2013 or previous surveys; and

n/a - coordinates not available

⁴ An error in the DEC search, this species has only been recorded from the Kimberley / Victoria Bonaparte bioregion.

3.2.6 Potentially Occurring Vegetation Communities of Conservation Significance

Two Threatened Ecological Communities (TECs) occur in the Pilbara region, including:

- *Themeda* Grasslands on Cracking Clays; the closest occurrence is >50 km west of the survey area; and
- Ethel Gorge aquifer stygobiont community; the closest occurrence is approximately 100 km south of the survey area.

Neither of the TECs has been recorded in the vicinity of the survey area, and no analogues are expected to occur due to the absence of extensive clay plains typical of the *Themeda* grasslands and extensive calcrete geology for the stygobionts.

Thirty Priority Ecological Communities (PECs) are listed for the Pilbara bioregion (DEC 2013). One PEC occurs in the southern part of the survey area: Fortescue Marsh (Marsh Land System) on the Fortescue River, east of Mulga Downs on Marillana and Roy Hills stations (Priority 1).

The Fortescue Marsh Priority 1 PEC contains endemic *Eremophila* species and several near endemic, recently described (Shepherd & van Leeuwen 2011) and undescribed (*Tecticornia* sp. Christmas Creek) samphires. Specific vegetation types are found on Mulga Downs, only around the Marsh; an unusual system occurs downstream (Kendrick 2001, DEC 2011f).

The database search also identified one PEC occurring between 25 km and 50 km from the survey area, on the south side of Fortescue Marsh: Fortescue Valley Sand Dunes (Priority 3).

The Fortescue Valley Sand Dunes consist of red linear sand dune communities that lie at the junction of the Hamersley Range and Fortescue Valley, between Weeli Wolli Creek and the low hills to the west. A small number are vegetated with *Acacia dictyophleba* scattered tall shrubs over *Crotalaria cunninghamii* and *Trichodesma zeylanicum* var. *grandiflorum* open shrubland. The Sand Dunes are regionally rare, small and fragile and are highly susceptible to threatening processes (DEC 2011d).

The Freshwater Claypans of the Fortescue Valley are a Priority 1 PEC and are located more than 50 km west of the survey area on Mulga Downs Station.

Mulga vegetation has been mapped in previous surveys on the north side of Fortescue Marsh (Mattiske 2007; Biota 2004b; ENV 2010a and 2010b), and is considered significant (Kendrick 2001, Maslin 2006, Griffin and Trudgen 2011). Mulga is discussed in detail in Section 1.4.2 and in Section 3.4.3.

3.3 FLORA

3.3.1 Overview of Flora

Seasonal conditions for recording perennial, annual and other short-lived flora in April and May 2011, in April/May 2012, June 2012 and May 2013 were generally optimal, compensating for the very poor conditions in 2010 and moderate conditions during previous surveys. Conditions have resulted in a comprehensive vascular flora list.

During the 2011-2013 survey a total of 485 taxa (including published species, subspecies and varieties; and Mulga entities recognised by M. Trudgen; 468 native and 17 introduced taxa), representing 175 genera belonging to 53 families were recorded. The total included 20 weeds and 13 Priority taxa.

The 2011-2013 surveys **and** previous surveys recorded a total of 541 taxa and entities from 181 genera and 54 families.

Quadrat data from this survey, including photographs, are presented in Appendix F; the species by site matrix is presented in Appendix G. The flora inventory comprising taxa from the present and previous surveys is presented in Appendix H. The most frequently recorded families and genera are summarised in Tables 8 and 9 respectively.

Table 8: Plant Families with the Highest Number of Taxa Recorded During the 2011-2013 Surveys

Family	No. of native taxa	No. of introduced taxa
Fabaceae (Pea family) (includes former Mimosaceae, Papilionaceae, Caesalpiniaceae)	80	1
Poaceae (Grass family)	76	6
Malvaceae (Hibiscus family) (includes former Malvaceae, Tiliaceae, Sterculiaceae)	44	1
Chenopodiaceae (Saltbush/Samphire family)	44	0
Amaranthaceae (Mulla mulla family)	26	1
Asteraceae (Daisy family)	26	2
Convolvulaceae (Morning glory family)	16	0
Cyperaceae (Sedge family)	15	0

Table 9: Plant Genera with the Highest Number of Taxa Recorded During the 2011-2013 Surveys

Genus	Total no. of taxa
<i>Acacia</i>	32
<i>Senna</i>	22
<i>Ptilotus</i>	16
<i>Maireana</i>	12
<i>Sida</i>	12
<i>Eremophila</i>	11
<i>Hibiscus</i>	11
<i>Eragrostis</i>	10
<i>Sclerolaena</i>	10

3.3.2 Species Richness

Species richness for quadrats ranged from four to 73 taxa per quadrat, and averaged 30.6 taxa (± 17.7 S.D.). The most taxa-rich quadrats were associated with mulga vegetation on alluvial plains (up to 73 taxa) and riparian vegetation (up to 57 taxa), as well as some sites in the Marsh (up to 60 taxa). Quadrats with low taxa richness were associated with vegetation of hills and upper slopes that were recently (<6 months ago) burnt, with isolated degraded, overgrazed areas in the alluvial plains, and with some sites in the lower Marsh that were inundated until very recently.

Species accumulation calculations showed that 460 taxa were recorded from all quadrats and relevés, while an average of 557 species would be expected (Figure 4). In total, 485 taxa were recorded from quadrats, relevés, mapping notes and opportunistic collections in the 2011-2013 surveys, indicating that 87.1% of flora statistically expected to occur was recorded. While the accumulation curve is still increasing, the rate of increase lessens with each additional quadrat and would eventually plateau.

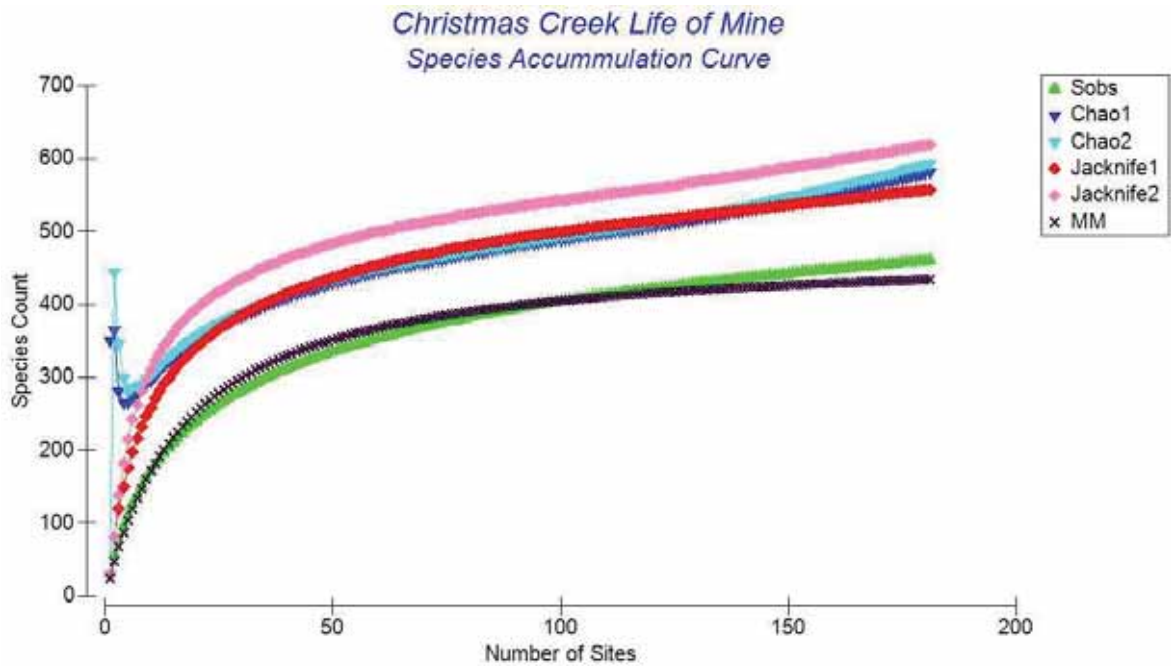


Figure 4: Species Accumulation Curve for Quadrats and Relevés assessed in 2011, 2012 and 2013. Green line (Sobs) indicates actual observations.

3.3.3 Conservation Significant Flora

No Threatened species pursuant to the *EPBC Act* or gazetted as DRF pursuant to the *WC Act* were recorded within the survey area during 2011-2013 or previous surveys.

Thirteen species listed as Priority flora by the DEC were recorded during the 2011-2013 ENV surveys at low to high percentage foliar cover (PFC), ranging from <1% to 80% (Table 10). One additional Priority flora, *Phyllanthus aridus*, has previously been recorded in the survey area (Table 9). The locations of the Priority Flora recorded are presented in Appendix I and illustrated in Figure 5.

All Priority Flora specimens collected during the 2011-2013 surveys were submitted to the Western Australian Herbarium as per FMG Guidelines (Fortescue 2011). See Appendix J for the Threatened and Priority Flora Report Forms.

Table 10: Priority Flora Recorded in the Survey Area during the 2011-2013 ENV Surveys and Previous Surveys

Taxa	Status	Biota 2004b	Mattiske 2005	Mattiske 2007	FMG 2010	ENV 2010	Current Surveys		
							ENV 2011	ENV 2012	ENV 2013
<i>Calotis squamigera</i>	P1						X		
<i>Eremophila spongiorcarpa</i>	P1		X	X		X	X	X	X
<i>Nicotiana heterantha</i>	P1			X			X	X	
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer <i>et al.</i> KS 1063)	P1					X		X	
<i>Tecticornia globulifera</i>	P1					X		X	
<i>Vigna</i> sp. central (M.E. Trudgen 1626)	P2						X		
<i>Atriplex flabelliformis</i>	P3					X		X	
<i>Eleocharis papillosa</i>	P3							X	
<i>Phyllanthus aridus</i>	P3				X				
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	P3				X	X	X		
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3		X		X		X		
<i>Tecticornia medusa</i>	P3					X		X	
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4		X	X			X	X	X
<i>Goodenia nuda</i>	P4	X			X		X		

The Priority species, including all taxa from the surveys above, are described in the following pages. Note that on Figures 5A-5D, symbols at some locations may overlap. Therefore, some species at some locations may be obscured.

Calotis squamigera (P1) (Plate 1) is a procumbent annual herb which grows to 0.2 m and produces yellow flowers in July (WAH 2013). It occurs on pebbly loams and at the time of the survey was known from one record from the WAH (2011) prior to the survey. It was recorded once as a single individual in vegetation type 30.1 during the current survey. The locations of *C. squamigera* are presented in Appendix I and Figure 5.

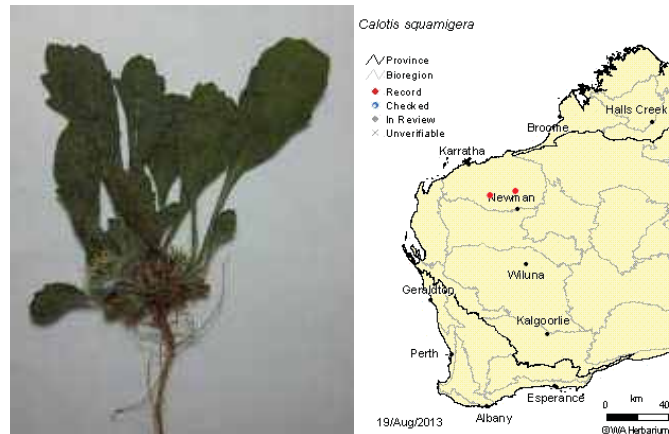


Plate 1: *Calotis squamigera* (Source: ENV and WAH 2013)

Eremophila spongiorcarpa (P1) (Plate 2) is a compact, succulent-leaved shrub, to 1 m with white flowers in May and September. It occurs on weakly saline alluvial plains on the margins of marshes. At the time of the survey, it was known from 16 records from the WAH (2011). It was recorded at over 70 locations in vegetation types bordering the Marsh during the 2011-2013 surveys, and previously at two locations in vegetation type 22 (Mattiske 2007). The locations of *E. spongiorcarpa* are presented in Appendix I and Figure 5.

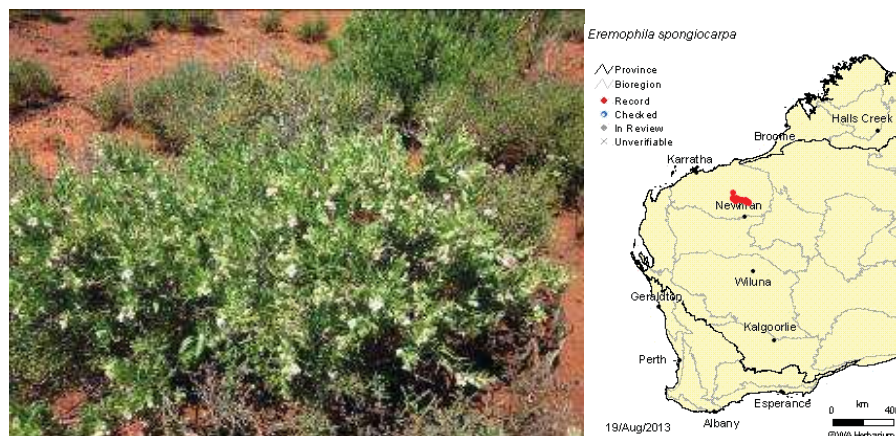


Plate 2: *Eremophila spongiorcarpa* (Source: ENV and WAH 2013)

Nicotiana heterantha (P1) (Plate 3) is a decumbent short lived annual or perennial herb to 0.5 m that forms low spreading colonies. It occurs on seasonally wet flats (WAH 2011). At the time of the survey, it was known from 17 records from the WAH (2011). It was recorded at 51 locations during the 2011-2013 surveys in vegetation types 2, 3 and 22. The locations of *N. heterantha* are presented in Appendix I and Figure 5.

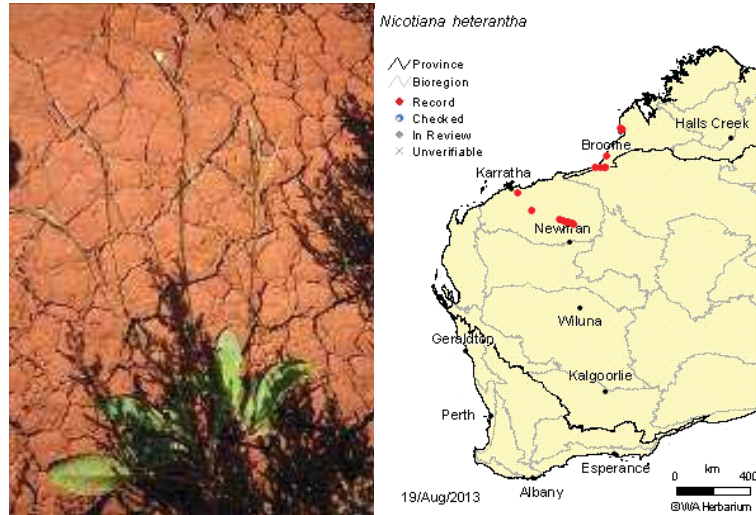


Plate 3: *Nicotiana heterantha* (Source: ENV and WAH 2013)

Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer *et al.* KS 1063) (P1) (Plate 4) is an erect, spreading shrub to 0.6 m with red to green foliage. It occurs on Samphire flats in association with salt lakes. At the time of the survey, it was known from ten records from the WAH (2011). It was previously recorded at eight locations within vegetation types 31, 32, 35 and 36, associated with the Marsh (ENV 2010a). This species was recorded during the 2012 survey at 22 locations throughout the Marsh. The locations of *Tecticornia* sp. Christmas Creek are presented in Appendix I and Figure 5.

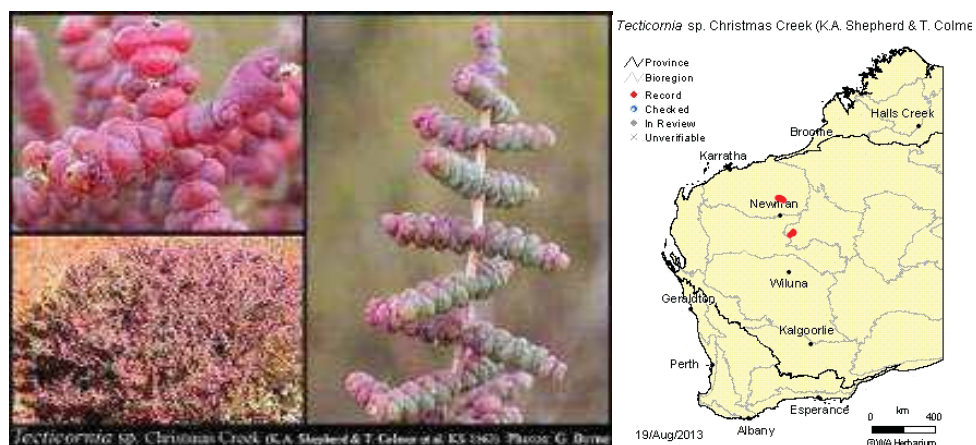


Plate 4: *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer *et al.* KS 1063)
(Source: WAH 2013)

Tecticornia globulifera K.A.Sheph. (P1) (Plate 5) is a shrub up to 1.5 m with leaves about 1-2 mm in diameter. During dry periods, only the upper two leaves remain on the branchlets, resembling red balls. The flowers are reduced and are green to yellow. The species favours heavy clays on the margins of salt lakes and marshes (Shepherd & van Leeuwen 2011) and is known from 10 records at the WAH (Lake Weelarrana 80 km south of Newman and Fortescue Marsh). It was previously recorded at three locations in vegetation type 31 associated with the Marsh (ENV 2010a, b), and was recorded at two locations during the 2012 survey in the lower, still wet parts of the Marsh. The locations of *T. globulifera* are shown in Appendix I and Figure 5.

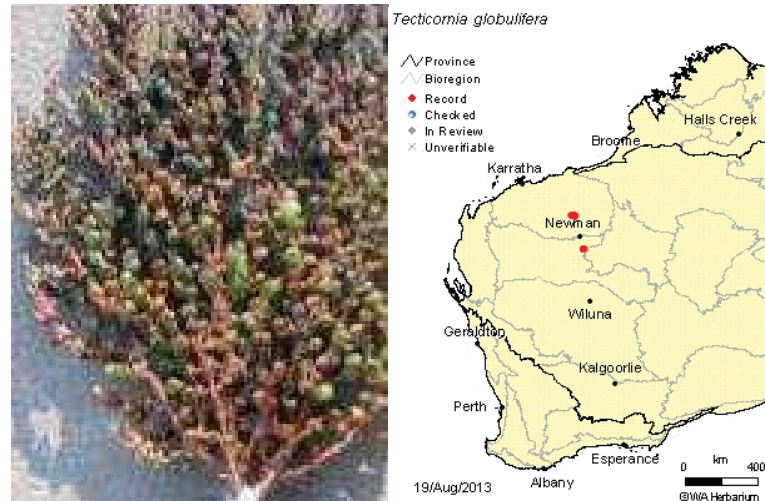


Plate 5: *Tecticornia globulifera* (Source: ENV and WAH 2013)

Vigna sp. central (M.E. Trudgen 1626) (P2) (Plate 6) is a vine with a perennial rootstock from which grow short lived erect to scrambling stems after rain. It has small yellow pea flowers and a pod, 1 to 2 cm long. This species colonises loamy to clayey creek banks in the Hamersley Ranges (M. Trudgen, *pers. comm.*) and is known from six records at the WAH (2011), including at least three coastal locations at Onslow in the Carnarvon bioregion and the remaining records from the Pilbara bioregion. It was recorded twice in 2011 and represents a small range extension to the south-east. The locations of *Vigna* sp. central (M.E. Trudgen 1626) are shown in Appendix I and Figure 5.

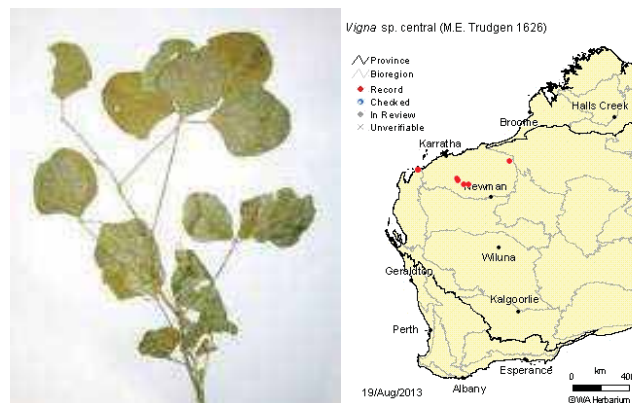


Plate 6: *Vigna* sp. central (M.E. Trudgen 1626) (Source: ENV and WAH 2013)

Atriplex flabelliformis (P3) (Plate 7) is a monoecious, erect, rounded perennial herb to 0.35 m. It occurs in clay-loams and loams on saline flats and marshes. At the time of the survey, it was known from six records from the WAH (2011), including three from Fortescue Marsh. It was recorded at one location in vegetation type 34 associated with the Marsh during a previous survey (ENV 2010b). This species was recorded again during the 2012 survey from one location in a depression of the mid – Marsh, in the western part of the survey area, in damp, clayey, slightly saline soil. The locations of *A. flabelliformis* are presented in Appendix I and Figure 5.

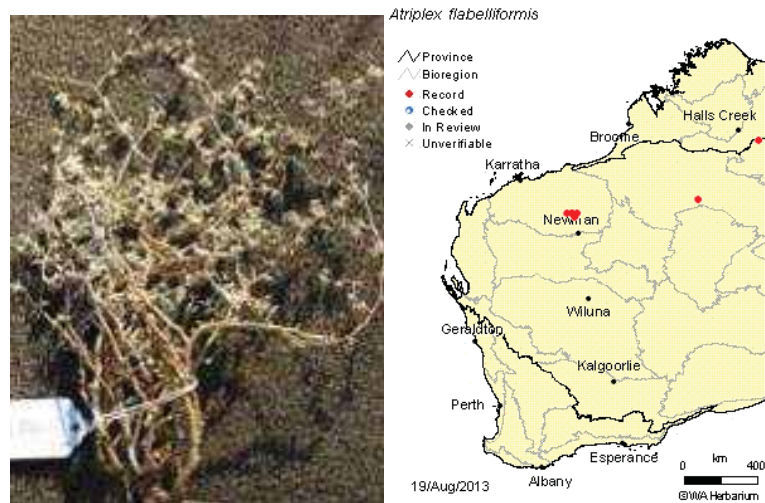


Plate 7: *Atriplex flabelliformis* (Source: ENV and WAH 2013)

Eleocharis papillosa (P3) (Plate 8) was recorded in 2012 in six locations in the survey area with densities between <1% up to 80%, in the lower Marsh in saline clay soils that were still very moist. Records from the current survey area represent a large range extension for this priority species. The maximum number of individuals estimated to be present in any one site is 8,000,000 individuals at site FMA44. The locations of *E. papillosa* (P3) are presented in Appendix I and Figure 5.

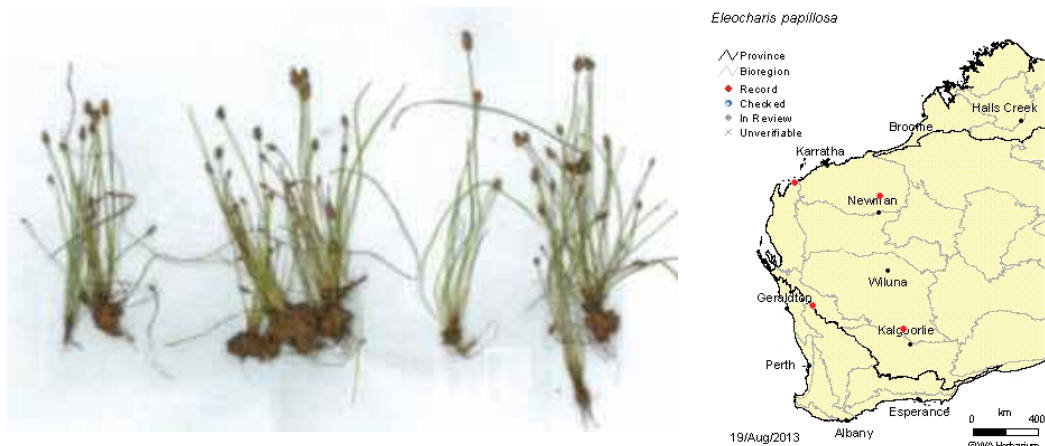


Plate 8: *Eleocharis papillosa* (Source: ENV and WAH2013)

***Phyllanthus aridus* (P3)** (Plate 9) is an erect, much-branched shrub to 0.25 m with cream to green flowers. It occurs in sand over sandstone, usually beside creeks. At the time of survey, it was known from 23 records from the WAH (2011), predominantly from the Northern Botanical Province (NBP), and the northern extremity of the Chichester subregion (a transitional zone). This species was recorded during previous surveys at 57 locations in vegetation types 1, 3, 4 and 17 (Fortescue 2010), but was not recorded during the 2011-2013 surveys. The locations of *P. aridus* are presented in Appendix I and Figure 5. The identity of this species is questionable and is later discussed in detail.

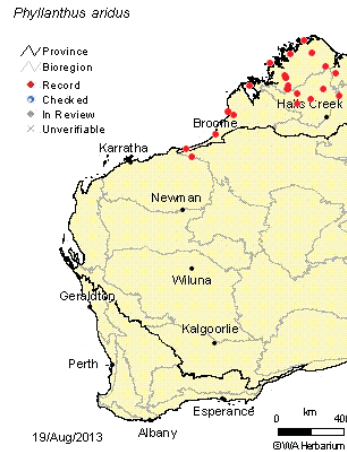


Plate 9: Distribution of *Phyllanthus aridus* (Source: WAH 2013)

***Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3)** (Plate 10) is a perennial erect shrub to 1.4 m with red-pink flowers. It is known from 11 records from the WAH (2011) and occurs on alluvial soils, often dominated by Mulga vegetation. It was recorded at 139 locations in vegetation types 1, 2, 3, 4, 17 and 30 during the 2011 survey, previously from one location in vegetation type 4 (ENV 2010a) and from two locations in vegetation type 17 (Fortescue 2010). The locations of *Rhagodia* sp. Hamersley (M. Trudgen 17794) are presented in Appendix I and Figure 5.

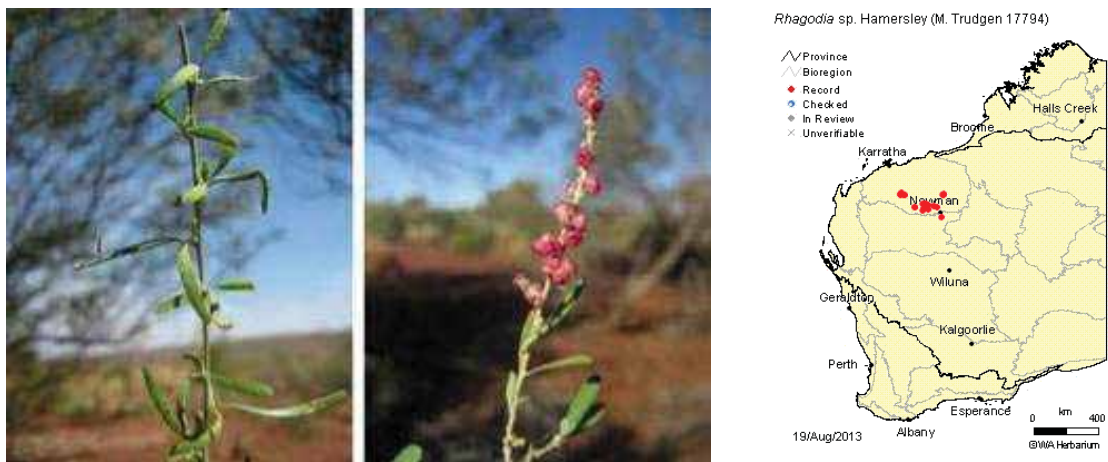


Plate 10: *Rhagodia* sp. Hamersley (M. Trudgen 17794) (Source: ENV and WAH 2013)

Rostellularia adscendens var. *latifolia* (P3) (Plate 11) is a prostrate shrub to 0.3 m with purple flowers from April to May. It occurs on ironstone soils, on rocky hills and near creeks and at the time of the survey was known from 12 records from the WAH (2011). This species was recorded at two locations in vegetation type 1 (a major creekline) during the 2011 survey and at one location in vegetation type 17 (hill slope) during previous surveys (Fortescue 2010). The locations of *R. adscendens* var. *latifolia* in the survey area are presented in Appendix I and Figure 5.

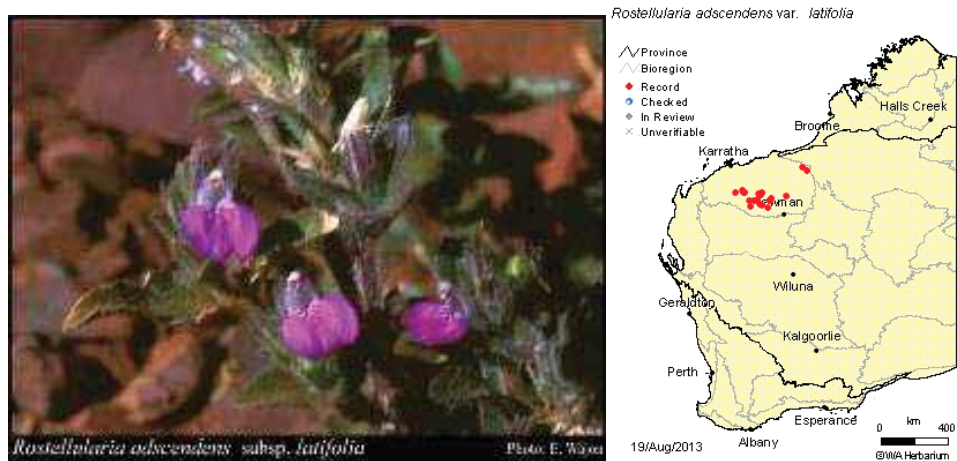


Plate 11: *Rostellularia adscendens* var. *latifolia* (Source: WAH 2013)

Tecticornia medusa [formerly *T. sp. Roy Hill* (H. Pringle 62)] (P3) (Plate 12) is an erect, yellow-green shrub to 1.2 m. It occurs in red, clayey sand on flat flood ways, lake beds, saline alluvial plains and drainage sumps. At the time of survey, it was known from 18 records from the WAH (2012). This species was previously recorded at five locations in vegetation types 31, 34, 35 and 36 associated with the Marsh (ENV 2010a). This species was recorded again during the 2012 survey at two locations in the western and central part of the lower Marsh, in wet saline clay soil. The locations of *Tecticornia medusa* are presented in Appendix I and Figure 5.

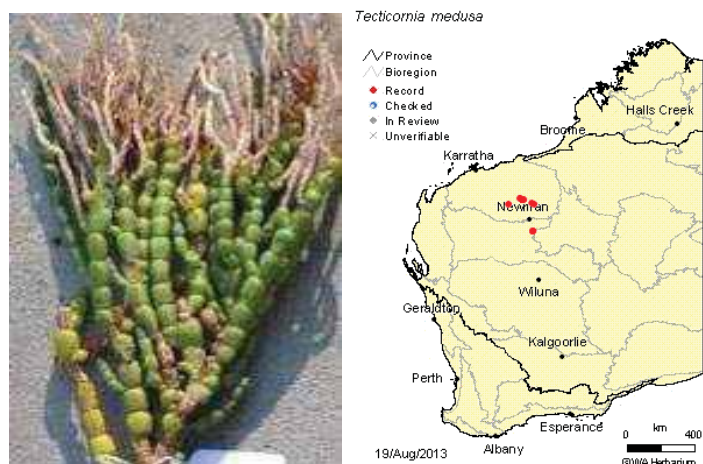


Plate 12: *Tecticornia medusa* (Source: ENV and WAH 2013)

Eremophila youngii subsp. *lepidota* (P4) (Plate 13) is a dense spreading shrub to 3 m high with purple, red or pink flowers. It occurs in stony sandy red loam soils on semi-saline flats and floodplains (WAH 2011). At the time of the survey, it was known from 27 records from the WAH (2011). The taxon was recorded at four locations in vegetation types 1, 2, 3 and 30 near the Marsh during the 2011 survey, and at over 20 locations during subsequent surveys. The locations of *E. youngii* subsp. *lepidota* are presented in Appendix I and Figure 5.

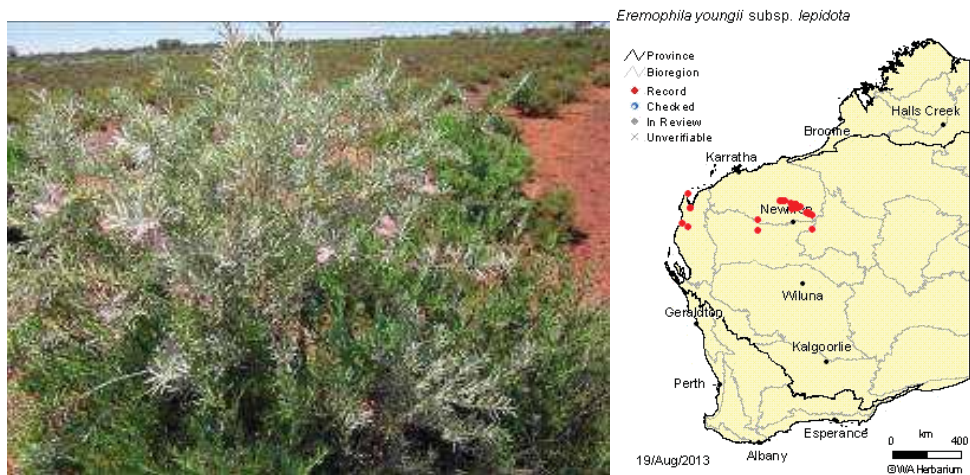


Plate 13: *Eremophila youngii* subsp. *lepidota* (Source: ENV and WAH 2013)

Goodenia nuda (P4) (Plate 14) is an erect to ascending herb to 0.5 m with yellow flowers. It is known from twenty records from the WAH (2011). *G. nuda* was recorded at eight locations in vegetation types 8, 10 and 17 during the 2011 survey and from 20 locations in vegetation types 1, 2, 3, 4 and 30 during previous surveys (Biota 2004a and 2004b; Fortescue 2010). The locations of *G. nuda* are presented in Appendix I and Figure 5.

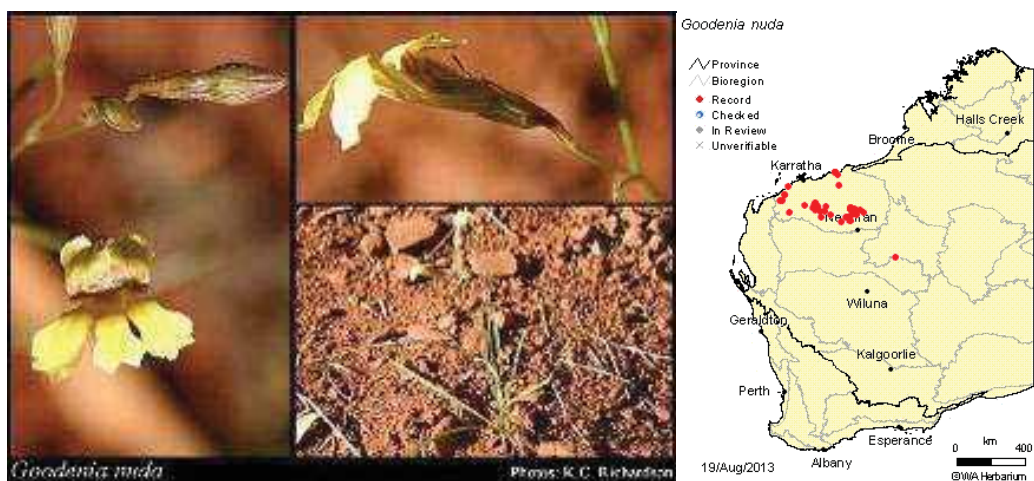


Plate 14: *Goodenia nuda* (Source: WAH 2013)

Species of Taxonomic Interest

Flora of taxonomic interest includes taxa representing range extension and unusual forms. Three range extensions of native species and two extensions of introduced species were recorded during 2011-2013 surveys.

Eleocharis papillosa (P3) at Christmas Creek represent a large range extension for this priority species, which is known from two records in the Murchison and Avon bioregions (WAH 2013). *Eleocharis papillosa* was collected in 2012 from six locations, all in the lower Marsh where in some instances it formed closed sedgelands. The soil was still very moist, as the waters in the Marsh were receding, with *Muehlenbeckia florulenta* dominating the perennial vegetation.

Maireana amoena (Plate 15) records from the survey area represented, at the time of the survey, a range extension to the north, into a new bioregion. Four specimens were collected in 2012 from seven sites, ranging in cover from an individual plant up to 3% cover; this species was recorded at one additional site in 2013. A specimen has been vouchered with the WAH. The specimen from the 2012 survey was confirmed by Peter Wilson, the Chenopodiaceae specialist at the WAH.

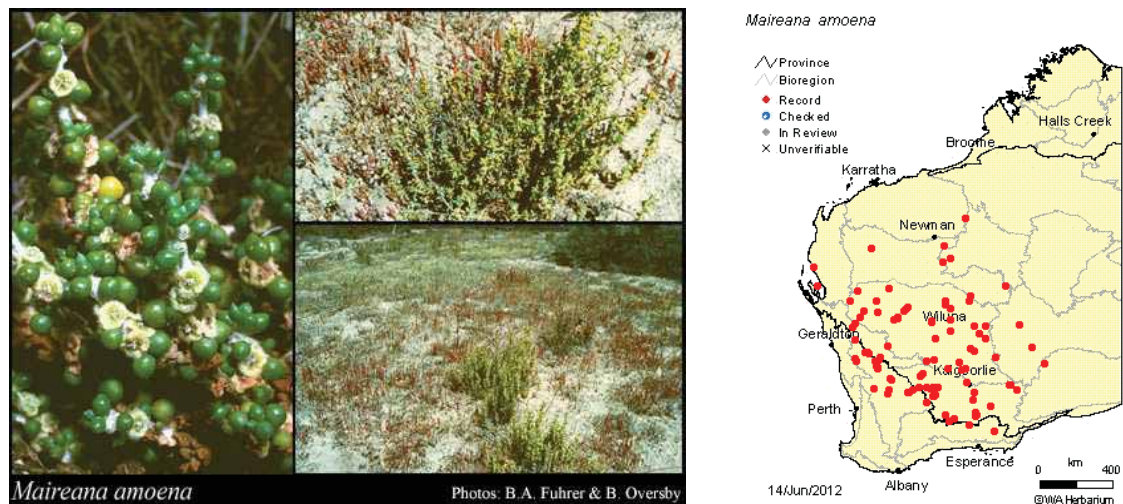


Plate 15: *Maireana amoena* (Source: WAH, 2012)

Sclerolaena recurvicauspis (Plate 16) was recorded in 2012 as one specimen from one location. This record represents a major range extension from the Murchison and Carnarvon bioregions into the Pilbara bioregion. A specimen has been vouchered with the WAH. The specimen from this survey was confirmed by Peter Wilson, the Chenopodiaceae specialist at the WAH.



Plate 16: *Sclerolaena recurvicauspis* (Source: ENV and WAH, 2012)

**Heliotropium europaeum* (Plate 17) was identified from one specimen and recorded from nine locations in the survey area, which, at the time of the survey, represented a range extension from southern bioregions into the Pilbara. A specimen has been vouchered with the WAH.

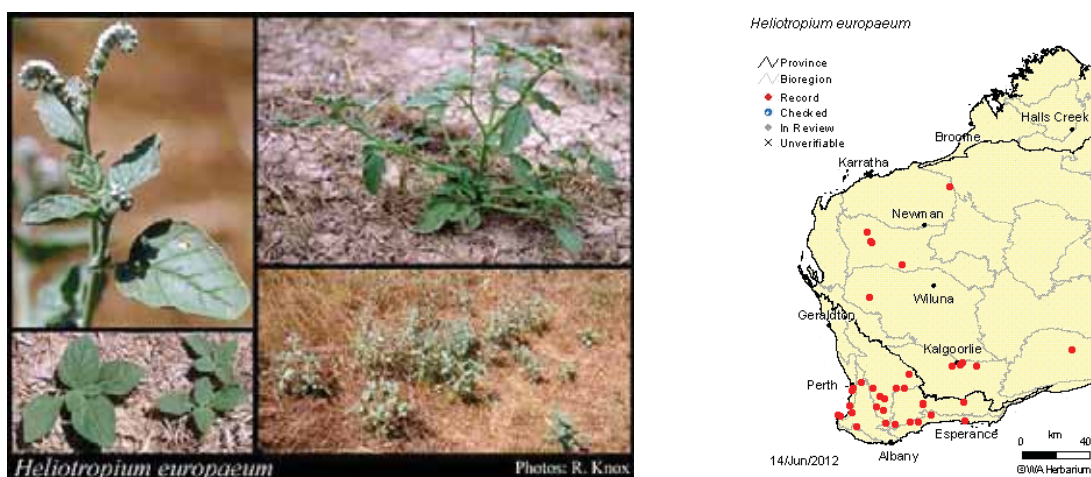


Plate 17: **Heliotropium europaeum* (Source: WAH, 2012)

**Eragrostis curvula* (Plate 18) was recorded from one specimen at one location, where this species had an approximate 5% cover (>100 individuals). This record represents a range extension from southern bioregions, especially those in the the Southwest Botanical Province, into the Pilbara. A specimen has been vouchered with the WAH.

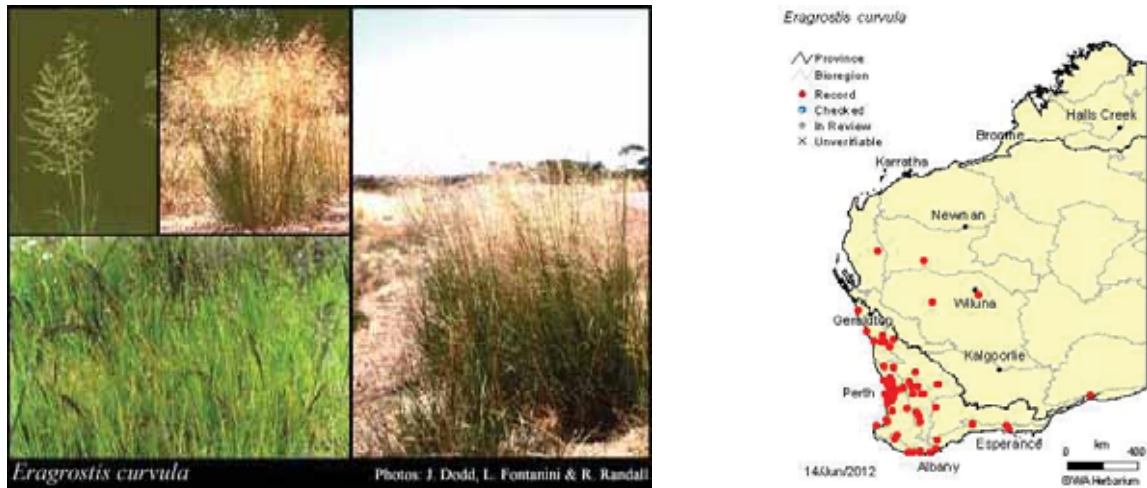


Plate 18: **Eragrostis curvula* (Source: WAH, 2012)

In addition, one Mulga form of interest, which was also previously noted by Biota (2004b), *Acacia* aff. *aneura* (long, flat, recurved; FMR35.3), occurred in 52 sites, ranging from a presence up to 80% cover. This form of *Acacia aneura* appears to represent a distinct taxon which may be restricted to the region north of Fortescue Marsh.

3.3.4 Introduced Flora

Twenty introduced species have been recorded within the survey area. Of these, 15 are listed as environmental weeds as defined by the Environmental Weed Strategy for Western Australia (CALM 1999). The rating and criteria for these species' inclusion under this strategy are presented in Table 11. The locations, where available, of these species are presented in Appendix K and mapped in Figure 6.

Weeds recorded within the survey area include:

- **Acetosa vesicaria* (Ruby Dock; Plate 19);
- **Aerva javanica* (Kapok Bush; Plate 20);
- **Argemone mexicana* (Mexican Poppy);
- **Argemone ochroleuca* (Mexican Poppy; Plate 21);
- **Bidens bipinnata* (Bipinnate Beggartick; Plate 22);
- **Cenchrus ciliaris* (Buffel Grass; Plate 23);
- **Cenchrus setiger* (Birdwood Grass; Plate 24);
- **Chloris virgata* (Feathertop Rhodes Grass; Plate 25);
- **Citrullus colocynthis* (Plate 26);
- **Cucumis melo* subsp. *agrestis* (Ulcardo Melon; Plate 27);
- **Echinochloa colona* (Awnless Barnyard Grass; Plate 28);

- **Eragrostis curvula* (African Lovegrass; Plate 18 previous section);
- **Flaveria trinervia* (Speedy weed; Plate 29, formerly *Flaveria australasica* and considered native);
- **Heliotropium europaeum* (Common Heliotrope; Plate 17 previous section);
- **Malvastrum americanum* (Spiked Malvastrum; Plate 30);
- **Portulaca oleracea* (Purslane; Plate 31);
- **Setaria verticillata* (Whorled Pigeon Grass; Plate 32);
- **Sonchus oleraceus* (Common Sowthistle; Plate 33)
- **Tribulus terrestris* (Caltrop; Plate 34); and
- **Vachellia farnesiana* (Mimosa Bush; Plate 35, formerly *Acacia farnesiana* and considered native).



Plate 19: **Acetosa vesicaria*
(Source: WAH 2013)

Plate 20: **Aerva javanica* (Source:ENV)



Plate 21: **Argemone ochroleuca*
(Source: WAH 2013)



Plate 22: **Bidens bipinnata* (Source: ENV)



Plate 23: **Cenchrus ciliaris* (Source: ENV)



Plate 24: **Cenchrus setiger*
(Source: WAH 2013)

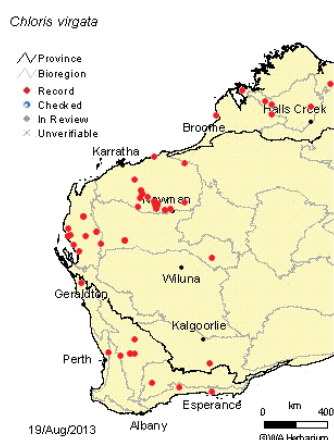


Plate 25: Distribution of **Chloris virgata*
(Source: WAH 2013)



Plate 26: **Citrullus colocynthis*
(Source: WAH 2013)



Plate 27: **Cucumis melo* subsp. *agrestis*
(Source: WAH 2013)



Plate 28: **Echinochloa colona*
(Source: WAH 2013)

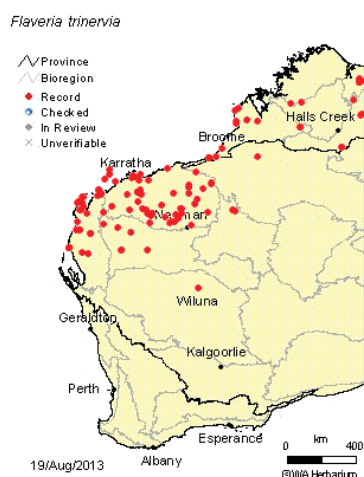


Plate 29: Distribution of **Flaveria trinervia*
(Source: WAH 2013)



Plate 30: **Malvastrum americanum* (Source: ENV)



Plate 31: **Portulaca oleracea*
(Source: ENV)



Plate 32: **Setaria verticillata*
(Source: WAH 2013)



Plate 33: **Sonchus oleraceus*
(Source: WAH 2013)



Plate 34: **Tribulus terrestris*
(Source: WAH 2013)



Plate 35: **Vachellia farnesiana* (Source: WAH 2013)

Table 11: Introduced Plant Species and Their Rating (where applicable) by the Environmental Weed Strategy (CALM 1999) Located in the Survey Area

Taxa	Common Name	Criteria				Previous Surveys				Current Surveys		
		Rating	Invasive -ness	Distribution	Impacts	Biota (2004b)	Mattiske (2007)	FMG Database	ENV (2010)	ENV (2011)	ENV (2012)	ENV (2013)
<i>*Acetosa vesicaria</i>	Bladder Dock	High	Yes	Yes	Yes	X		X		X		
<i>*Aerva javanica</i>	Kapok Bush	High	Yes	Yes	Yes	X		X		X	X	
<i>*Cenchrus ciliaris</i>	Buffel Grass	High	Yes	Yes	Yes	X		X		X	X	X
<i>*Cenchrus setiger</i>	Birdwood Grass	High	Yes	Yes	Yes	X		X		X	X	
<i>*Eragrotis curvula</i>	African Lovegrass	High	Yes	Yes	Yes						X	
<i>*Vachellia farnesiana</i>	Mimosa Bush	High	Yes	Yes	Yes			X		X	X	
<i>*Malvastrum americanum</i>	Spiked Malvastrum	Mod.	Yes	Yes	-	X	X	X		X	X	
<i>*Sonchus oleraceus</i>	Common Sowthistle	Mod	Yes	Yes	-					X	X	
<i>*Argemone ochroleuca</i>	Mexican Poppy	Mild	-	Yes	-	X		X		X		
<i>*Echinochloa colona</i>	Awnless Barnyard Grass	Mild	-	Yes	-			X		X	X	
<i>*Chloris virgata</i>	Feathertop Rhodes Grass	Low	-	-	-					X		
<i>*Citrullus colocynthis</i>	Bitter Apple	Low	-	-	-	X				X	X	
<i>*Heliotropium europaeum</i>	Common Heliotrope	Low	-	-	-						X	
<i>*Setaria verticillata</i>	Whorled Pigeon Grass	Low	-	-	-	X		X		X	X	
<i>*Argemone mexicana</i>	Mexican Poppy	TBA	-	-	-			X				
<i>*Cucumis melo subsp. agrestis</i>	Ulcardo Melon	TBA	-	-	-	X				X	X	
<i>*Bidens bipinnata</i>	Bipinnate Beggartick	TBA	-	-	-	X		X		X	X	
<i>*Flaveria trinervia</i>	Speedy Weed	N/A	-	-	-	X				X	X	
<i>*Portulaca oleracea</i>	Purslane	N/A	-	-	-	X				X	X	X
<i>*Tribulus terrestris</i>	Caltrop	N/A	-	-	-					X		

3.4 VEGETATION

3.4.1 Vegetation Types and Vegetation Associations

The survey area comprises 13 broad vegetation types (VTs), two mosaics combining two existing VTs, and 11 vegetation associations (VAs) in Fortescue Marsh, including:

- Four VTs associated with creeks and rivers;
- Seven VTs and two mosaics associated with flats and plains;
- Two VTs with hills and ridges (one of them in very early stages of succession due to recent fires); and
- 11 VAs associated with Fortescue Marsh.

Vegetation types and vegetation associations are mapped in Figure 7 and summarised below in Table 12.

Table 12: Vegetation Types (VT) and Vegetation Associations (VA) Mapped in the Survey Area, including Extent (km²) and % of the Survey Area

Habitat	Code	Description of Vegetation Type and Vegetation Association	Extent (km ²) ¹	% of Survey Area ¹
Creek and Drainage Lines	VT1	Open Woodland of <i>Eucalyptus victrix</i> , <i>E. camaldulensis</i> with pockets of <i>Acacia coriacea</i> subsp. <i>pendens</i> over <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Petalostylis labicheoides</i> and <i>A. tumida</i> over <i>Triodia longiceps</i> , <i>Chrysopogon fallax</i> , <i>Themeda triandra</i> and <i>Aristida</i> species	18.7	2.7
	VT2	Low Woodland to Low Open Forest of <i>Acacia aneura</i> var. <i>aneura</i> , <i>A. citrinoviridis</i> , <i>A. pruinocarpa</i> over <i>A. tetragonophylla</i> and <i>Psyrax latifolia</i> over <i>Chrysopogon fallax</i> , <i>Stemodia viscosa</i> , <i>Blumea tenella</i> , <i>Themeda triandra</i> and <i>Triodia</i> and <i>Aristida</i> species	51.3	7.3
	VT8	Closed Scrub to Tall Shrubland of <i>Acacia pruinocarpa</i> , <i>A. tumida</i> , <i>A. ancistrocarpa</i> , <i>A. maitlandii</i> , <i>A. kempeana</i> , <i>A. tetragonophylla</i> with occasional <i>E. gamophylla</i> and <i>Corymbia</i> spp. over <i>Triodia epactia</i> , <i>Themeda triandra</i> and <i>Aristida</i> species	5.4	0.8
	VT9	Closed Scrub to Shrubland of <i>Acacia ancistrocarpa</i> , <i>A. maitlandii</i> , <i>A. kempeana</i> , <i>A. monticola</i> , occasional <i>E. gamophylla</i> and <i>Corymbia deserticola</i> over <i>Senna</i> species, <i>Triodia basedowii</i> and <i>Aristida</i> species.	0.1	0.1
Flats and Broad Plains	VT3	Low Woodland to Low Open Forest of <i>Acacia aneura</i> var. <i>aneura</i> , <i>A. pruinocarpa</i> , <i>A. tetragonophylla</i> , <i>A. tenuissima</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Psyrax latifolia</i> over <i>Dodonaea petiolaris</i> and <i>Triodia</i> and <i>Aristida</i> species	61.5	8.8

Habitat	Code	Description of Vegetation Type and Vegetation Association	Extent (km ²) ¹	% of Survey Area ¹
	VT4	Low Open Woodland of <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Acacia xiphophylla</i> , <i>Acacia victoriae</i> over <i>A. tetragonophylla</i> , <i>Psyrax latifolia</i> and <i>Psyrax suaveolens</i> over <i>Ptilotus obovatus</i> and mixed <i>Maireana</i> and <i>Sclerolaena</i> species	95.3	13.6
	VT10.1	Low Open Woodland of <i>Acacia xiphophylla</i> , <i>Acacia victoriae</i> , <i>Acacia aneura</i> var. <i>aneura</i> over <i>Acacia tetragonophylla</i> , <i>Ptilotus obovatus</i> and mixed <i>Senna</i> , <i>Maireana</i> and <i>Sclerolaena</i> species	26.4	3.8
	VT10.2	Low Open Woodland of <i>Acacia xiphophylla</i> , <i>Acacia aneura</i> , <i>Eremophila platycalyx</i> subsp. <i>pardalota</i> over Low Open Shrubland of <i>E. cuneifolia</i> , <i>Maireana pyramidata</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> over sparse tussock grassland of mixed species	0.5	0.1
	VT30.1	High open Shrubland of <i>Acacia synchronicia</i> with <i>Senna glaucifolia</i> (<i>Sclerolaena</i> spp. and other halophytes) over <i>Aristida</i> species.	79.7	11.4
	VT30.1+10.1	Mosaic of VT30.1 and VT10.1, patches of vegetation were too small to map separately	10.6	1.5
	VT30.1+04	Mosaic of VT30.1 and VT4, patches of vegetation were too small to map separately	5.4	0.8
	VT30.2	Scattered shrubs of <i>Acacia synchronicia</i> over low shrubland to low open shrubland of <i>Eremophila spongiorcarpa</i> , <i>Atriplex bunburyana</i> and <i>Sclerolaena cuneata</i> , over scattered tussock grasses of <i>Dactyloctenium radulans</i> , <i>Eragrostis pergracilis</i> and <i>Panicum decompositum</i>	14.6	2.1
	VT30.3	Scattered tall shrubs of <i>Acacia synchronicia</i> over low open shrubland of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous), <i>Atriplex bunburyana</i> and <i>Sclerolaena cuneata</i> over scattered tussock grasses of <i>Dactyloctenium radulans</i>	4.9	0.7
Ranges, Hills and Hillslopes	VT16	Hummock Grassland of <i>Triodia basedowii</i> with pockets of <i>Triodia epactia</i> and <i>Triodia lanigera</i> with emergent patches of <i>Eucalyptus leucophloia</i> , <i>Corymbia deserticola</i> over <i>Acacia ancistrocarpa</i> , <i>Acacia hilliana</i> , <i>Acacia acradenia</i> , <i>Acacia pyrifolia</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> over <i>Goodenia stobbsiana</i> and mixed <i>Senna</i> species	1.1	0.2
	VT17	Hummock Grassland of <i>Triodia basedowii</i> with pockets of <i>Triodia epactia</i> and <i>Triodia lanigera</i> with emergent patches of <i>Eucalyptus leucophloia</i> , <i>Corymbia deserticola</i> over <i>Acacia ancistrocarpa</i> , <i>A. pyrifolia</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> over <i>Goodenia stobbsiana</i> and mixed <i>Senna</i> and <i>Ptilotus</i> species	123.7	17.6
Marsh Vegetation	VA1	<i>Tecticornia</i> sp. Christmas Creek, <i>T. auriculata</i> , <i>Muehlenbeckia florulenta</i> low closed heath over <i>Eragrostis pergracilis</i> , <i>E. tenellula</i> scattered tussock grasses and <i>Cullen cinereum</i> , <i>Nicotiana heterantha</i> , <i>Pterocaulon sphaeranthoides</i> open hermland	0.15	<0.1

Habitat	Code	Description of Vegetation Type and Vegetation Association	Extent (km ²) ¹	% of Survey Area ¹
	VA2	<i>Muehlenbeckia florulenta</i> shrubland to open heath over <i>Tecticornia indica</i> subsp. <i>bidens</i> low scattered shrubs to low open shrubland over <i>Eleocharis papillosa</i> , <i>Schoenoplectus dissachanthus</i> (very) open sedgeland with <i>Nicotiana heterantha</i> , <i>Marsilea hirsuta</i> open herbland	55.5	7.9
	VA3	* <i>Vachellia farnesiana</i> , <i>Acacia ampliceps</i> open scrub over <i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), * <i>Aerva javanica</i> and <i>Cullen cinereum</i> low open shrubland over * <i>Cenchrus setiger</i> , <i>Dactyloctenium radulans</i> and * <i>C. ciliaris</i> tussock grassland	0.25	<0.1
	VA4	<i>Melaleuca glomerata</i> open scrub over * <i>Aerva javanica</i> , <i>Tecticornia</i> spp. low open shrubland over <i>Cleome viscosa</i> , <i>Nicotiana heterantha</i> , <i>Swainsona kingii</i> herbland	0.7	0.1
	VA5	<i>Acacia synchronicia</i> , <i>Melaleuca glomerata</i> , <i>Eremophila youngii</i> subsp. <i>lepidota</i> scattered tall shrubs over <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Eremophila spongiorcarpa</i> low open shrubland over <i>Sporobolus virginicus</i> , * <i>Cenchrus ciliaris</i> , <i>Dactyloctenium radulans</i> tussock grassland	1.5	0.2
	VA6	<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), <i>T. indica</i> subsp. <i>bidens</i> , <i>Muehlenbeckia florulenta</i> low open heath over <i>Eragrostis pergracilis</i> (very) open tussock grassland and <i>Cyperus bulbosus</i> scattered sedges with <i>Nicotiana heterantha</i> , <i>Swainsona kingii</i> scattered to very open herbland	5.2	0.7
	VA7	<i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>T.</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), <i>Eremophila spongiorcarpa</i> low open heath to low closed heath over <i>Eragrostis</i> spp., <i>Enneapogon</i> spp., * <i>Cenchrus</i> spp. scattered tussock with <i>Nicotiana heterantha</i> , <i>Pterocaulon sphaeranthoides</i> , <i>Gomphrena kanisii</i> scattered herbs	21.8	3.1
	VA8	<i>Tecticornia auriculata</i> (and <i>T.</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) open heath over <i>Eragrostis pergracilis</i> , <i>Chloris pectinata</i> tussock grassland and <i>Cyperus bulbosus</i> scattered sedges with <i>Swainsona kingii</i> , <i>Nicotiana heterantha</i> scattered herbs	2.2	0.3
	VA9	<i>Acacia synchronicia</i> scattered tall shrubs over <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Eremophila spongiorcarpa</i> low open shrubland over <i>Eragrostis pergracilis</i> , * <i>Cenchrus ciliaris</i> tussock grassland with <i>Lawrencina densiflora</i> , <i>Euphorbia australis</i> , <i>Goodenia forrestii</i> scattered herbs	1.8	0.3

Habitat	Code	Description of Vegetation Type and Vegetation Association	Extent (km ²) ¹	% of Survey Area ¹
	VA10	<i>Acacia synchronicia</i> , <i>A. xiphophylla</i> high shrubland over <i>Eremophila</i> spp., <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Maireana pyramidata</i> scattered low shrubs over * <i>Cenchrus ciliaris</i> , <i>Eragrostis pergracilis</i> , <i>Triraphis mollis</i> very open tussock grassland and <i>Goodenia forrestii</i> , <i>Sclerolaena cornisheiana</i> , <i>Stemodia grossa</i> scattered herbs	8.3	1.2
	VA11	Lake bed likely to support annual herbs and grasses episodically	62.1	8.9
Infra-structure		Areas cleared for mining, infrastructure and associated activities.	42.7	6.1

¹rounded to one decimal point

VT Codes in bold represent sheetflow dependent mulga vegetation, including Mulga mosaics

For additional description and analysis of the vegetation of Fortescue Marsh, refer to the report “Vegetation of Fortescue Marsh – Portion South of Christmas Creek” (ENV 2013).

3.4.2 Vegetation Condition

Previous surveys (Mattiske 2007) along the northern fringe of Fortescue Marsh vegetation condition rating was based on low, medium or high levels of disturbance. The vast majority of sampling sites (48 out of 52, or 92%) of the samphire vegetation types had low levels of disturbance, due to the combination of dry seasonal conditions and unpalatable nature of the vegetation leading to low grazing pressure at the time of survey.

The Cloudbreak area is located adjacent to the west of the current survey area and shares some similarities in terms of land systems, vegetation types and land use (pastoral and mining). Vegetation condition in the mulga communities was variable, depending on grazing pressure and fire history, with highly impacted areas, e.g. near watering points, being (severely) degraded. In contrast, areas less attractive to cattle, including the hills to the north and parts of the Marsh supported vegetation in degraded to good condition (Mattiske 2005a).

The ENV 2010 surveys (2010a and 2010b) rated vegetation from Excellent to Good. The majority of the vegetation on the fringe of Samphire Flats, Creek and Drainage line and Ranges, Hills and Hillslope vegetation types was categorised as Excellent, whilst the majority of vegetation on Broad Flats and Plains was categorised as Good due to grazing pressures. Additionally, large tracts in the northeast were recently (< 1 year ago) burnt.

During the 2011 to 2013 surveys, vegetation condition was rated from Excellent to Completely Degraded, with the majority in Very Good condition (Table 13, Figure 8). Areas associated with mining areas and infrastructure were Completely Degraded. The

hills in the north and northwest were considered in Excellent to Very Good condition with little disturbance from cattle and only occasional invasive introduced flora. Large areas in the hills in the northeast were recently (<6 months prior to the survey) burnt, and weeds were generally absent at this early stage of succession post fire. The flats, plains, drainage lines, creeks and rivers were in lesser condition, mostly varying from Very Good to Poor. Disturbance in these areas included cattle, tracks and introduced flora, particularly along river frontages, where **Cenchrus* spp. formed tussock grasslands.

Tecticornia vegetation of Fortescue Marsh ranged in condition from Excellent (lower Marsh, depressions) to Very Poor (weed-infested drainage lines and ridges towards the lower Marsh). Most of the Marsh was in Excellent to Very Good condition. There was evidence of cattle grazing throughout the survey area, on the plains, in the drainage and creek line and on the rises and ridges. Weeds were present throughout most of the Marsh vegetation, at low to medium densities.

Mulga communities ranged in condition from Excellent to Poor, depending on the density and types of weeds present, and the extent of soil erosion resulting from cattle grazing (Appendix F, Appendix G). Most of the mulga quadrats in the plains were in Very Good condition, with weeds such as **Bidens bipinnata*, **Malvastrum americanum* and **Cenchrus ciliaris*, being present generally at a PFC of <1%, and vegetation maintaining high levels of native species richness.

Table 13: Vegetation Condition in the Survey Area

Vegetation Condition	Area (km ²)*	% of Survey Area*
Excellent	188.1	26.8
Very Good	397.5	56.6
Good	58.7	8.4
Poor	7.5	1.1
Very Poor	6.9	1.0
Completely Degraded	42.7	6.6

*Numbers rounded to one decimal point

Fire age ranged from Recent (within the last year) to Very Old (greater than 12 years since the last fire) with the majority of the area characterised by an Old fire age (eight to 12 years since the last fire); however, a large portion of the hills in the north eastern section of the survey area was burnt recently (less than six months ago) (Appendix F).

3.4.3 Mulga Communities

Mulga was recorded as VT2 along creeks and drainage lines, generally in Good to Poor condition; and as VT3, VT4, VT10.1 and VT10.2, in the flats and plains where (sheetflow dependent) Mulga was a (co)dominant component (Figure 7 and Figure 9). Sheetflow dependent vegetation occurs on gently sloping plains ($<2^\circ$, Ludwig et al, 1997; Reaney et al. 2007) in arid and semi-arid areas of Australia and is often typified by groving. VT30+10.1, a mosaic of *A. synchronicia* / *Acacia xiphophylla*, *A. victoriae* (or *A. synchronicia*) and *A. aneura*, was considered an additional Mulga community, with *Acacia aneura* being a minor component. Similarly, VT30+04, a mosaic of *A. synchronicia* / *A. aneura*, *A. pruinocarpa*, *A. xiphophylla*, *A. victoriae* (or *A. synchronicia*) represents an additional Mulga community. VT 10.2 was a new community, differentiated from VT10.1 by an understorey of *Eremophila cuneifolia*, recorded at two locations in the plains. Mulga VTs were generally in Very Good condition, supporting diverse flora despite the presence of some weeds.

Several areas in the flats and plains that were previously mapped as VT4 by Mattiske were revised as a result of the 2011 survey to represent VT10. Additional Mulga creeklines (VT2) were mapped in the flats near Fortescue Marsh. Overall 51.3 km², equivalent to 7.3% of the survey area, was mapped as mulga creekline vegetation VT2, and 199.7 km² equivalent to 28.5% of the survey area was mapped as Mulga on the flats (Table 14), which is considered sheet flow dependent and includes VTs 3, 4, 10.1, 10.2, and the mosaics 30.1+10.1 and 30.1+04.

Table 14: Extent of Mulga Vegetation in the Survey Area

Vegetation Type (VT)	Area (km ²)	Proportion within survey area (%)	Proportion within Mulga flats and plains (%)
2	51.3	7.3	21.2*
3	61.5	8.8	27.5
4	95.3	13.6	35.3
10.1	26.4	3.8	10.0
10.2	0.5	0.1	0.2
30.1+10.1	10.6	1.5	3.3
30.1+04	5.4	0.8	2.5
Total Mulga vegetation	251.0	35.8	100.0

*includes Mulga creekline vegetation in the hills

3.4.4 Groundwater-Dependent Ecosystems and Other Creekline Vegetation

Vegetation type 1, which comprised *Eucalyptus victrix*, *E. camaldulensis* and occasionally *Corymbia candida* as dominant species, was mapped as a potential GDE (Figure 7 and

Figure 10). VT1 comprised an area of 18.7 km², equivalent to 2.8% of the survey area. The non-GDE creekline VTs (VT 2, 8 and 9) totalled 75.3 km², representing approximately 8.3% of the survey area (Table 15).

Table 15: Extent of Creek and Drainage Line Vegetation Types in the Survey Area.

Vegetation Type	Area (km ²)	Proportion within Survey Area (%)	Proportion within Creek and Drainage Vegetation (%)
1	18.7	2.8	24.8
2	51.1	7.5	67.8
8	5.4	0.8	7.1
9	0.1	0.01	0.1

3.4.5 Samphire and Other Vegetation of Fortescue Marsh

The Marsh comprises 11 vegetation associations, totalling 159.4 km² or 22.7%. Nine of these are characterised by samphire (*Tecticornia*) species. The remaining two associations include VA10, an *Acacia synchronicia* shrubland with an understorey of halophytic chenopod species other than *Tecticornia*, while the low, inundated areas of the lake bed support VA11, likely to consist of herbs and grasses that are tolerant to prolonged periods of inundation and high levels of soil salinity. The Marsh vegetation coincides with the Marsh land systems; it also includes Warri and Calcrete land systems and small areas along the southern edge of the Cowra land system.

3.4.6 Threatened and Priority Ecological Communities

No TECs protected by Federal or State legislation were identified within the survey area. The survey area straddles the Fortescue Marsh Priority 1 PEC and the buffer zone (DEC 2011d). Vegetation associations VA1 to VA9 represent the samphire communities of this PEC.

No vegetation types observed or described during current or previous flora and vegetation assessments of the survey area represent the Fortescue Valley Sand Dunes (Priority 3) PEC, nor the Freshwater Claypans of the Fortescue Valley (Priority 1) community.

3.4.7 Regional Representation of Broad Vegetation Types

There are four Beard/Shepherd vegetation types in the survey area with High (676-samphires) to Medium (526-mosaic mulga/hummock grasslands and snappy gum/*T. wiseana*; 173-kanji over hummock grasslands) to Low (29-sparse low woodland, mulga) reservation priority (Kendrick 2001). Reservation priorities are based on their reservation status (IUCN I-IV, V-VI, CALM / DEC / DPaW leasehold or other), and priority for acquisition (McKenzie *et al.* 2002).

The vegetation mapped in the survey area was correlated as much as possible with the Beard/Shepherd broad vegetation types (Table 16). Differences exist with the

terminology used in the descriptions as they are based on different methods of categorising and characterising vegetation types, and a different spatial scale of analysis (*i.e.* regional *vs.* local scale). Representation of these units at the bioregional, subregional and local scale are summarised in Table 16 and 17.

Shepherd vegetation type 676, the samphire vegetation of Fortescue Marsh, and vegetation type 562 of the Chichester Ranges, are restricted at the bioregional and subregional level; in contrast, vegetation types 29 and 173 have a wide distribution within the bioregion (Table 15). Additionally, more than 98% of the pre-European extent of each unit remains (Shepherd *et al.* 2001; DAFWA, 2007) (Table 16). Vegetation types that have more than 50% of their pre-European extent are considered of 'Least Concern' (Department of Natural Resources and Environment, 2002).

Reservation priority for the samphire vegetation is high (Kendrick 2001). High reservation priority categories are targeted for inclusion in conservation estate. Although not yet confirmed, a significant proportion of the high reservation priority of vegetation type 676 (Kendrick 2001) may be included in the proposed Fortescue Marsh Conservation Reserve (FMCR).

Table 16: Regional Representation of Vegetation in the Survey Area

Beard / Shepherd VT	Corresponding VT or VA Mapping Unit ¹	Pre- European Area (km ²) ²	Current Extent (km ²) ³	Remaining (%) ³	Pre- European % in IUCN Class I-IV Reserves ³	Reservation Priority ⁱ
Pilbara Bioregion						
29	VT3, 4, 10.1, 10.1, 30.1, 30.2, 30.3, 30.1+10.1, 30.1+04,	11332.2	11332.2	100	1.9	Low
173	VT16, VT17	14207.9	14207.9	100	4.8	Medium
562	VT16, VT17	1036.1	1036.1	100	0.0	Medium
676	VA1 to VA9	923.6	922.9	99.9	0.0	High

¹approximation only

²Shepherd *et al.* (2001) and DAFWA (2007)

³Kendrick 2001

Table 17: Extent of Beard and Shepherd Vegetation Units at the Bioregional, Subregional and Local Scale

Beard / Shepherd Vegetation Unit	Extent in Pilbara Bioregion (km ²)	Extent in Fortescue Subregion (km ²)	Extent in Survey Area (km ²)	Vegetation Unit in Survey Area as a % of Subregion
29	11321.0	8945.7	417.45	4.7
173	17547.3	43.2	8.12	18.8 ¹
562	1036.6	997.8	146.05	14.6 ²
676	924.2	820.5	129.82	15.8 ³

¹This unit is widespread in the Chichester subregion, but not in the Fortescue subregion

²This unit is associated with the Chichester Ranges

³This unit is associated with Fortescue Marsh

3.5 SYNTHESIS OF THE STATISTICAL ANALYSIS USING PATN

The full report of the PATN analysis is provided in Appendix E. Below is a summary of the full report.

The PATN analysis, at the informative 600 Group Level (classification between vegetation association and “vegetation alliance” or sub-formation), resulted in 18 floristic groups containing sites from the survey area. The characteristics of the groups are summarized in Table 18, which also indicates the corresponding Mattiske VTs. Based on floristics and distribution, there are eight groups which are highly restricted geographically, and which are indicated in bold (Table 18). Seven of the eight correspond to Mulga groups, specifically to *Acacia* aff. *aneura* (long, flat, recurved; FMR35.3), a form recognised by M. Trudgen, which according to the PATN analysis appears to be geographically restricted to the southern slopes of the Chichester Ranges in the eastern part of the Fortescue Valley (see Griffin and Trudgen 2011, section 5.1 Appendix E). One group represents the samphire (*Tecticornia* spp.) vegetation of Fortescue Marsh.

The dendrogram of the groups at the 600 group level shows four clusters with sites (including quadrats, relevés and mapping notes) from the 2011 survey:

- Cluster 1 consisting of 10 sites from six groups: 526, 527, 528, 564, 567, 569
- Cluster 2 consisting of 28 sites of five groups: 427, 435, 567, 575, 578
- Cluster 3 consisting of 31 sites of three groups: 430, 433, 435
- Cluster 4 consisting of 4 sites of group 575.

The remaining sites, including the unique site XB 23, are distributed elsewhere throughout the dendrogram (Griffin & Trudgen 2011).

Table 18: Summary of Relevant Floristic Groups at the 600 Group Level and Equivalent Vegetation Type (VT) or Vegetation Association (VA) where Applicable

600 group level group	Equivalent VT or VA	No of sites in survey area ¹	No of sites in reference area	Description	Distribution
190		1	4	n/a	Chichester Plateau
253		3	10	n/a	n/a
427	VT4	10	11	Mulga on plains and valley floors	Chichester Ranges slopes, escarpment, Hamersley Range
430	VT2 VT1 (VT30.1)	15	5	Mulga and other <i>Acacia</i> spp.	Small area of Chichester Ranges slopes
433	VT3 VT10.1 VT10.2 VT30.1	9	8	Mulga	Several slopes of Chichester Ranges
434	VT3	1	5	Mulga, <i>A. catenulata</i> subsp. <i>occidentalis</i>	Small area of Chichester Ranges slopes
435	VT4 VT3 (VT10.1) (VT10.2)	21	6	Mulga	Small area of Chichester Ranges slopes
490	VA1-VA9	46	3	<i>Tecticornia</i> spp.	Fortescue Marsh, Weelarrana Lake
526	VT17	7	6	<i>E. leucophloia</i> ² , <i>C. deserticola</i> , <i>Triodia</i> spp.	Upper Chichester Ranges slopes, edge of Chichester Plateau
527	VT17	4	11	<i>E. leucophloia</i> , <i>C. hamersleyana</i>	Upper Chichester Ranges slopes, very edge of adjoining Chichester Plateau
528	VT17	1	6	<i>E. leucophloia</i> , <i>C. hamersleyana</i> , <i>Grevillea wickhamii</i>	Restricted to several patches on opposite sides of the valley
539		4	3	Mulga and <i>E. leucophloia</i>	Upper Chichester slopes, edge of Chichester Plateau
564	VT17	1	4	<i>E. leucophloia</i> , <i>C. hamersleyana</i> , <i>G. wickhamii</i>	Upper Chichester Ranges slopes, adjoining Chichester Plateau edge
567	VT4 VT10.1 VT10.2	8	14	Mulga, <i>A. pruinocarpa</i> , (<i>A. ayersiana</i>)	Many areas along Chichester Ranges upper slopes
568	VT10.1 VT10.2	2	6	Mulga, <i>A. ayersiana</i> , <i>A. pruinocarpa</i> , <i>E. leucophloia</i>	Several areas along Chichester Ranges upper slopes

600 group level group	Equivalent VT or VA	No of sites in survey area ¹	No of sites in reference area	Description	Distribution
569	VT17	2	6	<i>C. candida</i> , <i>E. leucophloia</i> , <i>G. wickhamii</i> , <i>A. inaequilatera</i>	Many areas along Chichester Ranges upper slopes
575	VT1	13	11	<i>E. victrix</i> , <i>C. hamersleyana</i>	Hamersley Ranges, Chichester Ranges upper slopes
578	VT4	1	13	n/a	Typical for Hamersley Ranges

¹Includes data from several surveys of survey area and the adjacent Cloudbreak

²short for *Eucalyptus leucophloia* subsp. *leucophloia* throughout the entire table

Distribution in **bold** indicates very high conservation significance (Griffin & Trudgen 2011)

The PATN analysis defined eight vegetation groups of high conservation significance, including

- Two Mulga groups occurring on the plains (430 and 433)
- Two Mulga/*E. leucophloia* groups occurring on the plains (539 outside the survey area, and 568)
- Two *E. leucophloia*/*C. hamersleyana* groups occurring on upper slopes (527 and 564)
- One *E. victrix*/*C. hamersleyana* group occurring on major creeks (575)
- One *Tecticornia* spp. group occurring on Fortescue Marsh flats (490)

Multivariate analysis of all sites of the current survey separated the samples into six groups comprising three to 31 sites (and two “groups” of single sites) at the 30% similarity level (Figure 11a), with a 2D stress of 0.17 indicating a good fit (Figure 11b). The six groups correspond approximately to:

- Hills in the northern part of the survey area with *E. leucophloia* as the significant species (VT16 and VT17);
- A unique Mulga unit with *Eremophila cuneifolia* as understorey in the plains near the Marsh (VT10.2);
- Major creeks supporting *Eucalyptus victrix* (VT1);
- Plains with moderately dense Mulga and *Acacia synchronicia* and mosaics (VT4, VT10.1, VT30.1+04, VT30.1+10.1);
- Lower slopes grading into plains in the northwest part of the survey area (VT3 VT4, and VT10.1); and
- Plains with generally more open Mulga (VT4 and VT10.1).

4 DISCUSSION

4.1 FLORA

4.1.1 General Flora

The number of taxa recorded in the survey area is high compared to surveys of similar size in the Fortescue subregion (Biota 2004b; Mattiske 2005a, 2007; Table 3). The 2011-2013 surveys were conducted under seasonally favourable conditions and included a range of habitats and underlying geology, thorough search efforts by experienced botanists, high rate of collections, identification of specimens to a fine level and high quality data management.

The high number of flora recorded from the 2011-2013 surveys, including 485 native and 19 introduced taxa (representing 87.1% of theoretically expected flora), was towards the higher end of the range for a survey area of this size, encompassing alluvial areas and some hills, and the vegetation of Fortescue Marsh. This number of taxa reflects good seasonal conditions, as the area had received up to 250 mm of rain in the three months prior to the surveys. As the April/May 2011 field survey coincided with late rains, some of the summer ephemerals such as annual grasses were not established and as such may be under-represented. The overall high number reflects the species richness of the vegetation north of Fortescue Marsh, particularly of the Mulga, and creek and rivers in alluvial areas (Biota 2004b, Mattiske 2005a, 2007).

The variable species richness and composition in the hills of the northern part of the survey area was different compared to mature vegetation, as large areas had experienced bushfires less than six months prior to the survey. These areas were in the early stages of succession, and were dominated by pioneer species including *Cleome viscosa*, *Ptilotus calostachyus*, *Codonocarpus cotinifolius* and other short-lived post-fire ephemerals. The floristics in these areas will change over time, as the vegetation develops into mature stands.

Mulga in the had up to 73 taxa per quadrat. While weeds were also present, they were not dominant, possibly due to the shading effect of the relatively dense stands of mulga forming woodlands to open forests. Mulga also supported Priority Flora, including *Rhagodia* sp. Hamersley (P3), which is likely to occur as scattered individuals throughout this vegetation, and *Calotis squamigera* P1), which was recorded once only as a single individual.

The Fortescue Marsh survey in 2012 and 2013 recorded 196 taxa (ENV 2013). Species richness of the Marsh vegetation ranged from four to 60 taxa per quadrat, averaging 20.2. The Marsh area was dominated by plains in the upper, mid and lower Marsh supporting *Tecticornia* low shrublands to low closed heaths, and included minor land forms such as creeks and drainage lines, depressions, ridges and low rises. An earlier survey, also focussing on the samphire flats of Fortescue Marsh recorded 92 taxa

(Mattiske 2007). In the report on Wetlands for the Fortescue River System (DEC, 2009), three transects (200 m²) in similar habitats (RCM002, RCM003 and RCM006) recorded a total of 23 taxa, eight of which were unspecified.

The wide range in species richness may be attributed to survey areas varying from small to large, seasonal conditions ranging from optimal to poor, degree of heterogeneity of the survey area and survey effort (time spent on the ground, observer quality).

4.1.2 Conservation Significant Flora

Thirteen taxa of conservation significance were recorded during the 2011-2013 surveys, and one further taxa of conservation significance was recorded by previous surveys. In the field, several taxa are difficult to differentiate from their more common related species. The morphological differences are often only discernible *via* a hand lens or microscope, or when the plant is flowering or fruiting. All field specimens were collected systematically for identification by taxonomists utilising the resources of the WAH, and verified by Pilbara expert Malcolm Trudgen. However, as a consequence of the difficulty of positively recognising these species in the field, these significant taxa may be more locally abundant in individual numbers than have been recorded during this and previous surveys.

***Rhagodia* sp. Hamersley**, which is distinguished from the common *R. eremaea* by the absence of fishy smell of the leaves, and by leaves that are generally longer and narrower. However, smell is not always reliable, and leaf morphology is variable and depends on maturity.

Goodenia nuda, which belongs to a complex of similar taxa, including *G. lamprosperma* and *G. triodiophila*, with some overlap in habitat.

Rostellularia adscendens* var. *latifolia is similar to its common congener *R. adscendens* var. *clementii*. The differences are detected under a dissecting microscope, with the hyaline margins of the sepals being narrower in the Priority taxon.

Calotis squamigera is differentiated from other Pilbara *Calotis* species based on its unique achene (fruit) characters: the crown on the achene has alternating bristles (minute spines) and flattened scales, and the surface of the body of the achene is tuberculate. These characters are apparent at the immature (flowering) stage, and at the mature (fruiting) stage. No other Pilbara species share these combined characters.

The remaining Priority species below are generally easily recognised, particularly under the prevailing good seasonal conditions. Therefore, the records are likely to reflect reliable numbers.

Atriplex flabelliformis is differentiated from the common *A. bunburyana* by vegetative characters including more compact habit and preference of more saline environments.

Eremophila spongiocarpa is only known from populations along the weakly saline fringes of Fortescue Marsh. It is an easily recognised species. Targeted searches of its preferred habitat will demonstrate the true range of this species. It is likely that this species occurs along the entire fringe of Fortescue Marsh.

Eremophila youngii subsp. *lepidota* was easily recognised in its habitat along the fringes of Fortescue Marsh, as it is conspicuous and stands up to 2.5 m high above the generally low shrubland.

Nicotiana heterantha has been recorded at low densities along the saline fringes of Fortescue Marsh. The species also occurs in coastal areas near Broome, a different Botanical Province and bioregion. It appears that the species is restricted to coastal salt marshes in the Dampierland bioregion near Broome, and Fortescue Marsh, an inland salt marsh. Targeted searches along Fortescue Marsh will show the true spatial extent of this habitat specialist. There are no other *Nicotiana* species that can tolerate the saline soil conditions.

Themeda sp. **Hamersley Station** was recorded during previous surveys; however, the location of the species has now been cleared. It is easily differentiated from the common *T. triandra* by preferring clayey soils, by its bluish leaves, thick, dense tussocks with curly broad leaves and its very vigorous growth.

Eleocharis papillosa, the Dwarf Desert Spike-rush, is a small, erect annual or perennial sedge to less than 10 cm high. It occurs on red clay over granite, open claypans and ephemeral wetlands and grows in response to inundation. During dry periods, populations persist as soil-stored seed or soil-stored root tubers (Duguid *et al.*, 2006). At the time of 2012 survey, it was known from two records (WAH, 2012), in the Murchison bioregion north of Kalgoorlie and the Avon bioregion east of Geraldton, and numerous locations in Central Australia and near coastal areas in the NT (Atlas of Living Australia, 2012).

Records from the 2012 survey represented a large range extension for this priority species. *E. papillosa* was collected from six locations, all in the lower Marsh where in some instances it formed closed sedgelands. The soil was still very moist, as the waters in the Marsh were receding, with *Muehlenbeckia florulenta* dominating the perennial vegetation.

The samphires (*Tecticornia* spp.) require the confirmation of specialist taxonomists, as individuals of the same species are highly variable, the genus is generally dioecious (an individual is either male or female), and differences are microscopic. All *Tecticornia* specimens were identified by Dr Kelly Shepherd, the *Tecticornia* specialist at the WAH.

Tecticornia globulifera is a shrub up to 1.5 m with leaves about 1-2 mm in diameter. During dry periods, only the upper two leaves remain on the branchlets, resembling red balls. The flowers are reduced and are green to yellow. The species favours moderately

saline flats with red-brown gritty clay or heavy clays on the margins of salt lakes and marshes (Shepherd & van Leeuwen, 2011).

The species is currently known from 10 records (WAH, 2013) in two saline ephemeral lake systems (Fortescue Marsh and Lake Weelerrana 80 km south of Newman) and therefore has a P1 status. As a part of the Marsh is proposed to become a conservation reserve in 2015, the status of this taxon may change to P2 in future (Shepherd & van Leeuwen, 2011)

T. globulifera was recorded twice in the lower Marsh in 2012, at sites that were inundated at the time of the survey. The species is likely to be present at low densities throughout the Marsh.

***Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)** is an erect, spreading shrub to 0.6 m with red to green foliage which is currently being described (Kelly Shepherd, *pers. comm.*). It occurs on samphire flats in association with salt lakes. It is known from 14 records from the WAH (2013). It was previously recorded at 18 locations with covers between <1% and up to 80% (ENV, 2013).

Tecticornia sp. Christmas Creek was recorded at various elevation and positions in the Fortescue Marsh, implying that it is a habitat generalist and tolerant of both inundation and dry conditions. The species is likely to be present at low densities throughout the Marsh.

Tecticornia medusa is an erect, yellow-green shrub to 1.2 m. It occurs in red, clayey sand on flat flood ways, lakebeds, saline alluvial plains and drainage sumps. It is known from 18 records from the WAH (2013). This species was previously recorded at one location in vegetation of the lower Marsh (ENV, 2010a).

T. medusa in 2012 was recorded in the low-lying areas of the Marsh that were still very moist. This is congruent with previous observations and may indicate tolerance to high levels of salinity that exceed seawater concentration (Veneklaas & Colmer, 2010; Shepherd & van Leeuwen, 2011). *T. medusa* forms extensive meadows in the lower Marsh, which can be inundated for extended periods in wet years (Dr Kelly Shepherd, *pers. comm.*).

Phyllanthus aridus has also been previously recorded in the project area, but these records are thought to be erroneous. ***Phyllanthus aridus*** is a woody perennial up to 1 m (rarely up to 2 m) high, in contrast to the common *P. maderaspatensis*, which is an annual herb. *P. aridus* is recorded in the Fortescue database to occur within the survey area. This species was searched for at previously known locations during the 2011 survey but could not be located.

P. aridus occurs primarily from the Kimberley to the Top End in the Northern Territory, with the outlying range extending south of these regions. In Western Australia, although

chiefly a Kimberley species, collections have been recorded from the northern Pilbara region (Shay Gap/ Goldsworthy area). The species usually grows in rocky or sandy sites.

It may be distinguished by its more or less filiform branchlets and seeds with longitudinal bands of minute striations alternating with smooth bands (Ian Telford, pers. comm.). Based on this expert opinion, it is likely that the name *P. aridus* on Fortescue's database has been misapplied to *P. maderaspatensis*.

4.1.3 Flora of Interest

The range extension of three native and two introduced species may reflect the good seasonal conditions in the case of herbaceous species including *Eleocharis papillosa* (P3) and **Heliotropium europaeum*. In the case of *Maireana amoena* and *Sclerolaena recurvicauspis*, it may reflect the presence of suitable soils and vegetation, such as saline, clayey, sandy alkaline soils, and samphire vegetation, similar to conditions in its known range of distribution.

Eleocharis papillosa is discussed previously in Section 4.1.2.

Maireana amoena, a small brittle shrub to 0.4 m with white flowers, grows on sandy and clay soils, on rises containing gypsum and around salt lakes. It is common in the Eastern Wheatbelt and in the Gascoyne, Murchison, Coolgardie and Yalgoo bioregions, and to a lesser extent in the Carnarvon, Little Sandy Desert and Nullarbor bioregions (WAH, 2013). In the survey area, *M. amoena* may occur on the Warri land system, which is dominated by calcrete platforms that are likely to provide suitable habitat for the species.

Sclerolaena recurvicauspis is a rounded perennial herb up to 0.3 m high, which grows in red sand or clay and sandy loam, on floodplains and in clay pans. It is common in the Carnarvon and Murchison bioregions (WAH, 2013). Being a herb, this species may have been overlooked in previous surveys when conducted under dry seasonal conditions.

**Heliotropium europaeum* is an annual herb up to 0.3 m high with white flowers during the wet season. It is known predominantly from the Southwest of WA, to a lesser extent in the southern Eremaean zone, with only one record from the Pilbara (WAH 2013). This species may have been overlooked in previous surveys when conducted under suboptimal seasonal conditions.

**Eragrostis curvula* is a densely caespitose perennial (often purple near base) grass up to 1.2 m high with purple/green flowers most of the year. It grows in a variety of soils and in disturbed sites. It occurs mainly in the Southwest, with very few records in the southern Eremaean Province (WAH, 2013). The record of this weed may reflect a recent introduction to the area, or may be an artefact of under-sampling in the past.

These range extensions are likely to be a result of insufficient survey effort in the bioregion and WAH lodgement in the past.

4.1.4 Introduced Flora

In total, 20 taxa of introduced flora were recorded, including 19 during the 2011-2013 assessments.

None of the introduced taxa are Declared Plants for the region. The majority of these weeds are common throughout the Pilbara and are result of pastoralism and other anthropogenic activities. Some taxa are aggressive environmental weeds and are discussed below, in order of invasiveness.

****Argemone ochroleuca* (Mexican Poppy)** is widely spread in the Pilbara bioregion, where it colonises creek edges, river banks and river beds. Being restricted to the riparian zone, seeds of this species will be spread during heavy rainfall events when creeks and rivers are running. Feasibility of control for populations of this species in remote areas is low (DEC 2011f, Keighery 2010). Seedlings of **A. ochroleuca* were recorded opportunistically at low densities in creek beds in the southeast of the survey area. **Argemone mexicana* was recorded on Fortescue's database, but is likely to be **A. ochroleuca*. **A. mexicana* is known from a single record in the Swan bioregion on Garden Island south of Perth, whereas **A. ochroleuca* is known from numerous locations in the Pilbara and Eremaean bioregions to the south.

****Cenchrus ciliaris* (Buffel Grass)** and the less common ****Cenchrus setiger* (Birdwood Grass)** were introduced by the pastoral industry for cattle fodder and stabilisation of eroding creeks and rivers. Its nutritional value is moderate when green and low when drying off. Despite not being Declared, these species are highly invasive and reduce the richness and cover of native flora by releasing chemicals that inhibit the growth of other species (allelopathic properties). **Cenchrus* may impact the natural fire regime, as extensive stands of dry plant matter provide a high fuel load. **Cenchrus* is spread by dispersing its seed by wind and water (CRC Weed Management 2008; Keighery 2010). Dense tussock grasslands of **Cenchrus* spp. were recorded along major creeks and rivers. However, the species richness in many of the areas was still relatively high. The feasibility of control measures for these two species is low (DEC 2011f).

****Acetosa vesicaria* (Ruby Dock)** is an invasive disturbance specialist and was recorded in previous surveys in disturbed areas and creeks. In the past, it was used in the Pilbara for mine site rehabilitation, and now it has become notorious in rehabilitated sites around the town of Newman. The species propagates by seed and vegetatively, forming dense stands at the expense of native species (Keighery 2010; Hussey *et al.* 1997).

****Aerva javanica* (Kapok)** is moderately invasive and typically was found along degraded creeks and rivers, as well as along corridors such as rail, roads and pipelines. It is grazed by cattle and appears to be spread by wind and water (Keighery 2010; Hussey *et al.* 1997).

****Vachellia farnesiana* (Mimosa Bush)** is a dense spiny shrub which is widespread along roadsides, creeks, rivers and disturbed floodplains throughout pastoral regions from the

Kimberley to Carnarvon and Wiluna. It was first recorded in the 1860s, with the purpose of the introduction unknown. It was recorded at 19 locations in the survey area, at densities up to 3%. While the species has a high ecological impact, its distribution appears to be stable (DEC 2011f).

Malvastrum americanum* (Spiked Malvastrum**) was recorded frequently in vegetation associated with dense mulga and creeks and rivers. This species becomes abundant under good seasonal conditions and can persist in a desiccated state during drought periods. This species has a high ecological impact; however control measures are not feasible (DEC 2011f; Keighery 2010; Hussey *et al.* 1997).

Bidens bipinnata* (Bipinnate Beggartick**) is also typical of mulga stands and occasionally creeks and rivers. Under good seasonal conditions, it can form dense stands, at the expense of other annual species. The seed attaches to animals (and people), which may function as a vector for the species' expansion (Keighery 2010; Hussey *et al.* 1997).

Cucumis melo subsp. agrestis* (Ulcardo Melon**) and **Citrullus colocynthis* are climbers of the Cucurbitaceae family and under favourable seasonal conditions quickly cover disturbed ground and to a lesser extent native vegetation. They were recorded frequently at mesic and disturbed sites; however, the species have low ecological impacts (DEC 2011f; Keighery 2010; Hussey *et al.* 1997).

The remaining species, including the grasses **Chloris virgata*, **Echinochloa colona*, **Eragrostis curvula* and **Setaria verticillata*, daisies including **Sonchus oleraceus*, **Sigesbeckia orientalis* and **Flaveria trinervia*, other herbs including **Heliotropium europaeum*, **Tribulus terrestris* and **Portulaca oleracea*, have been recorded at very low densities and are not considered to impact the vegetation communities where they occur (CALM 1999 and DEC 2011f).

4.2 VEGETATION

4.2.1 Vegetation Mapping

Most of the vegetation mapping was based on the vegetation mapping of the Christmas Creek area undertaken by Mattiske (2007). This assessment consisted of a compilation and an analysis of the results of previous surveys (Mattiske 2007; Biota 2004a; Biota 2004b), additional and supplementary surveys conducted in March and April 2011 (the plains and hills north of the Marsh), in 2012 (the Marsh vegetation), and 2013 (transitional areas between the Marsh and the adjacent plain to the north).

The original vegetation mapping (Mattiske 2007) described ten vegetation types in the survey area, excluding the samphire flats, and has been refined to a total of 15 vegetation types, including mosaics. The most significant refinements made were to mulga vegetation of the flats and plains, where the number of vegetation types has

increased from four to nine, including one unit not previously described, two vegetation types now described as mosaics consisting of previously described units, and one vegetation type being divided into three types.

Some areas originally mapped as VT2 (Mulga creekline vegetation), VT3 (Mulga low woodlands of the plains) and VT13 (*Tecticornia* shrublands) by Matiske (2005a) in the central survey area were observed to substantially differ from the VTs described and have been remapped as VT30.1, VT30.2, VT30.3 and VT10.2 and associated mosaics (*Acacia synchronicia* and others).

Some vegetation types mapped by Matiske (2007) originally as samphire VTs associated with Fortescue Marsh were found to actually represent vegetation characterised by scattered shrubs including *Acacia synchronicia* and *A. aneura* over low open shrubland of halophytic shrubs *Maireana*, *Atriplex*, *Sclerolaena*, *Frankenia*, and *Eremophila spongiorcarpa* and *E. cuneifolia* over mixed scattered to open tussock grasses. *Tecticornia* species were largely absent. These were re-mapped as mosaics, VT30.1+10.2 and VT30.1+04.

There were numerous small areas in the plains of the south-eastern part of the survey area originally mapped as VT8, typical of creeks and drainage lines, which actually supported a mosaic of VT30.1 and VT10, supporting *Acacia synchronicia*, *A. xiphophylla* and *A. aneura* high open shrubland over halophytic low shrubs and *Aristida* spp.

Several creekline vegetation types were previously mapped as VT2: *Acacia aneura* var. *aneura*, *A. citrinoviridis*, *A. pruinocarpa* upper stratum; however, *A. citrinoviridis* was not recorded in the present or previous surveys. In some cases, *Corymbia hamersleyana* was noted instead, which is a tree typical of major drainage lines and small creeks. The use of *A. citrinoviridis* in this VT description may originate from the larger survey area mapped by Matiske along the entire northern edge of Fortescue Marsh.

4.2.2 Floristic Groups

Based on Griffin's and Trudgen's (2011) floristic analysis of Christmas Creek and Cloudbreak data and the bioregional dataset comprising 2883 reference sites, there are 18 floristic groups (at approximately the Vegetation Association to Sub-Formation level in NVIS) in total. The survey area includes 17 floristic groups which are equivalent to the 14 VTs of the plains and slopes (including creeks), and 1 floristic group which is equivalent to VA1 – VA9 of the samphire flats of Fortescue Marsh.

Of the 17 floristic groups, seven are represented by a single site, which in the multivariate analysis are subsumed into larger groups. The seven Mulga VTs *sensu* Matiske (2007) are represented by eight distinct Mulga floristic groups based on the floristic analysis (Griffin & Trudgen 2011), although they do not always coincide.

Ten floristic groups at the 600 group level (synthesising vegetation at the level of vegetation association or above, Griffin & Trudgen 2011) that appear to be poorly

represented outside the survey area include the Mulga floristic groups 430, 433, 434, 435, 567, which roughly correspond to Mattiske VTs 3, 4 and 10; Mulga and *Eucalyptus leucophloia* and other species floristic groups 539, 568; *Eucalyptus* / *Corymbia* floristic groups 526, 527, 564 of the Chichester slopes, and creekline floristic group 575 cannot easily be assigned a VT equivalent. The *Tecticornia* shrublands group 490 of the Fortescue Marsh, which may have an analogous presence at Weelarrana Lake 80 km south of Newman, corresponds to eight VTs (Mattiske 2007), replaced since by the nine VAs (ENV 2013). The remaining eight floristic groups are more widely distributed, at the subregional and / or bioregional scale.

4.2.3 Threatened and Priority Ecological Communities

No vegetation types described during current and previous flora and vegetation assessments of the survey area resemble TECs protected by Federal or State legislation.

The Fortescue Marsh PEC is classified as a Priority 1 PEC and comprises an area from east of Mulga Downs to Marillana and Roy Hill Stations. The survey area is entirely located within the Fortescue Marsh PEC buffer. (Figure 12), The Marsh land system, classified as the PEC, represents 18.66% of the survey area.

The Fortescue Marsh PEC is characterised by endemic *Eremophila* species and recently described and still undescribed samphire (*Tecticornia*) species occurring on the fringe and the bed of the Marsh. The Mattiske (2007) samphire VTs 13, 22, 26, 31, 32, 34 and 35 (and VT36 representing bare ground for the Marsh), now superseded by VA1-VA9 of the recent Marsh survey (ENV 2013) (all collapsed into *Tecticornia* group 490 in the floristic analysis) are associated with this PEC, and includes *Eremophila spongiorcarpa* (Priority 1), *E. youngii* subsp. *lepidota* (Priority 4), *T. sp.* Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) (Priority 1), *T. globulifera* (Priority 1) and *T. medusa* (Priority 3). Therefore, these VAs may be considered to represent the PEC.

Although Fortescue Marsh is a Priority 1 PEC, the vegetation is under threat from grazing and trampling from cattle (Kendrick 2001), which were observed grazing at the time of the survey.

4.2.4 Samphire Vegetation Associated with Fortescue Marsh

Samphire vegetation of Fortescue Marsh generally coincides with the Marsh Land System, which is dominated by the saline floodplains and lakebeds, floodplains and stony plains; these landforms comprise 96% of the Marsh Land System (van Vreeswyk *et al.* 2004). The vegetation may be unique to the Pilbara bioregion (Fisher *et al.* 2004), but floristic analysis suggests that it may also occur at Lake Weelarrana south of Newman (Griffin and Trudgen 2011).

Samphire vegetation was mapped during previous surveys and was recorded from 23 quadrats in the survey area and 23 quadrats from the adjacent Cloudbreak project area (Mattiske 2007). Eight mapping units (Mattiske 2007) formed a single floristic group in

the floristic analysis at the 600 group level (Griffin & Trudgen 2011), together with three reference sites on the Pilbara coast. Note that the eight Mattiske (2007) vegetation types delineated as samphire vegetation in the Marsh have since been replaced with nine vegetation associations delineated in the 2012 survey. The single floristic group for all sites at Christmas Creek may be a result of unresolved data. However, the large number of sites from Fortescue Marsh indicate that the sites from the Marsh represent geographically restricted vegetation. This is supported by the analysis with a subset of the reference sites at the 5 group level, in which the vegetation of Fortescue Marsh appeared to be distinct (Griffin & Trudgen 2011).

When the samphire sites from Christmas Creek and Cloudbreak were analysed with a subset of the reference sites at the 5 group level (a higher level, which still separates the samphire vegetation community from the remaining vegetation), the vegetation of Fortescue Marsh appeared to be distinct.

The eight Mattiske (2007) mapping units, now replaced with the nine vegetation associations, correlate with the seven landforms of the Marsh Land System. This land system coincides with Fortescue Marsh, a Priority 1 PEC.

The major two landforms of the Marsh land system include:

- saline floodplains and lakebeds (50% of the land system) consisting of deep red/brown non-cracking clays with high alkalinity and high gypsum content supporting low shrublands of *Tecticornia* spp. often with distinct zonation; and also some extensive areas with no perennial vegetation; and
- flood plains (45% of the land system) consisting of deep red/brown cracking clays supporting shrubby grasslands of *Sporobolus virginicus* in patches or as continuous swards with *Muellerolimon salicorniaceum* and *Muehlenbeckia florulenta*; and grassy low shrublands with *Atriplex bunburyana*.

The remaining five landforms include alluvial fans and drainage floors (2%), gilgai plains (1%) and stony plains (1%) and kopi banks (<1%) and channels and water holes (<1%), which are likely to support vegetation different from the two dominating landforms.

Samphires recorded in Fortescue Marsh during previous flora and vegetation assessments include *Tecticornia auriculata*, *T. indica* subsp. *bidens*, *T. indica* subsp. *leiostachya* (Mattiske 2007), and two priority species, *T. globulifera* (P1) and *T. medusa* (P3) (ENV 2010a, Astron 2011).

The 2012 survey of the Fortescue Marsh (ENV 2013) focussed on vegetation associations typical of the *Tecticornia*-dominated Marsh vegetation and other minor vegetation associations. The purpose of the Marsh study was to gain a better floristic understanding of the Marsh and resulted in detailed vegetation mapping, a floristic inventory and an analysis of vegetation associations. The eight Priority species recorded in 2012-2013 included the samphire shrubs *T. globulifera*, *T. medusa* and *T. sp.* Christmas Creek, the shrubs *Eremophila spongiocarpa*, *E. youngii* subsp. *lepidota* and

Atriplex flabelliformis, and the herbs *Nicotiana heterantha* and *Eleocharis papillosa*. These taxa are likely to occur beyond the survey area, throughout Fortescue Marsh.

As in other parts of inland Australia, *Tecticornia* species in the survey area exhibited a pattern of zonation, *i.e.* certain species colonise higher lying areas, while other species prefer low-lying situation (Datson, 2005; Saintilan, 2009; Shepherd & van Leeuwen, 2011). *T. indica* subsp. *bidens* was typically found in the upper and mid elevations of the Marsh, while *T. auriculata* prefers the plains in the mid Marsh (with some overlap in both directions), and *T. medusa* was found only in the lower Marsh, which at the time of survey was still inundated and would remain so for extended periods.

The zonation of the vegetation does not correlate directly with elevation. The zonation appears to coincide with high salinity tolerance of species in the lower Marsh versus intermediate tolerance of species preferring conditions of the upper Marsh. Soil salinity changes across the landscape, the soil depth and with seasons. Salinity is higher closer to the surface than at depth, is higher in the lower Marsh than in the upper Marsh and increases as the dry season continues, to decrease again in response to cyclonic rainfall. Other edaphic factors reflecting zonation include depth to water table and soil moisture dynamics, as well as pH, and other factors and their interactions, all influencing the ecophysiology of the species (Veneklaas & Colmer, 2010).

4.2.5 Mulga Vegetation Types

Mulga (*Acacia aneura* and related taxa) is described in sections 1.4.2, 4.2.2 and in Appendix E in terms of ecosystem function and services, mulga taxonomy, and extent of its distribution. Here, the Mulga vegetation mapped in the survey area, the Mulga groups resulting from the floristic analysis and the relevant landforms of the relevant land systems that support Mulga are briefly discussed.

In the survey area the VTs supporting Mulga are grouped into two habitats and seven VTs, including:

- creeks and drainages supporting VT2, a low woodland to open forest of *A. aneura* var. *aneura* and other *Acacia* species; and
- flats and plains supporting VT3, a low woodland to open forest of *A. aneura* var. *aneura* and other low trees and shrubs, resulting in a diverse understorey; VT4, which is floristically similar, but has lower cover than VT3; VT 10.1 which has Mulga as a minor component, VT10.2 which is characterised by an understorey of *Eremophila cuneifolia*; VT30.1+04, a mosaic with a small component of Mulga; and VT30.1+10.1, with an even smaller Mulga cover.

Overall, there are five VTs (VT2, 3, 4, 10.1 and 10.2) that have a (co)dominant Mulga component, totalling 235.0 km² or 33.6% of the survey area, while the mosaics with a minor mulga component contribute 16.0 km² or 2.3%.

There are at least eight units at the 600 group level of the floristic analysis of the Christmas and Cloudbreak area (for detail, see Appendix E) that contain Mulga as a dominant or major species, including groups 427, **430**, **433**, 434, 435, **539**, 567 and **568**, with the four groups in bold indicating a restricted geographic distribution. Mapping of these units is complex, as the floristic groups are dispersed across several groups in the multivariate analysis. This may be explained by the method of the floristic analysis being based on creating 600 arbitrary groups, whereas the multivariate analysis is based on a level of similarity, in this case of 30%, which is typically accepted as a level for grouping similar samples (Clarke & Gorley 2006; Clarke 1993).

Land systems supporting Mulga vegetation (with number and percentage area of relevant landforms in brackets) include:

- Jamindie (6 landforms contributing 93% to the land system),
- Turee (3 landforms contributing 35% to the land system); and
- Cowra (2 landforms contributing 35% to the land system).

Overall, there are nine landforms (allowing for overlap in two land forms) with a characteristic Mulga component. Cowra land system is restricted (endemic) to Fortescue Marsh area; and Turee and Cowra are poorly represented in the conservation estate.

The approach to mapping Mulga combined previous mapping based on Mattiske (2005a, 2007) augmented by a refinement based on field observations, aerial photography signatures and statistical analysis. The resulting seven Mulga vegetation types correspond to some extent with the number of floristic groups and groups based on multivariate analysis. The discrepancies may be explained by different mapping scales, sampling intensity, seasonal conditions, grazing impacts and level of taxonomic resolution of Mulga.

4.2.6 Potential Groundwater-Dependent Ecosystems

The principles of GDE and the role and function of phreatophytic (groundwater dependent) trees have been discussed in a previous section of this report. Here GDE are discussed in the local context.

Creeks and rivers comprised of *Eucalyptus camaldulensis* and *E. victrix* as dominant species are mapped as VT 1 (18.5 km² or 2.7% of the survey area) and represent potential GDE. This vegetation may be sensitive to changes in groundwater tables that exceed the natural fluctuations. The potential GDE mapped in the survey area comprise River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. victrix*) communities and represent one of the 45 vegetation associations at the bioregional level and one of 11 associations at the subregional level that have a high priority for reservation (McKenzie *et al.* 2002; Kendrick 2001).

Some *Tecticornia* species of Fortescue Marsh may also be groundwater dependent. It is generally anticipated that there are species in the *Tecticornia* genus that may depend on groundwater and preliminary studies suggest that *T. auriculata*, *T. indica*, and *T. medusa* at Fortescue Marsh access moisture from deeper than 0.5 m in the soil profile (Astron 2011). However, overall, the degree of groundwater dependency for *Tecticornia* communities remains unknown.

For the purpose of this report, only riparian vegetation (VT1) is considered to be potentially groundwater dependent.

5 CONCLUSION

The Christmas Creek LOM survey area comprises 701.44 km² (70,144 ha). The southern part of the survey area is located in the Priority 1 PEC Fortescue Marsh, represented by samphire vegetation, while the remainder is located in the buffer zone of the PEC. A total of 541 taxa, including 14 Priority Flora and 20 introduced flora (ENV surveys 2011–2013, Biota 2004, ENV 2010a, Mattiske 2005a and 2007) have been recorded from the survey area.

Potential groundwater dependent ecosystems, represented by major creeks supporting *Eucalyptus victrix* and / or *E. camaldulensis* (VT1), have been delineated and occupy 18.7 km² (1,870 ha).

The mapping of Mulga vegetation has been refined and now delineates seven Mulga vegetation types (including mosaics) occupying 251 km² (25,100 ha). Most of the mulga is located on the plains and is sheetflow dependent.

The bioregional floristic analysis undertaken as part of this study (Griffin and Trudgen 2011) confirms that Mulga north of Fortescue Marsh is floristically different to other Mulga vegetation in the bioregion, as it supports a Mulga taxon (*Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) that is poorly represented south and west of the survey area.

The Fortescue Marsh portion of the survey area supported nine vegetation associations dominated by *Tecticornia* species, one shrubland association characterised by *Acacia synchronicia*, and the lake bed likely to support annual herbs and grasses. This area comprises 159.4 km² (15,937 ha) or 22.7% of the survey area.

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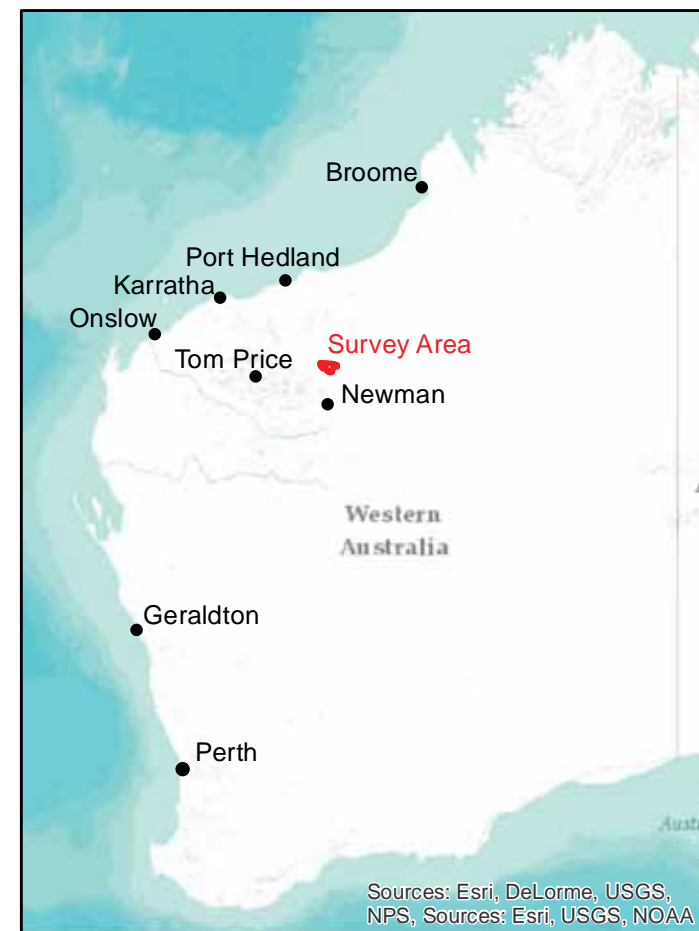
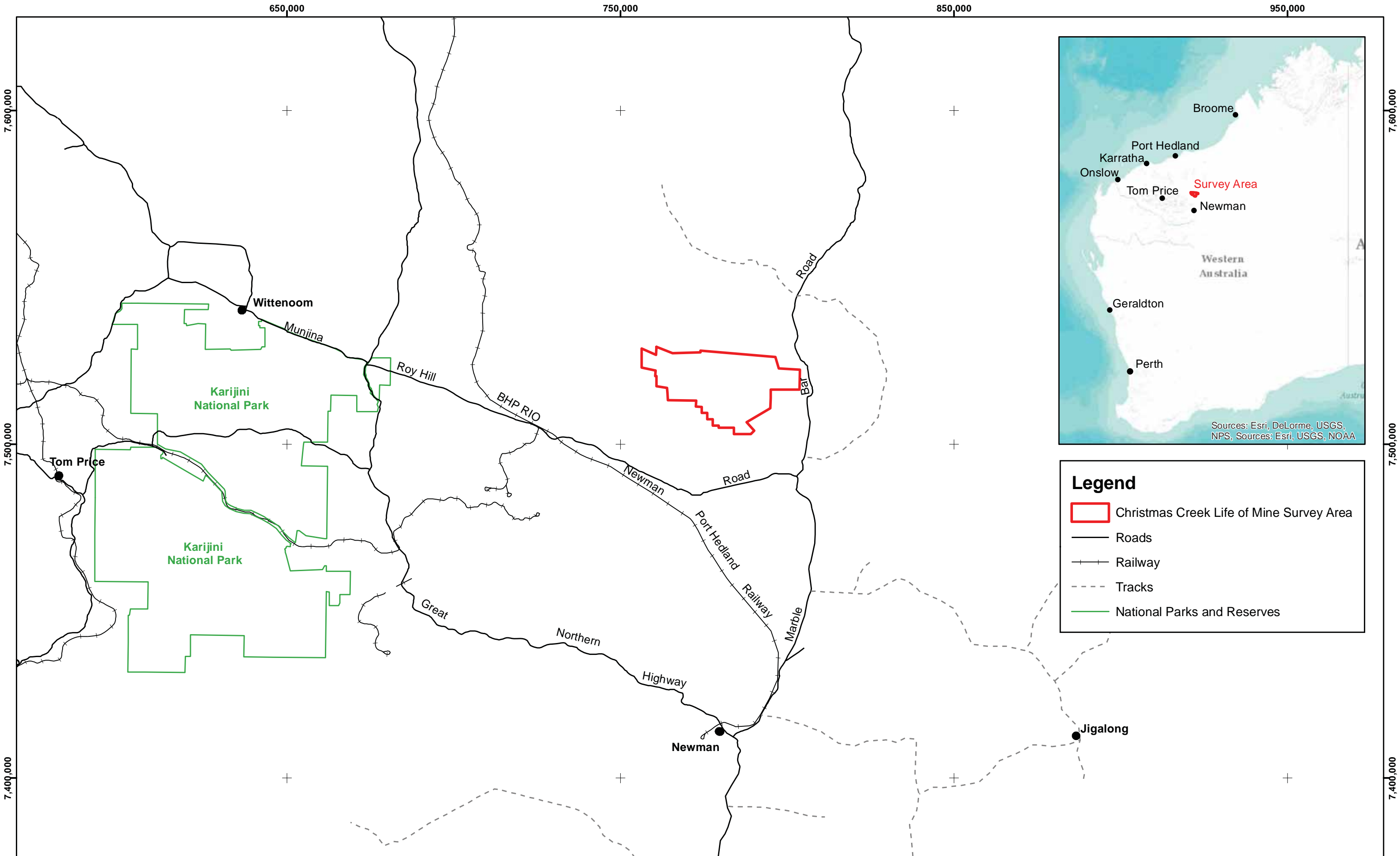
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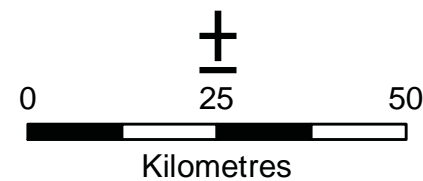
Legend

- Christmas Creek Life of Mine Survey Area
- Roads
- Railway
- Tracks
- National Parks and Reserves



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:1,000,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.
J121129
DATE
13-09-13



Regional Location

Christmas Creek LOM Flora & Vegetation Assessment

Conservation Significant Species	Biota 2004a	Mattiske 2007	FMG Database	ENV 2010a	ENV 2011 Survey	ENV 2012 Survey	ENV 2013 Survey
<i>Atriplex flabelliformis</i>				○		E	
<i>Calotis squamigera</i>					○		
<i>Eleocharis papillosa</i>						E	
<i>Eremophila spongiorcarpa</i>)			⊗	E	Ⓚ
<i>Eremophila youngii</i> subsp. <i>lepidota</i>					⊗	E	\$
<i>Goodenia nuda</i>	j<		W		⊗		
<i>Nicotiana heterantha</i>					○	E	
<i>Phyllanthus aridus</i>			W				
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)			W	●	⊗		
<i>Rostellularia adscendens</i> var. <i>latifolia</i>			W		⊗		
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd and T. Colmer <i>et al.</i> KS 1063)				●		E	
<i>Tecticornia globulifera</i>				●		E	
<i>Tecticornia medusa</i> (P3)				●		E	
<i>Vigna</i> sp. central (M.E. Trudgen 1626)					⊗		
Species of Interest							
<i>Maireana amoena</i>						E	\$
<i>Sclerolaena recurvicauspis</i>						E	


CLIENT

Fortescue Metals Group Ltd

AUTHOR

J. Mattner

SCALE

N/A @ A4

DRAWN

M. Mikkonen

PROJECTION

N/A

JOB NO.

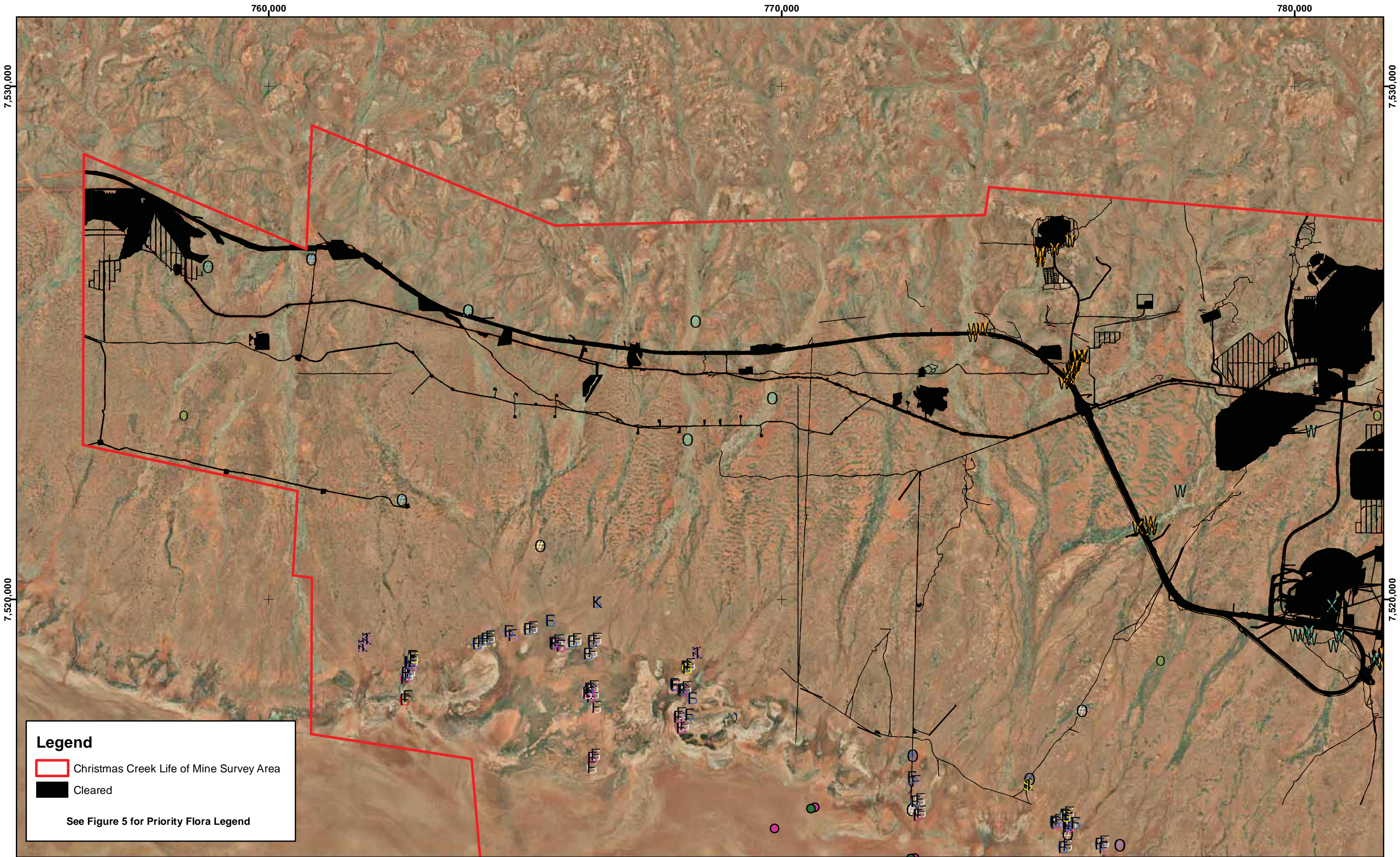
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Priority Flora Legend

Christmas Creek LOM Flora and Vegetation Assessment



Legend

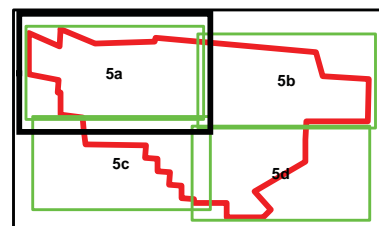
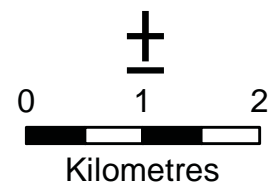
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See Figure 5 for Priority Flora Legend



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

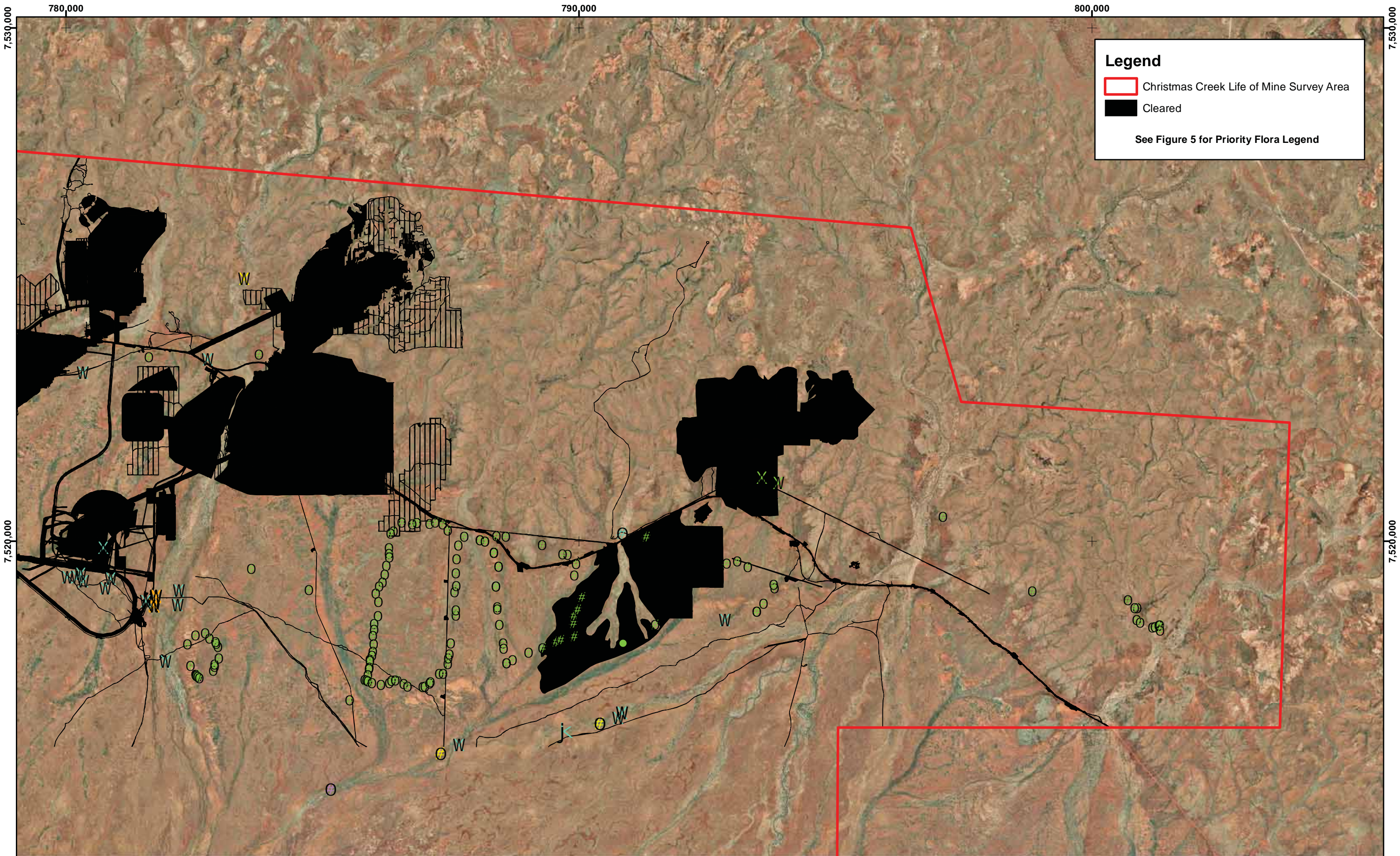
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Locations of Conservation Significant Species and Species of Interest

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **5a**



Legend

Christmas Creek Life of Mine Survey Area

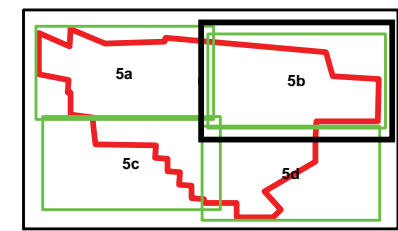
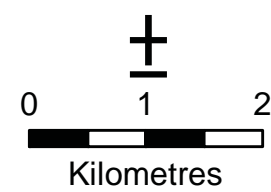
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See Figure 5 for Priority Flora Legend



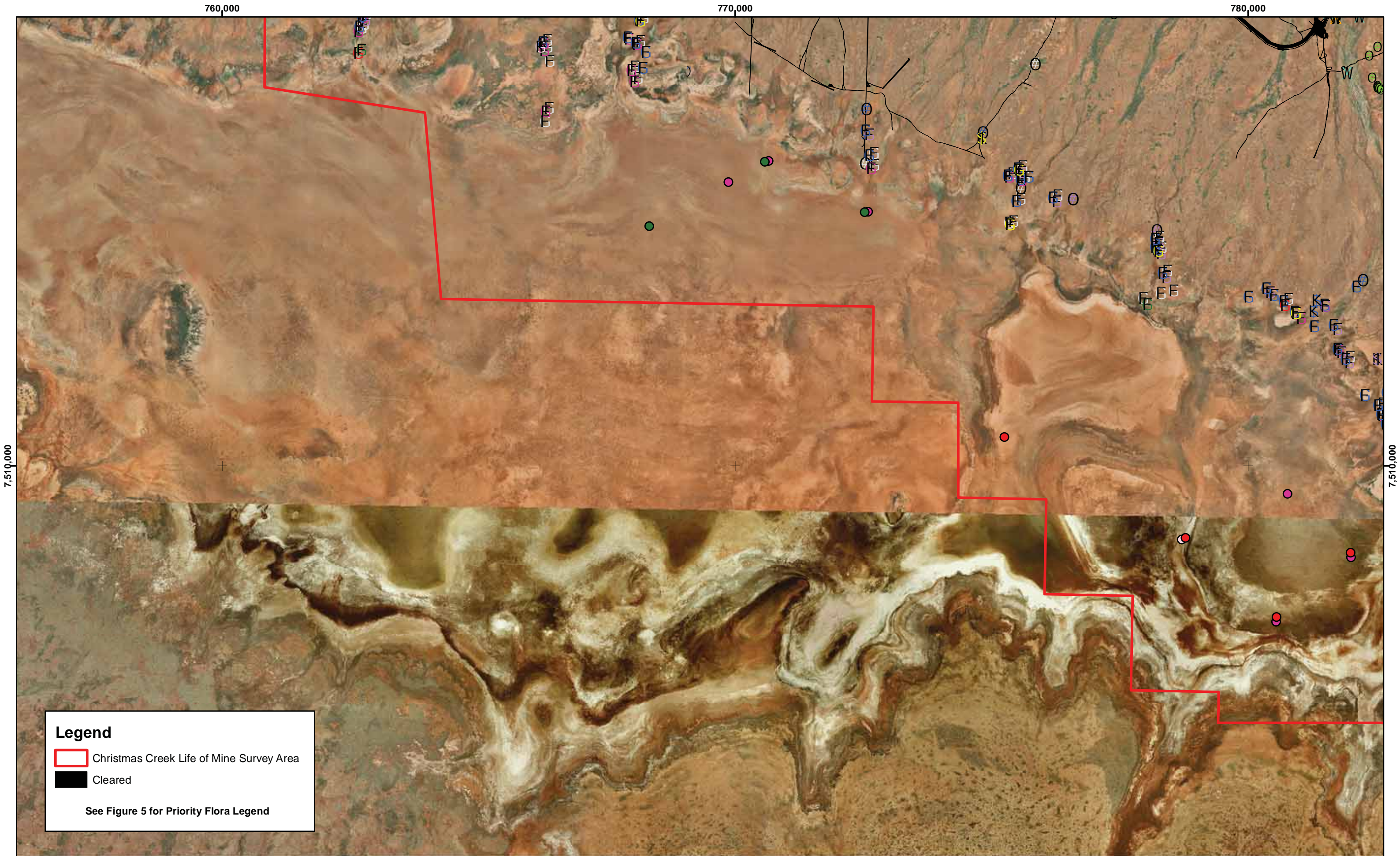
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AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	15-11-13



Locations of Conservation Significant Species and Species of Interest

Christmas Creek LOM Flora & Vegetation Assessment



Legend

Christmas Creek Life of Mine Survey Area

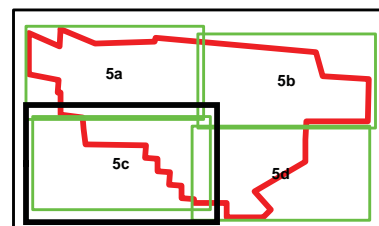
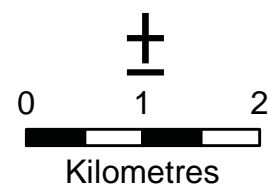
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See Figure 5 for Priority Flora Legend



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

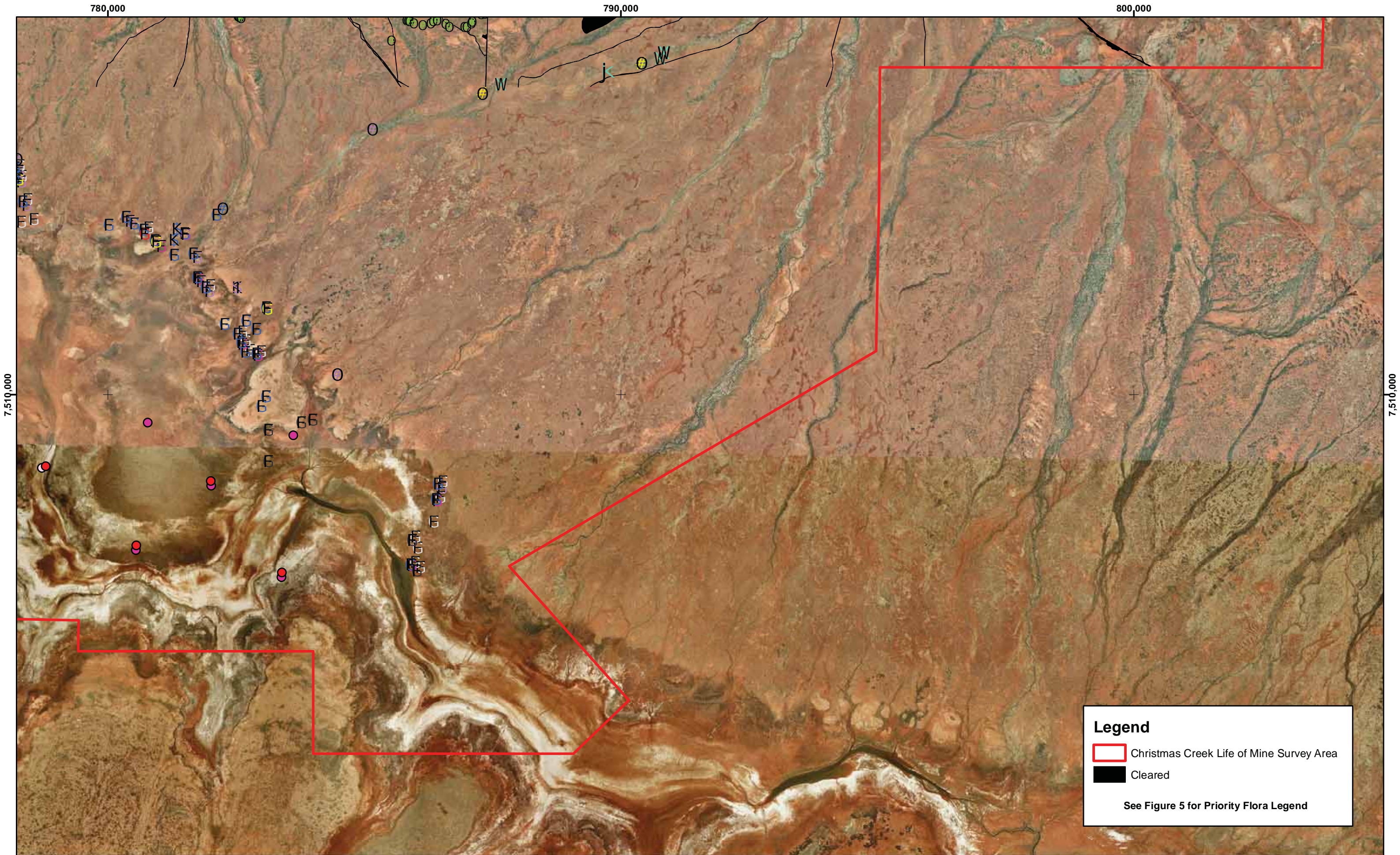
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Locations of Conservation Significant Species and Species of Interest

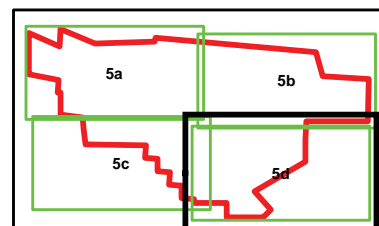
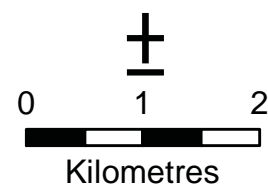
Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **5c**



CLIENT	Fortescue Metals Group Ltd	
AUTHOR	J. Mattner	DRAWN
		M. Mikkonen
SCALE	1:65,000 @ A3	PROJECTION
		GDA 94 MGA 50

JOB NO.	J121129
DATE	15-11-13



Locations of Conservation Significant Species and Species of Interest

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **5d**

Introduced Species	Biota 2004a	Mattiske 2007	FMG Database	ENV 2011 Survey	ENV 2012 Survey	ENV 2013 Survey	
* <i>Acetosa vesicaria</i>	W		Ø	●			
* <i>Aerva javanica</i>	W		0	○	F		
* <i>Argemone mexicana</i>			0				
* <i>Argemone ochroleuca</i>	W		Ø	●			
* <i>Bidens bipinnata</i>	W		Ø	●	F		
* <i>Cenchrus ciliaris</i>	W		Ø	●	F	\$	
* <i>Cenchrus setiger</i>	W		Ø	●	F		
* <i>Chloris virgata</i>	W			●			
* <i>Citrullus colocynthis</i>	W			●	F		
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	W			○	F		
* <i>Echinochloa colona</i>	W		0	○	F		
* <i>Eragrostis curvula</i>					F		
* <i>Flaveria trinervia</i>	W			●	F		
* <i>Heliotropium europaeum</i>					F		
* <i>Malvastrum americanum</i>	W)	Ø	●	F		
* <i>Portulaca oleracea</i>				●	F	\$	
* <i>Setaria verticillata</i>	W		Ø	○	F		
* <i>Sonchus oleraceus</i>				●	F		
* <i>Tribulus terrestris</i>				●			
* <i>Vachellia farnesiana</i>	W		Ø	●	F		


CLIENT

Fortescue Metals Group Ltd

AUTHOR

J. Mattner

SCALE

N/A @ A4

DRAWN

M. Mikkonen

PROJECTION

N/A

JOB NO.

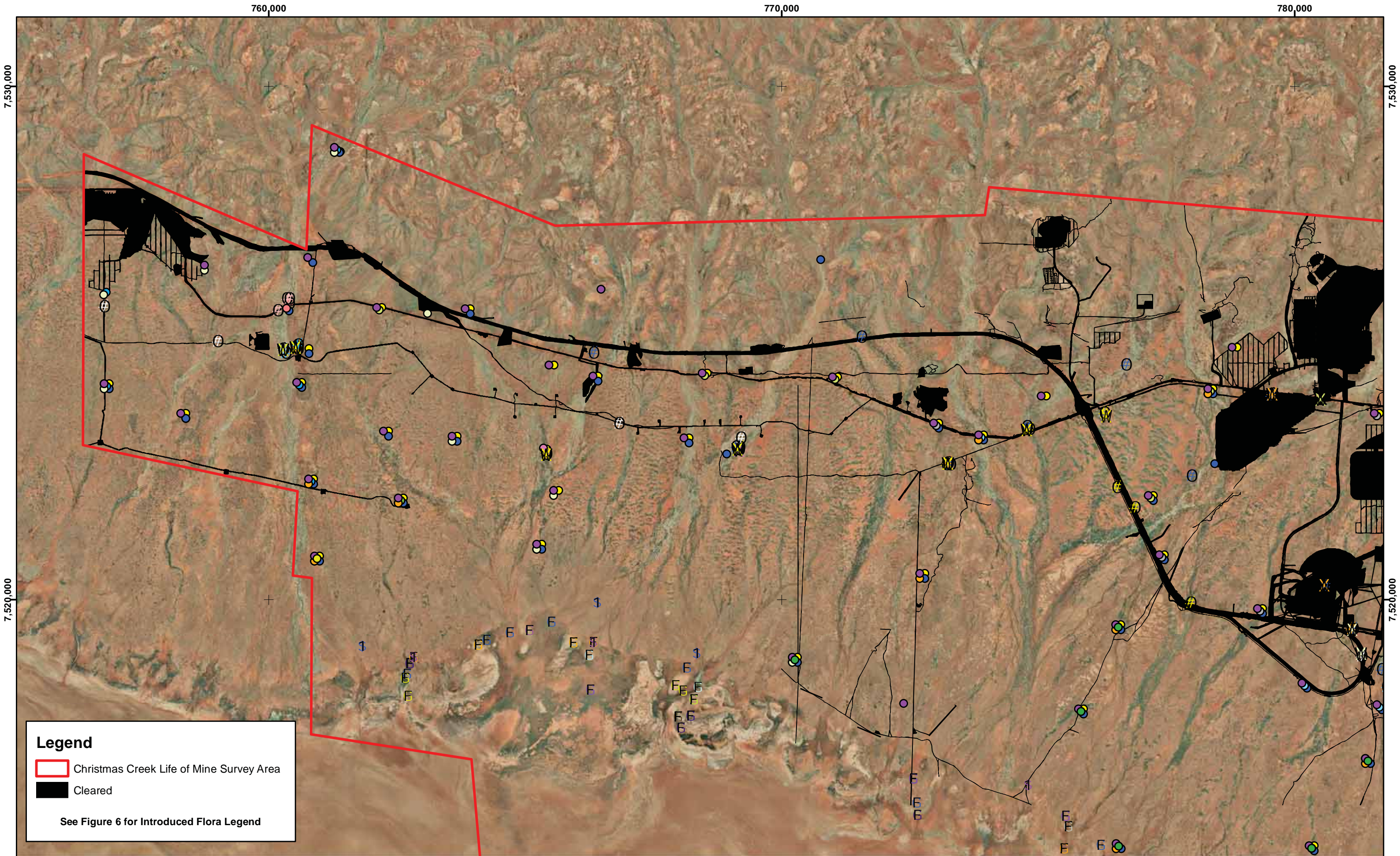
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DATE

21-11-13

Introduced Flora Legend

Christmas Creek LOM Flora and Vegetation Assessment



Legend

Christmas Creek Life of Mine Survey Area

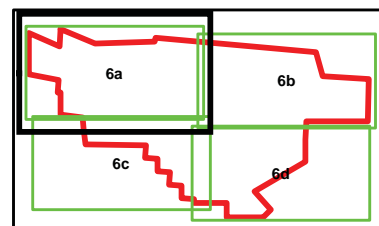
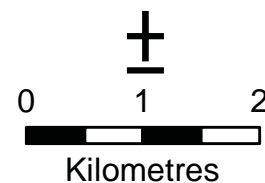
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See Figure 6 for Introduced Flora Legend



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

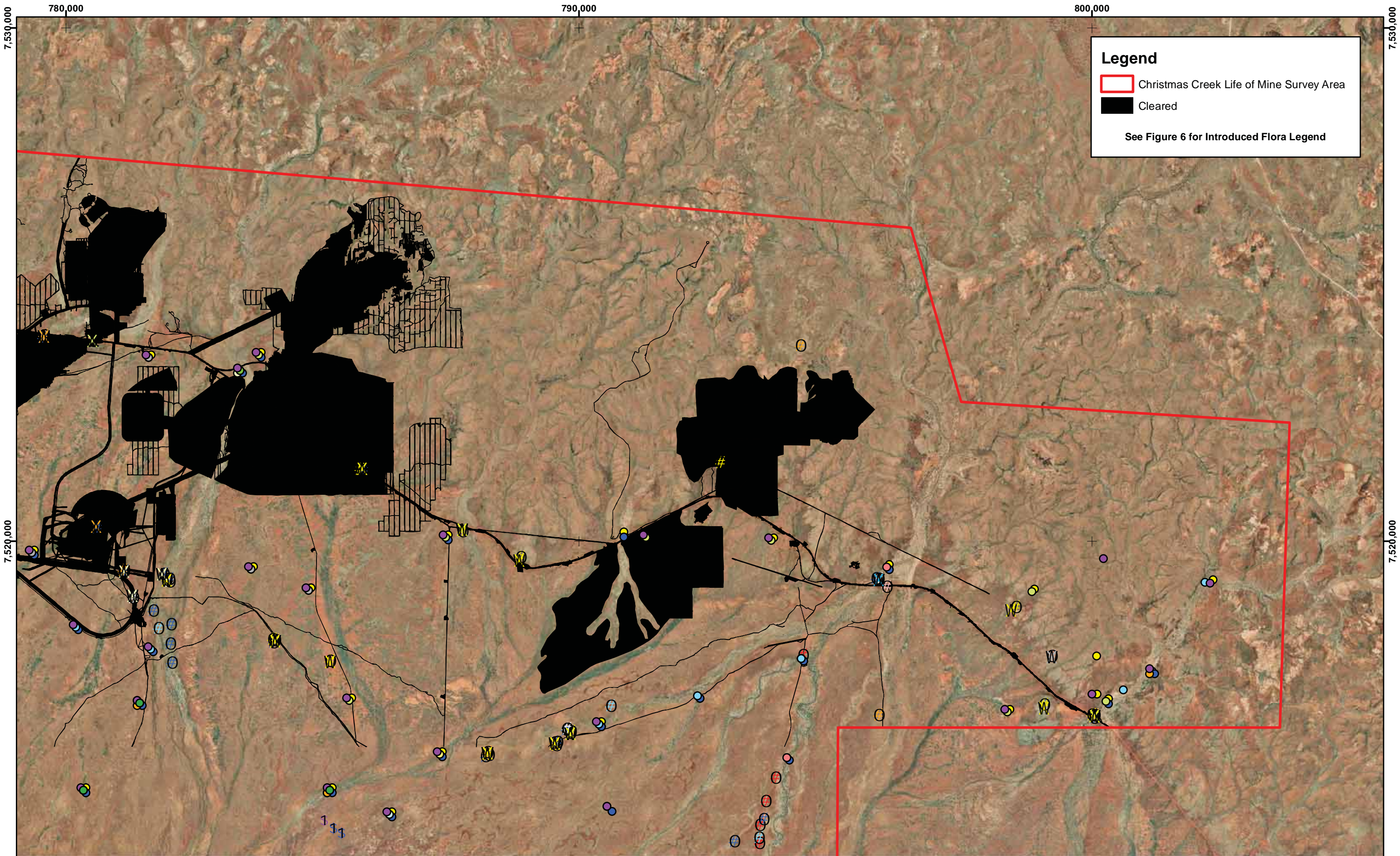
JOB NO.	J121129
DATE	15-11-13



Locations of Introduced Flora

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **6a**



Legend

Christmas Creek Life of Mine Survey Area

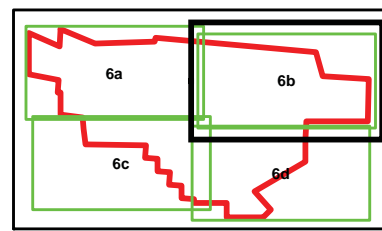
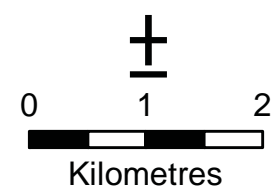
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See Figure 6 for Introduced Flora Legend



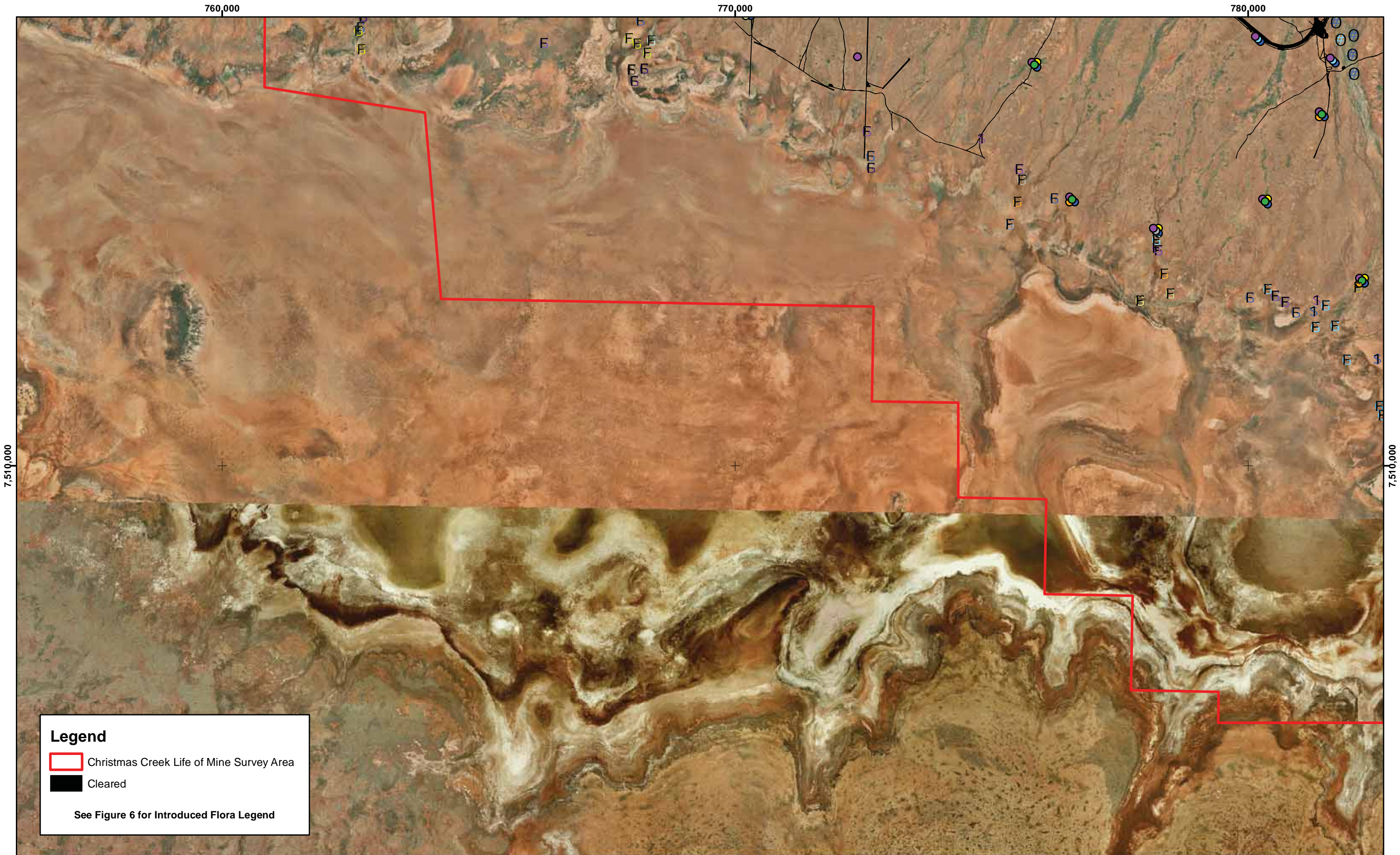
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AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	15-11-13



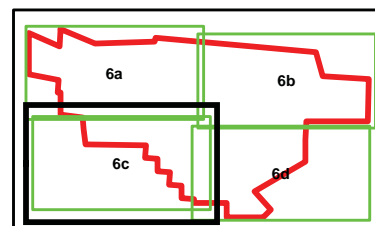
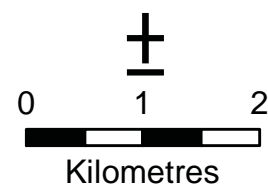
Locations of Introduced Flora

Christmas Creek LOM Flora & Vegetation Assessment



CLIENT	Fortescue Metals Group Ltd	
AUTHOR	J. Mattner	DRAWN
	M. Mikkonen	PROJECTION
SCALE	1:65,000 @ A3	GDA 94 MGA 50

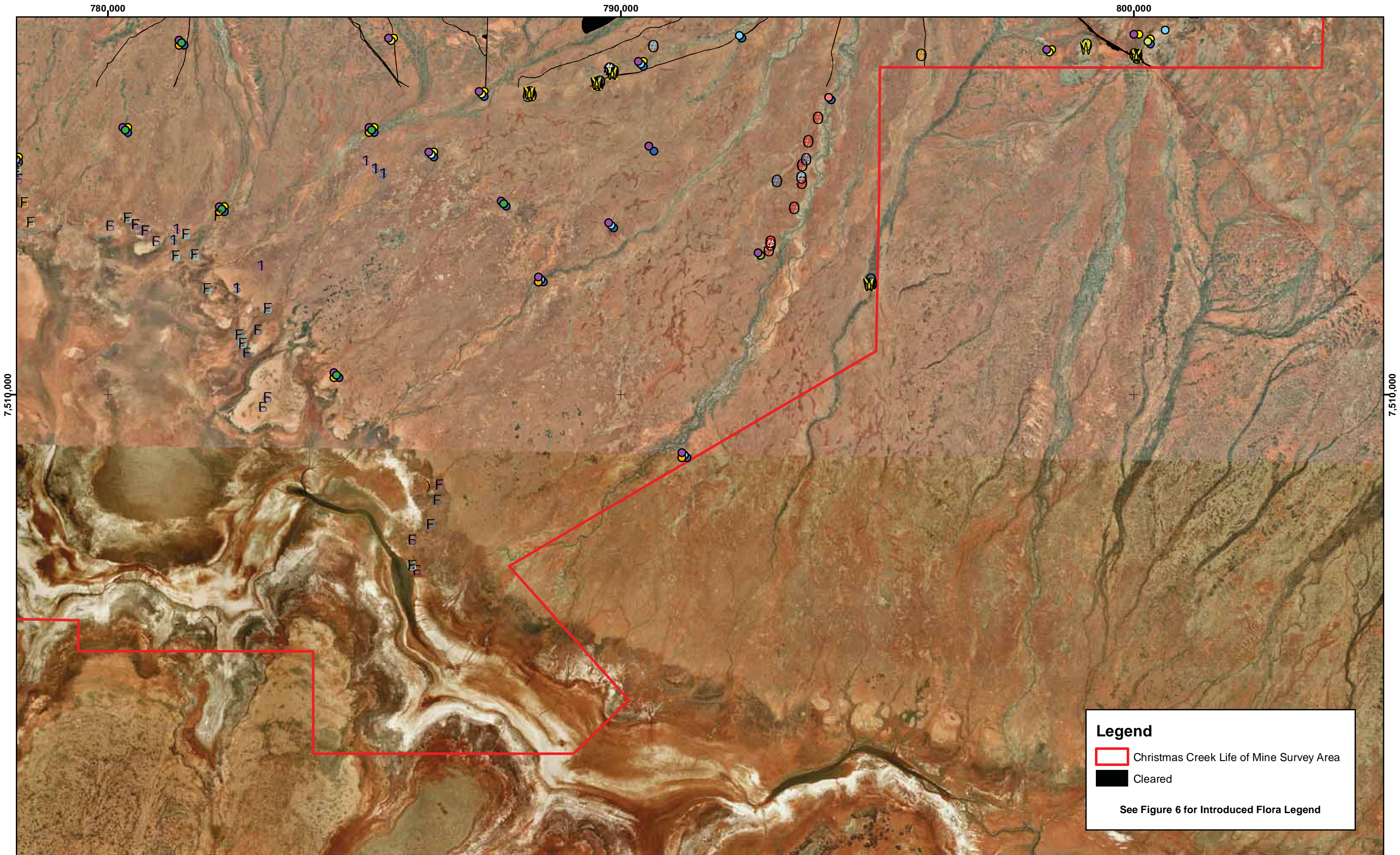
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Locations of Introduced Flora

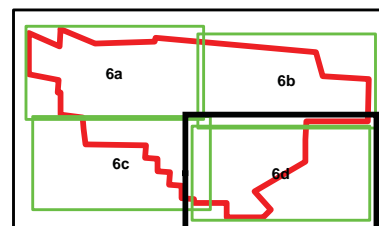
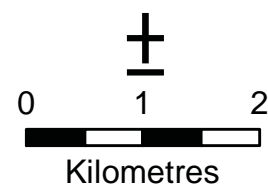
Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **6c**



CLIENT	Fortescue Metals Group Ltd	
AUTHOR	J. Mattner	DRAWN
	M. Mikkonen	PROJECTION
SCALE	1:65,000 @ A3	GDA 94 MGA 50

JOB NO.	J121129
DATE	15-11-13



Locations of Introduced Flora

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **6d**

Vegetation Types (sensu Mattiske) and Vegetation Associations

Creekline and Drainage Lines

VT1	Open Woodland of <i>Eucalyptus victrix</i> , <i>Eucalyptus camaldulensis</i> with pockets of <i>Acacia coriacea</i> subsp. <i>pendens</i> over <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Petalostylis labicheoides</i> , <i>Acacia tumida</i> over <i>Triodia longiceps</i> , <i>Chrysopogon fallax</i> , <i>Themeda triandra</i> and <i>Aristida</i> species.
VT2	Low Woodland to Low Open Forest of <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia citrinoviridis</i> , <i>Acacia pruinocarpa</i> over <i>Acacia tetragonophylla</i> and <i>Psydrax latifolia</i> over <i>Chrysopogon fallax</i> , <i>Stemodia viscosa</i> , <i>Blumea tenella</i> , <i>Themeda triandra</i> and species of <i>Triodia</i> and <i>Aristida</i> species.
VT8	Closed Scrub to Tall Shrubland of <i>Acacia pruinocarpa</i> , <i>Acacia tumida</i> , <i>Acacia ancistrocarpa</i> , <i>Acacia maitlandii</i> , <i>Acacia kempeana</i> , <i>Acacia tetragonophylla</i> with occasional <i>Eucalyptus gamophylla</i> and <i>Corymbia deserticola</i> over <i>Triodia epactia</i> , <i>Themeda triandra</i> and <i>Aristida</i> species.
VT9	Closed Scrub to Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia maitlandii</i> , <i>Acacia kempeana</i> , <i>Acacia monticola</i> with occasional <i>Eucalyptus gamophylla</i> and <i>Corymbia deserticola</i> over <i>Senna</i> species, <i>Triodia basedowii</i> and <i>Aristida</i> species.

Flats and Broad Plains

VT3	Low Woodland to Low Open Forest of <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Acacia tenuissima</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Psydrax latifolia</i> over <i>Dodonaea petiolaris</i> and species of <i>Triodia</i> and <i>Aristida</i> species.
VT4	Low Open Woodland of <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Acacia xiphophylla</i> , <i>Acacia victoriae</i> over <i>Acacia tetragonophylla</i> , <i>Psydrax latifolia</i> and <i>Psydrax suaveolens</i> over <i>Ptilotus obovatus</i> and mixed species of <i>Maireana</i> and <i>Sclerolaena</i> species.
VT10.1	Low Open Woodland of <i>Acacia xiphophylla</i> , <i>Acacia victoriae</i> , <i>Acacia aneura</i> var. <i>aneura</i> over <i>Acacia tetragonophylla</i> , <i>Ptilotus obovatus</i> , <i>Senna</i> species and mixed species of <i>Maireana</i> and <i>Sclerolaena</i> species.
VT10.2	Low Open Woodland of <i>Acacia xiphophylla</i> , <i>Acacia aneura</i> , <i>Eremophila platycalyx</i> subsp. <i>pardalota</i> over Low Open Shrubland of <i>E. cuneifolia</i> , <i>Maireana pyramidata</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> over sparse tussock grassland of mixed species
VT30.1	High open Shrubland of <i>Acacia synchronicia</i> with <i>Senna glaucifolia</i> (and <i>Sclerolaena</i> spp. and other halophytes) over <i>Aristida</i> sp.
VT30.1+04	Mosiac of VT30.1 and VT4.
VT30.1+10.1	Mosiac of VT30.1 and VT10.1.
VT30.2	<i>Acacia synchronicia</i> scattered shrubs over <i>Eremophila spongiocarpa</i> , <i>Atriplex bunburyana</i> and <i>Sclerolaena cuneata</i> low shrubland to low open shrubland, over <i>Dactyloctenium radulans</i> , <i>Eragrostis pergracilis</i> and <i>Panicum decompositum</i> scattered tussock grasses
VT30.3	<i>Acacia synchronicia</i> scattered tall shrubs over <i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous), <i>Atriplex bunburyana</i> and <i>Sclerolaena cuneata</i> low open shrubland over <i>Dactyloctenium radulans</i> scattered tussock grasses

Ranges, Hills and Hillslopes

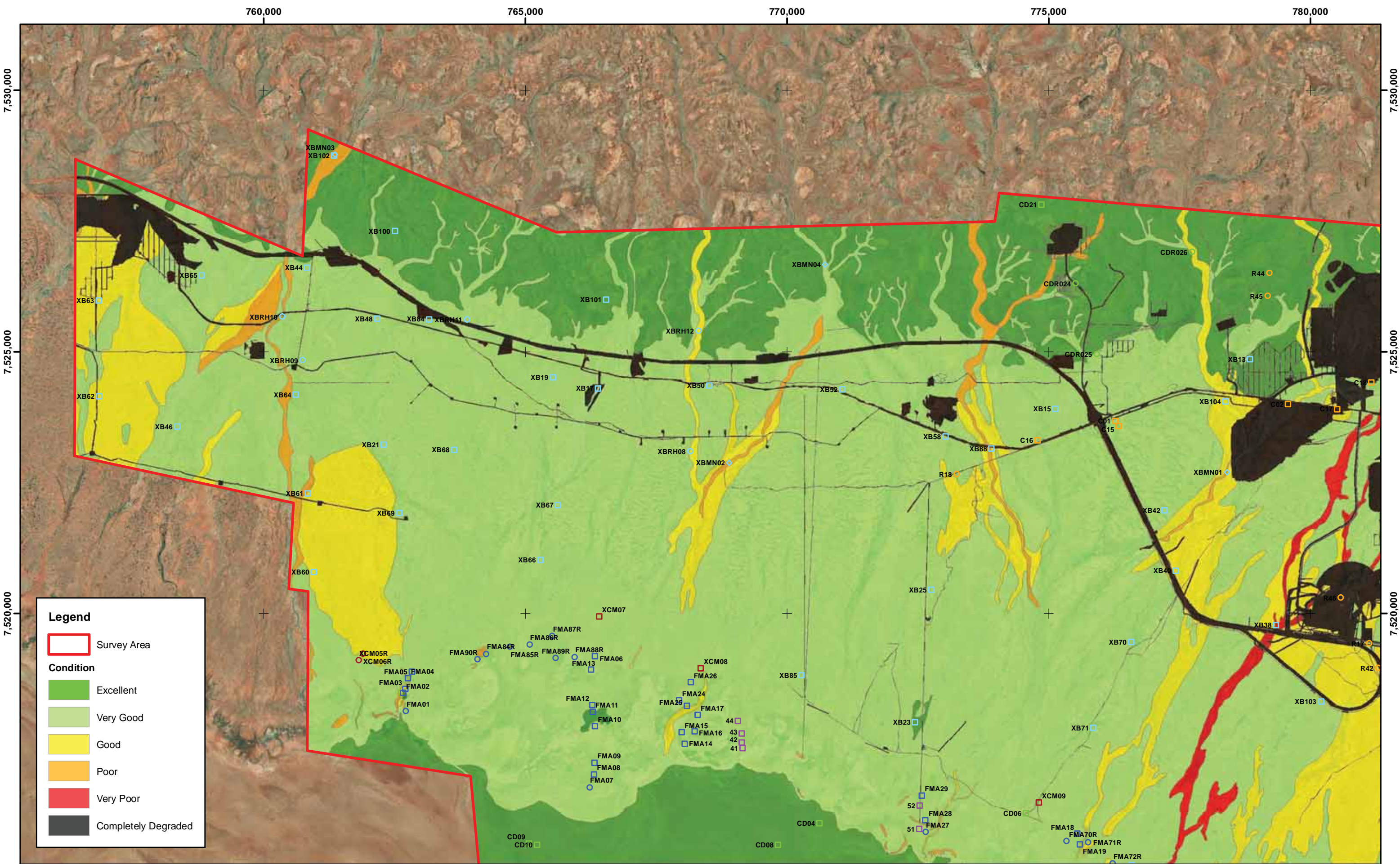
VT16	Hummock Grassland of <i>Triodia basedowii</i> with pockets of <i>Triodia epactia</i> and <i>Triodia lanigera</i> with emergent patches of <i>Eucalyptus leucophloia</i> , <i>Corymbia deserticola</i> over <i>Acacia ancistrocarpa</i> , <i>Acacia hilliana</i> , <i>Acacia acradenia</i> , <i>Acacia pyrifolia</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> over <i>Goodenia stobbsiana</i> and mixed <i>Senna</i> species.
VT17	Hummock Grassland of <i>Triodia basedowii</i> with pockets of <i>Triodia epactia</i> and <i>Triodia lanigera</i> with emergent patches of <i>Eucalyptus leucophloia</i> , <i>Corymbia deserticola</i> over <i>Acacia ancistrocarpa</i> , <i>Acacia pyrifolia</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> over <i>Goodenia stobbsiana</i> and mixed <i>Senna</i> and <i>Ptilotus</i> species.

Vegetation associated with Fortescue Marsh

VA1	<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd and T. Colmer et al. KS 1063), <i>T. auriculata</i> , <i>Muehlenbeckia florulenta</i> low closed heath over <i>Eragrostis pergracilis</i> , <i>E. tenellula</i> scattered tussock grasses and <i>Cullen cinereum</i> , <i>Nicotiana heterantha</i> , <i>Pterocaulon sphaeranthoides</i> open herbland
VA2	<i>Muehlenbeckia florulenta</i> shrubland to open heath over <i>Tecticornia indica</i> subsp. <i>bidens</i> low scattered shrubs to low open shrubland over <i>Eleocharis papillosa</i> , <i>Schoenoplectus dissachanthus</i> (very) open sedgeland with <i>Nicotiana heterantha</i> , <i>Marsilea hirsuta</i> (open) herbland
VA3	* <i>Vachellia farnesiana</i> , <i>Acacia amplex</i> open scrub over <i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd and T. Colmer et al. KS 1063), * <i>Aerva javanica</i> and <i>Cullen cinereum</i> low open shrubland over * <i>Cenchrus setiger</i> , <i>Dactyloctenium radulans</i> and * <i>C. ciliaris</i> tussock grassland
VA4	<i>Melaleuca glomerata</i> open scrub over * <i>Aerva javanica</i> , <i>Tecticornia</i> spp. low open shrubland over <i>Cleome viscosa</i> , <i>Nicotiana heterantha</i> , <i>Swainsona kingii</i> herbland
VA5	<i>Acacia synchronicia</i> , <i>Melaleuca glomerata</i> , <i>Eremophila youngii</i> subsp. <i>lepidota</i> scattered tall shrubs over <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Eremophila spongiocarpa</i> low open shrubland over <i>Sporobolus virginicus</i> , * <i>Cenchrus ciliaris</i> , <i>Dactyloctenium radulans</i> tussock grassland
VA6	<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd and J. English KS 552), <i>T. indica</i> subsp. <i>bidens</i> , <i>Muehlenbeckia florulenta</i> low open heath over <i>Eragrostis pergracilis</i> (very) open tussock grassland and <i>Cyperus bulbosus</i> scattered sedges with <i>Nicotiana heterantha</i> , <i>Swainsona kingii</i> scattered to very open herbland
VA7	<i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>T.</i> sp. Dennys Crossing (K.A. Shepherd and J. English KS 552), <i>Eremophila spongiocarpa</i> low open heath to low closed heath over <i>Eragrostis</i> spp., <i>Enneapogon</i> spp., * <i>Cenchrus</i> spp. scattered tussock with <i>Nicotiana heterantha</i> , <i>Pterocaulon sphaeranthoides</i> , <i>Gomphrena kanisii</i> scattered herbs
VA8	<i>Tecticornia auriculata</i> and <i>T.</i> sp. Dennys Crossing (K.A. Shepherd and J. English KS 552) open heath over <i>Eragrostis pergracilis</i> , <i>Chloris pectinata</i> tussock grassland and <i>Cyperus bulbosus</i> scattered sedges with <i>Swainsona kingii</i> , <i>Nicotiana heterantha</i> scattered herbs
VA9	<i>Acacia synchronicia</i> scattered tall shrubs over <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Eremophila spongiocarpa</i> low open shrubland over <i>Eragrostis pergracilis</i> , * <i>Cenchrus ciliaris</i> tussock grassland with <i>Lawrencia densiflora</i> , <i>Euphorbia australis</i> , <i>Goodenia forrestii</i> scattered herbs on brown sandy loam on low rises
VA10	<i>Acacia synchronicia</i> , <i>A. xiphophylla</i> high shrubland over <i>Eremophila</i> spp., <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Maireana pyramidata</i> scattered low shrubs over * <i>Cenchrus ciliaris</i> , <i>Eragrostis pergracilis</i> , <i>Triraphis mollis</i> very open tussock grassland and <i>Goodenia forrestii</i> , <i>Sclerolaena cornishiana</i> , <i>Stemodia grossa</i> scattered herbs
VA11	Lake bed - Lake bed likely to support annual herbs and grasses episodically

Other

	Areas cleared for mining, infrastructure and associated activities.
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Legend

Survey Area

Condition

Excellent

Very Good

Good

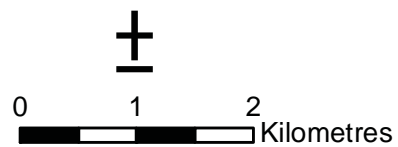
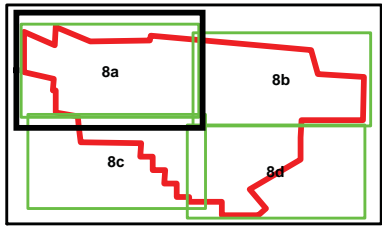
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Very Poor

Completely Degraded



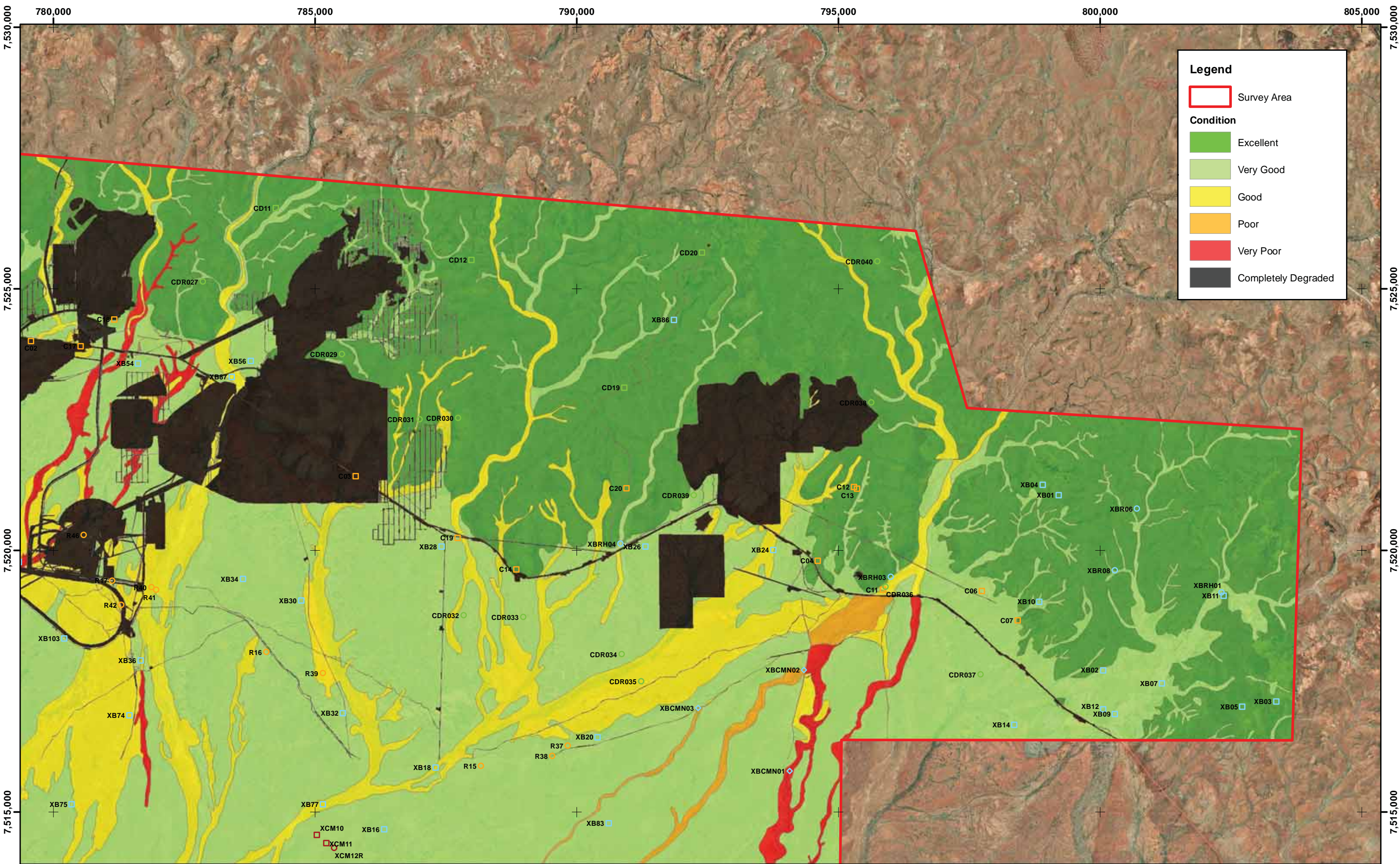
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Fortescue Metals Group Ltd		J121129
AUTHOR	DRAWN	DATE
J. Mattner	M. Mikkonen	19-09-13
SCALE	PROJECTION	
1:65,000 @ A3	GDA 94 MGA 50	



Vegetation Condition

Christmas Creek LOM Flora and Vegetation Assessment

FIGURE **8a**



Legend

Survey Area

Condition

Excellent

Very Good

Good

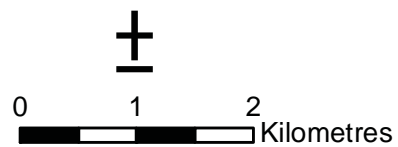
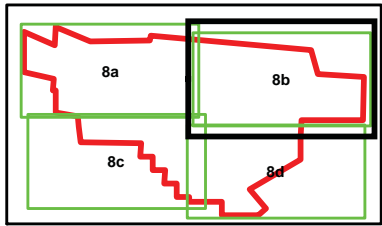
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Very Poor

Completely Degraded



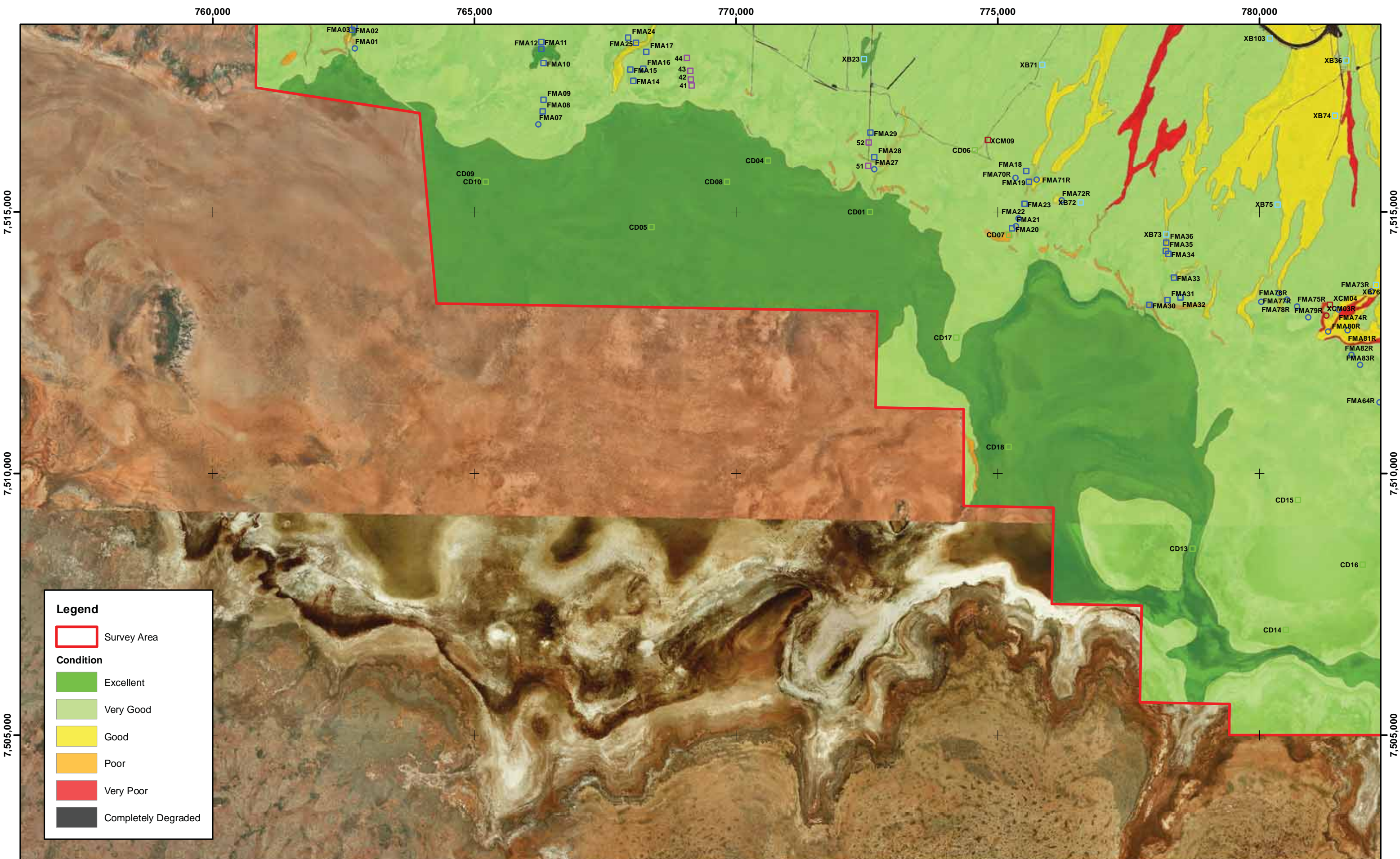
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Fortescue Metals Group Ltd		J121129
AUTHOR	DRAWN	DATE
J. Mattner	M. Mikkonen	19-09-13
SCALE	PROJECTION	
1:65,000 @ A3	GDA 94 MGA 50	



Vegetation Condition

Christmas Creek LOM Flora and Vegetation Assessment

FIGURE 8b



Legend

Survey Area

Condition

Excellent

Very Good

Good

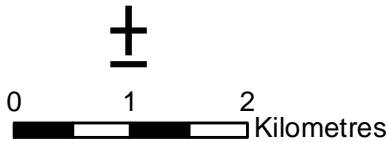
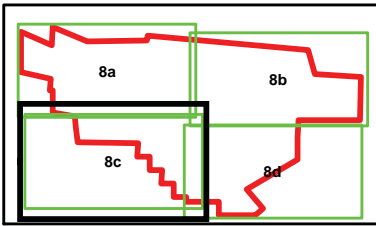
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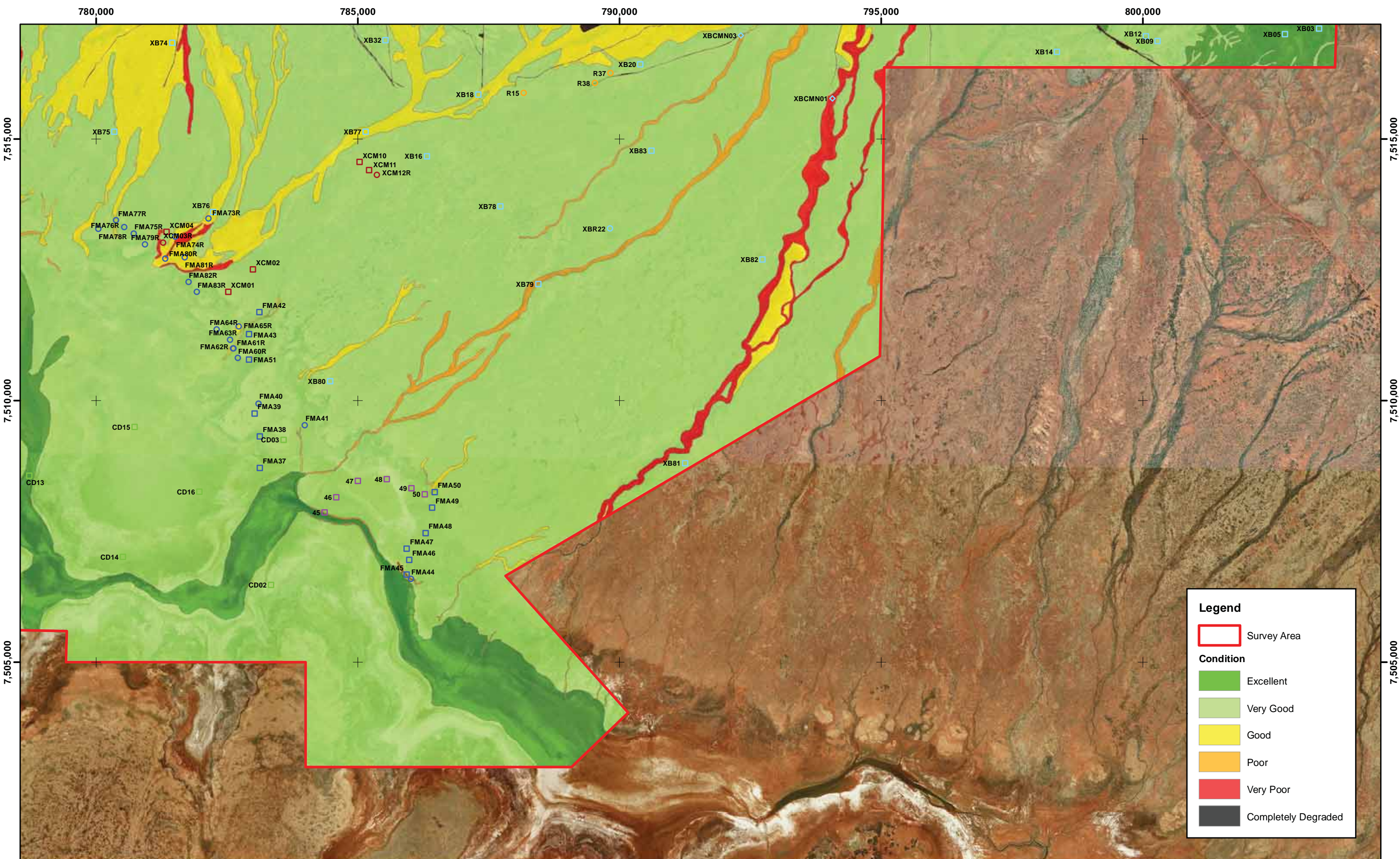
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J. Mattner	M. Mikkonen	19-09-13
SCALE	PROJECTION	
1:65,000 @ A3	GDA 94 MGA 50	



Vegetation Condition
Christmas Creek LOM Flora and
Vegetation Assessment



Legend

Survey Area

Condition

Excellent

Very Good

Good

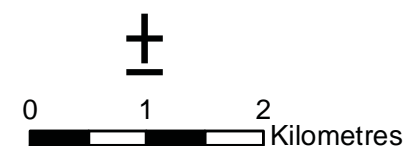
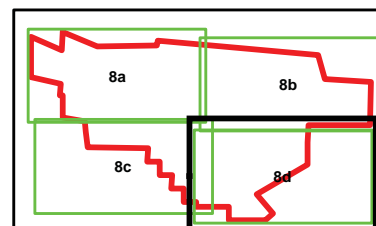
Poor

Very Poor

Completely Degraded



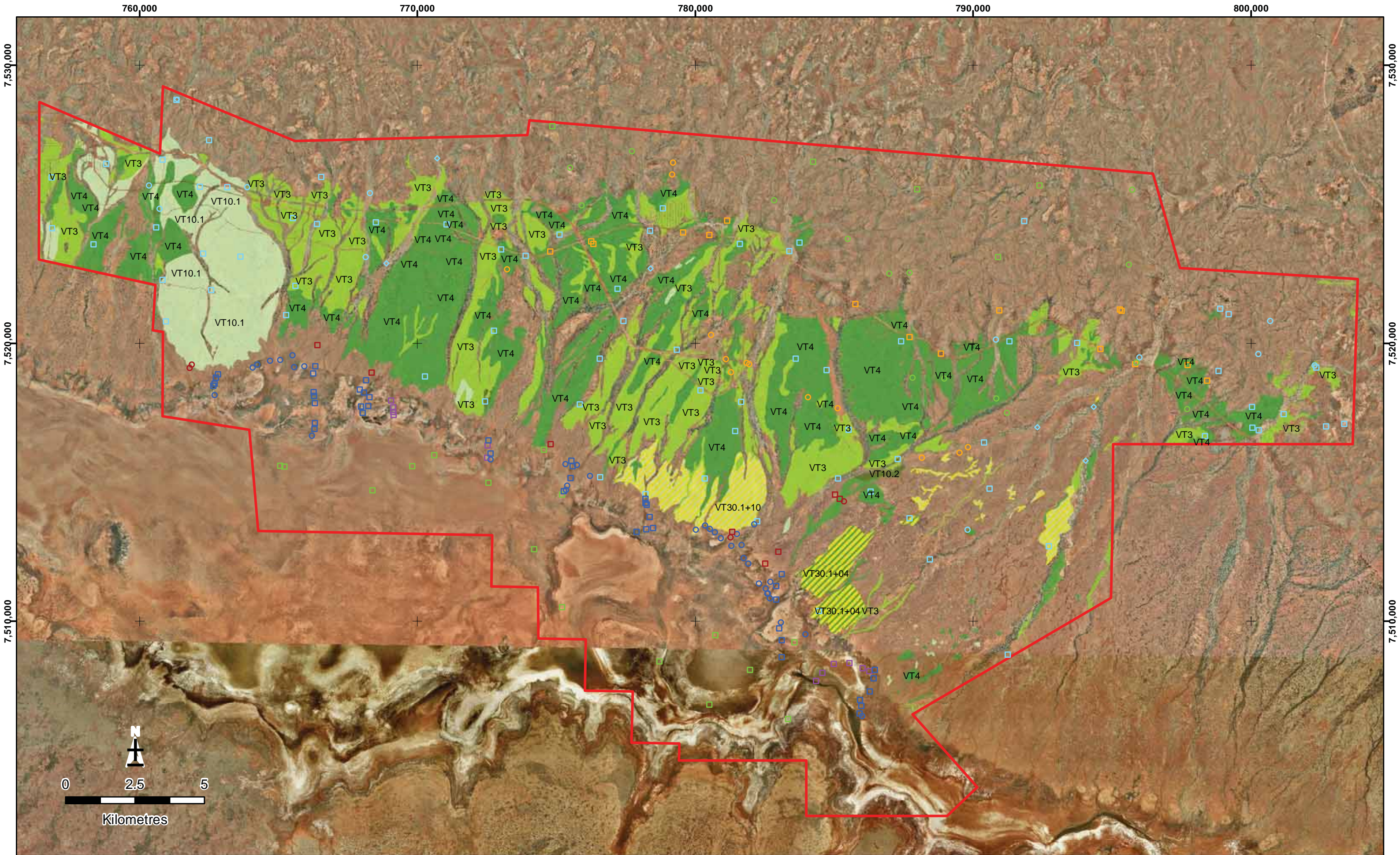
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AUTHOR	J. Mattner	DRAWN	M. Mikkonen
SCALE	1:65,000 @ A3	DATE	19-09-13
		PROJECTION	GDA 94 MGA 50



Vegetation Condition

Christmas Creek LOM Flora and
Vegetation Assessment

FIGURE **8d**



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:120,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	20-09-13

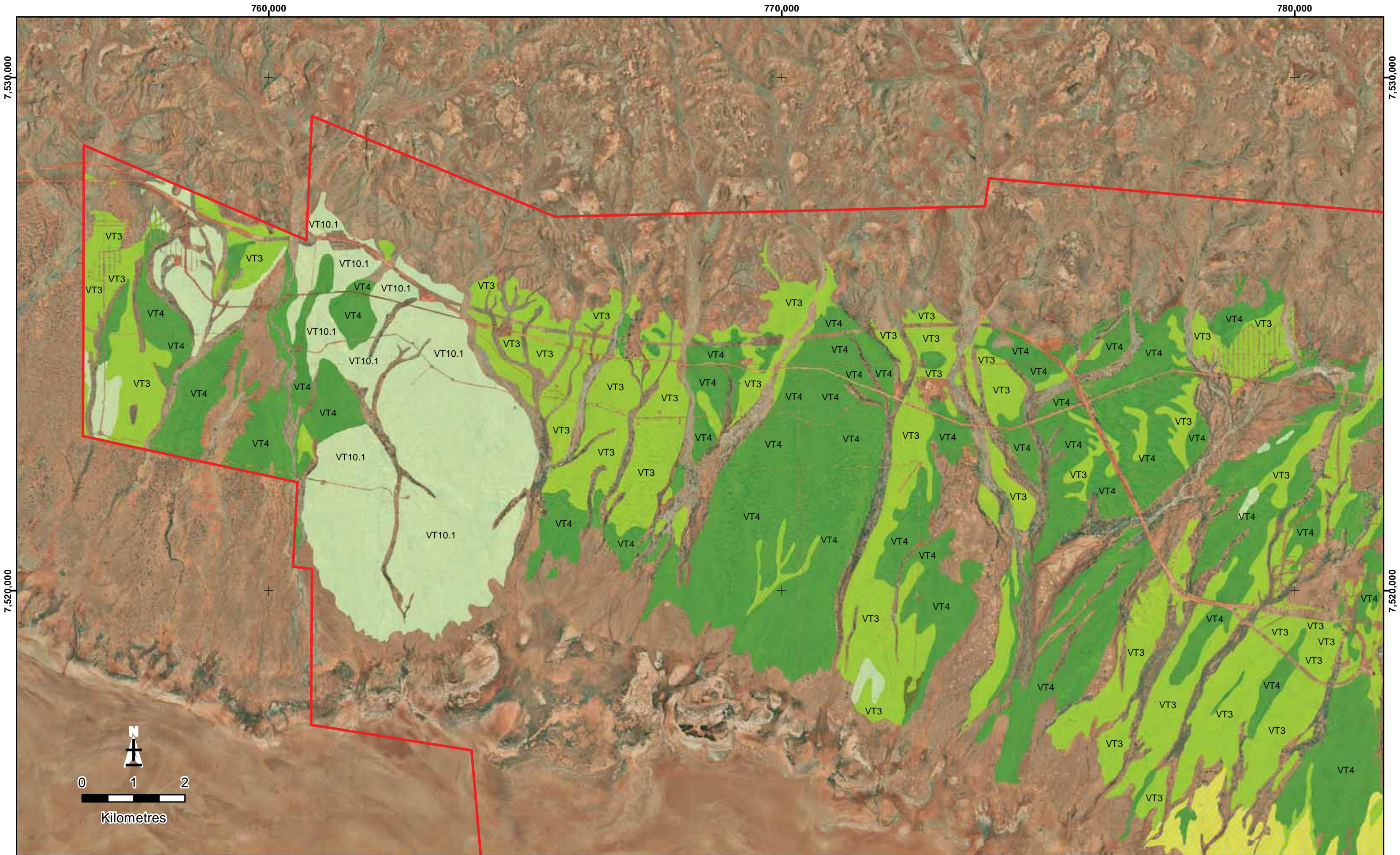
Legend

Christmas Creek Life of Mine Survey Area

See Figure 7 for Vegetation Type Legend

Potential Sheetflow-Dependent Mulga

Christmas Creek LOM Flora & Vegetation Assessment



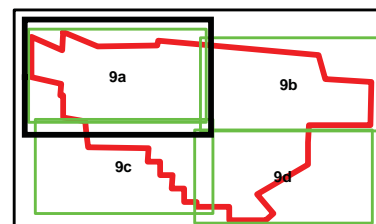
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AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	20-09-13

Legend

 Christmas Creek Life of Mine Survey Area

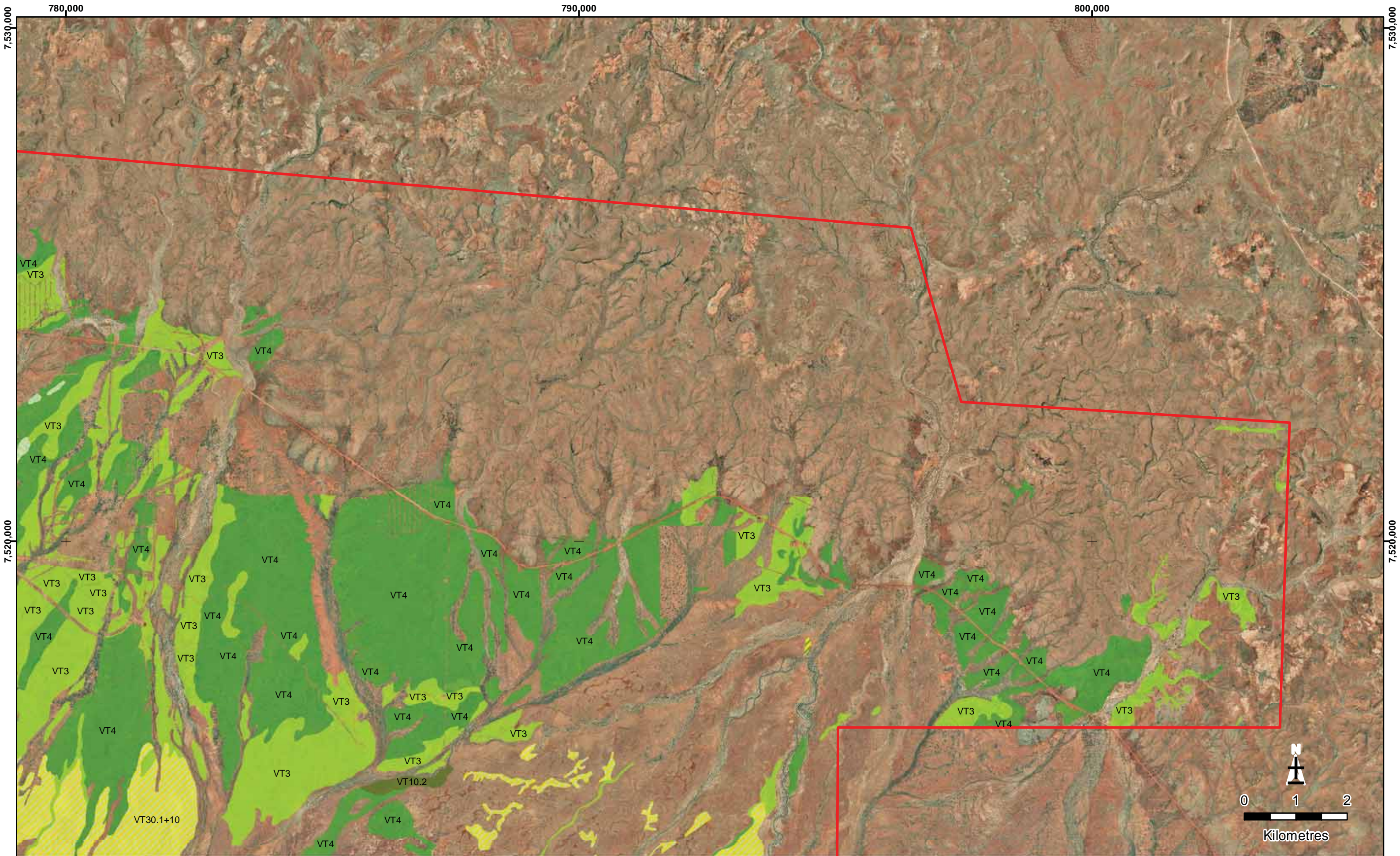
See Figure 7 for Vegetation Type Legend



Potential Sheetflow-Dependent Mulga

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **9a**



CLIENT
Fortescue Metals Group Ltd

AUTHOR
J. Mattner

SCALE
1:65,000 @ A3

DRAWN
M. Mikkonen

PROJECTION
GDA 94 MGA 50

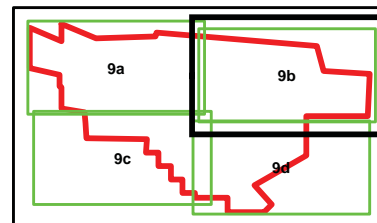
JOB NO.
J121129

DATE
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Legend

Christmas Creek Life of Mine Survey Area

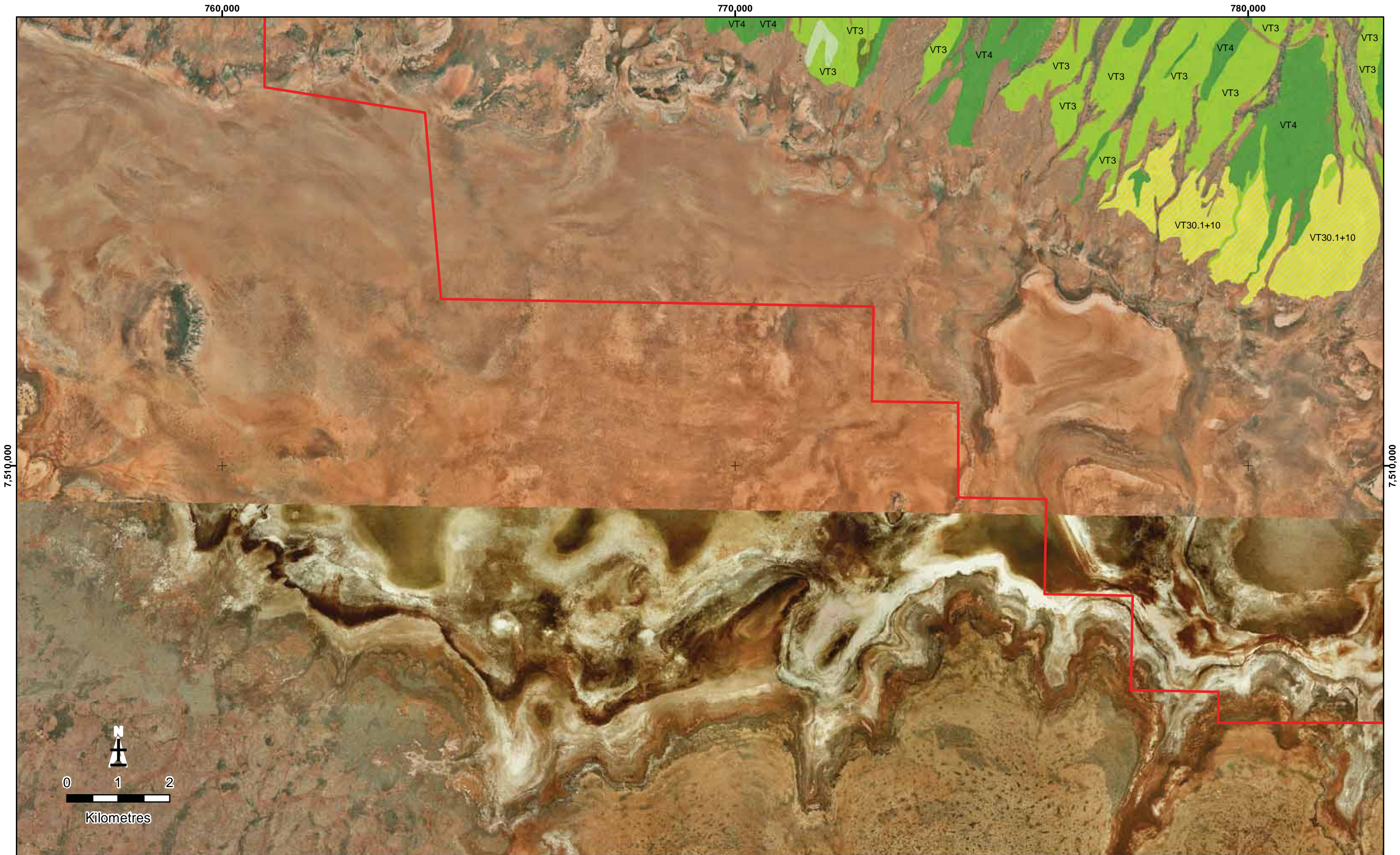
See Figure 7 for Vegetation Type Legend



Potential Sheetflow-Dependent Mulga

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **9b**



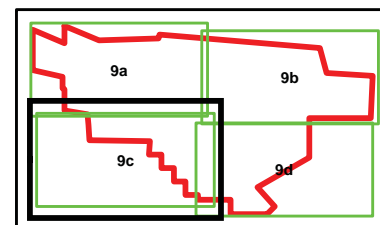
CLIENT	Fortescue Metals Group Ltd		
AUTHOR	J. Mattner	DRAWN	M. Mikkonen
SCALE	1:65,000 @ A3	PROJECTION	GDA 94 MGA 50

JOB NO.
J121129
DATE
20-09-13

Legend

 Christmas Creek Life of Mine Survey Area

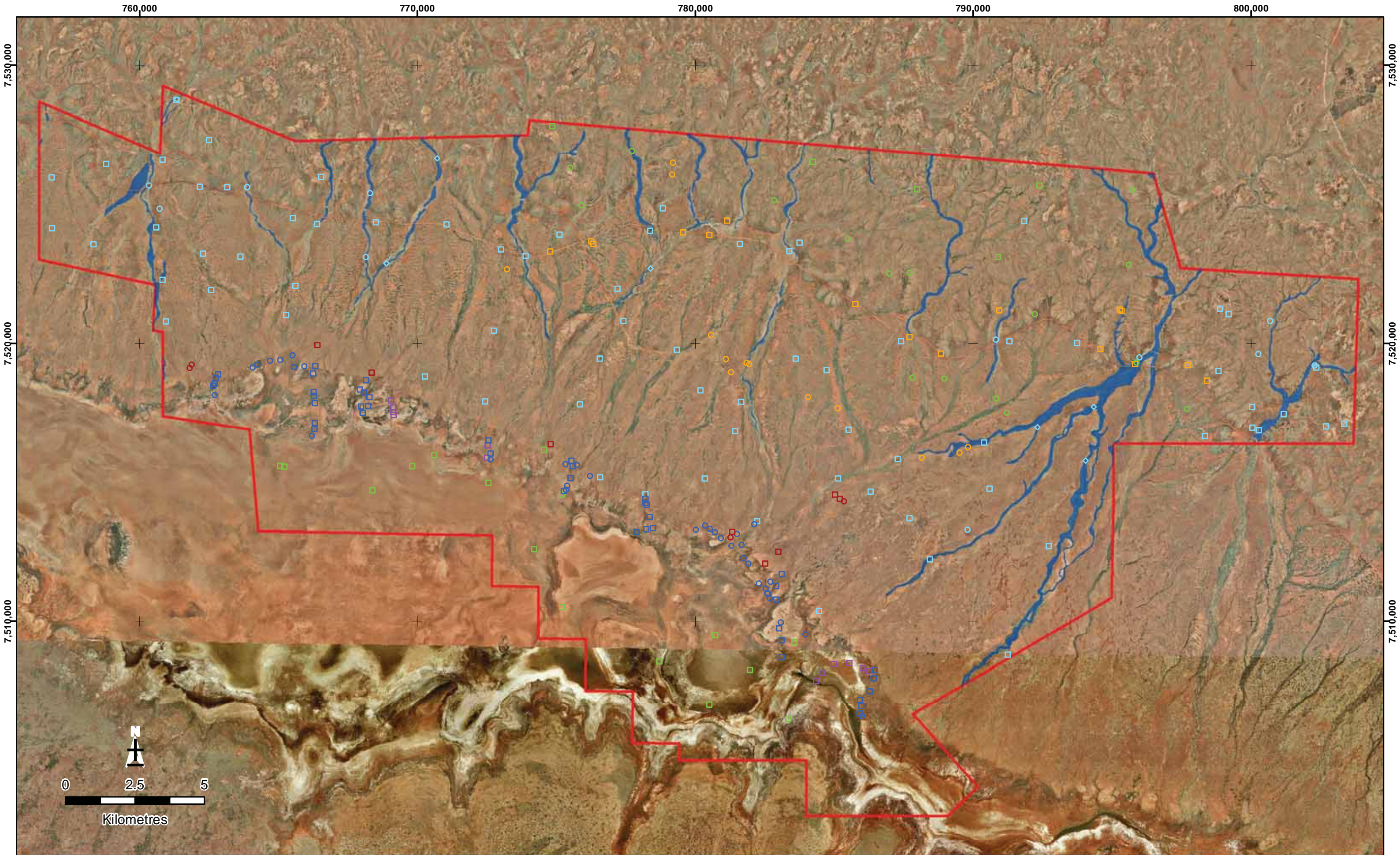
See Figure 7 for Vegetation Type Legend



Potential Sheetflow-Dependent Mulga

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **9c**



CLIENT	Fortescue Metals Group Ltd
AUTHOR	J. Mattner
SCALE	1:120,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	02-12-13

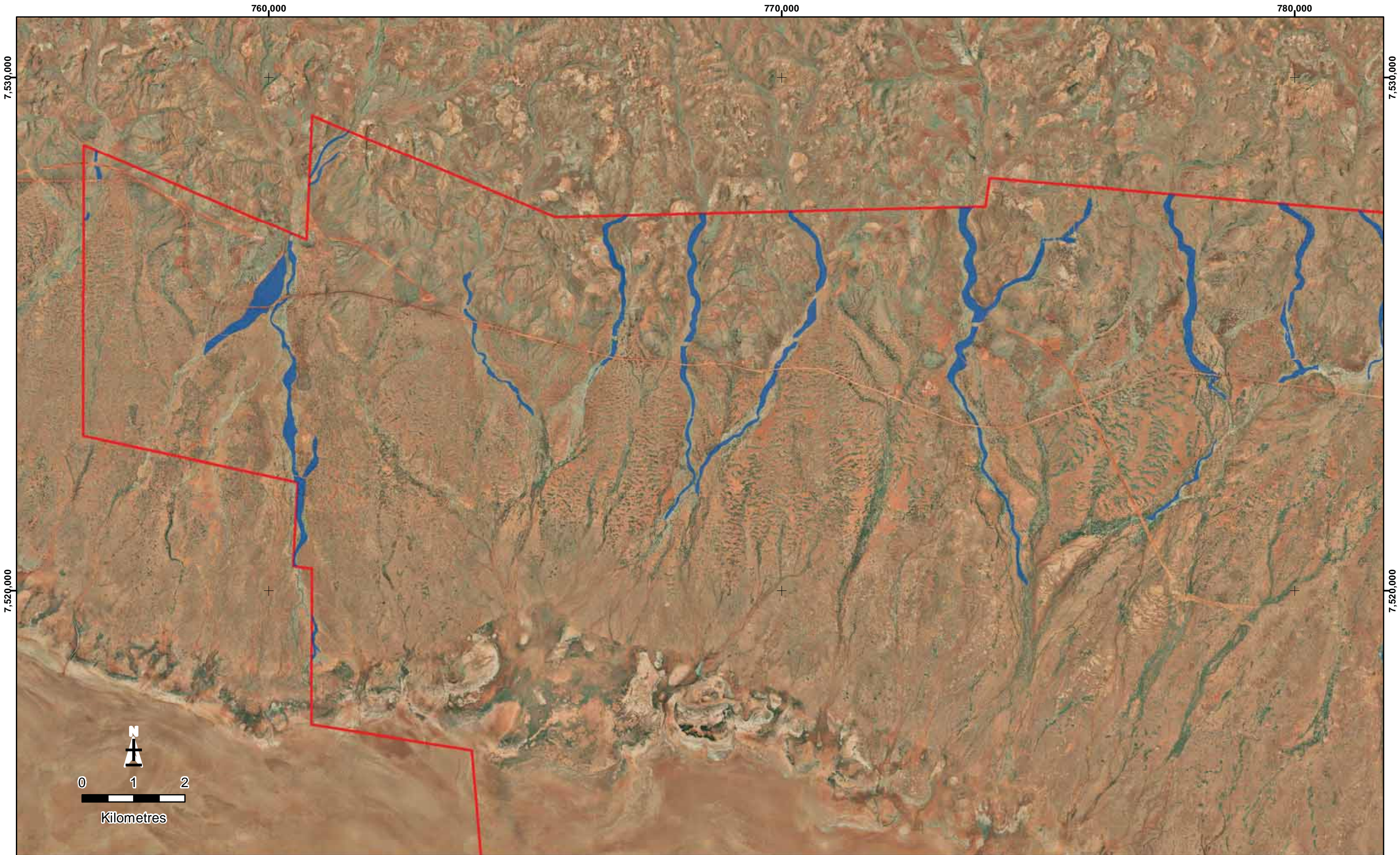
Legend

Christmas Creek Life of Mine Survey Area

See Figure 7 for Vegetation Type Legend

Potential Groundwater Dependent Vegetation

Christmas Creek LOM Flora & Vegetation Assessment



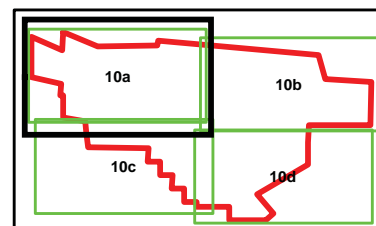
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AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.	J121129
DATE	02-12-13

Legend

 Christmas Creek Life of Mine Survey Area

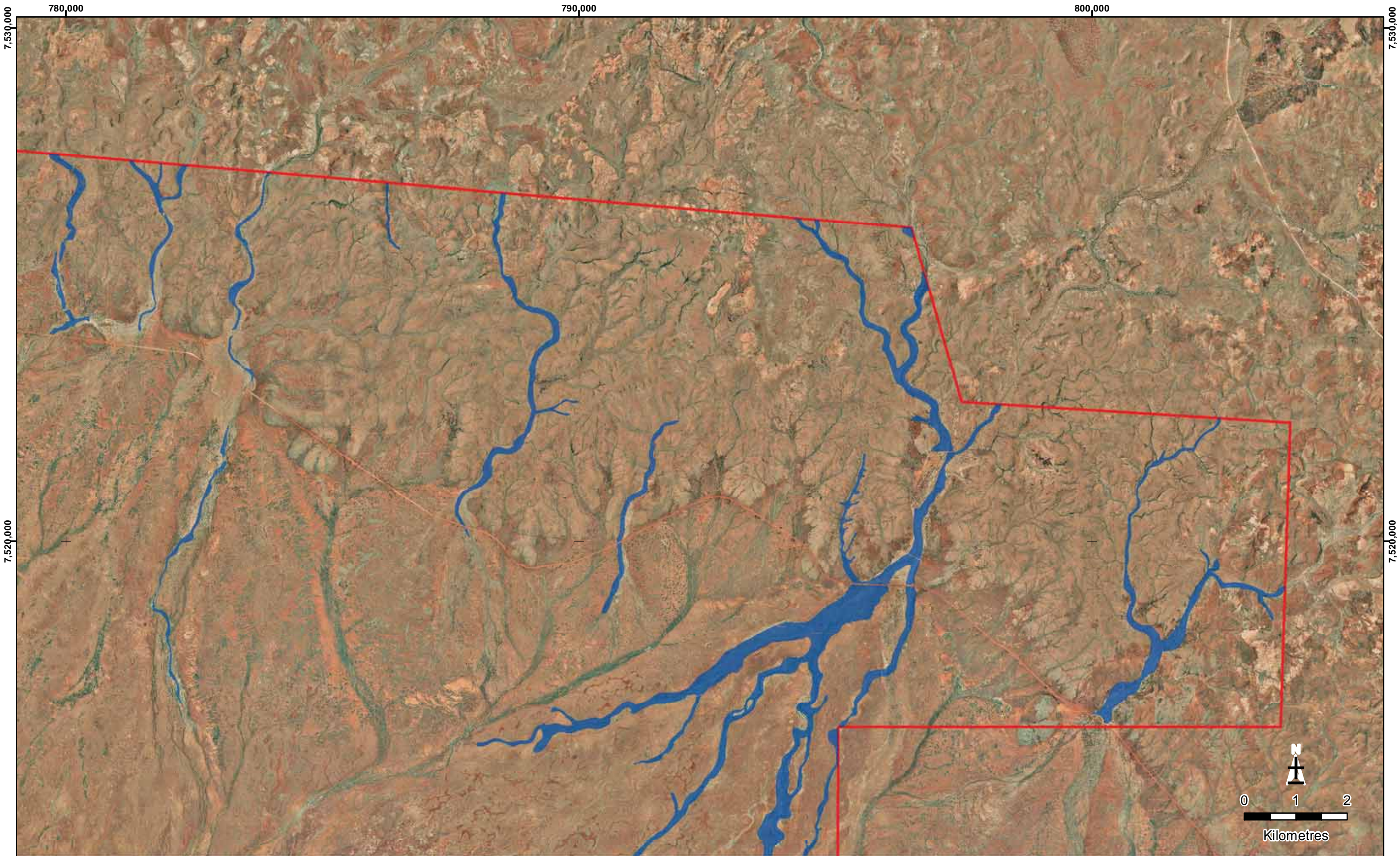
See Figure 7 for Vegetation Type Legend



Potential Groundwater Dependent Vegetation

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **10a**



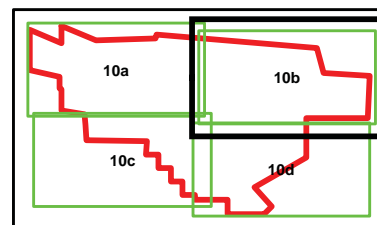
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 Fortescue Metals Group Ltd
AUTHOR
 J. Mattner
SCALE
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DRAWN
 M. Mikkonen
PROJECTION
 GDA 94 MGA 50

JOB NO.
 J121129
DATE
 02-12-13

Legend

Christmas Creek Life of Mine Survey Area

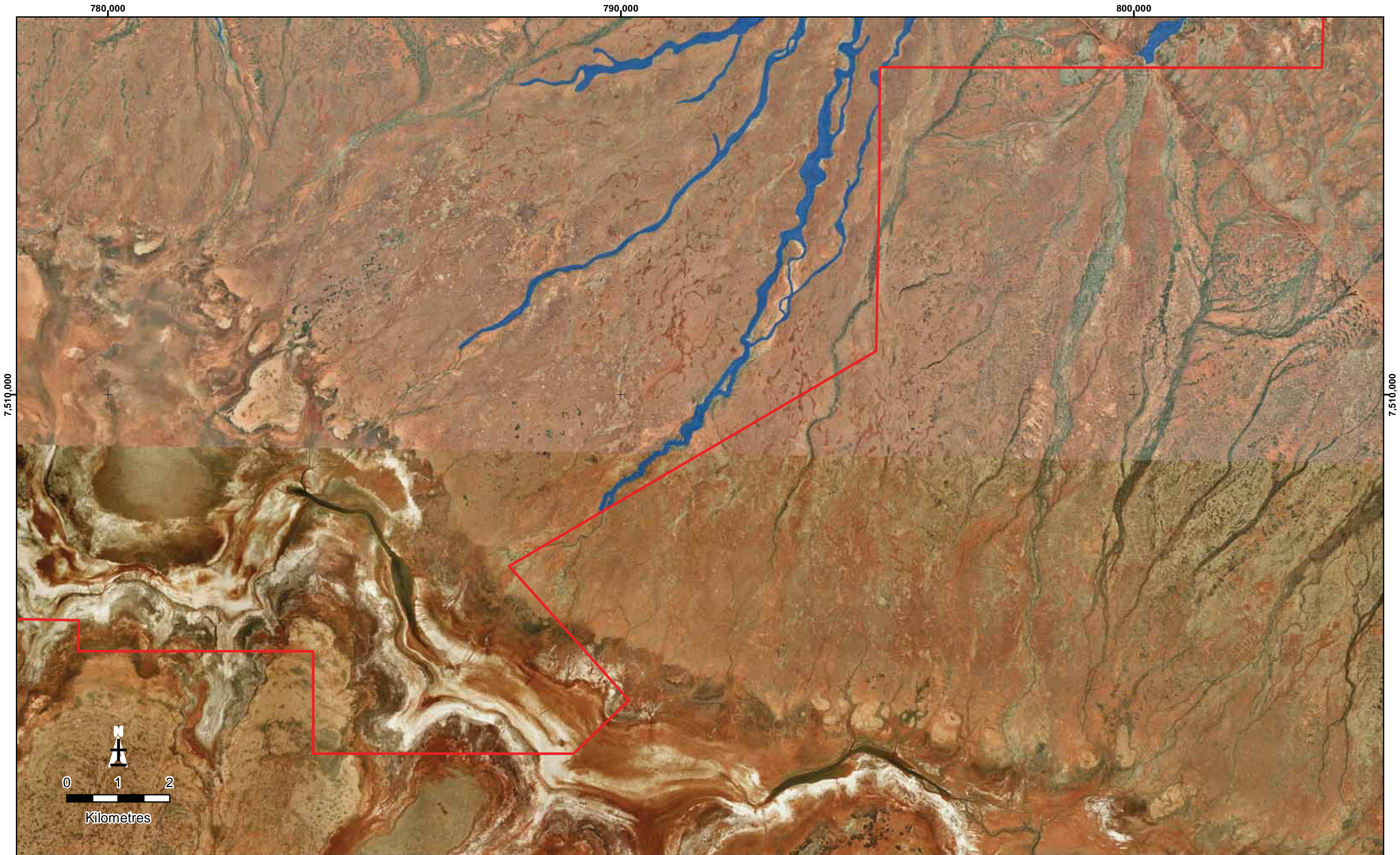
See Figure 7 for Vegetation Type Legend



Potential Groundwater Dependent Vegetation

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **10b**



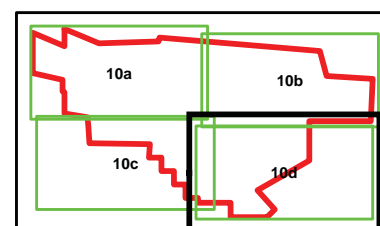
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AUTHOR	J. Mattner
SCALE	1:65,000 @ A3
DRAWN	M. Mikkonen
PROJECTION	GDA 94 MGA 50

JOB NO.
J121129
DATE
02-12-13

Legend

 Christmas Creek Life of Mine Survey Area

See Figure 7 for Vegetation Type Legend

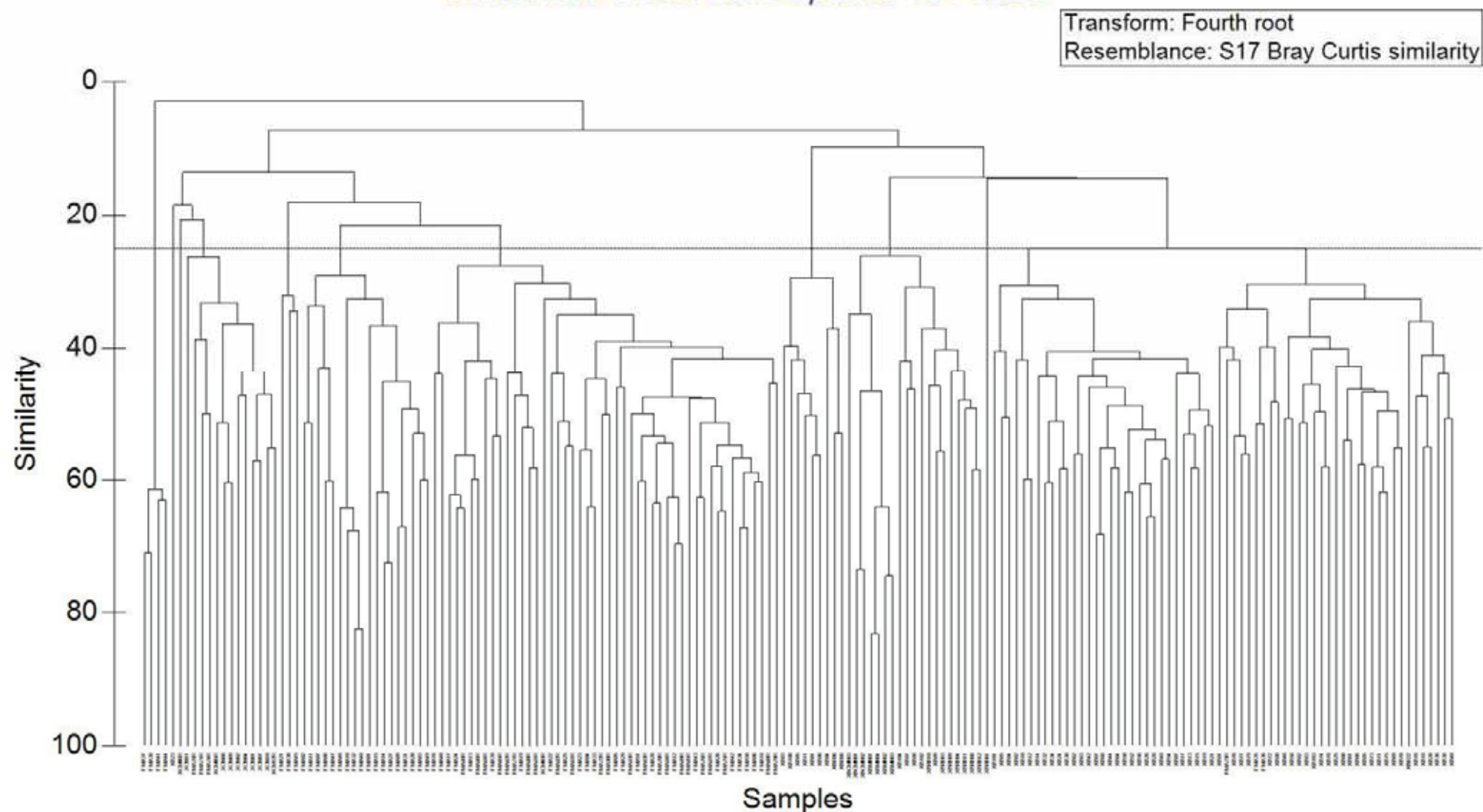


Potential Groundwater Dependent Vegetation

Christmas Creek LOM Flora & Vegetation Assessment

FIGURE **10d**

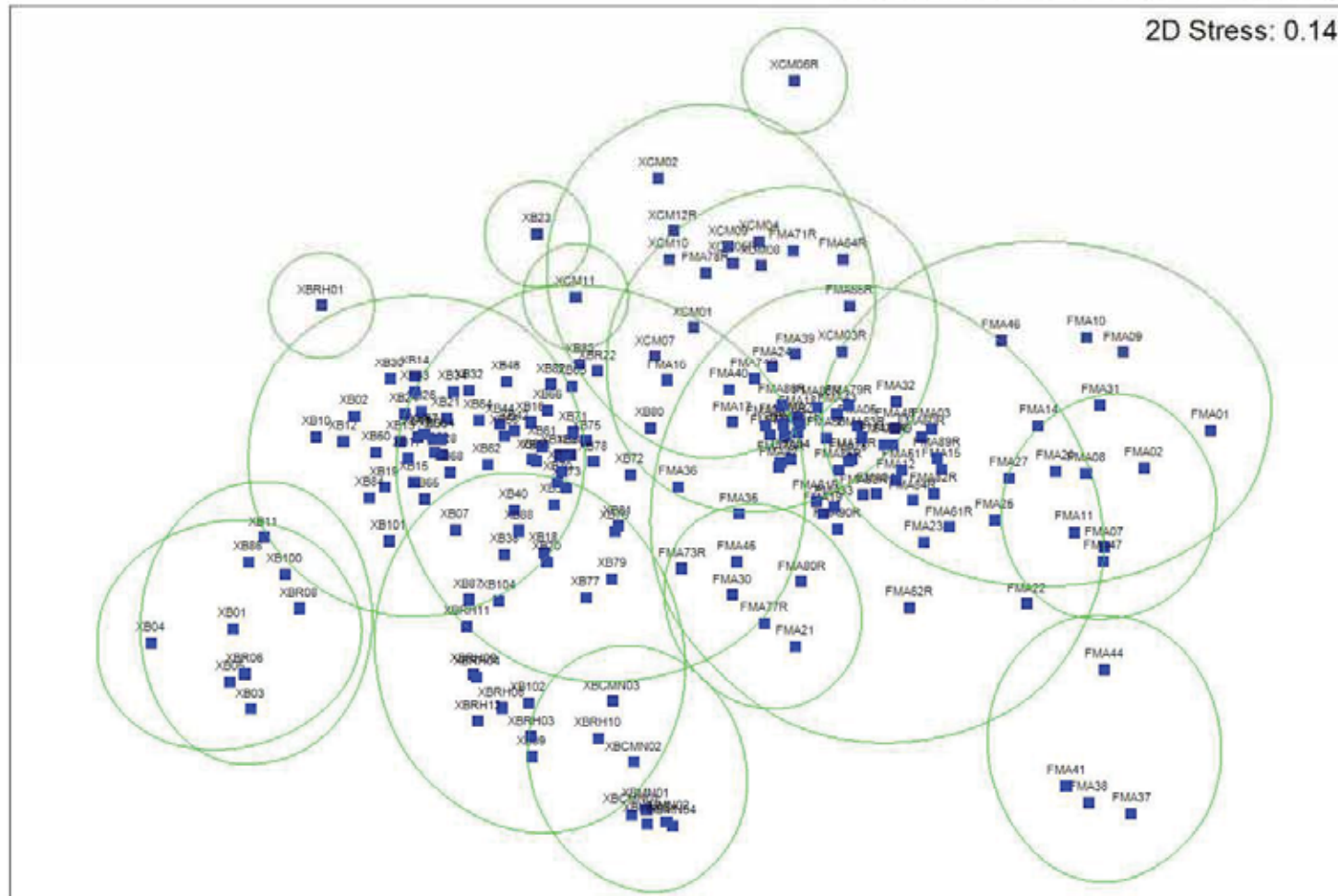
Figure 11a: Dendrogram of Sites Assessed in 2011 to 2013
Christmas Creek LoM Update 181 Sites

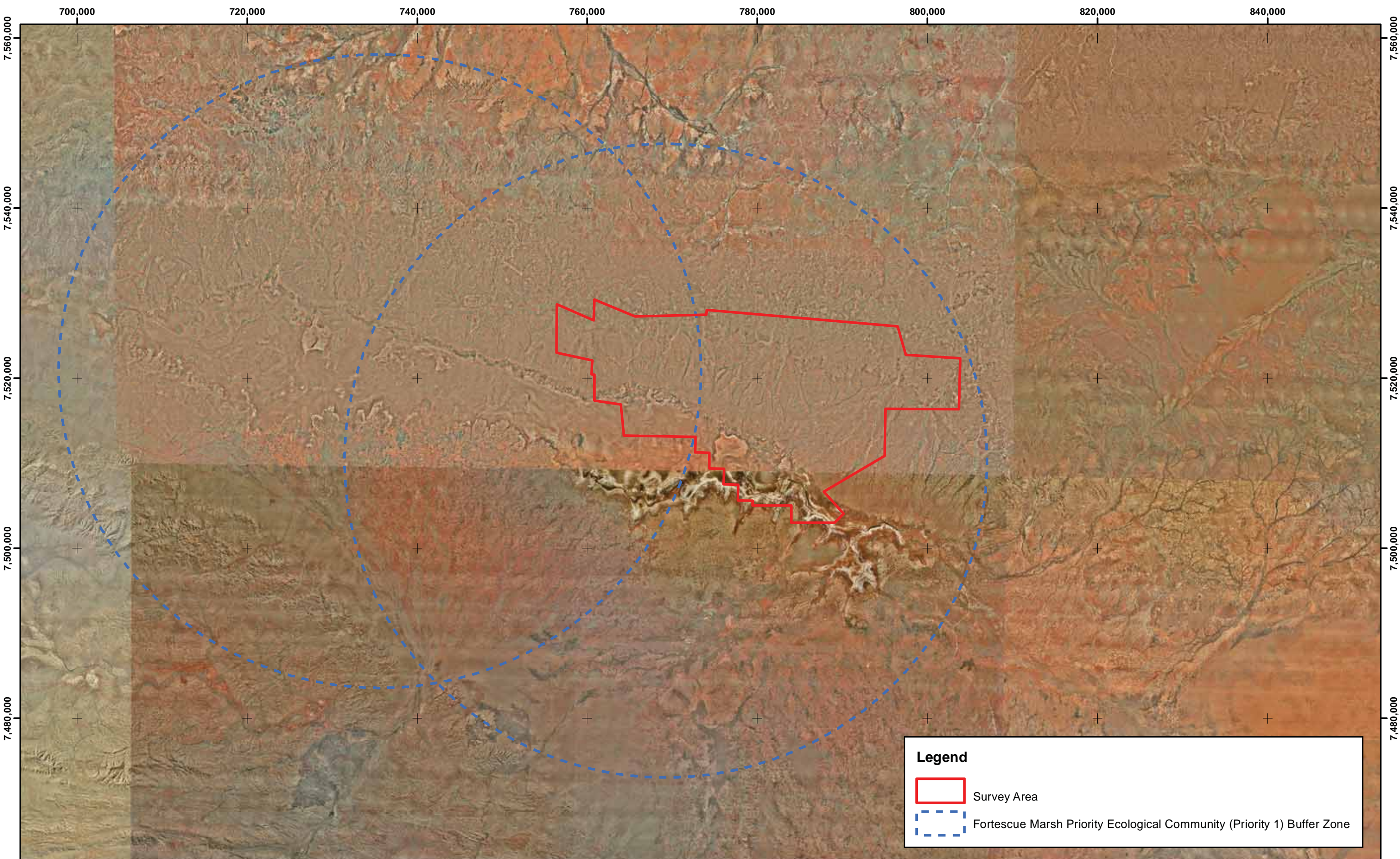


Christmas Creek LoM Update 181 Sltes

Resemblance: S17 Bray Curtis similarity

Similarity
30





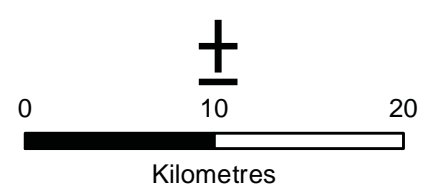
Legend

Survey Area

Fortescue Marsh Priority Ecological Community (Priority 1) Buffer Zone



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Fortescue Metals Group Ltd		J121129
AUTHOR	DRAWN	DATE
J. Mattner	M. Mikkonen	17-09-13
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1:400,000 @ A3	GDA 94 MGA 50	



Location of Survey Area in Relation to Fortescue Marsh PEC and Buffer Zone

Christmas Creek LOM Flora and Vegetation Assessment

APPENDIX A

DEFINITION OF DECLARED RARE / PRIORITY / THREATENED FLORA AND SIGNIFICANT FLORA POTENTIALLY OCCURRING IN THE SURVEY AREA

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX A

DEFINITIONS OF DECLARED RARE / PRIORITY / THREATENED FLORA AND
SIGNIFICANT SPECIES POTENTIALLY OCCURRING IN THE SURVEY AREA

A1: Categories of Declared Rare and Priority Flora

Conservation Code	Category
T	<p>Threatened Flora (Declared Rare Flora – Extant)</p> <p>Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 of the Wildlife Conservation (Rare Flora) Notice under the <i>Wildlife Conservation Act 1950</i>).</p> <p>Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria:</p> <ul style="list-style-type: none"> • CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild • EN: Endangered – considered to be facing a very high risk of extinction in the wild • VU: Vulnerable – considered to be facing a high risk of extinction in the wild
X	<p>Presumed Extinct Flora (Declared Rare Flora – Extant)</p> <p>Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 of the Wildlife Conservation (Rare Flora) Notice under the Wildlife Conservation Act 1950).</p> <p>Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.</p>
P1	<p>Priority One: Poorly - known taxa</p> <p>Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.</p>
P2	<p>Priority Two: Poorly - known taxa</p> <p>Taxa which are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown Land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known</p>

Conservation Code	Category
	threatening processes.
P3	<p>Priority Three: Poorly - known taxa</p> <p>Taxa which are known from collections or sight records from several localities not under imminent threat, or few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them</p>
P4	<p>Priority Four: Rare, Near Threatened and other taxa in need of monitoring</p> <p>a. Rare. Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.</p> <p>b. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>c. Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
P5	<p>Priority Five: Conservation Dependent taxa</p> <p>Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years.</p>

Source: Department of Environment and Conservation (2010). *Western Australian Flora Conservation Codes*. Department of Environment and Conservation, Perth, Western Australia. Online: <http://florabase.calm.wa.gov.au>, accessed September 2013.

A2: Categories of Threatened Flora Species

Category Code	Category
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which are known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or 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.
CE	Critically Endangered Taxa which at a particular time, are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	Endangered Taxa which are not critically endangered and are facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
V	Vulnerable Taxa which are not critically endangered or endangered and are facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent Taxa which at a particular time if, at that time, 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 within a period of 5 years.

Source: *Environment Protection and Biodiversity Conservation Act 1999*

A3: Significant Flora Species Potentially Occurring in the Survey Area

Priority Taxon	Status	Habitat Preference (WAH 2011)
<i>Acacia aphanoclada</i>	P1	Skeletal stony soils. Rocky hills, ridges & rises.
<i>Acacia cyperophylla</i> var. <i>omearana</i>	P1	Stony & gritty alluvium along drainage lines.
<i>Acacia effusa</i>	P3	Stony red loam. Scree slopes of low ranges.
<i>Acacia fecunda</i>	P3	Grey-red skeletal soil. Along shallow creeks and drainage lines, hills.
<i>Acacia</i> sp. Nullagine (B.R. Maslin 4955)	P1	Rocky clay. Low-lying areas between rocky hills
<i>Acacia subtiliformis</i>	P3	Rocky calcrete plateaus
<i>Amaranthus centralis</i>	P3	Low in the landscape, alluvial flats. River banks. Mulga woodlands
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P1	Hard pan plains. Mulga woodlands.
<i>Atriplex spinulosa</i>	P1	Creek banks. Clay flats. Foot slopes of low hills. Saline areas.
<i>Atriplex flabelliformis</i>	P3	Clay loam, loam. Saline flats or marshes
<i>Brachyscome</i> sp. Wanna Munna Flats (S. van Leeuwen 4662)	P1	Clayey loams and loamy plains. Mulga woodlands.
<i>Brunonia</i> sp. Long Hairs (D.E. Symon 2440)	P1	Along creeklines. Floodplains.
<i>Bulbostylis burbridgeae</i>	P4	Granitic soils. Granite outcrops. Cliff bases.
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	P3	Skeletal soils over ironstone. Summits. Base of cliffs. Rocky outcrops.
<i>Eremophila pilosa</i>	P1	Red-brown clay loams on sandy plains
<i>Eremophila spongicarpa</i>	P1	Weakly saline alluvial plain on margins of marsh.
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	P4	Stony red sandy loam. Flats plains, floodplains, semi-saline and clay
<i>Glycine falcata</i>	P3	Black clayey sand. Along drainage depressions in crabhole plains, river floodplains.
<i>Goodenia lyrata</i>	P1	Red sandy loam. Near claypan.
<i>Goodenia nuda</i>	P4	Flood plains. Drainage lines.
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	Low undulating plain, swampy plains.
<i>Helichrysum oligochaetum</i>	P1	Red clay. Alluvial plains.
<i>Indigofera ixocarpa</i>	P2	Skeletal red soils over massive ironstone.
<i>Iotasperma sessilifolium</i>	P3	Cracking clay. Black loam. Edges of waterholes, plains.
<i>Lepidium catapycnon</i>	DRF	Skeletal soils. Hillsides.

Priority Taxon	Status	Habitat Preference (WAH 2011)
<i>Myriocephalus scalpellus</i>	P1	Clay. Depression on flood plain.
<i>Nicotiana heterantha</i>	P1	Black clay. Seasonally wet flats
<i>Nicotiana umbratica</i>	P3	Rocky outcrops
<i>Peplidium</i> sp. Fortescue Marsh (S. van Leeuwen 4865)	P1	Saline flats
<i>Ptilotus mollis</i>	P4	Stony hills and screes
<i>Phyllanthus aridus</i>	P3	Sandstone, gravel, red sand.
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	P3	Clay pans. Mulga plains
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3	Creeks and rocky hills with stony soils
<i>Rhynchosia bungarensis</i>	P4	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	P3	Skeletal red soils pockets. Steep slope.
<i>Stemodia</i> sp. Battle Hill (A.L. Payne 1006)	P1	Cracking clay. Flood plain.
<i>Stylidium weeliwolli</i>	P2	Gritty sand soil, sandy clay. Edge of watercourses.
<i>Tecticornia globulifera</i> (formerly <i>T. sp.</i> Fortescue Marsh)	P1	Moderately saline flats, red-brown gritty clay
<i>Tecticornia medusa</i> (formerly <i>T. sp.</i> Roy Hill)	P3	Floodplains. Dry lake beds. Saline lake edges
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer <i>et al.</i> KS 1063)	P1	Plains. Salt flats
<i>Teucrium pilbaranum</i>	P1	Crab hole plain in a river floodplain, margin of calcrete table
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	P3	Claypans and grass plains
<i>Tribulus minutus</i>	P1	Stony rises. Calcrete.
<i>Triodia triticoides</i>	P1	Sandstone hills

Source: Department of Environment and Conservation Database Search (February 2011)

APPENDIX B

DEFINITION OF THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX B

DEFINITIONS OF THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

B1: Definitions of Threatened Ecological Communities

Presumed Totally Destroyed (PD)

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant **and either** of the following applies (A or B);

- A) Records within the last 50 years have not been confirmed despite thorough searches or known or likely habitats **or**
- B) All occurrences recorded within the last 50 years have since been destroyed.

Critically Endangered (CR)

An ecological community will be listed as **Critically Endangered** when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and **either or both** of the following apply (i or ii)
 - i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 5 years)
 - ii) modification throughout its range is continuing such that in the immediate future (within approximately 5 years) the community is unlikely to be capable of being substantially rehabilitated.
- B) Current distribution is limited, and **one or more** of the following apply (i, ii or iii):
 - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 5 years)
 - ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
 - iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes

- C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the immediate future (within approximately 5 years)

Endangered (EN)

An ecological community will be listed as **Endangered** when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 70% and **either or both** of the following apply (i or ii)
- i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term (within approximately 10 years)
 - ii) modification throughout its range is continuing such that in the short term future (within approximately 10 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
- B) Current distribution is limited, and **one or more** of the following apply (i, ii or iii):
- i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 10 years)
 - ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
 - iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes
- C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the short term future (within approximately 10 years).

Vulnerable (VU)

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 in the medium to long term future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

- A) The ecological community exists largely as modified occurrences which are likely to be capable of being substantially restored or rehabilitated.
- B) The ecological community can be modified or destroyed and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

- C) The ecological community may still be 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.

Source: Department of Environment and Conservation (2010). *Definitions, Categories and Criteria for Threatened and Priority Ecological Communities*. Department of Environment and Conservation, Perth, Western Australia. Online: www.naturebase.net/

B2: Definitions of Priority Ecological Communities

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

Priority One: Poorly known ecological communities Ecological communities 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: Poorly known ecological communities. 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: Poorly known ecological communities

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or;
- (ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
- (iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: 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.

- (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.
- (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.
- (c) Ecological communities that have been removed from the list of threatened communities during the past five years.

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

Source: Department of Environment and Conservation (2010). *Definitions, Categories and Criteria for Threatened and Priority Ecological Communities*. Department of Environment and Conservation, Perth, Western Australia. Online: www.naturebase.net/

APPENDIX C

ENVIRONMENTAL WEEDS AND DECLARED PLANT CATEGORIES AND INTRODUCED FLORA POTENTIALLY OCCURRING IN THE SURVEY AREA

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX C

ENVIRONMENTAL WEEDS AND DECLARED PLANT CATEGORIES AND INTRODUCED FLORA POTENTIALLY OCCURRING IN THE SURVEY AREA

C1: Criteria used for Ranking Environmental Weeds

The Environmental Weed Strategy for Western Australia (CALM 1999) contains criteria for the assessment and ranking of weeds in terms of their environmental impact on biodiversity. These criteria are as follows:

- **Invasiveness** – ability to invade bushland in good to excellent condition or ability to invade waterways. (Score as yes or no).
- **Distribution** – wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world. (Score as yes or no).
- **Environmental Impacts** – ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community. (Score as yes or no).

The rating of each weed is determined by the following scoring system:

- **High** - a weed species would have to score yes for all three criteria. Rating a weed species as high would indicate prioritising this weed for control and/or research i.e. prioritising funding to it.
- **Moderate** - a weed species would have to score yes for two of the above criteria. Rating a weed species as moderate would indicate that control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
- **Mild** – a weed species scoring one of the criteria. A mild rating would indicate monitoring of the weed and control where appropriate.
- **Low** – a weed species would score none of the criteria. A low ranking would mean that this species would require a low level of monitoring.

Source: Department of Conservation and Land Management (1999). *Environmental Weed Strategy for Western Australia*. Department of Conservation and Land Management, Perth, Western Australia.

C2: Standard Meanings of Declared Plant Categories

P1

Prohibits movement.

The movement of plants or their seeds is prohibited within the State.

This prohibits the movement of contaminated machinery and produce including livestock and fodder.

P2

Aim is to eradicate infestation.

Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.

P3

Aims to control infestation by reducing area and/or density of infestation.

The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery.

Treat to destroy and prevent seed set all plants:

- * Within 50m inside of the boundaries of the infestation;
- * within 50m of roads and high water mark on waterways;
- * within 50m of sheds, stock yards and houses.

Treatment must be done prior to seed set each year.

Properties with less than 20ha of infestation must treat the entire infestation.

Additional areas may be ordered to be treated.

P4

Aims to prevent infestation spreading beyond existing boundaries of infestation

The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery.

Treat to destroy and prevent seed set all plants:

- * within 50m inside of the boundaries of the infested property for one-leaf and 20m for two-leaf;
- * within 50m of roads and high water mark on waterways;
- * within 50m of sheds, stock yards and houses.

Treatment must be done prior to seed set each year. Properties with less than 20ha of infestation must treat the entire infestation.

Additional areas may be ordered to be treated.

Special considerations.

In the case of P4 infestations where they continue across property boundaries there is no requirement to treat the relevant part of the property boundaries as long as the boundaries of the infestation as a whole are treated. There must be agreement between neighbours in relation to the treatment of these areas.

P5

Aims to control infestations on public lands.

Source: Department of Agriculture and Food (2007). *List of Declared Plants*. Department of Agriculture and Food, Western Australia. Online: <http://www.agric.wa.gov.au/>.

C3: Introduced Flora Species Previously Recorded in the Survey Area

Species	Rating	Common Name	Record
<i>*Acetosa vesicaria</i>	High	Ruby Dock	Mattiske (2007)
<i>*Aerva javanica</i>	High	Kapok Bush	Mattiske (2007)
<i>*Cenchrus ciliaris</i>	High	Buffel grass	Biota (2004a) Mattiske (2007)
<i>*Malvastrum americanum</i>	Moderate	Spiked Malvastrum	Biota (2004a) Mattiske (2007)
<i>*Sigesbeckia orientalis</i>	Moderate	Indian Weed	Biota (2004a)
<i>*Citrullus colocynthis</i>	Low	Bitter Apple	Mattiske (2007)
<i>*Setaria verticillata</i>	Low	Whorled Pigeon Grass	Mattiske (2007)
<i>*Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mild	Mexican Poppy	Mattiske (2007)
<i>*Bidens bipinnata</i>	TBA	Bipinnate Beggartick	Mattiske (2007)
<i>*Bidens pilosa</i>	TBA	Cobbler's Pegs	Biota (2004a)
<i>*Cenchrus setiger</i>	TBA	Birdwood grass	Biota (2004a) Mattiske (2007)
<i>*Flaveria trinervia</i>	TBA	Speedy Weed	Biota (2004a) Mattiske (2007)

APPENDIX D

VEGETATION CONDITION SCALE

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX D

VEGETATION CONDITION SCALE

Definition of Condition Scales (Trudgen 1991)

Condition Code	Definition
E	Excellent Pristine or nearly so, no obvious signs of damage caused by the activities of European man.
VG	Very Good Some relatively slight signs of damage caused by the activities of European man, e.g. some signs of damage to tree trunks caused by repeated fire and the presence of some relatively non-aggressive weeds such as <i>Ursinia anthemoides</i> or <i>Briza</i> species, or occasional vehicle tracks.
G	Good More obvious signs of damage caused by the activities of European man, including some obvious impact on the vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones.
P	Poor Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of activities of European man such as grazing or partial clearing (chaining) or very frequent fires. Weeds as above, probably plus some more aggressive ones such as <i>Ehrharta</i> species.
VP	Very Poor Severely impacted by grazing, fire, clearing or a combination of these activities. Scope for some regeneration but, not to a state approaching good condition without intensive management. Usually with a number of weed species including aggressive species.
D	Completely Degraded Areas that are completely or almost completely without native species in the structure of their vegetation, e.g. areas that are cleared or “parkland cleared” with their flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX E

**NUMERICAL ANALYSIS OF FLORISTIC
DATA FROM THE FORTESCUE METALS
GROUP CHRISTMAS CREEK AND
CLOUDBREAK SURVEY AREAS WITH
DATA FROM THE SURROUNDING
PILBARRA BIOREGION OF WESTERN
AUSTRALIA (TRUDGEN M.E. AND
GRIFFIN E.A. 2011)**

**Numerical analysis
of floristic data from the
Fortescue Metals Group
Christmas Creek and Cloudbreak Project
areas with comparisons to data from the
surrounding Pilbara Bioregion of Western
Australia**

Prepared for

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(Report writing)

July 2011

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1.0 INTRODUCTION

1.1 Purpose of this report and data sources

The purpose of this report is to investigate the conservation value of the vegetation of areas of the Fortescue Metals Group Christmas Creek and Cloudbreak project areas in the north-west of Western Australia. To do this, the report presents the results of numerical analyses of the floristic data (lists of flora species present in vegetation recording quadrats) recorded from the Christmas Creek and Cloudbreak project areas, combined in a data set with similar floristic data from earlier studies. The data from the Christmas Creek and Cloudbreak project areas was mainly collected by ENV Australia Pty Ltd and Matiske Consulting, but includes some data from an earlier study by Biota Environmental Sciences.

The regional data set the Christmas Creek and Cloudbreak data is compared to in this report is from studies carried out by a number of consultancies for projects located in other parts of the Pilbara Bioregion. It forms a combined data set (see Table 3) that has two thousand eight hundred and eighty-three (2,883) sites, not including the ENV and Matiske data from the Christmas Creek and Cloudbreak areas. This data set was used in earlier reports (Griffin & Trudgen 2009a, b, c) and is used in this report as a reference data set and the classification of it using pattern analysis as a reference classification (this maintains integrity of units across reports).

1.2 Adequacy of the regional data set

The regional data set has been compiled by one of us (MET) over a period of time. Over that time a significant effort has been made to include data that is of a better quality in terms of:

- Collected in better seasons;
- Collected by more experienced workers;
- Specimens identified or checked by one of us (MET);
- Apart from some earlier data from releves, the data is from 50 x 50 m quadrats or equivalent size of different shape (except in narrow habitats such as narrow creeklines and gully floors, where a transect of 100 metres length has been found to be adequate in most cases).

Undoubtedly, there are limitations to the use of this data, in that it tends to be from surveys that are of a restricted area or from rail line routes rather than evenly spread through the

Pilbara Bioregion. However, even spread is less important (provided there is adequate spread) than adequate sampling of different geologies, physical habitat types and climate variation. When the regional data set is examined in detail, it can be readily seen that it samples the vegetation of a very wide diversity of underlying geological types, geomorphological types (physical habitat types such as various slopes, crests, creeklines, gullies, gorges, mesa tops, "flats" i.e. small plains within ranges) and soil types, as well as significant variation in climate (including different rainfall areas but also including other factors).

The authors of this report have used the data in the regional data set in analyses for several reports (Griffin & Trudgen 2009a, b, c for all of it and earlier reports for various parts of it). From this experience with the data, we believe that it provides a sufficient basis to investigate the floristic variation present in the vegetation of the Fortescue Metals Group Christmas Creek and Cloudbreak project areas in relation to the vegetation of the Pilbara Bioregion that is adequate for environmental impact assessment purposes. The congruence below between the results from the pattern analyses, physiography and Mulga type distribution supports this assessment.

1.3 Interpretation of the levels of classification provided

A classification of vegetation quadrat data into groups of sites with similar floristic composition (that is into groups of quadrats with similar lists of species in the quadrats placed together) was a fundamental part of the analyses being carried out. Some appreciation of the basis of the groups defined, and some caution are needed in interpreting these groups. They are not directly comparable to the more well known assignment of vegetation stands into *plant communities* based on structure and dominance, or the grouping of such plant communities into *vegetation associations* and then at a very high level *vegetation formations*.

The different levels of floristic units defined by the pattern analyses carried out in this report are simply defined by their degree of similarity in the presence and absence of the species recorded at the sites placed in them (that is, on their *floristics*). This is a very different methodology to the emphasis on structure and dominance in the definition of plant communities, vegetation associations and vegetation formations. When more floristic groups are defined (from the same number of quadrats), the groups will have less variation in floristics and probably less variation in structure and dominance. This is a low level of synthesis if the data set is large and the number of units is large. As the number of groups is

decreased (from the same data set), the variation in floristic composition, structure and dominance will increase and the level of synthesis of the groups becomes higher. At a high level of synthesis (relatively few groups for the size of the data set), the variation in floristics of each group (as well as of the structure and dominance of the vegetation of the sites included) will be high and the groups will be quite abstract. This is meant to imply that they have varied composition, not that they do not possess some reality in the sense of dividing the data into different groups with some relationship within the groups defined and differences between groups. Where care needs to be taken, is that the groups defined at different levels of an analysis should be used for purposes appropriate to their level. Importantly, high synthesis level, relatively abstract groups should be used for understanding regional patterns of variation, while lower level groups with an appropriate level of synthesis should be used for conservation assessment.

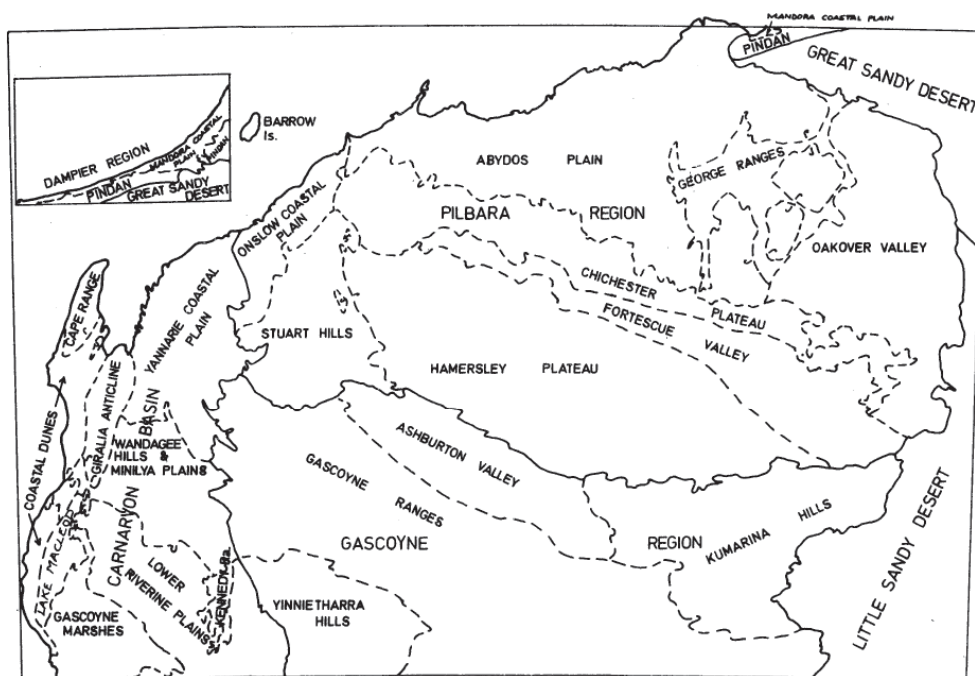
In the analysis presented in this report, it was originally intended that the groups defined in the lower level (the 600-group level) of the classification of the data set used would vary from near (but above) the plant community concept in level of synthesis to near or above the vegetation association level in level of synthesis. However, examination of the vegetation descriptions of sites placed within groups at the 600-group level of the analysis shows that it is likely that most are in the upper part of this range to somewhat higher. Certainly, most have variation in structure and dominance that would be at or above the vegetation association level of synthesis. The plant community level groups together sites with similar structure, dominance and floristics, and the vegetation association level groups together similar plant communities. The 600-group level was chosen to be a somewhat similar level of synthesis to these concepts so that the groups defined would not be too abstract for environmental impact assessment purposes. However, it is emphasised that the groups defined are based on a different classification process (that is floristics only, not floristics, dominance and structure). The fact that the 600-group level is somewhat higher in synthesis than originally intended reflects the significant variation in the vegetation of the Pilbara Bioregion and the fact that even 2,883 sites only samples part of that variation.

The intermediate levels of the analysis of the overall data set should be considered as varying from near, but above, the vegetation association level to the alliance level (or higher) in level of synthesis (so at least a significant proportion of the groups defined are largely abstract) and are potentially useful for regional comparisons. The higher levels vary from near sub-formation to the formation level in level of synthesis (so higher level groups defined are quite

abstract). Again, it is emphasised that they are not the same as such units (which are based on structure, dominance and floristics, or in the case of vegetation formation, only the structure of the upper layer), as they are only based only on floristics. Although of a different type of synthesis to traditional classifications of vegetation, these units, as long as their nature is understood, are useful for the purpose of the analysis. The higher and intermediate levels are suitable for analysing regional distribution patterns and associations with factors such as geology or habitat (for example cracking clay or creek/river relationships).

1.4 Location of the project area

The Fortescue Metals Group Christmas Creek and Cloudbreak project areas are located in the Pilbara Bioregion (Thackway, R., and Cresswell 1995) of the northwest of Western Australia (effectively equivalent to the Pilbara Natural Region (see Map 1 below) and Fortescue Botanical Districts of Beard (1975)). Within this area, they are located on the southern slopes of the Chichester Plateau or Range adjacent to the Fortescue Marsh, a large seasonally inundated area that lies in the Fortescue Valley. This valley runs along the south side of the Chichester Plateau for several hundred kilometres (see Map 1 and Figure 1a and 1b).



Map 1. Natural Regions and physiographic units of the north west of Western Australia
 Note. From Beard 1975, p. 7. Beard's Pilbara Region is equivalent to the Pilbara Bioregion.

1.5 Landscape and habitat types of the project area

The vegetation recording sites in the Christmas Creek and Cloudbreak project areas are mainly located on the southern slopes of the Chichester Plateau, with some on the crest, a few on the edge of the Plateau and a few in the bed of the Fortescue Marsh. So the area sampled goes from the floor of a major valley to the edge of the top of a major plateau.

The slopes consist of a series of depositional areas (alluvial fans) of varied size (they may be alluvium/colluvium over spurs formed by erosion) with seasonal streams between and on them. The group of these fans in the survey area are part of a *bajada* or *compound alluvial fan* that extends a short distance to the east out of the area of interest, but seems to have lower relief there. Most of this Bajada is in the area of interest. The crest and southern edge of the Plateau consist of outcrop and residual material. The area the vegetation recording sites occur in therefore includes a moderate range of topography, including gentle to moderate slopes, outcrop areas, flatter areas (on the plateau), various sized streams and the bed of the Fortescue Marsh. For the plants present, such physical habitat types are strong modifiers of the underlying geology present in the project area. The combination creates a significant range of habitat for plants and thus a significant range of vegetation types.

Table 1: Brief descriptions of the land systems in the areas shown in Figure 1a and 1b.

Note. From Van Vreeswyk et al 2004.

Symbol	Land System Name	Description
MCK	McKay	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts.
NEW	Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.
JAM	Jamindie	Stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey.
TUR	Turee	Stony alluvial plains with gilgaied and non-gilgaied surfaces supporting tussock grasslands and grassy shrublands of Mulga and Snakewood.
CWA	Cowra	Plains fringing the Marsh land system and supporting Snakewood and Mulga shrublands with some halophytic undershrubs.
MSH	Marsh	Lakebeds and flood plains subject to regular inundation, supporting samphire shrublands, salt-water couch grasslands and chenopod shrublands.

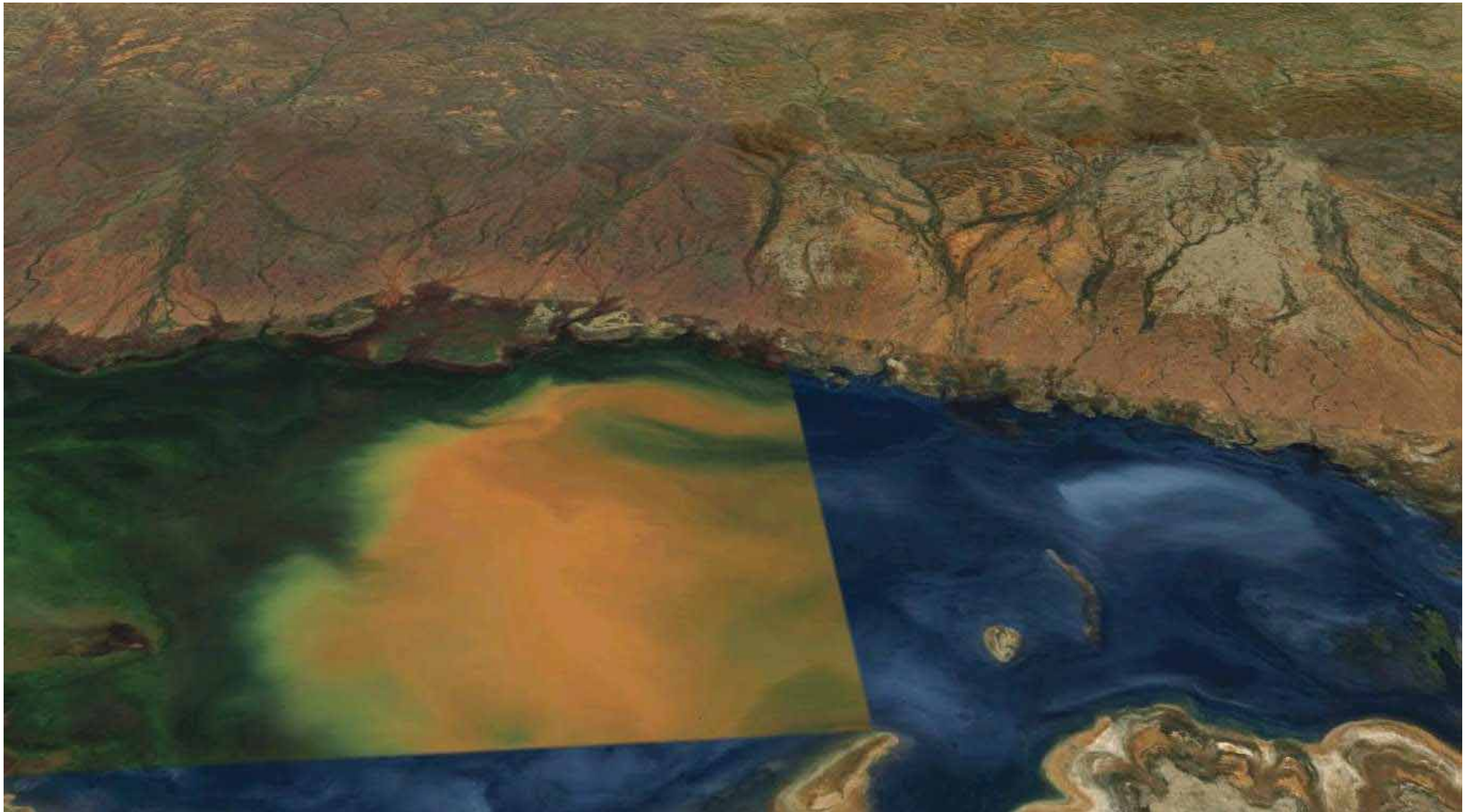


Figure 1a. Oblique view of part of the Christmas Creek and Cloudbreak project areas (from the south), which is on the slopes of the bajada (compound alluvial fan) running along the north side of the Fortescue Marsh and the edge of the Chichester Plateau which lies north of the bajada.

Notes: The Fortescue Marsh is in the foreground (and is full after rain), the bajada forming the southern slopes of the Chichester Plateau in the mid-ground and the Plateau itself in the background. Note the variation in the vegetation, including the groved Mulga stands, on the bajada. The shallow area in the marsh can be used to locate this image in relation to Figure 1b. Image from Google Earth; slopes exaggerated for clarity.

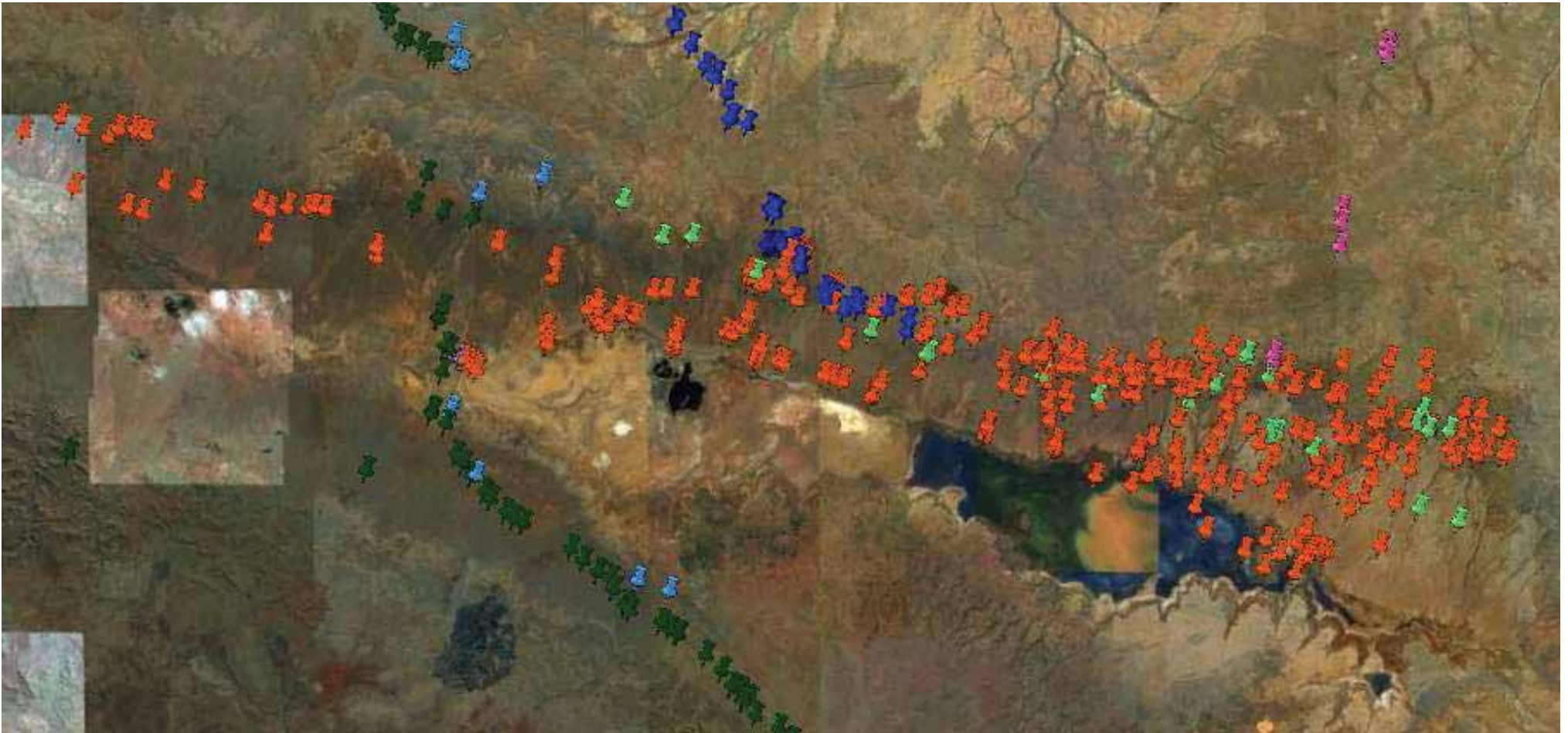
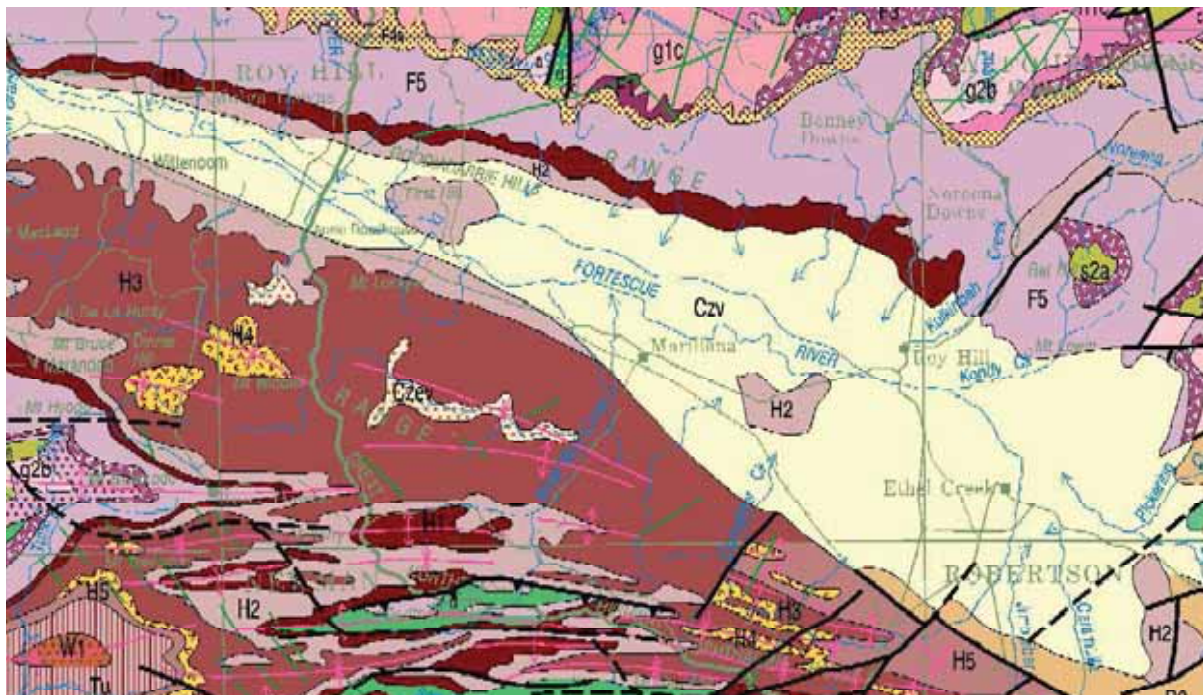


Figure 1b. Vertical view of the Christmas Creek and Cloudbreak project with the vegetation sites marked.

Notes: The red markers are the sites recorded by ENV Australia Pty Ltd and Mattiske Consulting on the area of interest for this report. The other colours are from projects in the reference data set. These sites sample land systems which in the distance are McKay, Newman (on plateau), Jamindie, Turee, and Cowra (on slopes) and Marsh in flats. Table 1 gives brief descriptions of these land systems.

1.6 Geological types found in the project area

The Christmas Creek and Cloudbreak vegetation data comes from three geological types on the 1:2,500,000 scale geological map of Western Australia (Myers & Hocking 1998) an extract from which is shown on Map 2, see below. These are units H1, H2 and Czv. Unit H1 is described as "BIF [=banded iron formation], shale, chert, unit H2 as "Shale, dolomite, BIF, chert" and unit Czv as "Alluvial and lacustrine valley-fill deposits; in places saline or calcreted" on the legend of the map.



Map 2. Geology of the Christmas Creek and Cloudbreak areas and surrounds.

Notes: Extract from Myers & Hocking (1998)

However, it should be realised that the descriptions of the units at this scale ignores many smaller occurrences of different material and much variation within units. Of particular importance is that unit Czv is extremely heterogenous. This unit (light yellow on Map 2) fills the Fortescue Valley floor and covers the southern slopes of the Chichester plateau, superficially implying one unit. However, the slopes of the Chichester Plateau have material deposited on them that is at least partly sourced from the Plateau top. This is unit F5 on the geology map, which is largely of volcanic origin and is described as "basalt, Andesite, dacite, Rhyolite, shale" in the map key (Myers & Hocking 1998). Thus these slopes are likely to have fairly different soils to those on the southern side of the Fortescue Valley that are derived mainly from the sedimentary banded iron formations (BIF) that make up the major part of the adjoining areas of the Hamersley Range.

1.7 Data provided

Three sets of data were provided for analysis in this report. Two were recorded by ENV Australia Pty Ltd and the third by Matiske Consulting. All three sets of data were recorded for Fortescue Metals Group, the owner of the Christmas Creek and Cloudbreak leases. These data sets will be referred to as the Christmas Creek, Cloudbreak and Matiske Consulting data sets.

The Christmas Creek data set was recorded by ENV in 2011, a year with good rainfall. The identifications have been reviewed by one of us (MET) to standardise the application of names with the reference data set. The review of specimens resulted in a significant level of redetermination of the identifications. This data set had 73 quadrats and 18 releves.

The Cloudbreak data set was recorded by ENV in 2010, a year with very low rainfall and it is understood that the sites were only visited once. We have not reviewed all the identifications, but have reviewed some. The dry year the data was recorded in has undoubtedly led to low species numbers being recorded for this data. It is likely that there is a moderate level of error in the identifications. This data set had had 22 quadrats and 40 releves.

The Matiske Consulting data was collected in 2004, 2005 and 2006 and consisted of 115 sites and was provided in Microsoft Excel files.

The ENV Australia data was provided in a standardised database format that readily allowed the data to be combined into a single database with the reference data being used in the analyses. The Matiske Consulting data was provided in a Microsoft Excel file. This data was imported into the combined data set, but does not have all the data fields that the other data has.

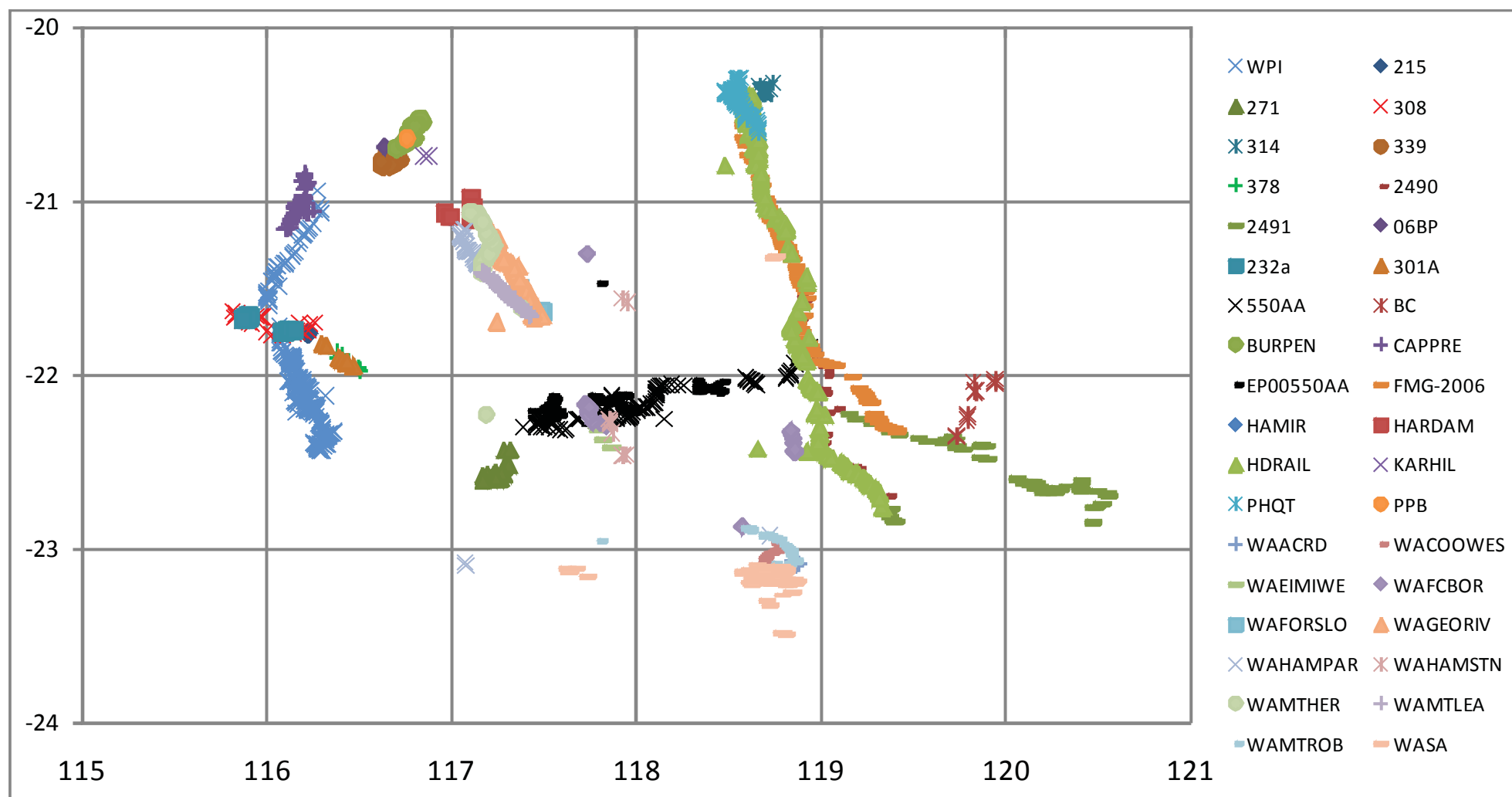
1.8 Regional spread of reference data

Although the new data is all from the eastern part of the Fortescue Valley, the reference data comes from a band across most of the Pilbara Bioregion. This was considered necessary because geological types represented in area the data is from have distributions that extend across larger parts of the bioregion and previous experience has shown that vegetation types in the Pilbara Bioregion can be strongly associated with geological types.

The data used includes data that overlaps the distribution of the new data (particularly from the Biota Environmental Sciences report for the FMG stage B project and the Hope Downs Rail Project) and data from areas as far away as Port Hedland and the Western Pilbara. For example, it includes data from Cape Preston and from the areas between Nullagine and Newman. The distribution of all the sites used is shown on Map 3 (see below). This map shows that the west to east spread of the sites used in the overall analysis is ca. five hundred and eighty (580) km and the north to south spread is ca. three hundred and fifty (350) km.

The projects from which the data is sourced are listed in Table 2, which also gives the number of sites for each project. Any reference to these data sets later in this report will be by means of the project code (see Table 2). All this data is part of a data set that is maintained by M.E. Trudgen.

As the vegetation of the Pilbara Bioregion is mostly distinct from the vegetation of adjoining bioregions, it was not considered necessary to make comparisons to vegetation occurring outside the bioregion to make an assessment of the conservation value of the vegetation of the Solomon Project and Investigator Project Area.



Map 3. 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. Abbreviations for projects given in Table 3 on next page.

Table 2. Data sets used in the regional study.

Notes. The column "sites" the number of sites used from each project in the analyses carried out.

Code	Project	Sites
06BP	Pluto Burrup Pipeline Survey 06	2
215	Flora and vegetation survey of the Mesa J Extension area	6
232a	Mesa A / Mesa G vegetation and flora surveys (Rio Tinto)	27
2490	FMG Stage A	45
2491	FMG Stage B	96
271	Flora and vegetation survey of the Brockman Syncline 4 project area	22
301A	Flora and vegetation survey of Bungaroo Trial Pit and Transport Corridor to Mesa J	7
308	Flora and vegetation survey of the Mesa A transport corridor, Warrambo deposit, and Yarraloola bore field and pipeline	23
314	Port Hedland Salt Expansion: Biological Survey	24
339	Vegetation flora survey of the Dampier salt expansion area	36
378	Flora and vegetation survey of the expanded Bungaroo Valley project area	9
550AA	EP00550AA - Flora and Vegetation Survey Solomon Rail Project Area, FMG	136
BC	BC Iron Bonnie Creek Flora and Vegetation survey	14
BURPEN	Burru Peninsula Floristic Survey	118
CAPPRE	Cape Preston Flora Survey	106
EP00550AA	ENVIPERT00550AA - Flora and Vegetation Survey, Solomon Project and Investigator, FMG	268
FMG-2006	Fortescue Metals Group - Cloud Break to Pt Hedland	152
HAMIR	Burru Peninsula Floristic Survey	3
HARDAM	Burru Peninsula Floristic Survey	11
HDRAIL	Hope Downs rail alignment between Newman and Port Hedland	192
KARHIL	Burru Peninsula Floristic Survey	3
PHQT	Sinclair Knight Merz Quantum Proj. Port Hedland	113
PPB	Pluto Burrup Pipeline Survey	10
WAACRD	West Angelas Access Road	13
WACOOWE S	West Angelas Coondewanna West Route	57
WAEIMIWE	West Angelas Eight Mile Well Route	8
WAFCBOR	West Angelas Four Corners Bore Route	41
WAFORSL O	West Angelas Fortescue Valley, slopes at east end Mt Leal route	18
WAGEORIV	West Angelas George River Route	242
WAHAMPA R	West Angelas Hamersley Parallel Route	71
WAHAMST N	West Angelas Hamersley Station	21
WAMTHER	West Angelas Mt Herbert Route	109
WAMTLEA	West Angelas Mt Leal Route	111
WAMTROB	West Angelas Mt Robinson Route	73
WASA	West Angelas Core Survey Area	271
API [WPI]	API West Pilbara Iron Ore project [WPI]	427

2.0 METHODS

2.1 Data preparation

The data from the Christmas Creek and Cloud Break Project Areas and the data from the earlier projects was all 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. The Matiske was converted from excel to access and imported.

To make the data set as compatible as possible across the various projects used in the analyses, a process of reconciliation of flora species names as used in the different projects was undertaken. This was necessary partly because of changes in nomenclature over the period in which the studies have been carried out, but also because of the potential of project specific variations in the application of names. The reconciliation involved:

- Reducing some infra-specific names to the relevant species name (where misidentifications were likely, or where in some projects specimens had been named to species only),
- Combining some taxa where confusion is likely to have occurred in field observations and identifications, and
- Omitting some records that were ambiguous.

It was observed that the Matiske Consulting data was recorded at a more general level in some cases; that is using species level names only rather than infraspecific names were these are the level of taxonomy published. To allow for this in the analyses carried out, a separate reconciliation table between the Matiske Consulting data and the reference sites was created.

Thus two separate classifications were conducted: Christmas Creek plus Cloud Break against the reference sites and Matiske against the reference sites.

It should be noted that the data maintained by M.E. Trudgen is dynamic and (as much as time allows) is updated as the understanding of the application of existing and new names develops. However, there are some differences in names between the data sets analysed for

earlier studies and the current one that reflect changes in nomenclature rather than in identification and the reconciliation process compensates for this.

2.2 Analyses carried out

The two separate datasets mentioned above were run to provide a regional analysis. In this analysis, the presence and absence of species at a quadrat was taken into account. Cover (a measure of the abundance of species at a site) was not used. Analysing the presence and absence of species in such data sets has been found to be appropriate for assessing the regional variation in composition of site data in earlier analyses of data from the Pilbara Bioregion. Including the cover of species at sites tends to be more useful when analysing data sets from smaller areas with higher data density; therefore, cover was not used in the analyses carried out for this report. “Singletons” (species present in only one site in a data set) were retained for they often contain useful information to distinguish uncommon floristic types.

The results of these classifications showed that the new sites clumped strongly and thus provided little discrimination of likely communities present. The clumping was strongest for the releves and for the Mattiske data. While it is recognised that some “new” plant communities are present, these patterns were interpreted as being significantly a product of the lower species richness of this segment of the new data (see Table 3 below).

Thus, in an attempt to provide a clearer view of the relationships in the Christmas Creek and Cloud Break area, a new data set composed of the quadrats from these projects plus their “nearest neighbours” from the regional data was analysed (see Table 3).

2.3 Use of the PATN numerical classification package

We have found that the numerical classification package PATN (Belbin 1987) is an effective tool for the analysis of data sets such as those analysed in this report. We have used it on such data sets from the Pilbara and from the south-west of Western Australia over a significant period of time. Our experience is that the resulting sorting (classification) of data sets has been meaningful in providing an ability to understand the variation in the data sets analysed and in making assessments of the importance of such variation.

Several modules of the numerical classification package PATN (Belbin 1987) were used for the analyses. The PATN modules used were ASO (calculation of similarity matrix), FUSE (classification), DEND (representation of classification) and NNB (nearest neighbour analysis). The default parameter settings of these modules were used in all analyses.

For the analysis of the data set, the modules were run with the sites as the classified objects (ie the species as the attributes). Classification of the data set with the species as the classified objects (ie the sites as the attributes) was also undertaken for both data sets. From the ASO association matrix, it is possible to determine for each site, which other sites are most similar and how similar they are. This can be used in a number of ways including determining the nearest neighbours for sites and an indication of the homogeneity of the groups. By combining these with the classification a measure of concordance can be determined.

The dendrogram represents the way the classified rows (sites or species) fuse. This can be used to construct groups of sites (groups of rows in the dendrogram) by “cutting” at a particular value or cutting to obtain a particular number of groups. For the purpose of the local data set, four “cuts” were made to divide (classify) the data into groups at different levels of synthesis (from very broad to moderate). For ease of reference, these “cuts” are referred to as the “5-group”, “10-group”, “20-group”, and “40-group” classifications. While the levels of these “cuts” are arbitrary, they have been applied after large experience with similar data sets, and the lower level in the regional analysis was chosen to relate (at level of synthesis) to the more widely used vegetation association level (see above).

Classifications at several levels such as those outlined above provide opportunities to make interpretations of the nature of the variation in the floristic data from vegetation recording sites in relation to a range of other information; including geology and location. While the levels of these “cuts” (especially the higher level ones) are arbitrary, they come out of experience with this type of data. It should be noted that while the 600-group level of the regional analysis is still somewhat arbitrary, when the makeup of the 600 groups defined at this level of the regional analysis is examined, it is apparent that many of them have more than similar species lists in common. They also often have similar dominance and structure, come from similar habitat or are mostly from the same or similar geology.

2.4 Summaries made

The results of the PATN analyses were imported into the Access database, where, using queries, it was joined and summarised with other information such as site characteristics. Some data was exported as kml files for display on satellite images from Google Earth.

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 shows 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. While there are different reasons for data degradation in the three different data sets provided for analysis for this report, it is clear that several of the factors listed above have played a part.

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 Cloudbreak data provided for this report very clearly was recorded in a drought year and was therefore of poor quality. Similarly, variation in the standard of identifications can affect data quality between data sets. While the Christmas Creek data was checked for identification errors by one of us (MET), this could not be done for most of the Cloudbreak specimens or for any of the Mattiske Consulting collections. Therefore, the data had a level of identification error that cannot be precisely defined, but was not insignificant. For example, the Mulga group of *Acacia* species was only identified to "*Acacia aneura*" in the Mattiske Consulting data, that is a broad general concept, rather than the forms used for the Christmas Creek data and the reference data set.

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, and variation in seasonal conditions.

These factors have partly resulted in the differences in the number of species per site (Table 3). This shows that of the new datasets, only the Christmas Creek quadrats appeared to have comparable number of species to the main projects of relevance. This is worth some comment. The ENV quadrats from Christmas Creek have an average of 47 species per site, while the relevés have an average of 27 species per site; the ENV quadrats and relevés from Cloudbreak on the other have average 6 and 9 species per site. The Mattiske consulting data varies from 8 to 16 species per site in the different years. While significant parts of this variation are due to varying seasonal conditions (the 2010 drought for instance) and some to

differences in habitats sampled this is not the issue. 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 3. Range of species richness at sites in relevant projects.

Notes: XB_Q = Christmas Creek quadrats; XB_R = Christmas Creek relevés; CD_Q = Cloudbreak quadrats; CD_R = Cloudbreak relevés; EM = Matiske Consulting.

PROJECT*	Average # of species	# 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
XB_Q	47	73		1	7	16	36	21	12	7		
XB_R	21	18	28	17	22	33						
CD_Q	6	22	82	18								
CD_R	9	40	70	30								
EM 2004	16	56	5	73	21							
EM 2005	8	7	71	29								
EM 2006	9	52	69	25	6							
2490	37	45		11	24	29	18	13	0	2	0	2
2491	43	96		7	14	23	21	18	9	5	3	
550AA	25	135	7	33	28	17	9	5				
BC	21	14		43	43	14						
FMG-2006	22	151	8	38	33	13	6	1	1			
HDRAIL	33	192	3	10	21	34	22	7	2	1		
WASA	35	271		11	30	29	15	8	4	1	1	
WPI	22	427	3	55	20	11	7	4	1			

* see Table 2 for other Project codes

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.

Limitations in data density and distribution (see Map 2) 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.

The necessarily abstract nature of the higher order groups defined is noted in section 1.2 above. This abstraction means that individual occurrences of (ie. sites referred to) a particular group may have quite different structure and dominance, particularly at higher levels of synthesis. However, at the various levels of synthesis there should be corresponding degrees of similarity in the floristic composition of stands referred to the different groups in them. So at the lowest level, the stands (sites) referred to a group should have relatively similar lists, particularly if data density is high. In the overall data set used for this report, data density is variable for different projects and the number of quadrats is still low for the size of the region studied, so groups in the lowest level of the classification (the 600-group level) will still often have a significant level of difference, although some groups will be more varied than others.

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 “real new” floristic groups and “real poor data”.

4.0 RESULTS

4.1 Assignment of the new sites to the 600 group level of the reference classification

As noted above, the new data is of varied quality and this meant that it could not simply be used with the reference data to investigate what groups were present via a classification. The principal evidence for this is the strong clustering of new sites to their peers rather than dispersion amongst the reference sites. The principal analysis tool available in the PATN package to circumvent this problem is the nearest neighbour module.

This approach used infers the group (in the classification of the reference data set given in Griffin & Trudgen 2009 a & b) for the new site through the group associated with its nearest neighbours from amongst these reference sites. Where the similarity of these nearest neighbours is low, the reliability of this method is low. This was found to be the case for many of the new sites, which consequently have an assignment using this method that is provisional.

The nearest neighbour interpreted for each of the new sites is provided in Table 4. To indicate the degree of certainty of allocations, they are qualified in the table by ?, ??, & ???, progressively indicating poor to very poor fit to the reference data 600-group level floristic groups. In line with the data quality, few of the sites in the ENV Christmas Creek data set (quadrats with code XB) were qualified in this way. Almost all of the other sites had a level of qualification. The collection and seasonal quality of the data at each site is not included in this certainty interpretation. All but the ENV Christmas Creek data set quadrats (eg XB001 to XB104) should have an additional level of uncertainty added. Thus, those groups only assigned to other than the ENV Christmas Creek data set sites should be inferred to be present with low degrees of certainty.

The information in Table 4 can be summarised to show that the sites in it were allocated to sixty-five (65) of the 600-group level groups the reference data was allocated to in Griffin & Trudgen (2009a & b). This is shown in Table 5. This table also gives general information about the distribution of these 65 groups and how many of the known occurrences of them are in the new data sets. The general distribution information given is for the two “spatial windows” of data location given above (Figure 2 – the smaller and larger areas examined in detail).

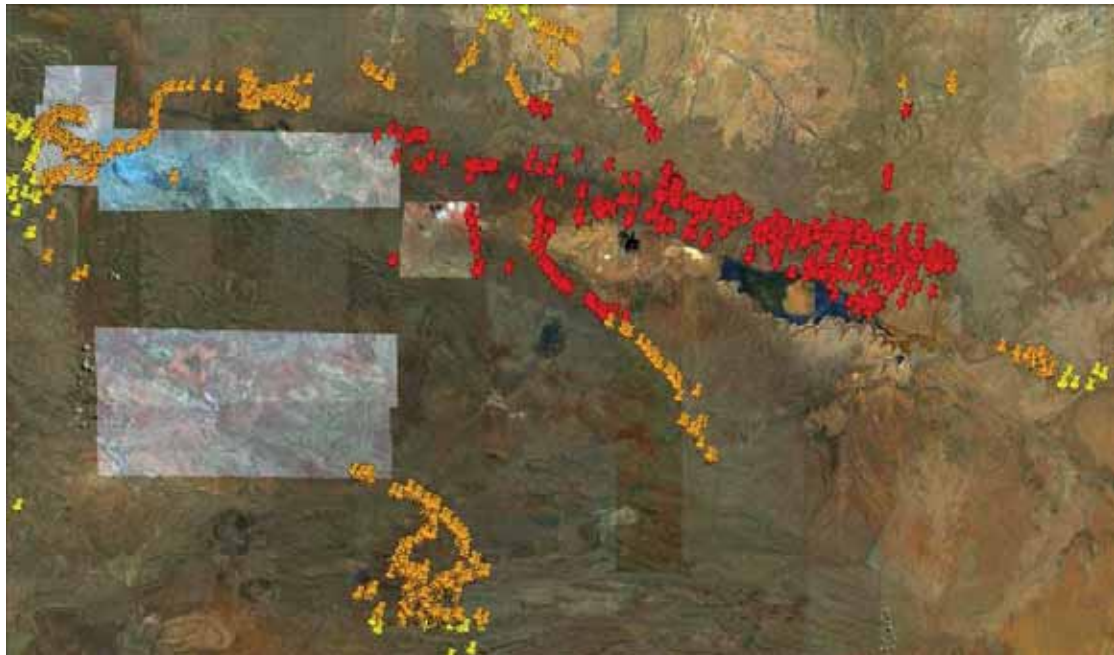
Table 4: Allocation of the new sites to the 600-group level floristic groups of the reference (regional) classification

Notes: Qual = Qualifier (?, ??, & ??? indicating poor to very poor fit). NNB = 600-group number from Griffin & Trudgen (2009a & b). Site prefixes CD, XB, EM4, EM5, EM6 indicate new data sets. An additional R on a code indicates a releve, rather than a quadrat.

Site	NNB	Qual	Site	NNB	Qual	Site	NNB	Qual	Site	NNB	Qual	Site	NNB	Qual
CD01	490	???	CDR032	427	??	EM445	427	?	EM635	205	??	XB056	567	
CD02	490	???	CDR033	427	??	EM446	317	?	EM636	399	??	XB058	435	
CD03	490	???	CDR034	544	??	EM447	317	?	EM637	490	???	XB060	433	
CD04	490	???	CDR035	273	???	EM448	296	?	EM638	484	???	XB061	433	
CD05	490	???	CDR036	131	?	EM449	427	?	EM639	484	??	XB062	435	
CD06	490	???	CDR037	544	??	EM450	179	?	EM640	486	?	XB063	567	
CD07	490	???	CDR038	327		EM451	539	?	EM641	490	??	XB064	433	
CD08	490	???	CDR039	544	?	EM452	532	?	EM642	490	??	XB065	567	
CD09	490	???	CDR040	526		EM453	532		EM643	490	???	XB066	433	
CD10	490	???	EM401	427		EM454	427	?	EM644	446	??	XB067	435	
CD11	254		EM402	425	?	EM455	552	?	EM645	484	??	XB068	575	
CD12	253		EM403	567		EM456	560	?	EM646	484	???	XB069	430	
CD13	490	???	EM404	440	?	EM557	208	??	EM647	490	??	XB070	430	
CD14	490	???	EM405	427	??	EM558	209	??	EM648	490	???	XB071	433	?
CD15	490	???	EM406	545	?	EM559	484		EM649	490	???	XB072	435	?
CD16	490	???	EM407	552	?	EM560	275	??	EM650	484		XB073	433	
CD17	490	???	EM408	247	?	EM561	432	??	EM651	490	???	XB074	433	
CD18	490	???	EM409	250	?	EM562	485	??	EM652	485	?	XB075	430	
CD20	253	??	EM410	530	?	EM563	253	??	XB001	527		XB076	430	
CD21	190		EM411	539		EM601	445	???	XB002	578		XB077	430	
CD22	526	??	EM412	179	?	EM602	490	???	XB003	526		XB078	430	?
CD23	539	?	EM413	527	??	EM603	490	???	XB004	527	?	XB079	430	
CDR001	320		EM414	427	?	EM604	490	???	XB005	528		XB080	435	??
CDR002	254		EM415	398	?	EM605	490	??	XB007	575		XB081	430	?
CDR003	526		EM416	527		EM606	484	?	XB009	575		XB082	430	?
CDR004	247	?	EM417	207		EM607	484	?	XB010	567		XB083	433	?
CDR005	247	?	EM418	526	?	EM608	484	??	XB011	527		XB084	567	
CDR006	273		EM419	212	?	EM609	490	???	XB012	567		XB085	435	?
CDR007	251		EM420	250		EM610	490	???	XB013	435		XB086	569	
CDR008	526		EM421	530	?	EM611	399		XB014	434	?	XB087	575	
CDR009	320		EM422	404	?	EM612	415	??	XB015	435		XB088	430	
CDR010	254	?	EM423	484	???	EM613	490	???	XB016	435	?	XB100	569	
CDR011	539	?	EM424	484		EM614	490	??	XB017	435		XB101	564	
CDR012	246	?	EM425	245	??	EM615	398	??	XB018	430		XB102	575	
CDR013	252		EM426	427		EM616	490	??	XB019	435		XB103	433	
CDR014	131	?	EM427	423	?	EM617	490	??	XB020	430		XB104	575	
CDR015	254	?	EM428	587		EM618	490	???	XB021	568		XBCMNO1	131	
CDR016	544	???	EM429	282		EM619	490	??	XB024	435	?	XBCMNO2	131	
CDR017	254		EM430	191	?	EM620	446	?	XB026	435		XBCMNO3	131	?
CDR018	544		EM431	207		EM621	490	???	XB028	435		XBMNO1	131	?
CDR019	527	??	EM432	530	?	EM622	490	???	XB030	427		XBMNO2	131	
CDR020	254	??	EM433	527		EM623	490	??	XB032	435		XBMNO3	131	
CDR021	568	??	EM434	503	?	EM624	490	???	XB034	435		XBMNO4	131	?
CDR022	254	??	EM435	530	?	EM625	490	?	XB036	430	??	XBR06	572	?
CDR023	247	??	EM436	207	?	EM626	490	???	XB038	430		XBR08	572	?
CDR024	246	?	EM437	282	?	EM627	490	???	XB040	430		XBR22	430	?
CDR025	544	?	EM438	556	?	EM628	399	??	XB042	435		XBRH01	251	?
CDR026	320	??	EM439	567	?	EM629	490	???	XB044	435		XBRH03	575	?
CDR027	526		EM440	404	??	EM630	490	???	XB046	435	?	XBRH04	575	??
CDR028	254		EM441	425	??	EM631	432	??	XB048	435		XBRH08	575	
CDR029	252		EM442	425	??	EM632	425	??	XB050	575		XBRH09	572	?
CDR030	273	?	EM443	274	?	EM633	490	??	XB052	575		XBRH10	575	?
CDR031	251	?	EM444	226	?	EM634	490	???	XB054	435		XBRH11	575	?
												XBRH12	575	?

Figure 2. Windows (areas) for regional assessment

Window 1 - red symbols (mostly area of interest data). Window 2 orange symbols (nearby data).
Rest – yellow symbols



The darker shading in Table 5 show the groups at the 600-group level that have at least fifty percent of the sites from the reference data set in them located in the smaller window. These groups are therefore likely to be fairly restricted in their distribution. The lighter shading in Table 5 indicates groups that have at least fifty percent of the sites from the reference data set in them located in the larger window, but less than fifty percent in the small window. These groups are likely to be less restricted in their distribution, than those shaded darker, but most are not likely to be widely distributed.

From Table 6 it can be seen that 13 of the 65 groups to which the new sites are allocated using the nearest neighbours method are restricted (or almost restricted) to the local window and a total of 34 of the groups are restricted to the wider window (see Figure 2 for the windows (analysis areas)). These groups represent 20 and 52% of the 65 groups respectively; a high degree of localisation. The degree of apparent localisation is not consistent across all new datasets. It appears that in the Cloudbreak, EM5 and EM6 data sets, which have more widespread groups, there are a higher proportion of drainage line units.

Gp600	all	XB	XBR	CD	CDR	EM4	EM5	EM6
131	9		7		2			
179	2					2		
190	1			1				
191	1					1		
205	1							1
207	3					3		
208	1						1	
209	1						1	
212	1					1		
226	1					1		
245	1					1		
246	2							
247	4				2	1		
250	2				3	2		
251	3		1		2			
252	2				2			
253	3			2			1	
254	8			1	7			
273	3				3			
274	1					1		
275	1						1	
282	2					2		
296	1					1		
317	2					2		
320	3				3			
327	1				1			
398	2					1		1
399	3							3
404	2					2		
415	1							1
423	1					1		
425	4					3		1
427	10	1			2	7		
430	16	15	1					
432	2						1	1
433	9	9						
434	1	1						
435	21	21						
440	1					1		
445	1							1
446	2							2
484	11					2	1	8
485	2						1	1
486	1							1
490	47			16				31
503	1					1		
526	7	1		1	4	1		
527	7	3			1	3		
528	1	1						
530	4					4		
532	2					2		
539	4			1	1	2		
544	6				6			
545	1					1		
552	2					2		
556	1					1		
560	1					1		
564	1	1						
567	8	6				2		
568	2	1			1			
569	2	2						
572	3							
575	14	8	3					
578	1	1						
587	1					1		

Table 5: Number of sites allocated to the 600 group level floristic groups from the new data and occurrence out of the new data

Notes. Shading of groups: dark indicates at least 50% of the reference sites in the group are in window 1 (the smaller window); pale indicates at least 50% indicates at least 50% of the reference sites in the group are within window 2, but less than 50% are in window. All indicates the total number of sites in the new data.

Table 6; Summary of distribution Summary of Floristic Groups allocated (see Table 5)

Notes. W1, W2 are the two windows of distribution (see Figure 2). Shading: dark shading indicates at least 50% of groups or sites in a window. Pale shading indicates 20 to 50% of sites or groups in a window.

	all	XB	XBR	CD	CDR	EM4	EM5	EM6
Groups:								
# in W1	13	6	2	1	4	3	1	1
# in W2	34	12	3	2	7	11	1	5
Total	65	14	5	6	15	31	7	12
Sites:								
# in W1	52	24	9	1	6	10	1	1
# in W2	124	49	10	2	24	36	1	8
Total	266	71	18	22	40	56	7	52

An additional classification of the better parts of the new data and a subset of the reference data selected based on its similarity to the new data is given and discussed in section 4.4 below.

4.2 Significance of the floristic groups in the new data when referred to the 600 group level of the reference (regional) classification

While Table 4 suggests (from the Nearest Neighbours analysis) that there are around 65 different floristic groups in the new data. Many of these are uncertain and may be unreliable to base a conservation assessment on due to the quality of the data provided by the Fortescue Metals Group. There are only the eighteen (18) floristic groups at the 600-group level of the reference data classification allocated to the ENV Australia Christmas Creek and Cloudbreak quadrats. Only these are considered below for further assessment because they are based on the better part of the data provided. However, in assessing the occurrence of these 18 groups, all the new data is considered. Appendix X1 give a summary of the data for the sites in these groups in a tabular form.

A series of plots showing the distribution for each of these eighteen floristic groups on satellite imagery (from Google Earth) is given below. On these plots the sites referred to each floristic group were coloured to signify which data group they are from in the following categories: ENV Australia Cloudbreak or Christmas Creek quadrats; ENV Australia Cloudbreak or Christmas Creek relevés; Mattiske Consulting sites; and sites from the reference data set. This provides an indication of the relative distribution of these groups. Note that the plots are at different scales chosen to best present the extent of each.

In understanding the discussion of these groups, it should be remembered that in level of synthesis the 600-group level groups of the classification of the reference data are generally

equivalent to between the vegetation association and vegetation alliance level, but with some equivalent to the latter level (in degree of synthesis). That is, they are well above the plant community level and are moderate to high-level groups. They will therefore not be uniform in vegetation description or habitat, although many have core groups of sites that are fairly similar. Depending on the group, they will contain sites from a few or several plant communities.

Six-hundred level Group 190



Six-hundred level Group 190 has four sites from the reference data (in the top left hand corner of the image above) and one (CD21) from the new data (bottom right hand corner of the image). The reference data sites are from the George River rail route recorded for the West Angelas Project survey. All the sites in that area are on the Chichester Plateau, so this group seems to be restricted to that. The best interpretation is that site CD21 appears to represent a variant of Six-hundred level Group 190, however the quality of the Cloudbreak sites was not as good (due to drought) as the Christmas Creek data and this site needs to be re-recorded in a better season to confirm its status.

Six-hundred level Group 253



Six-hundred level Group 253 has ten sites in the reference data set and three sites from the new data (two Christmas Creek sites and one Mattiske site). The reference data set sites are all from the API West Pilbara Iron survey, and are located in the west Pilbara. It therefore seems likely that the sites in the new data are a distinct subunit, as they are geographically distant. It may be that these are sites on the Marramamba unit, which would have soil characteristics similar to the mesas in the API survey area.

Six-hundred level Group 427



Six-hundred level Group 427 has eleven sites from the reference data set and ten sites from the new data sets. These include a cluster of sites from the ENV Australia Cloudbreak data set in the lower right hand corner of the image above. Most of the rest of the sites are along the Chichester slopes, although some are adjacent to or on the escarpment. The remaining four are in the Hamersley Range (one has not been plotted as it has an obviously incorrect geocode). Most of the sites in this unit are dominated by forms of *Acacia aneura* (Mulga). The habitat descriptions are plains and valley floors.

Six-hundred level Group 430

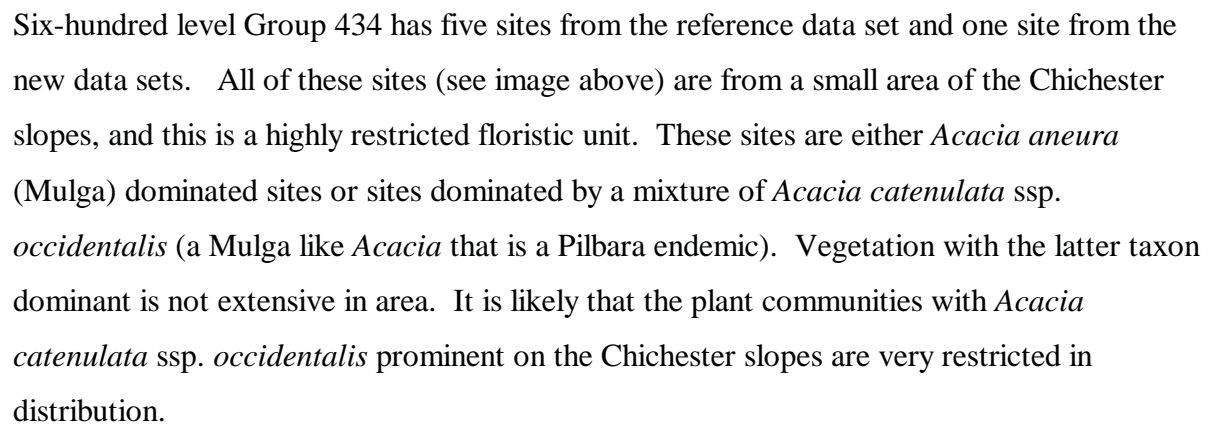


Six-hundred level Group 430 has fifteen sites from the reference data set and five sites from the new data sets. As the image above shows, the sites are restricted to a small area of the Chichester slopes and this is a highly geographically restricted floristic unit. The sites are mostly dominated by *Acacia aneura* (Mulga) variants, although some appear to be from the open areas between Mulga belts in groved mulga areas (places where strands of dense Mulga are separated by open areas) and a couple have other *Acacia* species as dominants.

Six-hundred level Group 433



Six-hundred level Group 433 has eight sites from the reference data set and nine sites in the new data sets. These sites are all from the Chichester slopes and this is a moderately geographically restricted floristic unit. Most sites referred to this unit are dominated by Mulga taxa (including five dominated by *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) the taxon with most of its records from the Chichester slopes), but some are herblands from between Mulga groves and one is dominated by a *Triodia*.



Six-hundred level Group 435 has six sites from the reference data set and twenty-one sites from the new data sets. All of these sites are from a relatively small area of the Chichester slopes and this is a geographically restricted floristic unit. Again, most of the sites are dominated by forms of Mulga, with nine of them dominated by *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), the Mulga taxon with most of its records from the Chichester slopes (some of the other sites may be dominated by this taxon also, but the *aneura* form is not specified in the data).

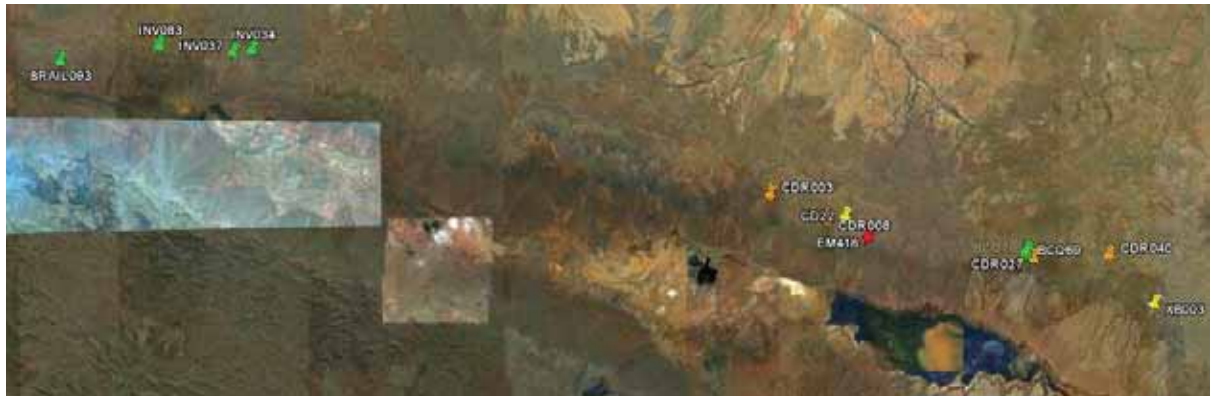
Six-hundred level Group 490



Six-hundred level Group 490 has three sites from the reference data set and forty-six sites from the new data sets. The allocation of the new sites to this unit is "real", as the three reference sites are all located on the coast (see image above) and are dominated by coastal plants (mangroves and samphires). What has happened, is that there has been nowhere in the reference classification for the new data concerned to fit and it has slotted into this unit as a default. As all the new sites concerned are from the poorer parts of the new data set, it seems reasonable to consider the possibility that this is a section of the data that was poor and therefore could not be well resolved. However, the large group of sites involved does indicate that the new sites concerned represent vegetation that is geographically restricted (otherwise it is likely they would have scattered across other groups), with the possibility that

a new unit or units are represented in this data (or that with better data these sites would be allocated to other units that are restricted to the Chichester slopes).

Six-hundred level Group 526



Six-hundred level Group 526 has six sites from the reference data set and seven sites from the new data sets. These sites are all located on the upper Chichester slopes or the edge of the Chichester Plateau. These are sites from the banded iron or Marramamba units rather than the depositional slopes and are mostly dominated by *Eucalyptus leucophloia* ssp. *leucophloia* or *Corymbia deserticola* (one is dominated by *Acacia maitlandii* and two by *Triodia basedowii*) rather than by Mulga types. The unit is somewhat restricted in distribution, and may have two distinct sub-units with one restricted to the area including the new data. Certainly there are at least three *Triodia* species in the different sites, suggesting a very varied unit.

Six-hundred level Group 527



Six-hundred level Group 527 has eleven sites from the reference data set and four sites from the new data sets. However, all the reference sites are from within the envelope defined by the new sites. This unit is therefore fairly restricted in distribution, only occurring along the upper slopes of the Chichester slopes and the very edge of the adjoining plateau. Like unit 526, it is mainly dominated by *Eucalyptus leucophloia* ssp. *leucophloia* or *Corymbia*

hamersleyana, however it also has one site dominated by *Eucalyptus gamophylla* with an *Acacia aneura* form and another site dominated by Gidgee (*Acacia pruinocarpa*). This obviously another broad floristic group that includes several plant communities.

Six-hundred level Group 528



Six-hundred level Group 528 has six sites from the reference data set and one site from the new data sets. The image above shows that this group is very restricted in distribution (occurring on two patches on opposite sides of the Fortescue valley), but that it is uncommon in the area the new data is from.

Six-hundred level Group 539



Six-hundred level Group 539 has three sites from the reference data set and four sites from the new data sets. However, the three sites from the reference data set are from within the same area as the new data sets and this unit is somewhat restricted in distribution and only known from along the upper Chichester slopes and adjacent edge of the Chichester Plateau. The sites are a mixture of Mulga and *Eucalyptus leucophloia* ssp. *leucophloia* sites, indicating that several plant communities are covered by the floristic group.

Six-hundred level Group 564



Six-hundred level Group 564 has four sites from the reference data set and one site from the new data sets. The four sites from the reference data set are within or adjacent to the area the new data is from. Six-hundred level Group 564 is quite restricted geographically and is only known from the upper slopes of the Chichester Plateau and the adjoining Plateau edge. This is another unit mostly dominated by *Eucalyptus leucophloia* ssp. *leucophloia* or *Corymbia hamersleyana*, but also has a site dominated by *Grevillea wickhamii*.

Six-hundred level Group 567



Six-hundred level Group 567 has fourteen sites from the reference data set and eight sites from the new data sets. This unit has a known distribution along the upper Chichester slopes in the area of the new data sets and a number of sites to the east of there. It is therefore somewhat geographically restricted, with a significant part of its distribution in the area the new data is from. All the sites are dominated by Mulga forms or Mulga forms with *Acacia pruinocarpa* or less commonly *Acacia ayersiana* (a broad "leaf" Mulga). The common presence of *Acacia pruinocarpa* in the vegetation descriptions supports the unit being well defined (and by inference, the other units also).

Six-hundred level Group 568



Six-hundred level Group 568 has six sites from the reference data set and two sites from the new data sets. The reference sites included are all in or adjacent to the area the new data sets are from and Group 568 is quite restricted geographically (see image above). This is another upper slope unit that mostly has sites dominated by Mulga types, however *Acacia ayersiana*,

Acacia pruinocarpa and *Eucalyptus leucophloia* ssp. *leucophloia* are also present in the upper layer of some of the sites.

Six-hundred level Group 569



Six-hundred level Group 569 has six sites from the reference data set and two sites from the new data sets. The reference sites included are all in or adjacent to the area the new data sets are from and Group 569 is quite restricted geographically (see image above). This is another upper slope/plateau edge unit. It is dominated by various species including *Corymbia candida* ssp. *dipsodes*, *Eucalyptus leucophloia* ssp. *leucophloia*, *Grevillea wickhamii*, *Acacia inaequilatera* and site by *Acacia aneura* with *Hakea lorea*.

Six-hundred level Group 575



Six-hundred level Group 575 has eleven sites from the reference data set and thirteen sites from the new data sets. Most of these sites are within the area that the new sites are from. The exceptions are a small cluster of sites in the Hamersley Range and one site to the east of the new data area. This unit is therefore somewhat geographically restricted with most occurrences from the upper parts of the Chichester slopes and the adjacent edge of the plateau. The habitat descriptions of for the sites in this group area mostly for moderate sized creeklines, and a number of the sites have *Eucalyptus victrix* as the dominant, although a few have *Corymbia hamersleyana* and four have *Acacia aneura* forms as the dominants.

Six-hundred level Group 578



Six-hundred level Group 578 has thirteen sites from the reference data set and one site from the new data sets. The reference data sites are all from the West Angelas area in the Hamersley Range well south of the new data. This is a fairly mixed unit, with very variable dominance. It is therefore possibly best to consider that the one site from the new data is somewhat poorly placed and probably represents a restricted sub-unit of Group 578.

4.3 Restricted occurrence of vegetation of one Mulga form

The taxonomy of the *Acacia aneura* (Mulga) group of *Acacia* species is known to be difficult and the discrimination of taxa within it in Western Australia has been poor. To cope with this in the vegetation data set compiled by one of us (MET) and for the identification of

specimens, an interim sort based on phyllode morphology has been used since 1998. In the twelve years since then, this sort has held up reasonably well and most specimens have been able to be referred to a form (although some of the forms are fairly variable).

The forms have mostly been referred to by a brief description of the phyllodes, such as *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3). During the checking of specimens from the ENV Australia Christmas Creek survey, it was noted that this taxon was more frequent in the collections than was usually the case. Subsequently, the records of all occurrences of this taxon in the data set were mapped and compared to the distribution of all other occurrences (some 1,600 other records) of *Acacia aneura* forms in the overall database. Figure 3a & 3b (see below) show firstly the distribution of *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) with all other occurrences of *Acacia aneura* forms (which obscure some occurrences of the former) in the data set and secondly the distribution of just *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) to clarify the distribution of this taxon.

Some occurrences of *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) may not have been correctly identified (ie, may be mapped as *aneura*-other), however, this is likely to be a small proportion of the records. The figure clearly shows that this taxon is restricted in distribution and with most records from the area of the new data sets provided for this report. It follows, that vegetation with *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) dominant or co-dominant is also restricted in distribution.

The situation can be summarised as follows, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) appears on the knowledge available to be common on the bajada (area of compound alluvial fans) that the area of interest for this report is a large part of. On the other hand, off of this physiographic feature, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) appears to be uncommon.

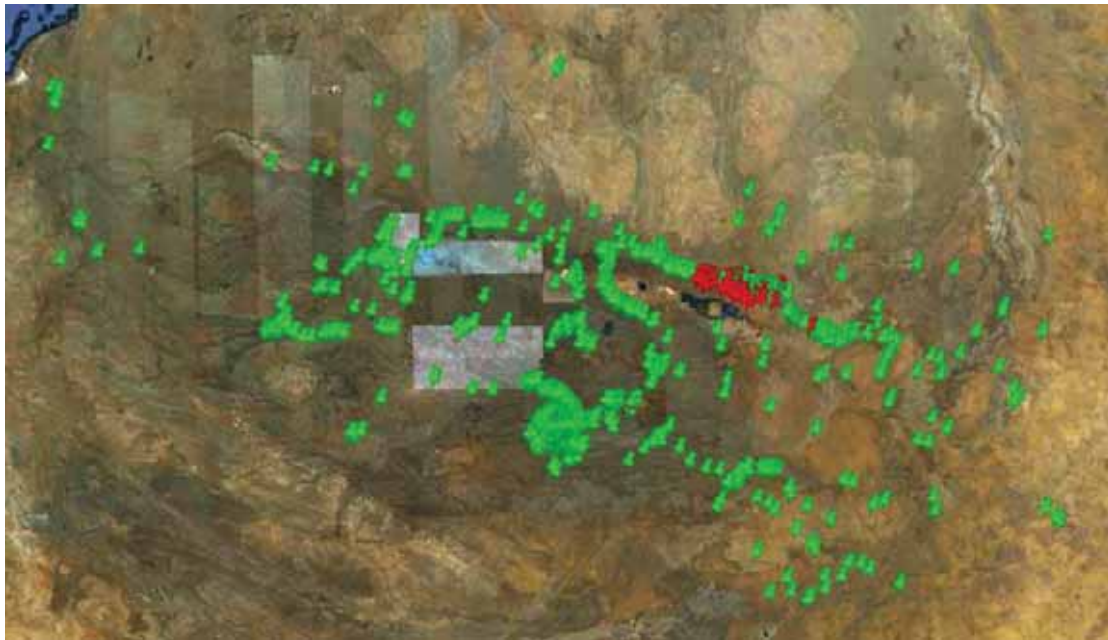


Figure 3a & b: The distribution of *Acacia aff. aneura* (long, flat, recurved; FMR 35.3)

Notes. Figure 3a show the distribution with other records of Mulga taxa (which obscure some records). Figure 3b shows just the distribution of *Acacia aff. aneura* (long, flat, recurved; FMR 35.3)

4.4 Local classification of new quadrats and subset of the reference sites

To provide a clearer understanding of the more reliable new data, the ENV Australia Cloudbreak and Christmas Creek quadrat data was classified with a selection of sites from the reference data set. This selection was the nearest neighbours of the new quadrats, and was identified from the nearest neighbour analysis. The distribution of the sites used in this analysis is shown on Figure 4. The five-group level discussed here is too high for conservation assessment, except at a broad level, but the lower groups defined are likely to

have significant information for the distribution of plant communities and vegetation associations in the area of interest.

This analysis will investigate (and hopefully elucidate) the structure within the new sites. The Mattiske Consulting sites were not included in the analysis because the naming of species (for example the Mulga taxa present) and other attributes such as average species numbers were not compatible with the other data sets.



Figure 4: The distribution of the sites used in the additional classification.

Notes: The colours represent the groups at the twenty-group level, these are clearer on the figures below.

The local classification is shown in Figure 5 as a dendrogram. This shows that most of the Cloudbreak sites cluster tightly together (see Table 7 below). These appear to be largely flat valley sites. Most of the Christmas Creek sites also group together. Superficially this suggests a difference in data quality, but the large numbers of sites in this cohort could contribute to this clustering. (This is a characteristic of the classification strategy used.)

The arbitrary classification levels (5, 10, 20 group and to a lesser degree 40 group) give a way to investigate the structure of the data. Commonly, the coarsest level of classification is not very informative about the communities present, but gives insight into broad environmental factors affecting the distribution of the vegetation types. In this case there is some information of note. This is discussed with the distribution maps of each of the five 5-group level groups below.

					Number of sites in group in each project in data used											
gp 05	gp 10	gp 20	gp 40	Av # SPP	Total # sites	XB	CD	2491	FMG-2006	550AA	EP00550AA	WACOOVES	WAGEORIV	WASA	BC	WPI
1	1	1	1	7	2				1				1			
1	1	2	2	13	11					2					1	8
1	1	2	3	13	1											1
1	2	3	4	11	2		1						1			
1	2	3	5	14	4				3						1	
1	3	4	6	13	1				1							
1	3	4	7	9	4		1		3							
1	3	5	8	3	1		1									
1	3	6	9	10	3		2									1
1	3	6	10	9	1		1									
2	4	7	11	19	9			2	7							
2	4	7	12	29	14	6		4		1	1				2	
2	4	7	13	18	2				2							
2	4	7	14	20	2	1			1							
2	5	8	15	37	4			2	2							
2	5	8	16	44	3				3							
2	5	9	17	38	4	1			3							
2	5	9	18	28	2			2								
2	5	9	19	24	2			1	1							
2	5	9	20	41	1				1							
2	5	10	21	54	11	2		5	4							
2	5	10	22	33	2				2							
2	5	10	23	36	3				3							
3	6	11	24	35	4	3								1		
3	6	11	25	47	25	25										
3	6	12	26	35	1							1				
3	6	12	27	56	10			10								
3	6	12	28	65	6			6								
3	6	13	29	32	2					1	1					
3	6	13	30	16	1						1					
3	7	14	31	46	13	10		3								
3	7	14	32	57	18	18										
3	7	14	33	52	2	2										
3	7	15	34	20	1	1										
4	8	16	35	45	7	4		3								
4	8	17	36	7	2					2						
5	9	18	37	4	7		7									
5	9	18	38	4	6		6									
5	9	19	39	3	2		2									
5	10	20	40	5	1		1									

Table 7. Sites by Project and classification group for the local classification

Notes. The local classification is shown in Figure 5 as a dendrogram. XB = Christmas Creek, CD = Cloudbreak. gp 05 = 5-group level (sites divided into five groups). Other project codes given in Table 2.

The relationship between the group numbers of sites from this local classification and the gp600 group (from reference sites and inferred for new sites) is shown in Table 8. Some of the new classification groups are spread over several of the 600-group level groups of the reference classification. The reverse also occurs with some sites from 600-group level groups of the reference classification spread over several groups of the local classification. However, the degree of fragmentation is low enough to conclude that there is a modest relationship between the local classification and reference classification.

Table 8. Local classification related to the 600-group level of the reference (regional) classification.

Notes: Vertical lines: 100 group level. Horizontal lines: 5 and 20 group level.

Shading of cells: dark – all new, light – some new, unshaded – all reference sites.

[illegible]

PROJ	site	no_spp	qp 5	qp 10	qp 20	qp 40	qp 600	Q	data							Geo	Habitat	Vegetation			
									0.0000	0.2211	0.4422	0.6633	0.8844	1.1056	1.3267	1.5478	1.7689	1.99			
WAGEORIV	0132	7	1	1	1	1	39									Czc	Dense stand of Acacia ancistrocarpa in an	Acacia ancistrocarpa open scrub over Triodia wiseana hummock grassland.			
FMG-2006	P2N	7	1	1	1	1	327									A-#	low lying flat land	Triodia epactia and Triodia lanigera Tussock Grassland with scattered Pluchea tetranthe			
550AA	7RAIL040	22	1	1	2	2	319									Qw	Valley floor, relatively flat	Open Woodland of Corymbia hamersleyana to 5m over Tall Open Shrubland of Grevillea wick			
WPI	CP140	12	1	1	2	2	273									Ql	Low rocky rise	Acacia bivenosa open shrubland over Triodia wiseana hummock grassland			
WPI	CP217	13	1	1	2	2	273									Qg	Plain	Corymbia hamersleyana low open woodland over Acacia synchronicia scattered tall shrubs			
WPI	CP211	12	1	1	2	2	249									Cp	Pediment, plain dissected by numerous mir	Acacia inaequilatera scattered tall shrubs over A. ancistrocarpa open shrubland over Tr			
WPI	CP120	13	1	1	2	2	252									Ql	Very broad drainage line in alluvial plai	Corymbia hamersleyana and Eucalyptus leucophloia ssp. leucophloia low open woodland ove			
WPI	CP171	11	1	1	2	2	251									Qc	Incised drainage line	Corymbia hamersleyana scattered low trees over Acacia ancistrocapra shrubland over Trio			
WPI	TR070	12	1	1	2	2	254									Tp	Mesa top	Acacia inaequilatera over A. bivenosa over Triodia wiseana			
BC	BCQ9	9	1	1	2	2	212									Czp	Moderately steep, upper to mid slope of m	Corymbia hamersleyana scattered low trees over Grevillea wickhamii high open shrubland			
WPI	CP134	13	1	1	2	2	273									Ql	Drainage line in an alluvial plain	Corymbia hamersleyana low open woodland over Acacia ancistrocarpa scattered shrubs over			
WPI	UCW002	11	1	1	2	2	273									Qc	Low undulating hills on a plain	Acacia inaequilatera high open shrubland over Triodia epactia hummock grassland			
550AA	8RAIL093	13	1	1	2	2	526									Czr	Gently sloping up to the south to a small	Scatetred Low Trees of Corymbia deserticola subsp. deserticola to 6m over Scattered Tal			
WPI	CW080	13	1	1	2	3	247									Tp	Creekline on low mesa with small hills	Corymbia hamersleyana scattered low trees over Acacia tumida high shrubland over Gossyp			
WAGEORIV	0207	12	1	2	3	4	190									Qaa	Creek with well defined channel about 400	Eucalyptus leucophloia open woodland over Acacia holosericea closed scrub over Acacia b			
CD	CD21	10	1	2	3	4	190										Flat / Broad plain.				
FMG-2006	9GtoP9Fg	8	1	2	3	5	320									Qc	Small flow lines on lower slopes (within	Grevillea wickhamii (=f) Tall Open Shrubland over Acacia monticola Closed Scrub over tr			
BC	BCQ11	15	1	2	3	5	320									Czp	Shallow flowline in a near level/gently u	Corymbia hamersleyana low open woodland over Acacia ancistrocarpa, Acacia monticola tal			
FMG-2006	9GtoP9Fp	14	1	2	3	5	320									Qc	Small flow line on a gentle slope through	Eucalyptus leucophloia scattered low trees over Gossypium robinsonii, Acacia tumida var			
FMG-2006	9GtoP9Fq	19	1	2	3	5	320									Qc	Small creek through gentle slopes, trends	Eucalyptus leucophloia scattered low trees over Acacia ancistrocarpa and Acacia bivenos			
FMG-2006	9GtoP9Fa	13	1	3	4	6	539									Qc	Westerly facing lower slope, gentle to m	Acacia aneura and Acacia pruinocarpa Low Woodland over Eremophila forestii, Senna artemi			
FMG-2006	9GtoP9Fd	6	1	3	4	7	539									Qc	Gentle lower slope and adjacent to LN-S t	Eucalyptus leucophloia Low Open Woodland over Corchorus sp Low Open Shrubland over			
FMG-2006	9GtoP9Ff	12	1	3	4	7	539									Qc	Variant of P9GtpP9Fd. Lower slopes of l	Eucalyptus leucophloia Low Open Woodland over Acacia aneura, Acacia ayersiana and Acaci			
CD	CD23	10	1	3	4	7	539 ?										Flat / Broad plain with nearby Hills and				
FMG-2006	9GtoP9Fe	9	1	3	4	7	246									Qc	Narrow north-south trending flowline, mod	Eucalyptus leucophloia Low Open Woodland over Acacia tumida var. pilbarensis Open Shru			
CD	CD22	3	1	3	5	8	526 ??										Hill top / Upper Hill slope.				
CD	CD11	10	1	3	6	9	254										Hilltop.				
CD	CD12	10	1	3	6	9	253										Hill top / Upper slope.				
WPI	UC010	10	1	3	6	9	253									Tp	Upper slope/flat top/crest	Eucalyptus leucophloia ssp. leucophloia scattered low trees over Acacia inaequilatera a			
CD	CD20	9	1	3	6	10	253 ??										Hill top / Upper Hill slope surrounded by				
FMG-2006	9GtoP9Fb	11	2	4	7	11	527									Qc	Westerly facing lower slopes of a low rou	Acacia aneura Scattered Tall Shrubs over Acacia arida Scattered Shrubs to Open Shrublan			
FMG-2006	P9G	22	2	4	7	11	527									Czr	Gentle slope facing east on the side of c	Acacia pruinocarpa Tall Open Shrubland over Corchorus sp (P9G-02) and Keraudrenia nephr			
2491	FMR68	21	2	4	7	11	527									Czr	Upper slopes and crest of a low hill	Hakea chordophylla, Acacia pruinocarps, Grevillea wickhamii scattered tall shrubs over			
2491	FMR74	23	2	4	7	11	527									AHm	Upper slopes and crest of a hill on south	Eucalyptus leucophloia, Hakea chordophylla, Corymbia hamersleyana scattered low trees o			
FMG-2006	9GtoP9Fk	21	2	4	7	11	527									Czr	Moderatley to steep westerly facing slope	Eucalyptus leucophloia scattered low trees over Acacia inaequilatera and Grevillea wic			
FMG-2006	9GtoP9FL	23	2	4	7	11	527									AHm	Steep slope and shoulder of a short spur	Eucalyptus leucophloia, Hakea chordophylla scattered low trees over an Open Tussock Gra			
FMG-2006	P9H	26	2	4	7	11	527									AHm	Hill top	Corymbia hamersleyana Low Open Woodland over Hakea chordophylla Open Shrubland over A			
FMG-2006	9GtoP9Fc	12	2	4	7	11	282									Qc	Southerly facing lower slopes of a low hi	Acacia pruinocarpa and Hakea chordophylla Open Shrubland to Low Open Woodland over Grev			
FMG-2006	9GtoP9Fh	11	2	4	7	11	282									Qc	Lower slope (very similar to cass's first	Corymbia hamersleyana and Hakea chordophylla scattered Low trees over an Acacia arida			
BC	BCQ69	21	2	4	7	12	526									AHm	Crest and upper slopes of rise (long east	Eucalyptus leucophloia subsp leucophloia scattered low trees over Hakea lorea ssp. lore			
BC	BCQ70	27	2	4	7	12	526									AHm	Gentle to moderate, south facing mid slop	Eucalyptus leucophloia subsp leucophloia scattered low trees over Acacia acradenia, Gre			
2491	FMC-MB	30	2	4	7	12	569									AHm	Low stony hill	Grevillea wickhamii tall open shrubland over Triodia epactia, T. aff. basedowii mid-den			
XB	XB100	41	2	4	7	12	569										Hilltop	Corymbia candida subsp. dipsodes and Eucalyptus leucophloia subsp. leucophloia Low Isol			
2491	FML61	28	2	4	7	12	569									Hm	Mid and upper slope (NNE / NE facing) slo	Eucalyptus leucophloia scattered trees over Grevillea wickhamii, Acacia spp. scattered			
XB	XB001	28	2	4	7	12	527										Hilltop, slight slope	Corymbia Hamersley Low Isolated Trees over Ptilotus calostachyus var. calostachyus Low			
XB	XB005	30	2	4	7	12	528										Hilltop	Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia Low Open Woodland o			
XB	XB011	33	2	4	7	12	527										Hilltop	Eucalyptus leucophloia subsp. leucophloia Low Open Woodland over Acacia pruinocarpa Mid			
XB	XB086	41	2	4	7	12	569										Hilltop	Eucalyptus leucophloia subsp. leucophloia Low Open Woodland over Ptilotus calostachyus			
XB	XB003	19	2	4	7	12	526										Rocky Scree	Eucalyptus leucophloia subsp. leucophloia Low Open Woodland over Acacia pruinocarpa an			
2491	FMG112	30	2	4	7	12	528									PLHj	Upper slope (N-facing) of low ridge	Corymbia hamersleyana, Hakea chordophylla scattered low trees over Acacia hilliana, Gom			
2491	FMG114	29	2	4	7	12	528									PLHb	Lower part of a gentle to moderately slop	Eucalyptus leucophloia scattered low trees over Grevillea wickhamii scattered tall shru			
550AA	KR004	22	2	4	7	12	284									Qa	Low Open Woodland of Corymbia hamersleyana to 6m over Scattered Shrubs of Acacia tumida				
A	VOK008	24	2	4	7	12	300									Czc	Hilltop and slopes, with a breakaway alon	Scattered Low Trees of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophl			
FMG-2006	9GtoP9Fn	15	2	4	7	13	528									AHm	Southerly facing lower slopes into a smal	Eucalyptus leucophloia scattered low trees over Goodenia stobbsiana Low Shrubland (vari			
FMG-2006	P9R	20	2	4	7	13	359									AHm	Gently sloping, west facing	Acacia inaequilatera Tall Shrubland over Acacia spondylophylla Low Shrubland over Mid-D			
FMG-2006	9GtoP9Fm	12	2	4	7	14	527									AHm	n/a	Gompholobium karijini and Goodenia stobbsiana Scrub to Low Shrubland.			
XB	XB004	28	2	4	7	14	527 ?										Creekline, no Eucalyptus, burnt around 6	Acacia tumida var. pilbarensis and Grevillea wickhamii subsp. hispidula Tall Sparse Shr			
FMG-2006	9GtoP9Fj	25	2	5	8	15	169									Czr	Small to moderate creek between low hills	Corymbia ?hamersleyana scattered Low trees over Grevillea wickhamii, acacia tumida var.			
FMG-2006	P9P	37	2	5	8	15	564									Czr	Low stony hill with creek near SW edge	Grevillea wickhamii Tall Shrubland over Senna glutinosa subsp. glutinosa, Ptilotus exal			
2491	FMC13	53	2	5	8	15	572									AHm	Flowline through low stony hills	Eucalyptus leucophloia, Corymbia hamersleyana low open woodland over Acacia tumida var.			
2491	FMR70	32	2	5	8	15	572									Qc	Bed of medium sized creek with shallow na	Corymbia spp. scattered low trees over Acacia tumida var. pilbarensis, Petalostylis lab			
FMG-2006	P9C	36	2	5	8	16	574									Qa	Floodplain dissected by minor flowlines a	Eucalyptus victrix and Corymbia sp 40 Low Open Woodland over Isotropis forrestii Low O			
FMG-2006	P9C-2	45	2	5	8	16	574									Qc	Creek banks - riparian vegetation	Eucalyptus victrix Low Woodland over Acacia tumida var. pilbarensis, Grevillea wickhami			
FMG-2006	P9U	52	2	5	8	16	574									Czr	Drainage line at foot of gently undulatin	Eucalyptus leucophloia subsp. leucophloia Scattered low trees over Petalostylis labic			
FMG-2006	9GtoP9Fo	26	2	5	9	17	564									AHm	Gentle slope below low hill into open val	Eucalyptus leucophloia scattered low trees over a Hummock Grassland of Triodia longicep			
FMG-2006	P9E	44	2	5	9	17	564									Qc	Gentle to moderate slopes to SSE below lc	Eucalyptus leucophloia subsp. leucophloia Low Open Woodland over a Hummock Grassland o			
FMG-2006	P9J	33	2	5	9	17	564									Qa	Very gentle slope low lying at base of sp	Corymbia hamersleyana Low Open Woodland over Acacia eriopoda and Grevillea wickhamii su			

[illegible]

Notes: The habitat descriptions and vegetation descriptions are truncated to fit the figure on the page (an electronic copy is available if needed). The first column (Project) gives the project the site is from. The second column gives the site number. The third column gives the number of species at the site. The fourth column gives the group with the classification of the sites divided into five groups (and so on up to the seventh column giving the classification of the sites divided into forty groups). The eight column gives the assignment of the site to the 600-group level of the reference classification and the next column giving a qualifier (level of uncertainty) to this assignment where appropriate.

Unit 1 at the 5-group level of the local classification

Unit 1 at the 5-group level of the local classification is a group of sites largely from the Chichester Plateau surface and is formed from many of the reference data set sites with some of the Cloudbreak sites, but no Christmas Creek sites. The geology is predominantly weathered colluviums or residual materials. Largely these are species poor sites suggesting lower data quality (which is certainly the case for the Cloudbreak sites which were collected in a drought year), but some probably represent genuinely lower diversity sites (but, bear in mind that poor data is more likely to significantly effect higher diversity sites – that have many annual species - than low diversity sites which tend to have few annuals). The subdivisions show some fidelity for projects but it is impossible to separate geography from project effort (or skill) or season. See Figure 6a & b for the distribution of Unit 1 at the 5-group level.

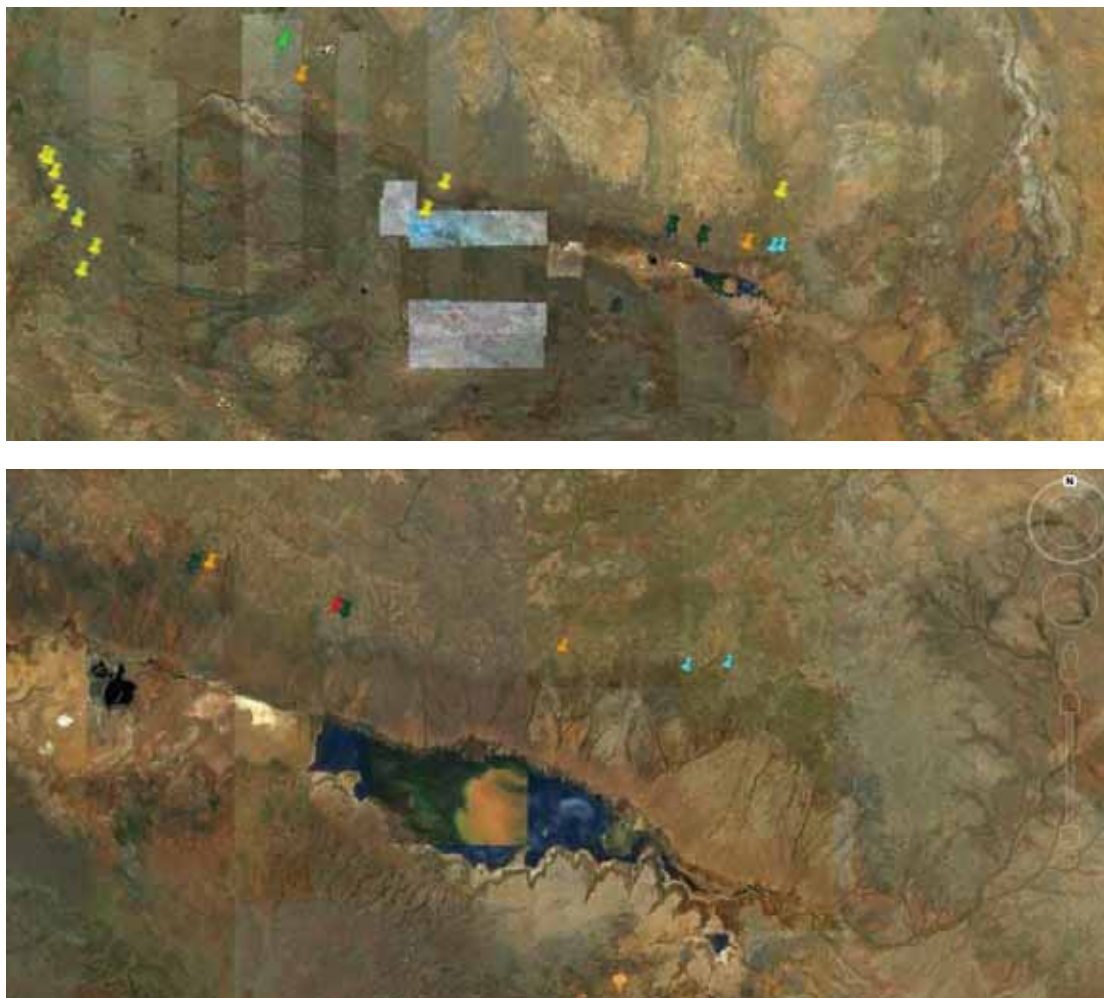


Figure 6a & b. Distribution of Unit 1 at the 5-group level of the local classification

Notes. The upper image gives the overall distribution and the lower image the distribution in the new data area (area of interest). The different colours indicate different groups at groups at the 20-group level within Unit 1 at the 5-group level.

Unit 2 at the 5-group level of the local classification

E.A. Griffin & Associates with M.E. Trudgen & Associates

Unit 2 at the 5-group level of the local classification is a group of sites along the margin of the plateau surface. Many of the sites are outcropping rocks (eg AHm) rather than colluvium. They include several reference projects and Christmas Creek sites but no Cloudbreak sites. The species richness is modest. There are no clear geography or project patterns obvious. There appears to be some differentiation by geology type with the fresher materials, the colluviums and the valley deposits differentiating. There is a slight overlap in distribution with Unit 1 at the 5-group level. See Figure 7a & b for the distribution of Unit 2 at the 5-group level.

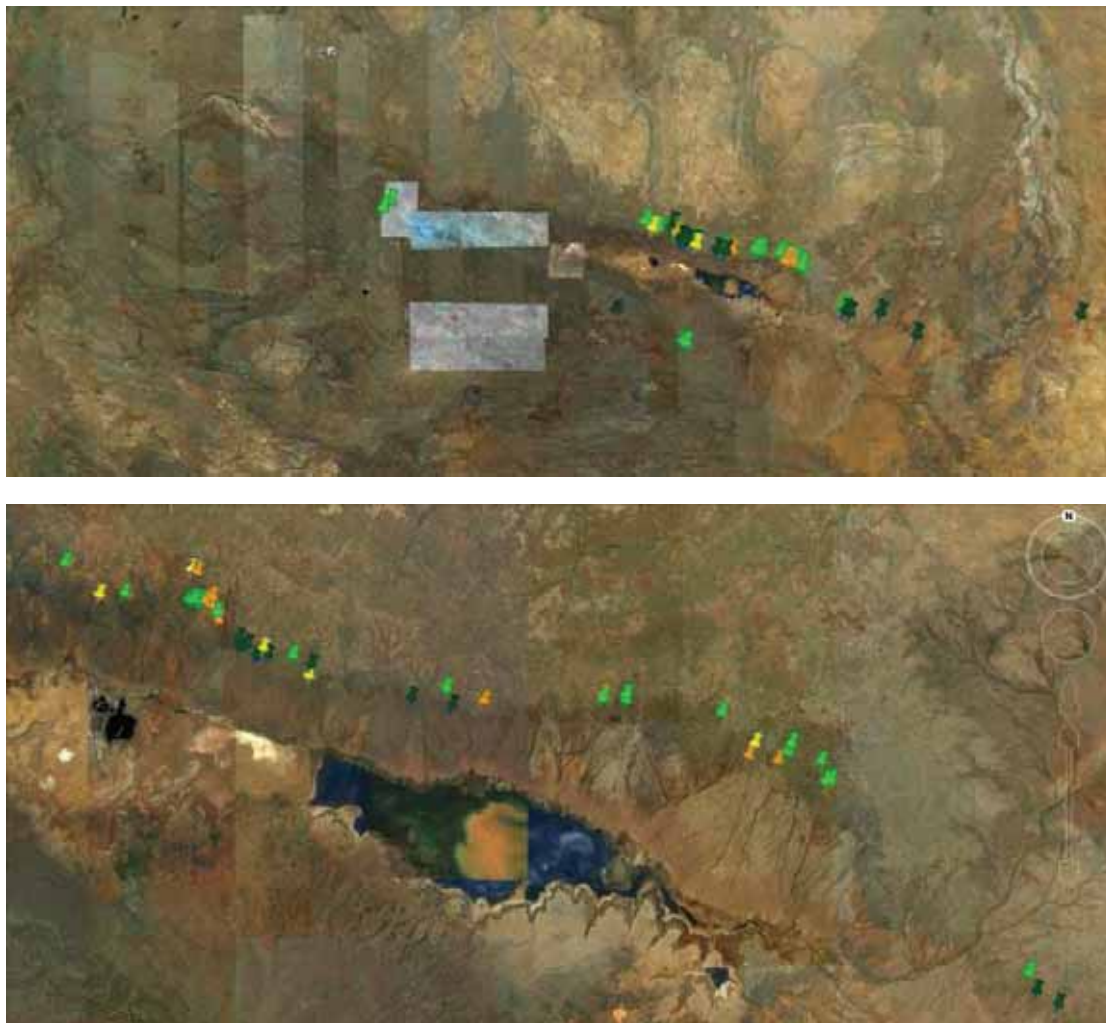


Figure 7 a & b. Distribution of Unit 2 at the 5-group five level of the local classification
Notes. The upper image gives the overall distribution and the lower image the distribution in the new data area. The different colours indicate different groups at groups at the 20-group level within Unit 2 at the 5-group level.

Unit 3 at the 5-group level and units 31, 32 and 33 at the 40-group level of the local classification

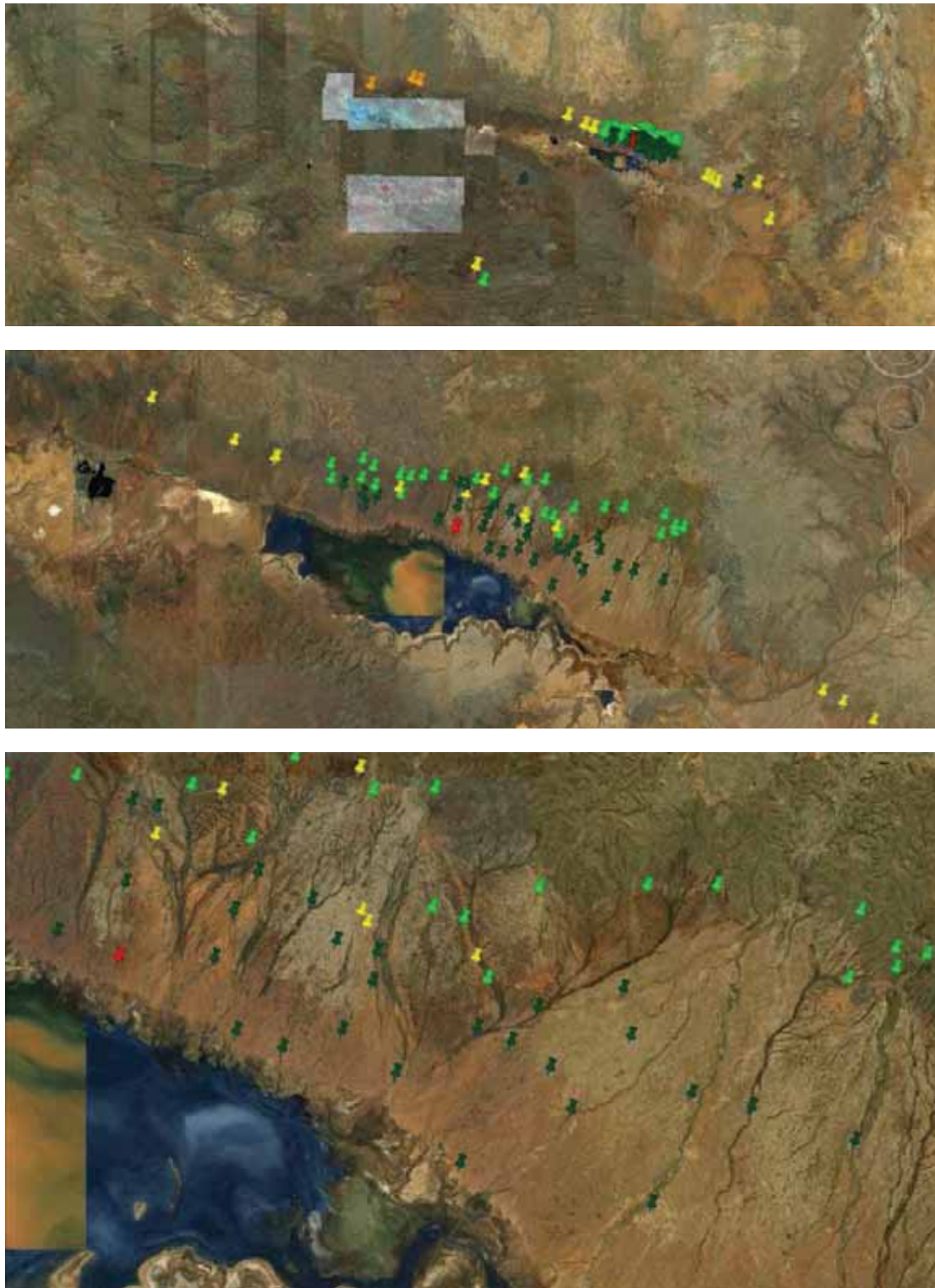


Figure 8a, b & c. Distribution of Unit 3 at the 5-group level of the local classification

Notes. The upper image gives the overall distribution and the lower images the distribution in the new data area and a local view. The different colours indicate different groups at the 20-group level; note the correlation with physiography and geology.

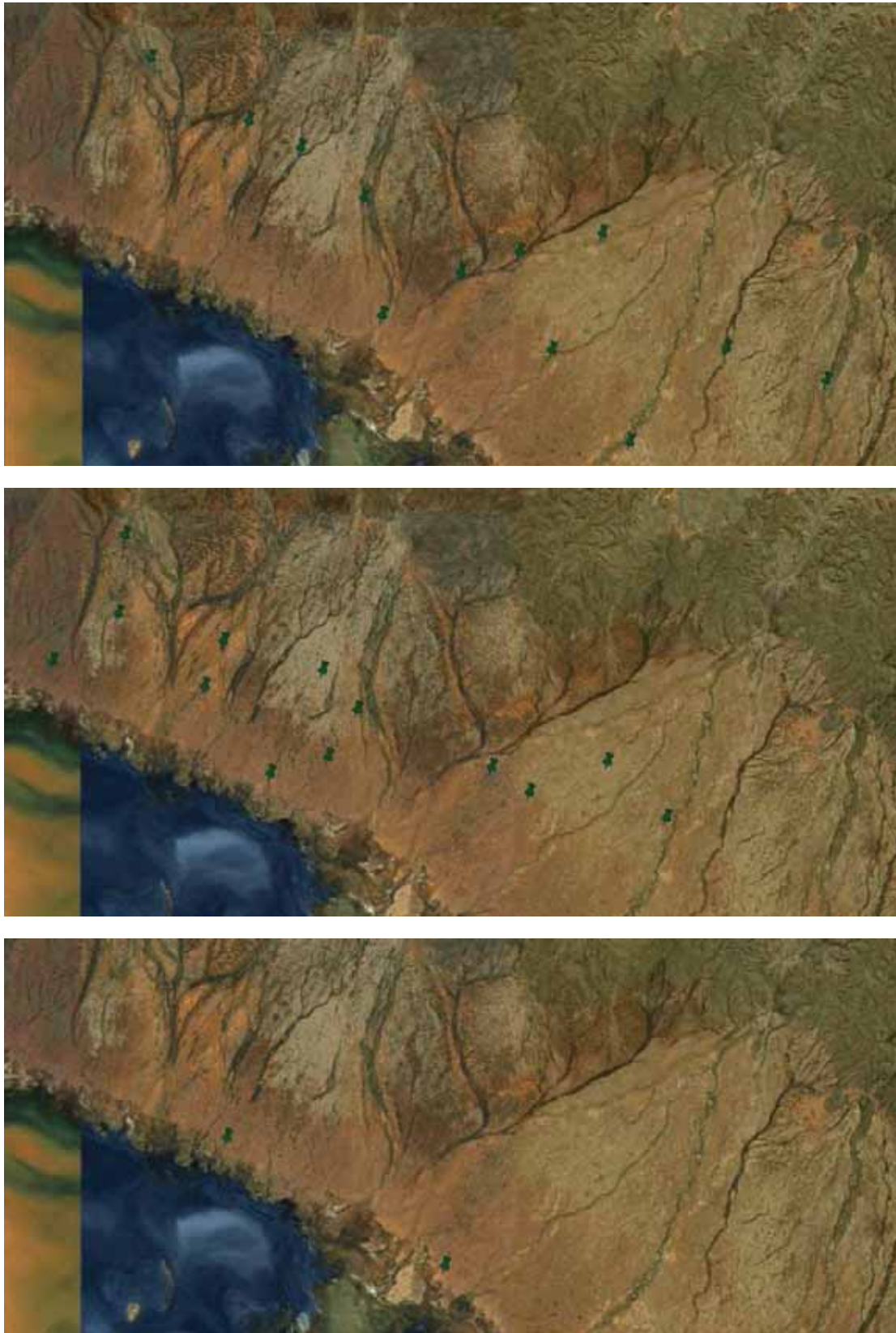


Figure 9 a, b & c. Distribution of units 31, 32 & 33 at the 40-group level of the local classification

Notes. The top image is Unit 31, the middle unit 32 and the lower is Unit 33, these are units at the 40-group level within Unit 3 of the local classification.

Unit 3 at the 5-group level of the local classification is a group of sites that is strongly faithful to the colluvial slopes of the southern edge of the Chichester Plateau with patches of

alluvium. There are strong project patterns, partly reflecting species richness and probably also geography (that is genuine differences). There are patterns associated with landform but these appear to be confounded by the project differences. There are patterns extending to the 40-group level. (It is possible to detect this, as all of these sites are from the Christmas Creek data and therefore are reasonably consistent). See figures 8a, b & c for the distribution of Unit 3 at the 5-group level and Figure 9a, b & c for units 31, 32 & 33 at the 40-group level of the local classification that are components of Unit 3 at the 5-group level.

Unit 4 at the 5-group level of the local classification

Unit 4 at the 5-group level of the local classification is a small group of Christmas Creek and reference data set sites. They are from the upper portion of the colluvial slopes and overlap geographically with Unit 3 at the 5group level. See Figure 10a & b for the distribution of Unit 4 at the 5-group level of the local classification.

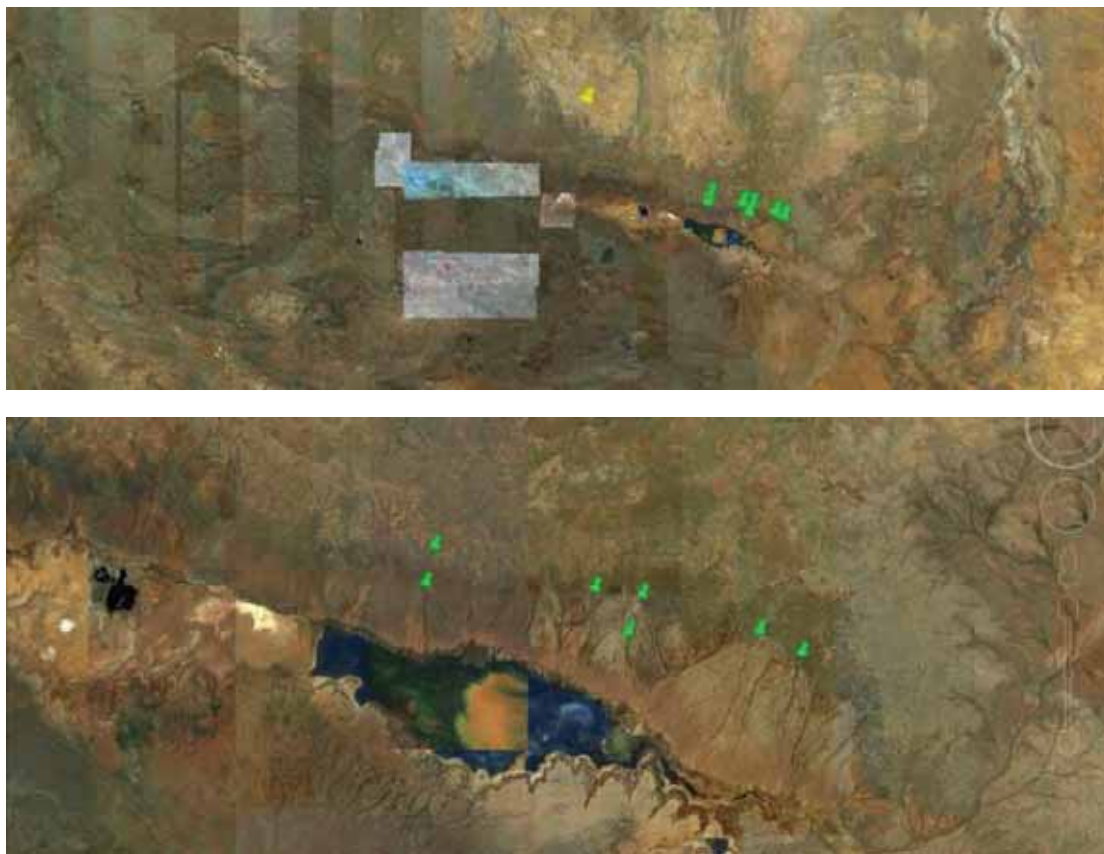


Figure 10 a & b. Distribution of Unit 4 at the 5-group level of the local classification

Notes. The upper image gives the overall distribution and the lower image the distribution in the new data area. The different colours indicate different groups at lower levels.

Unit 5 at the group five level of the local classification

Unit 5 at the 5-group level of the local classification is a group of sites in the Fortescue Marsh. The sites are dominated by halophytes and have low species diversity, as such sites predominantly are. This unit is obviously very restricted in occurrence in the data set, but is likely to occur in other parts of the marsh that are saline and seasonally wet. While the sites would have a broad relationship to saline coastal sites, the Fortescue Marsh has two *Tecticornia* species that are only known from there and south of Newman at Weelarrana Lake (Shepherd & van Leeuwen 2011) and the vegetation of this outstanding geomorphic feature is highly likely to be distinct. See Figure 11a & b for the distribution of Unit 5 at the 5-group level of the local classification.



Figure 11a & b. Distribution of unit 5 at the 5-group level of the local classification

Notes. The upper image gives the overall distribution and the lower image the distribution in the new data area. The different colours indicate different groups at groups at the 20-group level of the local classification.

The local classification shows that there is a quite good correlation between the sites allocated to different groups at a quite high level and environmental parameters such as position in the landscape and the associated factors of soil types and water relations. This

reinforces the outcome of the Nearest Neighbours allocation of sites to the 600-group level of the reference classification and the results that some groups are geographically restricted.

It needs to be clearly understood in this context that the 600-group level of the reference classification is a moderate level of classification. The 600 units defined are from data from a very wide geographic range, a very wide physical habitat range, a very wide range of underlying geology and a moderate range of climate. Therefore, it is likely that most of the 600-group level units thought to occur in the area of interest include several plant communities.

4.5 Potential new floristic groups

From a consideration of the classifications presented above and other forms of analysis, it appears that most of the Christmas Creek quadrats fit existing floristic groups. However, there was sometimes uncertainty as to which unit these quadrat should be allocated to.

On the other hand, a number of sites with a high level of uncertainty in allocation to a unit using the Nearest Neighbours methodology also appear to be distinct in the dendrogram. The Unit 5 quadrats at the 5-group level of the local classification contain several floristic groups that are not represented in the reference data set (and therefore the reference classification). This is largely a reflection that the Fortescue Marsh has not been sampled in the reference set. One of us (MET) has been able to view the Fortescue Marsh from a helicopter during a good season (but frustratingly not land). From this inspection, it is considered likely that the herblands in slightly higher (and not saline) parts of the Marsh are floristic units of restricted occurrence not sampled in the reference data set.

Additionally, a single site (site XB023 from the ENV Australia Christmas Creek data) that forms Unit 15 at the 20-group level in the local classification (that is, it is a group within Unit 3 at the 5-group level) also appears to be significantly different and to represent a floristic group not represented in the reference data set.

5.0 CONSERVATION ASSESSMENT

5.1 Assessment framework

A conservation assessment needs to be framed in an appropriate context to have proper meaning. This may consist of more than one level. In the present case, the distinctive vegetation and flora of the Pilbara Bioregion means that there is (with one possible exception) no need to go outside that bioregion. The one exception to this is in the special case of the Fortescue Marsh samphire vegetation where there is evidence that some values extend to a lake south of Newman.

Experience from earlier analyses of Pilbara floristic data and vegetation and flora surveys (e.g. Griffin & Trudgen 2005, 2009a, b, c; Trudgen & Casson 1998; Trudgen and Griffin 2001; Trudgen, Morgan & Griffin 2002) has indicated that the major physiographic units of Beard (1975) have vegetation with largely distinctive floristic composition. There is overlap, particularly at higher levels of synthesis, or where geological types occur in more than one of the major physiographic units. The largely distinctive geologies of these large scale geomorphic features and the fact that topographic (and hence habitat) variation and climatic variation coincides with them to some extent means that the observed differences are not particularly surprising. These significant differences in the vegetation of the physiographic units of Beard (1975) imply that they are a reasonable component of the context for the assessment of conservation values for vegetation in the Pilbara Bioregion. That is, they can (with an appropriate modest degree of caution) be used as boundaries to make conservation assessments.

Most of the area of interest for the current report is part of the southern slopes of the Chichester Plateau in the eastern part of the adjacent Fortescue Valley. However, the area of interest extends onto the adjoining edge of the Chichester Plateau and into the Fortescue marsh, a large seasonal water body that occupies part of the floor of the Fortescue Valley. The Chichester Plateau differs markedly in geology to the Hamersley Range on the southern side of the Fortescue Valley. While the Chichester Plateau is mainly made from volcanic rocks, the Hamersley Range is mainly composed of banded ironstones (although there are areas of volcanics and other rocks. The section of the plateau slopes concerned varies, in that part has a narrow strip of banded ironstones along the upper edge and part does not. This section of the plateau slopes also differs from most of those outside the area of interest in that it has well developed alluvial fans. These alluvial fans presumably differ in soil

characteristics from those on the southern side of the Fortescues Valley (on the north facing slopes of the Hamersley Range) due to the different source rocks involved.

While the broad scale geomorphology of the area of interest undoubtedly has important connotations for assessing its conservation value for vegetation (as discussed above), this will not be fully relied upon in this report, as knowledge of the level of restriction of individual vegetation types to these physiographic areas is not detailed enough at this time to do so. The appropriate methodology is to use the physiographic information at a broad level and then look at other data to test this and to provide information at a lower level.

Therefore, the more detailed conservation assessments for vegetation made in this report will mainly be based on the floristic groups defined at the 600-group level of the reference classification (the classification of the reference data set of 2,883 sites from across the Pilbara Bioregion given in Griffin & Trudgen 2009a & b), with some modification based on the local classification. The investigations of the results of the analysis given in Griffin & Trudgen (2009a & b) indicate that the 600-group level of the analysis is an appropriate basis for such assessments. It is likely that in most cases where a floristic group at the 600-group level is only recorded in the regional analysis from one of Beard's physiographic regions that it is restricted to that region.

5.2 Broad level vegetation conservation assessment based on physiographic features

The southern slopes of the Chichester Plateau in the area of interest for this report are (as noted above) most of the section of these slopes with well-developed alluvial fans. They form a physiographic feature called a *bajada*, a compound group of alluvial fans, this feature is likely to drive the vegetation values of the area of interest. The source rock for these fans is largely the volcanic rocks of the Chichester Plateau, although for part of the area of interest there is also a thin band of banded ironstone along the upper slopes and Chichester Plateau edge. Such physiographic and soil factors are strong determinants of vegetation development, and imply that there will be vegetation types restricted to or best developed in this area. The difference in soil and aspect of the alluvial fans in the area of interest compared to those along the northern slopes of the Hamersley Range (largely derived from banded ironstones) strongly suggests that the vegetation of these superficially similar structures will be quite different.

The Fortescue Marsh is another large physiographic feature, one that is clearly unique in the Pilbara Bioregion. This alone suggests that it would have vegetation values that are of high conservation value. This is supported by the presence of *Tecticornia* (samphire) species that are only known from this marsh and one salt lake south of Newman. However, the vegetation values are likely to be broader than those that are dependant on the two *Tecticornia* species involved.

5.3 Broad level vegetation conservation assessment based on Mulga occurrence

Section 4.3 above discusses the distribution of Mulga in the Pilbara Bioregion, particularly one "leaf" (they are not true leaves) form referred to as *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3). For ease of reference, part of the figure in that section is repeated here as Figure 12.

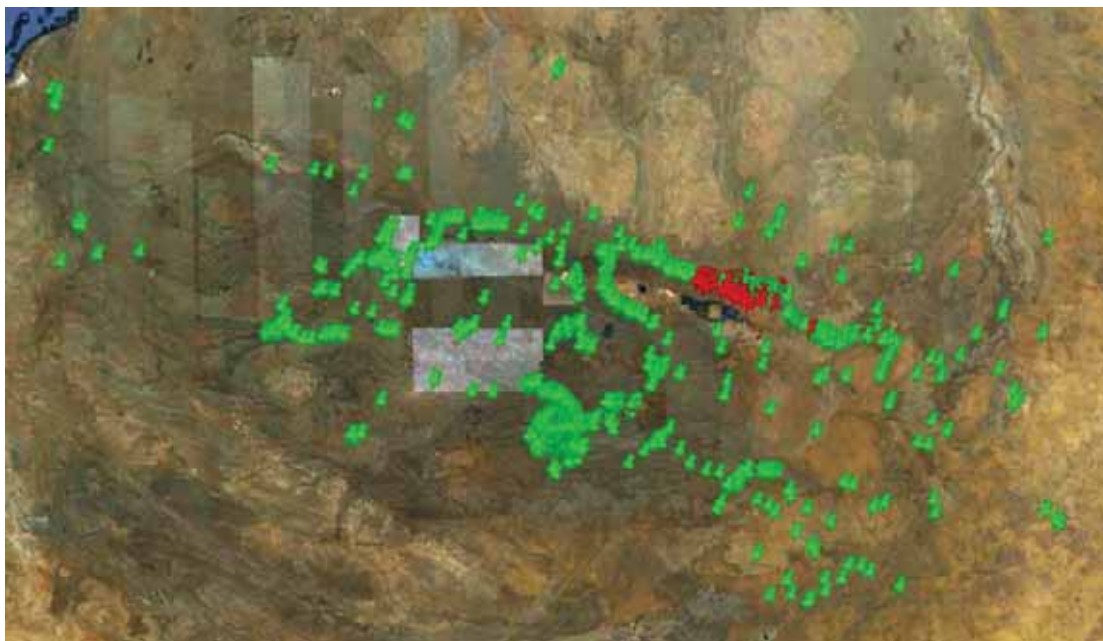


Figure 12. All Mulga taxa records in the reference data set and the larger data set it is a subset of.

This figure shows that the southern slopes of the Chichester Range are the northern boundary in the Pilbara Bioregion for extensive, well-developed Mulga stands. Note that the word Mulga has use both as a broad vegetation type dominated in different places by different forms (species, subspecies) and as a common name for those forms. So while "Mulga" occurs north of the southern slopes of the Chichester Plateau, this area is the northern limit for well-developed stands (including from inspection of Google Earth imagery, of groved Mulga stands). Coupled with the assessment in the previous section, this suggests the likelihood of significant value for Mulga stands in this area. That is such stands are likely to

differ in floristic composition from superficially similar ones further south due to the somewhat different soils they occur on.

This analysis is supported by the distribution of *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3). The main occurrence of this form is coloured red on Figure 12 (some other occurrences are obscured by the larger number of occurrences of other forms, but are shown on the figure in section 4.3 above). The distribution of this form (in the available data) is very restricted in occurrence, with most records in the area of interest for this report and a small number of records in the Hamersley Range. Clearly, the area of interest for this report has very high value for this Mulga form and vegetation dominated by it.

5.4 Conservation value for vegetation of the area of interest at the 600-group level of the reference classification

The area of interest has eighteen of the groups defined at the 600-group level of the reference classification (the classification of the 2,883 site reference data set). At this very broad level, this is a moderate to high (but not high) diversity of vegetation for the size of the area of interest.

The value of the area of interest for the individual groups at the 600-group level is summarised in Table 9. This table should be read in conjunction with the discussion and images for each group in section 4.2 above. It shows that the area of interest has very high conservation value for vegetation for seven of the groups at the 600-group level and moderate, moderate to high or high to very high conservation value for vegetation for another five of them.

It is also suggested in Table 9 that the representatives of the remaining groups may have significant value at levels below the 600-group level.

Table 9: Units at the 600-Group level of the reference (regional) classification in the area of interest, their degree of fidelity and conservation significance for this area.

Group number at the 600-group level	Number of sites in the 2,883 reference data set and the new data	Proportion of known sites in area of interest [Note that a number of the reference sites are in the area of interest.]	Conservation significance of the area of interest for the 600-group level unit
190	4 & 1	1 of 5	Low, but may be a different community to other occurrences.
253	10 & 3	3 of 13	Low, but may have different communities to other occurrences.
427	11 & 10	10 of 21 (except for 3, others also on Chichester slopes or escarpment)	High.
430	15 & 5	17 of 20 (others also on slopes)	Very high
433	8 & 9	14 of 17 (others also on slopes)	Very high
434	5 & 1	1 of 6 (others also on slopes)	Low to moderate.
435	6 & 21	21 of 27 (others also on slopes)	High to very high (the occurrences outside the area of interest seem not to have Mulga units)
"490" [Samphire unit]	3 & 46	46 of 49 (Other three sites coastal, not very similar.)	Very high, it is likely that the samphire communities of the Fortescue Marsh are very restricted in distribution.
526	6 & 7	7 of 13 (Others also on plateau edge – to west)	Moderate to high. There is likely to be some restriction of communities to the area of interest.
527	11 & 4	15 of 15	Very high
528	6 & 1	1 of 7	Moderate (It is likely that the communities on the slopes/escarpment are different to those in the Hamersley Range.)
539	3 & 4	7 of 7	Very high.
564	4 & 1	5 of 5	Very high
567	14 & 8	9 of 22 (12 others on slopes to east)	High to very high (It is likely that the sites to the east are at least partly different communities.)
568	6 & 2	8 of 8	Very high
569	6 & 2	5 of 8 (Other 3 on slopes to east)	High to very high (It is likely that the sites to the east are at least partly different communities.)
575	11 & 13	21 of 24	Very high (It is likely that the sites in the Hamersley Range are different communities.)
578	13 & 1	1 of 14	Low (But the site in the area of interest is likely to be a different community to those in the Hamersley Range.)

6. ACKNOWLEDGEMENTS

A number of mining and consulting companies have agreed to allow floristic data from a number of projects to be incorporated into the reference database used for the analyses carried out for this report. Their willingness to do so is greatly appreciated.

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8.0 APPENDICES

Appendix 1 Reconciliation of Species in Regional Analysis

Part A: Global

FCODE	NAME	lookup
	-99999	omitted
	Chara sp.	omitted
	Genus sp.	omitted
	Malvaceae sp.	omitted
	Unknown	omitted
	Unknown sp. (inadequate material)	omitted
007	Cheilanthes sp.	omitted
007	Cheilanthes sp. (inadequate material)	omitted
013	Marsilea drummondii	Marsilea hirsuta
031	? Bothriochloa	omitted
031	Amphipogon sericeus	Amphipogon sericeus (Hammersley form; MET 15,335)
031	Amphipogon sericeus (Hammersley form)	Amphipogon sericeus (Hammersley form; MET 15,335)
031	Amphipogon sericeus (Newman form BR2-21)	Amphipogon sericeus (Newman form; BR2-21)
031	Amphipogon sericeus (Newman form)	Amphipogon sericeus (Newman form; BR2-21)
031	Aristida holathera	Aristida holathera var. holathera
031	Aristida sp.	omitted
031	Aristida sp. (inadequate material)	omitted
031	Cenchrus setiger	Cenchrus setiger
031	Cenchrus setigerus	Cenchrus setiger
031	Chloris barbata	omitted
031	Cymbopogon ? ambiguus	Cymbopogon ambiguus
031	Cymbopogon ? bombycinus	Cymbopogon bombycinus
031	Cymbopogon ?obtectus	Cymbopogon obtectus
031	Cymbopogon sp.	omitted
031	Cymbopogon sp. (inadequate material)	omitted
031	Cyperochloa hirsuta	omitted
031	Dichanthium sericeum	Dichanthium sericeum subsp. humilium
031	Digitaria sp.	omitted
031	Diplachne fusca (Entry error)	Leptochloa fusca subsp. fusca
031	Enneapogon caeruleus var. caeruleus	Enneapogon caeruleus
031	Enneapogon caeruleus var. occidentalis	Enneapogon caeruleus
031	Enneapogon caeruleus var. occidentalis (large form; J.M. B	Enneapogon caeruleus
031	Enneapogon sp.	omitted
031	Enneapogon sp. (inadequate material)	omitted
031	Eragrostis ? elongata	Eragrostis elongata
031	Eragrostis aff. xerophila	Eragrostis xerophila
031	Eragrostis sp.	omitted
031	Eragrostis sp. (inadequate material)	omitted
031	Eriachne aff. benthamii	Eriachne benthamii
031	Eriachne mucronata	Eriachne mucronata (typical form)
031	Eriachne mucronata (Arid Form)	Eriachne mucronata (arid form) (MET 12 736)
031	Eriachne mucronata (large flower form)	Eriachne mucronata (typical form)
031	Eriachne mucronata (Typical Form)	Eriachne mucronata (typical form)
031	Eriachne pulchella subsp. dominii	Eriachne pulchella
031	Eriachne pulchella subsp. pulchella	Eriachne pulchella
031	Eriachne sp.	omitted
031	Eriachne sp. (inadequate material)	omitted
031	Iseilema eremaeum	Iseilema macratherum
031	Iseilema sp.	omitted
031	Panicum effusum	Panicum effusum var. effusum

FCODE	NAME	lookup
031	Panicum sp.	omitted
031	Paractaenum refractum	Urochloa piligera
031	Paspalidium sp.	omitted
031	Paspalidium tabulatum	Paspalidium tabulatum (Whim Creek form)
031	POACEAE sp.	omitted
031	Poaceae sp.	omitted
031	Poaceae sp. (CP19-3, WPI)	omitted
031	Poaceae sp. (inadequate material)	omitted
031	Setaria sp.	omitted
031	Themeda aff. triandra (MET 16 046)	Themeda aff. triandra (MET 16,046)
031	Triodia aff. epactia coffey sterile	Triodia epactia
031	Triodia aff. lanigera (dwarf habit)	omitted
031	Triodia aff. longiceps	Triodia longiceps
031	Triodia aff. pungens	Triodia pungens
031	Triodia basedowii?	Triodia basedowii
031	Triodia epactia (Form 1)	Triodia epactia
031	Triodia epactia (Form 2)	Triodia epactia
031	Triodia epactia (Form 3)	Triodia epactia
031	Triodia epactia (Form 4)	Triodia epactia
031	Triodia epactia (Form 5)	Triodia epactia
031	Triodia epactia/pungens	Triodia pungens
031	Triodia sp.	omitted
031	Triodia sp. nov.	Triodia sp. Robe River
031	Urochloa gilesii subsp. gilesii (glabrous florets)	omitted
031	Urochloa gilesii subsp. occidentalis	Urochloa occidentalis var. occidentalis
031	Urochloa occidentalis var. ciliata	Urochloa occidentalis
031	Urochloa occidentalis var. occidentalis	Urochloa occidentalis
031	Urochloa sp.	omitted
031	Urochloa sp. "glabrous apices"	omitted
031	Whiteochloa aff. airoides	Whiteochloa airoides
031	Whiteochloa cymbiformis	Whiteochloa airoides
031	Xerochloa imberbis	Xerochloa barbata
031	Xerochloa laniflora	Xerochloa barbata
031	Yakirra australiensis	Yakirra australiensis var. australiensis
032	Bulbostylis turbinata (form B; M1-16)	Bulbostylis turbinata
032	Cyperaceae sp.	omitted
032	Cyperus sp.	omitted
032	Fimbristylis ? depauperata	Fimbristylis depauperata
032	Fimbristylis leucocolea	Fimbristylis dichotoma
032	Fimbristylis sp.	omitted
087	Ficus aculeata var. indecora	Ficus opposita
087	Ficus opposita var. aculeata	Ficus opposita
087	Ficus opposita var. indecora	Ficus opposita
087	Ficus platypoda var. A	Ficus brachypoda
087	Ficus platypoda var. B	Ficus brachypoda
087	Ficus platypoda var. D	Ficus brachypoda
087	Ficus platypoda var. E	Ficus brachypoda
087	Ficus platypoda var. F	Ficus brachypoda
087	Ficus platypoda var. G	Ficus brachypoda
090	Grevillea sp.	omitted
090	Grevillea wickhamii subsp. ?	Grevillea wickhamii
090	Grevillea wickhamii subsp. aprica	Grevillea wickhamii
090	Grevillea wickhamii subsp. hispidula	Grevillea wickhamii
090	Grevillea wickhamii subsp. macrodonta	Grevillea wickhamii
090	Hakea lorea ssp. lorea	Hakea lorea subsp. lorea
092	?Santalum sp.	Santalum lanceolatum
092	Santalum sp.	Santalum lanceolatum
097	Amyema sp.	omitted
105	?Chenopodium gaudichaudianum	omitted
105	Chenopodium melanocarpum forma	Dysphania melanocarpa forma melanocarpa

FCODE	NAME	lookup
	melanocarpum	
105	Dysphania melanocarpa forma leucocarpa	Dysphania melanocarpa forma melanocarpa
105	Dysphania rhadinostachya	Dysphania rhadinostachya subsp. rhadinostachya
105	Dysphania sp.	omitted
105	Enchylaena tomentosa	Enchylaena tomentosa var. tomentosa
105	Enchylaena tomentosa x	omitted
105	Enchylaena tomentosa x Maireana georgei	omitted
105	Halosarcia ? halocnemoides subsp. tenuis	Halosarcia halocnemoides
105	Halosarcia ? pergranulata	Halosarcia pergranulata
105	Halosarcia ? pterigosperma	Halosarcia pterigosperma subsp. denticulata
105	Halosarcia auriculata	Tecticornia auriculata
105	Halosarcia halocnemoides subsp. catenulata	Halosarcia halocnemoides
105	Halosarcia halocnemoides subsp. tenuis	Halosarcia halocnemoides
105	Halosarcia indica subsp. leiostachya	Tecticornia indica subsp. leiostachya
105	Halosarcia pergranulata subsp. elongata	Halosarcia pergranulata
105	Halosarcia sp.	omitted
105	Maireana aff. georgei	Maireana georgei
105	Maireana amoena	omitted
105	Maireana luehmannii	omitted
105	Maireana planifolia x	Maireana planifolia x villosa
105	Maireana sp.	omitted
105	Maireana tomentosa	Maireana tomentosa subsp. tomentosa
105	Maireana villosa x planifolia?	omitted
105	Salsola kali	Salsola tragus
105	Salsola tragus subsp. grandiflora	Salsola tragus
105	Salsola tragus subsp. tragus	Salsola tragus
105	Sclerolaena bicornis	Sclerolaena bicornis var. bicornis
105	Sclerolaena glabra	omitted
105	Sclerolaena sp.	omitted
105	Sclerolaena sp. (inadequate material)	omitted
105	Sclerolaena sp. nov. aff densiflora	Sclerolaena densiflora
105	Tecticornia auriculata	Tecticornia auriculata
105	Tecticornia halocnemoides subsp. halocnemoides	Halosarcia halocnemoides
105	Tecticornia halocnemoides subsp. tenuis	Halosarcia halocnemoides
105	Tecticornia sp.	omitted
106	? Gomphrena sp.	omitted
106	Alternanthera denticulata	Alternanthera angustifolia
106	Alternanthera sp.	omitted
106	Alternanthera sp. (inadequate material)	omitted
106	Amaranthus ? interruptus	Amaranthus interruptus
106	Amaranthus mitchellii	Amaranthus interruptus
106	Amaranthus sp.	omitted
106	Amaranthus undulatus	Amaranthus pallidiflorus
106	Gomphrena canescens	Gomphrena canescens subsp. canescens
106	Gomphrena sp.	omitted
106	Gomphrena sp. (inadequate material)	omitted
106	Ptilotus aff. obovatus	Ptilotus obovatus
106	Ptilotus astrolasius	Ptilotus astrolasius var. astrolasius
106	Ptilotus calostachyus	Ptilotus calostachyus var. calostachyus
106	Ptilotus exaltatus	Ptilotus exaltatus var. exaltatus
106	Ptilotus fusiformis	Ptilotus fusiformis var. fusiformis
106	Ptilotus gaudichaudii	Ptilotus gaudichaudii var. gaudichaudii
106	Ptilotus helipteroides var. helipteroides	Ptilotus helipteroides
106	Ptilotus incanus var. elongatus	Ptilotus incanus
106	Ptilotus incanus var. incanus	Ptilotus incanus
106	Ptilotus murrayi	Ptilotus murrayi var. murrayi
106	Ptilotus obovatus var. obovatus	Ptilotus obovatus
106	Ptilotus polystachyus	Ptilotus polystachyus var. polystachyus
106	Ptilotus schwartzii	Ptilotus schwartzii var. schwartzii

FCODE	NAME	lookup
106	Ptilotus sp.	omitted
106	Ptilotus sp. (inadequate material)	omitted
106	Ptilotus sp. (WPI, CP50-23)	omitted
106	Ptilotus sp. LM100	omitted
107	Boerhavia aff. coccinea	Boerhavia coccinea
107	Boerhavia coccinea (form B)	Boerhavia coccinea
107	Boerhavia schomburgkiana	Boerhavia coccinea
107	Boerhavia sp.	Boerhavia coccinea
107	Boerhavia sp. (B82-6)	Boerhavia coccinea
107	Boerhavia type 1	Boerhavia coccinea
107	Boerhavia type 2	Boerhavia coccinea
110	Trianthema sp.	omitted
110	Trianthema triquetra	Trianthema triquetra var. triquetra
110A	Mollugo molluginea	Mollugo molluginea
110A	Mollugo molluginae	Mollugo molluginea
110A	Mollugo molluginea	Mollugo molluginea
110A	Mollugo molluginis	Mollugo molluginea
111	Calandrinia ?quadrialvis	Calandrinia quadrialvis
111	Calandrinia ?stagnensis	Calandrinia stagnensis
111	Calandrinia sp.	omitted
111	Portulaca sp.	omitted
111	Portulaca sp. (inadequate material)	omitted
113	Polycarpaea longiflora (pale form)	Polycarpaea longiflora
113	Polycarpaea longiflora (red form)	Polycarpaea longiflora
113	Polycarpaea longiflora (White form, M13-7)	Polycarpaea longiflora
113	Polycarpaea sp.	omitted
135	Argemone ochroleuca	Argemone ochroleuca subsp. ochroleuca
137A	Cadaba capparoides	omitted
137A	Capparis spinosa	Capparis spinosa var. nummularia
137A	Cleome uncifera	Cleome uncifera subsp. uncifera
138	Lepidium sp.	omitted
138	Stenopetalum sp.	omitted
152	Pittosporum phylliraeoides var. microcarpa	Pittosporum angustifolium
163	Acacia ? hilliana x stellaticeps (GLD(NIM)23.28)	omitted
163	Acacia ? lysiphloia x monticola (B.R. Maslin 2671)	omitted
163	Acacia aff. aneura	omitted
163	Acacia aff. aneura (scythe-shaped; MET 15,743)	Acacia aneura var. intermedia
163	Acacia aff. inaequilatera (MET 15,011)	Acacia trudgeniana
163	Acacia ancistrocarpa x stellaticeps	omitted
163	Acacia ancistrocarpa x stellaticeps	omitted
163	Acacia ancistrocarpa x trachycarpa	omitted
163	Acacia aneura var. ?	omitted
163	Acacia aneura var. microcarpa	omitted
163	Acacia atkinsiana X tenuissima	omitted
163	Acacia bivenosa x sclerosperma	omitted
163	Acacia colei x elachantha	omitted
163	Acacia coriacea	Acacia coriacea subsp. coriacea
163	Acacia elachantha (golden hairy variant)	Acacia elachantha
163	Acacia elachantha (golden hairy variant)	Acacia elachantha
163	Acacia elachantha (golden hairy variant)	Acacia elachantha
163	Acacia elachantha (silvery hairy variant)	Acacia elachantha
163	Acacia eriopoda x monticola (B.R. Maslin 7322)	omitted
163	Acacia hamersleyensis	Acacia hamersleyensis (bushy form)
163	Acacia hamersleyensis (spindly form)	Acacia hamersleyensis (bushy form)
163	Acacia kempeana	omitted
163	Acacia monticola x tumida var. pilbarensis	omitted
163	Acacia morrisonii	Acacia pyrifolia var. morrisonii
163	Acacia pyrifolia	Acacia pyrifolia var. pyrifolia

FCODE	NAME	lookup
163	Acacia pyrifolia var. pyrifolia	Acacia pyrifolia var. pyrifolia
163	Acacia pyrifolia var. pyrifolia	Acacia pyrifolia var. pyrifolia
163	Acacia pyrifolia var. pyrifolia	Acacia pyrifolia var. pyrifolia
163	Acacia sericocarpa	Acacia sericophylla
163	Acacia sericophylla	Acacia sericophylla
163	Acacia sericophylla	Acacia sericophylla
163	Acacia sp.	omitted
163	Acacia sp. (inadequate material)	omitted
163	Acacia stellaticeps	Acacia stellaticeps
163	Acacia stenophylla entry error ??	Acacia stellaticeps
163	Acacia trachycarpa x tumida	omitted
163	Acacia trachycarpa x tumida var. pilbarensis	omitted
163	Acacia tumida	Acacia tumida var. pilbarensis
163	Acacia tumida subsp. ? pilbarensis x ?	omitted
163	Acacia tumida var. pilbarensis	Acacia tumida var. pilbarensis
163	Neptunia aff. dimorphantha (M27)	Neptunia dimorphantha
163	Vachellia farnesiana	Vachellia farnesiana
163	Vachellia farnesiana	Vachellia farnesiana
164	Cassia ? oligophylla x	omitted
164	Cassia ? oligophylla x glaucifolia	omitted
164	Cassia ?glaucifolia x aff. oligophylla (thinly sericeous)(FMR29-11)	omitted
164	Cassia aff. oligophylla (thinly sericeous) x helmsii	omitted
164	Cassia glaucifolia x ? (site 626)	omitted
164	Cassia glaucifolia x glutinosa	omitted
164	Cassia glutinosa x luerksenii	omitted
164	Cassia glutinosa x 'stricta'	omitted
164	Cassia hamersleyensis	Senna hamersleyensis
164	Cassia hamersleyensis x sp. Karajini (MET 10 392)	Senna hamersleyensis X sp. Karajini(M.E. Trudgen 10392) .
164	Cassia helmsii x	omitted
164	Cassia helmsii x 'stricta'	omitted
164	Cassia luerksenii x 'stricta'	omitted
164	Cassia oligophylla x	omitted
164	Cassia oligophylla x glutinosa (FMG116-02)	omitted
164	Cassia oligophylla x helmsii (FMR75-01)	omitted
164	Cassia pruinosa x ?glutinosa	omitted
164	Cassia pruinosa x luerksenii	omitted
164	Cassia sp. Karajini (MET 10,392)	Senna sp. Karajini (M.E. Trudgen 10392)
164	Cassia sp. West Angelas (MET 16,115)	Senna sp. West Angeles (M.E.Trudgen 16,115)
164	Senna artemisioides aff. subsp. oligophylla x helmsii	Senna artemisioides subsp. oligophylla x helmsii
164	Senna artemisioides subsp. ? oligophylla x	omitted
164	Senna artemisioides subsp. aff. oligophylla (thinly sericeous)	Senna artemisioides aff subsp oligophylla (thinly sericeous)
164	Senna artemisioides subsp. oligophylla (thinly sericeous)	Senna artemisioides aff subsp oligophylla (thinly sericeous)
164	Senna artemisioides subsp. oligophylla x glutinosa	omitted
164	Senna artemisioides subsp. oligophylla x glutinosa	omitted
164	Senna ferraria x glaucifolia	omitted
164	Senna glaucifolia x aff. oligophylla (thinly sericeous FMR 29-11)	omitted
164	Senna glutinosa	Senna glutinosa subsp. glutinosa
164	Senna glutinosa subsp. glutinosa x luerksenii	omitted
164	Senna glutinosa subsp. glutinosa x stricta	omitted
164	Senna glutinosa subsp. luerksenii x pruinosa	omitted
164	Senna glutinosa subsp. luerksenii x stricta	omitted

FCODE	NAME	lookup
164	<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	<i>Senna glutinosa</i> subsp. <i>luerssenii</i>
164	<i>Senna</i> sp.	omitted
164	<i>Senna</i> sp. (inadequate material)	omitted
165	? <i>Glycine</i> sp.	omitted
165	<i>Crotalaria medicaginea</i> (Burrup form; B65-11)	<i>Crotalaria medicaginea</i>
165	<i>Crotalaria medicaginea</i> (Cape Preston form; M63-12)	<i>Crotalaria medicaginea</i>
165	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	<i>Crotalaria medicaginea</i>
165	<i>Crotalaria</i> sp.	omitted
165	<i>Crotalaria trifoliastrium</i>	<i>Crotalaria medicaginea</i>
165	<i>Cullen</i> sp.	omitted
165	<i>Desmodium</i> sp.	omitted
165	<i>Gompholobium polyzygum</i>	<i>Gompholobium</i> sp. Pilbara (N.F Norris 908)
165	<i>Indigastrum parviflorum</i> (Cape Preston form; M23-12)	<i>Indigastrum parviflorum</i>
165	<i>Indigofera monophylla</i>	omitted
165	<i>Indigofera monophylla</i> (forma)	omitted
165	<i>Indigofera monophylla</i> (PAN57-9)	<i>Indigofera monophylla</i> (FMR35-01)
165	<i>Indigofera</i> sp.	omitted
165	<i>Indigofera</i> sp. (HD19)	omitted
165	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	<i>Indigofera monophylla</i> (BRO 46-12)
165	<i>Kennedia</i> cf. <i>prorepens</i> (HD284-7)	<i>Kennedia prorepens</i>
165	<i>Papillionaceae</i> sp.	omitted
165	<i>Rhynchosia minima</i>	<i>Rhynchosia minima</i> var. <i>australis</i>
165	<i>Rhynchosia minima</i> var. aff. <i>australis</i>	<i>Rhynchosia minima</i> var. <i>australis</i>
165	<i>Senna hamersleyensis</i> X sp. Karijini(M.E. Trudgen 10392) .	omitted
165	<i>Swainsona</i> sp.	omitted
165	<i>Tephrosia</i> aff. <i>densa</i>	omitted
165	<i>Tephrosia</i> aff. <i>supina</i>	omitted
165	<i>Tephrosia</i> aff. <i>supina</i> (HD88-4)	<i>Tephrosia</i> aff. <i>supina</i> (HD237-23)
165	<i>Tephrosia rosea</i>	omitted
165	<i>Tephrosia</i> sp.	omitted
165	<i>Tephrosia</i> sp. (HD133)	omitted
165	<i>Tephrosia</i> sp. (inadequate material)	omitted
165	<i>Tephrosia supina</i> (06BP45-006)	omitted
165	<i>Vigna</i> sp.	omitted
165	<i>Vigna</i> sp. central (M.E. Trudgen 1626)	<i>Vigna lanceolata</i> var. <i>latifolia</i>
165	<i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)	<i>Vigna lanceolata</i> var. <i>latifolia</i>
165	<i>Zornia</i> sp.	omitted
167	<i>Erodium cygnorum</i>	<i>Erodium cygnorum</i> subsp. <i>cygnorum</i>
167	<i>Senna glaucifloia</i> x <i>ferraria</i>	omitted
168	<i>Senna helmsii</i>	<i>Senna artemisioides</i> subsp. <i>helmsii</i>
169	<i>Senna stricta</i> x <i>glutinosa</i>	omitted
173	<i>Tribulus</i> sp.	omitted
173	<i>Tribulus</i> sp. (inadequate material)	omitted
173	<i>Zygophyllum retivalve</i>	<i>Zygophyllum iodocarpum</i>
173	<i>Zygophyllum</i> sp.	<i>Zygophyllum iodocarpum</i>
183	<i>Polygala isingii</i>	<i>Polygala</i> aff. <i>isingii</i>
183	<i>Polygala</i> sp.	omitted
185	<i>Adriana tomentosa</i>	<i>Adriana urticoides</i> var. <i>urticoides</i>
185	<i>Adriana tomentosa</i> var. <i>tomentosa</i>	<i>Adriana urticoides</i> var. <i>urticoides</i>
185	<i>Adriana urticoides</i> var. <i>hookeri</i>	<i>Adriana urticoides</i> var. <i>urticoides</i>
185	<i>Euphorbia</i> aff. <i>australis</i>	omitted
185	<i>Euphorbia</i> aff. <i>boophthona</i> (large seed form)	<i>Euphorbia boophthona</i> (Large seed form)
185	<i>Euphorbia</i> aff. <i>myrtoides</i>	omitted
185	<i>Euphorbia alsiniflora</i>	<i>Euphorbia coghlanii</i>
185	<i>Euphorbia australis</i> (mid-green form)	<i>Euphorbia australis</i> (mid-green form)

FCODE	NAME	lookup
185	<i>Euphorbia australis</i> subsp. <i>glaucescens</i> (MS?)	omitted
185	<i>Euphorbia biconvexa</i>	<i>Euphorbia coghlanii</i>
185	<i>Euphorbia</i> sp.	omitted
185	<i>Euphorbia</i> sp. (inadequate material)	omitted
185	<i>Euphorbia</i> sp. (Site 1089)	<i>Euphorbia</i> sp. (site 1089)
185	<i>Euphorbia</i> sp. (site 1089)	<i>Euphorbia</i> sp. (site 1089)
185	<i>Euphorbia tannensis</i>	omitted
185	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Hammersley form)
185	<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	<i>Leptopus decaisnei</i> var. <i>orbicularis</i>
185	<i>Sauropus</i> sp.	omitted
207	<i>Alectryon oleifolius</i>	<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>
207	<i>Dodonaea lanceolata</i>	<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>
220	<i>Corchorus</i> aff. <i>lasiocarpus</i> subsp. <i>parvus</i>	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>
220	<i>Corchorus</i> aff. <i>parviflorus</i>	<i>Corchorus</i> aff. <i>parviflorus</i>
220	<i>Corchorus</i> aff. <i>parviflorus</i> (JW011-11)	<i>Corchorus</i> aff. <i>parviflorus</i>
220	<i>Corchorus</i> aff. <i>parviflorus</i> (JW11-11)	<i>Corchorus</i> aff. <i>parviflorus</i>
220	<i>Corchorus</i> aff. <i>walcottii</i> Michi	omitted
220	<i>Corchorus incanus</i>	<i>Corchorus incanus</i> subsp. <i>incanus</i>
220	<i>Corchorus incanus</i> subsp. <i>incanus</i>	<i>Corchorus incanus</i> subsp. <i>incanus</i>
220	<i>Corchorus incanus</i> subsp. <i>incanus</i>	<i>Corchorus incanus</i> subsp. <i>incanus</i>
220	<i>Corchorus lasiocarpus</i> var. <i>lasiocarpus</i>	<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>
220	<i>Corchorus sidoides</i>	omitted
220	<i>Corchorus</i> sp.	omitted
220	<i>Corchorus</i> sp. (inadequate material)	omitted
220	<i>Triumfetta</i> ? <i>centralis</i>	omitted
220	<i>Triumfetta appendiculata</i> (Burrup Form)	<i>Triumfetta appendiculata</i>
220	<i>Triumfetta appendiculata</i> (Mardie form)	<i>Triumfetta appendiculata</i>
220	<i>Triumfetta appendiculata</i> (Red Hill form)	<i>Triumfetta appendiculata</i>
220	<i>Triumfetta</i> cf. <i>propinqua</i> (B13-13)	omitted
220	<i>Triumfetta</i> sp.	omitted
220	<i>Triumfetta</i> sp. (inadequate material)	omitted
221	<i>Abutilon</i> aff. <i>dioicum</i>	<i>Abutilon dioicum</i>
221	<i>Abutilon</i> aff. <i>fraseri</i> (1)	<i>Abutilon fraseri</i>
221	<i>Abutilon</i> aff. <i>fraseri</i> (site 1212)	<i>Abutilon fraseri</i>
221	<i>Abutilon</i> aff. <i>lepidium</i>	omitted
221	<i>Abutilon</i> aff. <i>lepidum</i> (1)	<i>Abutilon</i> aff. <i>lepidum</i> (1) (MET 15 352)
221	<i>Abutilon</i> aff. <i>lepidum</i> (4)	<i>Abutilon macrum</i>
221	<i>Abutilon otocarpum</i>	<i>Abutilon otocarpum</i> (acute leaf form)
221	<i>Abutilon oxycarpum</i>	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>
221	<i>Abutilon</i> sp.	omitted
221	<i>Abutilon</i> sp. (inadequate material)	omitted
221	<i>Hibiscus</i> aff. <i>sturtii</i>	omitted
221	<i>Hibiscus</i> aff. <i>sturtii</i> (Site B9)	omitted
221	<i>Hibiscus austrinus</i> var. <i>austrinus</i>	<i>Hibiscus austrinus</i> var. <i>austrinus</i>
221	<i>Hibiscus austrinus</i> var. <i>austrinus</i>	<i>Hibiscus austrinus</i> var. <i>austrinus</i>
221	<i>Hibiscus</i> sp.	omitted
221	<i>Hibiscus</i> sp. (inadequate material)	omitted
221	<i>Hibiscus sturtii</i>	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>
221	<i>Hibiscus sturtii</i> var. aff. <i>grandiflorus</i>	<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>
221	<i>Hibiscus sturtii</i> var. aff. <i>Platychlamys</i>	omitted
221	<i>Hibiscus sturtii</i> var. <i>platychlamys</i> (MET 15067)	omitted
221	<i>Melhania</i> sp. Burrup wrong family #	<i>Melhania</i> sp. (Burrup)
221	<i>Sida</i> ? <i>cardiophylla</i> (juvenile)	omitted
221	<i>Sida</i> ? <i>echinocarpa</i>	omitted
221	<i>Sida</i> ? <i>rohlena</i>	omitted
221	<i>Sida</i> aff. <i>cardiophylla</i>	omitted
221	<i>Sida</i> aff. <i>clementii</i>	omitted
221	<i>Sida</i> aff. <i>excedentifolia</i> (FML58-14A)	<i>Sida excedentifolia</i>
221	<i>Sida</i> aff. <i>fibulifera</i>	omitted

FCODE	NAME	lookup
221	Sida aff. fibulifera	omitted
221	Sida aff. pilbarensis (EOB46-01B)	Sida aff. pilbarensis (EOB46-01B)
221	Sida aff. spiciforme panicles (FML46-13)	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/1990 PN)
221	Sida atrovirens	Sida sp. dark green fruit (S. van Leeuwen 2260)
221	Sida calyxhymenia	Sida sp. unisexual (N.H. Speck 574)
221	Sida ectogama	Sida sp. unisexual (N.H. Speck 574)
221	Sida pilbarensis (ferruginous form)	Sida pilbarensis (ferruginous form)
221	Sida pilbarensis (ferruginous form)	Sida pilbarensis (ferruginous form)
221	Sida rohlena var. rohlena	Sida rohlena subsp. rohlena
221	Sida sp.	omitted
221	Sida sp. (inadequate material)	omitted
221	Sida sp. (WPI, CR16-27)	omitted
221	Sida sp. Articulation below (A.A. Mitchell PRP 1605)	Sida sp. Articulation below (A.A. Mitchell PRP 1605)
221	Sida sp. Excedentifolia (J.L. Egan 1925)	Sida sp. Excedentifolia (J.L. Egan 1925)
221	Sida sp. Excedentifolia (J.L. Egan 1925)	Sida sp. Excedentifolia (J.L. Egan 1925)
221	Sida sp. Pilbara (A.A. Mitchell PRP 1543)	Sida pilbarensis (ferruginous form)
221	Sida sp. Pilbara (ferruginous form)	Sida pilbarensis (ferruginous form)
221	Sida sp. 'rugose'	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/1990 PN)
221	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90) PN	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/1990 PN)
221	Sida sp. spiciform panicles (E. Leyland sn 14/8/90)	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/1990 PN)
221	Sida sp. Supplejack Station	Sida rhytidocarpa
221	Sida sp. Wittenoom (W.R. Barker 1962)	Sida arsiniata
221	Sida subarticulata	Sida sp. Articulation below (A.A. Mitchell PRP 1605)
223	Keraudrenia ?nephrosperma	Keraudrenia nephrosperma
223	Keraudrenia sp.	Keraudrenia velutina subsp. elliptica
223	Melhanian sp.	omitted
236	Frankenia irregularis	Frankenia ambita
236	Frankenia setosa	Frankenia ambita
273	Corymbia candida subsp. candida	Corymbia candida
273	Corymbia candida subsp. dipsodes	Corymbia candida
273	Corymbia deserticola	Corymbia deserticola subsp. deserticola
273	Corymbia ferriticola	Corymbia ferriticola subsp. ferriticola
273	Corymbia opaca	Corymbia hamersleyana
273	Corymbia sp.	omitted
273	Eucalyptus leucophloia	Eucalyptus leucophloia subsp. leucophloia
273	Eucalyptus sp.	omitted
273	Eucalyptus sp. (WPI, UCW1-30)	omitted
273	Malleostemon hursthousei entry error	omitted
273	Melaleuca leiocarpa	Melaleuca glomerata
276	Haloragis gossei	Haloragis gossei var. gossei
276	Haloragis gossei var. gossei	Haloragis gossei var. gossei
281	Trachymene aff. oleracea (B61)	Trachymene oleracea subsp. oleracea
281	Trachymene oleracea	Trachymene oleracea subsp. oleracea
293	Samolus repens var. floribundus	Samolus repens
303	Centaurium spicatum	Centaurium clementii
305	Tylophora flexuosa	Cynanchum sp. Hamersley (M. Trudgen 2302)
307	Bonamia media var. villosa	Bonamia sp. Dampier (A.A. Mitchell PRP 217)
307	Bonamia sp.	omitted
307	Bonamia sp. (inadequate material)	omitted
307	Bonamia sp. Dampier (A.A. Mitchell PRP 217)	Bonamia sp. Dampier (A.A. Mitchell PRP 217)
307	Bonamia sp. Dampier (A.A. Mitchell PRP 217)	Bonamia sp. Dampier (A.A. Mitchell PRP 217)
307	Convolvulus ? clementii	Convolvulus angustissimus subsp. angustissimus
307	Convolvulus ? remotus	Convolvulus angustissimus subsp.

FCODE	NAME	lookup
		angustissimus
307	Convolvulus sp.	omitted
307	Duperreya commixta	Duperreya commixta
307	Duperreya commixta	Duperreya commixta
307	Duppereya commixta	Duperreya commixta
307	Ipomoea polymorpha (Golled)	Ipomoea polymorpha
307	Ipomoea sp.	omitted
307	Operculina aequisejala	Operculina aequisejala
307	Polymeria ? lanata	Polymeria lanata
307	Polymeria aff. ambigua	omitted
307	Polymeria aff. ambigua (MET 12302)	Polymeria aff. ambigua (MET 12, 302)
307	Polymeria ambigua/calycina	Polymeria aff. ambigua (PAN 26B-20)
307	Polymeria longifolia	omitted
307	Polymeria sp.	omitted
307	Porana commixta	Duperreya commixta
310	Ehretia ? (B23-22)	Ehretia saligna var. saligna
310	Heliotropium ? conocarpum	Heliotropium conocarpum
310	Heliotropium ? cunninghamii	Heliotropium cunninghamii
310	Heliotropium ? foliatum	Heliotropium pachyphyllum
310	Heliotropium sp.	omitted
310	Heliotropium sp. (inadequate material)	omitted
310	Heliotropium sp. LM168	omitted
310	Trichodesma zeylanicum	Trichodesma zeylanicum var. zeylanicum
311	Clerodendrum sp.	Clerodendrum floribundum var. angustifolium
311	Clerodendrum tomentosum	Clerodendrum tomentosum var. lanceolatum
311A	Dicrastylis georgei	Dicrastylis cordifolia
313	Prostanthera campbellii	Prostanthera striatiflora
315	Nicotiana heterantha	Nicotiana occidentalis
315	Nicotiana occidentalis subsp. obliqua	Nicotiana occidentalis
315	Nicotiana occidentalis subsp. occidentalis	Nicotiana occidentalis
315	Nicotiana sp.	omitted
315	Nicotiana sp. (inadequate material)	omitted
315	Solanum esuriale	omitted
315	Solanum sp.	omitted
315	Solanum sp. (inadequate material)	omitted
315	Solanum sturtianum	Solanum sturtianum
316	Peplidium sp.	Peplidium sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)
316	Stemodia sp.	Stemodia grossa
316	Stemodia sp. (inadequate material)	Stemodia grossa
318	Josephinia sp.	Josephinia sp. Marandoo (M.E. Trudgen 1554)
325	Dicladanthera sp.	Dicladanthera forrestii
325	Dipteracanthus australasicus	Dipteracanthus australasicus subsp. australasicus
325	Rostellularia adscendens subsp. adscendens var. latifolia	Rostellularia adscendens var. clementii
325	Rostellularia adscendens var. latifolia	Rostellularia adscendens var. clementii
326	Eremophila forrestii	Eremophila forrestii subsp. forrestii
326	Eremophila forrestii x latrobei	omitted
326	Eremophila fraseri subsp. parva	Eremophila fraseri subsp. fraseri
326	Eremophila latrobei	omitted
326	Eremophila latrobei x forrestii	omitted
326	Eremophila maculata	Eremophila maculata subsp. brevifolia
326	Eremophila platycalyx subsp. platycalyx	Eremophila platycalyx subsp. pardalota
326	Eremophila sp.	omitted
326	Eremophila sp. 1 (poor specimen)	omitted
326	Eremophila sp. 2 (sterile)	omitted
326	Eremophila youngii x latrobei	omitted
331	Spermacoce auriculata	Spermacoce brachystema
337	Austrobryonia pilbarensis	Mukia sp. D Flora of Australia (A.A. Mitchell)

FCODE	NAME	lookup
		PRP 1121)
337	Cucumis maderaspatanus	Cucumis maderaspatanus
337	Cucumis maderaspatanus	Cucumis maderaspatanus
337	Cucumis maderaspatanus	Cucumis maderaspatanus
337	Mukia aff. maderaspatana (1) (grey scabrid rounded)	Cucumis maderaspatanus
337	Mukia aff. maderaspatana (2) (grey scabrid serrate)	Cucumis maderaspatanus
337	Mukia aff. maderaspatana (3) (green scabrid rounded)	Cucumis maderaspatanus
337	Mukia aff. maderaspatana (4) (green not scabrid)	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. A	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. B	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. C	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. D	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. E	Cucumis maderaspatanus
337	Mukia aff. maderaspatana sp. F	Cucumis maderaspatanus
337	Mukia maderaspatana	Cucumis maderaspatanus
337	Trichosanthes cucumerina	Trichosanthes cucumerina var. cucumerina
339	Wahlenbergia queenslandica	Wahlenbergia tumidifructa
339	Wahlenbergia sp.	Wahlenbergia tumidifructa
341	Goodenia aff. cusackiana	Goodenia cusackiana
341	Goodenia aff. microptera	Goodenia microptera
341	Goodenia aff. muelleriana	Goodenia muelleriana
341	Goodenia sp.	omitted
341	Goodenia sp. (inadequate material)	omitted
341	Goodenia sp. (site 1205)	omitted
341	Goodenia sp. (site 92)	omitted
341	Goodeniaceae sp.	omitted
341	Scaevola sp.	omitted
341	Scaevola spicigera	Scaevola spinescens (broad form)
341	Scaevola spinescens	Scaevola spinescens (broad form)
345	? Ixiolaena sp.	omitted
345	Angianthus tomentosus	omitted
345	Asteraceae sp. (inadequate material)	omitted
345	Bidens pilosa	Bidens bipinnata
345	Calotis porphyroglossa	Calotis plumulifera
345	Chrysocephalum apiculatum	Chrysocephalum aff. apiculatum
345	Chrysocephalum sp.	omitted
345	Flaveria australasica	Flaveria australasica subsp. australasica
345	Flaveria australasica subsp. australasica	Flaveria australasica subsp. australasica
345	Flaveria sp. Tom Price (M.E. Trudgen 11246)	Flaveria australasica subsp. gilgai
345	Helichrysum gilesii	Chrysocephalum gilesii
345	Helichrysum luteoalbum	Helichrysum luteoalbum
345	Lactuca saligna	Lactuca serriola
345	Pentalepis aff. trichodesmoides (M.E. Trudgen 15,170)	Pentalepis trichodesmoides
345	Pluchea sp.	omitted
345	Pseudognaphalium luteoalbum	Helichrysum luteoalbum
345	Pterocaulon ? sphaeranthoides x sphacelatum	Pterocaulon sphaeranthoides
345	Pterocaulon sp.	omitted
345	Pterocaulon sp. (inadequate material)	omitted
345	Pterocaulon sphaeranthoides	Pterocaulon sphacelatum
345	Pterocaulon sphaeranthoides x sphacelatum	Pterocaulon sphaeranthoides
345	Rutidosis helichrysoides	Rutidosis helichrysoides subsp. helichrysoides
345	Streptoglossa sp.	omitted
345	Streptoglossa sp. (inadequate material)	omitted
345	Vittadinia arida	Peripleura arida
345	Vittadinia sp.	omitted
F	Podaxis pistillaris	omitted

Part B: Project level for Christmas Creek Cloud Break and Local Classification

NAME	Project	lookup	#
<i>Cheilanthes austrotenuifolia</i>	XB	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	7

Part C: Project level for Mattiske data

NAME	Project	lookup	#
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2491	<i>Acacia aneura</i>	4
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	CD	<i>Acacia aneura</i>	2
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	XB	<i>Acacia aneura</i>	51
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	2491	<i>Acacia aneura</i>	34
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	271	<i>Acacia aneura</i>	4
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	550AA	<i>Acacia aneura</i>	15
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	BC	<i>Acacia aneura</i>	2
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	CD	<i>Acacia aneura</i>	17
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	ENP2679AA	<i>Acacia aneura</i>	4
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	EP00550AA	<i>Acacia aneura</i>	15
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	FMG-2006	<i>Acacia aneura</i>	1
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	WAMTROB	<i>Acacia aneura</i>	1
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	WASA	<i>Acacia aneura</i>	8
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	WPI	<i>Acacia aneura</i>	2
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	XB	<i>Acacia aneura</i>	27
<i>Cheilanthes austrotenuifolia</i>	XB	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	7

Appendix 2: Appendix 2 extract of Dendrogram of Christmas Creek (XB) and Cloud Break (CD) sites with reference sites

Notes. Releves highlighted. Deleted rows indicated by grey row.

PROJ	site	no_spp	gp50	gp100	gp200	gp400	gp600	data	Geo	HABITAT	VEGETATION
								0.00000.24330.48670.73000.97331.21671.46001.7033			
WPI	AD007	12	16	41	86	159	242		Tp	Midslope of low rolling hills	Acacia xiphophylla open shrubland over
XB	XB023	20								Stony plain	Acacia xiphophylla and Eremophila
CAPPRE	M024	28	32	63	132	262	402		Qp	Paraburdoo LS. Stony plain.	2-10% Acacia xiphophylla over 30-50%
CAPPRE	M028	22	32	63	132	262	402		Qw	Paraburdoo LS. Stony plain.	Scattered Acacia xiphophylla low shrubs
CAPPRE	M028B	17	32	65	138	272	413		Qw	Paraburdoo LS. Stony plain	Open herbs dominated by Sclerolaena
WAFORSLO	0255	14	16	41	87	161	244		Czc	Flat area.	Acacia xiphophylla scattered tall shrubs
WAMTLEA	0521	8	16	41	87	161	244		AFjkdL	Gentle slopes.	Acacia xiphophylla high shrubland over
WPI	JW013	11	16	41	87	161	244		Qg	Drainage flat	Acacia xiphophylla high shrubland over
WAMTLEA	0418	6	16	41	87	161	244		AFm	Spur from low hill. Gentle to	Triodia wiseana hummock grassland.
WAFCBOR	1059	10	16	41	87	161	244		Qw	Mid to upper slope of a low ridge.	Acacia xiphophylla high shrubland over
WPI	AS023	7	16	41	87	161	244		Qc	Plain in undulating hills	Acacia xiphophylla low open shrubland over
WPI	CP058	14	16	41	87	161	244		Qg	Pediment of tilted mesa/rolling	Acacia xiphophylla high shrubland over
WAMTLEA	0471	8	16	41	87	162	245		AFjslg	Patches within site 470, on gentle	Eucalyptus leucophloia scattered low trees
WAMTHER	0595	6	16	41	87	162	245		Qwb	Very gently sloping area.	Triodia wiseana hummock grassland.
CD	CD06	5								Flat / Broad plain.	
CD	CDR035	2								Cracking Clay Flat.	Tall Open Shrubland of Acacia synchronicia
WASA	0627	14	45	91	180	357	537		Hm	Flowline/open gully through site	Eucalyptus leucophloia low open woodland
2490	FMG98	27	45	91	180	357	537		AFj	Plain	Eucalyptus leucophloia scattered low trees
2491	FML52	23	45	91	180	358	538		Td	Small to medium sized creek	Eucalyptus leucophloia low open woodland
2491	FML55	25	45	91	180	358	538		Td	Narrow irregular flowline between	Acacia ayersiana, A. paraneura low
FMG-2006	9GtoP9Fa	13	45	91	180	359	539		Qc	Westerly facing lower slope,	Acacia aneuraand Acacia pruinocarpa Low
FMG-2006	9GtoP9Fd	6	45	91	180	359	539		Qc	Gentle lower slope and adjacent to	Eucalyptus leucophloia Low Open Woodland
FMG-2006	9GtoP9Ff	12	45	91	180	359	539		Qc	Variant of P9GtpP9Fd. Lower	Eucalyptus leucophloia Low Open Woodland
WAMTROB	1210	22	45	91	181	360	540		Hm	Lower slope gentle (-moderate),	Acacia pruinocarpa, Acacia aff. aneura
2491	FML53	14	45	91	181	360	540		Td	Southerly facing slopes of a low	Grevillea berryana scattered tall shrubs
WAMTROB	1211	22	45	91	181	361	541		Czc	North facing colluvial slopes.	Corymbia deserticola scattered low trees
CD	CDR018	9								Flat / Broad plain.	High Open Shrubland of Acacia aff. Aneura
EP00550AA	INV031	16	45	92	183	364	544		Qa	flat plain	Scattered Low Trees of Corymbia
EP00550AA	INV018	11	45	89	177	354	532		Qa	flat plain	Tall Open Scrub of Acacia aff. aneura
EP00550AA	INV016	14	45	92	183	363	543		Qa	Low-lying, crabhole flats	Low Open Forest of Acacia aff. aneura
2491	FMN-MB	40	47	96	192	378	567		Qc	Breakaway (low, to 4 m) on east	Acacia aneura tall open shrubland over
EP00550AA	INV039	34	45	92	183	364	545		Czc	Valley floor, Plain	Tall Open Scrub of Acacia aff. aneura
EP00550AA	INV051	23	45	92	183	364	545		Qa	Relatively flat, low lying	Low Woodland of Acacia aff. aneura (narrow
WAGEORIV	0021	13	3	9	21	43	72		Qaa	Bed and Banks; of a branch of a	Eucalyptus camaldulensis var. obtusa open
WAGEORIV	0023	17	3	9	21	43	72		Qaa	Cobbly bed of a branch of a	Eucalyptus camaldulensis var. obtusa low
550AA	1RAIL110	22	7	22	43	83	128		Pb	Major drainage line E-W	Woodland of Eucalyptus camaldulensis var.
550AA	1RAIL104	26	7	22	43	82	127		AFtc	minor drainage N-S	Low Woodland of Eucalyptus camaldulensis
550AA	1RAIL091	37	7	22	43	82	126		AFm	Drainage line, steep on western	Open Forest of Eucalyptus camaldulensis
HDRAIL	H211	44	7	22	43	82	127		Qa	Floodplain within broad river bed.	Cullen leucanthum closed scrub over
HDRAIL	H213	48	7	22	43	82	127		AFm	Banks of multiple channel	Eucalyptus camaldulensis open woodland
FMG-2006	Ac1Ac5-2	22	7	22	44	84	130		Qa	Drainage line approx 80m wide	Eucalyptus camaldulensis var. obtusa, and
FMG-2006	Ac4-2	23	7	22	44	84	130		Agm	Drainage line approx 10m wide	Erythrina vespertilio, Eucalyptus victrix
FMG-2006	Ac2Ch870	13	7	22	44	84	130		Qeg	On creek river bed.	Eucalyptus camaldulensis var. obtusa Open
FMG-2006	AC56Ch87	24	7	22	44	84	130		Qa	Creek bed - braided	Acacia trachycarpa Low Open Woodland over
550AA	KR114	28	7	22	44	84	130		KgmX	Creek bed and flow line islands	Tall Shrubland of Acacia ampliceps and
550AA	RAIL112	17	7	22	44	84	130		Agm	Major Drainage line N-S	Open Woodland of Eucalyptus xerothermica
550AA	RAIL000	13	7	22	44	85	131		Qa	Major drainage line M-S	Tall Open Scrub of Acacia trachycarpa,

PROJ	site	no_spp	gp50	gp100	gp200	gp400	gp600	data	Geo	HABITAT	VEGETATION
								0.00000.24330.48670.73000.97331.21671.46001.7033			
550AA	RAIL109	7	7	22	44	85	131		Agm	Small rise	Tall Open Scrub of Acacia trachycarpa and
HDRAIL	H062	43	7	22	43	83	128		Qa	Shallow island in sandy river bed.	Eucalyptus camaldulensis scattered low
HDRAIL	H143	43	7	22	43	83	128		Qa	Riverbank	Eucalyptus victrix woodland over Melaleuca
HDRAIL	H064	33	7	22	43	83	128		Qa	Sandy bank of major river (Turner	Eucalyptus victrix scattered low trees
HDRAIL	H220	39	7	22	43	83	128		Qa	River channel and raised 'islands'	Eucalyptus victrix open woodland over
550AA	RAIL120b	29	7	22	43	83	128		Qa	Major drainage line N-S	Low Open Forest of Melaleuca argentea,
314	SPH-06	32	7	21	41	78	121		Alf	Sandy bed of a drainage line in a	Melaleuca argentea open woodland over open
314	SPH-10	26	7	21	41	78	121		Alf	Floodbank area adjacent to a sandy	Scattered low trees of Melaleuca argentea
550AA	8RAIL096	34	8	26	53	101	158		Qa	Major drainage line running north-	Open Woodland of Eucalyptus leucophloia
WPI	CP031	29	8	26	53	101	159		Qa	Creek/drainage line	Eucalyptus victrix woodland over mixed
WPI	KB021	54	8	26	53	101	159		Qa	Large river bed and banks	Eucalyptus camaldulensis var. obtusa and
WPI	TC008	29	8	26	53	101	159		Qc	River bed	Eucalyptus victrix woodland over Melaleuca
WPI	HR044	35	8	26	53	101	159		Qc	River	Eucalyptus victrix woodland over Melaleuca
301A	BUN05	31	8	26	53	101	159		Q1	Wide creekline - seasonal water	Eucalyptus victrix open woodland over
308	MATH14	42	7	22	43	83	129		Qr	Broad river bed	Eucalyptus camaldulensis low open woodland
378	BUN60	20	8	26	53	100	156		Q1	Pebbly, cobbly scoured river bed.	Eucalyptus victrix scattered trees over
WPI	CP508	33	7	22	43	83	129		Qr	Robe river bed	Eucalyptus camaldulensis var. obtusa open
308	MEAS08	59	7	22	43	83	129		Q1	River channel, banks of one	Eucalyptus camaldulensis low open forest
CD	CDR002	8								Drainage line.	Scattered Low Trees of Eucalyptus victrix
CD	CDR007	12								Creekline (Major).	Low Open Woodland of Eucalyptus victrix
CD	CDR031	9								Drainage Line.	Scattered Eucalyptus victrix over Acacia
CD	CDR004	8								Creekline (Major).	Low Open Woodland of Eucalyptus victrix
CD	CDR005	8								Creekline (Major).	Low Open Woodland of Eucalyptus victrix
CD	CDR036	10								Creekline (Major).	Low Open Woodland of Eucalyptus victrix,
CD	CDR014	9								Creekline (Major).	Low Open Woodland of Eucalyptus victrix
CD	CDR026	9								Creekline.	Woodland of Eucalyptus victrix over Acacia
CD	CDR009	9								Creekline (Major).	Scattered Low Trees of Eucalyptus victrix
CD	CDR023	7								Creekline (Major).	Low Open Woodland of Eucalyptus victrix
550AA	RAIL999	7	7	22	44	85	131		Agm	Flat plain/low lying/semi drainage	Woodland of Eucalyptus victrix to 20m over
XB	XBCMNO1	9								Creekline	
XB	XBCMNO2	14								Creekline	
XB	XBCMNO3	15								Creekline	
XB	XBMNO1	6								Creek bed	
XB	XBMNO4	4								Creek bed	
XB	XBMNO2	4								Creek bed	
XB	XBMNO3	5								Creek bed	
XB	XB009	29								River/ large creek	Eucalyptus victrix and Acacia coriacea
XB	XBRH03	32								Creek bed	
XB	XBRH04	25								Minor drainage line	
XB	XBRH08	26								Creek bed	
XB	XBRH12	30								Creek bed	
XB	XBRH11	31								Creek bed	
XB	XBRH09	30								Creek bed	
XB	XBRH10	21								Creek bed	
WAMTLEA	0487	10	17	42	88	163	246		AFm	Mid-lower slope.	Eucalyptus leucophloia low open woodland
WPI	CW007	8	17	42	88	163	246		Tp	West facing upper to mid slope of	Eucalyptus leucophloia ssp. leucophloia
308	WAR03	10	17	42	88	163	246		Tp	Gentle east-facing lower slope of	Eucalyptus leucophloia subsp. leucophloia
WPI	ASN032	10	16	41	85	157	239		Qc	Highly dissected drainage	Eucalyptus leucophloia and Corymbia
WAMTLEA	0501	12	20	45	96	183	277		Eer	Flat-gently sloping hilltop.	Eucalyptus leucophloia scattered low trees
WAHAMPAR	1092	16	1	5	14	31	51		Aft	Low ridge, gentle slope.	Corymbia hamersleyana low open woodland
CD	CD22	3								Hill top / Upper Hill slope.	
WAGEORIV	0187	9	13	33	66	123	190		AFjsl	Upper branch of a creek.	Eucalyptus leucophloia low open woodland
WAGEORIV	0207	12	13	33	66	123	190		Qaa	Creek with well defined channel	Eucalyptus leucophloia open woodland over
CD	CD21	10								Flat / Broad plain.	

PROJ	site	no_spp	gp50	gp100	gp200	gp400	gp600	data	Geo	HABITAT	VEGETATION
								0.00000.24330.48670.73000.97331.21671.46001.7033			
CD	CD23	10								Flat / Broad plain with nearby	
EP00550AA	INV019a	16	22	48	105	205	314		AFj	Very gently sloping up to the east	Scattered Shrubs of Acacia atkinsiana,
WAGEORIV	0210	20	13	33	66	123	190		AFjo	Low shale hills.	Eucalyptus leucophloia scattered low trees
WAGEORIV	0215	10	13	33	66	123	190		Qaa	Flat area.	Eucalyptus leucophloia scattered low trees
550AA	8RAIL093	13	44	88	175	349	526		Czr	Gently sloping up to the south to	Scatetred Low Trees of Corymbia
BC	BCQ69	21	44	88	175	349	526		AHm	Crest and upper slopes of rise	Eucalyptus leucophloia subsp leucophloia
BC	BCQ70	27	44	88	175	349	526		AHm	Gentle to moderate, south facing	Eucalyptus leucophloia subsp leucophloia
EP00550AA	INV034	18	44	88	175	349	526		AFj	Low hill of Chichester Ranges,	Scattered Low Trees of Eucalyptus
EP00550AA	INV037	17	44	88	175	349	526		AFj	Hill top, low rise, gently sloping	Scattered Shrubs of Acacia maitlandii to
EP00550AA	INV083	13	44	88	175	349	526		AHm	Hill top ridge running n-s approx	Scattered Low Trees of Eucalyptus
FMG-2006	9GtoP9Fb	11	44	88	175	350	527		Qc	Westerly facing lower slopes of a	Acacia aneura Scattered Tall Shrubs over
FMG-2006	P9G	22	44	88	175	350	527		Czr	Gentle slope facing east on the	Acacia pruinocarpa Tall Open Shrubland
2491	FMR68	21	44	88	175	350	527		Czr	Upper slopes and crest of a low	Hakea chordophylla, Acacia pruinocarpa,
2491	FMR74	23	44	88	175	350	527		AHm	Upper slopes and crest of a hill	Eucalyptus leucophloia, Hakea
FMG-2006	9GtoP9Fk	21	44	88	175	350	527		Czr	Moderatley to steep westerly	Eucalyptus leucophloia scattered low trees
FMG-2006	9GtoP9FL	23	44	88	175	350	527		AHm	Steep slope and shoulder of a	Eucalyptus leucophloia, Hakea chordophylla
FMG-2006	P9H	26	44	88	175	350	527		AHm	Hill top	Corymbia hamersleyana Low Open Woodland
FMG-2006	9GtoP9Fm	12	44	88	175	350	527		AHm	n/a	Gompholobium karijini and Goodenia
FMG-2006	P9R	20	28	56	117	232	359		AHm	Gently sloping, west facing	Acacia inaequilatera Tall Shrubland over
FMG-2006	9GtoP9Fn	15	44	88	175	351	528		AHm	Southerly facing lower slopes into	Eucalyptus leucophloia scattered low trees
2491	FMG113	37	29	59	124	247	381		Czc	Gently sloping, NW-facing	Grevillea wickhamii, Hakea chordophylla
2491	FMG112	30	44	88	175	351	528		PLHj	Upper slope (N-facing) of low	Corymbia hamersleyana, Hakea chordophylla
2491	FMG114	29	44	88	175	351	528		PLHb	Lower part of a gentle to	Eucalyptus leucophloia scattered low trees
2491	FMG122	31	44	88	175	351	528		PLHj	Upper slopes and near crest of a	Eucalyptus leucophloia scattered low trees
2491	FMG127	25	44	88	175	351	528		PLHj	Crest and adjacent upper slope of	
2491	FMG129	19	44	88	175	351	528		PLHb	Mid to upper slope of ridge	Eucalyptus leucophloia scattered low trees
2491	FMG116	29	44	88	175	351	529		PLHb	Small flowline in open gully	Eucalyptus leucophloia scattered low trees
HDRAIL	H038	27	44	88	175	351	529		Czr	Flowline in the centre of a	Eucalyptus leucophloia low woodland over
HDRAIL	H037	15	44	88	175	351	529		Czr	Medium rocky slope.	Triodia aff. basedowii mid-dense to dense
HDRAIL	H043	27	44	88	175	351	529		PLHb	Lower slope of ridge extending	Triodia aff. basedowii mid-dense hummock
XB	XB001	28								Hilltop, slight slope	Corymbia Hamersley Low Isolated Trees over
XB	XB005	30								Hilltop	Corymbia hamersleyana and Eucalyptus
XB	XB011	33								Hilltop	Eucalyptus leucophloia subsp. leucophloia
XB	XB086	41								Hilltop	Eucalyptus leucophloia subsp. leucophloia
XB	XB100	41								Hilltop	Corymbia candida subsp. dipsodes and
XB	XB003	19								Rocky Scree	Eucalyptus leucophloia subsp. leucophloia
XB	XB004	28								Creekline, no Eucalyptus, burnt	Acacia tumida var. pilbarensis and
XB	XBR06	31								Gully	
XB	XBR08	39								Minor Creekline	
WAMTLEA	0399	9	16	41	85	157	240		AFm	North east facing slopes.	Acacia bivenosa low open shrubland over
WPI	BOR199	12	16	41	85	157	240		Wm		
WPI	AD003	16	16	41	85	157	240		Wb	Creekline confluence in low	Eucalyptus victrix low open forest over
WPI	ASN022	12	16	41	86	160	243		Qc	Undulating plain	Acacia wanyu open shrubland over Triodia
WPI	CP213	11	16	41	86	160	243		Cp		Acacia bivenosa open shrubland over
WPI	CW025	14	17	42	91	171	259		Tp	North west facing mesa slope on	Mixed low scattered shrubs over Triodia
WPI	BOR279	19	17	42	91	171	258		Qc	Burnt pediment	Scattered Corymbia hamersleyana and Acacia
WPI	JW006	16	17	42	91	171	258		Qg	Mesa slope	Acacia bivenosa low open shrubland over
WPI	BOR-101	20	16	41	86	160	243		Qc	Undulating clayey plain	Acacia xiphophylla high open shrubland
WPI	BOR183	12	16	41	86	160	243		Qc		Acacia aneura (dead) over Acacia
WPI	CP088	14	16	41	86	160	243		Qc	Alluvial plain	Corymbia candida ssp. candida scattered
WAHAMPAR	1095	21	1	2	5	12	21		Czcb	Upper slope, adjacent to cracking	Acacia ancistrocarpa high to open
WPI	CP023	29	1	2	5	12	21		Phd	Southeast upper slope of a small	Acacia bivenosa and Petalostylis
WPI	BOR277	17	18	43	93	176	266		Qc		

PROJ	site	no_spp	gp50	gp100	gp200	gp400	gp600	data	Geo	HABITAT	VEGETATION
								0.00000.24330.48670.73000.97331.21671.46001.7033			
WPI	CP131	12	19	44	94	180	273		Qp	Drainage line	Corymbia hamersleyana scattered low trees
WPI	CP474	15	17	42	90	170	257		Phb	Base of gorge	Ficus brachypoda low open woodland over
WASA	0710	26	34	67	140	278	421		Qa	Extremely low rounded ends, of low	Eucalyptus socialis low open woodland over
XB	XBRH01	16								Base of hill slope	
WAFCBOR	1057	19	46	95	187	370	553		Qw	Gentle slopes of	Eucalyptus xerothermica low open woodland
232a	MESG18	17	15	39	80	151	231		Qg	Low stony plain (very gradually	Acacia inaequilatera scattered tall shrubs
WAFCBOR	1064	15	34	68	143	283	432		Qa	River bed.	Eucalyptus camaldulensis var. obtusa open
2491	FMR40	30	34	68	143	283	432		Qw	creek bed; seasonal water flow	Eucalyptus victrix open woodland over
EP00550AA	INV012	27	34	68	143	282	431		Qa	major creek line N-S	Low Woodland of Eucalyptus victrix to 8m
EP00550AA	INV065	33	34	68	143	282	431		Qa	Major drainage line	Open Forest of Eucalyptus victrix and
2491	FML27	40	34	68	143	282	430		Qa	River flood banks (small river	Eucalyptus victrix open forest over Acacia
2491	FMR02	59	34	68	143	282	430		Qa	Creek bed and edges of banks	Eucalyptus victrix, E. camaldulensis open
2491	FMR13	40	34	68	143	282	430		Qw	Broad drainage area - numerous	Acacia aneura low open forest over
2491	FMR32	72	34	68	143	282	430		Qa	Flowline through broad clayey pan	Acacia aneura low open forest over Acacia
2491	FMR35	83	34	68	143	282	430		Qa	Creekbank	Eucalyptus victrix low open woodland over
XB	XB076	54								Major Creek Bank	Acacia aff. aneura (long, flat, recurved;
XB	XB077	52								Mulga drainage line	Eucalyptus victrix, Acacia pruinocarpa and
XB	XB079	47								Floodplain adjacent to major creek	Eucalyptus victrix, Acacia coriacea subsp.
2491	FMR04	32	32	63	134	266	406			Poorly defined flow line on gently	Acacia synchronicia, A. farnesiana
2491	FMR12	35	32	63	134	266	406		Qa	Clayey plain	Eragrostis setifolia closed tussock
2490	FMG-BE	32	34	67	141	279	424		Q1	Flat plain	Acacia aneura low open forest over Acacia
XB	XB081	33								Alluvial plain	Acacia synchronicia and Vachellia
XB	XBR22	22								Mulga plain flats with crab holes	
XB	XB018	34								Dense Mulga drainage line	Acacia aff. aneura (long, flat, recurved;
XB	XB020	35								Malga drainage line	Acacia aff. aneura (long, flat, recurved;
XB	XB088	44								Floodplain	Acacia pruinocarpa, Acacia aff. aneura
XB	XB036	28								Alluvial plain with two minor	Acacia aff. aneura (long, flat, recurved;
XB	XB038	38								Creeklime near culverts	Acacia aff. aneura (narrow fine veined;
XB	XB040	40								Very shallow Mulga broad drainage.	Acacia aff. aneura (long, flat, recurved;
XB	XB016	48								Mulga Flats (patchy Mulga)	Acacia aff. aneura (long, flat, recurved;
XB	XB025	47								Mulga plain	Acacia aff. aneura (long, flat, recurved;
XB	XB060	62								Mulga Plain	Acacia aff. aneura (long, flat, recurved;
XB	XB061	67								Very gentle undulating plain	Acacia xiphophylla, Acacia aff. aneura
XB	XB069	72								Plain with crabholes	Acacia aff. aneura (long, flat, recurved;
XB	XB074	63								Very gently undulating plain	Acacia aff. aneura (long, flat, recurved;
XB	XB078	64								Near level plain	Acacia aff. aneura (long, flat, recurved;
XB	XB103	63								Plain	Acacia synchronicia Tall Sparse Shrubland
XB	XB082	41								Plain	Acacia aff. aneura (long, flat, recurved;
XB	XB083	40								Stony plain	Acacia synchronicia Tall Sparse Shrubland
XB	XB046	43								Undulating Mulga plain	Acacia xiphophylla, Acacia aff. aneura
XB	XB058	52								Mulga plains with crab holes	Acacia xiphophylla and Acacia aff. aneura
XB	XB066	51								Very gently undulating plain	Acacia xiphophylla and Acacia aff. aneura
XB	XB085	56								Plain	Acacia aff. aneura (long, flat, recurved;
XB	XB070	67								Mulga plain with drainage line	Acacia aff. aneura (long, flat, recurved;
XB	XB071	60								Mulga plain	Acacia aff. aneura (long, flat, recurved;
XB	XB075	70								Mulga drainage in plain near	Acacia aff. aneura (long, flat, recurved;
XB	XB073	59								Mulga drainage line adjacent to	Acacia aff. aneura (long, flat, recurved;
XB	XB072	47								Shallow mulga drainage line	Acacia aff. aneura (long, flat, recurved;
XB	XB080	56								Mulga patch, cly depression, in	Acacia aff. aneura (long, flat, recurved;
2491	FML10	67	34	69	144	285	434		Qw	Low area, slight rise on south	Acacia aneura (FML10-1), A. ayersiana low
2491	FML11	59	34	69	144	285	434		Qw	Plain; very gentle slope (to S?)	Acacia catenulata (A. aneura, A.
2491	FMN31	76	34	69	144	285	434		Qa	Plain; gentle slope, southerly? -	Acacia catenulata, A. aneura low woodland
2491	FMN32	68	34	69	144	285	434		Qw	Plain; very gentle slopes to flat	Acacia aneura, A. catenulata low woodland
2491	FMN01	34	34	69	144	285	434		Qw	Flat plain	Acacia catenulata, A. aneura low woodland

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								0.00000.24330.48670.73000.97331.21671.46001.7033			
2491	FML37	51	34	69	144	285	435		Qr	Shallow depression area on a flat	Acacia aneura low woodland over
2491	FMR64	54	34	69	144	285	435		Qs	Very gentle slope on plain - flow	Acacia aneura low open forest over
2491	FMR21	42	34	69	144	285	435		Qw	Very shallow, long swale on flat	Acacia aneura low open forest over
2491	FML48	60	34	69	144	285	435		Qa	Flowline across gentle slopes at	Acacia aneura, A. ayersiana low open
2491	FMR23	51	34	69	144	285	435		Qw	Clayey plain	Acacia aneura low closed forest over
2491	FMR06	57	34	69	144	285	435		Qr	Flowline with a channel on a	Acacia aneura 6-1 low woodland over Acacia
2491	FML40	48	34	69	144	284	433		Qa	Very gentle slope to south, at	Acacia aneura tall shrubland over Rhagodia
2491	FML41	31	34	69	144	284	433		Qw	Very gentle southerly slopes at	Ptilotus exaltatus, Trichodesma zeylanicum
2491	FML47	46	34	69	144	284	433		Qe	Low rise between areas of mulga,	Acacia aneura scattered low trees over
2491	FMR17	71	34	69	144	284	433		Qw	Flats - Mulga grove	Acacia aneura low closed forest over
2491	FMR43	82	34	69	144	284	433		Qa	Area of shallow depressions on	Acacia aneura low forest over Chrysopogon
2491	FMR42	47	34	69	144	284	433		Qw	Stony clay flat (?alluvial	Aristida contorta closed annual grassland
HDRAIL	H001	40	34	69	144	284	433		Qc	Clayey plain (~intergrove)	Acacia aneura, A. xiphophylla scattered
HDRAIL	H004	47	32	63	133	264	404		Qw	Clayey plain.	Acacia citrinoviridis, A. aneura open
HDRAIL	H058	50	32	63	133	264	404		Qw	Clayey plain	Acacia aneura open scrub over Eremophila
HDRAIL	H005	39	32	63	133	264	404		Qw	Clayey plain	Acacia aneura high open shrubland over
HDRAIL	H138	38	32	63	133	264	404		Qw	Clayey plain, scatter of	Acacia xiphophylla open scrub over Cassia
HDRAIL	H139	34	32	63	133	264	404		Qc	Clayey plain	Acacia xiphophylla high open shrubland
XB	XB002	37								(Low gently undulating hills) feat	Acacia paraneura, Acacia ayersiana and
XB	XB010	36								Very gently undulating plains with	Acacia aff. aneura (long, flat, recurved;
XB	XB012	38								Gentle Mulga slope with minor	Acacia aff. aneura (long, flat, recurved;
XB	XB007	36								Mulga floodplain	Acacia aff. aneura (narrow fine veined;
XB	XB019	40								Mulga Stony plain	Corymbia candida subsp. dipsodes Isolated
XB	XB021	39								Stony Mulga plain	Acacia aff. aneura (long, flat, recurved;
XB	XB013	40								Mulga floodplain	Acacia ayersiana, Acacia aff. aneura
XB	XB015	46								Mulga plain with some very minor	Acacia aff. aneura (narrow fine veined;
XB	XB017	43								Mulga Plain	Acacia aff. aneura (narrow fine veined;
XB	XB042	47								Sparsely vegetated Mulga	Acacia aff. aneura (long, flat, recurved;
XB	XB026	42								Mulga sheetflow, slightly raised.	Acacia aff. aneura (long, flat, recurved;
XB	XB028	51								Mulga plains, sheetflow area with	Acacia aff. aneura (narrow fine veined;
XB	XB056	46								Very gently incline Mulga slope	Acacia aff. aneura (long, flat, recurved;
XB	XB048	40								Mulga flats (not groves)	Acacia aff. aneura (long, flat, recurved;
XB	XB050	51								Mulga Plain	Corymbia hamersleyana and Acacia aff.
XB	XB052	45								Mulga grove with large areas of	Acacia aff. aneura (long, flat, recurved;
XB	XB044	46								A very gently undulating plain of	Acacia aff. aneura (long, flat, recurved;
XB	XB064	53								Gentle slope of low rise	Acacia aff. aneura (long, flat, recurved;
XB	XB067	68								Near level plain, sheet flow	Acacia aff. aneura (long, flat, recurved;
XB	XB068	69								Near level plain dominated by	Acacia aff. aneura (long, flat, recurved;
XB	XB062	72								Very gently undulating plain	Acacia aff. aneura (narrow fine veined;
XB	XB063	56								Very gently undulating plain	Acacia aff. aneura (narrow fine veined;
XB	XB014	35								Mulga grove, sheet flow sink.	Acacia aff. aneura (long, flat, recurved;
XB	XB054	52								Mulga Plains	Acacia aneura var. intermedia, Acacia aff.
XB	XB024	34								Sheetflow Mulga patch	Acacia aff. aneura (narrow fine veined;
XB	XB030	36								Mulga grove with a bit of	Acacia aff. aneura (narrow fine veined;
XB	XB032	44								Sheetflow Mulga, mainly sparse	Acacia aff. aneura (long, flat, recurved;
XB	XB034	40								Mulga plains, sheetflow with run	Acacia aff. aneura (narrow fine veined;
WAHAMSTN	0238	67	34	68	143	282	429		AgYel	Creek bed and Banks; next to site	Eucalyptus victrix open woodland over
HDRAIL	H050	45	47	97	194	384	575		Qa	Bank of Weeli Wolli Creek.	Eucalyptus victrix woodland over Acacia
HDRAIL	H051	51	47	97	194	384	575		Qa	Floodplain.	Eucalyptus victrix scattered low trees
2491	FMC11	52	47	97	194	384	575		Qa	Floodplain adjacent to moderate	Eucalyptus victrix low open woodland over
2491	FMR60	52	47	97	194	384	575		Qa	Bed of a medium sized creek	Eucalyptus victrix scattered low trees
XB	XB102	41								River bed, Floodplain	Eucalyptus victrix Low Woodland over
XB	XB087	58								Floodplain	Corymbia hamersleyana Low Isolated Trees
XB	XB104	56								Floodplain	Eucalyptus victrix Low Open Woodland over

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								0.00000.24330.48670.73000.97331.21671.46001.7033			
WACOOWES	0938	23	47	96	190	375	562		Qw	Lower part of open area between	Eucalyptus leucophloia low open woodland
WAFCBOR	1058	19	47	96	190	375	562		Qw	Mid slope to the crest of a low	Eucalyptus leucophloia low open woodland
2491	FMC-MA	22	47	96	190	375	563		AFj	Stony plain	Eucalyptus leucophloia low open woodland
FMG-2006	P9GT	25	47	96	190	375	563		AHm	Low lying very gently sloping	Eucalyptus leucophloia subsp. leucophloia
FMG-2006	7_5_06	36	47	96	190	376	564				
FMG-2006	9GtoP9Fo	26	47	96	190	376	564		AHm	Gentle slope below low hill into	Eucalyptus leucophloia scattered low trees
FMG-2006	P9E	44	47	96	190	376	564		Qc	Gentle to moderate slopes to SSE	Eucalyptus leucophloia subsp. leucophloia
FMG-2006	P9J	33	47	96	190	376	564		Qa	Very gentle slope low lying at	Corymbia hamersleyana Low Open Woodland
XB	XB101	49								Stony plain	Eucalyptus leucophloia subsp. leucophloia
FMG-2006	P9P	37	47	96	190	376	564		Czr	Low stony hill with creek near SW	Grevillea wickhamii Tall Shrubland over
271	BRO02	42	47	96	191	377	565		Czc	Mild colluvial footslope	Acacia inaequilatera, Acacia atkinsiana
271	BRO15	55	47	96	191	377	565		Czc	Crest of low stony hill	Eucalyptus leucophloia subsp. leucophloia,
271	BRO29	40	47	96	191	377	565		Czr	Rocky upper hillslope (mild slope)	Eucalyptus leucophloia subsp. leucophloia
271	BRO30	55	47	96	191	377	565		Qc	Rocky undulating plain	Acacia atkinsiana, Acaacia exilis tall
271	BRO28	93	47	96	191	377	565		Czc	Broad alluvial plain	Acacia aff. aneura (narrow fine veined;
271	BRO47	78	47	96	191	377	565		Czp	Crest of low stony rise	Acacia stowardii, Acacia aff. aneura
271	BRO42	53	47	96	191	377	565		AFj	Base of rocky hillslope	Cassia pruinosa, Cassia luerssenii, Acacia
271	BRO31	63	47	96	191	377	565		Qc	Shallow drainage line in broad	Eucalyptus leucophloia subsp. leucophloia,
271	BRO36	54	47	96	191	377	565		Qw	Plain	Eucalyptus gamophylla, Codonocarpus
271	BRO41	65	47	96	191	377	565		Qw	Seasonally wet minor drainage line	Corymbia hamersleyana, Eucalyptus
271	BRO12	71	47	96	191	377	565		Czc	Rocky creekline	Eucalyptus leucophloia subsp. leucophloia
271	BRO-MC	51	47	96	191	377	565		PLHb	Rocky gorge	Eucalyptus leucophloia subsp. leucophloia,
2491	FMC01	45	34	69	144	284	433		Qw	Stony floodplain	Triodia aff. basedowii closed hummock
2491	FMR39	45	34	69	144	284	433		Qw	Stony flat / low gibber plain	Acacia aneura, A. paraneura scattered low
2491	FMC18	51	47	96	192	378	567		Qc	Stony plain	Acacia aneura low open forest over Sida
2491	FMR24	40	47	96	192	378	567		Qr	Flat to gently sloping low ridge	Acacia aneura, A. pruinocarpa scattered
2491	FML32	38	47	96	192	378	567			Gentle west-facing slope of low	Corymbia hamersleyana scattered low trees
2491	FML31	57	47	96	192	378	567		Hm	Outwash plain between low stony	Acacia aneura scattered tall shrubs over
2491	FML50	46	47	96	192	378	567		Qw	Lower to mid slope (W facing) of a	Acacia pruinocarpa scattered low trees
2491	FML44	46	47	96	192	378	567		Tc	Gentle slopes on edge of plain /	Acacia aneura, A. pruinocarpa low open
2491	FML56	56	47	96	192	378	567		Td	Gentle hill slope (WNW facing)	Acacia aneura, Grevillea wickhamii
2491	FML46	66	47	96	192	378	567		Qa	SW facing mid slope on a low ridge	Acacia aneura, A. pruinocarpa low open
XB	XB065	67								Lower slope of hill	Acacia aff. aneura (long, flat, recurved;
XB	XB084	50								Gently undulating plain	Acacia pruinocarpa and Acacia aff. aneura
2491	FML49	41	47	96	192	378	567		Td	Lower slope (W facing) on part of	Acacia aneura, A. paraneura scattered low
2491	FML59	37	47	96	192	378	567		Td	Lower slopes of a low hill (N	Acacia aneura scattered tall shrubs over
2491	FML57	43	47	96	192	378	567		Td	Lower crest and upper slopes of a	Acacia pruinocarpa, A. aneura, Grevillea
2491	FML58	44	47	96	192	378	567		Td	Steep bouldery colluvial slope	Acacia aneura scattered low trees to low
2491	FMC04	26	47	96	192	378	566		Czr	Low stony rise	Acacia aneura scattered tall shrubs over
2491	FMC06	30	47	96	192	378	566		Czc	Crest of low rise	Acacia aneura, Grevillea berryana
FMG-2006	P9B	33	47	96	192	379	568		Qc	Floodplain area	Eucalytpus leucophloia subsp. leucophloia
FMG-2006	P9S	33	47	96	192	379	568		AHm	Mulga woodland	Acacia aneura var. pilbarana Tall Open
FMG-2006	P9D	43	47	96	192	379	568		Qc	n/a	Acacia ayersiana, Acacia pruinocarpa and
FMG-2006	P9M	60	47	96	192	379	568		Qw	Gentle southerly slope in	Acacia aneura var. intermedia and Acacia
FMG-2006	P9N	50	47	96	192	379	568		Qw	Gently undulating flat	Acacia aneura var. conifera with scattered
FMG-2006	P9O	34	47	96	192	379	568		Qw	Flat, very gently sloping, east	Acacia aneura var. intermedia and Acacia
PHQT	006	15	40	81	163	320	484		Tm	Very slight south facing sampfire	Mangrove over xxxxxx mixed squashy over
PHQT	018	12	40	81	163	320	484		Tf	Low sandy rise.	
PHQT	015	6	40	81	163	320	484		Tf	Samphire flats.	Broccolli red xxxxx and mixed squishies
HDRAIL	H150	13	40	81	163	320	484		Alf	Saline mudflats within tidal	Halosarcia halocnemoides subsp. tenuis
CAPPRE	M036	14	40	81	163	320	484		Qc	Littoral LS. Tidal mudflat.	Samphire.
CAPPRE	M074	13	40	81	163	320	484		Qhm	Littoral LS. Tidal mudflat.	Samphire.
314	SPH-03	8	40	81	163	320	484		Alf	Easterly facing, gently sloping	Samphire shrubland: Halosarcia indica

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								0.00000.24330.48670.73000.97331.21671.46001.7033			
314	SPH-12	7	40	81	163	320	484		Alf	Tidal drainage area in a gently	Dense Halosarcia pergranulata subsp.
PPB	W	8	40	81	163	320	484				
314	SPH-13	3	40	81	163	321	485		Alf	Tidal, saline drainage area (tidal	Halosarcia indica subsp. leiostachya low
339	DAMF16	11	40	81	164	322	486		Qhms	Samphire salt flat adjacent to	Low open heath of the halophytic species
339	DAMF17	18	40	81	164	322	486		Qhms	Low lying saline basin.	Low open heath of the halophytic species
339	DamFS-29	12	40	81	164	322	486		Qhms	Low lying saline drainage area	Low open shrubland of the halophytic
CAPPRE	M061	19	40	81	164	322	486		Qhms	Littoral LS. Broad (~65-70m),	Frankenia / Lawrencia / Dissocarpus /
2490	FMG16	19	40	81	164	323	487		Qa	Drainage flats - Fortescue valley	Halosarcia indica subsp. leiostachya, H.
PHQT	012	2	41	82	166	325	489			Mangrove.	Dark green and light Avicennia marina.
PHQT	014	2	41	82	166	325	489		Tf	Mangroves.	Light green mangrove xxxxxx.
PHQT	013	4	41	82	166	325	490		Tf	Samphire flats.	Avicennia marina over bally Broccoli
PHQT	040	2	41	82	166	325	490		Tf	Mangroves.	Light green mangrove xxxxxx over broccoli
CAPPRE	M113	8	41	82	166	325	490		Q1	Yamerina LS. Tidal creek; bed of	Avicennia marina tall open shrubland over
CD	CD01	6								Flat / Dry Marsh.	
CD	CD04	6								Flat / Broad plain.	
CD	CD18	4								Flat / Broad plain.	
CD	CD05	2								Flat / Broad plain.	
CD	CD02	4								Flat / Broad plain.	
CD	CD16	5								Flat / Broad plain.	
CD	CD14	4								Flat / Broad plain.	
CD	CD07	3								Flat / Broad plain.	
CD	CD10	2								Flat / Broad plain.	
CD	CD09	3								Flat / Broad plain.	
CD	CD15	5								Flat / Broad plain.	
CD	CD17	4								Flat / Broad plain.	
CD	CD13	9								Flat / Broad plain.	
CD	CD03	4								Flat / Broad plain.	
CD	CD08	1								Flat / Broad plain.	
CD	CD11	10								Hilltop.	
CD	CDR017	12								Flat / Broad plain.	High Open Shrubland of Acacia aneura (grey
CD	CD12	10								Hill top / Upper slope.	
CD	CDR019	7								Flat / Broad plain on gentle	Scattered Low Trees of Eucalyptus
CD	CDR024	6								Lower Hill slope with surrounding	Scattered Eucalyptus leucophloia over
CD	CD20	9								Hill top / Upper Hill slope	
CD	CDR001	10								Upper Hill slope with surrounding	Open Hummock Grassland of Triodia
CD	CDR038	6								Lower Hill slope.	Scattered Low Trees of Eucalyptus
CD	CDR040	7								Hill Slope.	Scattered Low Trees of Eucalyptus
CD	CDR006	8								Upper Hillslope with surrounding	Hummock Grassland of Triodia basedowii and
CD	CDR008	12								Upper Hill slope with surrounding	Hummock Grassland of Triodia basedowii and
CD	CDR027	8								Upper Hill Slope with surrounding	Scattered Eucalyptus leucophloia subsp.
CD	CDR013	10								Upper Hill slope with surrounding	Hummock Grassland of Triodia basedowii and
CD	CDR028	9								Lower Hillslope.	Hummock Grassland of Triodia basedowii and
CD	CDR029	9								Lower Hill slope with surrounding	Scattered Trees of Eucalyptus leucophloia
CD	CDR030	9								Lower Hill Slope with surrounding	Hummock Grassland of Triodia basedowii and
CD	CDR012	6								Flat / Broad plain.	Hummock Grassland of Triodia basedowii
CD	CDR003	11								Lower Hill slope.	Hummock Grassland of Triodia basedowii,
CD	CDR010	9								Lower Hill slope.	Hummock Grassland of Triodia basedowii
CD	CDR011	9								Flat / Broad plain.	Low Open Woodland of Acacia aff. Aneura
CD	CDR020	8								Flat / Broad plain.	High Open Shrubland of Acacia aff. aneura
CD	CDR022	8								Flat / Broad plain.	High Open Shrubland of Acacia aff. aneura
CD	CDR015	9								Clay Flat.	Shrubland of Acacia aff. Aneura (narrow
CD	CDR016	5								Flat / Broad plain.	Low Open Woodland of Acacia aff. Aneura
CD	CDR021	9								Flat / Broad plain.	High Open Shrubland of Acacia aff. aneura
CD	CDR032	7								Flat / Broad plain.	Low Open Woodland of Acacia aff. aneura
CD	CDR039	7								Flat / Broad plain.	Low Open Woodland of Acacia aff. aneura

PROJ	site	no_spp	gp50	gp100	gp200	gp400	gp600	data	Geo	HABITAT	VEGETATION
								0.00000.24330.48670.73000.97331.21671.46001.7033			
CD	CDR033	6								Flat / Broad plain.	Low Open Woodland of Acacia aff. aneura
CD	CDR037	6								Flat / Broad plain.	Low Open Woodland of Acacia aff. aneura
CD	CDR025	7								Flat / Broad plain.	Open Woodland of Acacia aff. aneura
CD	CDR034	7								Flat / Broad plain.	Low Open Woodland of Acacia aff. aneura
								0.00000.24330.48670.73000.97331.21671.46001.7033			

APPENDIX F

FLORA QUADRAT DATA SHEETS

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX F

Christmas Creek Site XB01

Described by Hayden Ajduk Date 18/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 799206 mE 7521059 mN

Habitat Hilltop, slight slope

Soil Red brown sandy loam with cobbles and pebbles and some rocks

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Corymbia hamersleyana* Low Isolated Trees over *Ptilotus calostachyus* var. *calostachyus*, *Corchorus lasiocarpus* subsp. *parvus*, *Dampiera candicans* Low Sparse Shrubland over *Triodia epactia* Low Isolated Hummock Grasses and *Eriachne lanata* Low Sparse Tussock Grassland.



Veg Condition Excellent

Fire Age Recent

Notes Aspect: North
Topography: Hilltop, slight slope
Bare Ground: 85%
Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
Disturbance: Very recent fire

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+	cr	XB01.13	
<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	+	0.1 m	XB01.20	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.2 m	XB01.19	
<i>Corymbia hamersleyana</i>	+	3 m	XB01.15	
<i>Cymbopogon ambiguus</i>	+	0.5 m	XB01.24	
<i>Dampiera candicans</i>	+	0.3 m	XB01.23	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB01.21	
<i>Eriachne lanata</i>	1%	0.1 m	XB01.06	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1 m	XB01.12	
<i>Goodenia stobbsiana</i>	+	0.05 m	XB01.17	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	0.5 m	XB01.27	
<i>Hakea chordophylla</i>	+	3 m	XB01.01	
<i>Hibiscus</i> sp.	+	0.05 m	XB01.28	
<i>Indigofera monophylla</i> (brown calyx form)	+	0.3 m	XB01.07	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Polycarpaea holtzei</i>	+	0.05 m	XB01.18	
<i>Ptilotus auriculifolius</i>	+	0.4 m	XB01.05	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	2%	0.6 m	XB01.04	
<i>Ptilotus clementii</i>	+	0.1 m	XB01.09	

<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14	
<i>Ptilotus fusiformis</i> var. <i>fusiformis</i>	+	0.4 m	XB01.16	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	0.6 m	XB01.03	
<i>Senna notabilis</i>	+	0.1 m	XB01.22	
<i>Solanum phlomoides</i>	+	0.6 m	XB01.02	
<i>Tribulus hirsutus</i>	+	0.05 m	XB01.29	
<i>Tribulus suberosus</i>	+	0.4 m	XB01.08	
<i>Triodia epactia/pungens</i>	+	0.1 m	XB01.10	Sterile
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.1 m	XB01.11	

Christmas Creek Site XB02

Described by Julia Mattner Date 18/03/2011

Type Quadrat 60x40 m

Location Christmas Creek

MGA Zone 50 800050 mE 7517710 mN

Habitat (Low gently undulating hills) feat of low hill top (Mulga, non-sheet flow)

Soil Red brown sandy loam with pebbles and gravel

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia paraneura*, *Acacia ayersiana* and *Acacia pruinocarpa* Low Open Woodland over *Eremophila forrestii* subsp. *forrestii*, *Senna sp.* and *Acacia marriamamba* Mid Sparse Shrubland over *Triodia sp.* Shovelanna Hill (S. van Leeuwen 3835) and *Triodia epactia/pungens* Low Open Hummock Grassland.

Veg Condition Excellent - Very good

Fire Age Moderate

Notes Aspect: N/A

Topography: Undulating hills

Bare Ground: 60%

Litter Cover: <1% Logs, <1% Twigs, 1% Lvs

Disturbance: Some old grazing.



An island of unburnt Mulga in a burnt landscape.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia ayersiana</i>	2%	3 m	XB02.06	
<i>Acacia marriamamba</i>	+	1.5 m	XB02.11	
<i>Acacia paraneura</i>	5%	3.5 m	XB02.01	
<i>Acacia pruinocarpa</i>	2%	4 m	XB02.12	
<i>Acacia tetragonophylla</i>	+	1.5 m	XB02.02	
<i>Anthobolus leptomerioides</i>	+	2 m	XB02.17	
<i>Aristida contorta</i>	+	0.2 m	XB02.23	
* <i>Bidens bipinnata</i>	+	0.1 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.2 m	XB02.03	
<i>Chloris pectinata</i>	+	0.2 m	XB02.21	
<i>Corchorus parviflorus</i>	+	0.5 m	XB02.15	Fl: yellow
<i>Corchorus sp.</i>	+	0.7 m	XB02.10	
<i>Cucumis maderaspatanus</i>	+	cr	XB02.04	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB01.21	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB02.14	
<i>Eragrostis eriopoda</i>	+	0.2 m	XB02.25	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	2%	1.5 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>		1.3 m	XB02.13	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.3 m	XB02.07	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	0.2 m	XB01.27	
<i>Hibiscus burtonii</i>	+	0.2 m	XB02.19	
<i>Maireana tomentosa</i>	+	0.2 m	XB10.29	
<i>Paspalidium clementii</i>	+	0.2 m	XB10.21	

<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.15 m	XB10.22	
<i>Polygala isingii</i>	+	0.15 m	XB02.16	
<i>Psydrax suaveolens</i>	+	1 m	XB10.28	
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB02.27	
<i>Ptilotus auriculifolius</i>	+	0.2 m	XB02.09	
<i>Ptilotus schwartzii</i>	+	0.5 m	XB10.01	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.4 m	XB01.03	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>	+	1.5 m	XB02.26	Fl; yellow
<i>Senna notabilis</i>	+	0.6 m	XB01.22	
<i>Senna</i> sp.	1%	1.2 m	XB02.22	Possibly <i>S. glaucifolia</i> x
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.4 m	XB02.20	
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB02.08	
<i>Triodia epactia/pungens</i>	2%	0.4 m	XB02.18	Sterile
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	25%	0.4 m	XB02.05	

Christmas Creek Site XB03

Described by Hayden Ajduk Date 18/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 803359 mE 7517114 mN

Habitat Rocky Scree

Soil Red brown loam with a covering of cobbles and pebbles

Rock Type Shale

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Acacia pruinocarpa*, *Goodenia stobbsiana* and *Ptilotus exaltatus* var. *exaltatus* Low Sparse Shrubland over *Triodia epactia/pungens* and *Triodia basedowii* Low Sparse Hummock Grassland.

Veg Condition Excellent

Fire Age Young to moderate

Notes Aspect: North

Topography: Scree

Bare Ground: 75%

Litter Cover: 0% Logs, 0% Twigs, 0% Lvs

Disturbance: None



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia acradenia</i>	+	0.2 m	XB03.09	
<i>Acacia colei</i> var. <i>colei</i>	+	0.2 m	XB03.10	
<i>Acacia pruinocarpa</i>	1%	0.8 m	XB03.05	
<i>Amphipogon sericeus</i> (Newman form BR2-21)	+	0.3 m	XB03.03	
<i>Aristida contorta</i>	+	0.1 m	XB03.08	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.1 m	XB01.19	
<i>Dampiera candicans</i>	+	0.2 m	XB01.23	
<i>Dodonaea coriacea</i>	+	0.4 m	XB03.06	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.2 m	XB03.07	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1%	3-4 m	XB03.02	
<i>Goodenia stobbsiana</i>	1%	0.2 m	XB01.17	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	1-2 m	XB01.27	
<i>Polygala isingii</i>	+	0.05 m	XB03.11	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.3 m	XB01.04	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	0.8 m	XB01.03	
<i>Sida excedentifolia</i> MS	+	0.1 m	XB03.01	
<i>Triodia basedowii</i>	+	0.1 m	XB03.12	
<i>Triodia epactia/pungens</i>	15%	0.2 m	XB03.04	

Christmas Creek Site XB04

Described by Julia Mattner Date 18/03/2011

Type Relevé 10x250 m

Location Christmas Creek

MGA Zone 50 798898 mE 7521252 mN

Habitat Creekline, no Eucalyptus, burnt around 6 months ago

Soil Loamy sand with pebbles and gravel, rocks, cliff face, dark brown (red)

Rock Type Ironstone and dolerite

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* Tall Sparse Shrubland over *Senna notabilis* and *Indigofera monophylla* (brown calyx form) Low Sparse Shrubland over *Triodia epactia/pungens* Low Isolated Hummock Grasses over *Eriachne mucronata* (typical form) Low Sparse Tussock Grassland.

Veg Condition Excellent

Fire Age Recent

Notes Aspect: South
Topography: Hill slope
Bare Ground: 90%
Litter Cover: 1% Logs, 1% Twigs, 1% Lvs
Disturbance: fire 6 months ago



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia pyrifolia</i>			XB04.18	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	4-8%	2.2 m	XB04.01	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)			XB01.13	
<i>Bulbostylis barbata</i>			XB04.07	
<i>Cleome viscosa</i>			XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>			XB04.15	
<i>Dodonaea petiolaris</i>			XB04.13	
<i>Dysphania rhadinostachya</i>	+	0.3 m	XB01.21	
<i>Eriachne mucronata</i> (typical form)	+	0.3 m	XB04.02	
<i>Goodenia stobbsiana</i>	+	0.5 m	XB01.17	
<i>Gossypium robinsonii</i>			XB04.14	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1%	1.8-2.5 m	XB01.27	
<i>Hibiscus gardneri</i>			XB04.12	
<i>Hybanthus aurantiacus</i>	+	0.2 m	XB04.04	
<i>Indigofera monophylla</i> (brown calyx form)	1%	0.6-1 m	XB01.07	
<i>Indigofera</i> sp.	+	1.5 m	XB04.05	
<i>Jasminum didymum</i> subsp. <i>lineare</i>			XB04.10	
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.3 m	XB04.03	
<i>Mollugo molluginea</i>			XB04.08	
<i>Pterocaulon sphacelatum</i>			XB04.06	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.8 m	XB01.04	
<i>Ptilotus clementii</i>			XB04.17	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>			XB01.14	
<i>Ptilotus fusiformis</i> var. <i>fusiformis</i>	+	0.5 m	XB01.16	

<i>Santalum lanceolatum</i>				XB04.09	
<i>Senna notabilis</i>	2%	1 m		XB01.22	
<i>Solanum phlomoides</i>	+	0.5 m		XB01.02	
<i>Tephrosia spechtii</i>				XB04.11	
<i>Triodia epactia/pungens</i>				XB04.16	Sterile

Christmas Creek Site XB05

Described by Hayden Ajduk Date 18/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 802715 mE 7517009 mN

Habitat Hilltop

Soil Red brown loam with cobbles and pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Matiske 2007): 17
 Vegetation Sub-Association: *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Grevillea wickhamii* subsp. *hispidula* and *Hakea chordophylla* and Mid Sparse Shrubland over *Senna glutinosa* subsp. *glutinosa*, *Ptilotus calostachyus* var. *calostachyus* and *Solanum phlomoides* Low Sparse Shrubland over *Triodia basedowii* Low Sparse Hummock Grassland.



Veg Condition Excellent

Fire Age Moderate

Notes Aspect: North-west
 Topography: Hilltop
 Bare Ground: 60%
 Litter Cover: 0% Logs, 1% Twigs, <1% Lvs
 Disturbance: None

SPECIES LIST:

Quad	Name	Cover	Height	Specimen	Notes
	<i>Acacia ancistrocarpa</i>	+	0.8 m	XB05.10	
	<i>Amphipogon sericeus</i> (Newman form BR2-21)	+	0.4 m	XB03.03	
	<i>Aristida holathera</i> var. <i>holathera</i>	+	0.5 m	XB05.12	
	<i>Calytrix carinata</i>	+	0.6 m	XB05.08	
	<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
	<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	+	0.8 m	XB05.15	
	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.5 m	XB01.19	
	<i>Corymbia hamersleyana</i>	1%	3-4 m	XB01.15	
	<i>Dampiera candidans</i>	+	0.4 m	XB01.23	
	<i>Dodonaea coriacea</i>	+	0.2 m	XB03.06	
	<i>Eriachne lanata</i>	+	0.1 m	XB01.06	
	<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1 m	XB03.07	
	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1%	2.4 m	XB03.02	
	<i>Fimbristylis simulans</i>	+	0.1 m	XB05.02	
	<i>Goodenia stobbsiana</i>	+	0.1 m	XB01.17	
	<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	5%	1-2 m	XB01.27	
	<i>Hakea chordophylla</i>	+	1 m	XB01.01	
	<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09	
	<i>Indigofera monophylla</i> (brown calyx form)	+	0.2 m	XB01.07	
	<i>Indigofera monophylla</i> (PAN57-9)	+	0.3 m	XB05.17	
	<i>Oldenlandia crouchiana</i>	+	0.1 m	XB05.11	
	<i>Paspalidium clementii</i>	+	0.1 m	XB05.16	
	<i>Polycarpaea holtzei</i>	+	0.05 m	XB05.03	

<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.6 m	XB01.04
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.1 m	XB01.14
<i>Ptilotus fusiformis</i> var. <i>fusiformis</i>	+	0.3 m	XB01.16
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1%	0.8 m	XB01.03
<i>Solanum phlomoides</i>	+	0.3 m	XB01.02
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.2 m	XB05.14
<i>Triodia basedowii</i>	15%	0.2 m	XB05.01

Christmas Creek Site XB07

Described by Hayden Ajduk Date 19/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 801179 mE 7517459 mN

Habitat Mulga floodplain

Soil Red brown loam with some pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa* Low Open Forest over *Atalaya hemiglauc* and *Acacia tetragonophylla* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Eremophila lanceolata* and *Eremophila latrobei* subsp. *filiformis* Mid Sparse Shrubland over **Cenchrus ciliaris*, *Sporobolus australasicus* and *Paspalidium clementii* Low Sparse Tussock Grassland.

Veg Condition Very good- good

Fire Age Moderate

Notes Aspect: N/A

Topography: Plain

Bare Ground: 70%

Litter Cover: 1% Logs, 3% Twigs, 5% Lvs

Disturbance: Weeds, tracks



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon fraseri</i>	+	0.4 m	XB07.17	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	40%	3-5 m	XB07.33	
<i>Acacia pruinocarpa</i>	4%	4 m	XB03.05	
<i>Acacia tetragonophylla</i>	2%	4 m	XB07.01	
<i>*Aerva javanica</i>	+	0.5 m	XB07.08	
<i>Amaranthus interruptus</i>	+	0.2 m	XB07.16	
<i>Atalaya hemiglauc</i>	8%	5 m	XB07.07	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.05 m	XB07.25	
<i>*Cenchrus ciliaris</i>	3%	0.2 m	XB07.02	
<i>Cheilanthes austrotenuifolia</i>	+	0.1 m	XB07.22	
<i>Commelina ensifolia</i>	+	0.1 m	XB07.04	
<i>Corchorus tridens</i>	+	cr	XB07.06	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.05	
<i>Duperreya commixta</i>	+	cr	XB07.20	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.2 m	XB07.03	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.6 m	XB07.30	
<i>Eremophila lanceolata</i>	+	0.5 m	XB07.19	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	XB07.13	
<i>Euphorbia alsiniflora</i>	+	0.1 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.05 m	XB07.26	
<i>Hibiscus burtonii</i>	+	0.05 m	XB07.28	
<i>Hybanthus aurantiacus</i>	+	0.2 m	XB05.09	
<i>Paspalidium clementii</i>	+	0.1 m	XB07.21	
<i>Perotis rara</i>	+	0.05 m	XB07.14	

<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.05 m	XB07.27
* <i>Portulaca oleracea</i>	+	cr	XB07.09
<i>Pterocaulon sphacelatum</i>	+	0.05 m	XB07.23
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.1 m	XB01.14
<i>Ptilotus obovatus</i>	+	0.5 m	XB07.24
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2 m	XB07.18
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		0.2 m	XB07.15
<i>Senna glutinosa</i> subsp. <i>luersenii</i> x <i>stricta</i>	+	0.4 m	XB07.12
<i>Senna stricta</i>	+	0.6 m	XB07.29
<i>Sporobolus australasicus</i>	+	0.1 m	XB07.11
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	cr	XB05.14

Christmas Creek Site XB09

Described by Hayden Ajduk Date 19/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 800279 mE 7516875 mN

Habitat River/ large creek

Soil Skeletal cobbles and pebbles

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Woodland
 over *Acacia coriacea* subsp. *pendens* and *Atalaya hemiglauc* Tall
 Isolated Shrubs over *Acacia pyrifolia* and *Melaleuca linophylla*
 Mid Sparse Shrubland over *Triodia longiceps* Low Isolated
 Hummock Grasses over **Cenchrus ciliaris* and *Cymbopogon*
procerus Mid Sparse Tussock Grassland.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: North-east
 Topography: Creek line
 Bare Ground: 90%
 Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Weeds (buffel)



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon amplum</i>	+	0.5 m	XB09.06	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1%	3 m	XB09.02	
<i>Acacia pyrifolia</i>	3%	2 m	XB09.03	
<i>Amaranthus undulatus</i>	+	0.5 m	XB09.08	
<i>Atalaya hemiglauc</i>	+	4 m	XB07.07	
<i>Boerhavia coccinea</i>	+	cr	XB09.22	
<i>*Cenchrus ciliaris</i>	10%	0.5 m	XB07.02	
<i>*Citrullus colocynthis</i>	+	cr	XB09.21	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.1 m	XB09.14	
<i>Corchorus tridens</i>	+	cr	XB07.06	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cymbopogon procerus</i>	1%	0.6 m	XB09.01	
<i>Duperreya commixta</i>	+	cr	XB09.17	
<i>Enneapogon robustissimus</i>	+	0.5 m	XB09.15	
<i>Eucalyptus victrix</i>	10%	8-10 m	XB09.16	
<i>Euphorbia alsiniflora</i>	+	0.05 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Haloragis gossei</i>	+	0.05 m	XB09.19	
<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	+	0.4 m	XB09.10	
<i>Ipomoea polymorpha</i>	+	0.1 m	XB09.24	
<i>Melaleuca linophylla</i>	1%	2 m	XB09.12	
<i>Operculina aequisejala</i>	+	cr	XB09.05	
<i>Petalostylis labicheoides</i>	+	0.6 m	XB09.09	
<i>Polycarpaea longiflora</i> (red form)	+	0.4 m	XB09.25	
<i>Polymeria</i> aff. <i>ambigua</i> (PAN 26B-20)	+	0.05 m	XB09.07	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.4 m	XB09.11	

<i>Tephrosia</i> aff. <i>rosea</i> (HD292-37)	+	0.4 m	XB09.20
<i>Triodia longiceps</i>	+	0.2 m	XB09.04

Christmas Creek Site XB10

Described by Julia Mattner Date 18/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 798836 mE 7519014 mN

Habitat Very gently undulating plains with gentle slope to south (Mulga sheet in low area)

Soil Red brown sandy loam with pebbles and gravel

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia ayersiana*Low Open Woodland over *Acacia aneura* (grey bushy form; MET 15 732) Tall Sparse Shrubland over *Ptilotus schwartzii* Low Sparse Shrubland over *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) Low Isolated Hummock Grasses

Veg Condition Excellent to very good

Fire Age Moderate

Notes Aspect: South

Topography: Undulating plains

Bare Ground: 80%

Litter Cover: 1% Logs, 1% Twigs, 2% Lvs

Disturbance: Old pads of cattle, horses and donkeys

An island of unburnt Mulga in a burnt landscape.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon fraseri</i>	+	0.15 m	XB10.07	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	3.5 m	XB10.04	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)	1%	2.8 m	XB10.20	
<i>Acacia ayersiana</i>	1%	3 m	XB10.05	
<i>Anthobolus leptomerioides</i>	+	0.8 m	XB10.06	
* <i>Bidens bipinnata</i>	+	0.15 m	XB10.17	
* <i>Citrullus colocynthis</i>	+	cr	XB10.18	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.3 m	XB10.02	
<i>Cucumis maderaspatanus</i>	+	cr	XB10.08	
<i>Cymbopogon ambiguus</i>	+	0.5 m	XB10.16	
<i>Dodonaea petiolaris</i>	+	1.3 m	XB10.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB01.21	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9 m	XB10.13	
<i>Eriachne mucronata</i> (large flower form)	+	0.2 m	XB10.24	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.05 m	XB02.07	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.15 m	XB10.30	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB10.27	
<i>Keraudrenia nephrosperma</i>	+	0.6 m	XB10.26	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.8 m	XB10.15	
<i>Maireana tomentosa</i>	+	0.2 m	XB10.29	
<i>Paspalidium clementii</i>	+	0.2 m	XB10.21	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB10.22	

<i>Psyrax suaveolens</i>	+	1.1 m	XB10.28
<i>Ptilotus clementii</i>	+	0.4 m	XB04.17
<i>Ptilotus schwartzii</i>	7%	0.5 m	XB10.01
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	1.8 m	XB10.09
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.2 m	XB01.03
<i>Senna glutinosa</i> subsp. <i>luerssenii</i> x <i>stricta</i>	+	1 m	XB10.03
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	0.9 m	XB10.19
<i>Senna notabilis</i>	+	0.4 m	XB01.22
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.3 m	XB10.14
<i>Solanum lasiophyllum</i>	+	0.5 m	XB10.12
<i>Tribulus suberosus</i>	+	0.5 m	XB01.08
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.3 m	XB10.10

Christmas Creek Site XB100

Described by Lucy Dadour Date 5/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 762554 mE 7527366 mN

Habitat Hilltop

Soil Skeletal soils with red brown clayey loam

Rock Type Dolerite and ironstone

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Corymbia candida* subsp. *dipsodes* and *Eucalyptus leucophloia* subsp. *leucophloia* Low Isolated Trees over *Acacia acradenia*, *Grevillea wickhamii* subsp. *hispidula* and *Hakea chordophylla* Mid Sparse Shrubland over *Triodia pungens* Low Open Hummock Grassland over *Eriachne lanata*, *Eriachne mucronata* (typical form) and *Cymbopogon* sp. Low Sparse Tussock Grassland



Veg Condition Excellent

Fire Age Old

Notes Aspect: South
Topography: Hilltop
Bare Ground: 45%
Litter Cover: <1% Logs, 1% Twigs, <1% Lvs
Disturbance: None

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia acradenia</i>	4%	1.5m	XB100.01	
<i>Acacia inaequilatera</i>	+	0.2m	XB100.22	
<i>Acacia pruinocarpa</i>	+	2m	XB62.12	
<i>Aristida contorta</i>	+	0.3m	XB100.15	
<i>Calytrix carinata</i>	+	1m	XB100.26	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.2m	XB100.10	
<i>Corymbia candida</i> subsp. <i>dipsodes</i>	+	2m	XB100.23	
<i>Cucumis maderaspatanus</i>	+	Cr	XB100.17	
<i>Cymbopogon</i> sp.	+	0.5m	XB100.34	
<i>Dampiera candidans</i>	+	0.6m	XBOPLD02	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.1m	XB100.24	
<i>Eriachne lanata</i>	30%	0.3m	XB100.02	
<i>Eriachne mucronata</i> (typical form)	+	0.1m	XB100.08	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.2m	XB100.13	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	+	3m	XB100.27	
<i>Euphorbia alsiniflora</i>	+	0.1m	XB100.19	
<i>Fimbristylis simulans</i>	+	0.1m	XB100.07	
<i>Gomphrena cunninghamii</i>	+	0.2m	XB100.12	
<i>Gomphrena kanisii</i>	+	0.2m	XB100.04	
<i>Goodenia triodiophila</i>	+	0.3m	XB100.25	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1%	1.5m	XB65.12	
<i>Hakea chordophylla</i>	1%	2m	XB100.03	

<i>Mollugo molluginea</i>	+	0.2m	XB62.37	
<i>Oldenlandia crouchiana</i>	+	0.2m	XB100.14	
<i>Perotis rara</i>	+	0.2m	XB100.21	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB60.46	
<i>Polycarpaea holtzei</i>	+	0.1m	XB60.03	
<i>Polycarpaea longiflora</i>	+	0.2m	XB100.31	
<i>Polygala isingii</i>	+	0.2m	XB100.30	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.3m	XB100.16	
<i>Ptilotus exaltatus</i>	+	0.3m	XB60.55	
<i>Rhodanthe margarethae</i>	OUT	0.2m	XB100.32	
<i>Schizachyrium fragile</i>	+	0.3m	XB100.33	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	0.6m	XB100.18	
<i>Senna notabilis</i>	+	0.3m	XB60.56	
<i>Sida arenicola</i>	+	0.3m	XB100.29	
<i>Themeda triandra</i>	+	0.5m	XB100.20	
<i>Trachymene oleracea</i>	+	0.7m	XB100.11	
<i>Tribulus suberosus</i>	+	0.8m	XB100.28	
<i>Triodia epactia/pungens</i>	12%	0.5m	XB100.06	Sterile
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	6%	0.3m	XB100.05	

Christmas Creek Site XB101

Described by Lucy Dadour Date 5/05/2011

Location Christmas Creek

MGA Zone 50 766541 mE 7525994 mN

Habitat Stony plain

Soil Red brown loam with cobbles and pebbles

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Acacia pruinocarpa*, *Acacia synchronicia*, *Acacia ancistrocarpa* and *Acacia adsurgens* Mid Sparse Shrubland over *Senna sericea*, *Senna artemisioides* subsp. *oligophylla* x *helmsii* and *Ptilotus exaltatus* Low Sparse Shrubland over *Triodia longiceps*, *Triodia basedowii* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) Low Open Hummock Grassland.

Veg Condition Excellent

Fire Age Old

Notes Aspect: N/A

Topography: Stony plain

Bare Ground: 45%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: None

Type Quadrat 50 x 50 m



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon cunninghamii</i>	+	0.3m	XB101.33	
<i>Acacia adsurgens</i>	+	1.4m	XB101.31	
<i>Acacia ancistrocarpa</i>	+	1.6m	XB101.37	
<i>Acacia pruinocarpa</i>	1%	1.6m	XB62.12	
<i>Acacia synchronicia</i>	1%	1.3m	XB101.07	
<i>Aristida contorta</i>	+	0.2m	XB101.28	
<i>Brachyachne prostrata</i>	+	0.05m	XB101.14	
<i>Bulbostylis barbata</i>	1%	0.1m	XB101.04	
<i>Calytrix carinata</i>	+	0.2m	XB101.26	
<i>Cleome viscosa</i>	+	0.3m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	+	0.2m	XB101.27	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB100.24	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB101.05	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3%	3m	XB101.35	
<i>Euphorbia alsiniflora</i>	+	0.2m	XB100.19	
<i>Fimbristylis simulans</i>	+	0.2m	XB101.30	
<i>Gomphrena kanisii</i>	+	0.1m	XB101.13	
<i>Goodenia microptera</i>	+	0.2m	XB101.16	
<i>Goodenia stobbsiana</i>	+	0.2m	XB101.17	
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	0.5m	XB101.34	
<i>Hybanthus aurantiacus</i>	+	0.3m	XB84.04	
<i>Indigofera monophylla</i> (small leaflet form)	+	0.2m	XB101.23	Sterile
<i>Maireana georgei</i>	+	0.05m	XB101.10	

<i>Mollugo molluginea</i>	+	0.2m	XB62.37
<i>Paraneurachne muelleri</i>	+	0.3m	XB101.24
<i>Pluchea tetranthera</i>	+	0.2m	XB101.20
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB60.46
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
* <i>Portulaca oleracea</i>	+	0.05m	XB101.06
<i>Ptilotus astrolasius</i>	+	0.3m	XB101.26
<i>Ptilotus auriculifolius</i>	+	0.3m	XB101.40
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.6m	XB100.16
<i>Ptilotus exaltatus</i>	+	0.5m	XB60.55
<i>Ptilotus helipteroides</i>	+	0.3m	XB101.18
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.5m	XB60.59
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>luerssenii</i>	+	0.6m	XB101.39
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	0.9m	XB101.25
<i>Senna notabilis</i>	+	0.3m	XB60.56
<i>Senna sericea</i>	1%	0.6m	XB101.01
<i>Sida</i> sp. Pilbara (ferruginous form)	+	0.1m	XB101.21
<i>Sporobolus australasicus</i>	+	0.4m	XB101.38
<i>Streptoglossa bubakii</i>	+	0.1m	XB101.11
<i>Tephrosia</i> sp. Pilbara Ranges (S. van Leeuwen 4246) PN	+	0.1m	XB101.19
<i>Themeda triandra</i>	+	0.7m	XB101.36
<i>Trachymene oleracea</i>	+	0.2m	XB65.11
<i>Trianthema glossostigma</i>	+	0.3m	XB101.08
<i>Trianthema triquetra</i>	+	0.05m	XB101.15
<i>Triodia basedowii</i>	10%	0.3m	XB101.02
<i>Triodia longiceps</i>	30%	0.4m	XB101.03
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.3m	XB101.22

Christmas Creek Site XB102

Described by Lucy Dadour Date 5/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 761340 mE 7528757 mN

Habitat River bed, Floodbank

Soil Skeletal soils with red brown sandy loam

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* and *Corymbia hamersleyana* Low Woodland over *Acacia coriacea* subsp. *pendens*Tall Sparse Shrubland over *Acacia trachycarpa*, *Acacia pyrifolia*, *Petalostylis labicheoides*, *Atalaya hemiglauc* and *Rulingia**luteiflora* Mid Sparse Shrubland over *Indigofera monophylla* (small leaflet form), *Crotalaria medicaginea* var. *neglecta* and *Corchorus**tridens* Low Sparse Shrubland over *Triodia longiceps* Low SparseHummock Grassland over **Cenchrus ciliaris* and **Cenchrus setiger* Low Open Tussock Grassland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Riverbed and floodplain

Bare Ground: 50%

Litter Cover: 2% Logs, 1% Twigs, <1% Lvs

Disturbance: Weeds and tracks



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	10%	6-8m	XB102.21	
<i>Acacia pyrifolia</i>	1%	1.5m	XB102.08	
<i>Acacia trachycarpa</i>	3%	2m	XB102.04	
<i>*Aerva javanica</i>	+	0.5m	XB74.15	
<i>Amaranthus undulatus</i>	+	0.3m	XB102.25	
<i>Atalaya hemiglauc</i>	1%	2m	XB102.02	
<i>Boerhavia coccinea</i>	+	Cr	XB102.15	
<i>Bulbostylis barbata</i>	+	0.1m	XB102.29	
<i>*Cenchrus ciliaris</i>	30%	0.5m	XB60.22	
<i>*Cenchrus setiger</i>	10%	0.5m	XB60.01	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus</i> sp.	+	0.2m	XB102.23	
<i>Corchorus tridens</i>	+	Cr	XB102.13	
<i>Corymbia hamersleyana</i>	ASS	8m	XB102.26	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	+	0.3m	XB102.31	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	Cr	XB102.05	
<i>Cyperus vaginatus</i>	+	0.3m	XB102.20	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.5m	XB60.07	
<i>Eriachne tenuiculmis</i>	+	0.4m	XB102.16	
<i>Eucalyptus victrix</i>	30%	8m	XB102.22	
<i>Euphorbia</i> sp. (Site 1089)	+	Cr	XB102.28	
<i>*Flaveria trinervia</i>	+	0.2m	XB102.30	
<i>Gomphrena cunninghamii</i>	+	0.2m	XB102.14	
<i>Goodenia microptera</i>	+	0.3m	XB102.06	
<i>Goodenia stobbsiana</i>	+	0.1m	XB101.17	

<i>Gossypium robinsonii</i>	+	1.5m	XB102.27	
<i>Indigofera monophylla</i> (small leaflet form)	2%	0.4m	XB101.23	Sterile
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.2m	XB102.32	
<i>Petalostylis labicheoides</i>	1%	1.8m	XB102.03	
<i>Phyllanthus maderaspatensis</i>	+	0.3m	XB102.07	
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03	
<i>Polycarpaea longiflora</i>	+	0.2m	XB102.11	
<i>Polymeria calycina</i>	+	Cr	XB102.09	
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05	
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB60.26	
<i>Ptilotus exaltatus</i>	+	0.2m	XB60.55	
<i>Rulingia luteiflora</i>	1%	1.6m	XB102.01	
<i>Sesbania cannabina</i>	+	0.5m	XB102.19	
<i>Streptoglossa bubakii</i>	+	0.2m	XB102.24	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	+	0.4m	XB102.12	
<i>Triodia longiceps</i>	2%	0.3m	XB102.18	
<i>Triumfetta clementii</i>	+	0.3m	XB102.17	

Christmas Creek Site XB103

Described by Lucy Dadour Date 6/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 780200 mE 7518317 mN

Habitat Plain

Soil Red brown sandy loam with cobbles and pebbles

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia synchronicia* Tall Sparse Shrubland over *Acacia tetragonophylla*, *Acacia aneura* var. *conifera* and *Senna artemisioides* subsp. *oligophylla* Mid Sparse Shrubland over *Dysphania rhadinostachya* subsp. *rhadinostachya* and *Ptilotus calostachyus* var. *calostachyus* Low Sparse Shrubland over *Aristida contorta*, **Cenchrus ciliaris*, *Chloris pectinata*, *Dactyloctenium radulans* and *Enteropogon ramosus* Low Sparse Tussock Grassland.

Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 30%

Litter Cover: -% Logs, <1% Twigs, <1% Lvs

Disturbance: Weeds



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.3m	XB103.12	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	2%	1.8m	XB103.34	
<i>Acacia farnesiana</i>	+	0.2m	XB103.40	
<i>Acacia synchronicia</i>	8%	3m	XB101.07	
<i>Acacia tetragonophylla</i>	6%	2m	XB60.37	
<i>Aristida contorta</i>	1%	0.2m	XB101.28	
<i>Aristida latifolia</i>	+	0.6m	XB103.42	
<i>Boerhavia coccinea</i>	+	Cr	XB103.01	
<i>Bulbostylis barbata</i>	+	0.2m	XB103.15	
<i>Bulbostylis turbinata</i>	+	0.1m	XB103.06	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>*Cenchrus ciliaris</i>	1%	0.4m	XB60.22	
<i>Chloris pectinata</i>	1%	0.3m	XB103.11	
<i>Chrysopogon fallax</i>	+	0.7m	XB103.19	
<i>*Citrullus colocynthis</i>	+	Cr	XB103.13	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus tridens</i>	+	Cr	XB102.13	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	+	0.4m	XB103.44	
<i>Cyperus iria</i>	+	0.3m	XB103.37	
<i>Dactyloctenium radulans</i>	1%	0.3m	XB103.09	
<i>Dichanthium sericeum</i>	+	0.4m	XB103.25	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	15%	0.2m	XB60.07	
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.4m	XB103.41	
<i>Enneapogon polyphyllus</i>	+	0.4m	XB103.22	
<i>Eragrostis desertorum</i>	+	0.6m	XB103.39	
<i>Eragrostis eriopoda</i>	+	0.4m	XB103.26	
<i>Eragrostis tenellula</i>	+	0.2m	XB100.38	

<i>Eremophila lanceolata</i>	+	0.5m	XB103.31
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB101.05
<i>Euphorbia alsiniflora</i>	+	0.2m	XB103.24
<i>Euphorbia</i> sp. (Site 1089)	+	0.05m	XB103.16
<i>Gomphrena cunninghamii</i>	+	0.3m	XB102.14
<i>Gomphrena kanisii</i>	+	0.3m	XB100.04
<i>Goodenia prostrata</i>	+	Cr	XB103.05
<i>Heliotropium heteranthum</i>	+	0.05m	XB103.07
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	+	0.2m	XB103.35
<i>Indigofera colutea</i>	+	0.3m	XB103.18
<i>Iseilema membranaceum</i>	+	0.2m	XB103.10
<i>Mollugo molluginea</i>	+	0.2m	XB62.37
<i>Neptunia dimorphantha</i>	+	0.2m	XB103.43
<i>Oldenlandia crouchiana</i>	+	0.1m	XB103.33
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB60.46
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>Polygala isingii</i>	+	0.05m	XB103.38
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB103.20
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB60.26
<i>Ptilotus aervoides</i>	+	Cr	XB103.17
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.5m	XB74.07
<i>Ptilotus exaltatus</i>	+	0.4m	XB60.55
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	+	0.3m	XB103.36
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.3m	XB103.29
<i>Ptilotus macrocephalus</i>	+	0.4m	XB67.13
<i>Rhynchosia minima</i>	+	0.1m	XB103.30
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.3m	XB103.32
<i>Sclerolaena cornishiana</i>	+	0.1m	XB103.03
<i>Sclerolaena costata</i>	+	0.2m	XB103.02
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		1m	XB103.28
<i>Sida</i> aff. <i>fibulifera</i> (HD200-6)	+	0.3m	XB103.27
<i>Solanum lasiophyllum</i>	+	0.5m	XB103.14
<i>Sporobolus australasicus</i>	+	0.2m	XB101.09
<i>Streptoglossa bubakii</i>	+	0.2m	XB101.11
<i>Tribulus astrocarpus</i>	+	0.05m	XB103.08

Christmas Creek Site XB104

Described by Lucy Dadour Date 6/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 778373 mE 7524053 mN

Habitat Floodplain

Soil Red brown sandy loam

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* Low Open Woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa* and *Atalaya hemiglauca* Tall Sparse Shrubland over *Acacia tetragonophylla*, *Acacia pyrifolia* and *Melaleuca glomerata* Mid Sparse Shrubland over *Triodia longiceps* Low Sparse Hummock Grassland over **Cenchrus ciliaris*, **Cenchrus setiger* and *Cymbopogon ambiguus* Mid Open Tussock Grassland.

Veg Condition Good

Fire Age Very Old

Notes Aspect: North West

Topography: Floodplain

Bare Ground: 70%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Weeds and nearby tracks



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	4%	4m	XB104.30	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	2m	XB102.10	
<i>Acacia pruinocarpa</i>	3%	4m	XB62.12	
<i>Acacia pyrifolia</i>	2%	2m	XB102.08	
<i>Acacia rhodophloia</i>	+	2m	XBB7	
<i>Acacia tetragonophylla</i>	3%	1.4m	XB60.37	
<i>*Aerva javanica</i>	+	0.3m	XB74.15	
<i>Amaranthus undulatus</i>	+	0.4m	XB104.07	
<i>Ammannia multiflora</i>	+	0.3m	XB104.08	
<i>Atalaya hemiglauca</i>	+	3m	XB104.22	
<i>*Bidens bipinnata</i>	+	0.2m	XB60.21	
<i>Bulbostylis turbinata</i>	+	0.1m	XB104.14	
<i>*Cenchrus ciliaris</i>	5%	0.6m	XB60.22	
<i>*Cenchrus setiger</i>	20%	0.6m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.2m	XB104.20	
<i>*Citrullus colocynthis</i>	+	Cr	XB103.13	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.2m	XB104.10	
<i>Corchorus tridens</i>	+	0.05m	XB102.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB104.21	
<i>Cymbopogon ambiguus</i>	+	0.8m	XB104.02	
<i>Cyperus iria</i>	+	0.2m	XB104.15	
<i>Cyperus squarrosus</i>	+	0.1m	XB104.05	

<i>Dicladantha forrestii</i>	+	0.2m	XB104.09	
<i>Digitaria ctenantha</i>	+	Cr	XB104.11	
<i>Duperreya commixta</i>	+	Cl	XB104.03	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB100.24	
<i>Eragrostis cumingii</i>	+	0.1m	XB104.29	
<i>Eragrostis leptocarpa</i>	+	0.2m	XB104.19	
<i>Eragrostis tenellula</i>	+	0.3m	XB100.38	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.6m	XB104.26	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB101.05	
<i>Eucalyptus victrix</i>	8%	7m	XB102.22	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB103.35	
<i>Fimbristylis microcarya</i>	+	0.1m	XB104.18	
<i>Goodenia microptera</i>	+	0.3m	XB104.28	
<i>Hybanthus aurantiacus</i>	+	0.3m	XB84.04	
<i>Indigofera monophylla</i> (small leaflet form)	+	0.3m	XB101.23	Sterile
<i>Ipomoea muelleri</i>	+	Cr	XB104.24	
<i>Ipomoea polymorpha</i>	+	Cr	XB104.25	
<i>Lipocarpa microcephala</i>	+	0.1m	XB104.17	
* <i>Malvastrum americanum</i>	+	0.2m	XB60.23	
<i>Melaleuca glomerata</i>	1%	2m	XB104.23	
<i>Mollugo molluginea</i>	+	0.2m	XB62.37	
<i>Perotis rara</i>	+	0.1m	XB61.19	
<i>Phyllanthus maderaspatensis</i>	+	0.4m	XB104.01	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB60.46	
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05	
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB60.26	
<i>Ptilotus macrocephalus</i>	+	0.4m	XB67.13	
<i>Schoenoplectus laevis</i>	+	0.2m	XB104.12	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	0.6m	XB63.17	
<i>Sporobolus australasicus</i>	+	0.2m	XB101.09	
<i>Themeda triandra</i>	+	0.5m	XB104.04	
<i>Triodia longiceps</i>	3%	0.3m	XB102.18	
<i>Urochloa occidentalis</i>	+	0.2m	XB104.27	

Christmas Creek Site XB11

Described by Hayden Ajduk Date 19/03/2011

Location Christmas Creek

MGA Zone 50 802360 mE 7519133 mN

Habitat Hilltop

Soil Shallow red brown loam with cobbles, pebbles and rocks

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Acacia pruinocarpa*, *Clerodendrum floribundum* var. *angustifolium*, *Grevillea wickhamii* subsp. *hispidula*, *Hibiscus goldsworthii* and *Senna glutinosa* subsp. *glutinosa* Mid Sparse Shrubland over *Corchorus lasiocarpus* subsp. *lasiocarpus*, *Sida* sp. Pilbara (ferruginous form) and *Goodenia stobbsiana* Low Sparse Shrubland over *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) Low Sparse Hummock Grassland over *Eriachne lanata* Low Sparse Tussock Grassland.

Type Quadrat 50 x 50 m



Veg Condition Excellent

Fire Age Moderate to old

Notes Aspect: N/A

Topography: Hilltop

Bare Ground: 60%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: None

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia pruinocarpa</i>	2%	1-2 m	XB03.05	
<i>Amphipogon sericeus</i> (Newman form BR2-21)	+	0.4 m	XB03.03	
<i>Bonamia</i> sp. <i>Dampier</i> (A.A. Mitchell PRP 217)	+	0.05 m	XB01.13	
<i>Bulbostylis barbata</i>	+	0.05 m	XB07.25	
<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	+	2 m	XB11.07	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	1%	0.6 m	XB01.19	
<i>Dampiera candicans</i>	+	0.3 m	XB11.10	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Enneapogon robustissimus</i>	+	0.4 m	XB09.15	
<i>Eriachne lanata</i>	1%	0.2 m	XB01.06	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1 m	XB01.12	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1%	2 m	XB03.02	
<i>Gomphrena cunninghamii</i>	+	0.2 m	XB11.03	
<i>Goodenia stobbsiana</i>	+	0.3 m	XB01.17	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	1 m	XB01.27	
<i>Hakea chordophylla</i>	+	0.3 m	XB01.01	
<i>Hibiscus goldsworthii</i>	+	1.2 m	XB11.09	
<i>Mollugo molluginea</i>	+	0.1 m	XB11.04	
<i>Paspalidium clementii</i>	+	0.1 m	XB05.16	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB13.25	
* <i>Portulaca oleracea</i>	+	cr	XB07.09	
<i>Ptilotus auriculifolius</i>	+	0.4 m	XB01.05	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.5 m	XB01.04	

<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.2 m	XB01.14	
<i>Ptilotus incanus</i> var. <i>incanus</i>	+	0.2 m	XB11.02	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1 m	XB01.03	
<i>Sida excedentifolia</i> MS	+	0.1 m	XB11.05	
<i>Sida</i> sp. Pilbara (ferruginous form)	+	0.3 m	XB11.08	
<i>Solanum horridum</i>	+	0.2 m	XB11.11	Peduncles stout
<i>Tribulus suberosus</i>	+	0.4 m	XB01.08	
<i>Triodia epactia</i>	10%	0.3 m	XB11.01	
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	1%	0.1 m	XB11.06	

Christmas Creek Site XB12

Described by Julia Mattner Date 19/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 800057 mE 7516966 mN

Habitat Gentle Mulga slope with minor creekline

Soil Red brown sandy loam with pebbles and gravel

Vegetation Vegetation Type (Mattiske 2007): 4
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia pruinocarpa* Low Open Woodland over *Acacia ayersiana* and *Acacia aneura* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Eremophila latrobei* subsp. *filiformis*, *Senna glutinosa* subsp. *luersenii* x *stricta* and *Acacia tetragonophylla* Mid Sparse Shrubland over *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) Low Sparse Hummock Grasses.

Veg Condition Very good**Fire Age** Moderate**Notes** Aspect: West

Topography: Gentle Mulga slope

Bare Ground: 70%

Litter Cover: 1% Logs, 1% Twigs, 10% Lvs

Disturbance: some evidence of horses and very old cattle pads

North-east corner affected by recent fire.

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	3.5 m	XB12.05	
<i>Acacia aneura</i>	1%	2.5 m	XB12.16	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)	+	0.7 m	XB12.12	
<i>Acacia ayersiana</i>	3%	2.8 m	XB12.01	
<i>Acacia pruinocarpa</i>	1%	4 m	XB02.12	
<i>Acacia tetragonophylla</i>	+	1.2 m	XB12.11	
<i>Anthobolus leptomerioides</i>	+	1.9 m	XB12.14	
* <i>Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4 m	XB12.10	
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	0.9 m	XB04.13	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB01.21	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1%	1.2 m	XB12.17	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.2 m	XB12.04	
<i>Eriachne mucronata</i> (large flower form)	+	0.3 m	XB12.15	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.05 m	XB02.07	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB12.06	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Goodenia forrestii</i>	+	0.4 m	XB12.13	
<i>Goodenia stobbsiana</i>	+	0.2 m	XB01.17	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB04.04	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.3 m	XB12.03	Large leaf

<i>Maireana villosa</i>	+	0.3 m	XB12.02	Small leaf
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08	
<i>Paspalidium clementii</i>	+	0.2 m	XB10.21	
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07	
<i>Ptilotus clementii</i>	+	0.4 m	XB04.17	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.2 m	XB01.14	
<i>Ptilotus schwartzii</i>	+	0.4 m	XB10.01	
<i>Senna glutinosa</i> subsp. <i>luersenii</i> x <i>stricta</i>	+	1.5 m	XB10.03	
<i>Senna notabilis</i>	+	0.3 m	XB01.22	
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.3 m	XB12.07	
<i>Solanum lasiophyllum</i>	+	0.3 m	XB10.12	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.2 m	XB02.08	
<i>Tribulus suberosus</i>	+	0.4 m	XB01.08	
<i>Triodia pungens</i>	2%	0.3 m	XB12.08	
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.2 m	XB12.09	

Christmas Creek Site XB13

Described by Hayden Ajduk Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 778844 mE 7524859 mN

Habitat Mulga floodplain

Soil Red brown loam with pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia ayersiana*, *Acacia* aff. *aneura*(long, flat, recurved; FMR 35.3), *Acacia* aff. *aneura* (narrow fineveined; site 1259) and *Acacia pruinocarpa* Low Open Woodlandover *Dodonaea petiolaris*, *Acacia maitlandii*, *Acacia**tetragonophylla*, *Eremophila forrestii* subsp. *forrestii* and *Senna**glaucofolia* x aff. *oligophylla* (thinly sericeous FMR 29-11) MidSparse Shrubland over *Sida ectogama* Low Sparse Shrubland over *Eriachne mucronata* (typical form), *Sporobolus**australasicus* and *Chrysopogon fallax* Low Isolated Tussock Grasses.

Veg Condition Excellent to very good

Fire Age Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 80%

Litter Cover: 1% Logs, 2% Twigs, 3% Lvs

Disturbance: Nearby drill lines



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	4 m	XB13.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	4%	1.2 m	XB13.03	
<i>Acacia ayersiana</i>	6%	3-4 m	XB13.01	
<i>Acacia maitlandii</i>	+	2 m	XBRH04.02	
<i>Acacia pruinocarpa</i>	3%	3 m	XB03.05	
<i>Acacia tetragonophylla</i>	+	2 m	XB07.01	
<i>Aristida obscura</i>	+	0.15 m	XB13.06	
* <i>Bidens bipinnata</i>	+	0.15 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB13.11	
<i>Chrysopogon fallax</i>	+	0.9 m	XB13.13	
<i>Cleome oxalidea</i>	+	0.05 m	XB13.14	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.05	
<i>Dodonaea petiolaris</i>	6%	1.2 m	XBRH01.08	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.3 m	XB13.07	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.9 m	XB13.15	
<i>Eriachne mucronata</i> (typical form)	+	0.3 m	XB13.12	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	cr	XB13.19	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB13.09	
<i>Goodenia prostrata</i>	+	cr	XB13.22	
<i>Hybanthus aurantiacus</i>	+	0.2 m	XB05.09	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.4 m	XB13.23	

<i>Maireana villosa</i>	+	0.3 m	XB13.04
<i>Mollugo molluginea</i>	+	0.3 m	XB13.18
<i>Paspalidium clementii</i>	+	0.1 m	XB05.16
<i>Perotis rara</i>	+	0.1 m	XBRH11.06
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB13.25
* <i>Portulaca oleracea</i>	+	0.02 m	XB07.09
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14
<i>Ptilotus helipteroides</i>	+	0.05 m	XB13.26
<i>Ptilotus macrocephalus</i>	+	0.1 m	XB13.27
<i>Ptilotus obovatus</i>	+	0.2 m	XB13.28
<i>Ptilotus schwartzii</i>	+	0.25 m	XB13.10
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.3 m	XB13.21
<i>Senna glaucifolia</i> x aff. <i>oligophylla</i> (thinly sericeous FMR 29-11)	+	2.1 m	XB13.24
<i>Senna notabilis</i>	+	0.1 m	XB01.22
<i>Sida ectogama</i>	1%	0.7 m	XB13.08
<i>Solanum lasiophyllum</i>	+	0.2 m	XB13.17
<i>Sporobolus australasicus</i>	+	0.05 m	XB13.16
<i>Tribulus astrocarpus</i>	+	cr	XB13.20

Christmas Creek Site XB14

Described by Julia Mattner Date 19/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 798358 mE 7516668 mN

Habitat Mulga grove, sheet flow sink.

Soil Red brown fine sandy clayey loam, some crabholes

Rock Type

Vegetation Vegetation Type (Matiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Woodland over *Eremophila latrobei* subsp. *filiformis*, *Dodonaea petiolaris* and *Psyrax latifolia* Mid Isolated Shrubs over *Dysphania rhadinostachya* and *Ptilotus obovatus* Low Sparse Shrubland over *Eragrostis cumingii*, *Chrysopogon fallax* and *Chloris pectinata* Isolated Tussock Grassland over *Corchorus tridens*, *Cheilanthes sieberi* subsp. *sieberi*, **Bidens bipinnata* and *Commelina ensifolia* Low Sparse Herbland.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: N/A

Topography: Grove

Bare Ground: 40%

Litter Cover: <1% Logs, <1% Twigs, 2% Lvs

Disturbance: old grazing

Very wet from recent rains. Crabholes present.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	50%	4.5 m	XB14.01	
<i>*Bidens bipinnata</i>	2%	0.2 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.05 m	XB14.05	
<i>Bulbostylis turbinata</i>	+	0.1 m	XB14.02	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	4%	0.2 m	XB02.03	
<i>Chloris pectinata</i>	+	0.2 m	XB14.06	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>*Citrullus colocynthis</i>	1%	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Commelina ensifolia</i>	2%	0.1 m	XB14.20	
<i>Corchorus tridens</i>	1%	0.15 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	1.5 m	XB04.13	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4 m	XB14.08	
<i>Eragrostis cumingii</i>	+	0.2 m	XB14.04	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.7 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	XB02.13	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.15 m	XB10.30	
<i>Ipomoea muelleri</i>	+	cr	XB14.14	
<i>Iseilema membranaceum</i>	+	0.1 m	XB14.11	

<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26
<i>Perotis rara</i>	+	0.15 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB10.22
* <i>Portulaca oleracea</i>	1%	0.05 m	XB16.07
<i>Psydrax latifolia</i>	+	1.5 m	XBR08.10
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB14.10
<i>Ptilotus macrocephalus</i>	+	0.2 m	XB14.18
<i>Ptilotus obovatus</i>	+	0.4 m	XB14.22
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.7 m	XBR08.09
<i>Senna notabilis</i>	+	0.3 m	XB01.22
<i>Sida ectogama</i>	+	1.4 m	XB14.07
<i>Stenopetalum nutans</i>	+	0.2 m	XB14.19
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.2 m	XB02.08
<i>Tribulus astrocarpus</i>	+	0.05 m	XB14.12

Christmas Creek Site XB15

Described by Hayden Ajduk Date 23/03/2011

Location Christmas Creek

MGA Zone 50 775124 mE 7523911 mN

Habitat Mulga plain with some very minor drainage lines

Soil Red brown loam with a few pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia pruinocarpa* Low Woodland over *Acacia tetragonophylla*, *Senna artemisioides* subsp. *helmsii*, *Eremophila latrobei* subsp. *filiformis*, *Grevillea berryana* Mid Sparse Shrubland over *Ptilotus obovatus*, *Eremophila forrestii* subsp. *forrestii* Low Sparse Shrubland over *Triodia longiceps* Low Isolated Hummock Grasses over *Chrysopogon fallax* and *Eriachne pulchella* subsp. *dominii* Low Sparse Tussock Grassland over **Bidens bipinnata* Low Sparse Herbland.

Type Quadrat 50 x 50 m



Veg Condition Very good

Fire Age Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 40%

Litter Cover: 3% Logs, 4% Twigs, 8% Lvs

Disturbance: Cattle and Bidens (weed)

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.4 m	XB15.05	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	10%	6 m	XB15.16	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	15%	1-4 m	XB15.01	
<i>Acacia pruinocarpa</i>	1%	2-5 m	XB03.05	
<i>Acacia tetragonophylla</i>	1%	1 m	XB07.01	
<i>*Bidens bipinnata</i>	1%	0.5 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.09 m	XB13.11	
<i>Cheilanthes austrotenuifolia</i>	+	cr	XB07.22	
<i>Chrysopogon fallax</i>	10%	0.5 m	XB15.09	
<i>*Citrullus colocynthis</i>	+	cr	XB09.21	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Commelina ensifolia</i>	+	cr	XB07.04	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	cr	XB15.11	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.2 m	XB15.07	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cyperus iria</i>	+	0.1 m	XB15.14	
<i>Duperreya commixta</i>	+	cr	XB15.06	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.8 m	XBRH09.09	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1 m	XB13.15	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	1%	0.4 m	XB01.12	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01 m	XB13.19	
<i>Euphorbia alsiniflora</i>	+	0.2 m	XB15.03	Previously <i>E. coghlanii</i>

<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB13.09
<i>Grevillea berrryana</i>	+	1.2 m	XB15.10
<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.3 m	XB13.23
<i>Maireana villosa</i>	+	0.2 m	XB13.05
<i>Mollugo molluginea</i>	+	0.1 m	XB13.18
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.02 m	XB15.08
<i>Paspalidium clementii</i>	+	0.1 m	XB05.16
<i>Perotis rara</i>	+	0.08 m	XBRH11.06
<i>Phyllanthus maderaspatensis</i>	+	0.1 m	XBRH12.08
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.15 m	XB13.25
* <i>Portulaca oleracea</i>	+	cr	XB07.09
<i>Portulaca pilosa</i>	+	0.05 m	XB15.13
<i>Psyrax latifolia</i>	+	1.2 m	XB15.15
<i>Ptilotus helipteroides</i>	+	0.03 m	XB13.26
<i>Ptilotus obovatus</i>	6%	0.6 m	XB15.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1%	1 m	XB13.21
<i>Senna notabilis</i>	+	0.2 m	XB01.22
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.3 m	XB15.17
<i>Solanum lasiophyllum</i>	+	0.3 m	XB13.17
<i>Sporobolus australasicus</i>	+	0.4 m	XB13.16
<i>Triodia longiceps</i>	+	0.5 m	XB15.12

Christmas Creek Site XB16

Described by Julia Mattner Date 20/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 786314 mE 7514672 mN

Habitat Mulga Flats (patchy Mulga)

Soil Red brown clay loam with pebbles and gravel and crab holes

Rock Type

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Woodland over **Malvastrum americanum*, *Eremophila forrestii* subsp. *forrestii*, *Eremophila lanceolata*, *Eremophila longifolia* and *Rhagodia eremaea* Low Sparse Shrubland over *Sporobolus australasicus*, **Cenchrus ciliaris*, *Eragrostis xerophila*, *Chrysopogon fallax* and *Eriachne benthamii* Low Sparse Tussock Grassland over *Corchorus tridens* Low Sparse Herbland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A
Topography: Flats
Bare Ground: 60%
Litter Cover: <1% Logs, <1% Twigs, 1% Lvs
Disturbance: Old grazing



Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	40%	1.5-3 m	XB16.01	
<i>Acacia synchronicia</i>	+	1.2 m	XB16.14	
<i>Acacia xiphophylla</i>	+	3 m	XB16.29	
<i>Aristida</i> sp.	+	0.2m	NC	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Boerhavia paludosa</i>	+	0.1 m	XB16.26	
<i>*Cenchrus ciliaris</i>	1%	0.4 m	XB07.02	
<i>Chloris pectinata</i>	+	0.4 m	XB14.06	
<i>Chrysopogon fallax</i>	+	0.8 m	XB14.09	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Commelina ensifolia</i>	+	0.2 m	XB14.20	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	0.05 m	XB16.05	
<i>Corchorus tridens</i>	4%	0.15 m	XB14.23	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	+	0.3 m	XB16.17	Fl; yellow
<i>Cyperus iria</i>	+	0.2 m	XB16.25	
<i>Dactyloctenium radulans</i>	+	0.1 m	XB16.02	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>*Echinochloa colona</i>	+	0.3 m	XB16.20	
<i>Eragrostis xerophila</i>	+	0.2 m	XB16.15	
<i>Eremophila cuneifolia</i>	+	0.3 m	XBOPJM14	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.8 m	XB10.13	Fl; blue/purple
<i>Eremophila lanceolata</i>	+	0.3 m	XB16.13	
<i>Eremophila longifolia</i>	+	1 m	XB16.12	

<i>Eriachne benthamii</i>	+	0.3 m	XB16.16	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.15 m	XB10.30	
<i>Goodenia prostrata</i>	+	0.3 m	XB16.22	
<i>Ipomoea lonchophylla</i>	+	cr	XB16.30	
<i>Ipomoea muelleri</i>	+	cr	XB16.31	
<i>Ipomoea polymorpha</i>	+	0.1 m	XB16.04	
<i>Iseilema membranaceum</i>	+	0.1 m	XB14.11	
* <i>Malvastrum americanum</i>	1%	0.3 m	XB16.23	
<i>Operculina aequiseipala</i>	+	cr	XB16.18	
<i>Panicum laevinode</i>	+	0.4 m	XB16.21	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.15 m	XB16.06	
<i>Polygala isingii</i>	+	0.15 m	XB16.24	
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07	
<i>Ptilotus macrocephalus</i>	+	0.4 m	XB16.28	
<i>Rhagodia eremaea</i>	+	0.4 m	XB16.09	Grazed
<i>Rhynchosia minima</i>	+	cr	XB16.19	
<i>Sclerolaena cornishiana</i>	+	0.1 m	XB16.11	
<i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous)	+	1.2 m	XB16.10	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.8 m	XBR08.09	
<i>Senna notabilis</i>	+	0.1 m	XB01.22	
<i>Solanum lasiophyllum</i>	+	0.3 m	XB10.12	
<i>Sporobolus australasicus</i>	2%	0.3 m	XB16.03	
<i>Tragus australianus</i>	+	0.4 m	XB16.08	
<i>Tribulus astrocarpus</i>	+	0.5 m	XB16.27	
* <i>Vachellia farnesiana</i>	+	0.5 m	XBOPJM06 Seedling	

Christmas Creek Site XB17

Described by Hayden Ajduk Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 766834 mE 7524301 mN

Habitat Mulga Plain/Creek

Soil Red brown loam with scattered covering of pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259) Low Open Woodland over *Acacia* aff. *aneura* (narrow fine veined; site 1259) , *Senna glutinosa* subsp. *luerssenii* and *Eremophila forrestii* subsp. *forrestii* Mid Sparse Shrubland over *Triodia pungens* Low Isolated Hummock Grasses over **Portulaca oleracea*, *Goodenia prostrata* and **Bidens bipinnata* Low Sparse Herbland.



Veg Condition Excellent to very good

Fire Age Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 80%

Litter Cover: 1% Logs, 1% Twigs, 2% Lvs

Disturbance: Some buffel and cattle

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (4)	+	0.1 m	XB17.09	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	12%	3 m	XB17.01	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	5%	1.2 m	XB17.06	
<i>Acacia ancistrocarpa</i>	+	2.5 m	XB05.10	
<i>Acacia pyrifolia</i>	+	2 m	XB09.03	
<i>Acacia tetragonophylla</i>	+	1.4 m	XB07.01	
<i>Aristida obscura</i>	+	0.2 m	XB13.06	
<i>Aristida pruinosa</i>	+	0.7 m	XB17.10	
<i>*Bidens bipinnata</i>	+	0.2 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.03m	XB17.08	
<i>*Cenchrus ciliaris</i>	+	0.4 m	XB07.02	
<i>Cleome viscosa</i>	+	0.6 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.2 m	XB15.07	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cymbopogon ambiguus</i>	+	0.7 m	XB17.11	
<i>Duperreya commixta</i>	+	cr	XB15.06	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	2%	1 m	XBRH09.09	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.05 m	XB13.15	
<i>Eremophila longifolia</i>	+	1.5 m	XB17.07	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01 m	XB13.19	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB13.09	
<i>Gomphrena kanisii</i>	+	0.1 m	XB17.03	
<i>Goodenia prostrata</i>	+	cr	XB13.22	

<i>Maireana villosa</i>	+	0.2 m	XB13.05
<i>Paspalidium clementii</i>	+	0.1 m	XB05.16
<i>Perotis rara</i>	+	0.05 m	XBRH11.06
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.08 m	XB13.25
* <i>Portulaca oleracea</i>	1%	cr	XB07.09
<i>Psydrax suaveolens</i>	+	0.9 m	XB10.28
<i>Ptilotus auriculifolius</i>	+	0.1 m	XB01.05
<i>Ptilotus helipteroides</i>	+	0.05 m	XB13.26
<i>Ptilotus obovatus</i>	+	0.4 m	XB15.04
<i>Ptilotus polystachyus</i>	+	0.3 m	XB17.04
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.6 m	XB17.12
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>	+	0.7 m	XB17.05
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	3%	1-2 m	XB17.02
<i>Senna notabilis</i>	+	0.15 m	XB01.22
<i>Sida ectogama</i>	+	0.6 m	XB13.08
<i>Solanum lasiophyllum</i>	+	0.6 m	XB13.17
<i>Sporobolus australasicus</i>	+	0.3 m	XB13.16
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB05.14
<i>Tribulus astrocarpus</i>	+	cr	XB13.20
<i>Triodia pungens</i>	+	0.4 m	XB17.14
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.3 m	XB17.13

Christmas Creek Site XB18

Described by Julia Mattner Date 20/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 787295 mE 7515849 mN

Habitat Dense Mulga drainage line

Soil Red brown sandy loam, with gravel

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Corymbia candida* subsp. *candida* Low Isolated Trees over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia pruinocarpa* and *Atalaya hemiglauca* Tall Open Shrubland over **Cenchrus ciliaris*, *Chloris pectinata* and *Sporobolus australasicus* Mid Sparse Tussock Grassland over **Cucumis melo* subsp. *agrestis*, *Corchorus tridens* and **Bidens bipinnata* Low Sparse Herbland.



Veg Condition Good

Fire Age Moderate

Notes Aspect: E

Topography: Drainage line

Bare Ground: 60%

Litter Cover: <1% Logs, 1% Twigs, 1% Lvs

Disturbance: Grazing and weeds

Dead cow in big crabhole. Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	35%	1-4 m	XB18.01	
<i>Acacia pruinocarpa</i>	+	3 m	XB02.12	
<i>Acacia farnesiana</i>	+	0.9 m	XBOPJM06	
<i>Alternanthera angustifolia</i>	+	0.2 m	XB18.08	
<i>Alternanthera denticulata</i>	+	0.3 m	XB18.03	
<i>Atalaya hemiglauca</i>	+	2 m	XBR06.09	
<i>*Bidens bipinnata</i>	1%	0.1-0.5 m	XB10.17	
<i>Boerhavia paludosa</i>	+	cr	XB16.26	
<i>*Cenchrus ciliaris</i>	6%	0.6 m	XB07.02	
<i>Chloris pectinata</i>	+	0.3 m	XB14.06	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Commelina ensifolia</i>	+	0.3 m	XB14.20	
<i>Corchorus tridens</i>	2%	0.15 m	XB14.23	
<i>Corymbia candida</i> subsp. <i>candida</i>	+	3 m	XB18.02	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	3%	cr	XB14.17	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	
<i>Euphorbia alsiniflora</i>	+	0.4 m	XB18.06	Previously <i>E. coghlanii</i>
<i>Euphorbia boophthona</i>	+	0.3 m	XBR08.01	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.15 m	XB10.30	
<i>Goodenia forrestii</i>	+	0.4 m	XB12.13	
<i>Ipomoea muelleri</i>	+	cr	XB16.31	Fl; pink
<i>Iseilema membranaceum</i>	+	0.2 m	XB14.11	

<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2 m	XB04.03	
<i>Maireana planifolia</i>	+	0.6 m	XB18.04	
* <i>Malvastrum americanum</i>	+	0.4 m	XB16.23	
<i>Operculina aequiseipala</i>	+	cr	XB16.18	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB18.07	
<i>Rhynchosia minima</i>	+	0.2 m	XB16.19	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	+	0.15 m	XB18.09	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.4 m	XBR08.09	
<i>Senna</i> sp.	+	0.4 m	XB18.05	possibly atypically hairy <i>S. hamersleyensis</i>
<i>Sporobolus australasicus</i>	+	0.3 m	XB16.03	

Christmas Creek Site XB19

Described by Hayden Ajduk Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 765523 mE 7524510 mN

Habitat Mulga Stony plain

Soil Red brown loam with cobbles and pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Senna glutinosa* subsp. *xluerssenii*, *Acacia pruinocarpa*, *Grevillea wickhamii* subsp. *hispidula* and *Ptilotus obovatus* Mid Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Senna notabilis*, *Corchorus lasiocarpus* subsp. *parvus*, *Senna artemisioides* subsp. *oligophylla* and *Senna stricta* Low Sparse Shrubland over *Triodia pungens* and *Triodia longiceps* Low Sparse Hummock Grassland.

Veg Condition Very good**Fire Age** Moderate**Notes** Aspect: N/A

Topography: Plain

Bare Ground: 70%

Litter Cover: 1% Logs, 1% Twigs, 1% Lvs

Disturbance: Nearby tracks

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	8%	2 m	XB19.01	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)	+	2.5 m	XB19.08	
<i>Acacia pruinocarpa</i>	3%	1.9 m	XB03.05	
<i>Aristida obscura</i>	+	0.15 m	XB13.06	
* <i>Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.03 m	XB17.08	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.3 m	XB15.07	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Corymbia candida</i> subsp. <i>dipsodes</i>	+	1.5 m	XB19.03	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cymbopogon oblectus</i>	+	0.6 m	XB19.10	
<i>Dodonaea petiolaris</i>	+	1 m	XBRH01.08	
<i>Duperreya commixta</i>	+	cr	XB15.06	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	3%	0.8 m	XBRH09.09	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.5 m	XB01.12	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.07 m	XB13.19	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB13.09	
<i>Gomphrena kanisii</i>	+	0.3 m	XB19.06	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	2 m	XB01.27	
<i>Heliotropium heteranthum</i>	+	0.01 m	XB19.12	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB05.09	
<i>Mollugo molluginea</i>	+	0.05 m	XB13.18	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB13.25	

<i>*Portulaca oleracea</i>	+	cr	XB07.09
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.1 m	XB01.14
<i>Ptilotus helipteroides</i>	+	0.1 m	XB13.26
<i>Ptilotus obovatus</i>	1%	1.2 m	XB19.05
<i>Ptilotus schwartzii</i>	+	0.5 m	XB13.10
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.5 m	XB19.11
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	4%	1.2 m	XB17.02
<i>Senna notabilis</i>	+	0.2 m	XB01.22
<i>Senna stricta</i>	+	1 m	XB19.09
<i>Sida</i> aff. <i>echinocarpa</i> (MET 15,350)	+	0.4 m	XB19.04
<i>Solanum lasiophyllum</i>	+	0.4 m	XB13.17
<i>Sporobolus australasicus</i>	+	0.1 m	XB13.16
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB05.14
<i>Triodia longiceps</i>	2%	0.3 m	XB19.07
<i>Triodia pungens</i>	10%	0.5 m	XB19.02

Christmas Creek Site XB20

Described by Julia Mattner Date 20/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 790394 mE 7516431 mN

Habitat Malga drainage line

Soil Red brown sandy loam, no crab holes

Rock Type

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) , *Hakea lorea* subsp. *lorea* and *Acacia tetragonophylla* Tall Sparse Shrubland over **Malvastrum americanum*, *Tephrosia rosea* var. *glabrior* and *Ptilotus obovatus* Low Sparse Shrubland over **Cenchrus ciliaris*, *Sporobolus australasicus* and *Chrysopogon fallax* Mid Sparse Tussock Grassland over *Ipomoea muelleri*, **Cucumis melo* subsp. *agrestis* and **Citrullus colocynthis*, *Corchorus tridens* and **Bidens bipinnata* Low Open Herbland.



Veg Condition Good - degraded

Fire Age Moderate

Notes Aspect: N/A

Topography: Drainage line

Bare Ground: 40%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing and weeds

A small section in the North appears to have been burnt around 3 to 4 years ago. The burnt age of the rest of the quadrat is moderate to old. Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	30%	1.5-5 m	XB26.02	
<i>*Vachellia farnesiana</i>	+	0.9 m	XBOPJM06	
<i>Acacia synchronicia</i>	+	1.5 m	XB16.14	
<i>Acacia tetragonophylla</i>	1%	0.5-2.5 m	XB02.02	
<i>Amaranthus centralis</i>	+	0.6 m	XB20.09	
<i>Amyema fitzgeraldii</i>	+	0.5 m	XB20.01	Fl; red
<i>*Bidens bipinnata</i>	1%	0.4 m	XB10.17	
<i>Boerhavia paludosa</i>	+	0.05 m	XB16.26	Fl; pink
<i>*Cenchrus ciliaris</i>	10%	0.8 m	XB07.02	
<i>Chrysopogon fallax</i>	+	0.8 m	XB14.09	
<i>*Citrullus colocynthis</i>	7%	cr	XB14.16	Fl; yellow
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	Fl; yellow
<i>Corchorus parviflorus</i>	+	0.6 m	XB20.06	
<i>Corchorus tridens</i>	3%	0.2 m	XB14.23	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	+	0.2 m	XB16.17	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	8%	cr	XB14.17	Fl; yellow
<i>Cyperus iria</i>	+	0.15 m	XB16.25	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	
<i>Digitaria ctenantha</i>	+	0.4 m	XB20.03	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.15 m	XB10.30	
<i>Goodenia nuda</i>	+	0.4 m	XB20.02	

<i>Hakea lorea</i> subsp. <i>lorea</i>	1%	3.5 m	XB30.01	
<i>Ipomoea muelleri</i>	10%	cr	XB16.31	Fl; pink
<i>Ipomoea polymorpha</i>	+	0.1 m	XB20.11	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2 m	XB04.03	
* <i>Malvastrum americanum</i>	1%	0.05-0.4 m	XB16.23	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	
<i>Pterocaulon sphacelatum</i>	+	0.15 m	XB18.07	
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2 m	XB20.08	
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	+	0.2 m	XB20.05	
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4 m	XB20.07	
<i>Senna</i> sp.	+	0.8 m	XB18.05	possibly atypically hairy <i>S. hamersleyensis</i>
<i>Sporobolus australasicus</i>	+	0.4 m	XB16.03	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	+	0.6 m	XB20.04	Sterile
<i>Urochloa occidentalis</i>	+	0.5 m	XB20.10	

Christmas Creek Site XB21

Described by Hayden Ajduk Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 762293 mE 7523225 mN

Habitat Stony Mulga plain

Soil Red brown loam with some clay patches with a covering of pebbles

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Atalaya hemiglauca*, *Acacia sericophylla*, and *Grevillea wickhamii* subsp. *hispidula* Tall Sparse Shrubland over *Dodonaea petiolaris*, *Senna glaucifolia* x aff. *oligophylla* (thinly sericeous FMR 29-11) and *Senna glutinosa* subsp. *xluerssenii* Mid Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Solanum lasiophyllum*, *Heliotropium heteranthum* and *Eremophila cuneifolia* Low Sparse Shrubland over **Cenchrus ciliaris*, *Chrysopogon fallax* and *Perotis rara* Mid Isolated Tussock Grasses.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: N/A

Topography: Plain

Bare Ground: 80%

Litter Cover: 2% Logs, 2% Twigs, 1% Lvs

Disturbance: Nearby drilling and weeds (bidens)



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.2 m	XB21.03	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	5%	4-5 m	XB21.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	15%	2-3 m	XB21.01	
<i>Acacia aneura</i> var. <i>intermedia</i>	+	2.5 m	XB21.12	
<i>Acacia sericophylla</i>	+	2.5 m	XB21.11	
<i>Acacia tetragonophylla</i>	+	1.9 m	XB07.01	
<i>Aristida obscura</i>	+	0.3 m	XB13.06	
<i>Atalaya hemiglauca</i>	+	2.9 m	XB21.13	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.05 m	XB17.08	
<i>*Cenchrus ciliaris</i>	+	0.4 m	XB07.02	
<i>Cheilanthes austrotenuifolia</i>	+	cr	XB07.22	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	cr	XB07.22	
<i>Chrysopogon fallax</i>	+	0.6 m	XB21.09	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.05	
<i>Dodonaea petiolaris</i>	4%	1.5 m	XBRH01.08	
<i>Duperreya commixta</i>	+	cr	XB15.06	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eremophila cuneifolia</i>	+	1 m	XB21.08	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	4%	0.7 m	XBRH09.09	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	cr	XB13.19	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB13.09	
<i>Gomphrena kanisii</i>	+	0.2 m	XB19.06	

<i>Goodenia prostrata</i>	+	0.05 m	XB21.10
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	2.5 m	XB01.27
<i>Heliotropium heteranthum</i>	+	0.02 m	XB19.12
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.2 m	XB13.23
<i>Maireana tomentosa</i>	+	0.3 m	XB07.03
<i>Mollugo molluginea</i>	+	0.05 m	XB13.18
<i>Perotis rara</i>	+	0.1 m	XBRH11.06
* <i>Portulaca oleracea</i>	+	cr	XB07.09
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.2 m	XB01.14
<i>Ptilotus schwartzii</i>	+	0.3 m	XB13.10
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.3 m	XB21.04
<i>Scaevola spinescens</i> (narrow form)	+	0.9 m	XB21.07
<i>Sclerolaena cornishiana</i>	+	0.3 m	XB21.05
<i>Senna glaucifolia</i> x aff. <i>oligophylla</i> (thinly sericeous FMR 29-11)	2%	1.3 m	XB21.06
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	2%	1.2 m	XB17.02
<i>Solanum lasiophyllum</i>	+	0.5 m	XB13.17
<i>Sporobolus australasicus</i>	+	0.3 m	XB13.16

Christmas Creek Site XB23

Described by Hayden Ajduk Date 24/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 772442 mE 7517919 mN

Habitat Stony plain adjacent to Marsh

Soil Red brown loam with cobbles and pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 10b
 Vegetation Sub-Association: *Acacia xiphophylla*, *Eremophila platycalyx* subsp. *pardalota* and *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Tall Sparse Shrubland over *Eremophila cuneifolia*, *Maireana pyramidata* and *Senna artemisioides* aff. subsp. *oligophylla* (thinly sericeous) Low Sparse Shrubland over *Xerochloa laniflora* and *Dactyloctenium radulans* Low Isolated Tussock Grasses.

Veg Condition Excellent to Very good

Fire Age Moderate

Notes Aspect: N/A

Topography: Plain

Bare Ground: 80%

Litter Cover: <1% Logs, <1% Twigs, 1% Lvs

Disturbance: Cattle



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	+	4 m	XB23.14	
<i>Acacia tetragonophylla</i>	+	0.1 m	XB07.01	
<i>Acacia xiphophylla</i>	15%	2.3 m	XB23.01	
<i>Brachyachne prostrata</i>	+	0.1 m	XB23.13	
<i>Cheilanthes austrotenuifolia</i>	+	cr	XB07.22	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB23.07	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.2 m	XB23.12	
<i>Eremophila cuneifolia</i>	2%	0.8 m	XB23.03	Fl; dark pink
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>	1%	2.5 m	XB23.02	Fl; pink
<i>Maireana pyramidata</i>	1%	0.5 m	XB23.09	
<i>Maireana triptera</i>	+	0.3 m	XB23.04	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB13.25	
* <i>Portulaca oleracea</i>	+	cr	XB07.09	
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.3 m	XB23.06	
<i>Sclerolaena eriacantha</i>	+	0.3 m	XB23.05	
<i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous)	1%	0.4 m	XB23.08	
<i>Trianthema triquetra</i>	+	cr	XB23.10	
<i>Tribulus astrocarpus</i>	+	0.01 m	XB23.15	
<i>Xerochloa laniflora</i>	+	0.1 m	XB23.11	

Christmas Creek Site XB24

Described by Julia Mattner Date 21/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 793751 mE 7520010 mN

Habitat Sheetflow Mulga patch

Soil Red brown sandy loam and clay with gravel and pebbles

Rock Type Ironstone and dolerite

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259) Tall Sparse Shrubland over *Dodonaea petiolaris*, *Senna artemisioides* subsp. *helmsii*, *Ptilotus obovatus*, *Eremophila latrobei* subsp. *filiformis*, *Psyrax suaveolens* and *Sida ectogama* Mid to Low Sparse Shrubland over *Paspalidium clementii* and *Perotis rara* Low Isolated Tussock Grasses.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: N/A
Topography: Flats
Bare Ground: 70%
Litter Cover: <1% Logs, 1% Twigs, 1% Lvs
Disturbance: very old pads (cattle and horses)



Two age groups of Mulga present. Old - 3.5m (20 years old) and young 0.5m (5 years old). Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	20%	0.5-3.5 m	XB24.01	
<i>Amaranthus interruptus</i>	+	0.2 m	XB24.05	
* <i>Bidens bipinnata</i>	+	0.05-0.4 m	XB10.17	
<i>Boerhavia paludosa</i>	+	0.15 m	XB16.26	
* <i>Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Cleome viscosa</i>	+	0.05-0.3 m	XB01.25	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	0.3-105 m	XB24.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Dysphania rhadinostachya</i>	+	0.05-0.2 m	XB14.15	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.6 m	XB24.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.5-1.2 m	XB02.13	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Hybanthus aurantiacus</i>	+	0.2 m	XB24.15	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Maireana villosa</i>	+	0.3 m	XB24.10	
<i>Paspalidium clementii</i>	+	0.2 m	XB24.06	
<i>Perotis rara</i>	+	0.15 m	XB14.03	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB24.09	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	

<i>Psyrax suaveolens</i>	+	0.4-1 m	XB10.28
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03
<i>Sclerolaena cornishiana</i>	+	0.15 m	XB24.07
<i>Senna ferraria</i> x <i>glaucifolia</i>	+	1.5 m	XB24.14
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.5 m	XB24.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.6-1.2 m	XB24.04
<i>Sida ectogama</i>	+	0.3-1.2 m	XB24.12
<i>Solanum lasiophyllum</i>	+	0.3 m	XB10.12
<i>Sporobolus australasicus</i>	+	0.4 m	XB16.03
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.1 m	XB02.08
<i>Tragus australianus</i>	+	0.3 m	XB24.16
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek Site XB25

Described by Hayden Ajduk Date 24/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 772752 mE 7520452 mN

Habitat Mulga plain

Soil Red brown loam with clay holes and a covering of pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat,recurved; FMR 35.3) Low Open Woodland over *Acacia**synchronicia* Mid Sparse Shrubland over *Senna artemisioides*aff. subsp. *oligophylla* (thinly sericeous), *Eremophila forrestii*subsp. *forrestii*, *Rhagodia eremaea* and *Senna artemisioides*subsp. *oligophylla* Low Sparse Shrubland over *Sporobolus**australasicus*, *Aristida obscura*, *Eragrostis leptocarpa*, **Cenchrus ciliaris* and *Chloris pectinata* Low Sparse Tussock Grassland.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: N/A

Topography: Plain

Bare Ground: 50%

Litter Cover: 1% Logs, <1% Twigs, <1% Lvs

Disturbance: Cattle and weeds (portulaca)

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	15%	3-5 m	XB25.01	
<i>Acacia synchronicia</i>	3%	1.5 m	XB25.06	
<i>Acacia tetragonophylla</i>	+	0.8 m	XB07.01	
<i>Aristida obscura</i>	2%	0.2 m	XB13.06	
<i>*Bidens bipinnata</i>	+	0.1 m	XB10.17	
<i>Brachyachne prostrata</i>	+	cr	XB23.13	
<i>Bulbostylis barbata</i>	+	0.1 m	XB13.11	
<i>*Cenchrus ciliaris</i>	+	0.4 m	XB07.02	
<i>Cheilanthes austrotenuifolia</i>	+	cr	XB07.22	
<i>Chloris pectinata</i>	1%	0.2 m	XB25.04	
<i>Chrysopogon fallax</i>	+	0.6 m	XB25.08	
<i>*Citrullus colocynthis</i>	+	cr	XB09.21	
<i>Cleome viscosa</i>	+	0.5 m	XB01.25	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	+	0.3 m	XB25.03	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cyperus iria</i>	+	0.3 m	XB25.16	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB23.07	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eragrostis leptocarpa</i>	+	0.7 m	XB25.07	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.4 m	XBRH09.09	
<i>Euphorbia alsiniflora</i>	+	cr	XB07.31	Previously <i>E. coghlanii</i>
Genus sp.	+	0.1 m	XB25.18	
<i>Goodenia muelleriana</i>	+	0.1 m	XB25.19	

<i>Goodenia prostrata</i>	+	cr	XB13.22
<i>Heliotropium heteranthum</i>	+	cr	XB19.12
<i>Ipomoea optica</i>	+	cr	XB25.05
<i>Lepidium phlebopetalum</i>	+	0.1 m	XB25.21
<i>Maireana pyramidata</i>	+	0.2 m	XB23.09
* <i>Malvastrum americanum</i>	+	0.15 m	XB25.09
<i>Marsilea hirsuta</i>	+	0.09 m	XB25.14
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.2 m	XB25.17
<i>Oldenlandia crouchiana</i>	+	0.1 m	XB25.12
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB13.25
* <i>Portulaca oleracea</i>	+	cr	XB07.09
<i>Pterocaulon sphacelatum</i>	+	0.05 m	XBRH11.08
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14
<i>Rhagodia eremaea</i>	+	0.4 m	XB25.20
<i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous)	2%	0.7 m	XB23.08
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	+	0.8 m	XB25.15
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.6 m	XB25.11
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	0.6 m	XB17.02
<i>Senna notabilis</i>	+	0.4 m	XB01.22
<i>Sida</i> aff. <i>fibulifera</i> (HD200-6)	+	cr	XB25.10
<i>Solanum lasiophyllum</i>	+	0.6 m	XB13.17
<i>Sporobolus australasicus</i>	5%	0.3 m	XB13.16
<i>Tephrosia</i> aff. <i>dementii</i> (9) (HD284-6)	+	cr	XB25.02
<i>Tribulus astrocarpus</i>	+	cr	XB23.15

Christmas Creek Site XB26

Described by Julia Mattner Date 21/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 791308 mE 7520072 mN

Habitat Mulga sheetflow, slightly raised.

Soil Brown red loamy sand with pebbles and gravel

Rock Type Basalt

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Woodland over *Dodonaea petiolaris*, *Eremophila latrobei* subsp. *filiformis*, *Senna glutinosa* subsp. *luerssenii* and *Hakea lorea* subsp. *lorea* Mid Sparse Shrubland over *Eriachne helmsii*, *Eriachne pulchella* subsp. *pulchella* and *Perotis rara* Mid Sparse Tussock Grassland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 50%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing



Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	4%	3.5 m	XB26.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	+	2.8 m	XB26.04	
<i>Acacia ayersiana</i>	+	3.5 m	XB26.01	
<i>Acacia tetragonophylla</i>	+	0.9 m	XB02.02	
<i>Aristida contorta</i>	+	0.25 m	XB26.06	
* <i>Bidens bipinnata</i>	+	0.05-0.4 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.05 m	XB02.03	
* <i>Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Corchorus parviflorus</i>	+	0.2 m	XB20.06	
<i>Corchorus tridens</i>	+	0.05 m	XB14.23	
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	4%	1.1 m	XB24.11	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.2 m	XB26.07	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.4 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	XB02.13	
<i>Eriachne helmsii</i>	+	0.3 m	XB26.08	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2 m	XB26.05	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.25 m	XB10.30	
<i>Goodenia prostrata</i>	+	0.1 m	XB26.10	
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	1.1 m	XB30.01	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Maireana villosa</i>	+	0.3 m	XB24.08	

<i>*Malvastrum americanum</i>	+	0.1 m	XB16.23
<i>Paspalidium clementii</i>	+	0.2 m	XB24.06
<i>Perotis rara</i>	+	0.15 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB10.22
<i>*Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Psydrax suaveolens</i>	+	0.3-1.5 m	XB10.28
<i>Pterocaulon sphacelatum</i>	+	0.05 m	XB18.07
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.4 m	XB01.14
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03
<i>Ptilotus schwartzii</i>	+	0.4 m	XB10.01
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	0.5-1.8 m	XB26.03
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.2 m	XB24.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.1 m	XB24.04
<i>Sida ectogama</i>	+	0.4-0.8 m	XB24.12
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12
<i>Tephrosia</i> aff. <i>dementii</i> (12) (HD1-32)	+	0.1 m	XB26.11
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek Site XB28

Described by Julia Mattner Date 21/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 787409 mE 7520072 mN

Habitat Mulga plains, sheetflow area with some small wetter pockets.

Soil Red brown loam with some clayey patches

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 4
 Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259) Tall Sparse Shrubland over *Hybanthus aurantiacus*, *Ptilotus obovatus*, *Senna notabilis*, *Corchorus parviflorus* and *Eremophila forrestii* subsp. *forrestii* Low Sparse Shrubland over *Triodia wiseana* Low Sparse Hummock Grassland over **Cucumis melo* subsp. *agrestis*, *Tribulus astrocarpus* and *Mollugo molluginea* Low Sparse Herbland



Veg Condition Very good to Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Flats

Bare Ground: 80%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing

Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.5 m	XB28.04	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	3%	4 m	XB26.04	
<i>Acacia ayersiana</i>	+	1 m	XB26.01	
<i>Acacia tetragonophylla</i>	+	1.2 m	XB02.02	
<i>Aristida contorta</i>	+	0.2 m	XB28.05	
<i>*Bidens bipinnata</i>	+	0.2 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>*Cenchrus ciliaris</i>	+	0.7 m	XB07.02	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.3 m	XB20.06	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	1%	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	1 m	XB24.11	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB28.01	
<i>Eragrostis xerophila</i>	+	0.2 m	XB28.08	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.7 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.1 m	XB02.13	
<i>Eriachne helmsii</i>	+	0.5 m	XB26.08	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1 m	XB46.05	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	

<i>Gomphrena kanisii</i>	+	0.1 m	XB28.07
<i>Goodenia prostrata</i>	+	0.05 m	XB28.09
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	3.5 m	XB01.27
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	1.2 m	XB30.01
<i>Hybanthus aurantiacus</i>	1%	0.3 m	XB05.09
<i>Iseilema membranaceum</i>	+	0.1 m	XB28.10
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26
<i>Mollugo molluginea</i>	+	0.05 m	XB04.08
<i>Paspalidium clementii</i>	+	0.2 m	XB24.06
<i>Perotis rara</i>	+	0.15 m	XB14.03
* <i>Portulaca oleracea</i>	+	0.12 m	XB16.07
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB18.07
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.8 m	XB01.14
<i>Ptilotus obovatus</i>	+	0.1-0.8 m	XB24.03
<i>Ptilotus schwartzii</i>	+	0.4 m	XB10.01
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07
<i>Senna ferraria</i> x <i>glaucifolia</i>	+	0.8 m	XB24.14
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	0.6-1.2 m	XB24.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1 m	XB24.04
<i>Senna notabilis</i>	+	0.4 m	XB01.22
<i>Senna stricta</i>	+	1.2 m	XB28.11
<i>Sida ectogama</i>	+	0.8 m	XB24.12
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	+	0.1 m	XB28.03
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.1 m	XB02.08
<i>Trianthema glossostigma</i>	+	0.05 m	XB28.06
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27
<i>Trichodesma zeylanicum</i>	+	0.5 m	XBOPJM13
<i>Triodia wiseana</i>	1%	0.5 m	XB28.02

Christmas Creek Site XB30

Described by Julia Mattner Date 21/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 784731 mE 7519039 mN

Habitat Mulga grove with a bit of intergrove

Soil Red-brown clayey fine sandy loam with gravel and pebbles with moist areas around crabholes.

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa* and *Hakea lorea* subsp. *lorea* Low Open Woodland over *Psyrax latifolia*, *Eremophila latrobei* subsp. *filiformis*, *Psyrax suaveolens*, *Senna ferraria* x *glaucofolia* and *Senna artemisioides* subsp. *helmsii* Mid Sparse Shrubland over *Commelina ensifolia*, **Bidens bipinnata*, *Corchorus tridens* and *Tribulus astrocarpus* Low Open Herbland.



Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 60%

Litter Cover: <1% Logs, <1% Twigs, 1% Lvs

Disturbance: Grazing with fresh cattle pads.

Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	35%	4.5 m	XB26.04	
<i>Acacia pruinocarpa</i>	1%	1-4 m	XB02.12	
<i>Amaranthus interruptus</i>	+	0.3 m	XB30.05	
<i>Aristida contorta</i>	+	0.2 m	XB28.05	
<i>*Bidens bipinnata</i>	1%	0.05-0.4 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.1 m	XB14.05	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.1 m	XB02.03	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
<i>Commelina ensifolia</i>	25%	0.2 m	XB14.20	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
<i>Digitaria ctenantha</i>	+	0.2 m	XB20.03	
<i>Dodonaea petiolaris</i>	+	1.8 m	XB24.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB30.04	
<i>Eragrostis xerophila</i>	+	0.3 m	XB28.08	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.9 m	XB12.04	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	2.5 m	XB30.01	
<i>Hibiscus burtonii</i>	out	0.3 m	XB30.06	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.5 m	XB30.02	
<i>Maireana villosa</i>	+	0.4 m	XB24.10	

<i>Paspalidium clementii</i>	+	0.2 m	XB24.06
<i>Perotis rara</i>	+	0.2 m	XB14.03
<i>*Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Psydrax latifolia</i>	1%	2 m	XBR08.10
<i>Psydrax suaveolens</i>	+	1.5 m	XB10.28
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	2.5 m	XB30.03
<i>Senna ferraria</i> x <i>glaucifolia</i>	+	1.1 m	XB24.14
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.9 m	XB24.04
<i>Senna notabilis</i>	+	0.2 m	XB01.22
<i>*Setaria verticillata</i>	out	0.2 m	XB30.07
<i>Sida ectogama</i>	+	1.2 m	XB24.12
<i>Solanum lasiophyllum</i>	+	0.3 m	XB10.12
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek Site XB32

Described by Julia Mattner Date 21/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 785527 mE 7516889 mN

Habitat Sheetflow Mulga, mainly sparse habitat with denser Mulga patch

Soil Sandy loamy clay.

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia* aff. *aneura* (narrow fine veined; site 1259) Tall Sparse Shrubland over *Sida platycalyx*, *Eremophila lanceolata*, *Eremophila forrestii* subsp. *forrestii*, *Tephrosia* aff. *clementii* (12) (HD1-32) and *Senna artemisioides* aff subsp *oligophylla* (thinly sericeous), Low Sparse Shrubland over *Chrysopogon fallax*, *Aristida contorta*, *Sporobolus australasicus* and *Chloris pectinata* Mid Isolated Tussock Grasses over *Commelina ensifolia*, *Goodenia prostrata*, *Tribulus astrocarpus* and **Cucumis melo* subsp. *agrestis* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Flats

Bare Ground: 90%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Old grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	1-5 m	XB26.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	1%	3 m	XB26.04	
<i>Acacia synchronicia</i>	+	1.8 m	XB16.14	
<i>Aristida contorta</i>	+	0.2 m	XB32.05	
<i>*Bidens bipinnata</i>	+	0.2 m	XB10.17	
<i>Boerhavia paludosa</i>	+	0.1 m	XB16.26	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Chloris pectinata</i>	+	0.3 m	XB02.21	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.1 m	XB01.25	
<i>Commelina ensifolia</i>	1%	0.2 m	XB14.20	
<i>Corchorus tridens</i>	+	0.2 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	1.2 m	XB24.11	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.6 m	XB10.13	
<i>Eremophila lanceolata</i>	+	0.2 m	XB16.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.8-1.5 m	XB12.04	
<i>Eriachne helmsii</i>	+	0.3 m	XB26.08	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Goodenia prostrata</i>	+	0.1 m	XB32.02	

<i>Goodenia</i> sp.	+	0.3 m	XB32.03
<i>Iseilema membranaceum</i>	+	0.2 m	XB28.10
<i>Maireana villosa</i>	+	0.4 m	XB24.10
<i>Paspalidium clementii</i>	+	0.3 m	XB24.06
<i>Perotis rara</i>	+	0.1 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB24.09
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Psydrax latifolia</i>	+	1.8 m	XBR08.10
<i>Psydrax suaveolens</i>	+	1.2 m	XB10.28
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.1 m	XB01.14
<i>Ptilotus schwartzii</i>	+	0.3 m	XB10.01
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	0.4-1.8 m	XB32.04
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07
<i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous)	+	0.9 m	XB32.06
<i>Sida platycalyx</i>	1%	0.1 m	XB32.01
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12
<i>Sporobolus australasicus</i>	+	0.1 m	XB16.03
<i>Tephrosia</i> aff. <i>clementii</i> (12) (HD1-32)	+	0.1 m	XB26.11
<i>Tragus australianus</i>	+	0.3 m	XB16.08
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27
<i>Urochloa occidentalis</i>	+	0.2 m	XB20.10

Christmas Creek Site XB34

Described by Julia Mattner Date 22/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 783615 mE 7519452 mN

Habitat Mulga plains, sheetflow with run off near the edge of crabhole country

Soil Red brown sandy loam.

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa* and *Psyrax latifolia* Tall Open Shrubland over *Senna glutinosa* subsp. *luerssenii*, *Senna artemisioides* subsp. *oligophylla* (thinly sericeous), *Eremophila latrobei* subsp. *filiformis* Mid Isolated Shrubs over *Sporobolus australasicus*, *Eriachne helmsii*, *Aristida contorta* and *Chloris pectinata* Mid Isolated Tussock Grasses over **Cucumis melo* subsp. *agrestis*, *Goodenia prostrata* and *Tribulus astrocarpus* Low Sparse Herbland.



Veg Condition Very good

Fire Age Old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 70%

Litter Cover: <1% Logs, 1% Twigs, 3% Lvs

Disturbance: Old grazing

Area is a sink for sheet flow with many leaves washed into lines.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> sp.	+	0.2 m	XB34.08	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	35%	4.5 m	XB34.01	
<i>Acacia pruinocarpa</i>	3%	4.5 m	XB02.12	
<i>Amaranthus interruptus</i>	+	0.4 m	XB34.06	
<i>Aristida contorta</i>	+	0.2 m	XB34.04	
<i>*Bidens bipinnata</i>	+	0.1-0.3 m	XB10.17	
<i>Boerhavia paludosa</i>	+	0.2 m	XB16.26	
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.1 m	XB02.03	
<i>Chloris pectinata</i>	+	0.3 m	XB02.21	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Commelina ensifolia</i>	+	0.2 m	XB14.20	
<i>Corchorus tridens</i>	+	0.2 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	1%	cr	XB14.17	
<i>Cyperus iria</i>	+	0.15 m	XB34.03	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	
<i>Digitaria ctenantha</i>	+	0.3 m	XB20.03	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.8 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	XB12.04	
<i>Eriachne helmsii</i>	+	0.1 m	XB26.08	

<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30
<i>Goodenia prostrata</i>	+	0.05 m	XB34.09
<i>Iseilema membranaceum</i>	+	0.1 m	XB28.10
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.3 m	XB34.05
<i>Paspalidium clementii</i>	+	0.2 m	XB24.06
<i>Perotis rara</i>	+	0.2 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB24.09
<i>Polygala isingii</i>	+	0.1 m	XB34.07
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07
<i>Psydrax latifolia</i>	+	3 m	XBR08.10
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB18.07
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	1 m	XB26.03
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		1.2 m	XB34.02
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.2 m	XB24.02
* <i>Setaria verticillata</i>	+	0.3 m	XB30.07
<i>Sporobolus australasicus</i>	+	0.1-0.2 m	XB16.03
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27
<i>Urochloa occidentalis</i>	+	0.3 m	XB20.10

Christmas Creek Site XB36

Described by Julia Mattner Date 22/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 781661 mE 7517895 mN

Habitat Alluvial plain with two minor creek line channels

Soil Red brown sandy loam with gravel and pebbles

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia pruinocarpa* Tall Sparse Shrubland *Ptilotus obovatus*, *Senna glaucifolia* x aff. *oligophylla* (thinly sericeous) and *Hybanthus aurantiacus* Low Isolated Shrubs over *Sporobolus australasicus*, **Cenchrus ciliaris*, *Eragrostis cumingii*, *Eragrostis xerophila*, *Eragrostis xerophila* and *Chloris pectinata* Low Isolated Tussock Grasses over *Ipomoea muelleri*, **Cucumis melo* subsp. *agrestis*, *Operculina aequiseipala* and **Portulaca oleracea* Low Sparse Herbland.

Veg Condition Degraded

Fire Age Old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 70%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Heavily grazed and eroded.

A patch of open Mulga shrubland in a vast expanse of *Acacia synchronicia*.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	5%	3 m	XB26.02	
<i>Acacia pruinocarpa</i>	1%	2.5 m	XB02.12	
<i>Acacia trachycarpa</i>	+	2 m	XB36.05	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Brachyachne prostrata</i>	+	0.1 m	XB36.01	
<i>*Cenchrus ciliaris</i>	+	0.6 m	XB07.02	
<i>Chloris pectinata</i>	+	0.3 m	XB02.21	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus tridens</i>	+	0.2 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	1%	cr	XB14.17	
<i>Cyperus iria</i>	+	0.2 m	XB34.03	
<i>Dactyloctenium radulans</i>	+	0.1 m	XB16.02	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.2 m	XB30.04	
<i>Eragrostis cumingii</i>	+	0.2 m	XB36.04	
<i>Eragrostis xerophila</i>	+	0.3 m	XB36.06	
<i>Hybanthus aurantiacus</i>	+	0.2 m	XB05.09	
<i>Ipomoea muelleri</i>	6%	cr	XB16.31	
<i>Operculina aequiseipala</i>	1%	cr	XB16.18	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB24.09	
<i>*Portulaca oleracea</i>	1%	0.1 m	XB16.07	
<i>Ptilotus obovatus</i>	+	0.2 m	XB24.03	

<i>Salsola tragus subsp. tragus</i>	+	0.3 m	XB20.07
<i>Senna glaucifolia</i> x aff. <i>oligophylla</i> (thinly sericeous FMR 29-11)	+	0.2 m	XB24.14
<i>Sida fibulifera</i>	out	0.1 m	XB28.03
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03
<i>Trianthema triquetra</i>	+	0.1 m	XB36.02
<i>Tribulus astrocarpus</i>	+	0.1 m	XB16.27
* <i>Vachellia farnesiana</i>	+	0.2 m	XBOPJM06

Christmas Creek Site XB38

Described by Julia Mattner Date 22/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 779339 mE 7519773 mN

Habitat Creekline near culverts

Soil Red brown sandy clay

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa* Low Open Forest over *Acacia pyrifolia* and *Acacia tetragonophylla* Tall Sparse Shrubland over *Eremophila latrobei* subsp. *filiformis*, *Sida ectogama*, *Senna artemisioides* subsp. *helmsii* and *Ptilotus obovatus* Mid Isolated Shrubs over **Cenchrus ciliaris*, *Chloris pectinata*, *Chrysopogon fallax* and *Eragrostis xerophila* Sparse Hummock Grassland over *Ipomoea muelleri*, **Citrullus colocynthis*, **Bidens bipinnata*, **Cucumis melo* subsp. *agrestis* and *Corchorus tridens* Low Open Herbland.

Veg Condition Degraded

Fire Age Old

Notes Aspect: N/A

Topography: Creekline

Bare Ground: 40%

Litter Cover: 2% Logs, 2% Twigs, 1% Lvs

Disturbance: Grazing, concentrated waterflow from culverts near by.

Weed cover will increase as wet season continues.

To the south is a rail embankment and culverts, to the east is a road.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	50%	5 m	XB26.04	
<i>Acacia pruinocarpa</i>	3%	6 m	XB02.12	
<i>Acacia pyrifolia</i>	2%	3.5 m	XB04.18	
<i>Acacia tetragonophylla</i>	+	3 m	XB02.02	
<i>Amaranthus interruptus</i>	+	0.4 m	XB24.05	
<i>*Bidens bipinnata</i>	1%	0.2 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Brachyachne convergens</i>	+	0.3 m	XB38.02	
<i>*Cenchrus ciliaris</i>	5%	0.7 m	XB07.02	
<i>Chloris pectinata</i>	+	0.4 m	XB02.21	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>*Citrullus colocynthis</i>	1%	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus tridens</i>	1%	0.2 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	1%	cr	XB14.17	
<i>Cyperus iria</i>	+	0.2 m	XB34.03	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	
<i>Dicladanthera forrestii</i>	+	0.3 m	XBOPJM07	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Eragrostis xerophila</i>	+	0.3 m	XB28.08	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.2 m	XB02.13	
<i>Euphorbia alsiniflora</i>	+	0.4 m	XB38.03	Previously <i>E. coghlanii</i>

<i>Hybanthus aurantiacus</i>	+	0.3 m	XBR05.09
<i>Ipomoea muelleri</i>	30%	cr	XB16.31
* <i>Malvastrum americanum</i>	+	0.4 m	XB16.23
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08
<i>Paspalidium clementii</i>	+	0.2 m	XB48.05
<i>Perotis rara</i>	+	0.1 m	XB14.03
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07
<i>Pterocaulon sphacelatum</i>	+	0.3 m	XB18.07
<i>Ptilotus obovatus</i>	+	0.3 m	XB24.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.3 m	XB24.04
* <i>Setaria verticillata</i>	+	0.4 m	XB30.07
<i>Sida ectogama</i>	+	1.2 m	XB24.12
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03
<i>Themeda triandra</i>	+	0.7 m	XB38.01
<i>Trichodesma zeylanicum</i>	+	0.5 m	XBOPJM13
<i>Urochloa occidentalis</i>	+	0.3 m	XB20.10

Christmas Creek Site XB40

Described by Julia Mattner Date 22/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 777422 mE 7520814 mN

Habitat Very shallow Mulga broad drainage.

Soil Red-brown sandy loam

Vegetation Vegetation Type (Mattiske 2007): 2
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia paraneura* Low Woodland over *Acacia paraneura*, *Acacia tetragonophylla*, *Senna artemisioides* subsp. *helmsii* and *Eremophila latrobei* subsp. *filiformis* Mid Sparse Shrubland over *Chrysopogon fallax*, *Sporobolus australasicus*, **Cenchrus ciliaris* and **Setaria verticillata* Mid Isolated Grasses over *Ipomoea muelleri*, *Boerhavia coccinea*, **Bidens bipinnata* and *Corchorus tridens* Low Sparse Herbland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A
 Topography: broad drainage line
 Bare Ground: 80%
 Litter Cover: 1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Grazing

Some very big old Mulga trees



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	35%	7 m	XB26.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	2%	4 m	XB26.04	
<i>Acacia paraneura</i>	1%	5 m	XB40.04	
<i>Acacia paraneura</i>	1%	1.5 m	XB40.05	
<i>Acacia tetragonophylla</i>	+	1.2 m	XB02.02	
<i>Aeschynomene indica</i>	+	0.4 m	XB40.01	
<i>Amaranthus interruptus</i>	+	0.2 m	XB30.05	
<i>Amyema fitzgeraldii</i>	+	cr	XB20.01	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis barbata</i>	+	0.15 m	XB04.07	
<i>Calandrinia</i> sp.	+	0.05 m	XB40.07	sterile
<i>*Cenchrus ciliaris</i>	+	0.6 m	XB07.02	
<i>Chloris pectinata</i>	+	0.3 m	XB02.21	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Cyperus iria</i>	+	0.2 m	XB34.03	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	

<i>Digitaria ctenantha</i>	+	0.3 m	XB20.03
<i>Duperreya commixta</i>	+	cr	XB10.25
<i>*Echinochloa colona</i>	+	0.3 m	XB40.02
<i>Eremophila lanceolata</i>	+	0.3 m	XB16.13
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.2 m	XB12.04
<i>Euphorbia boophthona</i>	+	0.3 m	XBR08.01
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30
<i>Hybanthus aurantiacus</i>	+	0.05 m	XB24.15
<i>Ipomoea muelleri</i>	2%	cr	XB16.31
<i>Maireana planifolia</i>	+	0.5 m	XB18.04
<i>Malvaceae</i> sp.	+	0.1 m	XB40.06
<i>Marsilea hirsuta</i>	+	0.1 m	XBOPJM16
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.3 m	XB34.05
<i>Perotis rara</i>	+	0.1 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB24.09
<i>*Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07
<i>Ptilotus macrocephalus</i>	+	0.4 m	XB40.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.3 m	XB24.04
<i>*Setaria verticillata</i>	+	0.3 m	XB30.07
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03
<i>Tribulus astrocarpus</i>	+	0.2 m	XB14.12

Christmas Creek Site XB42

Described by Julia Mattner Date 22/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 777209 mE 7521970 mN

Habitat Sparsely vegetated Mulga intergrove.

Soil Red brown clayey loam

Rock Type

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Eucalyptus victrix* Low Isolated Trees over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia pruinocarpa* Tall Sparse Shrubland over *Eremophila lanceolata*, *Ptilotus obovatus*, *Senna artemisioides* aff subsp. *oligophylla* (thinly sericeous), *Eremophila forrestii* subsp. *forrestii* and *Senna notabilis* Low Sparse Shrubland over *Aristida contorta*, *Paraneurachne muelleri*, **Cenchrus ciliaris*, *Sporobolus australasicus* and *Aristida inaequiglumis* Mid Isolated Tussock Grasses.



Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 90%

Litter Cover: <1% Logs, <1% Twigs, 2% Lvs

Disturbance: Old grazing

The Eucalyptus are probably a blow-in from the creek to the south.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	3.5 m	XB42.04	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	out	3.5 m	XB26.04	
<i>Acacia pruinocarpa</i>	+	3 m	XB02.12	
<i>Acacia synchronicia</i>	+	1 m	XB16.14	
<i>Acacia tetragonophylla</i>	+	1.2 m	XB02.02	
<i>Aristida contorta</i>	+	0.2 m	XB42.02	
<i>Aristida inaequiglumis</i>	+	1 m	XBOPJM18	
* <i>Bidens bipinnata</i>	+	0.2 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.1 m	XB36.03	
* <i>Cenchrus ciliaris</i>	+	0.4 m	XBRH03.13	
* <i>Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
<i>Commelina ensifolia</i>	+	0.1 m	XB14.20	
<i>Dactyloctenium radulans</i>	+	0.1 m	XB16.02	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB30.04	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.7 m	XB10.13	
<i>Eremophila lanceolata</i>	1%	0.3 m	XB16.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.8 m	XB12.04	Fl; purple
<i>Eucalyptus victrix</i>	+	0.7 m	XB09.16	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	

<i>Euphorbia biconvexa</i>	+	0.3 m	XB42.03
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07
<i>Goodenia prostrata</i>	+	0.05 m	XB34.09
<i>Ipomoea muelleri</i>	+	cr	XB16.31
<i>Maireana planifolia</i> x <i>villosa</i>	out	0.4 m	XB42.11
<i>Maireana villosa</i>	+	0.4 m	XB42.08
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08
<i>Panicum decompositum</i>	+	0.4 m	XB42.07
<i>Paraneurachne muelleri</i>	+	0.2 m	XB42.05
<i>Paspalidium clementii</i>	+	0.3 m	XB24.06
<i>Perotis rara</i>	+	0.1 m	XB14.03
<i>*Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Ptilotus macrocephalus</i>	+	0.15 m	XB42.10
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03
<i>Ptilotus schwartzii</i>	+	0.3 m	XB10.01
<i>Sclerolaena tetragona</i>	+	0.2 m	XB42.09
<i>Senna artemisioides</i> aff. subsp. <i>oligophylla</i> (thinly sericeous)	+	0.4 m	XB32.06
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.1 m	XB24.04
<i>Senna notabilis</i>	+	0.2 m	XB01.22
<i>Sida platycalyx</i>	+	0.1 m	XB32.01
<i>Solanum lasiophyllum</i>	+	0.5 m	XB10.12
<i>Sporobolus australasicus</i>	+	0.1-0.2 m	XB16.03
<i>Trianthema glossostigma</i>	+	0.05 m	XB28.06
<i>Trianthema triquetra</i>	+	0.1 m	XB36.02
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek Site XB44

Described by Julia Mattner Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 760824 mE 7526610 mN

Habitat A very gently undulating plain of Mulga and Acacia

Soil Red brown sandy loam with pebbles

Vegetation Vegetation Type (Mattiske 2007): 10
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia synchronicia* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Eremophila lanceolata*, *Senna artemisioides* subsp. *oligophylla* (thinly sericeous) and *Eremophila latrobei* x *forrestii* Low Sparse Shrubland over *Enneapogon polyphyllus*, *Eragrostis xerophila*, *Aristida contorta* and **Cenchrus ciliaris* Low Isolated Tussock Grasses over *Bulbostylis barbata* Low Sparse Sedgeland.

Veg Condition Very good to Good

Fire Age Young

Notes Aspect: N/A

Topography: Undulating plain

Bare Ground: \70%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing

Site was between road and rail.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.3 m	XB44.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	2.5 m	XB44.11	
<i>Acacia synchronicia</i>	2%	2.2 m	XB16.14	
<i>Acacia tetragonophylla</i>	+	1.4 m	XB02.02	
<i>Alternanthera nana</i>	+	0.2 m	XB44.10	
<i>Aristida contorta</i>	+	0.2 m	XB44.02	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis barbata</i>	1%	0.1 m	XB04.07	
<i>*Cenchrus ciliaris</i>	+	0.6 m	XB07.02	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.2 m	XB20.06	
<i>Corchorus tridens</i>	+	0.2 m	XB14.23	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB44.05	
<i>Eragrostis xerophila</i>	+	0.3 m	XB44.13	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1%	0.9 m	XB10.13	
<i>Eremophila lanceolata</i>	+	0.4 m	XB16.13	
<i>Eremophila latrobei</i> x <i>forrestii</i>	+	0.4 m	XB44.15	
<i>Eriachne mucronata</i> (large flower form)	+	0.3 m	XB44.09	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Goodenia prostrata</i>	+	0.1 m	XB44.01	
<i>Heliotropium heteranthum</i>	+	0.02 m	XB44.07	

<i>Ipomoea muelleri</i>	+	cr	XB16.31
<i>Iseilema membranaceum</i>	+	0.3 m	XB28.10
<i>Lepidium phlebopetalum</i>	+	0.1 m	XB44.06
<i>Perotis rara</i>	+	0.15 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB24.09
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB18.07
<i>Ptilotus aervoides</i>	+	0.1 m	XB44.03
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.4 m	XB01.14
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.15 m	XB44.12
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4 m	XBOPJM10
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	1.1 m	XB34.02
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.5 m	XB24.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.2 m	XB24.04
<i>Senna notabilis</i>	+	0.8 m	XB01.22
<i>Sida fibulifera</i>	+	0.1 m	XB28.03
<i>Solanum lasiophyllum</i>	+	0.8 m	XB10.12
<i>Solanum phlomoides</i>	+	0.4 m	XB44.14
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03
<i>Stenopetalum nutans</i>	+	1 m	XB14.19
<i>Urochloa occidentalis</i>	+	0.2 m	XB20.10
<i>Vigna</i> sp. central (M.E. Trudgen 1626) PN	+	0.1 m	XB44.08

Christmas Creek Site XB46

Described by Julia Mattner Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 758342 mE 7523573 mN

Habitat Undulating Mulga plain

Soil Red brown fine sandy clayey loam with some crabholes, gravel and pebbles

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia xiphophylla*, *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Tall Sparse Shrubland over *Senna glutinosa* subsp. *luerssenii*, *Senna artemisioides* subsp. *oligophylla* (thinly sericeous), *Rhagodia eremaea*, *Eremophila cuneifolia* and *Acacia synchronicia* Mid Sparse Shrubland over *Sporobolus australasicus*, *Chloris pectinata*, *Aristida contorta* and *Eriachne pulchella* subsp. *pulchella* Low Isolated Tussock Grasses over *Bulbostylis barbata* Low Sparse Sedgeland.

Veg Condition Very Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Undulating plain

Bare Ground: 75%

Litter Cover: <1% Logs, <1% Twigs, 5% Lvs

Disturbance: Grazing, presence of horses.

A patch of dead old Mulga adjacent to site.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.3 m	XB44.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	1%	3 m	XB26.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	2%	3.5 m	XB26.04	
<i>Acacia synchronicia</i>	+	1.2 m	XB16.14	
<i>Acacia tetragonophylla</i>	+	1.6 m	XB02.02	
<i>Acacia xiphophylla</i>	3%	3 m	XB16.29	
<i>Aristida contorta</i>	+	0.2 m	XB28.05	
* <i>Bidens bipinnata</i>	+	0.1 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis barbata</i>	1%	0.1 m	XB04.07	
* <i>Cenchrus ciliaris</i>	+	0.6 m	XB07.02	
<i>Chloris pectinata</i>	+	0.2 m	XB02.21	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>Cleome viscosa</i>	+	0.2 m	XB01.25	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.2 m	XB46.07	
<i>Eremophila cuneifolia</i>	+	0.6 m	XB46.03	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.9 m	XB02.13	Fl; red
<i>Eriachne mucronata</i> (large flower form)	+	0.3 m	XB46.08	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1 m	XB46.05	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Hibiscus sturtii</i> var. aff. <i>grandiflorus</i>	+	0.2 m	XB46.04	
<i>Iseilema membranaceum</i>	+	0.2 m	XB28.10	

<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Keraudrenia nephrosperma</i>	+	1.4 m	XB46.09	
<i>Lepidium phlebopetalum</i>	+	0.1 m	XB44.06	
<i>Maireana planifolia</i>	+	0.3 m	XB18.04	
<i>Maireana triptera</i>	+	0.2 m	XB46.06	
<i>Paspalidium clementii</i>	+	0.3 m	XB48.05	
<i>Perotis rara</i>	+	0.1 m	XB14.03	
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07	
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07	
<i>Rhagodia eremaea</i>	+	0.8 m	XB16.09	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	1.7 m	XB26.03	No fishy smell
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2 m	XBOPJM10	
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	1%	1.3 m	XB34.02	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	2%	1.5 m	XB24.02	
<i>Senna hamersleyensis</i> x sp. Karijini (M.E. Trudgen 10392)	+	1.2 m	XB46.01	
<i>Solanum horridum</i>	+	0.2 m	XB46.02	Peduncle probably
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12	
<i>Sporobolus australasicus</i>	+	0.3 m	XB16.03	
<i>Tragus australianus</i>	+	0.2 m	XB16.08	
<i>Urochloa occidentalis</i>	+	0.3 m	XB20.10	

Christmas Creek Site XB48

Described by Julia Mattner Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 762166 mE 7525636 mN

Habitat Mulga flats (not groves)

Soil Red brown clayey loam with pebbles and gravel.

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia aneura* var. *intermedia* Tall Sparse Shrubland over *Senna artemisioides* subsp. *helmsii*, *Dodonaea petiolaris* and *Acacia tetragonophylla* Mid Isolated Shrubs over *Eriachne mucronata* (large flower form), *Enneapogon polyphyllus* and *Paspalidium clementii* Low Isolated Tussock Grasses over *Bulbostylis barbata* Low Sparse Sedgeland over **Bidens bipinnata*, **Citrullus colocynthis*, *Tribulus astrocarpus* and *Mollugo molluginea* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A

Topography: Flats

Bare Ground: 70%

Litter Cover: <1% Logs, <1% Twigs, 3% Lvs

Disturbance: Grazing and weeds

Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.4 m	XB44.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	3.5 m	XB26.02	
<i>Acacia aneura</i> var. <i>intermedia</i>	1%	4 m	XB48.06	
<i>Acacia aneura</i> var. <i>intermedia</i>	4%	2.5 m	XB48.01	
<i>Acacia tetragonophylla</i>	+	2 m	XB02.02	
<i>*Bidens bipinnata</i>	1%	0.4 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis barbata</i>	1%	0.15 m	XB04.07	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.3 m	XB48.04	
<i>Corchorus parviflorus</i>	+	0.1 m	XB20.06	
<i>Dodonaea petiolaris</i>	+	1.1 m	XB24.11	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB30.04	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.8 m	XB48.03	
<i>Eriachne mucronata</i> (large flower form)	+	0.3 m	XB46.08	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Goodenia prostrata</i>	+	0.05 m	XB34.09	
<i>Heliotropium heteranthum</i>	+	0.05 m	XB44.07	

<i>Iseilema membranaceum</i>	+	0.2 m	XB28.10	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.3 m	XB30.02	
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08	
<i>Paspalidium clementii</i>	+	0.3 m	XB48.05	
<i>Perotis rara</i>	+	0.15 m	XB14.03	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.15 m	XB24.09	
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07	
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.4 m	XB01.14	
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	+	0.3 m	XB48.02	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.2 m	XB24.04	
<i>Senna notabilis</i>	+	0.2 m	XB01.22	
<i>Sida ectogama</i>	+	0.8 m	XB24.12	
<i>Solanum horridum</i>	+	0.2 m	XB46.02	Peduncle probably
<i>Sporobolus australasicus</i>	+	0.2 m	XB16.03	
<i>Trianthema glossostigma</i>	+	<0.05 m	XB28.06	
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27	
<i>Trichodesma zeylanicum</i>	+	0.3 m	XBOPJM13	
<i>Urochloa occidentalis</i>	+	0.2 m	XB20.10	

Christmas Creek Site XB50

Described by Julia Mattner Date 23/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 768508 mE 7524356 mN

Habitat Mulga Plain

Soil Red brown loam with gravel and pebbles

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Corymbia hamersleyana* Low Isolated Trees over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Grevillea berryana* Tall Sparse Shrubland over *Acacia pruinocarpa*, *Senna artemisioides* subsp. *helmsii*, *Dodonaea petiolaris*, *Psydrax suaveolens* and *Eremophila forrestii* subsp. *forrestii* Mid Sparse Shrubland over *Triodia epactia/pungens* Low Isolated Hummock Grasses over **Bidens bipinnata*, *Mollugo molluginea*, *Tribulus astrocarpus* and *Goodenia prostrata* Low Sparse herbland.



Veg Condition Very good to good

Fire Age Moderate

Notes Aspect: N/A

Topography: Plains

Bare Ground: 70%

Litter Cover: <1% Logs, <1% Twigs, 4% Lvs

Disturbance: Grazing, old mustering tracks

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	10%	2-5 m	XB50.01	2 age groups
<i>Acacia pruinocarpa</i>	1%	2 m	XB02.12	
<i>*Bidens bipinnata</i>	1%	0.3 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome oxalidea</i>	+	0.1 m	XB14.13	
<i>Corchorus parviflorus</i>	+	0.6 m	XB20.06	
<i>Corymbia hamersleyana</i>	+	1.1 m	XB50.08	
<i>Dodonaea petiolaris</i>	+	1 m	XB24.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Dysphania rhadinostachya</i>	+	0.1 m	XB14.15	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.1 m	XB48.03	
<i>Eriachne mucronata</i> (large flower form)	+	0.4 m	XB46.08	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.15 m	XB46.05	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Goodenia prostrata</i>	+	0.05 m	XB34.09	
<i>Grevillea berryana</i>	+	3 m	XB50.07	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	3 m	XB50.11	
<i>Hibiscus</i> aff. <i>sturtii</i> (Site B9)	+	0.2 m	XB50.05	
<i>Hibiscus burtonii</i>	+	0.4 m	XB50.06	
<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09	
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.4 m	XB30.02	
<i>Maireana villosa</i>	+	0.2 m	XB24.10	

<i>Mollugo molluginea</i>	+	0.05 m	XB04.08	
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.3 m	XB34.05	
<i>Paraneurachne muelleri</i>	+	0.4 m	XB42.06	
<i>Paspalidium clementii</i>	+	0.3 m	XB48.05	
<i>Perotis rara</i>	+	0.1 m	XB14.03	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB24.09	
<i>Polycarpaea longiflora</i>	+	0.1 m	XB50.03	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	
<i>Psydrax latifolia</i>	+	0.6 m	XBR08.10	
<i>Psydrax suaveolens</i>	+	1.5 m	XB10.28	
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.2 m	XB01.14	
<i>Ptilotus helipteroides</i>	+	0.15 m	XB50.04	
<i>Ptilotus obovatus</i>	+	0.4 m	XB24.03	
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07	
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.2 m	XB24.02	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.2 m	XB24.04	
<i>Senna notabilis</i>	+	0.2 m	XB01.22	
<i>Senna stricta</i> x <i>glutinosa</i>	+	1 m	XB50.09	
<i>Sida ectogama</i>	+	0.6 m	XB24.12	
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.3 m	XB50.02	
<i>Solanum lasiophyllum</i>	+	0.4 m	XB10.12	
<i>Solanum phlomoides</i>	+	0.2 m	XB44.14	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB02.08	
<i>Trianthema glossostigma</i>	+	0.05 m	XB28.06	
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27	
<i>Trichodesma zeylanicum</i>	+	0.2 m	XBOPJM13	
<i>Triodia epactia/pungens</i>	+	0.4 m	XB50.10	Sterile

Christmas Creek Site XB52

Described by Julia Mattner Date 23/03/2011

Type Quadrat 35 x 75 m

Location Christmas Creek

MGA Zone 50 771050 mE 7524280 mN

Habitat Mulga grove with large areas of intergrove.

Soil Red brown fine sandy loam

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) *Acacia pruinocarpa*, *Acacia tetragonophylla* and *Hakea chordophylla* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Sida ectogama*, *Ptilotus obovatus*, *Psydrax suaveolens* and *Senna glutinosa* subsp. *luerssenii* Mid Sparse Shrubland over *Aristida inaequiglumis*, *Cymbopogon ambiguous*, *Aristida obscura* and *Digitaria ctenantha* Mid Sparse Tussock Grassland over **Portulaca oleracea* Low Sparse Herbland.



Veg Condition Very good

Fire Age Old

Notes Aspect: N/A
 Topography: Flats
 Bare Ground: 85%
 Litter Cover: 1% Logs, 1% Twigs, 5% Lvs
 Disturbance: Grazing, road near by, weeds

Weed cover will increase as wet season continues.

An unusual intergrove probably because of the wetter than typical weather.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	5 m	XB26.02	
<i>Acacia pruinocarpa</i>	1%	4 m	XB02.12	
<i>Acacia tetragonophylla</i>	1%	3.5 m	XB02.02	
<i>Aristida inaequiglumis</i>	1%	1.1 m	XBOPJM18	
<i>Aristida obscura</i>	+	0.2 m	XB52.03	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.1 m	XB36.03	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.4 m	XB20.06	
<i>Cymbopogon ambiguus</i>	1%	1 m	XB52.01	
<i>Digitaria ctenantha</i>	+	0.2 m	XB20.03	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB14.15	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.3 m	XB46.07	
<i>Enneapogon polyphyllus</i>	+	0.5 m	XB30.04	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1%	1.2 m	XB10.13	
<i>Eriachne mucronata</i> (large flower form)	+	0.4 m	XB46.08	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05 m	XB10.23	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.1 m	XB28.07	
<i>Goodenia prostrata</i>	+	0.05 m	XB44.01	

<i>Hakea chordophylla</i>	+	1-3 m	XB01.01
<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08
<i>Paraneurachne muelleri</i>	+	0.3 m	XB42.06
<i>Perotis rara</i>	+	0.15 m	XB14.03
<i>Polycarpaea longiflora</i>	+	0.15 m	XB50.03
<i>*Portulaca oleracea</i>	5%	0.1 m	XB16.07
<i>Psydrax latifolia</i>	+	2.5 m	XBR08.10
<i>Psydrax suaveolens</i>	+	1.8 m	XB10.28
<i>Pterocaulon sphacelatum</i>	+	0.1 m	XB18.07
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.3 m	XB01.14
<i>Ptilotus helipteroides</i>	+	0.15 m	XB50.04
<i>Ptilotus macrocephalus</i>	+	0.3 m	XB40.03
<i>Ptilotus obovatus</i>	+	1 m	XB24.03
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4 m	XB20.07
<i>Sclerolaena cornishiana</i>	+	0.2 m	XB24.07
<i>Senna ferraria</i> x <i>glaucifolia</i>	+	1 m	XB24.14
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.7 m	XB24.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.2 m	XB24.04
<i>Senna notabilis</i>	+	0.3 m	XB01.22
<i>Sida ectogama</i>	1%	1.1 m	XB24.12
<i>Solanum lasiophyllum</i>	+	0.6 m	XB10.12
<i>Sporobolus australasicus</i>	+	0.1 m	XB16.03
<i>Tephrosia</i> aff. <i>dementii</i> (2)	+	0.2 m	XB52.02
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek **Site** XB54
Described by Julia Mattner **Date** 24/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 781614 mE 7523576 mN

Habitat Mulga Plains

Soil Red brown sandy loam with gravel and pebbles

Vegetation Vegetation Type (Mattiske 2007): 4
 Vegetation Sub-Association: *Acacia aneura* var. *intermedia*,
Acacia aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia*
pruinocarpa, *Acacia tetragonophylla* and *Psyrax latifolia* Tall
 Sparse Shrubland *Senna stricta*, *Eremophila latrobei* subsp.
filiformis and *Senna artemisioides* subsp. *helmsii* Mid Isolated
 Shrubs over *Perotis rara*, *Eriachne mucronata* (large flower
 form), *Aristida contorta*, *Enneapogon polyphyllus* and *Eriachne*
pulchella subsp. *pulchella* Low Sparse Tussock Grassland.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: N/A
 Topography: Plains
 Bare Ground: 70%
 Litter Cover: <1% Logs, 1% Twigs, <1% Lvs
 Disturbance: Old cattle pads



Much dryer than many other grove sites. Weed cover will increase as wet season continues.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.3 m	XB44.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	4.5 m	XB54.03	
<i>Acacia aneura</i> var. <i>intermedia</i>	9%	4 m	XB54.02	
<i>Acacia pruinocarpa</i>	2%	6 m	XB02.12	
<i>Acacia tetragonophylla</i>	1%	3 m	XB02.02	
<i>Aristida contorta</i>	+	0.2 m	XB54.05	
* <i>Bidens bipinnata</i>	+	0.4 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.1 m	XB36.03	
<i>Bulbostylis barbata</i>	+	0.1 m	XB54.07	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.2 m	XB02.03	
<i>Chloris pectinata</i>	+	0.2 m	XB02.21	
* <i>Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	+	0.3-1.2 m	XB24.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Dysphania rhadinostachya</i>	+	0.15 m	XB14.15	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB30.04	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.3-1.7 m	XB12.04	
<i>Eriachne mucronata</i> (large flower form)	+	0.3 m	XB46.08	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+		XB54.13	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Gomphrena kanisii</i>	+	0.2 m	XB28.07	
<i>Gossypium australe</i> (Burrup Peninsula form)	+	0.1 m	XB54.10	

<i>Ipomoea muelleri</i>	+	cr	XB16.31
<i>Iseilema membranaceum</i>	+	0.2 m	XB54.08
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2 m	XB54.11
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.3 m	XB30.02
<i>Panicum effusum</i>	+	0.4 m	XB54.06
<i>Paspalidium clementii</i>	+	0.3 m	XB48.05
<i>Perotis rara</i>	1%	0.1 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.15 m	XB24.09
<i>Polygala isingii</i>	+	0.15 m	XB16.24
* <i>Portulaca oleracea</i>	+	0.05 m	XB16.07
<i>Psydrax latifolia</i>	+	2.2 m	XBR08.10
<i>Psydrax suaveolens</i>	+	0.8 m	XB10.28
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB54.09
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.2 m	XB01.14
<i>Ptilotus macrocephalus</i>	+	0.1 m	XB54.12
<i>Ptilotus obovatus</i>	+	0.7 m	XB24.03
<i>Ptilotus schwartzii</i>	+	0.3 m	XB10.01
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	0.3 m	XB26.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.6 m	XB24.04
<i>Senna stricta</i>	+	1.4 m	XB54.01
* <i>Setaria verticillata</i>	+	0.3 m	XB30.07
<i>Sida ectogama</i>	+	0.3-1.3 m	XB24.12
<i>Sida platycalyx</i>	+	0.1 m	XB32.01
<i>Solanum phlomoides</i>	+	0.2 m	XB44.14
<i>Sporobolus australasicus</i>	+	0.1 m	XB16.03
<i>Stenopetalum nutans</i>	+	0.2 m	XB54.04
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27

Christmas Creek Site XB56

Described by Julia Mattner Date 24/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 783765 mE 7523623 mN

Habitat Very gently incline Mulga slope

Soil Red brown sandy loam

Rock Type ironstone

Vegetation Vegetation Type (Mattiske 2007): 4
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia* aff. *aneura* (narrow fine veined; site 1259) and *Grevillea wickhamii* subsp. *hispidula* Tall Sparse Shrubland over *Dodonaea petiolaris*, *Psyrax latifolia*, *Acacia tetragonophylla*, *Senna glutinosa* subsp. *luerssenii* and *Sida ectogama* Mid Sparse Shrubland over *Eriachne mucronata* (large flower form), **Cenchrus ciliaris*, *Enneapogon polyphyllus* and *Aristida contorta* Low Sparse Tussock Grassland.

Veg Condition Very good**Fire Age** Moderate

Notes Aspect: South
 Topography: gentle incline slope
 Bare Ground: 70%
 Litter Cover: <1% Logs, <1% Twigs, 2% Lvs
 Disturbance: Old grazing, close to hall road (dust)

Areas to the east of the site is densely gridded (drill lines)

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (4)	+	0.2m	XB56.05	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	4%	3.5 m	XB26.02	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	1%	4 m	XB26.04	
<i>Acacia ayersiana</i>	+	2 m	XB56.04	
<i>Acacia tetragonophylla</i>	+	2 m	XB02.02	
<i>Aristida contorta</i>	+	0.2 m	XB54.05	
<i>*Bidens bipinnata</i>	+	0.3 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis barbata</i>	+	0.1 m	XB54.07	
<i>*Cenchrus ciliaris</i>	+	0.3 m	XB07.02	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Corchorus parviflorus</i>	+	0.2 m	XB20.06	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	XB14.17	
<i>Dodonaea petiolaris</i>	2%	0.4-1.8 m	XB24.11	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Enneapogon polyphyllus</i>	+	0.4 m	XB56.01	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.2 m	XB10.13	
<i>Eriachne mucronata</i> (large flower form)	1.5%	0.5 m	XB46.08	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1 m	XB10.23	
<i>Gomphrena kanisii</i>	+	0.3 m	XB28.07	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	2.4 m	XB01.27	
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	+	0.2 m	XB56.02	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB05.09	

<i>Iseilema membranaceum</i>	+	0.2 m	XB54.08
<i>Maireana planifolia</i> x <i>villosa</i>	+	0.8 m	XB30.02
<i>Maireana villosa</i>	+	1 m	XB24.10
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08
<i>Paspalidium clementii</i>	+	0.3 m	XB48.05
<i>Perotis rara</i>	+	0.1 m	XB14.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	XB24.09
<i>Polycarpaea longiflora</i> (red form)	+	0.1 m	XB50.03
<i>Polygala isingii</i>	+	0.1 m	XB16.24
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07
<i>Psydrax latifolia</i>	+	1.1 m	XBR08.10
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB54.09
<i>Ptilotus obovatus</i>	+	0.7 m	XB24.03
<i>Ptilotus schwartzii</i>	+	0.4 m	XB10.01
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	+	0.5 m	XB26.03
<i>Senna ferraria</i> x <i>glaucifolia</i>	+	0.4 m	XB24.14
<i>Senna glutinosa</i> subsp. <i>luerssenii</i>	+	1.3 m	XB24.02
<i>Senna notabilis</i>	+	0.6 m	XB01.22
<i>Sida ectogama</i>	+	0.4-1.2 m	XB24.12
<i>Solanum lasiophyllum</i>	+	0.8 m	XB10.12
<i>Solanum phlomoides</i>	+	0.3 m	XB44.14
<i>Solanum</i> sp.	+	0.2m	XB56.03
<i>Sporobolus australasicus</i>	+	0.1 m	XB16.03
<i>Trianthema glossostigma</i>	+	0.05 m	XB28.06
<i>Trichodesma zeylanicum</i>	+	0.2 m	XBOPJM13

Christmas Creek Site XB58

Described by Julia Mattner Date 24/03/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 773024 mE 7523383 mN

Habitat Mulga plains with crab holes

Soil Red brown clayey loam with gravel and pebbles.

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia xiphophylla* and *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Tall Sparse Shrubland over *Senna artemisioides* subsp. *oligophylla*, *Senna artemisioides* subsp. *helmsii* and *Acacia tetragonophylla* Mid Isolated Shrubs over *Chrysopogon fallax*, **Setaria verticillata*, *Sporobolus australasicus*, *Aristida contorta* and *Eriachne mucronata* (large flower form) Mid Isolated Tussock Grasses over *Bulbostylis turbinata* Low Sparse Sedgeland.

Veg Condition Very good

Fire Age Old

Notes Aspect: N/A

Topography: Plains

Bare Ground: 70%

Litter Cover: <1% Logs, <1% Twigs, 5% Lvs

Disturbance: Grazing, dust from road near by.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	1%	4.5 m	XB58.11	
<i>Acacia tetragonophylla</i>	+	1.9 m	XB02.02	
<i>Acacia xiphophylla</i>	4%	3.5 m	XB16.29	
<i>Amaranthus interruptus</i>	+	0.2 m	XB58.17	
<i>Amyema fitzgeraldii</i>	+	cr	XB20.01	
<i>Aristida contorta</i>	+	0.2 m	XB28.05	
<i>*Bidens bipinnata</i>	+	0.4 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.2 m	XB36.03	
<i>Bulbostylis turbinata</i>	1%	0.2 m	XB58.07	
<i>*Cenchrus ciliaris</i>	+	0.5 m	XB07.02	
<i>Chloris pectinata</i>	+	0.4 m	XB02.21	
<i>Chrysopogon fallax</i>	+	0.7 m	XB14.09	
<i>*Citrullus colocynthis</i>	+	cr	XB14.16	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	+	0.4 m	XB58.03	Fl; yellow
<i>Cyperus iria</i>	+	0.3 m	XB34.03	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4 m	XB58.02	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.5 m	XB46.07	
<i>Enneapogon polyphyllus</i>	+	0.3 m	XB30.04	
<i>Eremophila cuneifolia</i>	+	0.8 m	XBOPJM14	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9 m	XB10.13	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	XB58.01	Fl; red

<i>Eremophila longifolia</i>	out	1.2 m	XB58.12	
<i>Eriachne mucronata</i> (large flower form)	+	0.5 m	XB46.08	
<i>Euphorbia alsiniflora</i>	+	0.2 m	XB58.09	Previously <i>E. coghlanii</i>
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2 m	XB10.30	
<i>Heliotropium heteranthum</i>	+	0.05 m	XB44.07	Fl; white
<i>Iseilema</i> sp.	+	0.2 m	XB58.10	
<i>Mollugo molluginea</i>	+	0.1 m	XB04.08	
<i>Oldenlandia</i> sp. 'gilgai'	+	0.1 m	XB58.08	
<i>Paspalidium clementii</i>	+	0.1 m	XB48.05	
<i>Perotis rara</i>	+	0.1 m	XB14.03	
<i>Phyllanthus maderaspatensis</i>	+		XB58.09B	
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2 m	XB24.09	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	
<i>Pterocaulon sphacelatum</i>	+	0.2 m	XB18.07	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.4 m	XB01.14	
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.15 m	XB58.06	
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.1 m	XB20.07	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	1.2 m	XB58.14	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x?	+	1.2 m	XB58.18	
<i>Senna hamersleyensis</i>	+	0.4 m	XB58.15	
<i>Senna hamersleyensis</i> x sp. Karijini (M.E. Trudgen 10392)	+	0.3 m	XB58.04	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.1 m	XB24.04	
<i>Senna notabilis</i>	+	0.8 m	XB01.22	
* <i>Setaria verticillata</i>	+	0.4 m	XB30.07	
<i>Sida fibulifera</i>	+	0.2 m	XB28.03	
<i>Sida</i> sp.	+	0.2 m	XB58.05	
<i>Solanum lasiophyllum</i>	+	0.6 m	XB10.12	
<i>Sporobolus australasicus</i>	+	0.1 m	XB16.03	
<i>Streptoglossa bubakii</i>	+	0.2 m	XB58.13	
<i>Trianthema glossostigma</i>	+	0.05 m	XB28.06	
<i>Tribulus astrocarpus</i>	+	0.05 m	XB16.27	
<i>Urochloa occidentalis</i>	+	0.4 m	XB20.10	

Christmas Creek Site XB60

Described by Julia Mattner Date 29/04/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 760951 mE 7520790 mN

Habitat Mulga Plain

Soil Orange-brown clayey loam, mantle of gravel and pebbles, some cracking clay patches and crabholes

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia xiphophylla*, *Acacia synchronicia*, *Acacia tetragonophylla* and *Psyrax latifolia* Tall Sparse Shrubland over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Senna glutinosa* subsp. *x luerssenii* and *Rhagodia eremaea* Mid Sparse Shrubland over *Sclerolaena densiflora*, *Eremophila cuneifolia*, *Senna notabilis* and *Ptilotus obovatus* Low Sparse Shrubland over **Cenchrus setiger*, **Cenchrus ciliaris* and *Enneapogon robustissimus* Mid Open Tussock Grassland over *Eragrostis tenellula*, *Eriachne benthamii* and *Sporobolus australasicus* Low Open Tussock Grassland over *Marsilea hirsuta*, *Trianthema triquetra*, *Portulaca pilosa* and *Goodenia prostrata* Low Sparse Herbland.



Veg Condition Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Mulga plain

Bare Ground: -

Litter Cover: <1% Logs, <1% Twigs, 2% Lvs

Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	4%	4m	XB60.24	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	1.5m	XB60.41	
<i>Acacia synchronicia</i>	3%	3.5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	4m	XB60.37	
<i>Acacia xiphophylla</i>	1%	3.5m	XB60.30	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Brachyachne prostrata</i>	+	0.05m	XB60.08	
<i>*Cenchrus ciliaris</i>	2%	0.6m	XB60.22	
<i>*Cenchrus setiger</i>	15%	0.8m	XB60.01	
<i>Chloris pectinata</i>	+	0.3m	XB60.19	
<i>Chrysopogon fallax</i>	+	1.3m	XB60.11	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus tridens</i>	1%	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cyperus iria</i>	+	0.2m	XB60.20	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4m	XB60.40	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.3m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.3m	XB60.34	
<i>Enneapogon robustissimus</i>	+	0.5m	XB60.42	
<i>Eragrostis desertorum</i>	+	0.1m	XB60.58	

<i>Eragrostis dielsii</i>	+	0.05m	XB60.47
<i>Eragrostis leptocarpa</i>	+	0.6m	XB60.51
<i>Eragrostis tenellula</i>	3%	0.3m	XB60.15
<i>Eragrostis xerophila</i>	+	0.1m	XB60.53
<i>Eremophila cuneifolia</i>	+	0.7m	XB60.48
<i>Eremophila lanceolata</i>	+	0.3m	XB60.44
<i>Eriachne benthamii</i>	1%	0.4m	XB60.65
<i>Eriachne mucronata</i> (large flower form)	1%	0.4m	XB60.36
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1m	XB60.29
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB60.64
* <i>Flaveria trinervia</i>	+	0.4m	XB60.62
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	+	0.3m	XB60.39
<i>Iseilema macratherum</i>	+	0.2-0.3m	XB60.54
<i>Maireana pyramidata</i>	+	1.2m	XB60.33
<i>Maireana villosa</i>	+	0.4m	XB60.27
* <i>Malvastrum americanum</i>	+	0.4m	XB60.23
<i>Marsilea hirsuta</i>	1%	0.1m	XB60.14
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB60.46
<i>Polycarpaea holtzei</i>	+	0.1m	XB60.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.2m	XB60.43
<i>Psydrax latifolia</i>	+	3.0m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.4m	XB60.26
<i>Ptilotus exaltatus</i>	+	0.5m	XB60.55
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus obovatus</i>	+	0.9m	XB60.31
<i>Rhagodia eremaea</i>	+	1.5m	XB60.63
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4m	XB60.50
<i>Sclerolaena cuneata</i>	+	0.5m	XB60.09
<i>Sclerolaena densiflora</i>	1%	0.3m	XB60.49
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	+	1.5m	XB60.25
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.7m	XB60.60
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.6m	XB60.59
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.5m	XB60.28
<i>Senna notabilis</i>	+	0.2m	XB60.56
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.9m	XB60.57
* <i>Setaria verticillata</i>	+	0.9m	XB60.12
<i>Sporobolus australasicus</i>	1%	0.1m	XB60.02
<i>Trianthema triquetra</i>	1%	0.05m	XB60.04
<i>Tribulus astrocarpus</i>	+	0.05m	XB60.35

Christmas Creek Site XB61

Described by Julia Mattner Date 30/04/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 760838 mE 752291 mN

Habitat Very gentle undulating plain

Soil Sandy loam, red-brown, mantle of gavel and small rocks, some cracking clay and crab holes

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia xiphophylla*, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia tetragonophylla* and *Acacia synchronicia* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Solanum phlomoides*, *Sida fibulifera*, and *Eremophila lanceolata* Low Isolated Shrubs over **Cenchrus ciliaris*, **Cenchrus setiger* and *Chrysopogon fallax* Mid Sparse Tussock Grassland over *Aristida contorta*, *Sporobolus australasicus*, and *Eragrostis tenellula* Low Open Tussock Grassland over *Bulbostylis turbinata* Low Sparse Sedgeland over *Polycarpaea corymbosa* var. *corymbosa*, **Portulaca oleracea* and *Tragus australianus* Sparse Low Herbland.



Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Very gentle undulating plain

Bare Ground: 40%

Litter Cover: <1% Logs, <1% Twigs, 20% Lvs

Disturbance: Nearby tracks and pipeline, Buffel

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.6m	XB61.11	
<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	+	0.4m	XB61.27	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	5%	6m	XB61.05	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	3%	4m	XB61.33	
<i>Acacia synchronicia</i>	1%	3.5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	3.5m	XB60.37	
<i>Acacia xiphophylla</i>	10%	4.5m	XB60.30	
<i>Aristida contorta</i>	15%	0.2m	XB60.52	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB61.23	
<i>Boerhavia coccinea</i>	+	0.2m	XB61.18	
<i>Boerhavia paludosa</i>	+	0.2m	XB61.26	
<i>Brachyachne prostrata</i>	+	0.05m	XB60.08	
<i>Bulbostylis turbinata</i>	1%	0.1m	XB61.02	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>*Cenchrus ciliaris</i>	8%	0.6m	XB60.22	
<i>*Cenchrus setiger</i>	4%	0.7m	XB60.01	
<i>Chloris pectinata</i>	+	0.5m	XB60.19	
<i>Chrysopogon fallax</i>	+	1.2m	XB60.11	
<i>Cleome viscosa</i>	+	0.6m	XB60.38	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.3m	XB60.40	

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.4m	XB60.07
<i>Ehretia saligna</i> var. <i>saligna</i>	+	3.5m	XB61.31
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.4m	XB61.07
<i>Enneapogon polyphyllus</i>	+	0.4m	XB60.34
<i>Eragrostis desertorum</i>	+	0.2m	XB61.17
<i>Eragrostis tenellula</i>	1%	0.2m	XB61.24
<i>Eragrostis xerophila</i>	+	0.4m	XB61.10
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9m	XB61.16
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1m	XB60.29
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Iseilema dolichotrichum</i>	+	0.1m	XB61.01
<i>Iseilema macrathrum</i>	+	0.3m	XB60.54
<i>Maireana planifolia</i>	+	1.1m	XB61.29
<i>Maireana triptera</i>	+	0.3m	XB61.15
<i>Maireana villosa</i>	+	0.9m	XB61.12
* <i>Malvastrum americanum</i>	+	0.1m	XB60.23
<i>Neptunia dimorphantha</i>	+	0.1m	XB61.08
<i>Paspalidium clementii</i>	+	0.3m	XB61.36
<i>Perotis rara</i>	+	0.2m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	5%	0.2m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.1m	XB60.03
* <i>Portulaca oleracea</i>	2%	0.1m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Pterocaulon serrulatum</i>	+	0.4m	XB61.21
<i>Ptilotus aervoides</i>	+	0.05m	XB64.17
<i>Ptilotus exaltatus</i>	+	0.3m	XB60.55
<i>Ptilotus macrocephalus</i>	+	0.5m	XB61.25
<i>Ptilotus obovatus</i>	+	0.7m	XB60.31
<i>Rhagodia eremaea</i>	+	2.5m	XB61.13
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.2m	XB61.28
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.3m	XB66.14
<i>Sclerolaena cornishiana</i>	+	0.2m	XB61.20
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.5m	XB60.28
<i>Sida fibulifera</i>	+	0.1m	XB61.09
<i>Solanum phlomoides</i>	+	0.3m	XB61.34
<i>Sporobolus australasicus</i>	15%	0.3m	XB60.02
<i>Tragus australianus</i>	+	0.3m	XB61.14
<i>Trianthema glossostigma</i>	+	0.01m	XB61.30
<i>Urochloa pubigera</i>	+	0.2m	XB61.35

Christmas Creek Site XB62

Described by Julia Mattner Date 30/04/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 756852 mE 7524149 mN

Habitat Very gently undulating plain

Soil Red-brown loam with mantle of gravel, some pockets with cracking clays

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia tetragonophylla* and *Psyrax suaveolens* Tall Sparse Shrubland over *Senna artemisioides* subsp. *helmsii*, *Dodonaea petiolaris* and *Eremophila forrestii* subsp. *forrestii* Mid Sparse Shrubland over **Cenchrus setiger*, **Cenchrus ciliaris* and *Aristida pruinosa* Mid Sparse Grassland over *Aristida*

contorta, *Sporobolus australasicus* and *Perotis rara* Low Sparse Tussock Grassland over *Polycarpaea corymbosa* var. *corymbosa*, *Boerhavia paludosa*, *Streptoglossa bubakii* and *Calandrinia Ptychosperma* Low Sparse Herbland.

Veg Condition Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Very gentle undulating plain

Bare Ground: 60%

Litter Cover: <1% Logs, <1% Twigs, 5% Lvs

Disturbance: Weeds



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.6m	XB61.38	
<i>Abutilon macrum</i>	+	0.4m	XB62.16	
<i>Abutilon otocarpum</i>	+	0.6m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	2.5m	XB62.30	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	4%	3.5m	XB62.26	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	4%	4m	XB62.01	
<i>Acacia pruinocarpa</i>	+	3.5m	XB62.12	
<i>Acacia tetragonophylla</i>	+	2.5m	XB60.37	
<i>Amaranthus interruptus</i>	+	0.7m	XB62.35	
<i>Aristida contorta</i>	5%	0.2m	XB60.52	
<i>Aristida pruinosa</i>	+	0.8m	XB62.11	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Boerhavia paludosa</i>	1%	0.1m	XB62.06	
<i>Bulbostylis barbata</i>	+	0.1-0.2m	XB62.23	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>*Cenchrus ciliaris</i>	1%	0.7m	XB60.22	
<i>*Cenchrus setiger</i>	3%	0.6m	XB60.01	
<i>Chrysopogon fallax</i>	+	1.1m	XB60.11	
<i>Cleome viscosa</i>	+	0.5m	XB60.38	
<i>Commelina ensifolia</i>	+	0.2m	XB62.10	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus parviflorus</i>	+	0.3m	XB02.15	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	

<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.3m	XB60.40
<i>Digitaria brownii</i>	+	0.3m	XB62.17
<i>Dodonaea petiolaris</i>	+	1.5m	XB62.24
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.4m	XB60.07
<i>Enneapogon polyphyllus</i>	+	0.4m	XB60.34
<i>Eragrostis leptocarpa</i>	+	0.4m	XB62.32
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.5m	XB62.09
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01m	XB62.07
<i>Euphorbia biconvexa</i>	+	0.3m	XB62.02
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Indigofera monophylla</i>	+	0.3m	XB62.19
<i>Indigofera monophylla</i> (grey/green leaflet form)	+	0.2m	XB62.18
<i>Ipomoea muelleri</i>	6%	Cr	XB62.03
<i>Iseilema dolichotrichum</i>	+	0.1m	XB61.01
<i>Iseilema macratherum</i>	+	0.3m	XB60.54
<i>Mollugo molluginea</i>	+	0.1m	XB62.37
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.4m	XB62.13
<i>Perotis rara</i>	1%	0.2m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	1%	0.2m	XB61.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax latifolia</i>	+	2.5m	XB60.18
<i>Psydrax suaveolens</i>	+	2.5m	XB62.20
<i>Pterocaulon serrulatum</i>	+	0.4m	XB61.21
<i>Ptilotus exaltatus</i>	+	0.7m	XB60.55
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus helipteroides</i>	+	0.3m	XB62.05
<i>Ptilotus obovatus</i>	+	0.7m	XB62.21
<i>Rhynchosia minima</i>	+	Cr	XB62.31
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.1m	XB61.28
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4m	XB66.14
<i>Sclerolaena cornishiana</i>	+	0.2m	XB62.27
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1%	1.5m	XB62.08
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	0.2m	XB60.28
<i>Senna notabilis</i>	+	0.3m	XB60.56
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Solanum horridum</i>	+	0.1m	XB62.38
<i>Spermacoce brachystema</i>	+	0.2m	XB62.22
<i>Sporobolus australasicus</i>	2%	0.2m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.5m	XB62.25
<i>Striga squamigera</i>	+	0.6m	XB62.14
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	0.05m	XB62.34
<i>Tragus australianus</i>	+	0.3m	XB61.14
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus astrocarpus</i>	+	0.05m	XB60.35
<i>Trichodesma zeylanicum</i>	+	0.4m	NC
<i>Urochloa occidentalis</i>	+	0.3m	XB61.35

Christmas Creek Site XB63

Described by Julia Mattner Date 30/04/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 756840 mE 7525979 mN

Habitat Very gently undulating plain

Soil Red-brown loam, gravel mantle with some small patches of crabholes

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia pruinocarpa*, *Acacia ayersiana* and *Psyrax latifolia* Tall Sparse Shrubland over *Dodonaea petiolaris*, *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *helmsii*, *Sida ectogama* and *Senna glaucifolia* Mid Sparse Shrubland over **Cenchrus setiger*, *Digitaria brownii* and *Paraneurachne muelleri* Mid Sparse

Tussock Grassland over *Eriachne helmsii*, *Perotis rara* and *Aristida contorta* Low Sparse Tussock Grassland over *Polycarpaea corymbosa* var. *corymbosa*, *Tribulus astrocarpus* and *Commelina ensifolia* Low Sparse Herbland.



Veg Condition Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Very gently undulating plain

Bare Ground: 65%

Litter Cover: <1% Logs, 1% Twigs, 15% Lvs

Disturbance: Grazing (Cattle and Horses)

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.5m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	21%	3.5m	XB63.05	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)	+	1.4m	XB63.13	
<i>Acacia ayersiana</i>	+	3m	XB63.07	
<i>Acacia maitlandii</i>	+	3.5m	XB63.22	
<i>Acacia pruinocarpa</i>	5%	6m	XB62.12	
<i>Aristida contorta</i>	1%	0.2m	XB60.52	
<i>Boerhavia coccinea</i>	+	0.2m	XB63.19	
<i>*Cenchrus setiger</i>	1%	0.7m	XB60.01	
<i>Commelina ensifolia</i>	1%	0.2m	XB62.10	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB63.21	
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	+	0.1m	XB63.20	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.2m	XB60.40	
<i>Digitaria brownii</i>	+	0.5m	XB63.12	
<i>Digitaria ctenantha</i>	+	0.3m	XB62.15	
<i>Dodonaea petiolaris</i>	2%	1.5m	XB62.24	
<i>Duperreya commixta</i>	+	Cr	XB63.11	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.3m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.4m	XB60.34	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1%	1.5m	XB62.09	
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44	
<i>Eriachne mucronata</i> (large flower form)	3%	0.6m	XB63.09	

<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Glycine canescens</i>	+	Cr	XB63.04
<i>Gomphrena kanisii</i>	+	0.3m	XB61.06
<i>Goodenia prostrata</i>	+	0.01m	XB60.32
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	0.4m	XB63.16
<i>Iseilema membranaceum</i>	+	0.2m	XB63.02
<i>Maireana villosa</i> x <i>planifolia</i> ?	+	0.3m	XB63.14
<i>Mollugo molluginea</i>	+	0.1m	XB62.37
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.4m	XB63.01
<i>Paraneurachne muelleri</i>	+	0.5m	XB84.05
<i>Perotis rara</i>	1%	0.2m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	1%	0.2m	XB61.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax latifolia</i>	+	2.5m	XB60.18
<i>Psydrax suaveolens</i>	+	1.5m	XB62.20
<i>Pterocaulon serrulatum</i>	+	0.4m	XB61.21
<i>Ptilotus exaltatus</i>	+	0.3m	XB60.55
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	+	0.2m	XB63.10
<i>Ptilotus helipteroides</i>	+	0.2m	XB62.05
<i>Ptilotus obovatus</i>	+	0.3m	XB62.21
<i>Sclerolaena cornishiana</i>	+	0.2m	XB64.09
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1%	1.4m	XB62.08
<i>Senna glaucifolia</i>	+	1.5m	XB63.18
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1%	2.2m	XB63.17
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Sida ectogama</i>	+	1.2m	XB63.06
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Solanum lasiophyllum</i>	+	0.5m	XB74.09
<i>Spermacoce brachystema</i>	+	0.1m	XB62.22
<i>Sporobolus australasicus</i>	+	0.4m	XB60.02
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35

Christmas Creek Site XB64

Described by Julia Mattner Date 30/04/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 760607 mE 7524179 mN

Habitat Gentle slope of low rise

Soil Red-brown sandy loam with mantle of gravel and small rocks

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Grevillea berryana* and *Acacia synchronicia*Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*,*Senna glutinosa* subsp. *x luerksenii* and *Acacia tetragonophylla*Mid Sparse Shrubland over *Indigofera monophylla*, *Solanum**lasiophyllum*, *Abutilon otocarpum* and *Senna glaucifolia* LowSparse Shrubland over *Eriachne mucronata* (large flower form), *Aristida contorta* and **Cenchrus ciliaris* Low Sparse Grasslandover *Bulbostylis barbata* Low Sparse Sedgeland over *Polycarpaea corymbosa* var. *corymbosa*, **Portulaca oleracea*, **Bidens**bipinnata* and *Goodenia prostrata* Low Sparse Herbland.

Veg Condition Very Good

Fire Age Moderate

Notes Aspect: West

Topography: Gentle slope of low rise

Bare Ground: 60%

Litter Cover: 1% Logs, 2% Twigs, 5% Lvs

Disturbance:



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon macrum</i>	+	0.5m	XB64.08	
<i>Abutilon otocarpum</i>	+	0.6m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	8%	5m	XB64.01	
<i>Acacia synchronicia</i>	1%	2.5m	XB60.10	
<i>Acacia tetragonophylla</i>	+	1.5m	XB60.37	
<i>Aristida contorta</i>	1%	0.2m	XB60.52	
* <i>Bidens bipinnata</i>	+	0.3m	XB60.21	
<i>Boerhavia paludosa</i>	+	0.1m	XB64.04	
<i>Bulbostylis barbata</i>	15%	0.1m	XB64.02	
<i>Bulbostylis turbinata</i>	+	0.1-0.2m	XB64.22	
* <i>Cenchrus ciliaris</i>	+	0.6m	XB60.22	
* <i>Cenchrus setiger</i>	+	0.7m	XB60.01	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.4m	XB64.12	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	2%	0.4-1.8m	XB62.09	
<i>Eriachne mucronata</i> (large flower form)	3%	0.4m	XB63.09	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39	
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06	
<i>Goodenia prostrata</i>	+	0.05m	XB60.32	
<i>Gossypium australe</i> (Burrup Peninsula form)	+	0.7m	XB64.14	

<i>Grevillea berryana</i>	2%	5m	XB64.07
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Indigofera monophylla</i>	1%	0.4m	XB62.19
<i>Iseilema membranaceum</i>	+	0.1m	XB64.18
<i>Marsdenia australis</i>	+	Cr	XB64.15
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.3m	XB64.10a
<i>Oldenlandia crouchiana</i>	+	0.2m	XB64.21
<i>Paspalidium clementii</i>	+	0.2m	XB64.05
<i>Perotis rara</i>	+	0.2m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	10%	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>Polycarpaea longiflora</i>	+	0.3m	XB64.10b
* <i>Portulaca oleracea</i>	1%	0.1m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.4m	XB64.06
<i>Ptilotus aervoides</i>	+	0.02m	XB64.17
<i>Ptilotus exaltatus</i>	+	0.3m	XB60.55
<i>Ptilotus helipteroides</i>	+	0.2m	XB62.05
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2m	XB64.19
<i>Sclerolaena cornishiana</i>	+	0.3m	XB64.09
<i>Sclerolaena costata</i>	+	0.2m	XB64.23
<i>Senna glaucifolia</i>	+	0.4m	XB64.16
<i>Senna glutinosa</i> subsp. <i>x luerksenii</i>	1%	1.8m	XB60.28
<i>Senna notabilis</i>	+	0.2m	XB60.56
<i>Solanum lasiophyllum</i>	+	0.6m	XB74.09
<i>Solanum phlomoides</i>	+	0.4m	XB61.34
<i>Sporobolus australasicus</i>	+	0.2m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.4m	XB64.13
<i>Tephrosia supina</i>	+	0.1m	XB64.20
<i>Tragus australianus</i>	+	0.3m	XB61.14
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35

Christmas Creek **Site** XB65
Described by Hayden Ajduk **Date** 1/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 758808 mE 7526463 mN

Habitat Lower slope of hill

Soil Red-brown loam with mantle of gravel

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia pruinocarpa*, *Grevillea wickhamii* subsp. *hispidula*, *Senna glutinosa* subsp. *x luerssenii* and *Senna glutinosa* subsp. *glutinosa* Tall Sparse Shrubland over *Eremophila latrobei* subsp. *filiformis*, *Acacia ancistrocarpa*, *Senna glutinosa* subsp. *x luerssenii*, *Eremophila forrestii* subsp. *forrestii* and *Keraudrenia nephrosperma* Mid Isolated Shrubs over *Senna notabilis*, *Hybanthus aurantiacus*, *Solanum lasiophyllum* and *Senna notabilis* Low Sparse Shrubland over *Triodia pungens* and *Triodia longiceps* Low Open Hummock Grassland over *Trianthema glossostigma*, *Goodenia prostrata*, *Polycarpaea holtzei* and *Gomphrena cunninghamii* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Moderate

Notes Aspect: North East
 Topography: :Lower slope of hill
 Bare Ground: 65%
 Litter Cover: 1% Logs, 1% Twigs, 1% Lvs
 Disturbance: Grazing, old gridlines nearby

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon otocarpum</i>	+	0.4m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	3.5m	XB65.06	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	+	2.5m	XB65.13	
<i>Acacia ancistrocarpa</i>	+	1.9m	XB65.02	
<i>Acacia aneura</i> var. <i>intermedia</i>	+	3m	XB65.34	
<i>Acacia ayersiana</i>	+	2.5m	XB65.30	
<i>Acacia bivenosa</i>	+	0.4m	XB65.25	
<i>Acacia pruinocarpa</i>	1%	3m	XB62.12	
<i>Acacia tenuissima</i>	+	2.1m	XB65.29	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>Aristida holathera</i> var. <i>holathera</i>	+	0.4m	XB65.18	
<i>Bonamia rosea</i>	+	0.3m	XB65.09	
* <i>Cenchrus ciliaris</i>	+	0.6m	XB60.22	
<i>Chloris pectinata</i>	+	0.2m	XB65.32	
<i>Chrysopogon fallax</i>	+	1.1m	XB60.11	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corymbia hamersleyana</i>	+	2.2m	XB65.23	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cymbopogon ambiguus</i>	+	1.2m	XB65.26	
<i>Cymbopogon obtectus</i>	+	0.4m	XB65.15	
<i>Digitaria brownii</i>	+	0.4m	XB65.24	
<i>Duperreya commixta</i>	+	Cr	XB63.11	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	

<i>Enneapogon polyphyllus</i>	+	0.4m	XB65.31
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.4m	XB62.09
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.9m	XB65.07
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB64.03
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Gomphrena cunninghamii</i>	+	0.2m	XB65.14
<i>Gomphrena kanisii</i>	+	0.3m	XB61.06
<i>Goodenia microptera</i>	+	0.3m	XB65.27
<i>Goodenia nuda</i>	+	0.2m	XB65.10
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1%	3.5m	XB65.12
<i>Hibiscus</i> aff. <i>coatesii</i>	+	0.2m	XB65.33
<i>Hibiscus burtonii</i>	+	0.8m	XB65.28
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	+	0.4m	XB65.21
<i>Hybanthus aurantiacus</i>	1%	0.4m	XB65.04
<i>Indigofera monophylla</i>	+	1m	XB62.19
<i>Iseilema macratherum</i>	+	0.3m	XB60.54
<i>Keraudrenia nephrosperma</i>	+	1.2m	XB65.19
<i>Maireana villosa</i> x <i>planifolia</i> ?	+	0.2m	XB65.22
<i>Mollugo molluginea</i>	+	0.2m	XB62.37
<i>Paraneurachne muelleri</i>	+	0.4m	XB84.05
<i>Paspalidium clementii</i>	+	0.3m	XB61.36
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax suaveolens</i>	+	1.8m	XB62.20
<i>Pterocaulon sphacelatum</i>	+	0.4m	XB64.06
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.2m	XB74.07
<i>Ptilotus exaltatus</i>	+	0.5m	XB60.55
<i>Ptilotus helipteroides</i>	+	0.2m	XB62.05
<i>Ptilotus obovatus</i>	+	0.1m	XB62.21
<i>Sclerolaena costata</i>	+	0.3m	XB64.23
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.2m	XB62.08
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1%	2.2m	XB63.17
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.8m	XB65.20
<i>Senna notabilis</i>	1%	0.4m	XB60.56
<i>Senna stricta</i>	+	1.3m	XB65.16
<i>Solanum lasiophyllum</i>	+	0.4m	XB74.09
<i>Solanum phlomoides</i>	+	0.4m	XB61.34
<i>Sporobolus australasicus</i>	+	0.1m	XB60.02
<i>Streptoglossa bubakii</i>	+	1.5m	XB62.25
<i>Trachymene oleracea</i>	+	1.2m	XB65.11
<i>Trianthema glossostigma</i>	1%	0.01m	XB62.36
<i>Tribulus suberosus</i>	+	0.5m	XB65.17
<i>Trichodesma zeylanicum</i>	+	0.9m	NC
<i>Triodia longiceps</i>	1%	1.2m	XB65.08
<i>Triodia pungens</i>	20%	0.7m (1.1)	XB65.01

Christmas Creek Site XB66

Described by Julia Mattner Date 1/02/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone mE mN

Habitat Very gently undulating plain

Soil Red-brown loam with a mantle of gravel and small rock some erosion gullies (accelerated erosion), sheetflow

Rock Type Iron

Vegetation Vegetation Type (Mattiske 2007): 30

Vegetation Sub-Association: *Acacia xiphophylla*, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia synchronicia*, *Psyrax latifolia* and *Psyrax suaveolens* Tall Sparse Shrubland over *Rhagodiaeremaea*, *Eremophila latrobei* subsp. *filiformis* and *Senna artemisioides* subsp. *helmsii* Mid Isolated Shrubsover *Sporobolus australasicus*, *Eragrostis leptocarpa*, *Enteropogon ramosus* and *Chrysopogon fallax* Low Sparse Tussock Grassland over *Sclerolaena cuneata*, **Bidens bipinnata*, *Calandrinia ptychosperma* and **Cucumis melo* subsp. *agrestis* Low Sparse Herbland.

Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A

Topography: Very gently undulating plain

Bare Ground: 60%

Litter Cover: 1% Logs, 1% Twigs, 15% Lvs

Disturbance: Grazing, weeds



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon macrum</i>	+	0.3m	XB66.09	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	7%	4.5m	XB66.11	
<i>Acacia synchronicia</i>	1%	4m	XB60.10	
<i>Acacia tetragonophylla</i>	+	2.0m	XB60.37	
<i>Acacia xiphophylla</i>	10%	3m	XB60.30	
<i>*Bidens bipinnata</i>	1%	0.4m	XB60.21	
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	+	0.4m	XB66.12	
<i>Brachyachne prostrata</i>	+	0.01m	XB60.08	
<i>Bulbostylis barbata</i>	+	0.1m	XB66.17	
<i>Bulbostylis turbinata</i>	+	0.1m	XB66.16	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>Calotis squamigera</i>	+	0.05m	XB66.19	
<i>*Cenchrus ciliaris</i>	+	0.7m	XB60.22	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB66.18	
<i>Chloris pectinata</i>	1%	0.4m	XB60.19	
<i>Chrysopogon fallax</i>	+	1.2m	XB60.11	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	Cr	XB66.15	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.1m	XB60.40	
<i>Digitaria ctenantha</i>	+	0.3m	XB62.15	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.9m	XB66.07	

<i>Enneapogon polyphyllus</i>	+	0.3m	XB60.34
<i>Eragrostis leptocarpa</i>	1%	0.5m	XB66.08
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.5m	XB62.09
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.8m	XB65.07
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06
<i>Hybanthus aurantiacus</i>	+	0.2m	XB65.04
<i>Ipomoea muelleri</i>	+	Cr	XB62.03
<i>Maireana pyramidata</i>	+	1.2m	XB66.01
<i>Paspalidium clementii</i>	+	0.4m	XB61.36
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Pluchea dunlopii</i>	+	0.1m	XB66.05
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	1%	0.1m	XB60.46
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>*Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Psydrax latifolia</i>	+	2.2m	XB60.18
<i>Psydrax suaveolens</i>	+	2.5m	XB62.20
<i>Pterocaulon sphacelatum</i>	+	0.4m	XB64.06
<i>Ptilotus exaltatus</i>	+	0.4m	XB60.55
<i>Ptilotus obovatus</i>	+	0.5m	XB62.21
<i>Rhagodia eremaea</i>	+	1.8m	XB66.13
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.5m	XB66.14
<i>Sclerolaena cuneata</i>	1%	0.2m	XB66.04
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.5m	XB62.08
<i>Sporobolus australasicus</i>	6%	0.4m	XB60.02
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Wahlenbergia tumidifructa</i>	+	0.2m	XB66.10

Christmas Creek Site XB67

Described by Julia Mattner Date 1/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 765618 mE 7222069 mN

Habitat Near level plain, sheet flow

Soil Red-brown clayey loam, mantle of gravel and small rocks evidence of sheetflow

Rock Type Iron

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Woodland over *Eremophila forrestii* subsp. *forrestii*, *Dodonaea petiolaris*, *Acacia ayersiana*, *Sida ectogama* and *Acacia ayersiana* Mid Sparse Shrubland over *Sporobolus australasicus*, *Aristida contorta*, *Enneapogon polyphyllus* and *Sporobolus australasicus* Low Sparse Tussock Grassland over **Bidens bipinnata*, *Goodenia prostrata*, **Cucumis maderaspatanus* and *Mollugo molluginea* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Young

Notes Aspect: N/A

Topography: Near level plain, sheet flow

Bare Ground: 60%

Litter Cover: 1% Logs, 3% Twigs, 2% Lvs

Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.4m	XB61.38	
<i>Abutilon otocarpum</i>	+	0.4m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	25%	1.5-7m	XB65.06	
<i>Acacia ayersiana</i>	2%	1-6m	XB67.02	
<i>Acacia tetragonophylla</i>	+	2.5m	XB60.37	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>*Bidens bipinnata</i>	1%	0.4m	XB60.21	
<i>Boerhavia coccinea</i>	+	0.2m	XB67.01	
<i>Bulbostylis turbinata</i>	+	0.2m	XB67.03	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.2m	XB67.06	
<i>Cleome oxalidea</i>	+	0.1m	XB67.11	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cymbopogon ambiguus</i>	+	0.9m	XB65.26	
<i>Digitaria brownii</i>	+	0.4m	XB63.12	
<i>Digitaria ctenantha</i>	+	0.3m	XB62.15	
<i>Dodonaea petiolaris</i>	2%	1.8m	XB62.24	
<i>Duperreya commixta</i>	+	Cr	XB63.11	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.3m	XB60.34	
<i>Eremophila cuneifolia</i>	+	0.2m	XB60.48	

<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	2%	0.5-1.5m	XB62.09
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	2m	XB65.07
<i>Eriachne mucronata</i> (large flower form)	+	0.4m	XB63.09
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB64.03
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05m	XB61.04
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Gomphrena kanisii</i>	+	0.4m	XB61.06
<i>Goodenia prostrata</i>	+	0.05m	XB67.08
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Indigofera monophylla</i>	+	0.4m	XB62.19
<i>Iseilema membranaceum</i>	+	0.2m	XB64.18
<i>Lepidium phlebopetalum</i>	+	0.1m	XB67.12
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2m	XB67.17
<i>Maireana villosa</i>	+	0.4m	XB67.18
<i>Maireana villosa</i> x <i>planifolia</i> ?	+	0.3m	XB67.19
<i>Mollugo molluginea</i>	+	0.1m	XB62.37
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.4m	XB67.04
<i>Paspalidium clementii</i>	+	0.3m	XB61.36
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.7m	XB60.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus aervoides</i>	+	0.01m	XB64.17
<i>Ptilotus exaltatus</i>	+	0.7m	XB60.55
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	+	0.4m	XB63.03
<i>Ptilotus helipteroides</i>	+	0.2m	XB62.05
<i>Ptilotus macrocephalus</i>	+	0.5m	XB67.13
<i>Ptilotus schwartzii</i>	+	0.5m	XB67.10
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.2m	XB67.05
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.5m	XB66.14
<i>Sclerolaena cornishiana</i>	+	0.05m	XB67.07
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.3m	XB62.08
<i>Senna glaucifolia</i>	+	1.5m	XB67.16
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	2.5m	XB63.17
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.8m	XB60.28
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Sida ectogama</i>	2%	1.5m	XB63.06
<i>Solanum lasiophyllum</i>	+	0.5m	XB74.09
<i>Solanum phlomoides</i>	+	0.4m	XB61.34
<i>Spermacoce brachystema</i>	+	0.1m	XB62.22
<i>Sporobolus australasicus</i>	1%	0.1-0.2m	XB60.02
<i>Tephrosia</i> aff. <i>dementii</i> (2)	+	0.1m	XB67.09
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	0.2m	XB62.34
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
<i>Trichodesma zeylanicum</i>	+	0.4m	NC

Christmas Creek Site XB68

Described by Hayden Ajduk Date 1/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

Habitat Near level plain dominated by mulga, sheetflow

Soil Orange brown loam with mantle of gravel and small rocks

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Woodland over *Eremophila latrobei* subsp. *filiformis*, *Acacia coriacea* subsp. *pendens*, *Psyrax suaveolens*, *Grevillea berryana* and *Psyrax latifolia* Tall Isolated Shrubs over *Dodonaea petiolaris*, *Sida ectogama*, *Eremophila forrestii* subsp. *forrestii*, *Senna stricta* and *Rhagodia eremaea* Mid Sparse Shrubland over *Ptilotus exaltatus*, *Sida* sp. dark green fruit (S. van Leeuwen 2260), *Indigofera monophylla* and *Sida fibulifera* Low Sparse Shrubland over *Aristida contorta*, **Cenchrus ciliaris*, *Sporobolus australasicus*, *Eriachne mucronata* (large flower form) and *Enneapogon polyphyllus* Mid Sparse Tussock Grassland over **Bidens bipinnata*, *Polycarpaea corymbosa* var. *corymbosa*, *Tribulus astrocarpus*, *Polycarpaea holtzei* and *Goodenia prostrata* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Moderate

Notes Aspect: N/A

Topography: Near level plain

Bare Ground: %

Litter Cover: % Logs, % Twigs, % Lvs

Disturbance: Grazing, weeds

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.6m	XB61.38	
<i>Abutilon otocarpum</i>	+	0.4m	XB62.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	30%	6m	XB68.01	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	2.5m	XB68.08	
<i>Acacia pruinocarpa</i>	+	2m	XB62.12	
<i>Aristida contorta</i>	2%	0.2m	XB60.52	
<i>Aristida pruinosa</i>	+	0.9m	XB68.02	
<i>*Bidens bipinnata</i>	2%	0.4m	XB60.21	
<i>Boerhavia coccinea</i>	+	0.1m	XB68.03	
<i>Bulbostylis barbata</i>	+	0.1m	XB64.02	
<i>*Cenchrus ciliaris</i>	1%	0.7m	XB60.22	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4m	XB68.09	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cymbopogon ambiguus</i>	+	1m	XB65.26	
<i>Digitaria brownii</i>	+	0.4m	XB63.12	
<i>Dodonaea petiolaris</i>	4%	1.5m	XB62.24	
<i>Duperreya commixta</i>	+	Cr	XB63.11	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.4m	XB60.34	
<i>Eragrostis tenellula</i>	+	0.3m	XB61.24	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1%	1.4m	XB62.09	

<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	2.1m	XB65.07
<i>Eriachne mucronata</i> (large flower form)	+	0.5m	XB63.09
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.2m	XB68.05
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Gomphrena kanisii</i>	+	0.3m	XB61.06
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Grevillea berryana</i>	+	2.1m	XB64.07
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	3.5m	XB65.12
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Indigofera monophylla</i>	+	0.3m	XB62.19
<i>Iseilema macratherum</i>	+	0.3m	XB60.54
<i>Lepidium phlebopetalum</i>	+	0.1m	XB67.12
<i>Maireana villosa</i>	+	0.4m	XB67.14
<i>Marsdenia australis</i>	+	Cr	XB64.15
<i>Oldenlandia crouchiana</i>	+	0.2m	XB64.21
<i>Paraneurachne muelleri</i>	+	0.4m	XB84.05
<i>Paspalidium clementii</i>	+	0.3m	XB61.36
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	1%	0.2m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>Polycarpaea longiflora</i>	+	0.3m	XB64.10b
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax latifolia</i>	+	2.2m	XB60.18
<i>Psydrax suaveolens</i>	+	2.5m	XB62.20
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus aervoides</i>	+	0.01m	XB64.17
<i>Ptilotus exaltatus</i>	2%	0.9m	XB60.55
<i>Ptilotus helipteroides</i>	+	0.3m	XB62.05
<i>Ptilotus schwartzii</i>	+	0.4m	XB67.10
<i>Rhagodia eremaea</i>	+	1.8m	XB66.13
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.3m	XB68.06
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2m	XB66.14
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.5m	XB62.08
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.8m	XB60.28
<i>Senna notabilis</i>	+	0.5m	XB60.56
<i>Senna stricta</i>	+	1.5m	XB65.16
<i>Sida ectogama</i>	3%	1.4m	XB63.06
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	+	0.6m	XB68.07
<i>Solanum lasiophyllum</i>	+	0.6m	XB74.09
<i>Solanum phlomoides</i>	+	0.3m	XB61.34
<i>Sporobolus australasicus</i>	+	0.1-0.2m	XB60.02
<i>Tephrosia</i> aff. <i>dementii</i> (2)	+	0.3m	XB67.09
<i>Tragus australianus</i>	+	0.2m	XB61.14
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
<i>Tribulus suberosus</i>	+	0.7m	XB65.17
<i>Trichodesma zeylanicum</i>	+	0.7m	NC

Christmas Creek Site XB69

Described by Julia Mattner Date 1/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 762583 mE 7521925 mN

Habitat Plain with crabholes

Soil Red-brown light clay, crabholes, mantle of gravel

Vegetation Vegetation Type (Mattiske 2007): 10
 egetation Sub-Association: *Acacia* aff. *aneura* (long, flat,
 recurved; FMR 35.3) Low Woodland over *Senna artemisioides*
 subsp. *helmsii*, *Senna artemisioides* subsp. *oligophylla* x *helmsii*,
Rhagodia eremaea, *Abutilon* aff. *lepidum* (1) and *Senna*
artemisioides subsp. *oligophylla* Tall Isolated Shrubs over
Eremophila lanceolata, *Senna glaucifolia* and *Ptilotus obovatus*
 Low Isolated Shrubs over **Cenchrus ciliaris*, *Aristida contorta*
 and *Enneapogon polyphyllus* Low Sparse Tussock Grassland
 over *Bulbostylis barbata* and *Bulbostylis turbinata* Low Sparse Sedgeland over *Corchorus tridens*, **Bidens bipinnata*,
Boerhavia paludosa and *Ipomoea muelleri* Low Sparse Herbland



Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 7%

Litter Cover: 1% Logs, 1% Twigs, 1% Lvs

Disturbance: Grazing, cattle tracks, nearby pipeline and weeds

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	1.2m	XB61.38	
<i>Abutilon otocarpum</i>	+	0.5m	XB69.04	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	50%	6m	XB69.01	
<i>Acacia synchronicia</i>	+	3.5m	XB60.10	
<i>Alysicarpus muelleri</i>	+	0.7m	XB69.08	
<i>Aristida contorta</i>	1%	0.2m	XB60.52	
<i>Aristida latifolia</i>	+	0.4m	XB69.09	
<i>Austrobryonia pilbarensis</i>	+	Cr	XB69.21	
<i>*Bidens bipinnata</i>	1%	0.4m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB69.02	
<i>Boerhavia paludosa</i>	1%	0.1m	XB69.06	
<i>Bulbostylis barbata</i>	2%	0.1m	XB64.02	
<i>Bulbostylis turbinata</i>	2%	0.2m	XB67.03	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>*Cenchrus ciliaris</i>	1-2%	0.5m	XB60.22	
<i>*Cenchrus setiger</i>	+	0.7m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.4m	XB65.32	
<i>Chrysopogon fallax</i>	+	0.9m	XB60.11	
<i>Cleome viscosa</i>	+	0.6m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	3%	0.2m	XB60.13	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	+	0.3m	XB69.10	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	

<i>*Cucumis melo</i> subsp. <i>agrestis</i>	+	Cr	XB69.23
<i>Cyperus iria</i>	+	0.15m	XB69.22
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4m	XB60.40
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.9m	XB66.07
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.2m	XB69.11
<i>Enneapogon polyphyllus</i>	1%	0.3m	XB60.34
<i>Eragrostis leptocarpa</i>	+	0.4m	XB69.24
<i>Eragrostis tenellula</i>	+	0.3m	XB61.24
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05m	XB61.04
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.3m	XB61.39
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>	+	0.3m	XB69.07
<i>Gomphrena kanisii</i>	+	0.4m	XB61.06
<i>Goodenia muelleriana</i>	+	0.3m	XB69.12
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Ipomoea muelleri</i>	1%	Cr	XB62.03
<i>Iseilema dolichotrichum</i>	+	0.1m	XB61.01
<i>Iseilema macrathrum</i>	+	0.3m	XB60.54
<i>*Malvastrum americanum</i>	+	0.4m	XB60.23
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.6m	XB69.17
<i>Oldenlandia crouchiana</i>	+	0.2m	XB64.21
<i>Paspalidium clementii</i>	+	0.4m	XB61.36
<i>Perotis rara</i>	+	0.15m	XB61.19
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>Polygala isingii</i>	+	0.1m	XB69.20
<i>*Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.7m	XB67.13
<i>Ptilotus obovatus</i>	+	0.6m	XB62.21
<i>Rhagodia eremaea</i>	+	1.2m	XB66.13
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.3m	XB69.03
<i>Sclerolaena cornishiana</i>	+	0.1m	XB69.25
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.7m	XB62.08
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	1.1m	XB60.66
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	1.3m	XB60.59
<i>Senna glaucifolia</i>	+	0.4m	XB69.14
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Setaria dielsii</i>	+	0.5m	XB69.19
<i>Sporobolus australasicus</i>	+	0.2m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.4m	XB64.13
<i>*Tribulus terrestris</i>	+	0.01m	XB69.26
<i>Urochloa occidentalis</i>	+	0.2m	XB61.35
<i>Vigna</i> sp. central (M.E. Trudgen 1626) PN	+	Cr	XB69.18

Christmas Creek Site XB70

Described by Lucy Dadour Date 2/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 776569 mE 7519458 mN

Habitat Mulga plain with drainage line

Soil Red-brown clayey loam with cobbles and pebbles

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Forest over *Acacia**tetragonophylla* and *Senna artemisioides* subsp. *helmsii* TallSparse Shrubland over *Eremophila latrobei* subsp. *filiformis*,*Eremophila lanceolata* and *Acacia synchronicia* Low IsolatedShrubs over *Sporobolus australasicus*, *Chloris pectinata*,*Eragrostis tenellula*, *Eriachne pulchella* subsp. *pulchella* and *Perotis* rare Low Sparse Tussock Grassland over **Malvastrum americanum*, *Ipomoea muelleri* and **Citrullus colocynthis* Low Sparse Herbland.

Veg Condition Very Good

Fire Age Very Old

Notes Aspect: N/A

Topography: Mulga plain

Bare Ground: 45%

Litter Cover: 1% Logs, 2% Twigs, <1% Lvs

Disturbance: tracks and weeds



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)	+	0.5m	XB61.38	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	65%	1-8m	XB70.01	
<i>Acacia pruinocarpa</i>	+	8m	XB62.12	
<i>Acacia synchronicia</i>	+	0.9m	XB60.10	
<i>Acacia tetragonophylla</i>	5%	1-4m	XB60.37	
<i>*Aerva javanica</i>	+	0.4m	XB74.15	
<i>Alternanthera angustifolia</i>	+	0.3m	XB70.15	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>*Bidens bipinnata</i>	+	0.5m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB70.14	
<i>Boerhavia burbridgeana</i>	+	Cr	XB70.02	
<i>Bulbostylis barbata</i>	+	0.1m	XB64.02	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>Calotis porphyroglossa</i>	+	0.2m	XB70.04	
<i>*Cenchrus ciliaris</i>	+	0.4m	XB60.22	
<i>*Cenchrus setiger</i>	+	0.6m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.3m	XB65.32	
<i>*Chloris virgata</i>	+	0.8m	XB70.18	
<i>Chrysopogon fallax</i>	+	1m	XB60.11	
<i>*Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Cleome viscosa</i>	+	0.7m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	+	0.1m	XB60.13	

<i>Cyperus iria</i>	+	0.2m	XB70.12
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4m	XB60.40
<i>Digitaria ctenantha</i>	+	0.4m	XB62.15
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07
* <i>Echinochloa colona</i>	+	0.3m	XB70.16
<i>Enneapogon polyphyllus</i>	+	0.3m	XB60.34
<i>Eragrostis leptocarpa</i>	+	0.5m	XB70.06
<i>Eragrostis tenellula</i>	+	0.2m	XB61.24
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.5-1m	XB65.07
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03
<i>Euphorbia biconvexa</i>	+	0.1m	XB70.11
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB70.17
<i>Gomphrena kanisii</i>	+	0.4m	XB61.06
<i>Hibiscus sturtii</i> var. aff. <i>grandiflorus</i>	+	0.1m	XB70.07
<i>Ipomoea muelleri</i>	1%	Cr	XB62.03
<i>Iseilema membranaceum</i>	+	0.4m	XB64.18
<i>Maireana planifolia</i>	+	0.2m	XB70.20
* <i>Malvastrum americanum</i>	2%	0.4m	XB60.23
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.4-1m	XB70.09
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	+	1m	XB70.19
<i>Paspalidium clementii</i>	+	0.4m	XB61.36
<i>Perotis rara</i>	+	0.1m	XB61.19
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax latifolia</i>	+	1.5m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.3m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.5m	XB67.13
<i>Rhynchosia minima</i>	+	Cr	XB62.31
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.3m	XB70.08
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4m	XB70.10
<i>Sclerolaena costata</i>	+	0.2m	XB70.05
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1%	2m	XB62.08
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	1m	XB70.03
* <i>Setaria verticillata</i>	+	0.4m	XB60.12
<i>Sporobolus australasicus</i>	1%	0.2m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.2m	XB64.13
<i>Striga squamigera</i>	+	0.2m	XB62.14
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	Cr	XB62.34
<i>Tragus australianus</i>	+	0.2m	XB61.14
<i>Trianthema triquetra</i>	+	0.09m	XB66.02
<i>Urochloa occidentalis</i>	+	0.3m	XB61.35

Christmas Creek Site XB71

Described by Lucy Dadour Date 2/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 775849 mE 7517815 mN

Habitat Mulga plain

Soil Red-brown loam with cobbles and pebbles

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) and *Acacia* aff. *aneura* (narrow fine veined; site 1259) Low Open Woodland over *Acacia synchronicia* and *Acacia tetragonophylla* Tall Sparse Shrubland over *Eremophila lanceolata*, *Senna glutinosa* subsp. x *luerssenii*, *Sida fibulifera* and *Senna artemisioides* subsp. *oligophylla* Low Isolated Trees over **Cenchrus ciliaris*, *Chloris pectinata*, *Aristida contorta* and *Eragrostis leptocarpa* Mid Sparse Tussock Grassland.



Veg Condition Very good

Fire Age Old

Notes Aspect: N/A
 Topography: Mulga plain
 Bare Ground: %
 Litter Cover: 1% Logs, 2% Twigs, <1% Lvs
 Disturbance: Tracks, weeds and cattle

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon macrum</i>	+	0.1m	XB71.08	
<i>Abutilon</i> sp.	+	0.1m	XB71.12	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	15%	6m	XB71.01	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	5%	5m	XB71.14	
<i>Acacia synchronicia</i>	7%	1-4m	XB60.10	
<i>Acacia tetragonophylla</i>	4%	4m	XB60.37	
<i>Aeschynomene indica</i>	+	0.4m	XB71.05	
<i>Alternanthera denticulata</i>	+	0.3m	XB70.15	
<i>Aristida contorta</i>	+	0.4m	XB71.03	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB70.14	
<i>Boerhavia paludosa</i>	+	Cr	XB71.16	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB71.11	
<i>*Cenchrus ciliaris</i>	2%	0.6m	XB60.22	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.3m	XB71.06	
<i>*Chloris virgata</i>	+	0.5m	XB70.18	
<i>Chrysopogon fallax</i>	+	1.5m	XB60.11	
<i>*Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cyperus iria</i>	+	0.3m	XB70.12	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.3m	XB60.40	
<i>Digitaria ctenantha</i>	+	0.4m	XB62.15	

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.1m	XB60.07
* <i>Echinochloa colona</i>	+	0.3m	XB70.16
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4m	XB66.07
<i>Enneapogon polyphyllus</i>	+	0.8m	XB71.19
<i>Eragrostis cumingii</i>	+	0.1m	XB71.09
<i>Eragrostis dielsii</i>	+	0.1m	XB71.04
<i>Eragrostis leptocarpa</i>	+	0.4m	XB70.06
<i>Eragrostis tenellula</i>	+	0.2m	XB61.24
<i>Eremophila cuneifolia</i>	+	0.8m	XB60.48
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.8m	XB65.07
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Iseilema membranaceum</i>	+	0.1m	XB64.18
<i>Lepidium oxytrichum</i>	+	0.1m	XB71.07
<i>Maireana planifolia</i>	+	0.4m	XB71.15
<i>Maireana pyramidata</i>	+	0.7m	XB66.01
<i>Mollugo molluginea</i>	+	0.2m	XB62.37
<i>Nicotiana heterantha</i>	+	0.4m	XB71.17
<i>Perotis rara</i>	+	0.2m	XB61.19
<i>Pluchea tetranthera</i>	+	0.2m	XB71.18
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB61.03
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Portulaca pilosa</i>	+	0.2m	XB60.43
<i>Psyrax latifolia</i>	+	2m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.3m	XB60.17
<i>Rhagodia eremaea</i>	+	1.2m	XB61.13
<i>Sclerolaena costata</i>	+	0.3m	XB71.02
<i>Sclerolaena cuneata</i>	+	0.3m	XB66.04
<i>Sclerolaena densiflora</i>	+	0.3m	XB71.13
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		0.2m	XB60.66
<i>Senna glutinosa</i> subsp. <i>x. luerksenii</i>	+	0.5m	XB60.28
<i>Sida fibulifera</i>	+	0.3m	XB61.09
<i>Stenopetalum nutans</i>	+	0.2m	XB71.10
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35

Christmas Creek Site XB72

Described by Julia Mattner Date 2/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 776581 mE 7515186 mN

Habitat Shallow mulga drainage line adjacent to Fortescue Marsh

Soil Red brown loamy sand

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Woodland over *Acacia synchronicia*, *Eremophila youngii* subsp. *lepidota* and *Eremophila forrestii* subsp. *forrestii* Mid Sparse Shrubland over *Atriplex bunburyana*, *Eremophila spongiorcarpa*, *Maireana pyramidata*, *Senna notabilis* and *Senna artemisioides* subsp. *helmsii* Low Sparse Shrubland over **Cenchrus ciliaris*, *Eragrostis leptocarpa* and *Eragrostis tenellula* Low Tussock Grassland.

Veg Condition Good

Fire Age Very Old

Notes Aspect: South
 Topography: Mulga drainage line
 Bare Ground: 5%
 Litter Cover: 1% Logs, 1% Twigs, 1% Lvs
 Disturbance: Grazing and weeds

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	5%	5m	XB72.01	
<i>Acacia synchronicia</i>	10%	0.5-3m	XB60.10	
<i>Atriplex bunburyana</i>	1%	0.6m	XB72.05	
<i>Atriplex codonocarpa</i>	+	0.4m	XB72.18	
<i>Boerhavia coccinea</i>	+	0.1m	XB72.07	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB72.15	
<i>*Cenchrus ciliaris</i>	70%	0.7m	XB60.22	
<i>Chloris pectinata</i>	+	0.5m	XB60.19	
<i>*Chloris virgata</i>	+	0.4m	XB70.18	
<i>Cleome viscosa</i>	+	0.5m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	+	0.1m	XB60.13	
<i>Cyperus iria</i>	+	0.2m	XB70.12	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.3m	XB60.07	
<i>*Echinochloa colona</i>	+	0.4m	XB70.16	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.5m	XB66.07	
<i>Eragrostis dielsii</i>	+	0.05m	XB72.14	
<i>Eragrostis eriopoda</i>	+	0.4m	XB72.06	
<i>Eragrostis leptocarpa</i>	1%	0.4m	XB70.06	
<i>Eragrostis tenellula</i>	1%	0.5m	XB61.24	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.2m	XB62.09	
<i>Eremophila spongiorcarpa</i>	1%	0.8m	XB72.17	
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	1%	1.8m	XB72.02	
<i>Frankenia setosa</i>	+	0.3m	XB72.11	

<i>Ipomoea coptica</i>	+	Cr	XB72.22
<i>Ipomoea muelleri</i>	15%	Cr	XB62.03
<i>Lepidium phlebopetalum</i>	+	0.4m	XB72.16
<i>Maireana amoena</i>	+	0.2m	XB72.10
<i>Maireana carnosae</i>	+	0.2m	XB72.19
<i>Maireana pyramidata</i>	1%	0.9m	XB66.01
<i>*Malvastrum americanum</i>	+	0.3m	XB60.23
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Pluchea rubelliflora</i>	+	0.2m	XB72.04
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>*Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.2m	XB60.43
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Sclerolaena densiflora</i>	+	0.2m	XB72.08
<i>Sclerolaena glabra</i>	+	0.2m	XB72.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.7m	XB62.08
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.2m	XB60.66
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Sporobolus australasicus</i>	+	0.3m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.4m	XB64.13
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.5m	XB72.13
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Trianthema turgidifolia</i>	+	0.1m	XB72.09
<i>Xerochloa laniflora</i>	+	0.2m	XB72.12

Christmas Creek Site XB73

Described by Julia Mattner Date 2/05/2011

Type Quadrat 35 x 75 m

Location Christmas Creek

MGA Zone 50 778214 mE 7514573 mN

Habitat Mulga drainage line adjacent to Fortescue Marsh

Soil Brown red loamy sand with gravel and small rocks

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Forest over *Acacia tetragonophylla*, *Melaleuca glomerata*, *Eremophila youngii* subsp. *lepidota* and *Atalaya hemiglauc*a Tall Sparse Shrubland over *Maireana pyramidata*, *Senna glutinosa* subsp. *x luerssenii*, *Senna notabilis* and *Abutilon macrum* Low Sparse Shrubland over *Chrysopogon fallax*, *Eragrostis tenellula*, **Cenchrus ciliaris*, *Eragrostis leptocarpa* and *Sporobolus australasicus* Mid Open Tussock Grassland.



Veg Condition Good

Fire Age Very Old

Notes Aspect: South
Topography: Mulga drainage line
Bare Ground: 15%
Litter Cover: 1% Logs, 2% Twigs, 3% Lvs
Disturbance: Grazing, weeds and erosion

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon cryptopetalum</i>	+	0.4m	XB73.08	
<i>Abutilon macrum</i>	+	0.4m	XB66.09	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	65%	6m	XB73.01	
<i>Acacia synchronicia</i>	+	1-3.5m	XB60.10	
<i>Acacia tetragonophylla</i>	2%	1-3m	XB60.37	
<i>Alternanthera denticulata</i>	+	0.3m	XB70.15	
<i>Ammannia multiflora</i>	+	0.4m	XB73.02	
<i>Atalaya hemiglauc</i> a	1%	1-4.5m	XB73.03	
<i>Atriplex bunburyana</i>	+	0.6m	XB72.05	
<i>*Bidens bipinnata</i>	+	0.5m	XB60.21	
<i>Boerhavia paludosa</i>	+	0.1m	XB73.04	
<i>Calandrinia ptychosperma</i>	+	0.05m	XB61.22	
<i>*Cenchrus ciliaris</i>	10%	0.7m	XB60.22	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.5m	XB60.19	
<i>Chrysopogon fallax</i>	2%	1.1m	XB60.11	
<i>*Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus tridens</i>	+	0.1m	XB60.13	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.3m	XB60.07	
<i>*Echinochloa colona</i>	+	0.3m	XB70.16	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8m	XB66.07	

<i>Eragrostis cumingii</i>	+	0.5m	XB73.10
<i>Eragrostis leptocarpa</i>	+	0.6m	XB70.06
<i>Eragrostis tenellula</i>	2%	0.4m	XB61.24
<i>Eremophila cuneifolia</i>	+	0.4m	XB60.48
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	2.2m	XB65.07
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	1%	2.5m	XB72.02
<i>Eriachne mucronata</i> (large flower form)	+	0.4m	XB63.09
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06
<i>Goodenia lamprosperma</i>	+	0.3m	XB73.11
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Ipomoea coptica</i>	+	Cr	XB72.22
<i>Maireana planifolia</i>	+	0.6m	XB70.20
<i>Maireana pyramidata</i>	3%	0.9m	XB66.01
<i>Melaleuca glomerata</i>	2%	1-3m	XB73.07
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.4m	XB73.06
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	+	0.7m	XB70.19
<i>Paspalidium tabulatum</i>	+	0.2m	XB73.05
<i>Pluchea dunlopii</i>	+	0.4m	XB73.09
<i>Polycarpha corymbosa</i> var. <i>corymbosa</i>	+	0.2m	XB61.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Pterocaulon sphacelatum</i>	+	0.5m	XB64.06
<i>Ptilotus exaltatus</i>	+	0.7m	XB60.55
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus obovatus</i>	+	0.7m	XB62.21
<i>Rhagodia eremaea</i>	+	2.5m	XB73.13
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.5-3m	XB62.08
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	0.5m	XB60.28
<i>Senna notabilis</i>	+	0.4m	XB60.56
* <i>Setaria verticillata</i>	+	0.5m	XB60.12
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	+	0.1m	XB73.12
<i>Sporobolus australasicus</i>	+	0.5m	XB60.02
<i>Streptoglossa bubakii</i>	+	0.4m	XB64.13
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	Cr	XB62.34
<i>Trianthema triquetra</i>	+	0.1m	XB66.02

Christmas Creek Site XB74

Described by Julia Mattner Date 3/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 781445 mE 7516844mN

Habitat Very gently undulating plain

Soil Brown-orange loam, a patch of clay/crabholes

Vegetation Vegetation Type (Mattiske 2007): 3

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Woodland over *Acacia xiphophylla* and *Acacia tetragonophylla* Tall Isolated Shrubs over *Sporobolus australasicus*, *Aristida contorta*, *Eragrostis leptocarpa*, *Chloris pectinata* and *Chrysopogon fallax* Low Sparse Tussock Grassland over *Ipomoea muelleri*, *Indigofera colutea*, *Corchorus tridens*, *Streptoglossa bubakii* and *Portulaca oleracea* Low Isolated Shrubs.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Very undulating plain

Bare Ground: 75%

Litter Cover: <1% Logs, <1% Twigs, 1% Lvs

Disturbance: Grazing



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	10%	5m	XB74.01	
<i>Acacia tetragonophylla</i>	+	2.5m	XB60.37	
<i>Acacia xiphophylla</i>	+	2.5m	XB60.30	
* <i>Aerva javanica</i>	+	0.5m	XB74.15	
<i>Alternanthera denticulata</i>	+	0.2m	XB70.15	
<i>Aristida contorta</i>	2%	0.2m	XB74.03	
<i>Boerhavia paludosa</i>	+	0.1m	XB74.06	
<i>Brachyachne prostrata</i>	+	0.01m	XB60.08	
<i>Bulbostylis turbinata</i>	+	0.1m	XB67.03	
<i>Calandrinia ptychosperma</i>	+	0.02m	XB74.14	
<i>Calotis porphyroglossa</i>	+	0.3m	XB74.12	
* <i>Cenchrus ciliaris</i>	+	0.7m	XB60.22	
* <i>Cenchrus setiger</i>	+	0.5m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.2m	XB69.16	
<i>Chloris pectinata</i>	1%	0.3m	XB65.32	
* <i>Chloris virgata</i>	+	0.6m	XB70.18	
<i>Chrysopogon fallax</i>	1%	1.2m	XB60.11	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus tridens</i>	+	0.1m	XB60.13	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4m	XB60.40	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Eragrostis desertorum</i>	2%	0.3m	XB74.08	
<i>Eragrostis leptocarpa</i>	1%	0.4m	XB70.06	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01m	XB62.07	

<i>Euphorbia boophthona</i> (Large seed form)	+	0.2m	XB74.04
<i>Euphorbia</i> sp. (Site 1089)	+	0.05m	XB74.17
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Gomphrena kanisii</i>	+	0.3m	XB61.06
<i>Goodenia lamprosperma</i>	+	0.3m	XB78.19
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40
<i>Indigofera colutea</i>	+	0.15m	XB74.16
<i>Ipomoea muelleri</i>	+	Cr	XB62.03
<i>Iseilema macratherum</i>	+	0.3m	XB60.54
<i>Maireana georgei</i>	+	0.05m	XB74.05
* <i>Malvastrum americanum</i>	+	0.4m	XB60.23
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14
<i>Operculina aequiseipala</i>	+	Cr	XB74.13
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus auriculifolius</i>	+	0.6m	XB74.10
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.4m	XB74.07
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.6m	XB67.13
<i>Rhagodia eremaea</i>	+	1.5m	XB66.13
<i>Rhynchosia minima</i>	+	Cr	XB62.31
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2m	XB66.14
<i>Sclerolaena glabra</i>	+	0.2m	XB72.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.4m	XB62.08
<i>Setaria dielsii</i>	+	0.6m	XB69.19
<i>Sida</i> aff. <i>fibulifera</i> (HD200-6)	+	0.2m	XB74.11
<i>Solanum lasiophyllum</i>	+	0.7m	XB74.09
<i>Sporobolus australasicus</i>	8%	0.2m	XB74.02
<i>Streptoglossa bubakii</i>	+	0.4m	XB64.13
<i>Themeda triandra</i>	+	0.5m	XB74.18
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
* <i>Tribulus terrestris</i>	+	0.01m	XB74.19
* <i>Vachellia farnesiana</i>	+	0.3m	XB76.02

Christmas Creek Site XB75

Described by Julia Mattner Date 3/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 780345 mE 7515145 mN

Habitat Mulga drainage in plain near Fortescue Marsh

Soil Orange-brown clayey loam, patches of cryptogam crust

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Low Open Forest over *Acacia tetragonophylla*, *Acacia synchronicia*, *Ehretia saligna* var. *saligna* and *Psydrax latifolia* Tall Sparse Shrubland over *Senna artemisioides* subsp. *helmsii*, *Eremophila forrestii* subsp. *forrestii*, *Eremophila latrobei* and *Eremophila cuneifolia* Mid Isolated Shrubs over *Sporobolus australasicus*, *Eragrostis leptocarpa* and *Chrysopogon fallax* Mid Sparse Tussock Grassland.

Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A
 Topography: Mulga drainage line/plain
 Bare Ground: 8%
 Litter Cover: 1% Logs, 1% Twigs, 1% Lvs
 Disturbance: Grazing



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (1)		0.8m	XB61.38	
<i>Abutilon macrum</i>	+	0.7m	XB66.09	
<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	+	0.4m	XB75.16	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	75-80%	5m	XB75.01	
<i>Acacia synchronicia</i>	1%	3.5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	0.9-4m	XB60.37	
<i>Aeschynomene indica</i>	+	0.7m	XB71.05	
<i>Alternanthera angustifolia</i>	+	0.1m	XB75.14	
<i>Alternanthera denticulata</i>	+	0.2m	XB70.15	
* <i>Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Blumea tenella</i>	+	0.1m	XB70.14	
<i>Boerhavia paludosa</i>	+	0.1m	XB75.11	
<i>Bulbostylis turbinata</i>	+	0.1m	XB67.03	
<i>Calandrinia ptychosperma</i>	+	0.1m	XB72.15	
* <i>Cenchrus ciliaris</i>	+	0.7m	XB60.22	
* <i>Cenchrus setiger</i>	+	0.6m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.5m	XB65.32	
* <i>Chloris virgata</i>	+	0.6m	XB70.18	
<i>Chrysopogon fallax</i>	10%	1.2m	XB60.11	
* <i>Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Cleome viscosa</i>	+	0.5m	XB60.38	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cyperus iria</i>	+	0.2m	XB75.03	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	

<i>Digitaria ctenantha</i>	+	0.3m	XB62.15
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07
<i>Ehretia saligna</i> var. <i>saligna</i>	+	4m	XB75.04
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4m	XB66.07
<i>Enneapogon polyphyllus</i>	+	0.2m	XB60.34
<i>Eragrostis cumingii</i>	+	0.2m	XB73.10
<i>Eragrostis desertorum</i>	+	0.3m	XB74.08
<i>Eragrostis leptocarpa</i>	2%	0.6m	XB70.06
<i>Eragrostis pergracilis</i>	+	0.1m	XB75.09
<i>Eragrostis tenellula</i>	+	0.2m	XB61.24
<i>Eremophila cuneifolia</i>	+	1.1m	XB60.48
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1m	XB62.09
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Eremophila latrobei</i>	+	1.2m	XB75.07
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	0.5-2.5m	XB65.07
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Goodenia lamprosperma</i>	+	0.3m	XB75.13
<i>Goodenia prostrata</i>	+	0.05m	XB60.32
<i>Ipomoea muelleri</i>	+	Cr	XB62.03
<i>Maireana planifolia</i>	+	0.8m	XB70.20
<i>Maireana pyramidata</i>	+	1.1m	XB66.01
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.7m	XB75.05
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Phyllanthus erwinii</i>	+	0.2m	XB75.18
<i>Pluchea rubelliflora</i>	+	0.2m	XB75.02
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Psydrax latifolia</i>	+	3.5m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.1m	XB60.17
<i>Scaevola spinescens</i>	+	0.9m	XB75.06
<i>Sclerolaena cuneata</i>	+	0.2m	XB66.04
<i>Sclerolaena densiflora</i>	+	0.2m	XB75.08
<i>Sclerolaena glabra</i>	+	0.2m	XB72.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.5m	XB62.08
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.4m	XB75.19
* <i>Setaria verticillata</i>	+	0.6m	XB60.12
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	+	0.2m	XB75.15
<i>Solanum lasiophyllum</i>	+	0.7m	XB74.09
<i>Sporobolus australasicus</i>	4%	0.3m	XB74.02
<i>Streptoglossa bubakii</i>	+	0.2m	XB64.13
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	Cr	XB62.34
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
<i>Urochloa occidentalis</i>	+	0.4m	XB61.35
* <i>Vachellia farnesiana</i>	+	0.3m	XB76.02

Christmas Creek Site XB76

Described by Julia Mattner Date 3/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 782229 mE 7513606 mN

Habitat Mulga Creek Bank

Soil Red-brown sandy loam

Vegetation Vegetation Type (Mattiske 2007): 2
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia synchronicia*, *Acacia tetragonophylla* and *Atalaya hemiglauc*a Tall Sparse Shrubland over *Atriplex bunburyana*, *Senna artemisioides* subsp. *oligophylla* and *Ptilotus obovatus* Low Sparse Shrubland over **Vachellia farnesiana* Tall Sparse Shrubland over **Cenchrus setiger*, **Cenchrus ciliaris* and *Eragrostis leptocarpa* Mid Closed Tussock Grassland over *Ipomoea muelleri*, *Boerhavia burbridgeana* Low Sparse Herbland.



Veg Condition Good

Fire Age Very Old

Notes Aspect: South
 Topography: Major creekline
 Bare Ground: 5%
 Litter Cover: <1% Logs, 1% Twigs, <1% Lvs
 Disturbance: Grazing and weeds

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	7%	5m	XB76.01	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	1m	XB68.08	
<i>Acacia synchronicia</i>	10%	5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	4m	XB60.37	
<i>Amyema fitzgeraldii</i>	+		XB76.11	
<i>Atalaya hemiglauc</i> a	+	4m	XB73.03	
<i>Atriplex bunburyana</i>	1%	0.9m	XB72.05	
<i>*Bidens bipinnata</i>	+	0.5m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB70.14	
<i>Boerhavia burbridgeana</i>	1%	0.1m	XB76.05	
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	+	1.2m	XB76.06	
<i>*Cenchrus ciliaris</i>	20%	0.8m	XB60.22	
<i>*Cenchrus setiger</i>	65%	1m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.3m	XB69.16	
<i>Chloris pectinata</i>	+	0.4m	XB65.32	
<i>*Chloris virgata</i>	+	1m	XB70.18	
<i>Chrysopogon fallax</i>	+	1m	XB60.11	
<i>*Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Cleome viscosa</i>	+	0.9m	XB60.38	
<i>Cyperus iria</i>	+	0.2m	XB76.10	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dicladanthera forrestii</i>	+	0.4m	XB76.13	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>*Echinochloa colona</i>	+	0.5m	XB70.16	

<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.5m	XB66.07
<i>Eragrostis leptocarpa</i>	1%	0.6m	XB70.06
<i>Eragrostis tenellula</i>	+	0.3m	XB61.24
<i>Eremophila spongiocarpa</i>	+	0.8m	XB76.09
<i>Euphorbia biconvexa</i>	+	0.4m	XB76.04
<i>Ipomoea optica</i>	+	Cr	XB72.22
<i>Ipomoea muelleri</i>	2%	Cr	XB62.03
<i>Lepidium muelleri-ferdinandii</i>	+	0.3m	XB76.08
<i>Maireana pyramidata</i>	+	1m	XB66.01
* <i>Malvastrum americanum</i>	+	0.9m	XB60.23
<i>Panicum decompositum</i>	+	0.7m	XB76.07
<i>Phyllanthus maderaspatensis</i>	+	0.4m	XB76.12
<i>Pluchea rubelliflora</i>	+	0.3m	XB75.02
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB60.26
<i>Ptilotus exaltatus</i>	+	0.7m	XB60.55
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.4m	XB67.13
<i>Ptilotus obovatus</i>	+	0.6m	XB62.21
<i>Rhagodia eremaea</i>	+	1.2m	XB76.14
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.1-0.3m	XB76.03
<i>Scaevola spinescens</i> (broad form)	+	0.6m	XB75.06
<i>Sclerolaena cuneata</i>	+	0.2m	XB66.04
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		0.5m	XB60.66
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.7m	XB60.59
<i>Setaria dielsii</i>	+	0.4m	XB69.19
<i>Striga squamigera</i>	+	0.2m	XB62.14
<i>Trianthema triquetra</i>	+	0.2m	XB66.02
* <i>Vachellia farnesiana</i>	1%	0.5-3.5m	XB76.02

Christmas Creek Site XB77

Described by Julia Mattner Date 3/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 785145 mE 7515144 mN

Habitat Mulga drainage line

Soil Loamy sand, clayey loam

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* and *Corymbia deserticola* subsp. *deserticola* Low Open Woodland over *Acacia pruinocarpa*, *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Acacia tetragonophylla* and **Vachellia farnesiana* Tall Sparse Shrubland over *Eremophila youngii* subsp. *lepidota* and *Senna glaucifolia* Low Sparse Shrubland over **Cenchrus setiger*, **Cenchrus ciliaris* and *Eragrostis tenellula* Mid Closed Tussock Grassland over *Ipomoea optica*, **Citrullus colocynthis* and **Malvastrum americanum* Low Sparse Herbland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Mulga drainage line

Bare Ground: 10%

Litter Cover: 1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing and weeds



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	55%	4.7m	XB77.01	
<i>Acacia pruinocarpa</i>	1%	5m	XB62.12	
<i>Acacia tetragonophylla</i>	4%	4m	XB60.37	
<i>Achyranthes aspera</i>	+	0.5m	XB77.03	
<i>Alternanthera denticulata</i>	+	0.4m	XB70.15	
<i>Ammannia multiflora</i>	+	0.3m	XB73.02	
<i>Amyema fitzgeraldii</i>	+	+	XB76.11	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Blumea tenella</i>	+	0.2m	XB70.14	
<i>Boerhavia paludosa</i>	+	0.2m	XB77.02	
<i>*Cenchrus ciliaris</i>	25%	1m	XB60.22	
<i>*Cenchrus setiger</i>	65%	1.2m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.2m	XB69.16	
<i>Chloris pectinata</i>	+	0.4m	XB65.32	
<i>*Chloris virgata</i>	+	0.9m	XB70.18	
<i>Chrysopogon fallax</i>	+	1.1m	XB60.11	
<i>*Citrullus colocynthis</i>	1%	cr	XB70.13	
<i>Cleome viscosa</i>	+	1m	XB60.38	
<i>Commelina ensifolia</i>	+	0.2m	XB62.10	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	+	1.5m	XB77.11	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cyperus iria</i>	+	0.3m	XB77.09	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.4m	XB60.40	

<i>Duperreya commixta</i>	+	Cr	XB63.11
<i>*Echinochloa colona</i>	+	0.4m	XB70.16
<i>Eragrostis cumingii</i>	+	0.2m	XB73.10
<i>Eragrostis tenellula</i>	1%	0.5m	XB61.24
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	1%	0.4m	XB72.02
<i>Eucalyptus victrix</i>	1%	8m	XB77.08
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB77.10
<i>Gomphrena kanisii</i>	+	0.4m	XB61.06
<i>Ipomoea coptica</i>	1%	Cr	XB72.22
<i>Ipomoea muelleri</i>	10%	Cr	XB62.03
<i>Iseilema vaginiflorum</i>	+	0.2m	XB77.06
<i>*Malvastrum americanum</i>	2%	0.7m	XB60.23
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.5m	XB77.05
<i>Operculina aequisejala</i>	+	Cr	XB74.13
<i>Pluchea rubelliflora</i>	+	0.2m	XB75.02
<i>*Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.6m	XB67.13
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.4m	XB77.04
<i>Senna glaucifolia</i>	+	0.3m	XB77.07
<i>Setaria dielsii</i>	+	0.4m	XB69.19
<i>Streptoglossa bubakii</i>	+	0.3m	XB64.13
<i>Striga squamigera</i>	+	0.3m	XB62.14
<i>Urochloa occidentalis</i>	+	0.2m	XB61.35
<i>*Vachellia farnesiana</i>	+	2.5m	XB76.02

Christmas Creek Site XB78

Described by Julia Mattner Date 3/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 787720 mE 7513716 mN

Habitat Near level plain

Soil Brown-red clayey loam, some crabholes

Vegetation Vegetation Type (Mattiske 2007): 30(+4)

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia synchronicia*, *Acacia tetragonophylla* and **Vachellia farnesiana* Tall Sparse Shrubland over *Eremophila forrestii* subsp. *forrestii*, *Eremophila cuneifolia*, *Rhagodia eremaea*, *Senna artemisioides* subsp. *oligophylla* x *helmsii* and *Sida fibulifera* Low Isolated Shrubs over **Cenchrus ciliaris*, *Eragrostis leptocarpa*, *Panicum laevinode* and **Chloris virgata* Mid Sparse Tussock Grassland over *Eriachne benthamii*, *Eragrostis desertorum*, *Sporobolus australasicus*, *Eragrostis tenellula*, *Aristida contorta*, *Eriachne pulchella* subsp. *pulchella* and *Chloris pectinata* Low Open Tussock Grassland over *Cullen cinereum*, *Brachyachne prostrata*, *Tribulus astrocarpus* and *Ipomoea coptica* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Very Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 15%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	6%	5m	XB78.01	
<i>Acacia synchronicia</i>	1%	4m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	3m	XB60.37	
<i>*Aerva javanica</i>	+	0.4m	XB74.15	
<i>Alternanthera denticulata</i>	+	0.2m	XB70.15	
<i>Aristida contorta</i>	2%	0.2m	XB60.52	
<i>Aristida latifolia</i>	+	0.5m	XB78.12	
<i>Boerhavia burbridgeana</i>	+	0.1m	XB78.10	
<i>Brachyachne prostrata</i>	1%	0.01m	XB60.08	
<i>Bulbostylis turbinata</i>	+	0.1m	XB78.16	
<i>*Cenchrus ciliaris</i>	1%	0.7m	XB60.22	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.2m	XB78.14	
<i>*Chloris virgata</i>	1%	0.3m	XB70.18	
<i>Chrysopogon fallax</i>	+	0.7m	XB60.11	
<i>Corchorus tridens</i>	+	0.3m	XB60.13	
<i>Cullen cinereum</i>	4%	0.2m	XB78.07	
<i>Cyperus iria</i>	+	0.2m	XB70.12	
<i>Dactyloctenium radulans</i>	+	0.2m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.3m	XB60.40	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.2m	XB78.22	
<i>Enneapogon polyphyllus</i>	+	0.3m	XB60.34	

<i>Eragrostis desertorum</i>	5%	0.4m	XB78.03
<i>Eragrostis leptocarpa</i>	1%	0.9m	XB70.06
<i>Eragrostis tenellula</i>	2%	0.2m	XB61.24
<i>Eremophila cuneifolia</i>	+	0.8m	XB60.48
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9m	XB62.09
<i>Eremophila lanceolata</i>	+	0.4m	XB60.44
<i>Eriachne benthamii</i>	6%	0.4m	XB78.02
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB64.03
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01m	XB62.07
<i>Euphorbia alsiniflora</i>	+	0.2m	XB78.21
<i>Euphorbia boophthona</i> (Large seed form)	+	0.2m	XB78.13
<i>Gomphrena cunninghamii</i>	+	0.2m	XB65.14
<i>Goodenia lamprosperma</i>	+	0.3m	XB78.19a
<i>Goodenia muelleriana</i>	+	0.3m	XB78.09
<i>Hibiscus</i> sp.	+	0.3m	XB78.20
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	+	0.2m	XB78.23
<i>Ipomoea coptica</i>	+	Cr	XB72.22
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14
<i>Mimulus gracilis</i>	+	0.1m	XB78.15
<i>Neptunia dimorphantha</i>	+	0.1m	XB61.08
<i>Operculina aequisejala</i>	+	Cr	XB74.13
<i>Panicum laevinode</i>	1%	0.6m	XB78.05
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.3m	XB64.06
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17
<i>Ptilotus macrocephalus</i>	+	0.4m	XB67.13
<i>Rhagodia eremaea</i>	+	1m	XB78.17
<i>Rhynchosia minima</i>	+	Cr	XB62.31
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.2m	XB78.06
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.3m	XB66.14
<i>Sclerolaena costata</i>	+	0.2m	XB78.04
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		0.4m	XB60.66
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.4m	XB78.19b
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Solanum lasiophyllum</i>	+	0.5m	XB74.09
<i>Sporobolus australasicus</i>	4%	0.3m	XB74.02
<i>Streptoglossa bubakii</i>	+	0.3m	XB64.13
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	+	0.01m	XB78.18
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
* <i>Tribulus terrestris</i>	+	0.05m	XB78.11
* <i>Vachellia farnesiana</i>	+	2.5m	XB76.02

Christmas Creek Site XB79

Described by Julia Mattner Date 4/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 788445 mE 7512231 mN

Habitat Floodbank adjacent to major creek

Soil Orange brown sandy loam

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* Low OpenWoodland over *Acacia coriacea* subsp. *pendens*, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Atalaya hemiglauca*,**Vachellia farnesiana* and *Acacia synchronicia* Tall SparseShrubland over *Ipomoea muelleri* and **Malvastrum**americanum* Low Sparse Herbland over **Cenchrus setiger*,**Cenchrus ciliaris*, *Sporobolus australasicus* and *Eragrostis**tenellula* Mid Closed Tussock Grassland over *Ipomoea**muelleri*, **Cucumis maderaspatanus*, *Centipeda minima* subsp. *macrocephala* and *Pluchea rubelliflora* Low Isolated Herbs.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A

Topography: Floodplain

Bare Ground: 1%

Litter Cover: 1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing and weeds

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	20%	5m	XB79.02	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5%	6m	XB79.01	
<i>Acacia synchronicia</i>	1%	3m	XB60.10	
<i>Alternanthera denticulata</i>	+	0.4m	XB70.15	
<i>Alysicarpus muelleri</i>	+	0.5m	XB69.08	
<i>Ammannia multiflora</i>	+	0.3m	XB73.02	
<i>Atalaya hemiglauca</i>	1%	4.5m	XB73.03	
<i>Blumea tenella</i>	+	0.2m	XB70.14	
<i>Boerhavia paludosa</i>	+	0.1m	XB79.07	
* <i>Cenchrus ciliaris</i>	30%	0.8m	XB60.22	
* <i>Cenchrus setiger</i>	65%	0.9m	XB60.01	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1m	XB69.16	
<i>Chloris pectinata</i>	+	0.5m	XB60.19	
<i>Chrysopogon fallax</i>	+	1m	XB60.11	
<i>Cleome viscosa</i>	+	0.6m	XB60.38	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	+	0.4m	XB79.09	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cullen cinereum</i>	+	0.3m	XB78.07	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Eragrostis desertorum</i>	+	0.3m	XB78.03	
<i>Eragrostis tenellula</i>	+	0.4m	XB61.24	
<i>Eucalyptus victrix</i>	3%	5m	XB09.16	

<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04	Previously <i>E. coghlanii</i>
<i>Euphorbia alsiniflora</i>	+	0.4m	XB79.04	
<i>Goodenia lamprosperma</i>	+	0.2m	XB78.19	
<i>Ipomoea coptica</i>	+	Cr	XB72.22	
<i>Ipomoea muelleri</i>	2%	Cr	XB62.03	
<i>Maireana triptera</i>	+	0.1m	XB79.06	
* <i>Malvastrum americanum</i>	1%	0.7m	XB60.23	
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14	
<i>Operculina aequiseipala</i>	+	Cr	XB74.13	
<i>Pluchea rubelliflora</i>	+	0.2m	XB75.02	
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05	
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06	
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.2m	XB60.17	
<i>Ptilotus macrocephalus</i>	+	0.7m	XB67.13	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	0.3m	XB79.03	
<i>Sporobolus australasicus</i>	1%	0.4m	XB74.02	
<i>Streptoglossa bubakii</i>	+	0.2m	XB64.13	
<i>Striga squamigera</i>	+	0.3m	XB62.14	
<i>Trianthema triquetra</i>	+	0.1m	XB66.02	
<i>Trichodesma zeylanicum</i>	+	0.3m	NC	
<i>Triraphis mollis</i>	+	0.4m	XB79.05	
* <i>Vachellia farnesiana</i>	3%	0.5-3m	XB76.02	
<i>Zaleya galericulata</i>	+	0.4m	XB79.08	

Christmas Creek Site XB80

Described by Julia Mattner Date 4/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 784464 mE 7510373 mN

Habitat Mulga patch, clay depression, in stony plain

Soil Red brown loamy / sandy clay, patches of crabholes, some mantle of gravel

Vegetation Vegetation Type (Mattiske 2007): 30+4
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) *Melaleuca glomerata* and *Acacia synchronicia* Tall Open Shrubland over *Eremophila youngii* subsp. *lepidota*, **Vachellia farnesiana* and *Muehlenbeckia florulenta* Mid Sparse Shrubland over *Maireana pyramidata*, *Eremophila spongiorcarpa* and *Atriplex bunburyana* Low Sparse Shrubland over *Eriachne benthamii*, *Eragrostis desertorum* and **Cenchrus ciliaris* Low Sparse Tussock Grassland.

Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A
 Topography: Clay depression
 Bare Ground: 60%
 Litter Cover: <1% Logs, <1% Twigs, 2% Lvs
 Disturbance: Grazing



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	30%	1.5-6m	XB80.10	
<i>Acacia synchronicia</i>	+	2m	XB60.10	
<i>Acacia tetragonophylla</i>	+	0.9m	XB60.37	
<i>Alternanthera denticulata</i>	+	0.2m	XB70.15	
<i>Atriplex bunburyana</i>	1%	0.7m	XB72.05	
<i>Boerhavia coccinea</i>	+	0.1m	XB80.13	
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	+	1.1m	XB76.06	
<i>*Cenchrus ciliaris</i>	1%	0.8m	XB60.22	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.2m	XB69.16	
<i>Chloris pectinata</i>	+	0.9m	XB60.19	
<i>*Chloris virgata</i>	+	0.8m	XB70.18	
<i>Chrysocephalum gilesii</i>	+	0.2m	XB80.21	
<i>Cyperus rigidellus</i>	+	0.2m	XB80.18	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4m	XB66.07	
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.4m	XB80.11	
<i>Enneapogon polyphyllus</i>	+	0.3m	XB80.15	
<i>Eragrostis desertorum</i>	1%	0.4m	XB80.08	
<i>Eragrostis dielsii</i>	+	0.2m	XB80.04	
<i>Eragrostis leptocarpa</i>	+	0.8m	XB70.06	
<i>Eragrostis xerophila</i>	+	0.2m	XB80.23	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.13m	XB62.09	
<i>Eremophila spongiorcarpa</i>	2%	0.6m	XB80.07	

<i>Eremophila youngii</i> subsp. <i>lepidota</i>	1%	1.5m	XB80.12
<i>Eriachne benthamii</i>	1%	0.5m	XB80.19
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.01m	XB62.07
<i>Frankenia setosa</i>	+	0.3m	XB80.03
<i>Goodenia forrestii</i>	+	0.3m	XB80.06
<i>Ipomoea coptica</i>	+	Cr	XB72.22
<i>Lepidium phlebopetalum</i>	+	0.1m	XB72.16
<i>Lepidium platypetalum</i>	+	0.8m	XB80.09
<i>Maireana carnosa</i>	+	0.2m	XB80.01
<i>Maireana pyramidata</i>	4%	0.9m	XB66.01
* <i>Malvastrum americanum</i>	+	0.4m	XB60.23
<i>Marsilea hirsuta</i>	+	0.1m	XB60.14
<i>Melaleuca glomerata</i>	1%	3m	XB80.05
<i>Muehlenbeckia florulenta</i>	+	1.2m	XB80.20
<i>Neptunia dimorphantha</i>	+	0.2m	XB61.08
<i>Panicum laevinode</i>	+	0.7m	XB78.05
<i>Pluchea rubelliflora</i>	+	0.2m	XB75.02
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
* <i>Portulaca oleracea</i>	+	0.02m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus auriculifolius</i>	+	0.4m	XB74.10
<i>Ptilotus obovatus</i>	+	0.3m	XB62.21
<i>Rhagodia eremaea</i>	+	0.5m	XB80.28
<i>Scaevola spinescens</i>	+	0.4m	XB80.16
<i>Sclerolaena cuneata</i>	+	0.2m	XB80.17
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.4m	XB80.14
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Sporobolus australasicus</i>	+	0.3m	XB74.02
<i>Themeda triandra</i>	+	1.2m	XB80.22
<i>Tragus australianus</i>	+	0.3m	XB61.14
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Trianthema turgidifolia</i>	+	0.1m	XB80.02
* <i>Vachellia farnesiana</i>	+	1.5m	XB76.02

Christmas Creek Site XB81

Described by Julia Mattner Date 4/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 791250 mE 7508810 mN

Habitat Alluvial plain

Soil Red brown sandy - clayey loam

Vegetation Vegetation Type (Mattiske 2007): 30
 Vegetation Sub-Association: *Acacia synchronicia* and **Vachellia farnesiana* Tall Sparse Shrubland over *Senna sp.* Karijini (M.E. Trudgen 10392), *Senna notabilis* and *Sclerolaena glabra* Low Isolated Shrubs over **Cenchrus ciliaris*, **Cenchrus setiger*, *Sporobolus australasicus*, *Chloris pectinata* and *Eragrostis desertorum* Mid Open Tussock Grassland over *Ipomoea muelleri*, *Polycarpaea holtzei*, *Corchorus tridens* and *Cullen cinereum* Low Sparse Herbland.

Veg Condition Good to degraded**Fire Age** Old

Notes Aspect: N/A
 Topography: Alluvial plain
 Bare Ground: 20%
 Litter Cover: <1% Logs, <1% Twigs, 1% Lvs
 Disturbance: Grazing

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia synchronicia</i>	5%	3m	XB60.10	
<i>*Aerva javanica</i>	+	1.2m	XB74.15	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>Boerhavia burbridgeana</i>	+	0.1m	XB81.01	
<i>*Cenchrus ciliaris</i>	15%	0.7m	XB60.22	
<i>*Cenchrus setiger</i>	15%	0.8m	XB60.01	
<i>Chloris pectinata</i>	1%	0.5m	XB65.32	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cullen cinereum</i>	+	0.2m	XB78.07	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	+	0.3m	XB60.40	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.2m	XB56.01	
<i>Eragrostis desertorum</i>	1%	0.4m	XB80.08	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05m	XB61.04	
<i>Ipomoea muelleri</i>	1%	Cr	XB62.03	
<i>*Malvastrum americanum</i>	+	0.4m	XB60.23	
<i>Operculina aequiseipala</i>	+	Cr	XB74.13	
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03	
<i>Portulaca cyclophylla</i>	+	0.01m	XB81.02	

<i>*Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.1m	XB60.17
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.9m	XB81.04
<i>Sclerolaena densiflora</i>	+		XB81.07
<i>Sclerolaena glabra</i>	+	0.1m	XB81.03
<i>Senna notabilis</i>	+	0.4m	XB60.56
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.4m	XB81.06
<i>Sporobolus australasicus</i>	10%	0.4m	XB74.02
<i>Streptoglossa cylindriceps</i>	+	0.1m	XB81.05
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>*Vachellia farnesiana</i>	1%	2.5m	XB76.02

Christmas Creek Site XB82

Described by Julia Mattner Date 4/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 792731 mE 7512704 mN

Habitat Plain

Soil Red brown loam with stony mantle

Vegetation Vegetation Type (Mattiske 2007): 30+10
 Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.5), *Acacia tetragonophylla* and *Acacia synchronicia* Tall Sparse Shrubland over *Acacia coriacea* subsp. *pendens*, *Senna artemisioides* subsp. *oligophylla*, *Senna artemisioides* subsp. *helmsii* and *Rhagodia eremaea* Mid Isolated Shrubs over *Sporobolus australasicus*, *Eriachne pulchella* subsp. *pulchella*, *Aristida contorta*, *Eragrostis tenellula* and *Chrysopogon fallax* Low Sparse Tussock Grassland over *Boerhavia paludosa*, *Goodenia lamprosperma*, *Tribulus astrocarpus* and **Portulaca oleracea* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A
 Topography: Plain
 Bare Ground: 80%
 Litter Cover: <1% Logs, <1% Twigs, 1% Lvs
 Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	+	0.4m	XB82.06	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	6%	1.5-5.5m	XB82.01	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	2m	XB68.08	
<i>Acacia synchronicia</i>	1%	1.5-2.5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	3m	XB60.37	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>Boerhavia paludosa</i>	1%	0.1m	XB82.02	
<i>Brachyachne prostrata</i>	+	0.01m	XB60.08	
<i>*Cenchrus setiger</i>	+	0.7m	XB60.01	
<i>Chrysopogon fallax</i>	+	1m	XB60.11	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4m	XB68.09	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.5m	XB66.07	
<i>Enneapogon polyphyllus</i>	+	0.2m	XB60.34	
<i>Eragrostis desertorum</i>	+	0.4m	XB78.03	
<i>Eragrostis tenellula</i>	+	0.4m	XB61.24	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.05m	XB61.04	

<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Hamersley form)	+	0.6m	XB82.05
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Goodenia lamprosperma</i>	+	0.2m	XB78.19
<i>Indigofera colutea</i>	+	0.2m	XB82.07
<i>Portulaca cyclophylla</i>	+	0.01m	XB81.02
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Ptilotus aervoides</i>	+	0.05m	XB64.17
<i>Ptilotus macrocephalus</i>	+	0.4m	XB67.13
<i>Rhagodia eremaea</i>	+	1.5m	XB66.13
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.7m	XB82.13
<i>Sclerolaena cornishiana</i>	+	0.05m	XB82.03
<i>Sclerolaena cuneata</i>	+	0.2m	XB80.17
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.5m	XB62.08
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	1.8m	XB60.59
* <i>Setaria verticillata</i>	+	0.4m	XB60.12
<i>Solanum lasiophyllum</i>	+	0.7m	XB74.09
<i>Sporobolus australasicus</i>	2%	0.2m	XB74.02
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35
* <i>Tribulus terrestris</i>	+	0.01m	XB78.11

Christmas Creek Site XB83

Described by Julia Mattner Date 4/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 790604 mE 7514784 mN

Habitat Stony plain

Soil Orange brown loam with mantle of gravel and small rocks

Vegetation Vegetation Type (Mattiske 2007): 30
 Vegetation Sub-Association: *Acacia synchronicia* Tall Sparse Shrubland over *Rhagodia eremaea*, *Senna artemisioides* subsp. *oligophylla*, *Solanum lasiophyllum*, *Senna artemisioides* subsp. *oligophylla* and *Senna glaucifolia* Low Isolated Shrubs over *Aristida contorta*, *Sporobolus australasicus*, *Chloris pectinata* and **Cenchrus ciliaris* Low Sparse Tussock Grassland over *Corchorus tridens*, *Tribulus astrocarpus*, *Polycarpaea holtzei* and *Polycarpaea corymbosa* var. *corymbosa* Low Isolated Herbs.



Veg Condition Very Good

Fire Age Old

Notes Aspect: N/A
 Topography: Stony plain
 Bare Ground: 80%
 Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Grazing and some weeds

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia synchronicia</i>	3%	0.5-3m	XB60.10	
<i>Aristida contorta</i>	10%	0.2m	XB60.52	
<i>Boerhavia coccinea</i>	+	0.1m	XB83.04	
<i>Boerhavia paludosa</i>	+	0.4m	XB64.04	
<i>Brachyachne prostrata</i>	+	0.05m	XB60.08	
<i>*Cenchrus ciliaris</i>	+	0.8m	XB60.22	
<i>Chloris pectinata</i>	+	0.6m	XB60.19	
<i>Chrysopogon fallax</i>	+	0.7m	XB60.11	
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	+	0.4m	XB65.05	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.2m	XB83.07	
<i>Enneapogon polyphyllus</i>	+	0.2m	XB60.34	
<i>Eragrostis desertorum</i>	+	0.3m	XB83.06	
<i>Eriachne mucronata</i> (large flower form)	+	0.3m	XB63.09	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.2m	XB64.03	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Hamersley form)	+	0.3m	XB82.05	
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06	
<i>Goodenia forrestii</i>	+	0.2m	XB83.05	
<i>Heliotropium heteranthum</i>	+	0.01m	XB61.40	
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>	+	0.4m	XB83.03	
<i>Indigofera colutea</i>	+	0.2m	XB74.16	

<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
* <i>Portulaca oleracea</i>	+	0.01m	XB60.05
<i>Ptilotus aervoides</i>	+	0.05m	XB64.17
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.2m	XB74.07
<i>Rhagodia eremaea</i>	+	1m	XB66.13
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.5m	XB82.13
<i>Sclerolaena glabra</i>	+	0.2m	XB72.03
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous) +		0.4m	XB60.66
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	1.2m	XB60.59
<i>Senna glaucifolia</i>	+	0.3m	XB64.16
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	+	0.4m	XB83.02
<i>Sida fibulifera</i>	+	0.2m	XB61.09
<i>Solanum lasiophyllum</i>	+	0.7m	XB74.09
<i>Sporobolus australasicus</i>	1%	0.3m	XB74.02
<i>Tephrosia</i> aff. <i>dementii</i> (12) (HD1-32)	+	0.2m	XB83.01
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Tribulus astrocarpus</i>	+	0.01m	XB60.35

Christmas Creek Site XB84

Described by Julia Mattner Date 5/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 763155 mE 7525622 mN

Habitat Gently undulating plain

Soil Red-brown loam with mantle of gravel with occasional rock outcrop

Rock Type Fe

Vegetation Vegetation Type (Mattiske 2007): 10

Vegetation Sub-Association: *Eucalyptus gamophylla* Low Open Mallee Woodland over *Acacia pruinocarpa*, *Acacia* aff. *aneura* (narrow fine veined; site 1259), *Grevillea wickhamii* subsp. *hispidula* and *Acacia sibirica* Tall Sparse Shrubland over *Senna glutinosa* subsp. *glutinosa*, *Rulingia luteiflora*, *Keraudrenia nephrosperma*, *Dodonaea petiolaris* and *Acacia tetragonophylla* Mid Isolated Shrubs over *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) Low Sparse Hummock Grassland over *Eriachne mucronata* (large flower form), *Paraneurachne muelleri*, *Aristida holathera* var. *holathera*, *Aristida contorta* and *Eriachne pulchella* subsp. *pulchella* Low Sparse Tussock Grassland.



Veg Condition Very Good

Fire Age Old

Notes Aspect: South
Topography: Plain
Bare Ground: 60%
Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
Disturbance: Old cattle pad, drilling and nearby drill lines

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i>	+		XB84.23B	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	2%	2m	XB84.23	
<i>Acacia pruinocarpa</i>	1%	3m	XB62.12	
<i>Acacia sibirica</i>	+	2.2m	XB84.19	
<i>Acacia tetragonophylla</i>	+	1.2m	XB60.37	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>Aristida holathera</i> var. <i>holathera</i>	+	0.3m	XB84.12	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4m	XB68.09	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Dodonaea petiolaris</i>	+	1.3m	XB62.24	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.3m	XB84.16	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.9m	XB62.09	
<i>Eriachne mucronata</i> (large flower form)	1%	0.4m	XB84.01	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+	0.1m	XB64.03	
<i>Eucalyptus gamophylla</i>	1%	2.5m	XB84.03	
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06	
<i>Goodenia microptera</i>	+	0.4m	XB84.14	
<i>Goodenia stobbsiana</i>	+	0.5m	XB84.09	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	2.5m	XB84.07	

<i>Hybanthus aurantiacus</i>	+	0.4m	XB84.04
<i>Indigofera monophylla</i>	+	0.7m	XB62.19
<i>Keraudrenia nephrosperma</i>	+	1.5m	XB84.21
<i>Maireana villosa</i>	+	0.2m	XB84.15
<i>Mollugo molluginea</i>	+	0.1m	XB62.37
<i>Paraneurachne muelleri</i>	1%	0.4m	XB84.05
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
<i>*Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Ptilotus astrolasius</i>	+	0.3m	XB84.22
<i>Ptilotus auriculifolius</i>	+	0.4m	XB74.10
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.8m	XB74.07
<i>Ptilotus exaltatus</i>	+	1.1m	XB60.55
<i>Ptilotus helipteroides</i>	+	0.3m	XB62.05
<i>Ptilotus obovatus</i>	+	0.1m	XB84.26
<i>Ptilotus polystachyus</i>	+	0.05m	XB84.25
<i>Ptilotus schwartzii</i>	+	0.3m	XB67.10
<i>Rulingia luteiflora</i>	+	1.8m	XB84.18
<i>Schizachyrium fragile</i>	+	0.2m	XB84.17
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	1.5m	XB62.08
<i>Senna glaucifolia</i>	+	1.5m	XB84.13
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.9m	XB63.17
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.7m	XB60.28
<i>Senna notabilis</i>	+	0.5m	XB60.56
<i>Solanum horridum</i>	+	0.1m	XB84.10
<i>Sporobolus australasicus</i>	+	0.1m	XB74.02
<i>Trianthema glossostigma</i>	+	0.01m	XB62.36
<i>Tribulus suberosus</i>	+	0.5m	XB65.17
<i>Trichodesma zeylanicum</i>	+	0.5m	NC
<i>Triodia pungens</i>	7%	0.4m (0.8m)	XB84.06
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	5%	0.3m (0.6m)	XB84.02

Christmas Creek Site XB85

Described by Julia Mattner Date 5/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 770270 mE 7518820 mN

Habitat Plain

Soil Red brown loam with mantle of gravel

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.5), *Acacia aneura* (grey, bushy form; MET 15 732), *Acacia xiphophylla*, *Acacia synchronicia* and *Acacia tetragonophylla* Tall Sparse Shrubland over *Rhagodia eremaea* and *Maireana pyramidata* Mid Sparse Shrubland over *Maireana planifolia*, *Eremophila cuneifolia*, *Solanum lasiophyllum* and *Senna artemisioides* subsp. *oligophylla* (thinly sericeous) Low Sparse Shrubland over **Cenchrus ciliaris*, *Eragrostis tenellula*, *Sporobolus australasicus* and *Eragrostis dielsii* Low Isolated Grasses over *Sclerolaena cuneata*, *Ipomoea muelleri*, *Corchorus tridens* and *Pluchea rubelliflora* Low Sparse Herbland.



Veg Condition Very Good

Fire Age Very Old

Notes Aspect: N/A

Topography: Plain

Bare Ground: 65%

Litter Cover: <1% Logs, <1% Twigs, 15% Lvs

Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon lepidum</i>	+	0.1m	XB85.13	
<i>Abutilon macrum</i>	+	0.4m	XB66.09	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	2%	6m	XB85.01	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)	1%	5m	XB85.02	
<i>Acacia synchronicia</i>	1%	3.5m	XB60.10	
<i>Acacia tetragonophylla</i>	1%	3.5m	XB60.37	
<i>Acacia xiphophylla</i>	15%	3.5m	XB60.30	
<i>Atriplex codonocarpa</i>	+	0.2m	XB85.10	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Bulbostylis barbata</i>	+	0.1m	XB64.02	
<i>*Cenchrus ciliaris</i>	+	0.4m	XB60.22	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+	0.2m	XB85.18	
<i>Chloris pectinata</i>	+	0.5m	XB60.19	
<i>*Chloris virgata</i>	+	0.7m	XB70.18	
<i>Chrysopogon fallax</i>	+	1.1m	XB60.11	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Cyperus iria</i>	+	0.2m	XB85.17	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Digitaria ctenantha</i>	+	0.3m	XB62.15	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.7m	XB66.07	

<i>Enneapogon caeruleus</i> var. <i>caeruleus</i>	+	0.2m	XB85.20
<i>Eragrostis desertorum</i>	+	0.1m	XB85.07
<i>Eragrostis dielsii</i>	+	0.05m	XB85.03
<i>Eragrostis leptocarpa</i>	+	0.4m	XB70.06
<i>Eragrostis tenellula</i>	+	0.2m	XB61.24
<i>Eremophila cuneifolia</i>	1%	0.9m	XB60.48
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.2m	XB61.39
<i>Ipomoea muelleri</i>	+	Cr	XB62.03
<i>Lepidium phlebopetalum</i>	+	0.1m	XB72.16
<i>Maireana planifolia</i>	1%	0.9m	XB70.20
<i>Maireana pyramidata</i>	1%	1.2m	XB66.01
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.6m	XB85.16
<i>Paspalidium clementii</i>	+	0.1m	XB85.09
<i>Perotis rara</i>	+	0.1m	XB61.19
<i>Pluchea rubelliflora</i>	+	0.2m	XB85.05
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Portulaca pilosa</i>	+	0.1m	XB60.43
<i>Psydrax latifolia</i>	+	3.5m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.4m	XB64.06
<i>Rhagodia eremaea</i>	2%	1.5m	XB66.13
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.6m	XB85.08
<i>Sclerolaena cuneata</i>	1%	0.2m	XB80.17
<i>Sclerolaena densiflora</i>	+	0.2m	XB72.08
<i>Sclerolaena diacantha</i>	+	0.1m	XB85.11
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.6m	XB60.66
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.5m	XB85.06
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	+	0.2m	XB85.15
<i>Solanum lasiophyllum</i>	+	0.9m	XB74.09
<i>Sporobolus australasicus</i>	+	0.1m	XB74.02
<i>Tephrosia</i> aff. <i>rosea</i> (CH3-47)	+	Cr	XB62.34
<i>Trianthema triquetra</i>	+	0.1m	XB66.02
<i>Urochloa occidentalis</i>	+	0.1m	XB85.14
<i>Wahlenbergia tumidifructa</i>	+	0.2m	XB85.19
<i>Xerochloa laniflora</i>	+	0.2m	XB85.12

Christmas Creek Site XB86

Described by Julia Mattner Date 5/05/2011 Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 791852 mE 7524402 mN

Habitat Hilltop

Soil Brown-orange loam with mantle of gravel and rocks and some outcropping

Rock Type Fe

Vegetation Vegetation Type (Mattiske 2007): 17 (Burnt)

Photo unavailable

Vegetation Sub-Association: *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Acacia pruinocarpa*, *Grevillea wickhamii* subsp. *hispidula*, *Senna glutinosa* subsp. *glutinosa* and *Senna glutinosa* subsp. x *luerssenii* Mid Isolated Shrubs over *Ptilotus calostachyus*, *Dampiera candidans*, *Indigofera monophylla*, *Sida* sp. Pilbara (ferruginous form) and *Ptilotus rotundifolius* Low Sparse Shrubland over *Triodia epactia/pungens* Low Isolated Hummock Grasses over *Bulbostylis barbata* Low Open Sedgeland.

Veg Condition Excellent

Fire Age Recent

Notes Aspect: East
Topography: Hilltop
Bare Ground: 75%
Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
Disturbance: Recently burnt

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia pruinocarpa</i>	+	2m	XB62.12	
<i>Aristida contorta</i>	+	0.2m	XB60.52	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+	0.05m	XB86.12	
<i>Bulbostylis barbata</i>	25%	0.1m	XB86.02	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4m	XB68.09	
<i>Cymbopogon ambiguus</i>	+	0.6m	XB86.21	
<i>Dampiera candidans</i>	1%	0.4m	XB86.07	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Dysphania sphaerosperma</i>	+	0.1m	XB86.17	
<i>Eriachne mucronata</i>	+		XB86.24	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.2m	XB60.29	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1%	4.5m	XB86.01	
<i>Fimbristylis dichotoma</i>	+	0.2m	XB86.03	
<i>Fimbristylis simulans</i>	+	0.2m	XB86.04	
<i>Goodenia stobbsiana</i>	+	0.5m	XB86.18	
<i>Goodenia triodiophila</i>	+	0.3m	XB86.10	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	2m	XB65.12	
<i>Hakea chordophylla</i>	+	3.5m	XB86.20	
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	+	0.5m	XB86.05	
<i>Hybanthus aurantiacus</i>	+	0.4m	XB84.04	
<i>Indigofera monophylla</i>	+	0.5m	XB62.19	
<i>Oldenlandia crouchiana</i>	+	0.1m	XB86.06	
<i>Paspalidium clementii</i>	+	0.1m	XB86.13	

<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB60.46	
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03	
<i>Ptilotus aervoides</i>	+	0.01m	XB64.17	
<i>Ptilotus auriculifolius</i>	+	0.4	XB74.10	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	2%	1.1m	XB74.07	
<i>Ptilotus clementii</i>	+	0.4m	XB86.08	
<i>Ptilotus exaltatus</i>	+	0.7m	XB60.55	
<i>Ptilotus fusiformis</i>	+	0.3m	XB86.16	
<i>Ptilotus rotundifolius</i>	+	0.5	XB86.19	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.5m	XB63.17	
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	1.5m	XB60.28	
<i>Sida</i> sp. <i>excedentifolia</i> (J.L. Egan 1925)	+	0.3m	XB86.09	
<i>Sida</i> sp. Pilbara (ferruginous form)	+	0.4m	XB86.11	
<i>Solanum phlomoides</i>	+	0.7m	XB61.34	
<i>Tephrosia</i> aff. <i>supina</i> (HD88-4)	+	0.2m	XB86.15	
<i>Trachymene oleracea</i>	+	0.3m	XB86.14	
<i>Tribulus suberosus</i>	+	0.4m	XB65.17	
<i>Triodia epactia/pungens</i>	+	0.2m	XB86.22	Sterile
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	0.1m	XB86.23	

Christmas Creek Site XB87

Described by Julia Mattner Date 6/05/2011

Type Quadrat 40x65 m

Location Christmas Creek

MGA Zone 50 783399 mE 7523318 mN

Habitat Floodplain

Soil Red brown sandy loam

Vegetation Vegetation Type (Mattiske 2007): 8
 Vegetation Sub-Association: *Corymbia hamersleyana* Low
 Isolated Trees over *Acacia trachycarpa*, *Acacia pyrifolia*, *Acacia tetragonophylla*, *Acacia tumida* var. *pilbarensis* and *Atalaya hemiglaucula* Tall Sparse Shrubland over *Indigofera monophylla*, *Senna artemisioides* subsp. *oligophylla* x *helmsii*, *Senna glaucifolia* x *ferraria*, *Ptilotus obovatus* and *Senna notabilis* Low
 Sparse Shrubland over *Triodia wiseana* and *Triodia longiceps*
 Low Isolated Hummock Grasses over **Cenchrus ciliaris*,
**Cenchrus setiger* and *Eragrostis tenellula* Mid Tussock Grassland.

Veg Condition Good

Fire Age Old

Notes Aspect: N/A
 Topography: Floodplain
 Bare Ground: 2%
 Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Grazing and weeds

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia acradenia</i>	+	2.9m	XB87.20	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	+	3m	XB87.14	
<i>Acacia pruinocarpa</i>	+	3.5m	XB62.12	
<i>Acacia pyrifolia</i>	2%	3m	XB87.09	
<i>Acacia tetragonophylla</i>	1%	3.5m	XB60.37	
<i>Acacia trachycarpa</i>	4%	3m	XB87.01	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	1%	3m	XB87.02	
<i>*Aerva javanica</i>	+	1.1m	XB74.15	
<i>Alysicarpus muelleri</i>	+	0.4m	XB69.08	
<i>Amaranthus undulatus</i>	+	1.2m	XB87.13	
<i>Atalaya hemiglaucula</i>	1%	4m	XB73.03	
<i>Boerhavia coccinea</i>	+	0.2m	XB87.03	
<i>*Cenchrus ciliaris</i>	75%	0.7m	XB60.22	
<i>*Cenchrus setiger</i>	1%	0.8m	XB60.01	
<i>*Citrullus colocynthis</i>	+	Cr	XB70.13	
<i>Cleome viscosa</i>	+	0.5m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.4m	XB68.09	
<i>Corchorus tridens</i>	+	0.1m	XB60.13	
<i>Corymbia hamersleyana</i>	+	3.5m	XB87.17	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	+	0.3m	XB79.09	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Duperreya commixta</i>	+	Cr	XB63.11	

<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07
<i>Eragrostis tenellula</i>	+	0.4m	XB61.24
<i>Eriachne mucronata</i> (typical form)	+	0.4m	XB87.04
<i>Eriachne tenuiculmis</i>	+	0.5m	XB87.05
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Hamersley form)	+	0.4m	XB87.11
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.1m	XB87.16
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1%	3.5m	XB65.12
<i>Hybanthus aurantiacus</i>	+	0.4m	XB84.04
<i>Indigofera monophylla</i>	1%	0.9m	XB62.19
<i>Ipomoea muelleri</i>	+	Cr	XB62.03
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2m	XB67.17
<i>Mollugo molluginea</i>	+	0.1m	XB62.37
<i>Phyllanthus maderaspatensis</i>	+	0.4m	XB87.12
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea longiflora</i>	+	0.4m	XB64.10b
* <i>Portulaca oleracea</i>	+	0.05m	XB60.05
<i>Psydrax latifolia</i>	+	2m	XB60.18
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus auriculifolius</i>	+	0.4m	XB74.10
<i>Ptilotus obovatus</i>	+	0.5m	XB62.21
<i>Rhagodia eremaea</i>	+	1m	XB66.13
<i>Rhynchosia minima</i>	+	Cr	XB62.31
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.9m	XB87.21
<i>Senna glaucifolia</i> x <i>ferraria</i>	+	0.5m	XB87.18
<i>Senna notabilis</i>	+	0.5m	XB60.56
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)	+	0.1m	XB87.15
<i>Solanum horridum</i>	+	0.1m	XB87.19
<i>Sporobolus australasicus</i>	1%	0.4m	XB74.02
<i>Tephrosia densa</i>	+	1m	XB87.08
<i>Tephrosia rosea</i> var. <i>glabrior</i>	+	1.1m	XB87.07
<i>Trachymene oleracea</i>	+	0.2m	XB65.11
* <i>Tribulus terrestris</i>	+	0.05m	XB78.11
<i>Trichodesma zeylanicum</i>	+	0.2m	NC
<i>Triodia longiceps</i>	+	1m	XB87.10

Christmas Creek Site XB88

Described by Julia Mattner Date 6/05/2011

Type Quadrat 50 x 50 m

Location Christmas Creek

MGA Zone 50 773901 mE 7523150 mN

Habitat Floodplain

Soil Red brown loam with some gravel

Vegetation Vegetation Type (Mattiske 2007): 8
 Vegetation Sub-Association: *Acacia pruinocarpa*, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia tetragonophylla*, *Atalaya hemiglauc* and **Vachellia farnesiana* Tall Open Shrubland over *Ptilotus obovatus*, *Sida fibulifera* and *Senna notabilis* Low Isolated Shrubs and **Cenchrus ciliaris*, **Cenchrus setiger*, *Sporobolus australasicus* and *Enneapogon polyphyllus* Low Tussock Grassland.



Veg Condition Good

Fire Age Moderate

Notes Aspect: West
 Topography: Floodplain
 Bare Ground: 15%
 Litter Cover: 1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Grazing

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon lepidum</i>	+	0.2m	XB88.07	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	3%	6m	XB88.01	
<i>Acacia pruinocarpa</i>	7%	8m	XB62.12	
<i>Acacia tetragonophylla</i>	2%	4.5m	XB60.37	
<i>Amyema fitzgeraldii</i>	+		XB76.11	
<i>Atalaya hemiglauc</i>	2%	5.5m	XB73.03	
<i>*Bidens bipinnata</i>	+	0.4m	XB60.21	
<i>Boerhavia coccinea</i>	+	0.2m	XB87.03	
<i>Calotis porphyroglossa</i>	+	0.1m	XB88.02	
<i>*Cenchrus ciliaris</i>	60%	0.5m	XB60.22	
<i>*Cenchrus setiger</i>	5%	0.6m	XB60.01	
<i>Cleome viscosa</i>	+	0.4m	XB60.38	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	Cr	XB62.29	
<i>Corchorus tridens</i>	+	0.2m	XB60.13	
<i>Cucumis maderaspatanus</i>	+	Cr	XB60.16	
<i>Dactyloctenium radulans</i>	+	0.1m	XB60.06	
<i>Dicladanthera forrestii</i>	+	0.2m	XB88.04	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.2m	XB60.07	
<i>Enneapogon polyphyllus</i>	+	0.05m	XB88.06	
<i>Euphorbia</i> aff. <i>australis</i> var. 1 (MET 12 337)	+	0.1m	XB61.04	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Hamersley form)	+	0.2m	XB87.11	
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.1m	XB61.39	
<i>Gomphrena kanisii</i>	+	0.2m	XB61.06	

<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.3m	XB67.17
<i>Maireana planifolia</i>	+	0.7m	XB61.29
* <i>Malvastrum americanum</i>	+	0.5m	XB60.23
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	+	0.6m	XB88.08
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1m	XB61.03
<i>Polycarpaea holtzei</i>	+	0.05m	XB60.03
* <i>Portulaca oleracea</i>	+	0.1m	XB60.05
<i>Pterocaulon sphacelatum</i>	+	0.2m	XB64.06
<i>Ptilotus auriculifolius</i>	+	0.4m	XB74.10
<i>Ptilotus macrocephalus</i>	+	0.4m	XB88.03
<i>Ptilotus obovatus</i>	+	0.9m	XB62.21
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.4m	XB88.05
<i>Sclerolaena cornishiana</i>	+	0.1m	XB88.09
<i>Senna notabilis</i>	+	0.2m	XB60.56
<i>Setaria dielsii</i>	+	0.3m	XB69.19
<i>Sida fibulifera</i>	+	0.1m	XB61.09
<i>Solanum lasiophyllum</i>	+	0.7m	XB74.09
<i>Solanum phlomoides</i>	+	0.7m	XB61.34
<i>Sporobolus australasicus</i>	+	0.2m	XB74.02
<i>Trichodesma zeylanicum</i>	+	0.2m	NC
* <i>Vachellia farnesiana</i>	+	2.5m	XB76.02

Christmas Creek Site XBCMNO1

Described by Julia Mattner Date 20/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 794061 mE 7515781 mN

Habitat Creekline

Soil Sandy loam with gravel

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Acacia coriacea* subsp. *pendens*, *Ehretia saligna*
 var. *saligna*, *Hakea lorea* subsp. *lorea* and *Atalaya hemiglauca*
 Tall Sparse Shrubland over **Cenchrus ciliaris* Mid Closed Tussock
 Grassland over **Citrullus colocynthis* Sparse Vineland.

Veg Condition Degraded**Fire Age** Moderate**Notes** Very dense **Cenchrus* meadow all along creek.**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2%	5 m	XBCMNO3.02	
* <i>Argemone ochroleuca</i>	+	0.15 m	XBRH03.01	
<i>Atalaya hemiglauca</i>	+	3.5 m	XBR06.09	
* <i>Cenchrus ciliaris</i>	100%	0.7 m	XB07.02	
* <i>Citrullus colocynthis</i>	1%	cr	XB14.16	
<i>Dicladanthera forrestii</i>	+	0.4 m	XBOPJM07	
<i>Ehretia saligna</i> var. <i>saligna</i>	+	3.5 m	XBCMNO1.01	
<i>Eucalyptus victrix</i>	15%	6 m	XB09.16	
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	4.5 m	XB30.01	

Christmas Creek Site XBCMNO2

Described by Julia Mattner Date 20/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 794339 mE 7517711 mN

Habitat Creekline

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Acacia coriacea* subsp. *pendens*, *Atalaya*
hemiglauc and *Hakea lorea* subsp. *lorea* Tall Sparse
 Shrubland over *Ehretia saligna* var. *saligna* and *Acacia*
pyrifolia Mid Sparse Shrubland over **Cenchrus ciliaris* Mid
 Closed Tussock Grassland over *Ipomoea muelleri* and
**Citrullus colocynthis* Low Sparse Vineland.

Notes Very dense **Cenchrus***SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5%	6 m	XBCMNO3.02	
<i>Acacia pyrifolia</i>	+	2 m	XB04.18	
<i>*Aerva javanica</i>	+	0.6 m	XB07.08	
<i>Amaranthus undulatus</i>	+	0.5 m	XBCMNO2.01	
<i>Atalaya hemiglauc</i>	1%	5 m	XBR06.09	
<i>*Cenchrus ciliaris</i>	95%	0.8 m	XB07.02	
<i>*Citrullus colocynthis</i>	1%	cr	XB14.16	
<i>Dicladanthera forrestii</i>	+	0.2 m	XBOPJM07	
<i>Ehretia saligna</i> var. <i>saligna</i>	1%	1.9 m	XBCMNO1.01	
<i>Eucalyptus victrix</i>	3%	7 m	XB09.16	
<i>Hakea lorea</i> subsp. <i>lorea</i>	+	3 m	XB30.01	
<i>Ipomoea muelleri</i>	2%	cr	XB16.31	
<i>Sporobolus australasicus</i>	+	0.3 m	XB16.03	
<i>*Vachellia farnesiana</i>	+	1.5 m	XBOPJM06	

Christmas Creek Site XBCMNO3

Described by Julia Mattner Date 20/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 792317 mE 7516985 mN

Habitat Creekline

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Corymbia candida* subsp. *candida*
 Low Open Woodland over *Acacia coriacea* subsp. *pendens*,
Acacia pruinocarpa, *Acacia pyrifolia*, *Ehretia saligna* var.
saligna and *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3)
 Tall Shrubland over *Acacia tetragonophylla* Mid Sparse
 Shrubland over **Cenchrus ciliaris* Mid Closed Tussock
 Grassland.

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	+	4.5 m	XB26.02	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	20%	4 m	XBCMNO3.02	
<i>Acacia pruinocarpa</i>	5%	5 m	XB02.12	
<i>Acacia pyrifolia</i>	+	3.5 m	XB04.18	
<i>Acacia tetragonophylla</i>	1%	2 m	XB02.02	
<i>*Aerva javanica</i>	+	0.6 m	XB07.08	
<i>Bothriochloa ewartiana</i>	+	0.4 m	XBCMNO3.03	
<i>*Cenchrus ciliaris</i>	90%	0.8 m	XBRH03.13	
<i>Chrysopogon fallax</i>	+	0.9 m	XB14.09	
<i>Corchorus tridens</i>	+	0.15 m	XB14.23	
<i>Corymbia candida</i> subsp. <i>candida</i>	2%	4.5 m	XBCMNO3.01	
<i>Dactyloctenium radulans</i>	+	0.2 m	XB16.02	
<i>Ehretia saligna</i> var. <i>saligna</i>	+	3.5 m	XBCMNO1.01	
<i>Ipomoea muelleri</i>	+	Cr	XB16.31	
<i>*Vachellia farnesiana</i>	+	2 m	XBOPJM06	

Christmas Creek Site XBMN01

Described by Hayden Ajduk Date 21/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 778401 mE 7522693 mN

Habitat Creek bed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Melaleuca linophylla*, *Acacia trachycarpa* and
Acacia tetragonophylla Mid Sparse Shrubland over *Triodia*
basedowii Mid Isolated Hummock Grasses over **Cenchrus*
ciliaris Mid Open Tussock Grassland.

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia tetragonophylla</i>	+		XB07.01	
<i>Acacia trachycarpa</i>	+		XBOPHA04	
<i>*Cenchrus ciliaris</i>	30%		XB07.02	
<i>Eucalyptus victrix</i>	3%		XB09.16	
<i>Melaleuca linophylla</i>	5%		XB09.12	
<i>Triodia basedowii</i>	+		XB03.12	

Christmas Creek Site XBMN02

Described by Hayden Ajduk Date 21/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 768892 mE 7522882 mN

Habitat Creek bed

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* Low Open Woodland over *Acacia coriacea* subsp. *pendens* and *Acacia trachycarpa* Tall Sparse Shrubland over **Cenchrus ciliaris* Mid Open Tussock Grassland.

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2%	3-5 m	XB09.18	
<i>Acacia trachycarpa</i>	2%	2-3 m	XBOPHA04	
<i>*Cenchrus ciliaris</i>	20%	0.5 m	XB07.02	
<i>Eucalyptus victrix</i>	3%	5-10 m	XB09.16	

Christmas Creek Site XBMN03

Described by Hayden Ajduk Date 22/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 761356 mE 7528773 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Mid Woodland
 over *Acacia coriacea* subsp. *pendens* Tall Sparse Shrubland over
Acacia pyrifolia and *Acacia coriacea* subsp. *pendens* Mid Sparse
 Shrubland over **Cenchrus ciliaris* Mid Open Tussock Grassland.

Veg Condition Very good**Fire Age** Moderate**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1%	8 m	XB09.18	
<i>Acacia pyrifolia</i>	4%	2 m	XB09.03	
<i>Acacia trachycarpa</i>	+	1.5 m	XBOPHA04	
<i>*Cenchrus ciliaris</i>	40%	0.5 m	XB07.02	
<i>Eucalyptus victrix</i>	20%	10-15 m	XB09.16	

Christmas Creek Site XBMN04

Described by Hayden Ajduk Date 22/03/2011

Type Vegetation Description

Location Christmas Creek

MGA Zone 50 770723 mE 7526667 mN

Habitat Creek bed

Soil Skeletal

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Melaleuca linophylla* and *Acacia trachycarpa*
 Mid Sparse Shrubland over **Cenchrus ciliaris* Mid Sparse
 Tussock Grassland.

Veg Condition Very good**Fire Age** Moderate**SPECIES LIST:**

Name	Cover	Height	Specimen Notes
<i>Acacia trachycarpa</i>	+	1.5 m	XBOPHA04
<i>*Cenchrus ciliaris</i>	20%	0.5 m	XB07.02
<i>Eucalyptus victrix</i>	2%	6 m	XB09.16
<i>Melaleuca linophylla</i>	1%	2 m	XB09.12

Christmas Creek Site XBR06

Described by Julia Mattner Date 19/03/2011

Type Relevé 10x250m

Location Christmas Creek

MGA Zone 50 800710 mE 7520792 mN

Habitat Gully

Soil Red brown sandy loam, skeletal soil, mostly rocks and small cliff faces

Rock Type Iron

Vegetation Vegetation Type (Mattiske 2007): 17

Vegetation Sub-Association: *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Hakea chordophylla* and *Gossypium robinsonii* Tall Sparse Shrubland over *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* subsp. *hispidula* and *Atalaya hemiglauc* Mid Sparse Shrubland over *Indigofera monophylla* (brown calyx form), *Senna notabilis* and *Solanum phlomoides* Low Sparse Shrubland over *Triodia epactia/pungens* Low Sparse Hummock Grassland.

Veg Condition Excellent

Fire Age Recent

Notes Aspect: South
Topography: Gully
Bare Ground: 30%
Litter Cover: <1% Logs, 1% Twigs, 1% Lvs
Disturbance: Fire 6 months ago.



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia tumida</i> var. <i>pilbarensis</i>	3%	1.4 m	XB04.01	
<i>Atalaya hemiglauc</i>	+	1.6 m	XBR06.09	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+	0.1 m	XB01.13	Fl; white-purple
<i>Bulbostylis barbata</i>	+	0.1 m	XB04.07	
<i>Cleome viscosa</i>	+	0.7 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.3 m	XBR06.08	
<i>Cymbopogon</i> sp.	+	0.8 m	XBR06.13	cymbo
<i>Dampiera candicans</i>	+	0.4 m	XB01.23	
<i>Dodonaea pachyneura</i>	+	0.4 m	XBR06.17	
<i>Eriachne mucronata</i> (typical form)	+	0.2 m	XBR08.06	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2%	3 m	XBR06.07	
<i>Gossypium robinsonii</i>	1%	2.2 m	XB04.14	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	3%	1.9 m	XB01.27	
<i>Hakea chordophylla</i>	1%	3.5 m	XB01.01	
<i>Hibiscus</i> aff. <i>coatesii</i> (MET 15,012)	+	0.6 m	XBR06.18	Fl; purple
<i>Hibiscus</i> sp.	+	0.4 m	XB06.06	Fl; purple
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	+	0.4 m	XBR06.15	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB04.04	
<i>Indigofera monophylla</i> (brown calyx form)	12%	0.6 m	XB01.07	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Nicotiana</i> sp.	+	0.1 m	XBR06.12	
<i>Ptilotus auriculifolius</i>	+	0.4 m	XBR06.04	Fl; yellow-green
<i>Ptilotus clementii</i>	+	0.4 m	XBR06.01	

<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.5 m	XB02.09	
<i>Ptilotus incanus</i> var. <i>incanus</i>	2%	0.4 m	XBR06.05	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.5 m	XB01.03	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	+	0.9 m	XBR06.11	
<i>Senna notabilis</i>	2%	0.5 m	XB01.22	
<i>Sida</i> sp. Pilbara (ferruginous form)	+	0.3 m	XBR06.16	
<i>Solanum phlomoides</i>	1%	0.6 m	XB01.02	Fl; purple
<i>Solanum sturtianum</i>	+	0.5 m	XBR06.10	
<i>Tephrosia</i> aff. <i>supina</i> (HD88-4)	+	0.1 m	XBR06.19	Fl; orange
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB02.08	
<i>Triodia epactia/pungens</i>	1%	0.4 m	XBR06.02	Sterile

Christmas Creek Site XBR08

Described by Julia Mattner Date 19/03/2011

Type Relevé 25x100m

Location Christmas Creek

MGA Zone 50 800284 mE 7519609 mN

Habitat Minor Creekline

Soil Loamy coarse sand, brown-red.

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 2

Vegetation Sub-Association: *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* Low Open Woodland over *Gossypium robinsonii* Tall Sparse Shrubland over *Acacia tumida* var. *pilbarensis*, *Grevillea wickhamii* subsp. *hispidula*, *Senna glutinosa* subsp. *glutinosa* and *Atalaya hemiglauca* Mid Sparse Shrubland over *Senna venusta*, *Solanum phlomoides* and *Indigofera monophylla* (brown calyx form) Low Sparse Shrubland over *Triodia epactia/pungens* Low Isolated Hummock Grassland.



Fire Age Recent

Notes Aspect: East

Topography: minor creekline

Bare Ground: 10%

Litter Cover: 1% Logs, 2% Twigs, 2% Lvs

Disturbance: fire 6 months ago

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia maitlandii</i>	+	0.2 m	XBR08.08	
<i>Acacia pruinocarpa</i>	+	0.7 m	XB02.12	
<i>Acacia pyrifolia</i>	+	0.9 m	XB04.18	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	25%	1.9 m	XB04.01	
<i>Atalaya hemiglauca</i>	+	1.3 m	XBR06.09	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+	0.1 m	XB01.13	
<i>Bulbostylis barbata</i>	+	0.15 m	XBR08.10	
<i>Cleome viscosa</i>	+	0.5 m	XB01.25	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+	0.3 m	XBR06.08	
<i>Corymbia hamersleyana</i>	2%	4 m	XB01.15	
<i>Dodonaea coriacea</i>	+	0.9 m	XBR06.17	
<i>Dodonaea petiolaris</i>	+	0.6 m	XB04.13	
<i>Duperreya commixta</i>	+	cr	XB10.25	
<i>Dysphania rhadinostachya</i>	+	0.2 m	XB01.21	
<i>Eriachne mucronata</i> (typical form)	+	0.3 m	XBR08.06	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	+	3 m	XBR06.07	
<i>Euphorbia boophthona</i>	+	0.4 m	XBR08.01	
<i>Goodenia stobbsiana</i>	+	0.5 m	XB01.17	
<i>Gossypium robinsonii</i>	4%	2.2 m	XB04.14	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	1%	1.2 m	XB01.27	
<i>Hibiscus</i> aff. <i>coatesii</i> (MET 15,012)	+	0.5 m	XBR06.18	
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	+	0.5 m	XBR08.04	

<i>Hybanthus aurantiacus</i>	+	0.4 m	XB05.09	
<i>Indigofera monophylla</i> (brown calyx form)	1%	0.8 m	XB01.07	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
* <i>Portulaca oleracea</i>	+	0.1 m	XB16.07	
<i>Psydrax latifolia</i>	+	0.5 m	XBR08.10	
<i>Ptilotus calostachyus</i> var. <i>calostachyus</i>	+	0.6 m	XB01.04	
<i>Ptilotus fusiformis</i>	+	0.3 m	XBR08.05	
<i>Ptilotus macrocephalus</i>	+	0.4 m	XB16.28	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.4 m	XBR08.09	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	1.4 m	XB01.03	
<i>Senna venusta</i>	50%	0.9 m	XBR08.02	
<i>Solanum lasiophyllum</i>	+	0.5 m	XB10.12	
<i>Solanum phlomoides</i>	1%	0.6 m	XB01.02	
<i>Solanum sturtianum</i>	+	0.5 m	XBR06.10	
<i>Tephrosia</i> aff. <i>supina</i> (HD88-4)	+	0.2 m	XBR08.03	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.4 m	XB02.08	
<i>Triodia epactia/pungens</i>	+	0.2 m	XBR08.07	Sterile

Christmas Creek Site XBR22

Described by Julia Mattner Date 20/03/2011

Type Relevé 50x50m

Location Christmas Creek

MGA Zone 50 789820 mE 7513290 mN

Habitat Mulga plain flats with crab holes and cracked clay

Soil Red brown sandy/ clayey loam with pebbles and gravel

Vegetation Vegetation Type (Mattiske 2007): 4
 Vegetation Sub-Association: *Acacia* aff. *aneura* (narrow fine veined; site 1259) Tall Sparse Shrubland over *Rhagodia eremaea* and **Vachellia farnesiana* Mid Sparse Shrubland over *Acacia synchronicia*, *Senna artemisioides* subsp. *oligophylla* and *Senna artemisioides* subsp. *helmsii* Low Sparse Shrubland over *Eragrostis xerophila* and **Cenchrus ciliaris* Mid Sparse Shrubland.

Veg Condition Good

Fire Age Young

Notes Aspect: N/A

Topography: Flats

Bare Ground: 85%

Litter Cover: <1% Logs, <1% Twigs, <1% Lvs

Disturbance: Grazing



A patch of open Mulga shrubland in a vast expanse of *Acacia synchronicia*. Not species rich.

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	15%	3.5 m	XB26.04	
<i>Acacia synchronicia</i>	+	0.6 m	XB16.14	
<i>Aristida contorta</i>	+	0.3 m	XB22.07	
<i>Boerhavia paludosa</i>	+	0.1 m	XB16.26	
<i>*Cenchrus ciliaris</i>	+	0.7 m	XBRH03.13	
<i>Chloris pectinata</i>	+	0.4 m	XB14.06	
<i>Cleome viscosa</i>	+	0.5 m	XB01.25	
<i>Corchorus tridens</i>	+	0.1 m	XB14.23	
<i>Dactyloctenium radulans</i>	+	0.3 m	XB16.02	
<i>Eragrostis xerophila</i>	+	0.5 m	XB22.04	
<i>Ipomoea muelleri</i>	+	cr	XB16.31	
<i>Neptunia dimorphantha</i>	out	0.1 m	XB22.06	
<i>Operculina aequisejala</i>	+	cr	XB16.18	
<i>*Portulaca oleracea</i>	+	0.05 m	XB16.07	
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	+	0.15 m	XB20.08	
<i>Rhagodia eremaea</i>	+	1.2 m	XB22.02	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.8 m	XB22.03	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.5 m	XB24.04	
<i>Solanum lasiophyllum</i>	+	0.5 m	XB10.12	
<i>Sporobolus australasicus</i>	+	0.4 m	XB16.03	
<i>Tephrosia</i> aff. <i>dementii</i> (9) (HD284-6)	+	0.15 m	XB22.05	Fl; orange
<i>*Vachellia farnesiana</i>	+	1.8 m	XBOPJM06	

Christmas Creek Site XBRH01

Described by Hayden Ajduk Date 19/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 802320 mE 7519194 mN

Habitat Base of hill slope

Soil Red brown loam with some pebbles

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 3
 Vegetation Sub-Association: *Corymbia hamersleyana* Low
 Isolated Trees over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3) Tall Sparse Shrubland over *Acacia synchronicia*, *Acacia pruinocarpa* and *Senna glutinosa* subsp. *glutinosa* Mid Sparse Shrubland over *Triodia longiceps* and *Triodia wiseana* Low Hummock Grassland.

Veg Condition Excellent

Fire Age Very old

Notes Aspect: North

Topography: Slight slope

Bare Ground: 30%

Litter Cover: 0% Logs, 2% Twigs, 3% Lvs

Disturbance: None



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	1%	2-3 m	XBRH01.05	
<i>Acacia bivenosa</i>	+	3 m	XBRH01.06	
<i>Acacia pruinocarpa</i>	5%	1.5 m	XB03.05	
<i>Acacia synchronicia</i>	4%	1.5-3 m	XBRH01.04	
* <i>Bidens bipinnata</i>	+	0.5 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XB07.25	
<i>Corymbia hamersleyana</i>	+	3.9 m	XB01.15	
<i>Dodonaea petiolaris</i>	+	1 m	XBRH01.08	
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26	
<i>Psydrax suaveolens</i>	+	1 m	NC	
<i>Pterocaulon sphacelatum</i>	+	0.05 m	XB07.23	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1%	1.5 m	XB01.03	
<i>Senna notabilis</i>	+	0.2 m	XB01.22	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	+	0.5 m	XBRH01.07	
<i>Triodia longiceps</i>	50%	0.4 m	XBRH01.01	
<i>Triodia wiseana</i>	10%	0.4 m	XBRH01.02	

Christmas Creek Site XBRH03

Described by Hayden Ajduk Date 20/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 796005 mE 7519490 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Acacia coriacea* subsp. *pendens*, *Melaleuca*
linophylla, *Melaleuca glomerata* Tall Sparse Shrubland over
Triodia longiceps Mid Isolated Hummock Grasses over
**Cenchrus ciliaris*, *Eriachne tenuiculmis* and *Themeda triandra*
 Mid Sparse Tussock Grassland.

Veg Condition Very good

Fire Age Old

Notes Aspect: North-east
 Topography: Creek bed
 Bare Ground: 80%
 Litter Cover: 0% Logs, 0% Twigs, 0% Lvs
 Disturbance: Weeds (buffel)



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3%	4 m	XB09.18	
<i>Acacia pyrifolia</i>	+	0.58 m	XB09.03	
<i>Acacia tetragonophylla</i>	+	2 m	XB07.01	
<i>Acacia trachycarpa</i>	+	0.8 m	XBRH03.03	
<i>Achyranthes aspera</i>	+	0.4 m	XBRH03.05	
<i>Amaranthus undulatus</i>	+	0.5 m	XB09.08	
<i>Ammannia baccifera</i>	+	0.3 m	XBRH03.04	
<i>*Argemone ochroleuca</i>	+	0.1 m	XBRH03.01	
<i>Atalaya hemiglauc</i>	+	2 m	XB07.07	
<i>*Bidens bipinnata</i>	+	0.4 m	XB60.21	
<i>*Cenchrus ciliaris</i>	20%	0.5 m	XB07.02	
<i>Cheilanthes austrotenuifolia</i>	+	0.05 m	XB07.22	
<i>*Citrullus colocynthis</i>	+	cr	XB09.21	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.3 m	XBRH03.09	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.05	
<i>Cullen leucanthum</i>	+	0.5 m	XBRH03.14	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eriachne tenuiculmis</i>	+	0.4 m	XBRH03.07	
<i>Eucalyptus victrix</i>	8%	6-10 m	XB09.16	
<i>Euphorbia alsiniflora</i>	+	0.2 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Gossypium robinsonii</i>	+	0.6 m	XBRH03.11	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	1.5 m	XB01.27	
<i>Hybanthus aurantiacus</i>	+	0.5 m	XB05.09	

<i>Melaleuca glomerata</i>	+	4 m	XBRH03.02
<i>Melaleuca linophylla</i>	1%	2.5 m	XB09.12
<i>Operculina aequiseppala</i>	+	cr	XB09.05
<i>Plumbago zeylanica</i>	+	0.4 m	XBRH03.08
<i>Pterocaulon</i> sp.	+	0.05 m	XBRH03.10
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	+	0.2 m	XB09.11
<i>Senna</i> sp.	+	2 m	XBRH03.06
<i>Sesbania cannabina</i>	+	2 m	XBRH03.05
<i>Themeda triandra</i>	+	0.5 m	XBRH08.06
<i>Triodia longiceps</i>	+	0.5 m	XBRH03.12

Christmas Creek Site XBRH04

Described by James Sansom Date 20/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 790835 mE 7520126 mN

Habitat Minor drainage line

Soil Skeletal soils

Rock Type Ironstone

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Isolated Trees over *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia pyrifolia* and *Acacia maitlandii* Mid Sparse Shrubland over *Triodia longiceps* Mid Sparse Hummock Grassland over **Cenchrus ciliaris*, *Themeda triandra* and *Amphipogon sericeus* (Newman form BR2-21) Mid Sparse Tussock Grassland.



Veg Condition Excellent

Fire Age Young

Notes Aspect:
 Topography: Drainage line
 Bare Ground: 70%
 Litter Cover: 5% Logs, 2% Twigs, <1% Lvs
 Disturbance: Weeds (buffel)

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	10%	2.5 m	XBRH04.04	
<i>Acacia maitlandii</i>	2%	1 m	XBRH04.02	
<i>Acacia pyrifolia</i>	2%	1.2 m	XB09.03	
<i>Acacia tetragonophylla</i>	+	1.5 m	XB07.01	
<i>Amphipogon sericeus</i> (Newman form BR2-21)	+	0.5 m	XB03.03	
<i>*Bidens bipinnata</i>	+	0.4 m	XB10.17	
<i>*Cenchrus ciliaris</i>	20%	0.6 m	XB07.02	
<i>*Citrullus colocynthis</i>	+	cr	XB09.21	
<i>Cleome viscosa</i>	+	0.5 m	XB01.25	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.05	
<i>Cyperus iria</i>	+	0.4 m	XBRH04.08	
<i>Dysphania rhadinostachya</i>	+	0.5 m	XB07.32	
<i>Eucalyptus victrix</i>	1%	5 m	XB09.16	
<i>Euphorbia alsiniflora</i>	+	0.3 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Goodenia nuda</i>	+	0.3 m	XBRH04.06	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	1 m	XB01.27	
<i>Hybanthus aurantiacus</i>	+	0.5 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	+	0.6 m	XBRH04.07	
<i>Operculina aequiseapala</i>	+	cr	XB09.05	
<i>Plumbago zeylanica</i>	+	0.2 m	XBRH03.08	
<i>Ptilotus obovatus</i>	+	0.4 m	XBRH04.09	
<i>Rulingia luteiflora</i>	+	0.3 m	XBRH04.05	
<i>Solanum sturtianum</i>	+	1.2 m	XBOPHA02	
<i>Tephrosia</i> sp.	+	0.6 m	XB09.26	

<i>Themeda triandra</i>	+	0.6 m	XBRH04.03
<i>Triodia longiceps</i>	20%	0.5 m	XBRH04.01

Christmas Creek Site XBRH08

Described by Hayden Ajduk Date 21/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 768157 mE 7523093 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* and *Corymbia candida* subsp. *candida* Mid Open Woodland over *Acacia pyrifolia*, *Acacia maitlandii* and *Gossypium robinsonii* Mid Sparse Shrubland over *Triodia longiceps* Mid Isolated Hummock Grasses over **Cenchrus ciliaris* Open Tussock Grassland.

Veg Condition Very good to good**Fire Age** Moderate

Notes Aspect: North
 Topography: Creek bed
 Bare Ground: 70%
 Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Cattle and weeds (buffel)

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia maitlandii</i>	+	1.5 m	XBR08.08	
<i>Acacia pyrifolia</i>	2%	2 m	XB09.03	
<i>Amaranthus interruptus</i>	+	0.2 m	XB07.16	
<i>Atalaya hemiglauc</i>	+	3 m	XBRH08.03	
<i>*Bidens bipinnata</i>	+	0.2 m	XB10.17	
<i>Boerhavia coccinea</i>	+	0.05 m	XBRH08.10	
<i>*Cenchrus ciliaris</i>	40%	0.5 m	XB07.02	
<i>Corchorus parviflorus</i>	+	0.5 m	XBRH03.09	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Corymbia candida</i> subsp. <i>candida</i>	+	7 m	XBRH08.01	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Duperreya commixta</i>	+	cr	XBRH08.08	
<i>Enneapogon lindleyanus</i>	+	0.3 m	XBRH08.07	
<i>Eriachne tenuiculmis</i>	+	0.3 m	XBRH03.07	
<i>Eucalyptus victrix</i>	2%	10 m	XB09.16	
<i>Goodenia nuda</i>	+	0.2 m	XBRH08.12	
<i>Gossypium robinsonii</i>	+	1.8 m	XB04.14	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	3 m	XB01.27	
<i>Hybanthus aurantiacus</i>	+	0.3 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	+	0.5 m	XBRH08.04	
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.4 m	XBRH08.09	
<i>*Portulaca oleracea</i>	+	cr	XB07.09	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14	
<i>Tephrosia rosea</i> var. <i>glabrior</i>	+	0.5 m	XBRH08.02	

<i>Themeda triandra</i>	+	0.5 m	XBRH08.06
<i>Triodia longiceps</i>	+	0.4 m	XBRH08.05
<i>Unknown</i>	+	0.5 m	XBRH08.13

Christmas Creek Site XBRH09

Described by Hayden Ajduk Date 21/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 760745 mE 7524834 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 4

Vegetation Sub-Association: *Corymbia candida* subsp. *dipsodes* and *Corymbia hamersleyana* Low Open Woodland over *Acacia tetragonophylla*, *Atalaya hemiglauc*, *Acacia* aff. *aneura* (long, flat, recurved; FMR 35.3), *Acacia tumida* var. *pilbarensis* and *Acacia aneura* var. *intermedia* Tall Sparse Shrubland over *Acacia pyrifolia*, *Petalostylis labicheoides*, *Indigofera monophylla* (PAN57-9), *Eremophila longifolia* and *Eremophila forrestii* subsp. *forrestii* Mid Sparse Shrubland over *Tephrosia rosea* var. *glabrior* and *Senna glutinosa* subsp. *glutinosa* Low Sparse Shrubland over *Triodia longiceps* Low Sparse Hummock Grassland over **Cenchrus ciliaris*, *Cymbopogon ambiguus*, *Themeda triandra* Mid Sparse Tussock Grassland.



Veg Condition Very good to Good

Fire Age Moderate

Notes Aspect: South-west
Topography: Creek bed
Bare Ground: 60%
Litter Cover: 1% Logs, 1% Twigs, <1% Lvs
Disturbance: Weeds (buffel)

SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	+	6 m	XBRH09.01	
<i>Acacia aneura</i> var. <i>intermedia</i>	+	4 m	XBRH09.08	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	1.5 m	XBRH09.11	
<i>Acacia pyrifolia</i>	3%	1.5 m	XB09.03	
<i>Acacia tetragonophylla</i>	1%	3 m	XB07.01	
<i>Acacia tumida</i> var. <i>pilbarensis</i>	+	4 m	XBRH09.05	
<i>Amaranthus interruptus</i>	+	0.4 m	XB07.16	
<i>Atalaya hemiglauc</i>	+	6 m	XBRH08.03	
<i>*Bidens bipinnata</i>	+	0.1 m	XB10.17	
<i>*Cenchrus ciliaris</i>	30%	0.5 m	XB07.02	
<i>Cleome viscosa</i>	+	0.3 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.4 m	XBRH03.09	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Corymbia candida</i> subsp. <i>dipsodes</i>	4%	5-10 m	XBRH08.01	
<i>Corymbia hamersleyana</i>	2%	5-10 m	XBRH09.04	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cymbopogon ambiguus</i>	+	1 m	XBRH09.03	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1 m	XBRH09.09	
<i>Eremophila longifolia</i>	+	1 m	XBRH09.07	
<i>Hybanthus aurantiacus</i>	+	0.5 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	+	1.2 m	XBRH09.06	

<i>Jasminum didymum</i> subsp. <i>lineare</i>	+	cr	XB01.26
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.2 m	XBRH08.09
<i>Petalostylis labicheoides</i>	+	2 m	XBRH09.02
<i>Pterocaulon sphacelatum</i>	+	0.05 m	XB07.23
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.1 m	XB07.18
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	0.9 m	XB01.03
<i>Tephrosia rosea</i> var. <i>glabrior</i>	1%	0.6 m	XBRH08.02
<i>Themeda triandra</i>	+	0.5 m	XBRH08.06
<i>Triodia longiceps</i>	1%	0.4 m	XBRH09.10

Christmas Creek Site XBRH10

Described by Hayden Ajduk Date 22/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 760359 mE 7525666 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* Low Open
 Woodland over *Acacia trachycarpa* and *Atalaya hemiglauc*
 Tall Sparse Shrubland over *Acacia pyrifolia*, *Acacia coriacea*
 subsp. *pendens* and *Gossypium robinsonii* Mid Sparse
 Shrubland over **Cenchrus ciliaris* Mid Sparse Shrubland.

Notes Aspect: North-east
 Topography: Creek bed
 Bare Ground: 90%
 Litter Cover: <1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Weeds (buffel)



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	2 m	XBRH09.11	
<i>Acacia pyrifolia</i>	1%	1.5 m	XB09.03	
<i>Acacia trachycarpa</i>	4%	3 m	XBOPHA04	
<i>Amaranthus interruptus</i>	+	0.4 m	XB07.16	
<i>*Argemone ochroleuca</i>	+	0.03 m	XBRH03.01	
<i>Atalaya hemiglauc</i>	+	2.8 m	XBRH08.03	
<i>*Cenchrus ciliaris</i>	20%	0.5 m	XB07.02	
<i>Cheilanthes austrotenuifolia</i>	+	cr	XB07.22	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Convolvulus</i> sp.	+	cr	XBRH10.03	
<i>Cyperus vaginatus</i>	+	1 m	XBRH10.06	
<i>Dactyloctenium radulans</i>	+	0.1 m	XBRH10.05	
<i>Eucalyptus victrix</i>	8%	15 m	XB09.16	
<i>Euphorbia alsiniflora</i>	+	0.1 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Gossypium robinsonii</i>	+	1.5 m	XB04.14	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB05.09	
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+	0.05 m	XBRH10.02	
<i>Polymeria</i> aff. <i>ambigua</i> (MET 12, 302)	+	Cr	XBRH10.07	
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14	
<i>Salsola tragus</i> subsp. <i>tragus</i>	+	0.2 m	XB07.18	
<i>Sesbania cannabina</i>	+	0.2 m	XBRH10.04	
<i>Tephrosia</i> sp.	+	0.4 m	XB09.26	
<i>Tephrosia supina</i>	+	0.6 m	XBR08.03	

Christmas Creek Site XBRH11

Described by Hayden Ajduk Date 22/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 763886 mE 7525611 mN

Habitat Creek bed

Soil Skeletal soil over shallow rock

Rock Type Mixed and ironstone

Vegetation Vegetation Type (Mattiske 2007): 1

Vegetation Sub-Association: *Eucalyptus victrix* Low Open Woodland over *Acacia maitlandii* and *Acacia coriacea* subsp. *pendens* Tall Sparse Shrubland over *Acacia cowleana* and *Gossypium robinsonii* Mid Sparse Shrubland over *Indigofera monophylla* (PAN57-9), *Senna notabilis* and *Corchorus parviflorus* Low Sparse Shrubland over **Cenchrus ciliaris*, *Amphipogon sericeus* (Newman form BR2-21) and *Themeda triandra* Mid Sparse Tussock Grassland.

Veg Condition Very good

Fire Age Moderate

Notes Aspect: North-east
Topography: Creek bed
Bare Ground: 80%
Litter Cover: 1% Logs, <1% Twigs, <1% Lvs
Disturbance: Weeds (buffel), nearby rail lines



SPECIES LIST:

Name	Cover	Height	Specimen	Notes
<i>Abutilon</i> aff. <i>lepidum</i> (4)	+	0.3 m	XBRH11.05	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	5 m	XB09.18	
<i>Acacia cowleana</i>	2%	2 m	XB03.10	
<i>Acacia maitlandii</i>	4%	2.5 m	XBRH08.03	
<i>Amaranthus interruptus</i>	+	0.5 m	XB07.16	
<i>Amphipogon sericeus</i> (Newman form BR2-21)	3%	0.6 m	XB03.03	
<i>*Bidens bipinnata</i>	+	0.5 m	XB10.17	
<i>Bulbostylis barbata</i>	+	0.1 m	XBRH11.10	
<i>*Cenchrus ciliaris</i>	15%	0.4 m	XB07.02	
<i>Cleome viscosa</i>	+	0.4 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.6 m	XBRH03.09	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Cyperus iria</i>	+	0.05 m	XBRH11.09	
<i>Dysphania rhadinostachya</i>	+	0.05 m	XB07.32	
<i>Eucalyptus victrix</i>	1%	5-7 m	XB09.16	
<i>Euphorbia alsiniflora</i>	+	0.03 m	XB07.31	Previously <i>E. coghlanii</i>
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	0.4 m	XBRH11.03	
<i>Gossypium robinsonii</i>	+	1.8 m	XB04.14	
<i>Hybanthus aurantiacus</i>	+	0.5 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	1%	0.6 m	XBRH11.04	
<i>Leptopus decaisnei</i> var. <i>orbicularis</i>	+	0.4 m	XBRH08.09	
<i>Paspalidium clementii</i>	+	0.1 m	XB05.16	

<i>Perotis rara</i>	+	0.05 m	XBRH11.06
<i>*Portulaca oleracea</i>	+	cr	XB07.09
<i>Pterocaulon sphacelatum</i>	+	0.5 m	XBRH11.07
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.05 m	XB01.14
<i>Senna notabilis</i>	+	0.3 m	XB01.22
<i>Stemodia grossa</i>	+	0.05 m	XBRH11.08
<i>Themeda triandra</i>	+	0.6 m	XBRH11.02
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+	0.05 m	XB05.14

Christmas Creek Site XBRH12

Described by Hayden Ajduk Date 22/03/2011

Type Relevé

Location Christmas Creek

MGA Zone 50 768313 mE 7525397 mN

Habitat Creek bed

Soil Skeletal soils

Rock Type Mixed

Vegetation Vegetation Type (Mattiske 2007): 1
 Vegetation Sub-Association: *Eucalyptus victrix* and *Corymbia hamersleyana* Low Open Woodland over *Acacia pyrifolia*, *Acacia maitlandii* and *Gossypium robinsonii* Mid Sparse Shrubland over *Triodia epactia/pungens* Low Isolated Hummock Grasses over **Cenchrus ciliaris* and *Themeda triandra* Open Tussock Grassland.

Veg Condition Very good to good**Fire Age** Moderate

Notes Aspect: North-east
 Topography: Creek bed
 Bare Ground: 60%
 Litter Cover: 1% Logs, <1% Twigs, <1% Lvs
 Disturbance: Weeds (buffel)

**SPECIES LIST:**

Name	Cover	Height	Specimen	Notes
<i>Acacia acradenia</i>	+	0.9 m	XBRH12.01	
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	+	0.8 m	XBRH12.05	
<i>Acacia maitlandii</i>	1%	1 m	XBRH08.08	
<i>Acacia monticola</i>	+	2.5 m	XBRH12.04	
<i>Acacia pruinocarpa</i>	+	1.5 m	XB03.05	
<i>Acacia pyrifolia</i>	2%	2 m	XB09.03	
<i>Amaranthus undulatus</i>	+	0.9 m	XB09.08	
<i>Atalaya hemiglauc</i>	+	1.5 m	XB07.07	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+	0.02 m	XB01.13	
<i>Bulbostylis barbata</i>	+	0.05 m	XBRH11.10	
<i>*Cenchrus ciliaris</i>	40%	0.5 m	XB07.02	
<i>Cleome viscosa</i>	+	0.5 m	XB01.25	
<i>Corchorus parviflorus</i>	+	0.5 m	XBRH03.09	
<i>Corchorus tridens</i>	+	cr	XBRH08.11	
<i>Corymbia hamersleyana</i>	+	3 m	XB01.15	
<i>Cucumis maderaspatanus</i>	+	cr	XB07.10	
<i>Eriachne tenuiculmis</i>	+	0.5 m	XBRH03.07	
<i>Eucalyptus victrix</i>	1%	10 m	XB09.16	
<i>Goodenia nuda</i>	+	0.4 m	XBRH12.03	
<i>Gossypium robinsonii</i>	1%	1.6 m	XB04.14	
<i>Hybanthus aurantiacus</i>	+	0.4 m	XB05.09	
<i>Indigofera monophylla</i> (PAN57-9)	+	0.6 m	XBRH11.04	
<i>Opeculina aequisejala</i>	+	cr	XB09.05	
<i>Phyllanthus maderaspatensis</i>	+	0.2 m	XBRH12.08	

<i>Pterocaulon sphacelatum</i>	+	0.05 m	XB07.23
<i>Ptilotus astrolasius</i> var. <i>astrolasius</i>	+	0.3 m	XBRH12.06
<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	+	0.1 m	XBRH12.10
<i>Rulingia luteiflora</i>	+	0.4 m	XBRH12.09
<i>Tephrosia</i> sp.	+	0.6 m	XB09.26
<i>Themeda triandra</i>	+	0.6 m	XBRH12.02
<i>Triodia epactia/pungens</i>	+		XBRH12.07 Sterile

Fortescue Marsh Site FMA01

Described by Julia Mattner Date 26/04/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 762720 mE 7518115mN
Habitat Plain - Lower marsh
Soil Brown/yellow sandy clay
Rock Type 20-50% cover of 6-60 mm pebbles
Vegetation *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia globulifera* and *Tecticornia indica* subsp. *bidens* low open heath over *Mimulus repens* and **Heliotropium europaeum* scattered herbs with *Cyperus bulbosus* scattered sedges
Veg Condition Very good
Fire Age Very old
Notes Disturbances: cattle tracks
 Runoff rate: Slow
 Inundated at lower edge of relevé

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Cyperus bulbosus</i>	+	0.3 m	FMA01.05
<i>Heliotropium europaeum</i>	+	0.01 m	FMA01.07
<i>Mimulus repens</i>	3	0.2 m	FMA01.04
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA01.06
<i>Tecticornia globulifera</i>	5	0.8 m	FMA01.03
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.9 m	FMA01.01
<i>Tecticornia medusa</i>	+	0.2 m	FMA01.08
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	25	0.3 m	FMA01.02

Fortescue Marsh Site FMA02

Described by Julia Mattner Date 26/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 762660 mE 7518476mN
Habitat Slight depression - very moist
Soil Grey-brown saline clay
Rock Type Very few 2-20 mm pebbles
Vegetation *Melaleuca glomerata* scattered low trees over *Tecticornia auriculata* and *Muehlenbeckia florulenta* open shrubland over *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) and *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low open heath over *Mimulus repens*, *Nicotiana heterantha*, *Swainsona kingii* and **Heliotropium europaeum* scattered herbs

Veg Condition Very good**Fire Age** Very old

Notes Aspect: N/A
 Bare ground: 8%
 Litter cover: +% logs, +% twigs, +% leaves
 Disturbance: cattle tracks
 Depression ringed by *Muehlenbeckia* open heath and *Nicotiana* herbland

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Heliotropium europaeum</i>	+	0.01 m	FMA01.07
<i>Melaleuca glomerata</i>	+	3 m	FMA04.01
<i>Mimulus repens</i>	+	0.2 m	FMA01.04
<i>Muehlenbeckia florulenta</i>	+	1.2 m	FMA01.06
<i>Nicotiana heterantha</i>	+	0.6 m	FMA02.04
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	2	1.2 m	FMA02.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)		550.8 m	FMA02.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)		10.4 m	FMA02.03

Fortescue Marsh Site FMA03

Described by Julia Mattner Date 26/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 762702 mE 7518544 mN
Habitat Slightly raised plain - mid marsh
Soil Light brown fine sandy clay with a saline crust
Rock Type Common 6-60 mm pebbles
Vegetation *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English 552), *Tecticornia indica* subsp. *bidens*, *Muehlenbeckia florulenta* and *Eremophila spongicarpa* low open heath over *Eragrostis pergracilis*, *Dactyloctenium radulans*, **Cenchrus ciliaris* and *Enneapogon polyphyllus* open tussock grassland over *Cyperus bulbosus* scattered sedges with *Nicotiana heterantha* and *Gnephosis arachnoidea* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: W
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.5 m	NC
<i>Cyperus bulbosus</i>	+	0.3 m	FMA01.05
<i>Dactyloctenium radulans</i>	+	0.1 m	NC
<i>Dysphania plantaginella</i>	+	0.1 m	FMA03.04
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA03.06
<i>Eragrostis pergracilis</i>	25	0.2 m	FMA03.05
<i>Eremophila spongicarpa</i>	+	0.8 m	FMA03.03
<i>Gnephosis arachnoidea</i>	+	0.1 m	FMA03.07
<i>Muehlenbeckia florulenta</i>	1	0.8 m	FMA01.06
<i>Nicotiana heterantha</i>	+	0.6 m	FMA02.04
<i>Tecticornia indica</i> subsp. <i>bidens</i>	4	0.5 m	FMA03.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	30	0.6 m	FMA03.01

Fortescue Marsh Site FMA04

Described by Julia Mattner Date 26/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 762752 mE 7518754 mN
Habitat Drainage line - mid-marsh
Soil Red-brown sandy loam
Rock Type Very few 2-6 mm small pebbles
Vegetation *Melaleuca glomerata* high shrubland over *Tecticornia indica* subsp. *bidens*, *Scaevola spinescens* and *Eremophila youngii* subsp. *lepidota* open heath over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiorcarpa* and *Muehlenbeckia florulenta* low open heath over mixed tussock grasses with *Pluchea rubelliflora* and *Pluchea dunlopia* very open herbs

**Veg Condition** Good**Fire Age** Very old

Notes Aspect: S
 Runoff rate: moderately rapid
 Disturbances: grazing, weeds, some accelerated erosion
 Litter cover: +%logs, 1% twigs, 1% leaves

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	2.5 m	FMA04.10
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
* <i>Cenchrus ciliaris</i>	+	0.6 m	NC
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	FMA04.27
<i>Cullen cinereum</i>	+	0.7 m	FMA04.20
<i>Cyperus iria</i>	+	0.4 m	FMA04.19
<i>Dactyloctenium radulans</i>	+	0.2 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8 m	FMA04.12
<i>Enteropogon ramosus</i>	+	0.5 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.3 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.8 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.9 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	1.5 m	FMA04.14
<i>Heliotropium europaeum</i>	+	0.01 m	FMA01.07
* <i>Malvastrum americanum</i>	+	0.6 m	FMA04.21
<i>Melaleuca glomerata</i>	12	4 m	FMA04.01
<i>Muehlenbeckia florulenta</i>	+	0.7 m	FMA01.06
<i>Nicotiana heterantha</i>	1	0.8 m	FMA02.04
<i>Pluchea dunlopia</i>	+	0.7 m	FMA04.05
<i>Pluchea rubelliflora</i>	2	0.8 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.7 m	FMA04.15
<i>Scaevola spinescens</i>	+	1.2 m	FMA04.11
<i>Sporobolus virginicus</i>	2	0.6 m	FMA04.03
<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Swainsona kingii</i>	+	0.5 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.8 m	FMA04.24

<i>Tecticornia indica subsp. bidens</i>	80	1.2 m	FMA04.13
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.6 m	FMA04.25
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.9 m	FMA04.17

Fortescue Marsh Site FMA05

Described by Julia Mattner Date 26/04/2012

Type Quadrat 70 x 35 m

Location Northern Fortescue Marsh margin
MGA Zone 50 762823 mE 7518878mN
Habitat Gently inclined plain - upper marsh margin
Soil Red-brown sandy-clayey loam
Rock Type Abundant 6-60 mm pebbles
Vegetation *Tecticornia* sp. (sterile), *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiorcarpa* and *Maireana amoena* low open heath over *Dactyloctenium radulans* and *Eragrostis pergracilis* scattered tussock grasses with *Trianthema triquetra* and *Pterocaulon sphaeranthoides* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: W
 Disturbances: cattle and horse grazing
 Litter cover: 0% logs, +% twigs, +% leaves

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4 m	FMA04.12
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	0.8 m	FMA03.03
<i>Maireana amoena</i>	+	0.2 m	FMA05.01
<i>Maireana luehmannii</i>	+	0.2 m	FMA05.04
<i>Maireana triptera</i>	+	0.2 m	FMA05.03
<i>Pluchea rubelliflora</i>	+	0.2 m	FMA04.04
* <i>Portulaca oleracea</i>	+	0.05 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.2 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.1 m	NC
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20	0.7 m	FMA05.09
<i>Tecticornia</i> sp. (sterile)	20	0.5 m	FMA05.08
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.5 m	FMA05.07
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA06

Described by Julia Mattner Date 26/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 766328 mE 7519170mN
Habitat Upper fringe of marsh
Soil Red-brown silty clay
Rock Type Common 6-20 mm medium pebbles
Vegetation *Acacia synchronicia* scattered tall shrubs over *Tecticornia indica* subsp. *bidens* and *Eremophila spongiorcarpa* low open heath over *Chloris pectinata*, *Enteropogon ramosus*, *Eragrostis pergracilis*, *Panicum decompositum* and *Sporobolus australasicus* very open tussock grassland with *Pterocaulon sphaeranthoides*, *Pluchea dunlopilii*, *Stemodia grossa* and *Streptoglossa bubakii* very open herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: SW
 Disturbances: cattle tracks
 Bare ground: 30%
 Litter cover: 0% logs, +% twigs, +% leaves

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	2.4 m	FMA04.10
<i>Aristida contorta</i>	+	0.3 m	FMA06.05
* <i>Cenchrus ciliaris</i>	+	0.4 m	NC
<i>Chloris pectinata</i>	1	0.3 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caeruleus</i>	+	0.3 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA06.03
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis desertorum</i>	+	0.4 m	FMA06.02
<i>Eragrostis elongata</i>	+	0.2 m	FMA06.14
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.3 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	8	0.9 m	FMA03.03
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+	0.1 m	FMA06.20
<i>Gomphrena kanisii</i>	+	0.2 m	FMA06.19
<i>Hibiscus sturtii</i> var. <i>platyphlamys</i>	+	0.2 m	FMA06.18
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Lseilema vaginiflorum</i>	+	0.1 m	FMA06.22
<i>Maireana integra</i>	+	0.2 m	FMA06.23
<i>Nicotiana heterantha</i>	+	0.1 m	FMA02.04
<i>Panicum decompositum</i>	+	0.4 m	FMA06.15
<i>Pluchea dunlopilii</i>	+	0.4 m	FMA04.05
<i>Pluchea rubelliflora</i>	+	0.3 m	FMA04.04
* <i>Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.4 m	FMA04.15
<i>Sclerolaena cuneata</i>	+	0.1 m	FMA06.10
<i>Sclerolaena diacantha</i>	+	0.1 m	FMA06.11
<i>Sida fibulifera</i>	+	0.1 m	FMA06.13

<i>Solanum sturtianum</i>	+	0.4 m	FMA06.06
<i>Sporobolus australasicus</i>	+	0.2 m	FMA06.01
<i>Stemodia grossa</i>	+	0.2 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	50	0.6 m	FMA06.21
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>Triraphis mollis</i>	+	0.2 m	FMA06.17
<i>Xerochloa laniflora</i>	+	0.2 m	FMA06.07

Fortescue Marsh **Site** FMA07

Described by Julia Mattner **Date** 27/04/2012 **Type** Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 766230 mE 7516660mN

Habitat Plain - lower-marsh

Soil Red-brown wet clay

Vegetation *Muehlenbeckia florulenta* shrubland over
Tecticornia indica subsp. *bidens* low open shrubland over
Mimulus repens, *Nicotiana heterantha* and *Swainsona*
kingii herbs

Veg Condition Very good



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Mimulus repens</i>	35	0.2 m	FMA01.04
<i>Muehlenbeckia florulenta</i>	50	1.4 m	FMA08.03
<i>Nicotiana heterantha</i>	3	1.1 m	FMA02.04
<i>Swainsona kingii</i>	1	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	5	0.9 m	FMA07.01

Fortescue Marsh Site FMA08

Described by Julia Mattner Date 27/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 766306 mE 7516913mN
Habitat Lower marsh
Soil Red-brown moist clay (saline)
Rock Type None
Vegetation *Muehlenbeckia florulenta* shrubland over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia* sp. (sterile) and *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) low open shrubland over *Eragrostis pergracilis* scattered tussock grassland over *Cyperus bulbosus* scattered sedges with *Nicotiana heterantha*, *Swainsona kingii* and *Lawrencia densiflora* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: S
 Disturbances: Cattle tracks and grazing
 Litter cover: 0% logs, +% twigs, +% leaves

SPECIES LIST:

Name	Cover	Height	Specimen	
<i>Cyperus bulbosus</i>			+	0.2 m FMA01.05
<i>Eragrostis pergracilis</i>			1	0.2 m FMA03.05
<i>Lawrencia densiflora</i>			+	0.1 m FMA08.06
<i>Muehlenbeckia florulenta</i>			35	1.5 m FMA08.03
<i>Nicotiana heterantha</i>			1	1.2 m FMA02.04
<i>Pluchea rubelliflora</i>			+	0.1 m FMA08.04
<i>Swainsona kingii</i>			+	0.2 m FMA02.05
<i>Tecticornia</i> sp. (sterile)			3	0.5 m FMA08.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)			1	0.5 m FMA08.05
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)			10	0.6 m FMA08.01

Fortescue Marsh Site FMA09

Described by Julia Mattner Date 27/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 766317 mE 7517137 mN

Habitat Plain - mid-marsh

Soil Red-brown clay

Rock Type None

Vegetation *Tecticornia auriculata* scattered shrubs over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Muehlenbeckia florulenta* low open heath over *Eragrostis pergracilis* tussock grassland with *Cyperus bulbosus* scattered sedges

Veg Condition Very good

Fire Age Very old

Notes Disturbances: some cattle grazing/trampling
Litter cover: +% logs, +% twigs, +% leaves

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Eragrostis pergracilis</i>	65	0.1 m	FMA03.05
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA08.03
<i>Tecticornia auriculata</i>	+	1.1 m	FMA09.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	35	0.7 m	FMA09.01

Fortescue Marsh Site FMA10

Described by Julia Mattner Date 27/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 766322 mE 7517840mN

Habitat Saline clay flat - mid-marsh

Soil Red-brown clay

Rock Type None

Vegetation *Tecticornia auriculata* closed heath over
Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS
552) low scattered shrubs over *Eragrostis pergracilis* tussock
grassland over *Swainsona kingii* and *Nicotiana heterantha* very
open herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A
Disturbance: cattle tracks
Bare ground: 40%
Litter cover: 0% logs, +% twigs, +% leaves



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Eragrostis pergracilis</i>	50	0.2 m	FMA03.05
<i>Nicotiana heterantha</i>	+	0.5 m	FMA02.04
<i>Swainsona kingii</i>	3	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	75	1.4 m	FMA10.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA10.02

Fortescue Marsh Site FMA11

Described by Julia Mattner Date 27/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 766280 mE 7518110mN

Habitat Plain - mid-marsh

Soil Red-brown loamy clay

Rock Type None

Vegetation *Tecticornia auriculata* open scrub over *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) and *Muehlenbeckia florulenta* low closed heath over *Eragrostis tenellula* scattered tussock grass with *Nicotiana heterantha*, *Cullen cinereum* and *Pterocaulon sphaeranthoides* open herbs

Veg Condition Excellent

Fire Age Very old

Notes Aspect: N/A

Bare ground: 3%

Litter cover: 0% logs, +% twigs, 1% leaves

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Cressa australis</i>	+	0.5 m	FMA11.03
<i>Cullen cinereum</i>	15	0.6 m	FMA04.20
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.5 m	FMA04.09
<i>Maireana luehmannii</i>	+	0.4 m	FMA12.04
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA08.03
<i>Nicotiana heterantha</i>	2	0.4 m	FMA02.04
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Tecticornia auriculata</i>	2	1.2 m	FMA11.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	80	0.9 m	FMA11.01

Fortescue Marsh Site FMA12

Described by Julia Mattner Date 27/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 766274 mE 7518244 mN

Habitat Plain

Soil Red-brown clay (surface flakes)

Rock Type None

Vegetation *Eremophila spongiorcarpa* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) low closed heath over *Triraphis mollis*, *Chloris pectinata*, *Enteropogon ramosus*, *Enneapogon polyphyllus* and *Enneapogon caerulescens* scattered tussock grasses with *Pterocaulon sphaeranthoides*, *Pluchea dunlopia*, *Pluchea rubelliflora*, *Nicotiana heterantha* and *Swainsona kingii* very open herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A
Disturbances: cattle tracks
Bare ground: 90%
Litter cover: 0% logs, +% twigs, +% leaves

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Amaranthus undulatus</i>	+	0.3 m	FMA12.03
<i>Atriplex flabelliformis</i>	+	0.3 m	FMA12.05
* <i>Cenchrus setiger</i>	+	0.4 m	NC
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Enneapogon caerulescens</i>	+	0.1 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	1.2 m	FMA03.03
<i>Maireana luehmannii</i>	+	0.3 m	FMA12.04
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA08.03
<i>Nicotiana heterantha</i>	2	0.7 m	FMA02.04
<i>Pluchea dunlopia</i>	+	0.2 m	FMA04.05
<i>Pluchea rubelliflora</i>	1	0.7 m	FMA04.04
* <i>Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Pterocaulon sphaeranthoides</i>	5	0.8 m	FMA04.15
<i>Setaria dielsii</i>	+	0.6 m	FMA12.07
<i>Stemodia grossa</i>	+	0.5 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.3 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	80	0.5 m	FMA12.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	0.5 m	FMA12.06
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.4 m	FMA12.01
<i>Triraphis mollis</i>	+	0.3 m	FMA06.17

Fortescue Marsh Site FMA13

Described by Julia Mattner Date 27/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 766250 mE 7518915mN
Habitat Very low rise
Soil Red-brown sandy clay
Rock Type Calcrete; 2-10% outcropping, many 2-6 mm small pebbles and few 20-60 mm large pebbles
Vegetation *Eremophila spongiorcarpa* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Maireana integra*, *Solanum lasiophyllum*, *Solanum horridum* and *Sclerolaena cornishiana* low shrubland over *Eragrostis pergracilis*, *Chloris pectinata*, *Enneapogon polyphyllus*, **Cenchrus ciliaris* and *Dactyloctenium radulans* tussock grassland with *Pterocaulon sphaeranthoides*, *Stemodia grossa*, *Nicotiana heterantha*, *Gomphrena kanisii* and *Lawrenia densiflora* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: W
 Disturbance: minor weed infestation
 Bare ground: 60%
 Litter cover: 0% logs, +% twigs, +% leaves
 Runoff rate: slow

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aristida contorta</i>	+	0.4 m	FMA06.05
<i>*Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Cullen cinereum</i>	+	0.3 m	FMA04.20
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA03.06
<i>Eragrostis pergracilis</i>	35	0.2 m	FMA03.05
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.5 m	FMA13.13
<i>Eremophila spongiorcarpa</i>	1	1.1 m	FMA03.03
<i>Euphorbia australis</i>	+	0.1 m	FMA13.02
<i>*Flaveria trinervia</i>	+	0.3 m	FMA13.07
<i>Gomphrena kanisii</i>	+	0.1 m	FMA06.19
<i>Goodenia forrestii</i>	+	0.3 m	FMA13.01
<i>Ipomoea coptica</i>	+	cr	FMA13.03
<i>Lawrenia densiflora</i>	+	0.2 m	FMA08.06
<i>Maireana integra</i>	+	0.9 m	FMA13.09
<i>Nicotiana heterantha</i>	+	0.6 m	FMA02.04
<i>Pluchea rubelliflora</i>	+	0.3 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.2 m	NC
<i>Sclerolaena cornishiana</i>	+	0.3 m	FMA13.04
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.6 m	FMA13.14
<i>Sida fibulifera</i>	+	0.15 m	FMA13.11
<i>Solanum horridum</i>	+	0.5 m	FMA13.08
<i>Solanum lasiophyllum</i>	+	0.6 m	FMA13.10

<i>Stemodia grossa</i>	+	0.6 m	FMA04.06
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20	0.5 m	FMA13.05
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA14

Described by Julia Mattner Date 28/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 768037 mE 7517500mN

Habitat Plain - lower marsh

Soil Brown fine sand (thin salt crust)

Rock Type None

Vegetation *Tecticornia indica* subsp. *bidens* and *Muellerolimon salicorniaceum* low shrubland over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) low open heath over *Eragrostis pergracilis* and *Paraneurachne muelleri* very open tussock grassland with *Nicotiana heterantha*, *Frankenia ambita* and *Gnephosis arachnoidea* scattered herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: S
Disturbances: cattle grazing and trampling



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Eragrostis pergracilis</i>	3	0.2 m	FMA03.05
<i>Frankenia ambita</i>	+	0.1 m	FMA14.06
<i>Gnephosis arachnoidea</i>	+	0.05 m	FMA14.03
<i>Heliotropium europaeum</i>	+	0.01 m	FMA01.07
<i>Lawrenzia densiflora</i>	+	0.1 m	FMA08.06
<i>Muellerolimon salicorniaceum</i>	1	1.5 m	FMA15.06
<i>Nicotiana heterantha</i>	+	0.8 m	FMA02.04
<i>Sporobolus virginicus</i>	+	0.4 m	FMA14.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	10	1.2 m	FMA14.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	2	0.5 m	FMA14.04
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	35	0.8 m	FMA14.01
<i>Typha domingensis</i>	+	0.1 m	NC

Fortescue Marsh Site FMA15

Described by Julia Mattner Date 28/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 767980 mE 7517718mN
Habitat Plain - mid marsh
Soil Red-brown fine sandy clay (thin salt crust)
Rock Type Limestone; very few 2-20 mm pebbles
Vegetation *Muellerolimon salicorniaceum* scattered shrubs over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS106) and *Samolus repens* var. *floribundus* low open heath over *Eragrostis pergracilis* and **Cenchrus ciliaris* scattered tussock grasses with *Nicotiana heterantha*, *Swainsona kingii*, *Angianthus tomentosus* and *Streptoglossa bubakii* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: South
 Disturbances: some trampling from cattle, weeds

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Aerva javanica</i>	+	0.7 m	NC
<i>Angianthus tomentosus</i>	+	0.1 m	FMA15.03
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>Cyperus bulbosus</i>	+	0.3 m	FMA01.05
<i>Eragrostis pergracilis</i>	1	0.2 m	FMA03.05
<i>*Flaveria trinervia</i>	+	0.4 m	FMA13.07
<i>Frankenia ambita</i>	+	0.1 m	FMA15.02
<i>Lawrencina densiflora</i>	+	0.1 m	FMA08.06
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Muellerolimon salicorniaceum</i>	+	1.1 m	FMA15.06
<i>Nicotiana heterantha</i>	+	0.6 m	FMA02.04
<i>Pterocaulon sphaeranthoides</i>	+	0.4 m	FMA04.15
<i>Samolus repens</i> var. <i>floribundus</i>	1	0.4 m	FMA15.05
<i>Solanum lasiophyllum</i>	+	0.6 m	FMA13.10
<i>Streptoglossa bubakii</i>	+	0.1 m	FMA06.12
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	10	0.9 m	FMA15.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	0.4 m	FMA15.04
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	30	0.6 m	FMA14.01

Fortescue Marsh Site FMA16

Described by Julia Mattner Date 28/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 768227 mE 7517734 mN

Habitat Low rise/crest

Soil Brown silty clay

Rock Type Calcrete; abundant 2-6 mm small pebbles, few 6-20 mm medium pebbles

Vegetation *Acacia xiphophylla* and *Acacia tetragonophylla* high shrubland over *Eremophila forrestii* subsp. *forrestii*, *Eremophila spongiorcarpa*, *Maireana pyramidata*, *Ptilotus obovatus* and *Senna glaucifolia* open shrubland over *Sclerolaena cornishiana*, *Solanum lasiophyllum*, *Sida fibulifera*, *Abutilon lepidum* and *Rhagodia eremaea* low open shrubland over *Eragrostis desertorum*, *Enneapogon caeruleus*, *Enneapogon polyphyllus*, *Eragrostis pergracilis* and **Cenchrus ciliaris* very open tussock grassland with *Streptoglossa odora*, *Sclerolaena cornishiana*, *Stemodia grossa*, *Cleome viscosa* and *Goodenia forrestii* very open herbs



Veg Condition Very good

Fire Age Very old

Notes Bare ground: 75%
Litter cover: +% logs, +% twigs, 1% leaves
Disturbances: cattle, very minor weed infestation

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon fraseri</i>	+	0.4 m	FMA16.12
<i>Abutilon lepidum</i>	+	0.4 m	FMA16.12a
<i>Acacia synchronicia</i>	+	1.2 m	FMA04.10
<i>Acacia tetragonophylla</i>	1	2.5 m	FMA16.13
<i>Acacia xiphophylla</i>	20	4 m	FMA16.08
<i>Aristida contorta</i>	+	0.3 m	FMA06.05
<i>Boerhavia repleta</i>	+	0.1 m	FMA16.17
<i>*Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Cleome viscosa</i>	+	0.3 m	FMA16.09
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.4 m	FMA04.12
<i>Enneapogon caeruleus</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis desertorum</i>	2	0.4 m	FMA16.05
<i>Eragrostis pergracilis</i>	1	0.2 m	FMA03.05
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1.1 m	FMA13.13
<i>Eremophila spongiorcarpa</i>	+	1.2 m	FMA03.03
<i>Euphorbia australis</i>	+	0.05 m	FMA13.02
<i>Goodenia forrestii</i>	+	0.1 m	FMA13.01
<i>Heliotropium pachyphyllum</i>	1	0.1 m	FMA16.02
<i>Lawrenzia densiflora</i>	+	0.1 m	FMA08.06
<i>Maireana pyramidata</i>	+	1.4 m	FMA16.07
<i>*Malvastrum americanum</i>	+	0.3 m	FMA04.21
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.5 m	FMA16.11
<i>Ptilotus obovatus</i>	+	1.2 m	FMA16.06

<i>Rhagodia eremaea</i>	+	0.9 m	FMA16.15
<i>Salsola australis</i>	+	0.1 m	FMA16.18
<i>Sclerolaena cornishiana</i>	+	0.3 m	FMA16.03
<i>Senna glaucifolia</i>	+	1.2 m	FMA16.14
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Solanum horridum</i>	+	0.1 m	FMA13.08
<i>Solanum lasiophyllum</i>	+	0.6 m	FMA13.10
<i>Solanum sturtianum</i>	+	0.4 m	FMA06.06
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Stemodia grossa</i>	+	0.8 m	FMA04.06
<i>Streptoglossa odora</i>	+	0.8 m	FMA16.04
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>Tribulus hirsutus</i>	+	0.7 m	FMA16.16
<i>Tribulus occidentalis</i>	+	0.05 m	FMA16.10
<i>Triraphis mollis</i>	+	0.2 m	FMA06.17

Fortescue Marsh Site FMA17

Described by Julia Mattner Date 28/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 768284 mE 7518054 mN

Habitat Plain - low rise

Soil Red-brown silty loam (surface crust)

Rock Type Calcrete; few 2-6 mm small pebbles, very few 60-200 mm cobbles

Vegetation *Melaleuca glomerata*, *Acacia tetragonophylla* and *Acacia synchronicia* high open shrubland over *Eremophila spongiorcarpa* and *Chenopodium auricomum* open shrubland over *Acacia synchronicia*, *Tecticornia indica* subsp. *bidens*, *Solanum lasiophyllum* and *Enchylaena tomentosa* var. *tomentosa* low shrubland over *Eragrostis pergracilis*, *Enneapogon caeruleus*, *Enneapogon polyphyllus*, *Triraphis mollis* and **Cenchrus ciliaris* open tussock grassland with **Flaveria trinervia*, *Heliotropium pachyphyllum*, *Streptoglossa bubakii*, *Stemodia grossa* and *Ptilotus nobilis* var. *nobilis* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: W Bare ground: 75%
Litter cover: 0% logs, +% twigs, +% leaves
Disturbances: cattle and minor weed infestation

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon otocarpum</i>	+	0.3 m	FMA17.05
<i>Acacia synchronicia</i>	15	0.5 m	FMA04.10
<i>Acacia synchronicia</i>	1	2.5 m	FMA04.10
<i>Acacia tetragonophylla</i>	+	3 m	FMA16.13
<i>Aristida contorta</i>	+	0.3 m	FMA06.05
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.4 m	NC
<i>Chenopodium auricomum</i>	+	1.2 m	FMA17.06
<i>Cleome viscosa</i>	+	0.2 m	FMA16.09
<i>Dactyloctenium radulans</i>	+	0.2 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.9 m	FMA04.12
<i>Enneapogon caeruleus</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis pergracilis</i>	15	0.1 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	2	1.2 m	FMA03.03
<i>Euphorbia australis</i>	+	0.05 m	FMA13.02
<i>*Flaveria trinervia</i>	+	0.3 m	FMA13.07
<i>Goodenia forrestii</i>	+	0.1 m	FMA16.01
<i>Lawrenia densiflora</i>	+	0.2 m	FMA08.06
<i>Melaleuca glomerata</i>	3	3 m	FMA17.01
<i>Peripleura obovata</i>	+	0.2 m	FMA17.03
<i>Pterocaulon sphaeranthoides</i>	+	0.4 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.1 m	FMA16.11
<i>Salsola australis</i>	+	0.1 m	FMA16.18
<i>Sclerolaena cornishiana</i>	+	0.5 m	FMA17.04

<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.6 m	FMA13.14
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Solanum lasiophyllum</i>	+	0.8 m	FMA13.10
<i>Stemodia grossa</i>	+	0.6 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Tecticornia indica</i> subsp. <i>bidens</i>	1	0.6 m	FMA17.02
<i>Tribulus occidentalis</i>	+	0.05 m	FMA16.10
<i>Triraphis mollis</i>	+	0.2 m	FMA06.17

Fortescue Marsh Site FMA18

Described by Julia Mattner Date 29/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 775540 mE 7515780mN
Habitat Plain - upper marsh margin
Soil Red-brown sandy clay
Rock Type Few 6-20 mm medium pebbles
Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa*, *Eremophila youngii* subsp. *lepidota*, *Sclerolaena cuneata* and *Maireana amoena* low closed heath over *Eragrostis pergracilis*, *Chloris pectinata*, *Enteropogon ramosus*, *Xerochloa laniflora* and *Sporobolus australasicus* scattered tussock grasses with **Portulaca oleracea*, *Trianthema triquetra*, *Nicotiana heterantha*, *Streptoglossa bubakii* and *Swainsona kingii* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: N/A
 Bare ground: 70%
 Litter cover: 0% logs, +% twigs, 0% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.3 m	FMA04.10
<i>Aristida contorta</i>	+	0.3 m	FMA06.05
<i>Boerhavia paludosa</i>	+	0.1 m	FMA18.07
<i>*Cenchrus ciliaris</i>	+	0.1 m	FMA13.06
<i>Chloris pectinata</i>	+	0.4 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eremophila spongiocarpa</i>	1	0.9 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.3 m	FMA04.14
<i>Lawrenzia densiflora</i>	+	0.1 m	FMA08.06
<i>Maireana amoena</i>	+	0.3 m	FMA18.06
<i>Nicotiana heterantha</i>	+	0.3 m	FMA02.04
<i>*Portulaca oleracea</i>	+	0.05 m	FMA05.05
<i>Salsola australis</i>	+	0.1 m	FMA16.18
<i>Sclerolaena cuneata</i>	+	0.2 m	FMA18.08
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Sporobolus virginicus</i>	+	0.4 m	FMA14.05
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	80	0.9 m	FMA18.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.2 m	FMA18.05
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06
<i>Triraphis mollis</i>	+	0.2 m	FMA06.17
<i>Xerochloa laniflora</i>	+	0.2 m	FMA18.04

Fortescue Marsh **Site** FMA19**Described by** Julia Mattner **Date** 29/04/2012**Type** **Quadrat** 50 x 50 m**Location** Northern Fortescue Marsh margin**MGA Zone** 50 775590 mE 7515573 mN**Habitat** Drainage line**Soil** Red-brown clay, small incised channels of sand**Rock Type** None

Vegetation **Vachellia farnesiana*, *Acacia synchronicia*, *Melaleuca glomerata* and *Acacia aptaneura* high open shrubland over *Eremophila spongiorarpa* open shrubland over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Muehlenbeckia florulenta* and *Samolus repens* var. *floribundus* low shrubland over *Sporobolus virginicus*, *Eragrostis pergracilis*, **Echinochloa colona*, **Cenchrus ciliaris*, *Chloris pectinata* and *Enteropogon ramosus* closed tussock grassland with *Pluchea rubelliflora*, *Lotus cruentus*, **Malvastrum americanum*, *Marsilea hirsuta* and *Nicotiana heterantha* very open herbs

**Veg Condition** Good**Fire Age** Old

Notes Aspect: S Runoff rate: very slow Bare ground: 10%
 Litter cover: +% logs, +% twigs, +% leaves
 Disturbances: cattle tracks, weeds
 2 different morphologies of *E. spongiorarpa*: normal + longer and slender
Muehlenbeckia comes in the quadrat the further south you go

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia aptaneura</i>	+	2.5 m	FMA19.06
<i>Acacia synchronicia</i>	1	3 m	FMA04.10
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
<i>Atriplex bunburyana</i>	+	0.3 m	FMA19.15
* <i>Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
* <i>Cucumis melo</i> subsp. <i>agrestis</i>	+	cr	FMA04.27
<i>Cyperus iria</i>	+	0.2 m	FMA19.12
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
* <i>Echinochloa colona</i>	+	0.3 m	FMA19.10
<i>Enteropogon ramosus</i>	+	0.8 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.6 m	FMA04.09
<i>Eremophila spongiorarpa</i>	3	1.2 m	FMA03.03
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Iseilema vaginiflorum</i>	+	0.2 m	FMA19.13
<i>Lotus cruentus</i>	+	0.1 m	FMA19.08
* <i>Malvastrum americanum</i>	+	0.9 m	FMA04.21
<i>Marsilea hirsuta</i>	+	0.1 m	FMA19.09
<i>Melaleuca glomerata</i>	+	2.5 m	FMA19.11
<i>Muehlenbeckia florulenta</i>	1	1.3 m	FMA19.05
<i>Nicotiana heterantha</i>	+	1.1 m	FMA19.04
<i>Pluchea rubelliflora</i>	1	0.7 m	FMA04.04
<i>Samolus repens</i> var. <i>floribundus</i>	1	0.4 m	FMA15.05
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19

<i>Sporobolus virginicus</i>	80	0.7 m	FMA19.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	15	0.7 m	FMA19.03
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	5	0.9 m	FMA19.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.5 m	FMA18.05
* <i>Vachellia farnesiana</i>	5	3.5 m	FMA19.07

Fortescue Marsh Site FMA20

Described by Julia Mattner Date 29/04/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 775275 mE 7514680mN

Habitat Lower marsh

Soil Red-brown clay (thin salt crust)

Rock Type None

Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp.

Dennys Crossing (K.A. Shepherd & J. English KS 552) and

Muehlenbeckia florulenta low open heath over *Swainsona kingii*and *Sporobolus virginicus* scattered herbs with *Cyperus bulbosus* scattered sedges

Veg Condition Very good

Fire Age Very old

Notes Aspect: S

Bare ground: 45%

Litter cover: 0% logs, +% twigs, +% leaves

Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Muehlenbeckia florulenta</i>	1	0.9 m	FMA20.03
<i>Nicotiana heterantha</i>	+	0.4 m	FMA19.04
<i>Swainsona kingii</i>	1	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	35	0.6 m	FMA20.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	15	0.4 m	FMA20-01

Fortescue Marsh Site FMA21

Described by Julia Mattner Date 29/04/2012

Type Relevé 15 x 200 m

Location Northern Fortescue Marsh margin

MGA Zone 50 775357 mE 7514710mN

Habitat Low rise

Soil Brown loam

Rock Type Basalt

Vegetation *Melaleuca glomerata* low open forest over *Tecticornia indica* subsp. *leiostachya*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia* sp. (sterile), *Maireana amoena*, **Aerva javanica* and *Samolus repens* var. *floribundus* low open shrubland over *Chloris pectinata*, **Cenchrus ciliaris*, *Dactyloctenium radulans* and *Sporobolus australasicus* very open tussock grassland with *Nicotiana heterantha*, **Sonchus oleraceus* and *Cleome viscosa* open herbs



Veg Condition Very poor

Fire Age Very old

Notes Aspect: N/A

Disturbances: cattle tracks, weeds, heavy trampling

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Aerva javanica</i>	1	0.5 m	NC
<i>Boerhavia coccinea</i>	+	0.5 m	FMA30.08
<i>*Cenchrus ciliaris</i>	1	0.5 m	FMA13.06
<i>Chloris pectinata</i>	5	0.4 m	FMA06.08
<i>Cleome viscosa</i>	+	0.3 m	FMA16.09
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Frankenia ambita</i>	+	0.2 m	FMA21.05
<i>Maireana amoena</i>	3	0.3 m	FMA21.01
<i>Melaleuca glomerata</i>	60	3.5 m	FMA17.01
<i>Nicotiana heterantha</i>	20	0.8 m	FMA19.04
<i>Panicum decompositum</i>	+	0.5 m	FMA21.08
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.4 m	FMA15.05
<i>*Sonchus oleraceus</i>	1	0.6 m	FMA21.03
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>	1	0.6 m	FMA21.02
<i>Tecticornia</i> sp. (sterile)	1	0.5 m	FMA21.07
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	0.5 m	FMA21.06

Fortescue Marsh Site FMA22

Described by Julia Mattner Date 29/04/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 775407 mE 7514857 mN

Habitat Depression

Soil Red-brown clay (cryptogram crust)

Rock Type Basalt

Vegetation *Muehlenbeckia florulenta* open shrubland over
Tecticornia indica subsp. *bidens* and *Tecticornia* sp. Dennys
 Crossing (K.A. Shepherd & J. English KS 552) open heath over
Sporobolus virginicus scattered tussock grasses with *Marsilea*
hirsuta very open herbs

Veg Condition Very good

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Marsilea hirsuta</i>	8	0.3 m	FMA22.01
<i>Muehlenbeckia florulenta</i>	2	1.2 m	FMA22.04
<i>Sporobolus virginicus</i>	1	0.8 m	FMA19.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	60	0.8 m	FMA22.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.6 m	FMA22.03
<i>Typha domingensis</i>	+	0.5 m	NC

Fortescue Marsh Site FMA23

Described by Julia Mattner Date 29/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

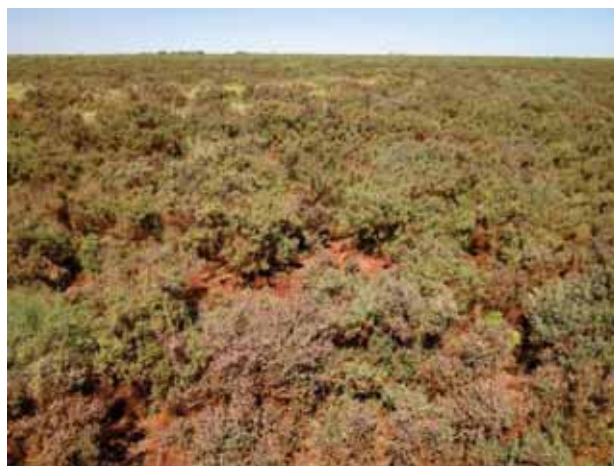
MGA Zone 50 775511 mE 7515147 mN

Habitat Slight depression

Soil Red-brown loamy clay

Rock Type None

Vegetation *Muellerolimon salicorniaceum* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Eremophila spongicarpa* low closed heath over *Sporobolus virginicus*, *Chloris pectinata*, **Echinochloa colona* and *Eragrostis tenellula* open tussock grassland over *Peplidium* sp. E (Evol. Fl. Fauna Arid Aust (A.S.Weston 12768)), *Nicotiana heterantha*, *Pluchea rubelliflora*, **Malvastrum americanum* and *Alternanthera nodiflora* very open herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: S
Litter cover: 0% logs, +% twigs, +% leaves
Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aeschynomene indica</i>	+	0.3 m	FMA23.03
<i>Alternanthera nodiflora</i>	+	0.5 m	FMA04.08
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Chloris pectinata</i>	3	0.3 m	FMA06.08
<i>Cullen cinereum</i>	+	0.6 m	FMA04.20
<i>Cyperus iria</i>	+	0.4 m	FMA23.04
<i>Digitaria brownii</i>	+	0.4 m	FMA23.07
<i>*Echinochloa colona</i>	+	0.9 m	FMA19.10
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.3 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA23.02
<i>Eremophila spongicarpa</i>	+	0.4 m	FMA03.03
<i>Frankenia ambita</i>	+	0.1 m	FMA23.10
<i>Gnephosis arachnoidea</i>	+	0.1 m	FMA14.03
<i>Heliotropium europaeum</i>	+	0.1 m	FMA01.07
<i>Ipomoea coptica</i>	+	0.1 m	FMA13.03
<i>Lotus cruentus</i>	+	0.3 m	FMA19.08
<i>*Malvastrum americanum</i>	+	0.4 m	FMA04.21
<i>Marsilea hirsuta</i>	+	0.1 m	FMA23.05
<i>Mimulus repens</i>	+	0.1 m	FMA01.04
<i>Muellerolimon salicorniaceum</i>	1	1.2 m	FMA23.01
<i>Nicotiana heterantha</i>	+	0.7 m	FMA19.04
<i>Peplidium</i> sp. E (Evol. Fl. Fauna Arid Aust (A.S.Weston 12768))	6	0.05 m	FMA23.06
<i>Pluchea rubelliflora</i>	+	0.6 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	+	0.2 m	FMA04.15
<i>Sporobolus virginicus</i>	5	0.5 m	FMA19.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	50	0.9 m	FMA23.08
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	25	0.5 m	FMA23.09

Fortescue Marsh Site FMA24

Described by Julia Mattner Date 30/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 767934 mE 7518329 mN

Habitat Low rise

Soil Light-brown sandy loam

Rock Type Calcrete; 2-10% cover of 2-60 mm pebbles

Vegetation *Acacia synchronicia* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiocarpa* and *Muehlenbeckia florulenta* low open shrubland over *Eragrostis pergracilis*, **Cenchrus ciliaris*, *Enneapogon caerulescens* and *Enteropogon ramosus* open tussock grassland with *Euphorbia australis*, *Heliotropium pachyphyllum*, *Ptilotus helipteroides*, *Ptilotus nobilis* var. *nobilis* and *Lawrencia densiflora* very open herbs



Veg Condition Very good

Fire Age Old

Notes Aspect: N/S (either side of crest)
Runoff rate: moderately rapid
Disturbances: cattle, weeds

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1	1.2 m	FMA04.10
<i>Aristida contorta</i>	+	0.1 m	FMA06.05
<i>*Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Enneapogon caerulescens</i>	+	0.1 m	FMA06.04
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis pergracilis</i>	50	0.2 m	FMA03.05
<i>Eremophila cuneifolia</i>	+	0.7 m	FMA24.06
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.7 m	FMA13.13
<i>Eremophila spongiocarpa</i>	1	0.8 m	FMA03.03
<i>Euphorbia australis</i>	1	0.05 m	FMA13.02
<i>*Flaveria trinervia</i>	+	0.2 m	FMA13.07
<i>Gomphrena kanisii</i>	+	0.1 m	FMA06.19
<i>Goodenia forrestii</i>	+	0.2 m	FMA16.01
<i>Heliotropium pachyphyllum</i>	+	0.1 m	FMA16.02
<i>Lawrencia densiflora</i>	+	0.1 m	FMA08.06
<i>Maireana integra</i>	+	0.8 m	FMA13.09
<i>Maireana pyramidata</i>	+	0.6 m	FMA16.07
<i>Maireana triptera</i>	+	0.2 m	FMA05.03
<i>Melaleuca glomerata</i>	+	0.4 m	FMA04.01
<i>Peripleura obovata</i>	+	0.1 m	FMA24.02
<i>Ptilotus auriculifolius</i>	+	0.4 m	FMAJM06.01
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.2 m	FMA16.11
<i>Ptilotus helipteroides</i>	+	0.1 m	FMA24.07
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA15.05
<i>Sclerolaena cornishiana</i>	1	0.3 m	FMA13.04
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.7 m	FMA13.14
<i>Solanum lasiophyllum</i>	+	0.5 m	FMA13.10

<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Tecticornia indica</i> subsp. <i>bidens</i>	2	0.7 m	FMA24.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.3 m	FMA24.03
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.2 m	FMA24.04

Fortescue Marsh Site FMA25

Described by Julia Mattner Date 30/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 768085 mE 7518225 mN

Habitat Depression

Soil Red-brown clay (saline)

Rock Type None

Vegetation *Melaleuca glomerata* high shrubland over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Eremophila spongiorcarpa* and *Muehlenbeckia florulenta* open heath over *Samolus repens* var. *floribundus* low scattered shrubs over *Paraneurachne muelleri* very open tussock grassland with *Nicotiana heterantha* and *Swainsona kingii* open herbs

Veg Condition Good

Fire Age Very old

Notes Aspect: N/A
 Litter cover: 1% logs, 1% twigs, +% leaves
 Disturbance: cattle trampling

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Eremophila spongiorcarpa</i>	+	1.2 m	FMA03.03
* <i>Flaveria trinervia</i>	+	0.8 m	FMA13.07
<i>Melaleuca glomerata</i>	6	4 m	FMA04.01
<i>Muehlenbeckia florulenta</i>	+	1.1 m	FMA08.03
<i>Nicotiana heterantha</i>	10	0.9 m	FMA19.04
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA15.05
<i>Sporobolus virginicus</i>	2	cr	FMA14.05
<i>Swainsona kingii</i>	2	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	50	1.2 m	FMA25.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	15	1.1 m	FMA25.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA25.03

Fortescue Marsh Site FMA26

Described by Julia Mattner Date 30/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 768154 mE 7518675 mN
Habitat Plain
Soil Red-brown sandy clay
Rock Type Basalt; common 6-20 mm medium pebbles
Vegetation *Tecticornia indica* subsp. *bidens* and *Eremophila spongiocarpa* low open heath over *Eragrostis pergracilis*, *Cymbopogon ambiguus*, *Dactyloctenium radulans*, **Cenchrus ciliaris* and *Sporobolus australasicus* very open tussock grassland with *Pterocaulon sphaeranthoides*, *Nicotiana heterantha*, *Streptoglossa decurrens*, *Streptoglossa bubakii* and *Swainsona kingii* very open herbs

Veg Condition Very good**Fire Age** Very old

Notes Aspect: N/A
 Bare ground: 75%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Aristida latifolia</i>	+	0.8 m	FMA26.06
<i>*Cenchrus ciliaris</i>	+	0.2 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Cymbopogon ambiguus</i>	+	1.2 m	FMA26.04
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.1 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Eragrostis pergracilis</i>	1	0.2 m	FMA03.05
<i>Eremophila spongiocarpa</i>	20	0.9 m	FMA03.03
<i>Gomphrena kanisii</i>	+	0.1 m	FMA06.19
<i>Maireana amoena</i>	+	0.4 m	FMA05.01
<i>Maireana integra</i>	+	0.4 m	FMA13.09
<i>Nicotiana heterantha</i>	+	0.8 m	FMA19.04
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	1	0.7 m	FMA04.15
<i>Salsola australis</i>	+	0.1 m	FMA16.18
<i>Sclerolaena cuneata</i>	+	0.3 m	FMA26.05
<i>Senna notabilis</i>	+	0.05 m	FMA26.03
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.6 m	FMA13.14
<i>Solanum horridum</i>	+	0.1 m	FMA13.08
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Streptoglossa decurrens</i>	+	0.8 m	FMA26.02
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	40	0.5 m	FMA26.01
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA27

Described by Julia Mattner Date 30/04/2012

Type Relevé 20 x 125 m

Location Northern Fortescue Marsh margin

MGA Zone 50 772651 mE 7515803 mN

Habitat Plain - lower marsh margin

Soil Red-brown clay

Rock Type Basalt with some calcrete; 2-10% cover of 6-60 mm pebbles

Vegetation *Acacia ampliceps* scattered shrubs over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia indica* subsp. *bidens*, *Muellerolimon salicorniaceum* and *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) low open heath over *Sporobolus virginicus*, *Eragrostis pergracilis* and *Chloris pectinata* very open tussock grassland over *Mimulus repens*, *Swainsona kingii*, **Heliotropium europaeum*, *Gnephosis arachnoidea* and *Dysphania plantaginella* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: S
Litter cover: +% logs, +% twigs, +% leaves
Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia ampliceps</i>	+	1.5 m	FMA27.05
<i>Chloris pectinata</i>	+	0.1 m	FMA06.08
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Dysphania plantaginella</i>	+	0.1 m	FMA03.04
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Frankenia ambita</i>	+	0.2 m	FMA27.04
<i>Gnephosis arachnoidea</i>	+	0.1 m	FMA14.03
<i>Heliotropium europaeum</i>	+	0.05 m	FMA01.07
<i>Mimulus repens</i>	1	0.2 m	FMA01.04
<i>Muellerolimon salicorniaceum</i>	1	0.9 m	FMA15.06
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.3 m	FMA15.05
<i>Sporobolus virginicus</i>	1	cr	FMA19.01
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20	0.7 m	FMA27.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	0.4 m	FMA27.03
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	40	0.5 m	FMA27.01

Fortescue Marsh Site FMA28

Described by Julia Mattner Date 30/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 772640 mE 7516040mN
Habitat Plain - upper-marsh
Soil Red-brown sandy clay
Rock Type Basalt; common 6-20 mm medium pebbles
Vegetation *Eremophila spongicarpa* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia auriculata*, *Solanum lasiophyllum* and *Sida fibulifera* low open heath over *Eragrostis pergracilis*, *Dactyloctenium radulans*, *Aristida contorta*, **Cenchrus ciliaris* and *Chloris pectinata* scattered tussock grasses with *Nicotiana heterantha*, *Maireana luehmannii*, *Pterocaulon sphaeranthoides*, *Swainsona kingii* and *Ptilotus nobilis* var. *nobilis* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: S
 Bare ground: 90%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
<i>Boerhavia repleta</i>	+	0.3 m	FMA28.04
<i>*Cenchrus ciliaris</i>	+	0.6 m	FMA13.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eremophila spongicarpa</i>	+	1.2 m	FMA03.03
<i>Lawrencia densiflora</i>	+	0.1 m	FMA08.06
<i>Maireana luehmannii</i>	+	0.3 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.1 m	FMA16.11
<i>Sida fibulifera</i>	+	0.1 m	FMA13.11
<i>Solanum lasiophyllum</i>	+	0.4 m	FMA13.10
<i>Sporobolus virginicus</i>	1	0.4 m	FMA19.01
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.9 m	FMA28.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	60	0.7 m	FMA28.03
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA28.02

Fortescue Marsh Site FMA29

Described by Julia Mattner Date 30/04/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 772568 mE 7516512mN
Habitat Plain - upper marsh margin
Soil Red-brown fine sandy clayey loam
Rock Type Basalt; few 2-60 mm pebbles
Vegetation *Acacia synchronicia* scattered shrubs over *Tecticornia* sp. (sterile), *Tecticornia auriculata*, *Eremophila spongiorcarpa* and *Sclerolaena cuneata* low shrubland over *Eragrostis pergracilis*, *Sporobolus virginicus*, *Sporobolus australasicus*, *Enteropogon ramosus* and *Chloris pectinata* scattered tussock grasses with *Trianthema triquetra* and **Portulaca oleracea* scattered herbs

Veg Condition Very good**Fire Age** Very old

Notes Aspect: N/A
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbances: weeds, cattle tracks

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.5 m	FMA04.10
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
* <i>Cenchrus ciliaris</i>	+	0.6 m	FMA13.06
<i>Chenopodium auricomum</i>	+	0.4 m	FMA17.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Cyperus cunninghamii</i>	+	0.2 m	FMA29.02
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.4 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.5 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.9 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.9 m	FMA04.14
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Pluchea rubelliflora</i>	+	0.2 m	FMA04.04
* <i>Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Sclerolaena cuneata</i>	+	0.3 m	FMA26.05
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Sporobolus virginicus</i>	+	cr	FMA19.01
<i>Streptoglossa odora</i>	+	0.2 m	FMA29.03
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.8 m	FMA29.04
<i>Tecticornia</i> sp. (sterile)	20	0.4 m	FMA29.01
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA30

Described by Julia Mattner Date 1/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 777895 mE 7513218mN
Habitat Low rise
Soil Brown sand
Rock Type Basalt; abundant 2-60 mm pebbles
Vegetation *Melaleuca glomerata* and *Acacia ampliceps* high shrubland over **Aerva javanica*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Samolus repens* var. *floribundus* and *Solanum lasiophyllum* very open shrubland over *Enneapogon caeruleus*, *Enneapogon polyphyllus*, *Sporobolus australasicus* and **Cenchrus ciliaris* scattered tussock grasses with *Cleome viscosa*, *Dysphania plantaginella*, *Swainsona kingii*, *Nicotiana heterantha* and *Streptoglossa bubakii* closed herbs

**Veg Condition** Poor**Fire Age** Very old

Notes Aspect: N or S (crest)
 Runoff rate: Very rapid
 Litter cover: +% logs, +% twigs, 20% leaves
 Disturbances: heavy weed infestation, cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia ampliceps</i>	1	3 m	FMA27.05
<i>*Aerva javanica</i>	12	0.9 m	FMA30.07
<i>Amaranthus undulatus</i>	+	0.8 m	FMA30.05
<i>Atriplex bunburyana</i>	+	0.7 m	FMA19.15
<i>Boerhavia coccinea</i>	+	0.2 m	FMA30.08
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>*Citrullus colocynthis</i>	1	cr	FMA30.04
<i>Cleome viscosa</i>	71	0.9 m	FMA16.09
<i>Dysphania plantaginella</i>	1	0.1 m	FMA30.02
<i>Enneapogon caeruleus</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Melaleuca glomerata</i>	20	4.5 m	FMA04.01
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>*Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.3 m	FMA16.11
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.4 m	FMA15.05
<i>Sesbania cannabina</i>	+	0.8 m	FMA30.09
<i>Setaria dielsii</i>	+	0.6 m	FMA12.07
<i>*Setaria verticillata</i>	+	0.5 m	FMA30.06
<i>Solanum lasiophyllum</i>	+	0.5 m	FMA13.10
<i>Sporobolus australasicus</i>	+	0.3 m	FMA16.19
<i>Sporobolus virginicus</i>	+	0.4 m	FMA19.01
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i>	2	0.8 m	FMA30.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	4	0.4 m	FMA30.03
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>*Vachellia farnesiana</i>	+	1.5 m	FMA19.07

Fortescue Marsh Site FMA31

Described by Julia Mattner Date 1/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 778240 mE 7513307 mN

Habitat Plain - mid-marsh

Soil Red-brown fine sandy clay (thin salt crust)

Rock Type Basalt; ver few 2-20 mm pebbles

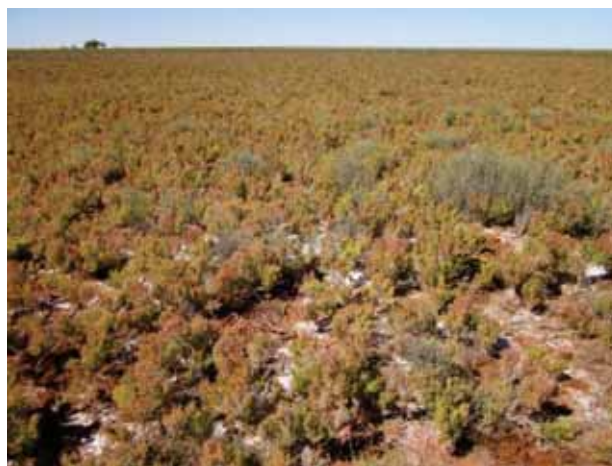
Vegetation *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Muehlenbeckia florulenta*, *Tecticornia indica*, *Tecticornia auriculata* and *Frankenia ambita* low closed heath over *Eragrostis pergracilis* open tussock grassland with *Cyperus bulbosus* scattered sedges and *Swainsona kingii* and *Nicotiana heterantha* open herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A

Runoff rate: Very slow



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Eragrostis pergracilis</i>	12	0.2 m	FMA03.05
<i>Frankenia ambita</i>	+	0.2 m	FMA31.03
<i>Muehlenbeckia florulenta</i>	1	0.9 m	FMA31.02
<i>Nicotiana heterantha</i>	+	0.7 m	FMA19.04
<i>Swainsona kingii</i>	12	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.9 m	FMA28.01
<i>Tecticornia indica</i>	1	0.5 m	FMA30.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	70	0.4 m	FMA31.01

Fortescue Marsh Site FMA32

Described by Julia Mattner Date 1/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 778486 mE 7513356mN
Habitat Slightly raised plain - mid-marsh
Soil Red-brown loamy clay (thin salt crust)
Rock Type Basalt; Very few 6-20 mm medium pebbles
Vegetation *Tecticornia auriculata* open heath over *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low scattered shrubs over *Eragrostis pergracilis*, *Dactyloctenium radulans*, *Enneapogon polyphyllus*, *Enneapogon caerulescens* and *Chloris pectinata* tussock grassland with *Swainsona kingii*, *Nicotiana heterantha*, *Streptoglossa bubakii*, *Maireana luehmannii* and *Cyperus bulbosus* very open herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: N/A
 Bare ground: 55%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Aerva javanica</i>	+	0.5 m	FMA30.07
<i>*Cenchrus ciliaris</i>	+	0.2 m	FMA13.06
<i>Chloris pectinata</i>	+	0.4 m	FMA06.08
<i>*Citrullus colocynthis</i>	+	cr	FMA30.04
<i>Cyperus bulbosus</i>	+	0.3 m	FMA32.04
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.5 m	FMA32.02
<i>Eragrostis pergracilis</i>	40	0.1 m	FMA03.05
<i>Maireana luehmannii</i>	+	0.3 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	1	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	50	1.2 m	FMA32.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA32.03

Fortescue Marsh Site FMA33**Described by** Julia Mattner **Date** 1/05/2012**Type** Quadrat **50 x 50 m**

Location Northern Fortescue Marsh margin
MGA Zone 50 778362 mE 7513741 mN
Habitat Shallow depression
Soil Red-brown clay
Rock Type Basalt; very few 6-20 mm medium pebbles
Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiorcarpa* and *Muehlenbeckia florulenta* low open heath over *Sporobolus virginicus*, *Eragrostis pergracilis*, *Eragrostis tenellula*, **Cenchrus ciliaris* and **Echinochloa colona* very open tussock grassland with *Cullen cinereum*, *Pterocaulon sphaeranthoides* and **Malvastrum americanum* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: N/A
 Runoff rate: very slow
 Bare ground: 10%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aeschynomene indica</i>	+	0.8 m	FMA23.03
<i>Alternanthera nodiflora</i>	+	0.3 m	FMA04.08
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Chloris pectinata</i>	+	0.4 m	FMA06.08
<i>Cullen cinereum</i>	5	0.7 m	FMA04.20
<i>Cyperus iria</i>	+	0.1 m	FMA33.07
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.1 m	FMA33.06
<i>*Echinochloa colona</i>	+	0.8 m	FMA19.10
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA32.02
<i>Enteropogon ramosus</i>	+	0.8 m	FMA04.02
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	1	0.3 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.2 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.9 m	FMA04.14
<i>Gomphrena kanisii</i>	+	0.1 m	FMA06.19
<i>Goodenia prostrata</i>	+	0.05 m	FMA33.12
<i>*Malvastrum americanum</i>	+	0.8 m	FMA04.21
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA31.02
<i>Neptunia dimorphantha</i>	+	0.3 m	FMA33.09
<i>Nicotiana heterantha</i>	+	0.8 m	FMA19.04
<i>Pluchea dunlopil</i>	+	0.4 m	FMA04.05
<i>Pluchea rubelliflora</i>	+	0.6 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.6 m	FMA04.15
<i>Ptilotus gomphrenoides</i>	+	0.15 m	FMA33.13
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.1 m	FMA13.14

<i>Sesbania cannabina</i>	+	0.6 m	FMA33.11
<i>Sida fibulifera</i>	+	0.4 m	FMA13.11
<i>Sporobolus virginicus</i>	4	0.6 m	FMA19.01
<i>Tecticornia auriculata</i>	+	0.7 m	FMA33.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	60	0.6 m	FMA33.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.4 m	FMA33.02

Fortescue Marsh Site FMA34

Described by Julia Mattner Date 1/05/2012

Type Quadrat 40 x 65 m

Location Northern Fortescue Marsh margin

MGA Zone 50 778255 mE 7514196 mN

Habitat Upper marsh margin

Soil Red-brown sandy loam

Rock Type Basalt; abundant 6-20 mm medium pebbles

Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. (sterile), *Eremophila spongiorcarpa* and *Maireana luehmannii* low open heath over *Eragrostis pergracilis*, *Chloris pectinata*, *Sporobolus virginicus*, *Sporobolus australasicus* and *Dactyloctenium radulans* scattered tussock grassland with *Trianthema triquetra*, **Portulaca oleracea*, *Boerhavia repleta*, *Goodenia forrestii* and *Evolvulus alsinoides* var. *decumbens* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: W
Runoff rate: very slow
Bare ground: 90%
Litter cover: 0% logs, +% twigs, 0% leaves
Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon fraseri</i>	+	0.05 m	FMA34.05
<i>Atriplex codonocarpa</i>	+	0.05 m	FMA34.03
<i>Boerhavia repleta</i>	+	0.3 m	FMA34.07
<i>*Cenchrus ciliaris</i>	+	0.2 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.1 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.4 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.3 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.8 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.4 m	FMA04.14
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.2 m	FMA34.06
<i>Goodenia forrestii</i>	+	0.05 m	FMA34.08
<i>Lotus cruentus</i>	+	0.1 m	FMA19.08
<i>Maireana amoena</i>	+	0.2 m	FMA05.01
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.3 m	FMA19.04
<i>Pluchea rubelliflora</i>	+	0.2 m	FMA04.04
<i>*Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.2 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.05 m	FMA16.11
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.6 m	FMA13.14
<i>Sida fibulifera</i>	+	0.1 m	FMA13.11
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19

<i>Sporobolus virginicus</i>	+	0.3 m	FMA19.01
<i>Streptoglossa bubakii</i>	+	0.1 m	FMA06.12
<i>Tecticornia</i> sp. (sterile)	+	0.7 m	FMA34.02
<i>Tecticornia indica</i> subsp. <i>bidens</i>	40	0.5 m	FMA34.01
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA35

Described by Julia Mattner Date 1/05/2012

Type Quadrat

10 x 250 m

Location Northern Fortescue Marsh margin

MGA Zone 50 778210 mE 7514250mN

Habitat Drainage line

Soil Red-brown coarse loamy sand

Rock Type Very few 6-20 mm medium pebbles

Vegetation *Melaleuca glomerata*, *Acacia tetragonophylla*, *Eremophila latrobei* subsp. *filiformis*, *Acacia coriacea* subsp. *pendens* open shrubland over *Acacia synchronicia* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Abutilon cryptopetalum*, *Eremophila spongicarpa*, *Scaevola spinescens* and *Eremophila youngii* subsp. *lepidota* low open shrubs over *Sporobolus virginicus*, *Eragrostis tenellula*, *Chloris pectinata*, **Cenchrus ciliaris* and **Echinochloa colona* open tussock grassland with *Pluchea rubelliflora*, *Enchylaena tomentosa* var. *tomentosa*, *Nicotiana heterantha* and *Ptilotus gomphrenoides* very open herbs



Veg Condition Very good

Fire Age Old

Notes Aspect: S
Runoff rate: very slow
Bare ground: 60%
Litter cover: +% logs, +% twigs, +% leaves
Disturbances: weeds and cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon cryptopetalum</i>	+	0.3 m	FMA35.07
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	3 m	FMA35.12
<i>Acacia synchronicia</i>	+	1.8 m	FMA04.10
<i>Acacia tetragonophylla</i>	+	3.5	FMA16.13
<i>Aeschynomene indica</i>	+	0.3 m	FMA23.03
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
<i>Ammannia multiflora</i>	+	0.1 m	FMA35.08
<i>Atriplex bunburyana</i>	+	0.4 m	FMA19.15
<i>*Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Chenopodium auricomum</i>	+	0.5 m	FMA35.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Corchorus tridens</i>	+	0.1 m	FMA35.04
<i>Cyperus iria</i>	+	0.2 m	FMA33.07
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	0.1 m	FMA35.02
<i>*Echinochloa colona</i>	+	0.4 m	FMA19.10
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8 m	FMA04.12
<i>Eragrostis elongata</i>	+	0.1 m	FMA35.05
<i>Eragrostis tenellula</i>	3	0.4 m	FMA04.09
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	2.2 m	FMA35.11
<i>Eremophila spongicarpa</i>	+	0.2 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.9 m	FMA04.14
<i>Frankenia ambita</i>	+	0.3 m	FMA35.10
<i>Glycine canescens</i>	+	climber	FMA35.13

<i>Ipomoea coptica</i>	+	cr	FMA13.03
<i>*Malvastrum americanum</i>	+	0.8 m	FMA04.21
<i>Marsilea hirsuta</i>	+	0.1 m	FMA35.09
<i>Melaleuca glomerata</i>	35	4 m	FMA04.01
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Pluchea rubelliflora</i>	3	0.6 m	FMA04.04
<i>*Portulaca oleracea</i>	+	0.05 m	FMA05.05
<i>Ptilotus gomphrenoides</i>	+	0.1 m	FMA32.13
<i>Scaevola spinescens</i>	+	0.7 m	FMA04.11
<i>Sclerolaena cornishiana</i>	+	0.3 m	FMA24.05
<i>Sclerolaena cuneata</i>	+	0.3 m	FMA26.05
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.3 m	FMA13.14
<i>Sporobolus virginicus</i>	20	0.4 m	FMA19.01
<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Tecticornia indica</i> subsp. <i>bidens</i>	2	0.5 m	FMA35.01
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA36

Described by Julia Mattner Date 2/05/2012

Type Quadrat 35 x 80 m

Location Northern Fortescue Marsh margin

MGA Zone 50 778216 mE 7514406 mN

Habitat Drainage line - upper marsh margin

Soil Red-brown loamy sand

Rock Type Basalt; very few 2-60 mm pebbles

Vegetation *Acacia aptaneura* low open forest over *Melaleuca glomerata*, *Eremophila youngii* subsp. *lepidota*, *Acacia synchronicia*, **Vachellia farnesiana* and *Acacia tetragonophylla* high open shrubland over *Eremophila latrobei* subsp. *filiformis*, *Eremophila longifolia* and *Senna artemisioides* subsp. *oligophylla* (thinly sericeous) open shrubland over *Tecticornia indica* subsp. *bidens*, *Tecticornia auriculata*, *Sclerolaena cuneata*, *Abutilon cryptopetalum* and *Maireana triptera* low shrubland over **Cenchrus ciliaris*, *Eragrostis tenellula*, *Sporobolus australasicus*, *Sporobolus virginicus* and *Enteropogon ramosus* open tussock grassland with *Evolvulus alsinoides* var. *decumbens*, *Pluchea rubelliflora*, *Ipomoea muelleri*, *Streptoglossa bubakii* and **Malvastrum americanum* very open herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: S

Runoff rate: Moderately rapid

Litter cover: +% logs, 1% twigs, 1% leaves

Disturbances: cattle tracks and weeds

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon cryptopetalum</i>	+	0.6 m	FMA36.12
<i>Acacia aptaneura</i>	50	6 m	FMA36.01
<i>Acacia synchronicia</i>	+	3.5 m	FMA04.10
<i>Acacia tetragonophylla</i>	+	0.5 m	FMA16.13
<i>Aeschynomene indica</i>	+	0.7 m	FMA23.03
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
<i>Atriplex bunburyana</i>	+	0.6 m	FMA19.15
<i>Atriplex codonocarpa</i>	+	0.4 m	FMA34.03
<i>*Bidens bipinnata</i>	+	0.4 m	FMA36.05
<i>Boerhavia repleta</i>	+	0.2 m	FMA36.19
<i>Bulbostylis barbata</i>	+	0.1 m	FMA36.10
<i>Calandrinia ptychosperma</i>	+	0.05 m	FMA36.08
<i>*Cenchrus ciliaris</i>	5	0.8 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.7 m	FMA36.18
<i>Chrysopogon fallax</i>	+	0.6 m	FMA36.16
<i>*Citrullus colocynthis</i>	+	cr	FMA30.04
<i>Cleome viscosa</i>	+	0.4 m	FMA16.09
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	1.1 m	FMA04.12
<i>Enteropogon ramosus</i>	+	0.8 m	FMA04.02
<i>Eragrostis desertorum</i>	+	0.4 m	FMA36.11
<i>Eragrostis elongata</i>	+	0.1 m	FMA06.14
<i>Eragrostis tenellula</i>	+	0.4 m	FMA33.08
<i>Eremophila cuneifolia</i>	+	0.5 m	FMA24.06

<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.5 m	FMA13.13
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	1.5 m	FMA35.11
<i>Eremophila longifolia</i>	+	1.8 m	FMA36.03
<i>Eremophila spongiorarpa</i>	+	0.7 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	1	3 m	FMA04.14
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.2 m	FMA34.06
<i>Frankenia ambita</i>	+	0.1 m	FMA27.04
<i>Glycine canescens</i>	+	cr	FMA35.13
<i>Ipomoea coptica</i>	+	cr	FMA13.03
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Maireana carnosa</i>	+	0.1 m	FMA36.13
<i>Maireana triptera</i>	+	0.1 m	FMA05.03
* <i>Malvastrum americanum</i>	+	0.6 m	FMA04.21
<i>Marsilea hirsuta</i>	+	0.1 m	FMA35.09
<i>Melaleuca glomerata</i>	2	3.5 m	FMA04.01
<i>Nicotiana heterantha</i>	+	0.3 m	FMA19.04
<i>Paspalidium clementii</i>	+	0.1 m	FMA36.14
<i>Pluchea rubelliflora</i>	+	0.3 m	FMA35.03
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	0.1 m	FMA36.09
<i>Pterocaulon sphaeranthoides</i>	+	0.3 m	FMA04.15
<i>Scaevola spinescens</i>	+	0.9 m	FMA04.11
<i>Sclerolaena cuneata</i>	1	0.2 m	FMA26.05
<i>Sclerolaena eriacantha</i>	+	0.2 m	FMA36.06
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.9 m	FMA36.04
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	1.1 m	FMA36.04
<i>Senna notabilis</i>	+	0.3 m	FMA26.03
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.9 m	FMA13.14
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	+	0.6 m	FMA36.20
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Sporobolus virginicus</i>	2	cr	FMA19.01
<i>Streptoglossa bubakii</i>	+	0.4 m	FMA06.12
<i>Tecticornia auriculata</i>	+	0.8 m	FMA36.17
<i>Tecticornia indica</i> subsp. <i>bidens</i>	4	0.9 m	FMA36.02
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>Trianthema glossostigma</i>	+	0.1 m	FMA36.07
* <i>Vachellia farnesiana</i>	+	3 m	FMA19.07

Fortescue Marsh **Site** FMA37

Described by Julia Mattner **Date** 3/05/2012 **Type** Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 783124 mE 7508706mN
Habitat Plain - lower marsh margin
Soil Red-brown clay
Rock Type None
Vegetation *Muehlenbeckia florulenta* shrubland over
Eleocharis papillosa and *Schoenoplectus dissachanthus*
closed sedges with *Sclerolaena eriacantha* herbs

Veg Condition Excellent

Fire Age Very old

Notes Aspect: S
Litter cover: 0% logs, +% twigs, +% leaves
Disturbance: some grazing (old pads)



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Eleocharis papillosa</i>	70	0.1 m	FMAJM03.02
<i>Marsilea hirsuta</i>	40	0.2 m	FMA19.09
<i>Muehlenbeckia florulenta</i>	20	1.5 m	FMA37.01
<i>Schoenoplectus dissachanthus</i>	+	0.2 m	FMAJM03.01

Fortescue Marsh Site FMA38

Described by Julia Mattner Date 3/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 783124 mE 7509310mN

Habitat Plain - mid-marsh

Soil Red-brown clay

Rock Type None

Vegetation *Aeschynomene indica* scattered shrubs over *Muehlenbeckia florulenta* and *Tecticornia* sp. (sterile) low shrubland over *Sporobolus virginicus* scattered tussock grasses with *Eleocharis papillosa* and *Schoenoplectus dissachanthus* open sedges and *Cressa australis* very open herbs

Veg Condition Excellent

Fire Age Very old

Notes Aspect: S
Disturbance: recent cattle grazing

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Aeschynomene indica</i>	+	1.2 m	FMA23.03
<i>Cressa australis</i>	3	0.1 m	FMA38.02
<i>Eleocharis papillosa</i>	10	0.1 m	FMAJM03.02
<i>Marsilea hirsuta</i>	70	0.2 m	FMA19.09
<i>Muehlenbeckia florulenta</i>	15	0.9 m	FMA37.01
<i>Schoenoplectus dissachanthus</i>	5	0.2 m	FMAJM03.01
<i>Sporobolus virginicus</i>	+	0.3 m	FMA19.01
<i>Tecticornia</i> sp. (sterile)	+	0.4 m	FMA38.01

Fortescue Marsh Site FMA39

Described by Julia Mattner Date 3/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 783020 mE 7509747 mN

Habitat Very low rise

Soil Light-brown sandy loam

Rock Type Calcrete; <2% outcropping, common 2-6 mm small pebbles

Vegetation *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiocarpa*, *Tecticornia indica* subsp. *bidens*, *Sclerolaena cornishiana* and *Acacia synchronicia* low open shrubland over *Eragrostis pergracilis*, **Cenchrus ciliaris*, *Dactyloctenium radulans*, *Tragus australianus* and *Enneapogon caerulescens* tussock grassland with *Lawrencia densiflora*, *Euphorbia australis*, *Goodenia forrestii*, *Trianthema triquetra* and *Ptilotus nobilis* var. *nobilis* very open herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A

Runoff rate: Very slow

Bare ground: 56%

Litter cover: 0% logs, +% twigs, +% leaves

Disturbances: cattle tracks and horse scats

Circular calcrete outcrops nearby with denser *Acacia synchronicia* and *A. xiphophylla***SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.4 m	FMA04.10
<i>*Cenchrus ciliaris</i>	+	0.6 m	FMA13.06
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Eragrostis pergracilis</i>	35	0.2 m	FMA03.05
<i>Eremophila spongiocarpa</i>	+	0.7 m	FMA03.03
<i>Euphorbia australis</i>	+	0.05 m	FMA13.02
<i>Goodenia forrestii</i>	+	0.1 m	FMA16.01
<i>Heliotropium pachyphyllum</i>	+	0.2 m	FMA16.02
<i>Lawrencia densiflora</i>	1	0.4 m	FMA39.03
<i>Maireana pyramidata</i>	+	0.7 m	FMA16.07
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.5 m	FMA16.11
<i>Salsola australis</i>	+	0.5 m	FMA39.04
<i>Sclerolaena cornishiana</i>	+	0.3 m	FMA39.02
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Streptoglossa odora</i>	+	0.2 m	FMA39.06
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.5 m	FMA39.07
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.4 m	FMA39.01
<i>Tragus australianus</i>	+	0.15 m	FMA39.05
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA40

Described by Julia Mattner Date 3/05/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 783110 mE 7509940 mN

Habitat Very low rise

Soil Red-brown loamy clay

Rock Type Very few 6-20 mm medium pebbles

Vegetation *Acacia synchronicia* and *Acacia xiphophylla* high shrubland over *Acacia synchronicia* and *Eremophila spongiorcarpa* shrubland over *Solanum sturtianum*, *Eremophila forrestii* subsp. *forrestii*, *Rhagodia eremaea*, *Maireana pyramidata* and *Enchylaena tomentosa* var. *tomentosa* low open shrubland over **Cenchrus ciliaris*, *Eragrostis pergracilis* and *Bothriochloa bladhii* subsp. *bladhii* open tussock grassland with *Pterocaulon sphaeranthoides*, *Boerhavia paludosa*, *Goodenia forrestii*, *Cullen cinereum* and *Evolvulus alsinoides* var. *decumbens* scattered herbs



Veg Condition Very good

Fire Age Old

Notes Aspect: S
Bare ground: 85%
Litter cover: 0% logs, +% twigs, 2% leaves
Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	20	1.5 m	FMA04.10
<i>Acacia synchronicia</i>	20	2.5 m	FMA04.10
<i>Acacia xiphophylla</i>	+	2.5 m	FMA16.08
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>	+	0.05 m	FMA40.01
<i>Boerhavia paludosa</i>	+	0.1 m	FMA40.06
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	+	0.8 m	FMA40.03
<i>*Cenchrus ciliaris</i>	5	0.6 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Cullen cinereum</i>	+	0.1 m	FMA04.20
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.7 m	FMA04.12
<i>Eragrostis eriopoda</i>	+	0.2 m	FMA40.05
<i>Eragrostis pergracilis</i>	3	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.3 m	FMA04.09
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.5 m	FMA13.13
<i>Eremophila spongiorcarpa</i>	1	1.1 m	FMA03.03
<i>Euphorbia alsiniflora</i>	+	0.2 m	FMA40.04
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.2 m	FMA34.06
<i>Goodenia forrestii</i>	+	0.2 m	FMA16.01
<i>Maireana pyramidata</i>	+	0.7 m	FMA16.07
<i>Pterocaulon sphaeranthoides</i>	+	0.6 m	FMA04.15
<i>Rhagodia eremaea</i>	+	0.6 m	FMA16.15
<i>Scaevola spinescens</i>	+	0.6 m	FMA04.11
<i>Sclerolaena cornishiana</i>	+	0.3 m	FMA39.02
<i>Sida fibulifera</i>	+	0.1 m	FMA13.11
<i>Solanum sturtianum</i>	+	0.5 m	FMA06.06
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Triraphis mollis</i>	+	0.1 m	FMA40.02

Fortescue Marsh Site FMA41

Described by Julia Mattner Date 3/05/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 783992 mE 7509512 mN

Habitat Plain - lower-marsh

Soil Red-brown clay

Rock Type Basalt

Vegetation *Muehlenbeckia florulenta* and *Aeschynomene indica* scattered shrubs over *Tecticornia* sp. (sterile) low open heath over *Sporobolus virginicus* scattered tussock grasses with *Eleocharis papillosa* and *Schoenoplectus dissachanthus* very open sedges and *Marsilea hirsuta* and *Cressa australis* open herbs

Veg Condition Excellent

Fire Age Very old

Notes Aspect: SW
Runoff rate: very slow
Litter cover: 0% logs, +% twigs, +% leaves
Disturbance: recent trampling

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Aeschynomene indica</i>	+	1.5 m	FMA23.03
<i>Alternanthera nodiflora</i>	+	0.5 m	FMA04.08
<i>Cressa australis</i>	+	0.1 m	FMA38.02
<i>Eleocharis papillosa</i>	8	0.1 m	FMAJM03.02
<i>Marsilea hirsuta</i>	10	0.2 m	FMA19.09
<i>Muehlenbeckia florulenta</i>	1	1 m	FMA37.01
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA15.05
<i>Schoenoplectus dissachanthus</i>	+	0.2 m	FMAJM03.01
<i>Sporobolus virginicus</i>	+	cr	FMA19.01
<i>Tecticornia</i> sp. (sterile)	45	0.6 m	FMA41.01

Fortescue Marsh Site FMA42

Described by Julia Mattner Date 3/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 783111 mE 7511685 mN
Habitat Plain - upper marsh margin
Soil Red-brown clay (surface crust)
Rock Type Basalt; few 2-60 mm pebbles
Vegetation *Acacia synchronicia* scattered tall shrubs over **Vachellia farnesiana* and *Acacia coriacea* subsp. *pendens* scattered shrubs over *Eremophila spongiorcarpa*, *Tecticornia indica* subsp. *bidens*, *Sclerolaena cuneata*, *Sclerolaena densiflora* and *Muehlenbeckia florulenta* low open heath over **Cenchrus ciliaris*, **Cenchrus setiger*, *Eragrostis tenellula*, *Enneapogon polyphyllus* and *Chloris pectinata* very open tussock grassland with *Boerhavia repleta*, *Trianthema triquetra*, **Portulaca oleracea* and *Portulaca pilosa* scattered herbs

**Veg Condition** Good**Fire Age** Old

Notes Aspect: SE
 Runoff rate: Very slow
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbances: cattle tracks, overgrazing, aggressive weeds
 Near small incised drainage line

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	1.2 m	FMA35.12
<i>Acacia synchronicia</i>	+	2.5 m	FMA04.10
<i>Boerhavia repleta</i>	+	0.2 m	FMA36.19
<i>*Cenchrus ciliaris</i>	1	0.7 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.5 m	FMA36.18
<i>Chloris pectinata</i>	1	0.2 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dichanthium sericeum</i>	+	0.1 m	FMA42.02
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	30	0.9 m	FMA03.03
<i>Euphorbia alsiniflora</i>	+	0.2 m	FMA40.04
<i>Goodenia forrestii</i>	+	0.2 m	FMA42.03
<i>Maireana amoena</i>	+	0.1 m	FMA21.01
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA19.05
<i>Neptunia dimorphantha</i>	+	0.3 m	FMA33.09
<i>*Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Salsola australis</i>	+	0.3 m	FMA16.18
<i>Sclerolaena cuneata</i>	+	0.2 m	FMA26.05
<i>Sclerolaena densiflora</i>	+	0.2 m	FMA42.04
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19

<i>Sporobolus virginicus</i>	+	0.1 m	FMA19.01
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	30	0.5 m	FMA42.01
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
* <i>Vachellia farnesiana</i>	+	1.5 m	FMA19.07

Fortescue Marsh Site FMA43

Described by Julia Mattner Date 3/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782917 mE 7511261 mN

Habitat Plain - upper marsh margin

Soil Red-brown sandy loam

Rock Type Calcrete; Few 6-60 mm pebbles

Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa*, *Dissocarpus paradoxus* and *Sclerolaena densiflora* open heath over *Eragrostis pergracilis*, *Dactyloctenium radulans*, *Chloris pectinata*, *Sporobolus australasicus* and *Eragrostis tenellula* very open tussock grassland with *Trianthema triquetra*, *Lawrencia densiflora* and *Portulaca pilosa* scattered herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: SW
Runoff rate: Very slow
Bare ground: 90%
Litter cover: 0% logs, +% twigs, +% leaves
Disturbance: Cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dissocarpus paradoxus</i>	+	0.4 m	FMA43.03
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.3 m	FMA04.09
<i>Eremophila spongiocarpa</i>	+	0.5 m	FMA03.03
<i>Lawrencia densiflora</i>	+	0.05 m	FMA39.03
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Sclerolaena densiflora</i>	+	0.2 m	FMA42.04
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Tecticornia indica</i> subsp. <i>bidens</i>	31	0.4 m	FMA43.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA43.02
<i>Tragus australianus</i>	+	0.1 m	FMA39.05
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA44

Described by Julia Mattner Date 4/05/2012 Type Relevé ~20 x 125

Location Northern Fortescue Marsh margin
MGA Zone 50 786020 mE 7506575 mN
Habitat Lower-marsh
Soil Red-brown clay
Rock Type Basalt
Vegetation *Muehlenbeckia florulenta* shrubland over *Samolus repens* var. *floribundus* and *Tecticornia* sp. (sterile) low open shrubland over *Eleocharis papillosa*, *Schoenoplectus dissachanthus* and *Cyperus cunninghamii* closed sedges with *Marsilea hirsuta* and *Alternanthera nodiflora* very open herbs

Veg Condition Very good**Fire Age** Very old

Notes Aspect: N/A
 Bare ground: 2%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: heavy trampling by cattle

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Alternanthera nodiflora</i>	+	0.4 m	FMA04.08
<i>Cressa australis</i>	+	0.1 m	FMA45.06
<i>Cyperus bulbosus</i>	+	0.3 m	FMA01.05
<i>Cyperus cunninghamii</i>	+	0.2 m	FMA44.01
<i>Eleocharis papillosa</i>	80	0.1 m	FMAJM03.02
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Heliotropium europaeum</i>	+	0.01 m	FMA01.07
<i>Marsilea hirsuta</i>	7	0.2 m	FMA19.09
<i>Muehlenbeckia florulenta</i>	25	1.5 m	FMA31.02
<i>Nicotiana heterantha</i>	+	0.2 m	FMA19.04
<i>Samolus repens</i> var. <i>floribundus</i>	2	0.6 m	FMA15.05
<i>Schoenoplectus dissachanthus</i>	+	0.3 m	FMAJM03.01
<i>Tecticornia</i> sp. (sterile)	1	0.6 m	FMA44.02

Fortescue Marsh Site FMA45

Described by Julia Mattner Date 4/05/2012 Type Quadrat 20 x 125 m

Location Northern Fortescue Marsh margin

MGA Zone 50 785927 mE 7506672 mN

Habitat Low ridge

Soil Red-brown sand

Rock Type Many 6-20 mm medium pebbles

Vegetation *Acacia coriacea* subsp. *pendens* scattered low trees over **Vachellia farnesiana*, *Melaleuca glomerata* and *Acacia ampliceps* open scrub over *Eremophila spongiorarpa*, *Acacia synchronicia* and *Acacia tetragonophylla* open shrubland over *Cullen cinereum*, **Aerva javanica*, *Enchylaena tomentosa* var. *tomentosa* and *Solanum lasiophyllum* low open shrubland over **Cenchrus setiger*, **Cenchrus ciliaris*, *Dactyloctenium radulans*, *Eragrostis pergracilis* and *Sporobolus australasicus* tussock grassland with *Nicotiana heterantha*, *Pterocaulon sphaeranthoides*, *Pluchea rubelliflora*, *Dysphania plantaginella* and *Trianthema triquetra* very open herbs



Veg Condition Good

Fire Age Young

Notes Aspect: W or E (crest)
 Runoff rate: Moderately rapid
 Bare ground: 25%
 Litter cover: +% logs, +% twigs, +% leaves
 Disturbances: prolific weeds and cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia ampliceps</i>	15	2.5 m	FMA27.05
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	5 m	FMA35.12
<i>Acacia synchronicia</i>	+	1.5 m	FMA04.10
<i>Acacia tetragonophylla</i>	+	1.4 m	FMA16.13
<i>*Aerva javanica</i>	2	0.9 m	FMA30.07
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>	+	0.1 m	FMA45.01
<i>Boerhavia repleta</i>	+	0.1 m	FMA36.19
<i>*Cenchrus ciliaris</i>	5	0.4 m	FMA13.06
<i>*Cenchrus setiger</i>	50	0.3 m	FMA36.18
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>*Citrullus colocynthis</i>	+	cr	FMA30.04
<i>Cleome viscosa</i>	+	0.2 m	FMA16.09
<i>Corchorus tridens</i>	+	0.1 m	FMA35.04
<i>Cressa australis</i>	+	0.1 m	FMA45.06
<i>Cullen cinereum</i>	1	0.5 m	FMA04.20
<i>Dactyloctenium radulans</i>	15	0.1 m	FMA04.23
<i>Dysphania plantaginella</i>	+	0.1 m	FMA45.04
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8 m	FMA04.12
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eremophila spongiorarpa</i>	+	1.2 m	FMA03.03
<i>Eucalyptus victrix</i>	+	0.9 m	FMA45.05
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.2 m	FMA34.06
<i>Frankenia ambita</i>	+	0.1 m	FMA45.03
<i>Heliotropium europaeum</i>	+	0.1 m	FMA01.07

<i>Lotus cruentus</i>	+	0.2 m	FMA19.08
<i>*Malvastrum americanum</i>	+	0.3 m	FMA04.21
<i>Melaleuca glomerata</i>	+	0.4 m	FMA04.01
<i>Nicotiana heterantha</i>	+	0.9 m	FMA02.04
<i>Pluchea rubelliflora</i>	+	0.4 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.8 m	FMA04.15
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA15.05
<i>Sida fibulifera</i>	+	0.1 m	FMA13.11
<i>Solanum lasiophyllum</i>	+	0.3 m	FMA13.10
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Sporobolus virginicus</i>	+	0.4 m	FMA19.01
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.6 m	FMA45.02
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>*Vachellia farnesiana</i>	25	4 m	FMA19.07

Fortescue Marsh Site FMA46

Described by Julia Mattner Date 4/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 785975 mE 7506953 mN

Habitat Plain - mid-marsh margin

Soil Red-brown sandy clay

Rock Type Basalt; few 6-20 mm medium pebbles

Vegetation *Tecticornia auriculata* open heath over
Eragrostis pergracilis, *Chloris pectinata* and *Dactyloctenium*
radulans open tussock grassland over *Swainsona kingii* and
Nicotiana heterantha herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: N/A
Bare ground: 60%
Litter cover: 0% logs, +% twigs, +% leaves
Disturbances: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Chloris pectinata</i>	3	0.2 m	FMA06.08
<i>Cyperus bulbosus</i>	+	0.1 m	FMA01.05
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Eragrostis pergracilis</i>	15	0.2 m	FMA03.05
<i>Nicotiana heterantha</i>	5	0.7 m	FMA46.02
<i>Swainsona kingii</i>	50	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	45	1.3 m	FMA46.01

Fortescue Marsh Site FMA47

Described by Julia Mattner Date 4/05/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 785931 mE 7507165 mN
Habitat Very shallow depression
Soil Red-brown clay
Rock Type None
Vegetation *Muehlenbeckia florulenta* and *Tecticornia auriculata* closed heath over *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) and *Tecticornia* sp. (sterile) low shrubland over *Eragrostis pergracilis* scattered tussock grasses with *Nicotiana heterantha*, *Swainsona kingii* and *Marsilea hirsuta* open herbs and *Eleocharis papillosa* scattered sedges

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: SW
 Runoff rate: very slow
 Bare ground: 10%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Alternanthera nodiflora</i>	+	0.8 m	FMA04.08
<i>Cressa australis</i>	+	0.1 m	FMA45.06
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Eleocharis papillosa</i>	+	0.1 m	FMAJM03.02
<i>Eragrostis pergracilis</i>	1	0.2 m	FMA03.05
<i>Heliotropium europaeum</i>	+	0.1 m	FMA01.07
<i>Marsilea hirsuta</i>	2	0.1 m	FMA19.09
<i>Mimulus repens</i>	+	0.1 m	FMA01.04
<i>Muehlenbeckia florulenta</i>	75	1.5 m	FMA31.02
<i>Nicotiana heterantha</i>	7	1.1 m	FMA02.04
<i>Swainsona kingii</i>	6	0.1 m	FMA02.05
<i>Tecticornia auriculata</i>	+	1.2 m	FMA46.01
<i>Tecticornia</i> sp. (sterile)	4	0.5 m	FMA47.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	9	0.7 m	FMA47.01

Fortescue Marsh Site FMA48

Described by Julia Mattner Date 4/05/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 786290 mE 7507465 mN
Habitat Plain - mid-marsh
Soil Red-brown fine sandy clay (thin salt crust)
Rock Type Basalt; few 2-60 mm pebbles
Vegetation *Tecticornia auriculata* open heath over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Maireana luehmannii* scattered shrubs over *Eragrostis pergracilis*, *Chloris pectinata*, **Cenchrus ciliaris*, *Enneapogon polyphyllus* and *Dactyloctenium radulans* tussock grassland with *Cyperus bulbosus* scattered sedges and *Nicotiana heterantha*, *Swainsona kingii*, *Cullen cinereum* and *Gomphrena kanisii* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: N/A
 Runoff rate: very slow
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbances: cattle tracks and weeds

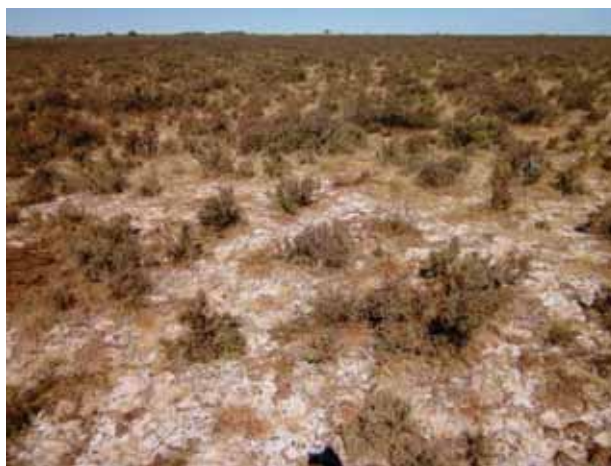
SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Aerva javanica</i>	+	0.7 m	FMA30.07
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Cullen cinereum</i>	+	0.4 m	FMA04.20
<i>Cyperus bulbosus</i>	+	0.2 m	FMA01.05
<i>Dactyloctenium radulans</i>	+	0.2 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA03.06
<i>Eragrostis pergracilis</i>	50	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Gomphrena kanisii</i>	+	0.3 m	FMA06.19
<i>Maireana luehmannii</i>	+	0.5 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.4 m	FMA02.04
<i>Swainsona kingii</i>	+	0.3 m	FMA02.05
<i>Tecticornia auriculata</i>	45	1.1 m	FMA46.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.6 m	FMA48.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA48.02

Fortescue Marsh Site FMA49

Described by Julia Mattner Date 4/05/2012 Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 786417 mE 7507948mN
Habitat Plain - upper marsh margin
Soil Red-brown fine sandy clay
Rock Type Basalt
Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia auriculata* and *Eremophila spongocarpa* low open heath over *Eragrostis pergracilis*, **Cenchrus ciliaris*, *Dactyloctenium radulans* and *Chloris pectinata* tussock grassland with *Swainsona kingii*, *Nicotiana heterantha* and *Gomphrena kanisii* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: N/A
 Runoff rate: very slow
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.7 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.2 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.5 m	FMA03.06
<i>Eragrostis pergracilis</i>	25	0.1 m	FMA03.05
<i>Eremophila spongocarpa</i>	+	0.6 m	FMA03.03
<i>Gomphrena kanisii</i>	+	0.2 m	FMA06.19
<i>Maireana luehmannii</i>	+	0.3 m	FMA49.04
<i>Nicotiana heterantha</i>	1	0.5 m	FMA02.04
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	1	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.8 m	FMA46.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	40	0.7 m	FMA49.02
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	0.5 m	FMA49.03
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	2	0.5 m	FMA49.01

Fortescue Marsh Site FMA50

Described by Julia Mattner Date 4/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 786464 mE 7508244 mN
Habitat Plain - upper marsh margin
Soil Red-brown sandy clay
Rock Type Very few 6-20 mm medium pebbles
Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) and *Eremophila spongiorcarpa* low open heath over *Eragrostis pergracilis*, *Dactyloctenium radulans*, **Cenchrus ciliaris*, *Enneapogon caerulescens* and *Enneapogon polyphyllus* very open tussock grassland with *Nicotiana heterantha*, *Swainsona kingii*, *Trianthema triquetra*, *Streptoglossa bubakii* and *Cullen cinereum* scattered herbs

**Veg Condition** Very good**Fire Age** Very old

Notes Aspect: W
 Runoff rate: very slow
 Bare ground: 90%
 Litter cover: 0% logs, +% twigs, +% leaves
 Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Cullen cinereum</i>	+	0.3 m	FMA04.20
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dysphania plantaginella</i>	+	0.05 m	FMA03.04
<i>Enneapogon caerulescens</i>	+	0.3 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	0.5 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.4 m	FMA04.14
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Muehlenbeckia florulenta</i>	+	0.5 m	FMA50.03
<i>Nicotiana heterantha</i>	+	0.5 m	FMA02.04
<i>*Portulaca oleracea</i>	+	0.05 m	FMA05.05
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Sclerolaena cuneata</i>	+	0.05 m	FMA26.05
<i>Sida fibulifera</i>	+	0.1 m	FMA13.11
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	OUT	0.7 m	FMA46.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	45	0.8 m	FMA50.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.5 m	FMA50.02
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA51

Described by Julia Mattner Date 5/05/2012

Type Quadrat 50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782920 mE 7510775 mN

Habitat Plain

Soil Red-brown clay (cryptogamic crust)

Rock Type Basalt

Vegetation *Tecticornia auriculata* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongiorcarpa* and *Maireana luehmannii* low open heath over *Eragrostis pergracilis*, *Chloris pectinata*, *Aristida latifolia* and *Aristida contorta* scattered tussock grasses with *Nicotiana heterantha*, *Cullen cinereum*, *Swainsona kingii*, *Pterocaulon sphaeranthoides* and *Peripleura obovata* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Aspect: SW
Disturbance: cattle tracks

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Amaranthus undulatus</i>	+	0.3 m	FMA51.06
<i>Aristida contorta</i>	+	0.5 m	FMA51.09
<i>Aristida latifolia</i>	+	0.8 m	FMA51.03
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+	cr	FMA51.07b
<i>Cullen cinereum</i>	2	0.4 m	FMA04.20
<i>Dysphania plantaginella</i>	+	0.1 m	FMA03.04
<i>Enneapogon caeruleus</i>	+	0.2 m	FMA06.04
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.7 m	FMA03.03
<i>Maireana luehmannii</i>	+	0.3 m	FMA12.04
<i>Nicotiana heterantha</i>	5	0.7 m	FMA51.05
<i>Peripleura obovata</i>	+	0.2 m	FMA51.08
<i>Pluchea dunlopia</i>	+	0.4 m	FMA51.10
<i>Pluchea rubelliflora</i>	+	0.2 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.7 m	FMA04.15
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Swainsona kingii</i>	1	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	3	1.1 m	FMA51.07a
<i>Tecticornia indica</i> subsp. <i>bidens</i>	50	0.6 m	FMA51.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	2	0.4 m	FMA51.04
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	1	0.4 m	FMA51.02

Fortescue Marsh Site FMA60R

Described by Julia Mattner Date 5/05/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782708 mE 7510809 mN

Habitat Upper marsh plain

Soil Red-brown clay loam

Rock Type Basalt

Vegetation *Tecticornia indica* subsp. *bidens* and *Eremophila spongicarpa* low open shrubland over *Eragrostis pergracilis*, **Cenchrus ciliaris* and *Chloris pectinata* open tussock grassland with *Swainsona kingii* and *Nicotiana heterantha* scattered herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbances: cattle tracks

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.5 m	FMA13.06
<i>Chloris pectinata</i>	+	0.5 m	FMA06.08
<i>Enneapogon caeruleus</i>	+	0.3 m	FMA06.04
<i>Eragrostis pergracilis</i>	2	0.1 m	FMA03.05
<i>Eremophila spongicarpa</i>	+	0.6 m	FMA03.03
<i>Nicotiana heterantha</i>	+	0.5 m	FMA19.04
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	8	0.5 m	FMA51.01

Fortescue Marsh Site FMA61R

Described by Julia Mattner Date 5/05/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782620 mE 7510990mN

Habitat Lower plain

Soil Red-brown clay

Rock Type Basalt

Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) and *Tecticornia auriculata* open heath over *Enneapogon polyphyllus*, *Chloris pectinata* and **Cenchrus setiger* open tussock grassland with *Swainsona kingii* and *Nicotiana heterantha* very open herbs

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>*Cenchrus setiger</i>	+	0.7 m	FMA36.18
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Enneapogon caeruleus</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Nicotiana heterantha</i>	1	0.4 m	FMA19.04
<i>Sporobolus virginicus</i>	25	0.4 m	FMA19.01
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.9 m	FMA51.07a
<i>Tecticornia indica</i> subsp. <i>bidens</i>	65	0.6 m	FMA51.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	3	0.5 m	FMA51.04

Fortescue Marsh Site FMA62R

Described by Julia Mattner Date 5/05/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782624 mE 7510993mN

Habitat Minor drainage line

Soil Red-brown clay

Vegetation **Vachellia farnesiana*, *Acacia ampliceps* and *Acacia tetragonophylla* open scrub over *Tecticornia indica* subsp. *bidens*, *Muehlenbeckia florulenta* and *Eremophila spongicarpa* low open shrubland over *Sporobolus virginicus*, *Eragrostis pergracilis* and *Eragrostis tenellula* tussock grassland with *Swainsona kingii*, *Ipomoea muelleri* and *Marsilea hirsuta* open herbs

Veg Condition Degraded

Fire Age Old

Notes Disturbances: weeds and cattle trampling

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia ampliceps</i>	10	2.8 m	FMA27.05
<i>Acacia tetragonophylla</i>	1	3.5 m	FMA16.13
<i>Alternanthera nodiflora</i>	+	0.4 m	FMA04.08
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.5 m	FMA04.09
<i>Eremophila spongicarpa</i>	+	0.8 m	FMA03.03
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Marsilea hirsuta</i>	15	0.1 m	FMA19.09
<i>Muehlenbeckia florulenta</i>	+	0.8 m	FMA19.05
<i>Sporobolus virginicus</i>	60	0.4 m	FMA19.01
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	5	0.5 m	FMA51.01
* <i>Vachellia farnesiana</i>	20	3 m	FMA19.07

Fortescue Marsh Site FMA63R

Described by Julia Mattner Date 5/05/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782560 mE 7511160mN

Habitat Plain

Soil Red-brown clay

Rock Type Basalt

Vegetation *Tecticornia auriculata* and *Acacia synchronicia* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Eremophila spongocarpa*, **Aerva javanica* and *Maireana luehmannii* low open heath over *Enneapogon polyphyllus*, *Enneapogon caeruleus*, *Eragrostis pergracilis*, *Chloris pectinata* and **Cenchrus setiger* very open tussock grassland with *Nicotiana heterantha*, *Swainsona kingii*, *Lawrencina densiflora* and *Pterocaulon sphaeranthoides* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Disturbance: grazing

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.2 m	FMA04.10
<i>*Aerva javanica</i>	+	0.5 m	FMA30.07
<i>Aristida latifolia</i>	+	0.8 m	FMA51.02
<i>*Cenchrus setiger</i>	+	0.5 m	FMA36.18
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Cullen cinereum</i>	3	0.5 m	FMA04.20
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dichanthium sericeum</i>	+	0.2 m	FMA42.02
<i>Enneapogon caeruleus</i>	+	0.3 m	FMA06.04
<i>Enneapogon polyphyllus</i>	2	0.4 m	FMA03.06
<i>Eragrostis pergracilis</i>	+	0.1 m	FMA03.05
<i>Eremophila spongocarpa</i>	+	0.8 m	FMA03.03
<i>Gomphrena kanisii</i>	+	0.2 m	FMA06.19
<i>Lawrencina densiflora</i>	+	0.2 m	FMA39.03
<i>Maireana luehmannii</i>	+	0.5 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Pterocaulon sphaeranthoides</i>	+	0.3 m	FMA04.15
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	1	1.1 m	FMA51.07a
<i>Tecticornia indica</i> subsp. <i>bidens</i>	35	0.5 m	FMA51.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA51.02

Fortescue Marsh Site FMA64R

Described by Julia Mattner Date 5/05/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782303 mE 7511356 mN

Habitat Low rise

Rock Type Calcrete

Vegetation *Acacia xiphophylla* high open shrubland over *Acacia synchronicia*, *Enchylaena tomentosa* var. *tomentosa* and *Melaleuca glomerata* shrubland over *Acacia synchronicia*, *Atriplex bunburyana*, *Eremophila spongocarpa* and *Tecticornia indica* subsp. *bidens* low open shrubland over *Eragrostis pergracilis* and *Enneapogon caerulescens* very open tussock grassland with *Goodenia forrestii*, *Stemodia grossa* and *Lawrencina densiflora* scattered herbs

Veg Condition Excellent

Fire Age Old

Notes Litter cover: +% leaves, +% twigs, +% logs
Bare ground: 90%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	7	1.5 m	FMA04.10
<i>Acacia synchronicia</i>	3	0.6 m	FMA04.10
<i>Acacia xiphophylla</i>	3	2.5 m	FMA16.08
<i>Atriplex bunburyana</i>	1	0.6 m	FMA19.15
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	2	1.3 m	FMA04.12
<i>Enneapogon caerulescens</i>	+	0.3 m	FMA06.04
<i>Eragrostis pergracilis</i>	5	0.2 m	FMA03.05
<i>Eremophila spongocarpa</i>	+	0.6 m	FMA03.03
<i>Goodenia forrestii</i>	+	0.05 m	FMA16.01
<i>Lawrencina densiflora</i>	+	0.1 m	FMA39.03
<i>Melaleuca glomerata</i>	+	1.2 m	FMA04.01
<i>Salsola australis</i>	+	0.3 m	FMA16.18
<i>Sclerolaena cornishiana</i>	+	0.2 m	FMA13.04
<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.5 m	FMA51.01

Fortescue Marsh Site FMA65R

Described by Julia Mattner Date 5/05/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 782726 mE 7511417 mN
Habitat Very low rise
Soil Red-brown loam
Rock Type Basalt
Vegetation *Tecticornia indica* subsp. *bidens*, *Acacia synchronicia*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), *Sclerolaena cornishiana* and *S. cuneata* low scattered shrubs over *Eragrostis pergracilis*, *Dactyloctenium radulans* and *Enneapogon polyphyllus* scattered tussock grasses with *Trianthema triquetra* and *Goodenia forrestii* scattered herbs

Veg Condition Very good**Fire Age** Very old

Notes Disturbance: cattle tracks
 Bare ground: 95%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.8 m	FMA04.10
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.1 m	FMA03.06
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eremophila spongicarpa</i>	+	0.5 m	FMA03.03
<i>Goodenia forrestii</i>	+	0.2 m	FMA13.01
<i>Sclerolaena cornishiana</i>	+	0.2 m	FMA13.04
<i>Sclerolaena cuneata</i>	+	0.1 m	FMA26.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.5 m	FMA51.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.4 m	FMA51.02
<i>Trianthema triquetra</i>	+	0.05 m	FMA05.06

Fortescue Marsh Site FMA70R

Described by Julia Mattner Date 5/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 775345 mE 7515642 mN

Habitat Upper marsh plain

Soil Red-brown clayey loam

Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Muellerolimon salicorniaceum* and *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low closed heath over *Eragrostis pergracilis*, *Chloris pectinata*, *Enteropogon ramosus*, *Eragrostis tenellula* and *Eragrostis elongata* very open tussock grassland over *Swainsona kingii*, *Pterocaulon sphaeranthoides*, *Evolvulus alsinoides* var. *decumbens* and *Nicotiana heterantha* very open herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbances: weeds and cattle grazing
Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 20%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aristida contorta</i>	+	0.3 m	FMA06.05
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Enteropogon ramosus</i>	+	0.5 m	FMA04.02
<i>Eragrostis elongata</i>	+	0.2 m	FMA70.04
<i>Eragrostis pergracilis</i>	2	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongiocarpa</i>	3	0.8 m	FMA03.03
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	+	0.1 m	FMA34.06
<i>Lawrenzia densiflora</i>	+	0.2 m	FMA39.03
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Muellerolimon salicorniaceum</i>	+	0.5 m	FMA70.03
<i>Nicotiana heterantha</i>	+	0.5 m	FMA19.04
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	1	0.5 m	FMA04.15
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Solanum horridum</i>	+	0.3 m	FMA13.08
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Streptoglossa odora</i>	+	0.5 m	FMA16.04
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	65	0.6 m	FMA70.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.4 m	FMA70.02
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02
<i>Xerochloa laniflora</i>	+	0.1 m	FMA18.04

Fortescue Marsh Site FMA71R

Described by Julia Mattner Date 5/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 775753 mE 7515615mN
Habitat Upper marsh plain
Soil Red-brown silty sand
Rock Type Basalt
Vegetation *Eremophila spongiorcarpa*, *Frankenia setosa*, *Trianthema glossostigma*, *Acacia synchronicia* and *Maireana carnos* low shrubland over *Eragrostis pergracilis* and *Sporobolus australasicus* scattered tussock grasses with *Lawrencia densiflora* and *Calandrinia stagnensis* scattered herbs

Veg Condition Very good**Fire Age** Very old

Notes Disturbance: cattle tracks
 Litter cover: +% leaves, +% twigs, -% logs
 Bare ground: 90%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.8 m	FMA04.10
<i>Atriplex bunburyana</i>	+	0.2 m	FMA19.15
<i>Atriplex codonocarpa</i>	+	0.1 m	FMA34.03
<i>Calandrinia stagnensis</i>	+	0.02 m	FMA71.02
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	11	0.9 m	FMA03.03
<i>Frankenia setosa</i>	3	0.4 m	FMA74.02
<i>Lawrencia densiflora</i>	+	0.2 m	FMA39.03
<i>Maireana carnos</i>	+	0.1 m	FMA36.13
<i>Maireana pyramidata</i>	+	0.9 m	FMA16.07
<i>Sclerolaena densiflora</i>	+	0.1 m	FMA71.03
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	+	0.05 m	FMA71.01
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>Trianthema glossostigma</i>	2	0.2 m	FMA36.07

Fortescue Marsh Site FMA72R

Described by Julia Mattner Date 5/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 776229 mE 7515214 mN
Habitat Slight depression
Soil Red-brown loamy clay
Rock Type Basalt
Vegetation *Melaleuca glomerata* scattered tall shrubs over *Enchylaena tomentosa* var. *tomentosa* scattered shrubs over *Eremophila spongiorcarpa*, *Tecticornia indica* subsp. *bidens*, *Sida fibulifera*, *Eremophila youngii* subsp. *lepidota* and *Senna pleurocarpa* var. *pleurocarpa* low closed heath over *Eragrostis pergracilis*, *Dactyloctenium radulans*, *Sporobolus australasicus*, *S. virginicus* and *Eragrostis tenellula* open tussock grassland with *Nicotiana heterantha*, *Pterocaulon sphaeranthoides*, *Stemodia grossa*, *Swainsona kingii* and *Portulaca pilosa* scattered herbs

**Veg Condition** Excellent**Fire Age** Old

Notes Disturbance: very minor weed infestation
 Litter cover: 3% leaves, +% twigs, -% logs
 Bare ground: 70%

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Abutilon macrum</i>	+	0.4 m	FMA72.01
<i>*Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	1.2 m	FMA04.12
<i>Eragrostis pergracilis</i>	20	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.2 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	50	0.9 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.3 m	FMA04.14
<i>Glycine canescens</i>	+	0.4 m	FMA72.03
<i>Ipomoea coptica</i>	+	0.4 m	FMA13.03
<i>Melaleuca glomerata</i>	+	3 m	FMA04.01
<i>Nicotiana heterantha</i>	1	0.2 m	FMA19.04
<i>Pluchea rubelliflora</i>	+	0.5 m	FMA04.04
<i>Portulaca pilosa</i>	+	0.2 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.6 m	FMA04.15
<i>Rhynchosia minima</i>	+	cr	FMAJ05.01
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA72.04
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>	+	0.6 m	FMA72.02
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.5 m	FMA13.14
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Solanum horridum</i>	+	0.3 m	FMA13.08
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Sporobolus virginicus</i>	+	0.4 m	FMA19.01
<i>Stemodia grossa</i>	+	0.5 m	FMA04.06
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	45	0.6 m	FMA70.01

Fortescue Marsh Site FMA73R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 782145 mE 7513477 mN

Habitat Major shallow drainage line

Soil Red-brown fine sandy clayey loam

Vegetation *Eucalyptus victrix* and *Acacia aptaneura* low open woodland over *Acacia synchronicia* high open shrubland over *Atriplex bunburyana*, *Maireana pyramidata* and *Eremophila spongiorcarpa* low shrubland over **Cenchrus ciliaris*, **Cenchrus setiger* and *Eragrostis tenellula* tussock grassland over mixed very open herbs

Veg Condition Poor

Fire Age Old

Notes Disturbance: cattle grazing
Litter cover: 5% leaves, 3% twigs, +% logs
Bare ground: 10%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia aptaneura</i>	5	4 m	FMA73.02
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	5 m	FMA35.12
<i>Acacia synchronicia</i>	3	4 m	FMA04.10
<i>Alternanthera nodiflora</i>	+	0.1 m	FMA04.08
<i>Amyema fitzgeraldii</i>	+	0.5 m	FMA73.04
<i>Atriplex bunburyana</i>	4	0.9 m	FMA19.15
<i>Boerhavia repleta</i>	+	0.5 m	FMA36.19
<i>Bothriochloa ewartiana</i>	+	0.6 m	FMA73.05
<i>*Cenchrus ciliaris</i>	20	0.8 m	FMA13.06
<i>*Cenchrus setiger</i>	5	0.7 m	FMA36.18
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Cleome viscosa</i>	+	0.5 m	FMA16.09
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis tenellula</i>	3	0.4 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	3	0.7 m	FMA03.03
<i>Eucalyptus victrix</i>	2	5 m	FMA73.01
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Maireana pyramidata</i>	4	0.7 m	FMA16.07
<i>*Malvastrum americanum</i>	+	0.6 m	FMA04.21
<i>Pluchea rubelliflora</i>	+	0.4 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Ptilotus gomphrenoides</i>	+	0.1 m	FMA73.07
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	+	0.5 m	FMA73.03
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.5 m	FMA13.14
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	+	0.9 m	FMA73.06
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA74R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 781515 mE 7513126mN

Habitat Upper marsh wash plain

Soil Red-brown fine sandy loam

Vegetation *Acacia synchronicia*, **Vachellia farnesiana* and *Acacia aptaneura* scattered tall shrubs over *Eremophila spongiocarpa*, *Atriplex bunburyana*, *Tecticornia indica* subsp. *bidens*, *Sclerolaena cuneata* and *Sclerolaena recurvicauspis* low open heath over *Eragrostis pergracilis*, *Eragrostis tenellula*, **Cenchrus ciliaris* and **Cenchrus setiger* very open tussock grassland

Veg Condition Very good

Fire Age Very old

Notes



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia aptaneura</i>	+	3.5 m	FMA73.02
<i>Acacia synchronicia</i>	1	3 m	FMA04.10
<i>Atriplex bunburyana</i>	1	0.9 m	FMA19.15
<i>*Cenchrus ciliaris</i>	2	0.8 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.8 m	FMA36.18
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enteropogon ramosus</i>	+	0.5 m	FMA04.02
<i>Eragrostis pergracilis</i>	1	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongiocarpa</i>	28	0.9 m	FMA03.03
<i>Frankenia setosa</i>	+	0.3 m	FMA74.02
<i>Sclerolaena cuneata</i>	+	0.2 m	FMA26.05
<i>Sclerolaena recurvicauspis</i>	+	0.3 m	FMA74.01
<i>Sporobolus australasicus</i>	+	0.7 m	FMA16.19
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	0.7 m	FMA70.01
<i>Trianthema triquetra</i>	+	0.2 m	FMA05.06
<i>Trianthema glossostigma</i>	+	0.2 m	FMA36.07
<i>*Vachellia farnesiana</i>	+	3.5 m	FMA19.07

Fortescue Marsh Site FMA75R

Described by Julia Mattner Date 6/06/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 780725 mE 7513190mN

Habitat Upper marsh plain

Soil Red-brown sandy clay

Rock Type Basalt

Vegetation *Acacia synchronicia* scattered shrubs over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorcarpa*, *Senna* sp. Karijini (M.E. Trudgen 10392), **Aerva javanica* and *Solanum lasiophyllum* low closed heath over *Eragrostis pergracilis*, **Cenchrus ciliaris*, *Panicum decompositum* and *Chloris pectinata* very open tussock grassland with *Swainsona kingii*, *Streptoglossa bubakii* and *Gomphrena kanisii* scattered herbs



Veg Condition Very good

Fire Age Very old

Notes Disturbance: weeds
Litter cover: 1% leaves, 1% twigs, -% logs
Bare ground: 75%

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.4 m	FMA04.10
<i>*Aerva javanica</i>	+	0.6 m	FMA30.07
<i>*Cenchrus ciliaris</i>	3	0.3 m	FMA13.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Cullen cinereum</i>	+	0.2 m	FMA04.20
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.1 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Eragrostis pergracilis</i>	2	0.1 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	15	0.6 m	FMA03.03
<i>Gomphrena kanisii</i>	+	0.1 m	FMA06.19
<i>Nicotiana heterantha</i>	+	0.4 m	FMA19.04
<i>Panicum decompositum</i>	+	0.8 m	FMA21.08
<i>*Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Pterocaulon sphaeranthoides</i>	1	0.7 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.9 m	FMA16.11
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.4 m	FMA13.14
<i>*Setaria verticillata</i>	+	0.2 m	FMA30.06
<i>Solanum lasiophyllum</i>	+	0.4 m	FMA13.10
<i>Streptoglossa bubakii</i>	+	0.4 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	60	0.5 m	FMA70.01
<i>Xerochloa laniflora</i>	+	0.1 m	FMA18.04

Fortescue Marsh Site FMA76R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 780536 mE 7513315mN

Habitat Upper marsh plain

Soil Red-brown clay

Rock Type Basalt

Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorcarpa* and *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low closed heath over *Enneapogon polyphyllus*, *Eragrostis tenellula*, **Cenchrus ciliaris* and *Chloris pectinata* very open tussock grassland with *Salsola australis*, **Portulaca oleracea*, *Trianthema triquetra* and *Sclerolaena cuneata* scattered herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbances: weeds, cattle tracks
Litter cover: 1% leaves, 1% twigs, -% logs
Bare ground: 90%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.3 m	FMA36.18
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon polyphyllus</i>	2	0.2 m	FMA03.06
<i>Eragrostis tenellula</i>	1	0.2 m	FMA33.08
<i>Eremophila spongiorcarpa</i>	+	0.7 m	FMA03.03
<i>*Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Salsola australis</i>	+	0.5 m	FMA39.04
<i>Sclerolaena cuneata</i>	+	0.2 m	FMA26.05
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Tecticornia indica</i> subsp. <i>bidens</i>	75	0.4 m	FMA70.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA77R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 780381 mE 7513441 mN

Habitat Creekline

Soil Fine sandy clay

Vegetation *Eucalyptus victrix* low open woodland over *Acacia synchronicia* and **Vachellia farnesiana* high shrubland over *Acacia synchronicia*, *Acacia tetragonophylla*, *Eremophila youngii* subsp. *lepidota* and *Acacia coriacea* subsp. *pendens* shrubland over *Eremophila spongiorcarpa*, *Tecticornia indica* subsp. *bidens* and *Enchylaena tomentosa* var. *tomentosa* low scattered shrubs over *Sporobolus virginicus*, **Cenchrus setiger*, **Cenchrus ciliaris* and *Panicum decompositum* closed tussock grassland with *Atriplex codonocarpa*, *Neptunia dimorphantha* and **Malvastrum americanum* scattered herbs



Veg Condition Good

Fire Age Old

Notes Disturbances: weeds and cattle tracks
Litter cover: 2% leaves, +% twigs, +% logs
Bare ground: 25%

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	1.2 m	FMA35.12
<i>Acacia synchronicia</i>	13	1.5 m	FMA04.10
<i>Acacia synchronicia</i>	12	2.2 m	FMA04.10
<i>Acacia tetragonophylla</i>	1	1.8 m	FMA16.13
<i>Atalaya hemiglauc</i>	+	1.1 m	NC
<i>Atriplex codonocarpa</i>	+	0.1 m	FMA34.03
<i>*Cenchrus ciliaris</i>	+	0.4 m	FMA13.06
<i>*Cenchrus setiger</i>	29	0.7 m	FMA36.18
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8 m	FMA04.12
<i>Eragrostis tenellula</i>	+	0.3 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.4 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	1.2 m	FMA04.14
<i>Eucalyptus victrix</i>	2	8 m	FMA73.01
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>*Malvastrum americanum</i>	+	0.4 m	FMA04.21
<i>Muehlenbeckia florulenta</i>	+	0.9 m	FMA19.05
<i>Neptunia dimorphantha</i>	+	0.1 m	FMA33.09
<i>Panicum decompositum</i>	+	0.5 m	FMA21.08
<i>Sporobolus virginicus</i>	40	0.3 m	FMA19.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	1	0.4 m	FMA70.01
<i>Trianthema ufoensis</i>	+	0.05 m	FMA77.01
<i>*Vachellia farnesiana</i>	1	2.4 m	FMA19.07

Fortescue Marsh Site FMA78R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 780041 mE 7513280mN
Habitat Low rise in upper marsh
Soil Red-brown sandy loam
Rock Type Gravel veneer
Vegetation *Acacia synchronicia* scattered shrubs over *Sclerolaena cuneata*, *Sclerolaena densiflora*, *Frankenia setosa* and *Maireana carnososa* low open shrubland over *Eragrostis xerophila*, *Aristida contorta* and **Cenchrus ciliaris* scattered tussock grasses with *Streptoglossa bubakii* and *Trianthema triquetra* scattered herbs

Veg Condition Very good**Fire Age** Old

Notes Disturbance: horse pads
 Litter cover: +% leaves, +% twigs, -% logs
 Bare ground: 95%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.9 m	FMA04.10
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
<i>Boerhavia repleta</i>	+	0.2 m	FMA36.19
<i>*Cenchrus ciliaris</i>	+	0.5 m	FMA13.06
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Eragrostis xerophila</i>	+	0.5 m	FMA78.01
<i>Eremophea spinosa</i>	+	0.3 m	FMA78.03
<i>Eremophila cuneifolia</i>	+	0.7 m	FMA24.06
<i>Eremophila spongocarpa</i>	+	0.9 m	FMA03.03
<i>Frankenia setosa</i>	+	0.4 m	FMA74.02
<i>Maireana carnososa</i>	+	0.3 m	FMA36.13
<i>Salsola australis</i>	+	0.4 m	FMA39.04
<i>Sclerolaena cuneata</i>	2	0.4 m	FMA26.05
<i>Sclerolaena densiflora</i>	1	0.3 m	FMA78.02
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06
<i>Xerochloa laniflora</i>	+	0.1 m	FMA18.04

Fortescue Marsh Site FMA79R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 780937 mE 7512982 mN

Habitat Low rise in upper marsh

Rock Type Calcrete

Vegetation *Acacia synchronicia* scattered tall shrubs over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorarpa*, *Sclerolaena beaugleholei* and *Eremophea spinosa* low open heath over *Eragrostis pergracilis*, *Eragrostis xerophila*, *Enneapogon caeruleus* and **Cenchrus ciliaris* very open tussock grassland with *Goodenia forrestii* and *Swainsona kingii* scattered herbs

Veg Condition Very good

Fire Age Old

Notes Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 80%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1	2.8 m	FMA04.10
<i>*Cenchrus ciliaris</i>	2	0.6 m	FMA13.06
<i>Chenopodium auricomum</i>	+	0.2 m	FMA17.06
<i>Enneapogon caeruleus</i>	+	0.1 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Eragrostis pergracilis</i>	1	0.3 m	FMA03.05
<i>Eragrostis xerophila</i>	+	0.5 m	FMA78.01
<i>Eremophea spinosa</i>	+	0.2 m	FMA78.03
<i>Eremophila spongiorarpa</i>	11	0.7 m	FMA03.03
<i>Goodenia forrestii</i>	1	0.2 m	FMA16.01
<i>Maireana amoena</i>	+	0.3 m	FMA05.01
<i>Sclerolaena beaugleholei</i>	+	0.2 m	FMA79.02
<i>Senna glaucifolia</i>	+	0.2 m	FMA79.01
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.5 m	FMA13.14
<i>Sida fibulifera</i>	+	0.3 m	FMA13.11
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20	0.6 m	FMA70.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02
<i>Trianthema glossostigma</i>	+	0.2 m	FMA36.07

Fortescue Marsh Site FMA80R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 781320 mE 7512706 mN

Habitat Creekline

Soil Red-brown sandy clay

Vegetation *Eucalyptus victrix* low open woodland over **Vachellia farnesiana* and *Acacia synchronicia* high open shrubland over *Acacia synchronicia* and **Vachellia farnesiana* shrubland over *Eremophila spongocarpa* and *Tecticornia indica* subsp. *bidens* low open shrubland over *Sporobolus virginicus*, **Cenchrus ciliaris*, *Bothriochloa ewartiana*, *Eragrostis pergracilis* and *Eragrostis tenellula* tussock grassland with *Pluchea rubelliflora*, *Swainsona kingii* and *Pterocaulon sphaeranthoides* very open herbs

Veg Condition Good

Fire Age Old

Notes Disturbances: weeds and cattle tracks
Litter cover: 2% leaves, +% twigs, +% logs
Bare ground: 40%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	1.4 m	FMA35.12
<i>Acacia synchronicia</i>	18	1.4 m	FMA04.10
<i>Acacia synchronicia</i>	2	3 m	FMA04.10
<i>Alternanthera nodiflora</i>	+	0.1 m	FMA04.08
<i>Bothriochloa ewartiana</i>	2	1.2 m	FMA80.01
<i>*Cenchrus ciliaris</i>	5	0.4 m	FMA13.06
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	+	0.1 m	FMA04.07
<i>Cullen cinereum</i>	+	0.3 m	FMA04.20
<i>Dichanthium sericeum</i>	+	0.3 m	FMA42.02
<i>*Echinochloa colona</i>	+	1.2 m	FMA19.10
<i>Eragrostis pergracilis</i>	1	0.1 m	FMA03.05
<i>Eragrostis tenellula</i>	1	0.4 m	FMA04.09
<i>Eremophila spongocarpa</i>	1	0.6 m	FMA03.03
<i>Eriachne benthamii</i>	+	0.5 m	FMA80.03
<i>Eucalyptus victrix</i>	3	7 m	FMA73.01
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Lotus cruentus</i>	+	0.2 m	FMA80.02
<i>Neptunia dimorphantha</i>	+	0.1 m	FMA33.09
<i>Panicum decompositum</i>	+	1.1 m	FMA21.08
<i>Pluchea rubelliflora</i>	2	0.5 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	+	0.3 m	FMA04.15
<i>Sporobolus australasicus</i>	+	0.2 m	FMA16.19
<i>Sporobolus virginicus</i>	40	0.2 m	FMA19.01
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	1	0.4 m	FMA70.01
<i>*Vachellia farnesiana</i>	3	3 m	FMA19.07
<i>*Vachellia farnesiana</i>	2	1.2 m	FMA19.07

Fortescue Marsh Site FMA81R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 781692 mE 7512731 mN

Habitat Floodplain

Soil Red-brown clayey loam

Vegetation **Vachellia farnesiana*, *Acacia synchronicia* high shrubland over *Acacia synchronicia*, **Vachellia farnesiana* open shrubland over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa*, *Maireana pyramidata* low closed heath over *Sporobolus virginicus*, **Cenchrus ciliaris*, *Eragrostis tenellula*, *Enteropogon ramosus* tussock grassland with *Pterocaulon sphaeranthoides*, *Swainsona kingii*, *Cullen cinereum*, *Pluchea rubelliflora* very open herbs

Veg Condition Good

Notes Disturbance: weeds
Litter cover: 1% leaves, +% twigs, +% logs
Bare ground: 20%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1	1.5 m	FMA04.10
<i>Acacia synchronicia</i>	12	3 m	FMA04.10
<i>Atriplex bunburyana</i>	+	0.2 m	FMA19.15
* <i>Cenchrus ciliaris</i>	1	0.5 m	FMA13.06
* <i>Cenchrus setiger</i>	+	0.6 m	FMA36.18
<i>Chenopodium auricomum</i>	+	0.5 m	FMA17.06
<i>Cullen cinereum</i>	+	0.4 m	FMA04.20
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dichanthium sericeum</i>	+	0.1 m	FMA42.02
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.6 m	FMA04.02
<i>Eragrostis tenellula</i>	1	0.3 m	FMA04.09
<i>Eremophila spongiocarpa</i>	15	0.9 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.8 m	FMA04.14
<i>Ipomoea muelleri</i>	+	cr	FMA06.16
<i>Lotus cruentus</i>	+	0.2 m	FMA80.02
<i>Maireana pyramidata</i>	+	0.8 m	FMA16.07
<i>Panicum decompositum</i>	+	0.9 m	FMA21.08
<i>Pluchea dunlopii</i>	+	0.2 m	FMA04.05
<i>Pluchea rubelliflora</i>	+	0.4 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	1	1.5 m	FMA04.15
<i>Sida fibulifera</i>	+	0.15 m	FMA13.11
<i>Sporobolus virginicus</i>	35	0.1 m	FMA19.01
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	50	0.7 m	FMA70.01
* <i>Vachellia farnesiana</i>	14	3 m	FMA19.07
* <i>Vachellia farnesiana</i>	1	1.4 m	FMA19.07

Fortescue Marsh Site FMA82R

Described by Julia Mattner Date 6/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 781767 mE 7512263mN

Habitat Mid-marsh plain

Soil Red-brown loamy clay

Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa*, *Eremophila youngii* subsp. *lepidota*, *Tecticornia auriculata* low closed heath over *Sporobolus virginicus*, *Chloris pectinata* very open tussock grassland with *Pterocaulon sphaeranthoides* scattered herbs

Veg Condition Excellent

Fire Age Very old

Notes Litter cover: +% leaves, +% twigs, -% logs
 Bare ground: 80%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Aeschynomene indica</i>	+	0.2 m	FMA23.03
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Dichanthium sericeum</i>	+	0.2 m	FMA42.02
<i>Eragrostis tenellula</i>	+	0.4 m	FMA33.08
<i>Eremophila spongiocarpa</i>	+	0.5 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.9 m	FMA04.14
<i>Leptochloa fusca</i> subsp. <i>fusca</i>	+	0.3 m	FMA82.02
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Sporobolus virginicus</i>	2	0.2 m	FMA19.01
<i>Tecticornia auriculata</i>	+	0.9 m	FMA51.07a
<i>Tecticornia indica</i> subsp. <i>bidens</i>	75	0.5 m	FMA70.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.5 m	FMA82.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02

Fortescue Marsh Site FMA83R

Described by Julia Mattner Date 6/06/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 781930 mE 7512070 mN

Habitat Mid-marsh plain

Soil Red-brown loam

Vegetation *Tecticornia indica* subsp. *bidens*, *Eremophila spongiocarpa* and *Eremophila youngii* subsp. *lepidota* low closed heath over *Chloris pectinata*, *Enneapogon caerulescens*, *Enneapogon polyphyllus* and *Sporobolus virginicus* very open tussock grassland over *Pterocaulon sphaeranthoides*, *Pluchea rubelliflora*, *Pluchea dentex* and *Nicotiana heterantha* very open herbs

Veg Condition Very good

Fire Age Old

Notes Disturbance: some grazing
Litter cover: 1% leaves, +% twigs, -% logs
Bare ground: 15%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Abutilon amplum</i>	+	1.2 m	FMA83.01
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
* <i>Cenchrus ciliaris</i>	+	0.5 m	FMA13.06
<i>Chloris pectinata</i>	3	0.4 m	FMA06.08
<i>Dichanthium sericeum</i>	+	0.4 m	FMA42.02
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA03.06
<i>Eragrostis pergracilis</i>	+	0.4 m	FMA03.05
<i>Eremophila spongiocarpa</i>	3	0.8 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.3 m	FMA04.14
<i>Eriachne benthamii</i>	+	0.4 m	FMA80.03
<i>Gomphrena kanisii</i>	+	0.2 m	FMA06.19
<i>Iseilema vaginiflorum</i>	2	0.3 m	FMA06.22
<i>Maireana luehmannii</i>	+	0.4 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.8 m	FMA19.04
<i>Pluchea dentex</i>	+	0.4 m	FMA83.02
<i>Pluchea dunlopia</i>	+	0.4 m	FMA04.05
<i>Pluchea rubelliflora</i>	+	0.3 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	3	0.9 m	FMA04.15
<i>Sporobolus virginicus</i>	2	0.3 m	FMA19.01
<i>Stemodia grossa</i>	+	0.7 m	FMA04.06
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	65	0.6 m	FMA70.01
* <i>Vachellia farnesiana</i>	+	0.5 m	FMA19.07

Fortescue Marsh Site FMA84R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 764256 mE 7519219 mN

Habitat Upper marsh plain

Soil Orange fine sandy clay

Vegetation *Tecticornia indica* subsp. *bidens* low closed heath over *Chloris pectinata*, **Cenchrus ciliaris* scattered tussock grasses with *Nicotiana heterantha* and *Pluchea rubelliflora* very open herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbances: cattle tracks, very minor weed infestation
Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 30%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>*Cenchrus ciliaris</i>	+	0.2 m	FMA13.06
<i>Chloris pectinata</i>	+	0.3 m	FMA06.08
<i>Enteropogon ramosus</i>	+	0.4 m	FMA04.02
<i>Eremophila spongicarpa</i>	+	0.2 m	FMA03.03
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Nicotiana heterantha</i>	2	0.5 m	FMA19.04
<i>Pluchea rubelliflora</i>	1	0.2 m	FMA84.01
<i>Portulaca pilosa</i>	+	0.1 m	FMA04.16
<i>Pterocaulon sphaeranthoides</i>	+	0.1 m	FMA04.15
<i>Stemodia grossa</i>	+	0.1 m	FMA04.06
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	80	0.4 m	FMA70.01

Fortescue Marsh Site FMA85R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 764710 mE 7519358mN

Habitat Broad drainage plain - upper marsh

Soil Red-brown fine sandy clayey loam

Vegetation *Acacia synchronicia* scattered tall shrubs over *Acacia synchronicia* open scrub over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorcarpa* and *Eremophila youngii* subsp. *lepidota* low open shrubland over *Eragrostis pergracilis*, *Eragrostis tenellula* and *Chloris pectinata* scattered tussock grasses with *Marsilea hirsuta*, *Pluchea dunlopia* and *Pluchea rubelliflora* very open herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbances: cattle tracks, very minor weeds
Litter cover: +% leaves, +% twigs, +% logs
Bare ground: 70%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+	2.5 m	FMA35.12
<i>Acacia synchronicia</i>	2	3 m	FMA04.10
<i>Acacia synchronicia</i>	3	1.4 m	FMA04.10
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
* <i>Cenchrus ciliaris</i>	+	0.6 m	FMA13.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Cymbopogon ambiguus</i>	+	1.2 m	FMA85.01
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.9 m	FMA04.12
<i>Enteropogon ramosus</i>	+	0.5 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongiorcarpa</i>	+	0.7 m	FMA03.03
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.8 m	FMA04.14
<i>Maireana luehmannii</i>	+	0.2 m	FMA12.04
<i>Marsilea hirsuta</i>	1	0.1 m	FMA19.09
<i>Pluchea dunlopia</i>	1	0.7 m	FMA87.02
<i>Pluchea rubelliflora</i>	+	0.5 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	+	0.5 m	FMA04.15
<i>Sclerolaena cuneata</i>	+	0.3 m	FMA26.05
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	35	0.4 m	FMA70.01
<i>Xerochloa laniflora</i>	+	0.2 m	FMA18.04

Fortescue Marsh Site FMA86R

Described by Julia Mattner Date 7/06/2012

Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 765087 mE 7519394 mN

Habitat Very slightly raised plain - upper marsh

Soil Red-brown sandy clay loam

Rock Type Basalt

Vegetation *Tecticornia indica* subsp. *bidens* and *Eremophila spongiorcarpa* low open shrubland over *Eragrostis pergracilis* open tussock grassland with *Nicotiana heterantha*, *Streptoglossa bubakii* scattered herbs

Veg Condition Excellent

Fire Age Very old

Notes Disturbance: very minor weeds
Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 80%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
<i>Boerhavia coccinea</i>	+	0.2 m	FMA86.01
<i>Cleome viscosa</i>	+	0.3 m	FMA16.09
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Enneapogon polyphyllus</i>	+	0.2 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.3 m	FMA04.02
<i>Eragrostis pergracilis</i>	15	0.2 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	0.5 m	FMA03.03
* <i>Flaveria trinervia</i>	+	0.3 m	FMA13.07
<i>Lawrencia densiflora</i>	+	0.1 m	FMA39.03
<i>Maireana triptera</i>	+	0.1 m	FMA05.03
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
* <i>Portulaca oleracea</i>	+	0.1 m	FMA05.05
<i>Pterocaulon sphaeranthoides</i>	+	0.4 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.1 m	FMA16.11
<i>Sclerolaena cornishiana</i>	+	0.2 m	FMA13.04
<i>Sclerolaena cuneata</i>	+	0.2 m	FMA26.05
<i>Solanum horridum</i>	+	0.1 m	FMA13.08
<i>Solanum lasiophyllum</i>	+	0.5 m	FMA13.10
<i>Streptoglossa bubakii</i>	+	0.2 m	FMA06.12
<i>Swainsona kingii</i>	+	0.1 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	2	0.4 m	FMA70.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02
<i>Trianthema triquetra</i>	+	0.1 m	FMA05.06

Fortescue Marsh Site FMA87R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 765517 mE 7519563 mN

Habitat Hummocky plain - upper marsh

Soil Red-brown clay

Vegetation *Acacia synchronicia* scattered tall shrubs over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorcarpa* and *Pluchea dunlopia* low open heath over *Eragrostis pergracilis*, *Chloris pectinata* and *Panicum decompositum* open tussock grassland over *Pterocaulon sphaeranthoides*, *Pluchea rubelliflora* and *Stemodia grossa* very open herbs

Veg Condition Very good

Fire Age Very old

Notes Disturbance: very minor weeds
Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 70%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1	2.2 m	FMA04.10
<i>Aristida contorta</i>	+	0.2 m	FMA06.05
<i>Aristida latifolia</i>	+	1.2 m	FMA87.03
* <i>Cenchrus ciliaris</i>	+	0.3 m	FMA13.06
<i>Chloris pectinata</i>	+	0.2 m	FMA06.08
<i>Dactyloctenium radulans</i>	+	0.1 m	FMA04.23
<i>Enneapogon polyphyllus</i>	+	0.3 m	FMA03.06
<i>Eragrostis pergracilis</i>	15	0.2 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	4	0.9 m	FMA03.03
<i>Panicum decompositum</i>	+	0.8 m	FMA21.08
<i>Pluchea dunlopia</i>	1	0.9 m	FMA87.02
<i>Pluchea ferdinandi-muelleri</i>	+	0.4 m	FMA87.01
<i>Pluchea rubelliflora</i>	1	0.5 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	5	1.2 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.3 m	FMA16.11
<i>Ptilotus obovatus</i>	+	0.6 m	FMA16.06
<i>Sporobolus australasicus</i>	+	0.1 m	FMA16.19
<i>Stemodia grossa</i>	+	0.4 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.3 m	FMA06.12
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	35	0.5 m	FMA70.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.3 m	FMA51.02
<i>Trianthema triquetra</i>	+	0.2 m	FMA05.06

Fortescue Marsh Site FMA88R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin
MGA Zone 50 765946 mE 7519161 mN
Habitat Low rise
Soil Light brown fine sandy loam
Rock Type Calcrete
Vegetation *Acacia synchronicia* scattered shrubs over *Sclerolaena cornishiana*, *Solanum lasiophyllum*, *Tecticornia indica* subsp. *bidens*, *Maireana appressa* and *Eremophila spongiorcarpa* low open shrubland over *Eragrostis pergracilis*, **Cenchrus ciliaris*, **Cenchrus setiger*, *Enteropogon ramosus*, *Enneapogon caerulescens* tussock grassland with *Pterocaulon sphaeranthoides*, *Goodenia forrestii*, *Nicotiana heterantha*, **Flaveria trinervia*, **Malvastrum americanum* scattered herbs

Veg Condition Very good**Fire Age** Old

Notes Litter cover: +% leaves, +% twigs, +% logs
 Bare ground: 80%

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.5 m	FMA04.10
<i>*Cenchrus ciliaris</i>	+	0.6 m	FMA13.06
<i>*Cenchrus setiger</i>	+	0.5 m	FMA36.18
<i>Enneapogon caerulescens</i>	+	0.2 m	FMA06.04
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	35	0.3 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	0.8 m	FMA03.03
<i>Euphorbia australis</i>	+	0.05 m	FMA13.02
<i>*Flaveria trinervia</i>	+	0.2 m	FMA13.07
<i>Goodenia forrestii</i>	+	0.2 m	FMA13.01
<i>Lawrenia densiflora</i>	+	0.2 m	FMA39.03
<i>Maireana appressa</i>	2	0.9 m	FMA88.01
<i>Maireana luehmannii</i>	+	0.3 m	FMA12.04
<i>Maireana pyramidata</i>	+	0.6 m	FMA16.07
<i>Maireana triptera</i>	+	0.2 m	FMA05.03
<i>*Malvastrum americanum</i>	+	0.4 m	FMA04.21
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Pluchea dunlopia</i>	+	0.4 m	FMA87.02
<i>Pterocaulon sphaeranthoides</i>	+	0.8 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.5 m	FMA16.11
<i>Sclerolaena cornishiana</i>	1	0.2 m	FMA13.04
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.5 m	FMA13.14
<i>Sida fibulifera</i>	+	0.3 m	FMA13.11
<i>Solanum lasiophyllum</i>	+	0.7 m	FMA13.10
<i>Stemodia grossa</i>	+	0.5 m	FMA04.06
<i>Streptoglossa bubakii</i>	+	0.3 m	FMA06.12
<i>Tecticornia indica</i> subsp. <i>bidens</i>	11	0.7 m	FMA70.01
<i>Tragus australianus</i>	+	0.1 m	FMA39.05

Fortescue Marsh Site FMA89R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 765584 mE 7519137 mN

Habitat Mid-marsh plain

Soil Red-brown clay

Vegetation *Tecticornia indica* subsp. *bidens*, *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063), *Tecticornia auriculata*, *Eremophila spongiorcarpa* low closed heath over *Enteropogon ramosus*, *Chloris pectinata*, *Eragrostis pergracilis* scattered tussock grasses with *Pterocaulon sphaeranthoides*, *Nicotiana heterantha*, *Pluchea rubelliflora*, *Swainsona kingii* scattered herbs

Veg Condition Very good

Fire Age Old

Notes Disturbances: cattle grazing and tracks
Litter cover: +% leaves, +% twigs, -% logs
Bare ground: 10%



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Chloris pectinata</i>	1	0.5 m	FMA06.08
<i>Enneapogon polyphyllus</i>	+	0.4 m	FMA03.06
<i>Enteropogon ramosus</i>	+	0.7 m	FMA04.02
<i>Eragrostis pergracilis</i>	+	0.2 m	FMA03.05
<i>Eremophila spongiorcarpa</i>	+	0.9 m	FMA03.03
<i>Maireana luehmannii</i>	+	0.4 m	FMA12.04
<i>Nicotiana heterantha</i>	+	0.6 m	FMA19.04
<i>Pluchea dunlopii</i>	+	0.5 m	FMA87.02
<i>Pluchea rubelliflora</i>	+	0.4 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	+	0.6 m	FMA04.15
<i>Streptoglossa bubakii</i>	+	0.4 m	FMA06.12
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia auriculata</i>	+	0.8 m	FMA51.07a
<i>Tecticornia indica</i> subsp. <i>bidens</i>	60	0.6 m	FMA70.01
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	15	0.7 m	FMADB07.01
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	0.5 m	FMA51.02

Fortescue Marsh Site FMA90R

Described by Julia Mattner Date 7/06/2012 Type Relevé ~50 x 50 m

Location Northern Fortescue Marsh margin

MGA Zone 50 764090 mE 7519115 mN

Habitat Very shallow depression

Soil Light-brown sandy loam

Rock Type Calcrete

Vegetation *Melaleuca glomerata* high shrubland over *Acacia synchronicia* scattered shrubs over *Sporobolus virginicus*, *Eragrostis pergracilis* and *Eragrostis tenellula* tussock grassland with *Pterocaulon sphaeranthoides*, *Cullen cinereum*, **Malvastrum americanum* and *Swainsona kingii* herbs

Veg Condition Good

Fire Age Old

Notes Litter cover: 1% leaves, +% twigs, -% logs



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	2	1.5 m	FMA04.10
<i>Acacia tetragonophylla</i>	4	4 m	FMA16.13
<i>Alternanthera nodiflora</i>	+	0.2 m	FMA04.08
<i>Cullen cinereum</i>	+	0.6 m	FMA04.20
* <i>Echinochloa colona</i>	+	0.3 m	FMA19.10
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+	0.8 m	FMA04.12
<i>Eragrostis pergracilis</i>	13	0.2 m	FMA03.05
<i>Eragrostis tenellula</i>	+	0.4 m	FMA04.09
<i>Eremophila spongicarpa</i>	1	0.9 m	FMA03.03
* <i>Flaveria trinervia</i>	+	0.2 m	FMA13.07
* <i>Malvastrum americanum</i>	+	0.7 m	FMA04.21
<i>Melaleuca glomerata</i>	25	5 m	FMA04.01
<i>Neptunia dimorphantha</i>	+	0.2 m	FMA33.09
<i>Nicotiana heterantha</i>	+	0.4 m	FMA19.04
<i>Pluchea dunlopia</i>	+	0.8 m	FMA87.02
<i>Pluchea rubelliflora</i>	+	0.6 m	FMA04.04
<i>Pterocaulon sphaeranthoides</i>	20	0.8 m	FMA04.15
<i>Ptilotus nobilis</i> var. <i>nobilis</i>	+	0.4 m	FMA16.11
<i>Rhynchosia minima</i>	+	cr	FMAJM05.01
<i>Samolus repens</i> var. <i>floribundus</i>	+	0.5 m	FMA90.01
<i>Setaria dielsii</i>	+	0.2 m	FMA12.07
<i>Sida fibulifera</i>	+	0.2 m	FMA13.11
<i>Solanum lasiophyllum</i>	+	0.7 m	FMA13.10
<i>Sporobolus virginicus</i>	35	0.5 m	FMA19.01
<i>Stemodia grossa</i>	+	0.6 m	FMA04.06
<i>Swainsona kingii</i>	+	0.2 m	FMA02.05
<i>Tecticornia indica</i> subsp. <i>bidens</i>	15	0.7 m	FMA70.01

Fortescue Marsh Site XCM01

Described by Kellie McMaster Date 7/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 782517mE 7512081 mN

Habitat Alluvial plain

Soil Red-brown clay

Rock Type Ironstone

Vegetation *Eremophila spongiorcarpa*, *Sclerolaena cuneata* and *Atriplex bunburyana* low open shrubland over *Dactyloctenium radulans* and *Panicum decompositum* scattered tussock grasses over *Portulaca oleracea* and *Trianthema ufoensis* scattered herbs

Veg Condition Very good

Fire Age Very old

Notes Aspect: S

Bare ground: 94%

Litter cover: -% logs, +% twigs, +% leaves

Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.5 m	NC
<i>Aristida contorta</i>	+	0.4 m	XCM01.05
<i>Atriplex bunburyana</i>	1	0.5 m	NC
<i>Boerhavia paludosa</i>	+	0.05 m	XCM01.02
* <i>Cenchrus ciliaris</i>	+	0.3 m	NC
<i>Chloris pectinata</i>	+	0.1 m	XCM01.03
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
<i>Enneapogon polyphyllus</i>	+	0.2 m	NC
<i>Eragrostis desertorum</i>	+	0.4 m	XCM01.04
<i>Eremophila cuneifolia</i>	+	0.7 m	NC
<i>Eremophila spongiorcarpa</i>	4	0.4 m	NC
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	0.4 m	NC
<i>Panicum decompositum</i>	+	0.5 m	NC
* <i>Portulaca oleracea</i>	+	0.05 m	XCM01.06
<i>Sclerolaena cuneata</i>	2	0.5 m	XCM01.01
<i>Solanum lasiophyllum</i>	+	0.4 m	NC
<i>Sporobolus australasicus</i>	+	0.1 m	NC
<i>Trianthema ufoensis</i>	+	0.1 m	XCM01.07

Fortescue Marsh **Site** XCM02

Described by Kellie McMaster **Date** 7/05/2013 **Type** Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 782990 mE 7512513 mN

Habitat Alluvial plain

Soil Red-brown clay

Rock Type Ironstone

Vegetation *Atriplex bunburyana* and *Sclerolaena cuneata* scattered low shrubland

Veg Condition Very good

Fire Age Very old

Notes Aspect: S
Bare ground: 98%
Litter cover: -% logs, -% twigs, +% leaves
Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.5 m	NC
<i>Atriplex bunburyana</i>	+	0.5 m	NC
<i>Brachyachne prostrata</i>	+	0.1 m	XCM02.01
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
* <i>Portulaca oleracea</i>	+	0.05 m	XCM01.06
<i>Sclerolaena cuneata</i>	1%	0.3 m	XCM01.01
<i>Sporobolus australasicus</i>	+	0.1 m	NC
<i>Trianthema ufoensis</i>	+	0.1 m	XCM01.07

Fortescue Marsh **Site** XCM03R

Described by Kellie McMaster **Date** 7/05/2013

Type **Relevé** ~50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 781285 mE 7513011 mN

Habitat Alluvial plain

Soil Red-brown clay

Vegetation *Tecticornia indica* subsp. *bidens* low shrubland
over mixed scattered tussock grassland

Veg Condition Very Good

Fire Age Very Old



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Aristida contorta</i>	1%	0.2 m	XCM01.05
* <i>Cenchrus ciliaris</i>	+	0.2 m	NC
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
<i>Eragrostis desertorum</i>	+	0.4 m	XCM01.04
<i>Eremophila spongiorarpa</i>	1%	1.2 m	NC
<i>Sclerolaena cuneata</i>	+	0.2 m	XCM01.01
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20%	0.4 m	NC

Fortescue Marsh Site XCM04

Described by Kellie McMaster Date 7/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 781342 mE 7513226 mN

Habitat Alluvial Plain

Soil Red-brown silty clay

Rock Type Ironstone

Vegetation *Eremophila spongiorpa* and *Atriplex bunburyana* low open shrubland over mixed very open tussock grassland

Veg Condition Very good

Fire Age Very Old

Notes Aspect: S

Bare ground: 96%

Litter cover: -% logs, +% twigs, +% leaves

Disturbances: Cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	1.5 m	NC
<i>Aristida contorta</i>	+	0.3 m	XCM01.05
<i>Atriplex bunburyana</i>	+	0.6 m	NC
<i>Dactyloctenium radulans</i>	+	0.5 m	NC
<i>Eragrostis pergracilis</i>	+	0.5 m	NC
<i>Eremophila spongiorpa</i>	3%	1 m	NC
<i>Iseilema vaginiflorum</i>	+	0.4 m	XCM04.01
<i>Panicum decompositum</i>	+	0.4 m	NC
* <i>Portulaca oleracea</i>	+	0.05 m	NC
<i>Sclerolaena cuneata</i>	+	0.2 m	XCM01.01
<i>Sclerolaena densiflora</i>	+	0.1 m	XCM04.02

Fortescue Marsh Site XCM05R

Described by Damien Buller Date 8/05/2013

Type Relevé ~50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 761823 mE 7519096 mN

Habitat Alluvial plain

Soil Red-brown silty loam

Vegetation *Eremophila youngii* subsp. *lepidota* and *E. spongicarpa* over *Sclerolaena cuneata* and *Sclerolaena densiflora* low scattered shrubs over *Eragrostis pergracilis* scattered tussock grassland

Veg Condition Very good

Fire Age Old

Notes Bare ground: 90%
Litter cover: -% logs, +% twigs, +% leaves

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Boerhavia paludosa</i>	+	0.2 m	XCM01.02
* <i>Cenchrus ciliaris</i>	+	0.4 m	NC
<i>Eragrostis pergracilis</i>	+	0.2 m	NC
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.8 m	NC
<i>Eremophila spongicarpa</i>	6%	1.1 m	NC
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	2%	1.5 m	NC
<i>Frankenia ambita</i>	+	0.4 m	NC
<i>Maireana pyramidata</i>	1%	0.7 m	XCM05.01
* <i>Portulaca oleracea</i>	+	0.1 m	NC
<i>Rhagodia eremaea</i>	+	0.9 m	NC
<i>Salsola australis</i>	+	0.3 m	NC
<i>Sclerolaena densiflora</i>	+	0.3 m	XCM04.02

Fortescue Marsh **Site** XCM06R

Described by Kellie McMaster **Date** 8/05/2013

Type Relevé ~50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 761898 mE 7519221 mN

Habitat Alluvial Plain

Soil Red-brown clay

Rock Type Ironstone

Vegetation *Acacia xiphophylla* open shrubland over
Eremophila youngii subsp. *lepidota*, *Sclerolaena cuneata* and
Sclerolaena densiflora low open shrubland

Veg Condition Very Good

Fire Age Very Old

Notes Bare ground: 90%
Litter cover: -% logs, +% twigs, 6% leaves
Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia xiphophylla</i>	8%	1.5 m	NC
<i>Eremophila spongicarpa</i>	+	0.6 m	NC
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	3%	1 m	NC
<i>Sclerolaena cuneata</i>	3%	0.2 m	XCM01.01
<i>Sclerolaena densiflora</i>	1%	0.2 m	XCM04.02

Fortescue Marsh Site XCM07

Described by Kellie McMaster Date 8/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 766404 mE 7519944 mN

Habitat Alluvial plain

Soil Red-brown silty clay

Vegetation *Acacia synchronicia* open shrubland over
Sclerolaena cuneata and *Maireana pyramidata* low open
 shrubland

Veg Condition Very Good

Fire Age Very Old

Notes Aspect: S
 Bare ground: 94%
 Litter cover: -% logs, +% twigs, +% leaves
 Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	2%	2 m	NC
<i>Aristida contorta</i>	+	0.4 m	NC
<i>Atriplex bunburyana</i>	+	0.6 m	NC
<i>Boerhavia paludosa</i>	+	0.1 m	XCM01.02
* <i>Cenchrus ciliaris</i>	+	0.4 m	NC
<i>Chloris pectinata</i>	+	0.2 m	NC
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
<i>Enneapogon polyphyllus</i>	+	0.2 m	NC
<i>Enteropogon ramosus</i>	+	0.3 m	XCM07.07
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	1 m	NC
<i>Eremophila spongicarpa</i>	+	0.3 m	NC
<i>Gomphrena kanisii</i>	+	0.2 m	NC
<i>Maireana carnosa</i>	+	0.2 m	XCM07.04
<i>Maireana pyramidata</i>	1%	0.6 m	XCM05.01
<i>Maireana triptera</i>	+	1 m	XCM07.01
* <i>Portulaca oleracea</i>	+	0.1 m	NC
<i>Portulaca pilosa</i>	+	0.2 m	XCM07.06
<i>Ptilotus nobilis</i>	+	0.1 m	NC
<i>Rhagodia eremaea</i>	+	1.4 m	NC
<i>Salsola australis</i>	+	0.2 m	NC
<i>Sclerolaena cuneata</i>	5%	0.3 m	XCM01.01
<i>Sclerolaena eriacantha</i>	+	0.2 m	XCM07.03
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.5 m	NC
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)+		0.5 m	XCM07.02
<i>Solanum lasiophyllum</i>	+	0.4 m	NC
<i>Sporobolus australasicus</i>	+	0.2 m	NC
<i>Trianthema triquetra</i>	+	0.2 m	XCM07.05
<i>Trianthema ufoensis</i>	+	0.2 m	XCM01.07

Fortescue Marsh Site XCM08

Described by Kellie McMaster Date 8/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 768349 mE 7518953 mN

Habitat Alluvial plain

Soil Red-brown clay

Vegetation *Eremophila spongiorarpa*, *E. youngii* subsp. *lepidota* and *Atriplex bunburyana* low shrubland over *Trianthema triquetra* very low open shrubland

Veg Condition Very Good

Fire Age Very Old

Notes Aspect: S
 Bare ground: 80%
 Litter cover: -% logs, +% twigs, +% leaves
 Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.8 m	NC
<i>Atriplex bunburyana</i>	5%	0.5 m	NC
<i>Atriplex codonocarpa</i>	+	0.1 m	NC
<i>Boerhavia paludosa</i>	+	0.2 m	XCM01.02
* <i>Cenchrus ciliaris</i>	+	0.1 m	NC
<i>Enteropogon ramosus</i>	+	0.2 m	XCM07.07
<i>Eragrostis pergracilis</i>	+	0.1 m	NC
<i>Eremophila spongiorarpa</i>	10%	0.5 m	NC
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	5%	1.6 m	NC
<i>Frankenia ambita</i>	+	0.3 m	NC
<i>Maireana carnosa</i>	+	0.2 m	XCM07.04
<i>Maireana pyramidata</i>	+	0.4 m	XCM05.01
* <i>Portulaca oleracea</i>	+	0.1 m	NC
<i>Portulaca pilosa</i>	+	0.1 m	XCM07.06
<i>Sclerolaena cuneata</i>	+	0.2 m	XCM01.01
<i>Sclerolaena densiflora</i>	+	0.2 m	XCM04.02
<i>Trianthema triquetra</i>	8%	0.1 m	XCM07.05
<i>Trianthema ufoensis</i>	+	0.1 m	XCM01.07

Fortescue Marsh Site XCM09

Described by Kellie McMaster Date 8/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 774806 mE 7516383 mN

Habitat Alluvial plain

Soil Red-brown clay

Rock Type Ironstone

Vegetation *Eremophila spongiorcarpa* and *Frankenia ambita*
over *Trianthema triquetra* and *Sclerolaena cuneata* low
shrubland

Veg Condition Very Good

Fire Age Very old

Notes Aspect: S

Bare ground: 90%

Litter cover: -% logs, +% twigs, +% leaves

Disturbance: cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	+	0.6 m	NC
<i>Atriplex bunburyana</i>	+	0.3 m	NC
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
<i>Eragrostis pergracilis</i>	+	0.2 m	NC
<i>Eragrostis xerophila</i>	+	0.3 m	XCM09.02
<i>Eremophila cuneifolia</i>	1%	1 m	NC
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	+	0.5 m	NC
<i>Eremophila spongiorcarpa</i>	3%	1 m	NC
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+	1 m	NC
<i>Frankenia ambita</i>	5%	0.3 m	NC
<i>Maireana amoena</i>	+	0.1 m	XCM09.01
<i>Maireana carnosia</i>	+	0.2 m	XCM07.04
<i>Maireana pyramidata</i>	+	0.5 m	XCM05.01
<i>Panicum decompositum</i>	+	0.3 m	NC
* <i>Portulaca oleracea</i>	+	0.1 m	NC
<i>Portulaca pilosa</i>	+	0.2 m	XCM07.06
<i>Sclerolaena cuneata</i>	1%	0.2 m	XCM01.01
<i>Sclerolaena densiflora</i>	+	0.2 m	XCM04.02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	0.5 m	NC
<i>Trianthema triquetra</i>	2%	0.1 m	XCM07.05

Fortescue Marsh Site XCM10

Described by Kellie McMaster Date 8/05/2013

Type Quadrat 50 X 50 M

Location North of the Fortescue Marsh

MGA Zone 50 785030 mE 7514563 mN

Habitat Alluvial plain

Soil Red-brown clay

Rock Type Ironstone

Vegetation *Acacia synchronicia* scattered tall shrubs over *Senna artemisioides* subsp. *oligophylla* (thinly sericeous) and *Sclerolaena cuneata* low open shrubland

Veg Condition Very good

Fire Age Very Old

Notes Aspect: S

**SPECIES LIST:**

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1%	3 m	NC
<i>Acacia tetragonophylla</i>	+	2 m	NC
<i>Boerhavia paludosa</i>	+	0.1 m	XCM01.02
<i>Dactyloctenium radulans</i>	+	0.2 m	NC
<i>Eragrostis pergracilis</i>	+	0.3 m	NC
<i>Maireana triptera</i>	+	0.3 m	XCM07.01
<i>Panicum decompositum</i>	+	0.3 m	NC
<i>*Portulaca oleracea</i>	+	0.1 m	NC
<i>Portulaca pilosa</i>	+	0.2 m	XCM07.06
<i>Rhagodia eremaea</i>	+	0.4 m	NC
<i>Salsola australis</i>	+	0.2 m	NC
<i>Sclerolaena cuneata</i>	1%	0.2 m	XCM01.01
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	2%	0.5 m	XCM07.02
<i>Sporobolus australasicus</i>	+	0.1 m	NC
<i>Trianthema ufoensis</i>	+	0.2 m	XCM01.07

Fortescue Marsh **Site** XCM11

Described by Damien Buller **Date** 8/05/2013

Type Quadrat 50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 785211 mE 7514407 mN

Habitat Broad shallow drainage line

Soil Red-brown sandy loam

Vegetation *Acacia synchronicia* and *Acacia aptaneura* low open woodland over *Acacia synchronicia* low scattered shrubs over **Cenchrus ciliaris* very open tussock grassland

Veg Condition Very Good

Fire Age Very Old

Notes Bare ground: 92%
Litter cover: +% logs, +% twigs, +% leaves
Disturbances: weeds and cattle tracks



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia aptaneura</i>	4%	5 m	XCM11.01
<i>Acacia synchronicia</i>	1%	0.9 m	NC
<i>Acacia synchronicia</i>	5%	4 m	NC
<i>Boerhavia paludosa</i>	+	0.1 m	XCM01.02
<i>*Cenchrus ciliaris</i>	3%	0.5 m	NC
<i>*Portulaca oleracea</i>	+	0.1 m	NC
<i>Sclerolaena cuneata</i>	+	0.3 m	XCM01.01
<i>Senna notabilis</i>	+	0.4 m	NC
<i>Solanum lasiophyllum</i>	+	0.5 m	NC

Fortescue Marsh Site XCM12R

Described by Kellie McMaster Date 8/05/2013

Type Relevé ~50 x 50 m

Location North of the Fortescue Marsh

MGA Zone 50 785367 mE 7514308 mN

Habitat Alluvial plain

Soil Red-brown clay

Vegetation *Acacia synchronicia* scattered high shrubs over
Senna artemisioides subsp. *oligophylla* (thinly sericeous),
Maireana pyramidata and *Sclerolaena cuneata* low open
shrubland

Veg Condition Very Good

Fire Age Very Old



SPECIES LIST:

Name	Cover	Height	Specimen
<i>Acacia synchronicia</i>	1%	3 m	NC
* <i>Cenchrus ciliaris</i>	+	0.3 m	NC
<i>Dactyloctenium radulans</i>	+	0.1 m	NC
<i>Eremophila cuneifolia</i>	+	0.4 m	NC
<i>Maireana pyramidata</i>	1%	1 m	XCM05.01
<i>Panicum decompositum</i>	+	0.3 m	NC
* <i>Portulaca oleracea</i>	+	0.1 m	NC
<i>Sclerolaena cuneata</i>	2%	0.2 m	XCM01.01
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	2%	1 m	XCM07.02
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)	+	0.2 m	XCM12.01

Fortescue Marsh **Site** FMADB01
Described by Damien Buller **Date** 3/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 782940 mE 7511360mN
Habitat Plain
Soil Red-brown clay
Rock Type Basalt
Vegetation *Tecticornia* and *Eremophila* low heath over *Enneapogon*, *Chloris pectinata* and *Eragrostis pergracilis* very open tussock grassland with *Nicotiana heterantha*, *Euphorbia* and *Pterocaulon* very open herbs

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Euphorbia boophthona</i>	+	0.3 m	FMADB01.01

Fortescue Marsh **Site** FMADB02
Described by Damien Buller **Date** 6/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 780786 mE 7513210mN
Habitat Upper marsh plain
Soil Clay
Rock Type N/A
Vegetation *Tecticornia auriculata* over *Tecticornia indica* subsp. *bidens*, *Eremophila spongiorarpa*, *Tecticornia* sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) over *Eragrostis pergracilis*, *Enteropogon ramosus* over **Malvastrum americanum* and *Nicotiana heterantha*

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Tecticornia medusa</i>	+	0.6 m	FMADB02.01

Fortescue Marsh **Site** FMADB03
Described by Damien Buller **Date** 6/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 781035 mE 7512897mN
Habitat Slight depression in upper marsh
Soil Red-brown clay
Vegetation *Tecticornia indica* subsp. *bidens* and *Eremophila spongiorarpa* low shrubland over **Cenchrus ciliaris*, *Chloris pectinata* and *Sporobolus virginicus* tussock grassland

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	+	0.5 m	FMADB03.01

Fortescue Marsh **Site** FMADB04
Described by Damien Buller **Date** 6/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 782060 **mE** 7513093**mN**
Habitat Shallow depression
Soil Red-brown clay
Vegetation *Acacia synchronicia* and **Vachellia farnesiana* tall shrubland over *Eremophila spongiorcarpa* and *Atriplex bunburyana* low open shrubland over *Chloris pectinata* and *Eragrostis tenellula* open tussock grassland

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>	1	0.02 m	FMADB04.01

Fortescue Marsh **Site** FMADB05
Described by Damien Buller **Date** 6/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 781945 **mE** 7512161**mN**
Habitat Mid-marsh plain
Soil Red-brown fine sandy clay
Vegetation *Acacia synchronicia* scattered shrubs over *Tecticornia indica* subsp. *bidens* and *Eremophila spongiorcarpa* over *Enneapogon polyphyllus* and *Eragrostis pergracilis* over *Pterocaulon sphaeranthoides*, *Nicotiana heterantha* and *Cullen cinereum*

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Wahlenbergia tumidifructa</i>	+	0.3 m	FMADB05.01

Fortescue Marsh **Site** FMADB06
Described by Damien Buller **Date** 6/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 782001 **mE** 7512540**mN**
Habitat Plain - mid-marsh
Soil Red-brown clay
Vegetation *Tecticornia indica* subsp. *bidens* and *Eremophila spongiorcarpa* over *Eragrostis tenellula*, *Chloris pectinata* and **Echinochloa colona* over *Ipomoea muelleri* and *Swainsona kingii*

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>	+	0.5 m	FMADB06.01

Fortescue Marsh **Site** FMADB07
Described by Damien Buller **Date** 7/06/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 765693 mE 7519104mN
Habitat Mid-marsh plain
Soil Red-brown clay
Vegetation *Tecticornia indica* subsp. *bidens* and *Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063) closed low heath over *Chloris pectinata* and **Cenchrus ciliaris* with *Cullen cinereum*, *Nicotiana heterantha*, *Pterocaulon sphaeranthoides* and *Swainsona kingii* very open herbs

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	15	0.6 m	FMADB07.01

Fortescue Marsh **Site** FMAJM01
Described by Julia Mattner **Date** 28/04/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 768367 mE 7518290mN
Habitat Creek
Soil Red-brown clay
Vegetation *Tecticornia* with mixed grasses

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Eragrostis curvula</i>	5	1.2 m	FMAJM01.01

Fortescue Marsh **Site** FMAJM02
Described by Julia Mattner **Date** 1/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 778040 mE 7513154mN
Habitat Lower flats
Soil Red-brown clay
Rock Type Basalt
Vegetation *Tecticornia*, *Muehlenbeckia* and *Swainsona*

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Tecticornia globulifera</i>	+	0.5 m	FMAJM02.01

Fortescue Marsh **Site** FMAJM03
Described by Julia Mattner **Date** 3/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783769 mE 7509464mN
Habitat Moist plain
Soil Red-brown moist clay
Vegetation *Muehlenbeckia* and *Tecticornia* over *Sporobolus* over *Eleocharis papillosa* and *Marsilea*

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Eleocharis papillosa</i>	60	0.1 m	FMAJM03.02
<i>Schoenoplectus dissachanthus</i>	<1 %	0.3 m	FMAJM03.01

Fortescue Marsh **Site** FMAJM04
Described by Julia Mattner **Date** 3/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783045 **mE** 7509817 **mN**
Habitat Calcrete rise
Soil Light brown sandy loam
Rock Type Gravel outcrops
Vegetation *Eremophila* and *Tecticornia* scattered low shrubs over **Cenchrus ciliaris* and *Eragrostis pergracilis* tussock grassland

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Triodia longiceps</i>	+	0.6 m	FMAJM04.01

Fortescue Marsh **Site** FMAJM05
Described by Julia Mattner **Date** 3/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783891 **mE** 7510870 **mN**
Habitat Upper marsh margin
Soil Red-brown clayey loam
Vegetation *Acacia synchronicia* scattered shrubs over *Tecticornia* and *Eremophila* low open heath over mixed grasses

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Rhynchosia minima</i>	+	cr	FMAJM05.01

Fortescue Marsh **Site** FMAJM06
Described by Julia Mattner **Date** 5/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783063 **mE** 7510840 **mN**
Habitat Plain
Soil Red-brown clay
Rock Type Basalt
Vegetation Mixed *Tecticornia* low heath over *Eragrostis* and *Dactyloctenium* scattered tussock grasses with *Nicotiana*, *Swainsona* and *Gomphrena* scattered herbs

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Ptilotus auriculifolius</i>	+	0.4 m	FMAJM06.01

Fortescue Marsh **Site** FMAJM07
Described by Julia Mattner **Date** 5/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783437 **mE** 7510752 **mN**
Habitat Broad shallow depression
Soil Red-brown fine sandy clay loam
Vegetation *Vachellia* and *Acacia* open shrub over *Tecticornia* and *Eremophila* low open heath over **Cenchrus setiger* and *C. ciliaris* tussock grassland with *Nicotiana*, *Pterocaulon* and *Cullen* scattered herbs

SPECIES LIST:

Name	Cover	Height	Specimen
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>	+	0.5 m	FMAJM07.01

Fortescue Marsh **Site** FMAJM08
Described by Julia Mattner **Date** 5/05/2012 **Type** Opportunistic Collection
Location Northern Fortescue Marsh margin
MGA Zone 50 783535 **mE** 7510732**mN**
Habitat Shallow depression
Soil Red-brown loam
Rock Type Calcrete
Vegetation *Vachellia* and *Acacia* open scrub over *Tecticornia*, *Eremophila* and *Solanum* low open heath over *Eragrostis pergracilis*, *Sporobolus* and *Cenchrus* open tussock grassland with *Pterocaulon* and *Euphorbia* scattered herbs
SPECIES LIST:

Name	Cover	Height	Specimen
<i>Melaleuca xerophila</i>	1 ind	4 m	FMAJM08.01

Christmas Creek Site OPPORTUNISTIC COLLECTIONS**Described by** Hayden Ajduk**Location** Christmas Creek**SPECIES LIST:**

Name	Cover	Height	Specimen	UTM Coordinates
<i>Abutilon amplum</i>	2	0.6m	XBOPHA116	0777275, 7521441
<i>Acacia rhodophloia</i>	6	1.6m	XBB7	0771078, 7524840
<i>Acacia</i> sp.	lots	2m	XBOPJM118	0775595, 7515395
<i>Acacia trachycarpa</i>	1 ind	0.6 m	XBOPHA04	0778358, 7522724
* <i>Acetosa vesicaria</i>	10	0.4m	XBOPHA111	0765364, 7522947
<i>Alysicarpus muelleri</i>	1	0.4m	XBOPHA115	0776657, 7522753
<i>Amaranthus undulatus</i>	4	1.0m	XBOPHA145	0790629, 7522922
<i>Aristida pruinosa</i>			XBOPJM18	
<i>Aristida pruinosa</i>	8 ind	0.05 m	XBOPHA06	0770918, 7524370
<i>Capparis spinosa</i> var. <i>nummularia</i>	2	2m	XBOPJM110	0760478, 7523737
<i>Capparis umbonata</i>	3	0.9m	XBOPJM111	0760537, 7523460
<i>Cullen cinereum</i>	1	0.2m	XBOPHA142	0793390, 7516780
<i>Cymbopogon ambiguus</i>	1	0.6m	XBB1	0762673, 7524964
<i>Dampiera candicans</i>	7	0.5m	XBOPLD02	0772622, 7526338
<i>Dicladantha forrestii</i>	7	0.3m	XBOPHA105	0769790, 7523925
<i>Dicladantha</i> sp.			XBOPJM107	
<i>Ehretia saligna</i> var. <i>saligna</i>	2		XBOPHA103	
<i>Eremophila latrobei</i> subsp. <i>glabra</i>	3	0.6m	XBOPHA132	0773778, 7527092
<i>Eremophila spongiorcarpa</i>	100+ ind	0.8 m	XBOPHA11	0772549, 7516938
<i>Eremophila spongiorcarpa</i>	3+	0.5m	XBOPJM113	0774820, 7516480
<i>Euphorbia biconvexa</i>	3	0.4m	XBOPLD04	0770684, 7525814
<i>Euphorbia boophthona</i>	1	0.2m	XBOPLD13	0793813, 7517205
<i>Goodenia muelleriana</i>	1 ind	0.1 m	XBOPHA07	0760641, 7526565
<i>Goodenia muelleriana</i>			XBOPJM106	
<i>Goodenia nuda</i>	2 ind	0.4 m	XBOPHA09	0763883, 7525613
<i>Goodenia nuda</i>	2 ind	0.5 m	XBOPHA10	0763883, 7525613
<i>Goodenia nuda</i>	1	0.2m	XBOPHA106	0769809, 7523903
<i>Goodenia prostrata</i>	2 ind	0.4 m	XBOPHA08	0760702, 7526580
<i>Goodenia</i> sp.	POP	0.4m	XBOPHA139	
<i>Goodenia triodiophila</i>	1	0.4m	XBOPLD06	0771314, 7526091
<i>Goodenia triodiophila</i>	5	0.3m	XBOPLD03	0772309, 7526608
<i>Goodenia triodiophila</i>	1	0.4m	XBB16	0788829, 7521427
<i>Goodenia triodiophila</i>	POP	0.3m	XBOPHA129	
<i>Hibiscus goldsworthii</i>	3	1.0m	XBOPHA144	0790629, 7522922
<i>Hibiscus trionum</i> var. <i>vesicarius</i>			XBOPJM103	
<i>Hybanthus aurantiacus</i>	2	0.4m	XBOPLD01	0772622, 7526338
<i>Isotropis atropurpurea</i>			XBOPJM108	
<i>Lepidium pholidogynum</i>			XBOPJM105	
<i>Muellerolimon salicorniaceum</i>	100+	0.5m	XBOPJM117	0775565, 7515402
<i>Nicotiana benthamiana</i>	5 ind	0.8m	XBOPHA118	0788114, 7521392
<i>Nicotiana benthamiana</i>	8 ind	0.5m	XBB20	0800630, 7519849
<i>Nicotiana benthamiana</i>	10 ind	0.3m	XBOPHA131	0774214, 7527164
<i>Nicotiana benthamiana</i>	6 ind	0.8m	XBOPHA118	0788198, 7521702
<i>Nicotiana heterantha</i>	100+		XBOPJM114	0775565, 7515402
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>			XBOPJM104	
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	1	0.5m	XBB2	0761740, 7525231

<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	2	0.5m	XBB2	0769321, 7524065
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	1	0.8m	XBOPLD14	0789466, 7523099
<i>Oldenlandia crouchiana</i>	1	0.2m	XBOPHA114	0776547, 7523644
<i>Oldenlandia crouchiana</i>	1	0.3m	XBOPHA124	0800646, 7519257
<i>Oldenlandia crouchiana</i>	20+	0.08m	XBOPHA101	
<i>Operculina aequiseipala</i>	6	Cr	XBOPLD08	0781960, 7517381
<i>Phyllanthus maderaspatensis</i>	2	0.4m	XBOPLD05	0770820, 7526266
<i>Phyllanthus maderaspatensis</i>			XBOPJM109	
<i>Portulaca cyclophylla</i>	50	0.02m	XBOPJM119	0785158, 7515017
<i>Rhagodia eremaea</i>	5	1.2m	XBOPHA110	0765394, 7523101
<i>Rhagodia eremaea</i>	1	1.5m	XBOPHA109	0769460, 7522357
<i>Rhagodia eremaea</i>	1	0.4m	XBB18	0792326, 7517954
<i>Rhagodia eremaea</i>	2 ind	1.2 m	XBOPHA03	0778401, 7522693
<i>Rhagodia eremaea</i>	1 ind	1.2 m	XBOPHA05	0778392, 7522831
<i>Rhagodia eremaea</i>	2	0.6m	XBOPLD12	0781980, 7518924
<i>Rhagodia eremaea</i>	2	2.5m	XBOPJM112	0762630, 7521852
<i>Rhagodia eremaea</i>	1	1.4m	XBB6	0768704, 7523925
<i>Rhagodia eremaea</i>	POP	0.6m	XBB17	0793022, 7521427
<i>Rhagodia eremaea</i>	1	0.5m	XBOPLD09	0781812, 7518895
<i>Rhagodia eremaea</i>	1	1m	XBOPLD07	0777147, 7517470
<i>Rhagodia eremaea</i>	1	0.7m	XBOPLD10	0781824, 7518932
<i>Rhagodia eremaea</i>	3	0.6m	XBOPLD11	0781920, 7518944
<i>Rhagodia eremaea</i>	POP	0.3m	XBB25	0785240, 7514963
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	2	1.6m	XBOPHA117	0787197, 7520352
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	1	1.0m	XBOPHA117	0787090, 7520324
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	1.5m	XBOPHA125	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	5	1.8m	XBOPHA125	0800874, 7518454
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	3	1.0m	XBOPHA123	0791482, 7518362
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	-	XBOPHA117	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	1	1.3m	XBOPHA117	0786838, 7520342
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	0.6m	XBB15	0788592, 7517614
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	2	1.5m	XBOPHA117	0787440, 7520201
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	1.6m	XBOPHA137	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	0.6m	XBB21	0797096, 7520467
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	1.9m	XBOPHA140	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	2	0.7m	XBB19	0793464, 7518615
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	3	1.0m	XBOPHA119	0792877, 7519561
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	1	0.7m	XBB14	0788379, 7519108
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)			XBB10	0788436, 7519494
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	POP	0.6m	XBB10	0788338, 7519769
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)			XBB10	0788165, 7519988
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	2	1m	XBB10	0788068, 7520012
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	1	1.0m	XBOPHA117	0787343, 7520319
<i>Rhodanthe floribunda</i>	3	0.05m	XBOPHA127	0773825, 7520105
<i>Rhodanthe margarethae</i>	5	0.6m	XBOPHA143D	0790568, 7522922
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.4m	XBB24	0771250, 7522355
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.4m	XBB23	0774835, 7518764
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.4m	XBB22	0774744, 7519720
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.4m	XBB9	0777122, 7521414
<i>Rostellularia adscendens</i> var. <i>clementii</i>	3		XBOPHA102	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	1	0.3m	XBB5	0768683, 7522801
<i>Rostellularia adscendens</i> var. <i>clementii</i>	1	0.3m	XBOPHA104	0762291, 7525130
<i>Rostellularia adscendens</i> var. <i>clementii</i>	2	0.3m	XBB4	0768882, 7523310
<i>Rostellularia adscendens</i> var. <i>clementii</i>	4	0.3m	XBOPHA143R	0793007, 7516561
<i>Rostellularia adscendens</i> var. <i>clementii</i>	1	0.2m	XBOPHA108	0769458, 7522661.

<i>Rostellularia adscendens</i> var. <i>clementii</i>	100+	0.2m	XBOPHA120	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	1	0.2m	XBOPHA141	0793481, 7516975
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.3m	XBOPHA133	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	8+	0.2m	XBOPHA121	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	2	0.1m	XBOPHA126	0773268, 7520689
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.3m	XBOPHA138	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.3m	XBOPHA128	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	20	0.4m	XBOPHA108	0777062, 7522536
<i>Rostellularia adscendens</i> var. <i>clementii</i>	1	0.3m	XBOPHA135	0777386, 7518799
<i>Rostellularia adscendens</i> var. <i>clementii</i>	POP	0.3m	XBOPHA134	
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	20	0.5m	XBOPJM116	0775565, 7515402
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>				
<i>Sida spinosa</i>			XBOPJM19a	
<i>Solanum sturtianum</i>	1	1.2m	XBOPHA130	0775552, 7525581
* <i>Sonchus oleraceus</i>			OPCOLL	
<i>Stemodia viscosa</i>	1	0.1m	XBOPHA112	0765391, 7522757
<i>Streptoglossa liatroides</i>			XBOPJM102	
<i>Striga squamigera</i>	1	0.2m	XBOPHA122	0791690, 7518264
<i>Striga squamigera</i>			XBOPJM101	
<i>Swainsona tanamiensis</i>	100+	0.2m	XBOPJM115	0775565, 7515402
<i>Themeda triandra</i>	1	0.6m	XBOPHA107	0769479, 7522911
<i>Themeda triandra</i>	20+	0.4m	XBOPHA107	0769918, 7523281
<i>Themeda triandra</i>	20+	0.4m	XBOPHA107	0770065, 7523914
<i>Themeda triandra</i>	5	1.0m	XBOPHA113	0771185, 7523596
<i>Themeda triandra</i>	1	1m	XBB8	0775648, 7524567
* <i>Vachellia farnesiana</i>	3 ind	2 m	XBOPHA01	0802216, 7519198
<i>Wahlenbergia tumidifructa</i>	1	0.2m	XBOPHA136	0777386, 7518799

APPENDIX G

SITE BY SPECIES MATRIX

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Abutilon amplum</i>							+																		
<i>Abutilon cryptopetalum</i>																									
<i>Abutilon cunninghamii</i>										+															
<i>Abutilon fraseri</i>						+		+																	
<i>Abutilon lepidum</i>																		+		+					
<i>Abutilon macrum</i>																									
<i>Abutilon otocarpum</i>												+												+	
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																									
<i>Abutilon</i> sp.																									
<i>Acacia acradenia</i>			+						4%																
<i>Acacia adsurgens</i>										+															
<i>Acacia</i> aff. <i>aneura</i>																									
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)								2%							2%	2%	50%	10%	40%		35%	8%	30%	5%	+
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)						40%						2%	4%			4%		15%		12%				15%	
<i>Acacia ampliceps</i>																									
<i>Acacia ancistrocarpa</i>					+					+										+					
<i>Acacia aneura</i>															1%										
<i>Acacia aneura</i> (grey bushy form; MET 15 732)								1%							+							+		+	
<i>Acacia aneura</i> var. <i>intermedia</i>																								+	
<i>Acacia ayersiana</i>		2%						1%							3%	6%									
<i>Acacia bivenosa</i>																									
<i>Acacia colei</i> var. <i>colei</i>			+																						
<i>Acacia coriacea</i> subsp. <i>pendens</i>							1%				10%		+												
<i>Acacia cowleana</i>																									
<i>Acacia inaequilatera</i>									+																
<i>Acacia maitlandii</i>																+									
<i>Acacia marramamba</i>		+																							
<i>Acacia monticola</i>																									
<i>Acacia paraneura</i>		5%																							
<i>Acacia pruinocarpa</i>		2%	1%			4%			+	1%			3%	2%	1%	3%		1%			+	3%			
<i>Acacia pyrifolia</i>							3%				1%		2%							+					
<i>Acacia rhodophloia</i>													+												
<i>Acacia sericophylla</i>																								+	
<i>Acacia sibirica</i>																									
<i>Acacia</i> sp.																									
<i>Acacia synchronicia</i>										1%		8%							+				+		
<i>Acacia tenuissima</i>																									
<i>Acacia tetragonophylla</i>		+				2%						6%	3%		+	+		1%		+			1%	+	+
<i>Acacia trachycarpa</i>											3%														
<i>Acacia tumida</i> var. <i>pilbarensis</i>				4-8%																					
<i>Acacia xiphophylla</i>																			+						15%
<i>Acetosa vesicaria</i>																									
<i>Achyranthes aspera</i>																									
<i>Aerva javanica</i>						+					+		+												
<i>Aeschynomene indica</i>																									
<i>Alternanthera angustifolia</i>																					+				
<i>Alternanthera denticulata</i>																					+				
<i>Alternanthera nana</i>																									
<i>Alternanthera nodiflora</i>																									
<i>Alysicarpus muelleri</i>																									
<i>Amaranthus interruptus</i>						+																			
<i>Amaranthus undulatus</i>							+				+		+										+		
<i>Ammannia baccifera</i>																									
<i>Ammannia multiflora</i>													+												

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Amphipogon sericeus</i>			+		+									+											
<i>Amyema fitzgeraldii</i>																							+		
<i>Androcalva luteiflora</i>											1%														
<i>Angianthus tomentosus</i>																									
<i>Anthobolus leptomerioides</i>		+						+							+										
<i>Argemone ochroleuca</i>																									
<i>Aristida contorta</i>		+	+						+	+		1%													
<i>Aristida holathera</i> var. <i>holathera</i>					+																				
<i>Aristida inaequiglumis</i>																									
<i>Aristida latifolia</i>												+													
<i>Aristida obscura</i>																+				+		+		+	
<i>Aristida pruinosa</i>																				+					
<i>Aristida</i> sp.																			+						
<i>Atalaya hemiglauca</i>						8%	+				1%		+								+			+	
<i>Atriplex bunburyana</i>																									
<i>Atriplex codonocarpa</i>																									
<i>Atriplex flabelliformis</i>																									
<i>Austrobryonia pilbarensis</i>																									
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																									
<i>Bidens bipinnata</i>		+				+		+					+		+	+	2%	1%	+	+	1%	+	1%	+	
<i>Blumea tenella</i>																									
<i>Boerhavia burbidgeana</i>																									
<i>Boerhavia coccinea</i>							+				+	+					+								
<i>Boerhavia paludosa</i>																			+		+		+		
<i>Boerhavia repleta</i>																									
<i>Bonamia rosea</i>																									
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	+													+											
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>																									
<i>Bothriochloa ewartiana</i>																									
<i>Brachyachne convergens</i>																									
<i>Brachyachne prostrata</i>										+															+
<i>Bulbostylis barbata</i>		+				+				1%	+	+		+	+	+		+		+		+		+	
<i>Bulbostylis turbinata</i>												+	+				+								
<i>Calandrinia ptychosperma</i>												+													
<i>Calandrinia</i> sp.																									
<i>Calandrinia stagnensis</i>																									
<i>Calotis porphyroglossa</i>																									
<i>Calotis squamigera</i>																									
<i>Calytrix carinata</i>					+				+	+															
<i>Capparis spinosa</i> var. <i>nummularia</i>																									
<i>Capparis umbonata</i>																									
<i>Cenchrus ciliaris</i>						3%	10%				30%	1%	5%						1%	+	6%		10%	+	
<i>Cenchrus setiger</i>											10%		20%												
<i>Centipeda minima</i> subsp. <i>macrocephala</i>													+												
<i>Cheilanthes austrotenuifolia</i>						+												+						+	+
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		+															4%							+	
<i>Chenopodium auricomum</i>																									
<i>Chloris pectinata</i>		+										1%					+		+		+				
<i>Chloris virgata</i>																									
<i>Chrysocephalum gilesii</i>																									
<i>Chrysopogon fallax</i>												+				+	+	10%	+				+	+	
<i>Citrullus colocynthis</i>							+	+				+	+				1%	+					7%		
<i>Cleome oxalidea</i>																+	+								
<i>Cleome viscosa</i>	+				+		+	+	+	+	+	+	+	+		+		+	+	+	+	+	+		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	+				+									+											
<i>Commelina ensifolia</i>						+											2%	+	+		+				
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																		+	+						
<i>Convolvulus</i> sp.																									
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>										+															
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	+		+		+			+	+				+	1%	+			+		+		+			
<i>Corchorus parviflorus</i>		+					+																+		
<i>Corchorus</i> sp.		+									+														
<i>Corchorus tridens</i>						+	+				+	+	+				1%	+	4%		2%	+	3%	+	
<i>Corymbia candida</i> subsp. <i>candida</i>																					+				
<i>Corymbia candida</i> subsp. <i>dipsodes</i>									+													+			
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																									
<i>Corymbia hamersleyana</i>	+				1%						out														
<i>Cressa australis</i>																									
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>												+							+				+		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>											+														
<i>Cucumis maderaspatanus</i>		+				+	+	+	+				+			+	+	+		+		+		+	
<i>Cucumis melo</i> subsp. <i>agrestis</i>											+				+		+				3%		8%		
<i>Cullen cinereum</i>																									
<i>Cullen leucanthum</i>																									
<i>Cymbopogon ambiguus</i>	+							+					+							+					
<i>Cymbopogon obtectus</i>																						+			
<i>Cymbopogon procerus</i>							1%																		
<i>Cymbopogon</i> sp.									+																
<i>Cyperus bulbosus</i>																									
<i>Cyperus cunninghamii</i>																									
<i>Cyperus iria</i>												+	+					+	+				+		
<i>Cyperus rigidellus</i>																									
<i>Cyperus squarrosus</i>													+												
<i>Cyperus vaginatus</i>											+														
<i>Dactyloctenium radulans</i>												1%							+		+		+		+
<i>Dampiera candicans</i>	+		+		+				+					+											
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>												+													
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																									
<i>Dicladanthera forrestii</i>													+												
<i>Dicladanthera</i> sp.																									
<i>Digitaria brownii</i>																									
<i>Digitaria ctenantha</i>													+										+		
<i>Dissocarpus paradoxus</i>																									
<i>Dodonaea coriacea</i>			+		+																				
<i>Dodonaea pachyneura</i>																									
<i>Dodonaea petiolaris</i>								+							+	6%	+					+		4%	
<i>Duperreya commixta</i>						+	+	+					+					+		+	+	+		+	
<i>Dysphania plantaginella</i>																									
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	+		+		+		+	+	+	+	15%	+	+	+	+	+	+	+	+		+		+	+
<i>Dysphania sphaerosperma</i>																									
<i>Echinochloa colona</i>																			+						
<i>Ehretia saligna</i> var. <i>saligna</i>																									
<i>Eleocharis papillosa</i>																									
<i>Elytrophorus spicatus</i>																									
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>						+											+								+
<i>Enneapogon caeruleascens</i>												+													
<i>Enneapogon lindleyanus</i>																									
<i>Enneapogon polyphyllus</i>		+										+													
<i>Enneapogon robustissimus</i>							+							+											

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
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<i>Enteropogon ramosus</i>																									
<i>Eragrostis cumingii</i>													+				+								
<i>Eragrostis curvula</i>																									
<i>Eragrostis desertorum</i>												+													
<i>Eragrostis dielsii</i>																									
<i>Eragrostis elongata</i>																									
<i>Eragrostis eriopoda</i>		+										+													
<i>Eragrostis leptocarpa</i>													+												
<i>Eragrostis pergracilis</i>																									
<i>Eragrostis tenellula</i>												+	+												
<i>Eragrostis xerophila</i>																			+						
<i>Eremophea spinosa</i>																									
<i>Eremophila cuneifolia</i>																			+					+	2%
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>		2%				+		+					+		1%	+	+	+	+	2%		3%		4%	
<i>Eremophila lanceolata</i>						+						+							+						
<i>Eremophila latrobei</i>																									
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>						+									+	+	+	+		+					
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																									
<i>Eremophila latrobei</i> x <i>forrestii</i>																									
<i>Eremophila longifolia</i>																			+	+					
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																									1%
<i>Eremophila spongiocharpa</i>																									
<i>Eremophila youngii</i> subsp. <i>lepidota</i>																									
<i>Eriachne benthamii</i>																			+						
<i>Eriachne helmsii</i>																									
<i>Eriachne lanata</i>	1%				+				30%					1%											
<i>Eriachne mucronata</i>				+				+	+						+	+									
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	+		+		+				+					+				1%				+			
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>		+						+		+		+	+		+										
<i>Eriachne tenuiculmis</i>											+														
<i>Eucalyptus gamophylla</i>																									
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>			1%		1%				+	3%				1%											
<i>Eucalyptus victrix</i>							10%				30%		8%												
<i>Euphorbia australis</i>		+						+							+	+		+	+	+	+	+		+	
<i>Euphorbia biconvexa</i>																									
<i>Euphorbia boophthona</i>																					+				
<i>Euphorbia coghlanii</i>						+	+		+	+		+						+			+				
<i>Euphorbia</i> sp. (site 1089)											+	+													
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																									
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																									
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>						+		+					+		+	+	+	+	+	+	+	+	+	+	
<i>Fimbristylis dichotoma</i>																									
<i>Fimbristylis microcarya</i>													+												
<i>Fimbristylis simulans</i>					+				+	+															
<i>Flaveria trinervia</i>											+														
<i>Frankenia ambita</i>																									
<i>Frankenia setosa</i>																									
<i>Glycine canescens</i>																									
<i>Gnephosis arachnoidea</i>																									
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																									
<i>Gomphrena cunninghamii</i>									+		+	+		+											
<i>Gomphrena kanisii</i>									+	+		+								+		+		+	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Goodenia forrestii</i>															+						+				
<i>Goodenia lamprosperma</i>																									
<i>Goodenia microptera</i>										+	+		+												
<i>Goodenia muelleriana</i>																									
<i>Goodenia nuda</i>																							+		
<i>Goodenia prostrata</i>												+				+			+	+				+	
<i>Goodenia</i> sp.																									
<i>Goodenia stobbsiana</i>	+		1%	+	+					+	+			+	+										
<i>Goodenia triodiophila</i>									+																
<i>Gossypium australe</i> (Burrup Peninsula form)																									
<i>Gossypium robinsonii</i>											+														
<i>Grevillea berryana</i>																		+							
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	+	+	+	1%	5%				1%					+				+				+		+	
<i>Hakea chordophylla</i>	+				+				1%					+											
<i>Hakea lorea</i> subsp. <i>lorea</i>										+													1%		
<i>Haloragis gossei</i>							+																		
<i>Heliotropium europaeum</i>																									
<i>Heliotropium heteranthum</i>												+										+		+	
<i>Heliotropium pachyphyllum</i>																									
<i>Hibiscus burtonii</i>		+				+																			
<i>Hibiscus coatesii</i>																									
<i>Hibiscus gardneri</i>																									
<i>Hibiscus goldsworthii</i>														+											
<i>Hibiscus</i> sp.	+																								
<i>Hibiscus sturtii</i>																									
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																									
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>												+													
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																									
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																									
<i>Hibiscus verdcourtii</i>																									
<i>Hybanthus aurantiacus</i>				+	+	+	+	+		+			+		+	+		+				+			
<i>Indigofera colutea</i>												+													
<i>Indigofera monophylla</i>	+			1%	+		+			+	2%		+												
<i>Indigofera</i> sp.				+																					
<i>Ipomoea coptica</i>																									
<i>Ipomoea lonchophylla</i>																			+						
<i>Ipomoea muelleri</i>													+				+		+		+		10%		
<i>Ipomoea plebeia</i>																									
<i>Ipomoea polymorpha</i>							+						+						+				+		
<i>Iseilema dolichotrichum</i>																									
<i>Iseilema macratherum</i>																									
<i>Iseilema membranaceum</i>												+					+		+		+				
<i>Iseilema</i> sp.																									
<i>Iseilema vaginiflorum</i>																									
<i>Isotropis atropurpurea</i>																									
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+														+		+								
<i>Keraudrenia nephrosperma</i>								+																	
<i>Lawrenzia densiflora</i>																									
<i>Lepidium muelleri-ferdinandii</i>																									
<i>Lepidium oxytrichum</i>																									
<i>Lepidium phlebopetalum</i>																									
<i>Lepidium pholidogynum</i>																									
<i>Lepidium platypetalum</i>																									
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																									
<i>Lipocarpha microcephala</i>													+												

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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<i>Lotus cruentus</i>																									
<i>Maireana amoena</i>																									
<i>Maireana appressa</i>																									
<i>Maireana carnosae</i>																									
<i>Maireana georgei</i>										+															
<i>Maireana integra</i>																									
<i>Maireana luehmannii</i>																									
<i>Maireana planifolia</i>																					+				
<i>Maireana planifolia</i> x <i>villosa</i>								+							+	+		+						+	
<i>Maireana pyramidata</i>																									1%
<i>Maireana tomentosa</i>		+						+																+	
<i>Maireana triptera</i>																									+
<i>Maireana villosa</i>															+	+		+		+					
<i>Malvaceae</i> sp.																									
<i>Malvastrum americanum</i>													+						1%		+		1%		
<i>Marsdenia australis</i>																									
<i>Marsilea hirsuta</i>																									
<i>Melaleuca glomerata</i>													1%												
<i>Melaleuca linophylla</i>							1%																		
<i>Melaleuca xerophila</i>																									
<i>Mimulus gracilis</i>																									
<i>Mimulus repens</i>																									
<i>Mollugo molluginea</i>									+	+		+	+	+	+	+		+				+		+	
<i>Muehlenbeckia florulenta</i>																									
<i>Muellerolimon salicorniaceum</i>																									
<i>Neptunia dimorphantha</i>												+													
<i>Nicotiana benthamiana</i>																									
<i>Nicotiana heterantha</i>																									
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>											+							+							
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																									
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																									
<i>Nicotiana</i> sp.																									
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)				+																	+		+		
<i>Oldenlandia crouchiana</i>					+				+			+													
<i>Operculina aequiseipala</i>							+												+		+				
<i>Panicum decompositum</i>																									
<i>Panicum effusum</i>																									
<i>Panicum laevinode</i>																			+						
<i>Paraneurachne muelleri</i>										+															
<i>Paspalidium clementii</i>		+			+	+		+						+	+	+		+		+					
<i>Paspalidium tabulatum</i>																									
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																									
<i>Peripleura obovata</i>																									
<i>Perotis rara</i>						+			+				+			+	+	+		+				+	
<i>Petalostylis labicheoides</i>							+				1%														
<i>Phyllanthus erwinii</i>																									
<i>Phyllanthus maderaspatensis</i>												+	+					+							
<i>Pleurocarpaea gracilis</i>																									
<i>Pluchea dentex</i>																									
<i>Pluchea dunlopii</i>																									
<i>Pluchea ferdinandi-muelleri</i>																									
<i>Pluchea rubelliflora</i>																									
<i>Pluchea tetranthera</i>										+															
<i>Plumbago zeylanica</i>																									

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<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>		+				+		+	+	+		+	+	+		+	+	+	+	+		+			+
<i>Polycarpaea holtzei</i>	+				+				+	+	+	+													
<i>Polycarpaea longiflora</i>							+		+		+														
<i>Polygala isingii</i>		+	+						+			+							+						
<i>Polymeria ambigua</i>							+																		
<i>Polymeria calycina</i>											+														
<i>Portulaca cyclophylla</i>																									
<i>Portulaca oleracea</i>						+				+	+	+	+	+	+	+	1%	+	+	1%	+	+	+	+	+
<i>Portulaca pilosa</i>												+						+							
<i>Psydrax latifolia</i>																	+	+							
<i>Psydrax suaveolens</i>		+						+												+					
<i>Pterocaulon serrulatum</i>																									
<i>Pterocaulon</i> sp.																									
<i>Pterocaulon sphacelatum</i>		+				+					+	+	+				+				+		+		
<i>Pterocaulon sphaeranthoides</i>																									
<i>Ptilotus aervoides</i>												+													
<i>Ptilotus astrolasius</i>										+															
<i>Ptilotus auriculifolius</i>	+	+								+				+						+					
<i>Ptilotus calostachyus</i>	2%		+	+	+				+	+		+		+											
<i>Ptilotus clementii</i>	+							+							+										
<i>Ptilotus fusiformis</i>	+			+	+																				
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>												+													
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>												+											+		
<i>Ptilotus helipteroides</i>										+						+		+		+		+			
<i>Ptilotus incanus</i>														+											
<i>Ptilotus macrocephalus</i>											+	+	+			+	+		+						
<i>Ptilotus nobilis</i>	+		+		+	+			+	+	+	+		+	+	+	+				+		+		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>						+										+	+	6%		+		1%	+		
<i>Ptilotus polystachyus</i>																				+					
<i>Ptilotus rotundifolius</i>																									
<i>Ptilotus schwartzii</i>		+						7%							+	+					+		+		
<i>Rhagodia eremaea</i>																			+						
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)								+																	
<i>Rhodanthe floribunda</i>																									
<i>Rhodanthe margarethae</i>																									
<i>Rhynchosia minima</i>												+							+		+				
<i>Rostellularia adscendens</i> var. <i>clementii</i>																									
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																					+		+		
<i>Salsola australis</i>						+						+											+	+	+
<i>Samolus repens</i> var. <i>floribundus</i>																									
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																									
<i>Santalum lanceolatum</i>																									
<i>Scaevola spinescens</i>																								+	
<i>Schizachyrium fragile</i>									+																
<i>Schoenoplectus dissachanthus</i>																									
<i>Schoenoplectus laevis</i>													+												
<i>Sclerolaena beaugleholei</i>																									
<i>Sclerolaena cornishiana</i>												+							+				+		
<i>Sclerolaena costata</i>												+													
<i>Sclerolaena cuneata</i>																									
<i>Sclerolaena densiflora</i>																									
<i>Sclerolaena diacantha</i>																									
<i>Sclerolaena eriacantha</i>																									+
<i>Sclerolaena glabra</i>																									
<i>Sclerolaena recurvicauspis</i>																									
<i>Sclerolaena tetragona</i>																									

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Senna artemisioides</i> subsp. <i>helmsii</i>																+	+	1%	+	+	+				
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																									
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)						+						+				+			+					2%	1%
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>							+			+											+				
<i>Senna glaucifloia</i> x <i>ferraria</i>																									
<i>Senna glaucifolia</i>																									
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																									
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+	+	+		1%			+	+				+	+											
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>		+																		+					
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																									
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>								+		+										3%		4%		2%	
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>						+		+							+										
<i>Senna hamersleyensis</i>																									
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																									
<i>Senna notabilis</i>	+	+		2%				+	+	+					+	+	+	+	+	+		+			
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																									
<i>Senna sericea</i>										1%															
<i>Senna</i> sp.		1%																			+		+		
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)																									
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																									
<i>Senna stricta</i>						+																+			
<i>Senna venusta</i>																									
<i>Sesbania cannabina</i>											+														
<i>Setaria dielsii</i>																									
<i>Setaria verticillata</i>																									
<i>Sida arenicola</i>									+																
<i>Sida echinocarpa</i>																						+			
<i>Sida ectogama</i>																1%	+			+					
<i>Sida fibulifera</i>												+													
<i>Sida platycalyx</i>																									
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																									
<i>Sida</i> sp.																									
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)		+						+							+			+							
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)			+											+											
<i>Sida</i> sp. Pilbara (ferruginous form)										+				+											
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																									
<i>Sida spinosa</i>																									
<i>Solanum horridum</i>														+											
<i>Solanum lasiophyllum</i>		+		+	+			+				+			+	+		+	+	+		+		+	
<i>Solanum phlomoides</i>	+			+	+																				
<i>Solanum</i> sp.																									
<i>Solanum sturtianum</i>																									
<i>Sonchus oleraceus</i>																									
<i>Spermacoce brachystema</i>																									
<i>Sporobolus australasicus</i>						+				+		+	+			+		+	2%	+	+	+	+	+	
<i>Sporobolus virginicus</i>																									
<i>Stemodia grossa</i>																									
<i>Stemodia viscosa</i>																									
<i>Stenopetalum nutans</i>																	+								
<i>Streptoglossa bubakii</i>										+	+	+													
<i>Streptoglossa cylindriceps</i>																									
<i>Streptoglossa decurrens</i>																									
<i>Streptoglossa liatroides</i>																									
<i>Streptoglossa odora</i>																									
<i>Striga squamigera</i>																									
<i>Swainsona kingii</i>																									
<i>Swainsona tanamiensis</i>																									

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																								
Year	2011																								
Taxa / Site	XB01	XB02	XB03	XB04	XB05	XB07	XB09	XB10	XB100	XB101	XB102	XB103	XB104	XB11	XB12	XB13	XB14	XB15	XB16	XB17	XB18	XB19	XB20	XB21	XB23
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																									
<i>Tecticornia auriculata</i>																									
<i>Tecticornia globulifera</i>																									
<i>Tecticornia indica</i>																									
<i>Tecticornia indica</i> subsp. <i>bidens</i>																									
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																									
<i>Tecticornia medusa</i>																									
<i>Tecticornia</i> sp. (sterile)																									
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)																									
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)																									
<i>Tephrosia clementii</i>																									
<i>Tephrosia oxalidea</i>										+															
<i>Tephrosia rosea</i>							+																		
<i>Tephrosia rosea</i> var. Fortescue creeks											+												+		
<i>Tephrosia</i> sp.																									
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																									
<i>Tephrosia supina</i>																									
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																									
<i>Themeda triandra</i>									+	+			+												
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>		+			+	+			+	+					+		+			+		+			
<i>Tragus australianus</i>																			+						
<i>Trianthema glossostigma</i>										+															
<i>Trianthema triquetra</i>										+															+
<i>Trianthema turgidifolia</i>																									
<i>Trianthema ufoensis</i>																									
<i>Tribulus astrocarpus</i>												+				+	+		+	+					+
<i>Tribulus hirsutus</i>	+																								
<i>Tribulus occidentalis</i>																									
<i>Tribulus suberosus</i>	+							+	+					+	+										
<i>Tribulus terrestris</i>																									
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																									
<i>Triodia basedowii</i>			+		15%					10%															
<i>Triodia epactia</i>														10%											
<i>Triodia epactia/pungens</i>	+	2%	15%						12%																
<i>Triodia longiceps</i>							+			30%	2%		3%					+				2%			
<i>Triodia pungens</i>															2%					+		10%			
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	+	25%						+	6%	+				1%	+					+					
<i>Triodia wiseana</i>																									
<i>Triraphis mollis</i>																									
<i>Triumfetta clementii</i>											+														
<i>Typha domingensis</i>																									
<i>Urochloa occidentalis</i>													+										+		
<i>Urochloa pubigera</i>																									
<i>Vachellia farnesiana</i>												+							+		+		+		
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																									
<i>Wahlenbergia tumidifructa</i>																									
<i>Xerochloa laniflora</i>																									+
<i>Zaleya galericulata</i>																									

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
Taxa / Site	XB24	XB25	XB26	XB28	XB30	XB32	XB34	XB36	XB38	XB40	XB42	XB44	XB46	XB48	XB50	XB52	XB54	XB56	XB58	XB60	XB61	XB62	XB63	XB64	XB65	XB66
<i>Abutilon amplum</i>																										
<i>Abutilon cryptopetalum</i>																										
<i>Abutilon cunninghamii</i>																										
<i>Abutilon fraseri</i>																										
<i>Abutilon lepidum</i>																		+			+	+				
<i>Abutilon macrum</i>																						+		+		+
<i>Abutilon otocarpum</i>				+								+	+	+			+					+	+	+	+	
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																					+					
<i>Abutilon</i> sp.							+																			
<i>Acacia acradenia</i>																										
<i>Acacia adsurgens</i>																										
<i>Acacia</i> aff. <i>aneura</i>																										
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)		15%	4%			3%		5%		35%	2%	3%	1%	2%	10%	3%	3%	4%	1%	3%	5%	2%		8%	+	7%
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	20%		+	3%	35%	1%	35%		50%	2%			2%					1%			3%	4%	21%			
<i>Acacia ampliceps</i>																										
<i>Acacia ancistrocarpa</i>																									+	
<i>Acacia aneura</i>																										
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																						+				
<i>Acacia aneura</i> var. <i>intermedia</i>														1%			9%								+	
<i>Acacia ayersiana</i>			+	+														+				+		+		
<i>Acacia bivenosa</i>																								+		
<i>Acacia colei</i> var. <i>colei</i>																										
<i>Acacia coriacea</i> subsp. <i>pendens</i>																										
<i>Acacia cowleana</i>																										
<i>Acacia inaequilatera</i>																										
<i>Acacia maitlandii</i>																						+				
<i>Acacia marramamba</i>																										
<i>Acacia monticola</i>																										
<i>Acacia paraneura</i>										1%																
<i>Acacia pruinocarpa</i>					1%		3%	1%	3%		+				1%	1%	2%					+	5%		1%	
<i>Acacia pyrifolia</i>									2%																	
<i>Acacia rhodophloia</i>																										
<i>Acacia sericophylla</i>																										
<i>Acacia sibirica</i>																										
<i>Acacia</i> sp.																										
<i>Acacia synchronicia</i>		3%				+					+	2%	+							3%	1%			1%		1%
<i>Acacia tenuissima</i>																									+	
<i>Acacia tetragonophylla</i>		+	+	+					+	+	+	+	+	+		1%	1%	+	+	1%	1%	+		+		+
<i>Acacia trachycarpa</i>								+																		
<i>Acacia tumida</i> var. <i>pilbarensis</i>													3%													
<i>Acacia xiphophylla</i>																			4%	1%	10%					10%
<i>Acetosa vesicaria</i>																										
<i>Achyranthes aspera</i>																										
<i>Aerva javanica</i>																										
<i>Aeschynomene indica</i>										+																
<i>Alternanthera angustifolia</i>																										
<i>Alternanthera denticulata</i>																										
<i>Alternanthera nana</i>												+														
<i>Alternanthera nodiflora</i>																										
<i>Alysicarpus muelleri</i>																										
<i>Amaranthus interruptus</i>	+				+		+		+	+									+			+				
<i>Amaranthus undulatus</i>																										
<i>Ammannia baccifera</i>																										
<i>Ammannia multiflora</i>																										

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
Taxa / Site	XB24	XB25	XB26	XB28	XB30	XB32	XB34	XB36	XB38	XB40	XB42	XB44	XB46	XB48	XB50	XB52	XB54	XB56	XB58	XB60	XB61	XB62	XB63	XB64	XB65	XB66
<i>Amphipogon sericeus</i>																										
<i>Amyema fitzgeraldii</i>										+									+							
<i>Androcalva luteiflora</i>																										
<i>Angianthus tomentosus</i>																										
<i>Anthobolus leptomerioides</i>																										
<i>Argemone ochroleuca</i>																										
<i>Aristida contorta</i>			+	+	+	+	+				+	+	+				+	+	+	+	15%	5%	1%	1%	+	
<i>Aristida holathera</i> var. <i>holathera</i>																									+	
<i>Aristida inaequiglumis</i>											+					1%										
<i>Aristida latifolia</i>																										
<i>Aristida obscura</i>		2%														+										
<i>Aristida pruinosa</i>																						+				
<i>Aristida</i> sp.																										
<i>Atalaya hemiglauca</i>																										
<i>Atriplex bunburyana</i>																										
<i>Atriplex codonocarpa</i>																										
<i>Atriplex flabelliformis</i>																										
<i>Austrobryonia pilbarensis</i>																										
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																										
<i>Bidens bipinnata</i>	+	+	+	+	1%	+	+		1%	+	+		+	1%	1%	+	+	+	+	+	+	+		+		1%
<i>Blumea tenella</i>																					+					
<i>Boerhavia burbidgeana</i>																										
<i>Boerhavia coccinea</i>					+			+	+	+	+	+	+	+	+	+	+	+	+		+		+			
<i>Boerhavia paludosa</i>	+					+	+														+	1%		+		
<i>Boerhavia repleta</i>																										
<i>Bonamia rosea</i>																									+	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																										
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>																										+
<i>Bothriochloa ewartiana</i>																										
<i>Brachyachne convergens</i>									+																	
<i>Brachyachne prostrata</i>		+						+												+	+					+
<i>Bulbostylis barbata</i>		+	+	+		+	+			+		1%	1%	1%			+	+				+		15%		+
<i>Bulbostylis turbinata</i>																			1%		1%			+		+
<i>Calandrinia ptychosperma</i>																					+	+				+
<i>Calandrinia</i> sp.										+																
<i>Calandrinia stagnensis</i>																										
<i>Calotis porphyroglossa</i>																										
<i>Calotis squamigera</i>																										+
<i>Calytrix carinata</i>																										
<i>Capparis spinosa</i> var. <i>nummularia</i>																										
<i>Capparis umbonata</i>																										
<i>Cenchrus ciliaris</i>		+		+				+	5%	+	+	+	+					+	+	2%	8%	1%		+	+	+
<i>Cenchrus setiger</i>																				15%	4%	3%	1%	+		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>																										+
<i>Cheilanthes austrotenuifolia</i>		+																								
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			+		+		+										+									
<i>Chenopodium auricomum</i>																										
<i>Chloris pectinata</i>		1%				+	+	+	+	+			+				+		+	+	+				+	1%
<i>Chloris virgata</i>																										
<i>Chrysocephalum gilesii</i>																										
<i>Chrysopogon fallax</i>		+				+			+	+			+						+	+	+	+			+	+
<i>Citrullus colocynthis</i>	+	+	+	+	+	+	+		1%	+	+			+	+	+	+	+	+							
<i>Cleome oxalidea</i>	+						+				+			+	+											
<i>Cleome viscosa</i>	+	+		+	+	+	+	+	+	+	+	+	+	+		+			+	+	+	+		+	+	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
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Taxa / Site	XB24	XB25	XB26	XB28	XB30	XB32	XB34	XB36	XB38	XB40	XB42	XB44	XB46	XB48	XB50	XB52	XB54	XB56	XB58	XB60	XB61	XB62	XB63	XB64	XB65	XB66
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																										
<i>Commelina ensifolia</i>					25%	1%	+				+											+	1%			
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																						+	+			
<i>Convolvulus</i> sp.																										
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																							+			
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>														+												
<i>Corchorus parviflorus</i>			+	+								+		+	+	+		+				+				
<i>Corchorus</i> sp.																										
<i>Corchorus tridens</i>	+	+	+		+	+	+	+	1%	+		+	+				+		+	1%	+	+	+			+
<i>Corymbia candida</i> subsp. <i>candida</i>																										
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																										
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																										
<i>Corymbia hamersleyana</i>															+										+	
<i>Cressa australis</i>																										
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>		+																	+							
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																										
<i>Cucumis maderaspatanus</i>		+																		+		+	+		+	+
<i>Cucumis melo</i> subsp. <i>agrestis</i>	+		+	1%		+	1%	1%	1%	+							+	+								+
<i>Cullen cinereum</i>																										
<i>Cullen leucanthum</i>																										
<i>Cymbopogon ambiguus</i>																1%									+	
<i>Cymbopogon obtectus</i>																									+	
<i>Cymbopogon procerus</i>																										
<i>Cymbopogon</i> sp.																										
<i>Cyperus bulbosus</i>																										
<i>Cyperus cunninghamii</i>																										
<i>Cyperus iria</i>		+					+	+	+	+									+	+						
<i>Cyperus rigidellus</i>																										
<i>Cyperus squarrosus</i>																										
<i>Cyperus vaginatus</i>																										
<i>Dactyloctenium radulans</i>		+					+	+	+	+	+									+	+	+				+
<i>Dampiera candicans</i>																										
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																			+	+	+	+	+			+
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																										
<i>Dicladantha forrestii</i>									+																	
<i>Dicladantha</i> sp.																										
<i>Digitaria brownii</i>																						+	+		+	
<i>Digitaria ctenantha</i>					+		+			+						+							+			+
<i>Dissocarpus paradoxus</i>																										
<i>Dodonaea coriacea</i>																										
<i>Dodonaea pachyneura</i>																										
<i>Dodonaea petiolaris</i>	+		4%	+	+	+								+	+		+	2%				+	2%			
<i>Duperreya commixta</i>	+				+					+					+		+	+					+		+	
<i>Dysphania plantaginella</i>																										
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	+	+	+			+	+	+		+	+		+	+	+	+			+	+	+	+	+	+	
<i>Dysphania sphaerosperma</i>																										
<i>Echinochloa colona</i>										+																
<i>Ehretia saligna</i> var. <i>saligna</i>																					+					
<i>Eleocharis papillosa</i>																										
<i>Elytrophorus spicatus</i>																										
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+												+			+			+							+
<i>Enneapogon caeruleus</i>																					+					
<i>Enneapogon lindleyanus</i>																										
<i>Enneapogon polyphyllus</i>			+	+	+			+			+	+		+		+	+	+	+	+	+	+	+	+	+	+
<i>Enneapogon robustissimus</i>																				+						

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
Taxa / Site	XB24	XB25	XB26	XB28	XB30	XB32	XB34	XB36	XB38	XB40	XB42	XB44	XB46	XB48	XB50	XB52	XB54	XB56	XB58	XB60	XB61	XB62	XB63	XB64	XB65	XB66
<i>Enteropogon ramosus</i>																										
<i>Eragrostis cumingii</i>								+																		
<i>Eragrostis curvula</i>																										
<i>Eragrostis desertorum</i>																				+	+					
<i>Eragrostis dielsii</i>																				+						
<i>Eragrostis elongata</i>																										
<i>Eragrostis eriopoda</i>																										
<i>Eragrostis leptocarpa</i>		+																		+		+				1%
<i>Eragrostis pergracilis</i>																										
<i>Eragrostis tenellula</i>																				3%	1%					
<i>Eragrostis xerophila</i>				+	+			+	+			+								+	+					
<i>Eremophea spinosa</i>																										
<i>Eremophila cuneifolia</i>													+						+	+						
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>		+	+	+		+	+				+	1%		+	+	1%	+	+	+		+	+	1%	2%	+	+
<i>Eremophila lanceolata</i>						+				+	1%	+								+	+		+			
<i>Eremophila latrobei</i>																										
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+		+	+	+	+	+		+	+	+		+				+		+						+	+
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																										
<i>Eremophila latrobei</i> x <i>forrestii</i>												+														
<i>Eremophila longifolia</i>																										
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																										
<i>Eremophila spongiorcarpa</i>																										
<i>Eremophila youngii</i> subsp. <i>lepidota</i>																										
<i>Eriachne benthamii</i>																				1%						
<i>Eriachne helmsii</i>			+	+		+	+																			
<i>Eriachne lanata</i>																										
<i>Eriachne mucronata</i>												+	+	+	+	+	+	1.5%	+	1%			3%	3%		
<i>Eriachne pulchella</i> subsp. <i>dominii</i>													+	+	+	+	+			+	+					
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>			+	+									+		+		+							+	+	
<i>Eriachne tenuiculmis</i>																										
<i>Eucalyptus gamophylla</i>																										
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																										
<i>Eucalyptus victrix</i>											+															
<i>Euphorbia australis</i>			+	+		+					+	+			+	+		+			+	+	+	+	+	
<i>Euphorbia biconvexa</i>											+											+				
<i>Euphorbia boophthona</i>										+																
<i>Euphorbia coghlanii</i>		+							+										+							
<i>Euphorbia</i> sp. (site 1089)																										
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																										
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																										
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+		+	+	+	+	+			+		+		+	+	+	+		+	+	+	+	+	+	+	+
<i>Fimbristylis dichotoma</i>																										
<i>Fimbristylis microcarya</i>																										
<i>Fimbristylis simulans</i>																										
<i>Flaveria trinervia</i>																				+						
<i>Frankenia ambita</i>																										
<i>Frankenia setosa</i>																										
<i>Glycine canescens</i>																							+			
<i>Gnephosis arachnoidea</i>																										
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																										
<i>Gomphrena cunninghamii</i>																									+	
<i>Gomphrena kanisii</i>				+		+					+	+	+	+	+	+	+	+			+	+	+	+	+	+

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
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<i>Goodenia forrestii</i>																										
<i>Goodenia lamprosperma</i>																										
<i>Goodenia microptera</i>																									+	
<i>Goodenia muelleriana</i>		+																								
<i>Goodenia nuda</i>																									+	
<i>Goodenia prostrata</i>		+	+	+		+	+				+	+		+	+	+				+	+	+	+	+	+	
<i>Goodenia</i> sp.						+																				
<i>Goodenia stobbsiana</i>																										
<i>Goodenia triodiophila</i>																										
<i>Gossypium australe</i> (Burrup Peninsula form)																	+							+		
<i>Gossypium robinsonii</i>																										
<i>Grevillea berryana</i>															+									2%		
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>				+											+			+							1%	
<i>Hakea chordophylla</i>																+										
<i>Hakea lorea</i> subsp. <i>lorea</i>			+	+	+																		+			
<i>Haloragis gossei</i>																										
<i>Heliotropium europaeum</i>																										
<i>Heliotropium heteranthum</i>		+										+		+					+		+	+		+		
<i>Heliotropium pachyphyllum</i>																										
<i>Hibiscus burtonii</i>															+										+	
<i>Hibiscus coatesii</i>																									+	
<i>Hibiscus gardneri</i>																										
<i>Hibiscus goldsworthii</i>																										
<i>Hibiscus</i> sp.																										
<i>Hibiscus sturtii</i>															+											
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																									+	
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>													+						+							
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																										
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																	+									
<i>Hibiscus verdcourtii</i>																										
<i>Hybanthus aurantiacus</i>	+			1%				+	+	+					+	+		+							1%	+
<i>Indigofera colutea</i>																										
<i>Indigofera monophylla</i>																					+		1%	+		
<i>Indigofera</i> sp.																										
<i>Ipomoea coptica</i>		+																								
<i>Ipomoea lonchophylla</i>																										
<i>Ipomoea muelleri</i>								6%	30%	2%	+	+					+				6%				+	
<i>Ipomoea plebeia</i>																										
<i>Ipomoea polymorpha</i>																										
<i>Iseilema dolichotrichum</i>																					+	+			+	
<i>Iseilema macratherum</i>																					+	+			+	
<i>Iseilema membranaceum</i>				+		+	+					+	+	+			+	+					+	+		
<i>Iseilema</i> sp.																			+							
<i>Iseilema vaginiflorum</i>																										
<i>Isotropis atropurpurea</i>																										
<i>Jasminum didymum</i> subsp. <i>lineare</i>	+		+	+									+													
<i>Keraudrenia nephrosperma</i>													+												+	
<i>Lawrenzia densiflora</i>																										
<i>Lepidium muelleri-ferdinandii</i>																										
<i>Lepidium oxytrichum</i>																										
<i>Lepidium phlebopetalum</i>		+										+	+													
<i>Lepidium pholidogynum</i>																										
<i>Lepidium platypetalum</i>																										
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																										
<i>Lipocarpha microcephala</i>																										

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
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<i>Lotus cruentus</i>																										
<i>Maireana amoena</i>																										
<i>Maireana appressa</i>																										
<i>Maireana carnosae</i>																										
<i>Maireana georgei</i>																										
<i>Maireana integra</i>																										
<i>Maireana luehmannii</i>																										
<i>Maireana planifolia</i>										+			+								+					
<i>Maireana planifolia</i> x <i>villosa</i>					+								+	+			+	+				+		+	+	
<i>Maireana pyramidata</i>		+																		+						+
<i>Maireana tomentosa</i>																										
<i>Maireana triptera</i>													+								+					
<i>Maireana villosa</i>	+		+		+	+					+		+		+			+		+	+					
<i>Malvaceae</i> sp.										+																
<i>Malvastrum americanum</i>		+	+						+											+	+					
<i>Marsdenia australis</i>																								+		
<i>Marsilea hirsuta</i>		+								+										1%				+		
<i>Melaleuca glomerata</i>																										
<i>Melaleuca linophylla</i>																										
<i>Melaleuca xerophila</i>																										
<i>Mimulus gracilis</i>																										
<i>Mimulus repens</i>																										
<i>Mollugo molluginea</i>				+					+		+			+	+	+		+	+			+	+		+	
<i>Muehlenbeckia florulenta</i>																										
<i>Muellerolimon salicorniaceum</i>																										
<i>Neptunia dimorphantha</i>																					+					
<i>Nicotiana benthamiana</i>																										
<i>Nicotiana heterantha</i>																										
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>		+					+			+				+							+	+	+			
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																										
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																										
<i>Nicotiana</i> sp.																										
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)																	+									
<i>Oldenlandia crouchiana</i>		+																+					+			
<i>Operculina aequiseipala</i>								1%																		
<i>Panicum decompositum</i>											+															
<i>Panicum effusum</i>																	+									
<i>Panicum laevinode</i>																										
<i>Paraneurachne muelleri</i>											+			+	+							+		+	+	
<i>Paspalidium clementii</i>	+		+	+	+	+	+		+		+		+	+	+		+	+	+		+			+	+	+
<i>Paspalidium tabulatum</i>																										
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																										
<i>Peripleura obovata</i>																										
<i>Perotis rara</i>	+		+	+	+	+	+		+	+	+	+	+	+	+	+	1%	+	+		+	1%	1%	+		+
<i>Petalostylis labicheoides</i>																										
<i>Phyllanthus erwinii</i>																										
<i>Phyllanthus maderaspatensis</i>																		+								
<i>Pleurocarpaea gracilis</i>		+																								
<i>Pluchea dentex</i>																										
<i>Pluchea dunlopii</i>																										+
<i>Pluchea ferdinandi-muelleri</i>																										
<i>Pluchea rubelliflora</i>																										
<i>Pluchea tetranthera</i>																										
<i>Plumbago zeylanica</i>																										

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	+	+			+	+	+		+		+		+	+		+	+	+	+	5%	1%	1%	10%		1%	
<i>Polycarpaea holtzei</i>																				+	+			+	+	+	
<i>Polycarpaea longiflora</i>															+	+		+						+			
<i>Polygala isingii</i>							+										+	+									
<i>Polymeria ambigua</i>																											
<i>Polymeria calycina</i>																											
<i>Portulaca cyclophylla</i>																											
<i>Portulaca oleracea</i>	+	+	+	+	+	+	+	1%	+	+	+	+	+	+	+	5%	+	+	+	+	2%	+	+	1%	+	+	
<i>Portulaca pilosa</i>																				+	+					+	
<i>Psydrax latifolia</i>					1%	+	+								+	+	+	+		+		+	+			+	
<i>Psydrax suaveolens</i>	+		+		+	+									+	+	+					+	+		+	+	
<i>Pterocaulon serrulatum</i>																					+	+	+				
<i>Pterocaulon</i> sp.																											
<i>Pterocaulon sphacelatum</i>		+	+	+	+	+	+		+	+		+	+	+	+	+	+	+	+	+				+	+	+	
<i>Pterocaulon sphaeranthoides</i>																											
<i>Ptilotus aervoides</i>												+									+			+			
<i>Ptilotus astrolasius</i>																											
<i>Ptilotus auriculifolius</i>																											
<i>Ptilotus calostachyus</i>																									+		
<i>Ptilotus clementii</i>																											
<i>Ptilotus fusiformis</i>																											
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>														+									+				
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>																			+	+		+		+	+		
<i>Ptilotus helipteroides</i>															+	+						+	+	+	+		
<i>Ptilotus incanus</i>																											
<i>Ptilotus macrocephalus</i>										+	+					+	+				+						
<i>Ptilotus nobilis</i>	+	+	+	+		+						+		+	+	+	+		+	+	+	+	+	+	+	+	
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	+		+	+	+			+	+		+				+	+	+	+		+	+	+	+		+	+	
<i>Ptilotus polystachyus</i>																											
<i>Ptilotus rotundifolius</i>																											
<i>Ptilotus schwartzii</i>			+	+		+					+						+	+									
<i>Rhagodia eremaea</i>		+											+							+	+					+	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)			+		+	+	+						+				+	+									
<i>Rhodanthe floribunda</i>																											
<i>Rhodanthe margarethae</i>																											
<i>Rhynchosia minima</i>																						+					
<i>Rostellularia adscendens</i> var. <i>clementii</i>												+									+	+					
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																											
<i>Salsola australis</i>								+				+	+			+			+	+	+	+		+		+	
<i>Samolus repens</i> var. <i>floribundus</i>																											
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																											
<i>Santalum lanceolatum</i>																											
<i>Scaevola spinescens</i>																											
<i>Schizachyrium fragile</i>																											
<i>Schoenoplectus dissachanthus</i>																											
<i>Schoenoplectus laevis</i>																											
<i>Sclerolaena beaugleholei</i>																											
<i>Sclerolaena cornishiana</i>	+			+		+						+	+		+	+					+	+	+	+			
<i>Sclerolaena costata</i>																								+	+		
<i>Sclerolaena cuneata</i>																				+						1%	
<i>Sclerolaena densiflora</i>																				1%							
<i>Sclerolaena diacantha</i>																											
<i>Sclerolaena eriacantha</i>																											
<i>Sclerolaena glabra</i>																											
<i>Sclerolaena recurvicauspis</i>																											
<i>Sclerolaena tetragona</i>											+																

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<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+		+	+	+				+	+	+	+		+	+	+	+		+		1%	1%		+	+		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>		+																	+	+							
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)		2%				+	+	+			+	+	1%						+	+							
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>		+																		+							
<i>Senna glaucifloia</i> x <i>ferraria</i>	+			+	+											+		+									
<i>Senna glaucifolia</i>																							+	+			
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																											
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>																							1%		1%		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>															+												
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																											
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	+	+	+			+					+	2%		+	+		+		+	+	+		1%	+		
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																											
<i>Senna hamersleyensis</i>																			+								
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)													+						+								
<i>Senna notabilis</i>		+		+	+						+	+		+	+	+		+	+	+		+	+	+	1%		
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																											
<i>Senna sericea</i>																											
<i>Senna</i> sp.																											
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)																				+							
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																											
<i>Senna stricta</i>				+													+								+		
<i>Senna venusta</i>																											
<i>Sesbania cannabina</i>																											
<i>Setaria dielsii</i>																											
<i>Setaria verticillata</i>							+		+	+							+		+	+							
<i>Sida arenicola</i>																											
<i>Sida echinocarpa</i>																											
<i>Sida ectogama</i>	+		+	+	+				+					+	+	1%	+	+					+				
<i>Sida fibulifera</i>		+										+							+		+	+	+				
<i>Sida platycalyx</i>						1%					+						+										
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																											
<i>Sida</i> sp.																			+								
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)															+												
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																											
<i>Sida</i> sp. Pilbara (ferruginous form)																											
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)				+																							
<i>Sida spinosa</i>																											
<i>Solanum horridum</i>													+	+								+					
<i>Solanum lasiophyllum</i>	+	+	+	+	+	+					+	+	+		+	+		+	+				+	+	+		
<i>Solanum phlomoides</i>												+			+		+	+			+			+	+		
<i>Solanum</i> sp.																		+									
<i>Solanum sturtianum</i>																											
<i>Sonchus oleraceus</i>																											
<i>Spermacoce brachystema</i>																						+	+				
<i>Sporobolus australasicus</i>	+	5%		+		+	+	+	+	+	+	+	+	+		+	+	+	+	1%	15%	2%	+	+	6%		
<i>Sporobolus virginicus</i>																											
<i>Stemodia grossa</i>																											
<i>Stemodia viscosa</i>																											
<i>Stenopetalum nutans</i>												+					+										
<i>Streptoglossa bubakii</i>																			+			+		+			
<i>Streptoglossa cylindriceps</i>																											
<i>Streptoglossa decurrens</i>																											
<i>Streptoglossa liatroides</i>																											
<i>Streptoglossa odora</i>																											
<i>Striga squamigera</i>																						+					
<i>Swainsona kingii</i>																											
<i>Swainsona tanamiensis</i>																											

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																									
Year	2011																									
Taxa / Site	XB24	XB25	XB26	XB28	XB30	XB32	XB34	XB36	XB38	XB40	XB42	XB44	XB46	XB48	XB50	XB52	XB54	XB56	XB58	XB60	XB61	XB62	XB63	XB64	XB65	XB66
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																										
<i>Tecticornia auriculata</i>																										
<i>Tecticornia globulifera</i>																										
<i>Tecticornia indica</i>																										
<i>Tecticornia indica</i> subsp. <i>bidens</i>																										
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																										
<i>Tecticornia medusa</i>																										
<i>Tecticornia</i> sp. (sterile)																										
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)																										
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)																										
<i>Tephrosia clementii</i>		+	+			+										+										
<i>Tephrosia oxalidea</i>																										
<i>Tephrosia rosea</i>																						+				
<i>Tephrosia rosea</i> var. Fortescue creeks																										
<i>Tephrosia</i> sp.																										
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																										
<i>Tephrosia supina</i>																								+		
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																										
<i>Themeda triandra</i>									+																	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	+			+											+										+	
<i>Tragus australianus</i>	+					+							+								+	+		+		
<i>Trianthema glossostigma</i>				+							+			+	+			+	+		+	+	+	+	1%	
<i>Trianthema triquetra</i>								+			+									1%						+
<i>Trianthema turgidifolia</i>																										
<i>Trianthema ufoensis</i>																										
<i>Tribulus astrocarpus</i>	+	+	+	+	+	+	+	+		+	+			+	+	+	+		+	+		+	+	+		
<i>Tribulus hirsutus</i>																										
<i>Tribulus occidentalis</i>																										
<i>Tribulus suberosus</i>																									+	
<i>Tribulus terrestris</i>																										
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>				+					+					+	+			+				+			+	
<i>Triodia basedowii</i>																										
<i>Triodia epactia</i>																										
<i>Triodia epactia/pungens</i>														+												
<i>Triodia longiceps</i>																									1%	
<i>Triodia pungens</i>																									20%	
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																										
<i>Triodia wiseana</i>				1%																						
<i>Triraphis mollis</i>																										
<i>Triumfetta clementii</i>																										
<i>Typha domingensis</i>																										
<i>Urochloa occidentalis</i>						+	+		+			+	+	+				+				+				
<i>Urochloa pubigera</i>																					+					
<i>Vachellia farnesiana</i>								+																		
<i>Vigna</i> sp. central (M.E. Trudgen 1626)												+														
<i>Wahlenbergia tumidifructa</i>																										+
<i>Xerochloa laniflora</i>																										
<i>Zaleya galericulata</i>																										

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Abutilon amplum</i>							+																	
<i>Abutilon cryptopetalum</i>							+																	
<i>Abutilon cunninghamii</i>																								
<i>Abutilon fraseri</i>																								
<i>Abutilon lepidum</i>	+	+	+	+					+										+			+		
<i>Abutilon macrum</i>					+		+		+										+					
<i>Abutilon otocarpum</i>	+	+	+																					
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)									+							+								
<i>Abutilon</i> sp.					+																			
<i>Acacia acradenia</i>																					+			
<i>Acacia adsurgens</i>																								
<i>Acacia</i> aff. <i>aneura</i>																		+						
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	25%	30%	50%	65%	15%	5%	65%	10%	75-80%	7%		6%	20%	30%		6%			2%			3%		
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)					5%						55%							2%			+			
<i>Acacia ampliceps</i>																								
<i>Acacia ancistrocarpa</i>																								
<i>Acacia aneura</i>																								
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																		1%						
<i>Acacia aneura</i> var. <i>intermedia</i>																								
<i>Acacia ayersiana</i>	2%																							
<i>Acacia bivenosa</i>																								
<i>Acacia colei</i> var. <i>colei</i>																								
<i>Acacia coriacea</i> subsp. <i>pendens</i>		+								+			5%			+							2%	5%
<i>Acacia cowleana</i>																								
<i>Acacia inaequilatera</i>																								
<i>Acacia maitlandii</i>																								
<i>Acacia marramamba</i>																								
<i>Acacia monticola</i>																								
<i>Acacia paraneura</i>																								
<i>Acacia pruinocarpa</i>		+		+							1%							1%		+	+	7%		
<i>Acacia pyrifolia</i>																					2%			+
<i>Acacia rhodophloia</i>																								
<i>Acacia sericophylla</i>																								
<i>Acacia sibirica</i>																		+						
<i>Acacia</i> sp.																								
<i>Acacia synchronicia</i>			+	+	7%	10%	+		1%	10%		1%	1%	+	5%	1%	3%		1%					
<i>Acacia tenuissima</i>																								
<i>Acacia tetragonophylla</i>	+			5%	4%		2%	+	1%	1%	4%	1%		+		1%		+	1%		1%	2%		
<i>Acacia trachycarpa</i>																					4%			
<i>Acacia tumida</i> var. <i>pilbarensis</i>																					1%			
<i>Acacia xiphophylla</i>								+											15%					
<i>Acetosa vesicaria</i>																								
<i>Achyranthes aspera</i>											+													
<i>Aerva javanica</i>				+				+				+			+						+			+
<i>Aeschynomene indica</i>					+				+															
<i>Alternanthera angustifolia</i>				+					+															
<i>Alternanthera denticulata</i>					+		+	+	+		+	+	+	+										
<i>Alternanthera nana</i>																								
<i>Alternanthera nodiflora</i>																								
<i>Alysicarpus muelleri</i>			+										+								+			
<i>Amaranthus interruptus</i>																								
<i>Amaranthus undulatus</i>																					+			+
<i>Ammannia baccifera</i>																								
<i>Ammannia multiflora</i>							+				+		+											

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Amphipogon sericeus</i>																								
<i>Amyema fitzgeraldii</i>										+	+										+			
<i>Androcalva luteiflora</i>																		+						
<i>Angianthus tomentosus</i>																								
<i>Anthobolus leptomerioides</i>																								
<i>Argemone ochroleuca</i>																						+		
<i>Aristida contorta</i>	+	2%	1%	+	+			2%				2%			+	+	10%	+		+				
<i>Aristida holathera</i> var. <i>holathera</i>																		+						
<i>Aristida inaequiglumis</i>												+												
<i>Aristida latifolia</i>			+																					
<i>Aristida obscura</i>																								
<i>Aristida pruinosa</i>		+																						
<i>Aristida</i> sp.																								
<i>Atalaya hemiglauca</i>							1%			+			1%								1%	2%	+	1%
<i>Atriplex bunburyana</i>						1%	+			1%			1%											
<i>Atriplex codonocarpa</i>						+													+					
<i>Atriplex flabelliformis</i>																								
<i>Austrobryonia pilbarensis</i>			+																					
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																								
<i>Bidens bipinnata</i>	1%	2%	1%	+	+		+		+	+	+								+			+		
<i>Blumea tenella</i>			+	+	+				+	+	+		+											
<i>Boerhavia burbidgeana</i>				+						1%		+			+									
<i>Boerhavia coccinea</i>	+	+				+								+			+				+	+		
<i>Boerhavia paludosa</i>			1%		+		+	+	+		+		+			1%	+							
<i>Boerhavia repleta</i>																								
<i>Bonamia rosea</i>																								
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																				+				
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>										+				+										
<i>Bothriochloa ewartiana</i>																								
<i>Brachyachne convergens</i>																								
<i>Brachyachne prostrata</i>								+				1%				+	+							
<i>Bulbostylis barbata</i>		+	2%	+															+	25%				
<i>Bulbostylis turbinata</i>	+		2%					+	+			+												
<i>Calandrinia ptychosperma</i>			+	+	+	+	+	+	+															
<i>Calandrinia</i> sp.																								
<i>Calandrinia stagnensis</i>																								
<i>Calotis porphyroglossa</i>				+				+														+		
<i>Calotis squamigera</i>																								
<i>Calytrix carinata</i>																								
<i>Capparis spinosa</i> var. <i>nummularia</i>																								
<i>Capparis umbonata</i>																								
<i>Cenchrus ciliaris</i>		1%	1-2%	+	2%	70%	10%	+	+	20%	25%	1%	30%	1%	15%		+		+		75%	60%	100%	95%
<i>Cenchrus setiger</i>			+	+				+	+	65%	65%		65%		15%	+					1%	5%		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			+	+	+		+	+	+	+	+	+	+	+										
<i>Cheilanthes austrotenuifolia</i>																								
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+																		+					
<i>Chenopodium auricomum</i>																								
<i>Chloris pectinata</i>			+	+	+	+	+	1%	+	+	+		+	+	1%		+		+					
<i>Chloris virgata</i>				+	+	+		+	+	+	+	1%		+					+					
<i>Chrysocephalum gilesii</i>														+										
<i>Chrysopogon fallax</i>			+	+	+		2%	1%	10%	+	+	+	+			+	+		+					
<i>Citrullus colocynthis</i>				+	+		+		+	+	1%										+		1%	1%
<i>Cleome oxalidea</i>	+																							
<i>Cleome viscosa</i>	+	+	+	+		+	+	+	+	+	+		+		+	+		+			+	+		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMN01	XBCMN02
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																								
<i>Commelina ensifolia</i>											+													
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	+		+	+		+									+						+	+		
<i>Convolvulus</i> sp.																								
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																	+							
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>		+														+		+		+	+			
<i>Corchorus parviflorus</i>																								
<i>Corchorus</i> sp.																								
<i>Corchorus tridens</i>	+		3%	+	+	+	+	+	+		+	+	+		+	+	+		+		+	+		
<i>Corymbia candida</i> subsp. <i>candida</i>																								
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																								
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>											+													
<i>Corymbia hamersleyana</i>																					+			
<i>Cressa australis</i>																								
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																								
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			+										+								+			
<i>Cucumis maderaspatanus</i>	+	+	+								+		+		+			+	+		+	+		
<i>Cucumis melo</i> subsp. <i>agrestis</i>			+																					
<i>Cullen cinereum</i>												4%	+		+									
<i>Cullen leucanthum</i>																								
<i>Cymbopogon ambiguus</i>	+	+																		+				
<i>Cymbopogon obtectus</i>																								
<i>Cymbopogon procerus</i>																								
<i>Cymbopogon</i> sp.																								
<i>Cyperus bulbosus</i>																								
<i>Cyperus cunninghamii</i>																								
<i>Cyperus iria</i>			+	+	+	+			+	+	+	+							+					
<i>Cyperus rigidellus</i>														+										
<i>Cyperus squarrosus</i>																								
<i>Cyperus vaginatus</i>																								
<i>Dactyloctenium radulans</i>			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+			+		
<i>Dampiera candicans</i>																				1%				
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>			+	+	+			+			+	+			+									
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																								
<i>Dicladantha forrestii</i>										+												+	+	+
<i>Dicladantha</i> sp.																								
<i>Digitaria brownii</i>	+	+																						
<i>Digitaria ctenantha</i>	+			+	+				+										+					
<i>Dissocarpus paradoxus</i>																								
<i>Dodonaea coriacea</i>																								
<i>Dodonaea pachyneura</i>																								
<i>Dodonaea petiolaris</i>	2%	4%																+						
<i>Duperreya commixta</i>	+	+									+										+			
<i>Dysphania plantaginella</i>																								
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	+	+	+	+	+	+	+	+	+	+		+	+		+	+	+	+		+	+	+		
<i>Dysphania sphaerosperma</i>																				+				
<i>Echinochloa colona</i>				+	+	+	+			+	+													
<i>Ehretia saligna</i> var. <i>saligna</i>									+														+	1%
<i>Eleocharis papillosa</i>																								
<i>Elytrophorus spicatus</i>																								
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>			+		+	+	+		+	+				+		+			+					
<i>Enneapogon caeruleascens</i>			+									+		+			+		+					
<i>Enneapogon lindleyanus</i>																								
<i>Enneapogon polyphyllus</i>	+	+	1%	+	+				+			+		+	+	+	+	+				+		
<i>Enneapogon robustissimus</i>																								

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Enteropogon ramosus</i>																								
<i>Eragrostis cumingii</i>					+		+		+		+													
<i>Eragrostis curvula</i>																								
<i>Eragrostis desertorum</i>								2%	+			5%	+	1%	1%	+	+		+					
<i>Eragrostis dielsii</i>					+	+								+					+					
<i>Eragrostis elongata</i>																								
<i>Eragrostis eriopoda</i>						+																		
<i>Eragrostis leptocarpa</i>			+	+	+	1%	+	1%	2%	1%		1%		+					+					
<i>Eragrostis pergracilis</i>									+															
<i>Eragrostis tenellula</i>		+	+	+	+	1%	2%		+	+	1%	2%	+			+			+		+			
<i>Eragrostis xerophila</i>														+										
<i>Eremophea spinosa</i>																								
<i>Eremophila cuneifolia</i>	+				+		+		+			+							1%					
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	2%	1%				+			+			+		+				+						
<i>Eremophila lanceolata</i>			+	+	+				+			+												
<i>Eremophila latrobei</i>									+															
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	+	+		+	+		+		+															
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																								
<i>Eremophila latrobei</i> x <i>forrestii</i>																								
<i>Eremophila longifolia</i>																								
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																								
<i>Eremophila spongiocarpa</i>						1%				+				2%										
<i>Eremophila youngii</i> subsp. <i>lepidota</i>						1%	1%				1%			1%										
<i>Eriachne benthamii</i>												6%		1%										
<i>Eriachne helmsii</i>																								
<i>Eriachne lanata</i>																								
<i>Eriachne mucronata</i>	+	+					+										+	1%		+	+			
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																				+				
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	+			+	+			+				+				+	+	+						
<i>Eriachne tenuiculmis</i>																					+			
<i>Eucalyptus gamophylla</i>																		1%						
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																				1%				
<i>Eucalyptus victrix</i>											1%		3%										15%	3%
<i>Euphorbia australis</i>	+	+	+					+				+	+	+	+	+					+	+		
<i>Euphorbia biconvexa</i>				+						+														
<i>Euphorbia boophthona</i>								+				+												
<i>Euphorbia coghlanii</i>												+	+											
<i>Euphorbia</i> sp. (site 1089)								+																
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																+	+				+	+		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																					+			
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	+	+	+	+	+		+	+	+		+					+			+		+	+		
<i>Fimbristylis dichotoma</i>																					+			
<i>Fimbristylis microcarya</i>																								
<i>Fimbristylis simulans</i>																					+			
<i>Flaveria trinervia</i>																								
<i>Frankenia ambita</i>																								
<i>Frankenia setosa</i>						+								+										
<i>Glycine canescens</i>																								
<i>Gnephosis arachnoidea</i>																								
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>			+																					
<i>Gomphrena cunninghamii</i>												+												
<i>Gomphrena kanisii</i>	+	+	+	+			+	+			+						+	+				+		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Goodenia forrestii</i>														+			+							
<i>Goodenia lamprosperma</i>							+	+	+			+	+			+								
<i>Goodenia microptera</i>																		+						
<i>Goodenia muelleriana</i>			+									+												
<i>Goodenia nuda</i>																								
<i>Goodenia prostrata</i>	+	+	+		+		+	+	+															
<i>Goodenia</i> sp.																								
<i>Goodenia stobbsiana</i>																		+		+				
<i>Goodenia triodiophila</i>																				+				
<i>Gossypium australe</i> (Burrup Peninsula form)																								
<i>Gossypium robinsonii</i>																								
<i>Grevillea berryana</i>		+																						
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>		+																+		+	1%			
<i>Hakea chordophylla</i>																				+				
<i>Hakea lorea</i> subsp. <i>lorea</i>																							+	+
<i>Haloragis gossei</i>																								
<i>Heliotropium europaeum</i>																								
<i>Heliotropium heteranthum</i>	+	+	+					+									+							
<i>Heliotropium pachyphyllum</i>																								
<i>Hibiscus burtonii</i>																								
<i>Hibiscus coatesii</i>																								
<i>Hibiscus gardneri</i>																								
<i>Hibiscus goldsworthii</i>																								
<i>Hibiscus</i> sp.												+												
<i>Hibiscus sturtii</i>																								
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																				+				
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>				+								+					+							
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																								
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																								
<i>Hibiscus verdcourtii</i>																								
<i>Hybanthus aurantiacus</i>																		+		+	+			
<i>Indigofera colutea</i>								+								+	+							
<i>Indigofera monophylla</i>	+	+																+		+	1%			
<i>Indigofera</i> sp.																								
<i>Ipomoea coptica</i>						+	+			+	1%	+	+	+										
<i>Ipomoea lonchophylla</i>																								
<i>Ipomoea muelleri</i>			1%	1%		15%		+	+	2%	10%		2%		1%				+		+			2%
<i>Ipomoea plebeia</i>																								
<i>Ipomoea polymorpha</i>																								
<i>Iseilema dolichotrichum</i>			+																					
<i>Iseilema macratherum</i>		+	+					+																
<i>Iseilema membranaceum</i>	+			+	+																			
<i>Iseilema</i> sp.																								
<i>Iseilema vaginiflorum</i>											+													
<i>Isotropis atropurpurea</i>																								
<i>Jasminum didymum</i> subsp. <i>lineare</i>																								
<i>Keraudrenia nephrosperma</i>																		+						
<i>Lawrenzia densiflora</i>																								
<i>Lepidium muelleri-ferdinandii</i>										+														
<i>Lepidium oxytrichum</i>					+																			
<i>Lepidium phlebopetalum</i>	+	+				+								+					+					
<i>Lepidium pholidogynum</i>																								
<i>Lepidium platypetalum</i>														+										
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																								
<i>Lipocarpa microcephala</i>																								

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Lotus cruentus</i>																								
<i>Maireana amoena</i>						+																		
<i>Maireana appressa</i>																								
<i>Maireana carnosae</i>						+								+										
<i>Maireana georgei</i>								+																
<i>Maireana integra</i>																								
<i>Maireana luehmannii</i>																								
<i>Maireana planifolia</i>				+	+		+		+										1%			+		
<i>Maireana planifolia</i> x <i>villosa</i>	+																							
<i>Maireana pyramidata</i>					+	1%	3%		+	+				4%					1%					
<i>Maireana tomentosa</i>																								
<i>Maireana triptera</i>													+											
<i>Maireana villosa</i>	+	+																+						
<i>Malvaceae</i> sp.																								
<i>Malvastrum americanum</i>			+	2%		+		+		+	2%		1%	+	+							+		
<i>Marsdenia australis</i>		+																						
<i>Marsilea hirsuta</i>				+				+			+	+	+	+										
<i>Melaleuca glomerata</i>							2%																	
<i>Melaleuca linophylla</i>																								
<i>Melaleuca xerophila</i>																								
<i>Mimulus gracilis</i>												+												
<i>Mimulus repens</i>																								
<i>Mollugo molluginea</i>	+				+													+			+			
<i>Muehlenbeckia florulenta</i>														+										
<i>Muellerolimon salicorniaceum</i>																								
<i>Neptunia dimorphantha</i>												+		+										
<i>Nicotiana benthamiana</i>																								
<i>Nicotiana heterantha</i>					+																			
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	+		+	+			+		+		+							+						
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																						+		
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>				+			+																	
<i>Nicotiana</i> sp.																								
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	+																				+	+		
<i>Oldenlandia crouchiana</i>		+	+																		+			
<i>Operculina aequiseipala</i>								+			+	+	+		+									
<i>Panicum decompositum</i>										+														
<i>Panicum effusum</i>																								
<i>Panicum laevinode</i>												1%		+										
<i>Paraneurachne muelleri</i>		+																1%						
<i>Paspalidium clementii</i>	+	+	+	+															+	+				
<i>Paspalidium tabulatum</i>							+																	
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																								
<i>Peripleura obovata</i>																								
<i>Perotis rara</i>	+	+	+	+	+	+			+										+					
<i>Petalostylis labicheoides</i>																								
<i>Phyllanthus erwinii</i>									+															
<i>Phyllanthus maderaspatensis</i>										+											+			
<i>Pleurocarpaea gracilis</i>																								
<i>Pluchea dentex</i>																								
<i>Pluchea dunlopia</i>							+																	
<i>Pluchea ferdinandi-muelleri</i>																								
<i>Pluchea rubelliflora</i>						+			+	+	+		+	+				+						
<i>Pluchea tetranthera</i>					+																			
<i>Plumbago zeylanica</i>																								

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	+	1%	+		+	+	+	+	+					+			+	+	+	+	+	+		
<i>Polycarpaea holtzei</i>	+	+	+					+							+		+	+		+		+		
<i>Polycarpaea longiflora</i>		+																			+			
<i>Polygala isingii</i>			+																					
<i>Polymeria ambigua</i>																								
<i>Polymeria calycina</i>																								
<i>Portulaca cyclophylla</i>															+	+								
<i>Portulaca oleracea</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+		
<i>Portulaca pilosa</i>					+	+	+	+	+	+									+					
<i>Psydrax latifolia</i>		+		+	+				+										+		+			
<i>Psydrax suaveolens</i>		+																						
<i>Pterocaulon serrulatum</i>																								
<i>Pterocaulon</i> sp.																								
<i>Pterocaulon sphacelatum</i>	+	+	+	+	+		+	+	+	+	+	+	+	+					+		+	+		
<i>Pterocaulon sphaeranthoides</i>																								
<i>Ptilotus aervoides</i>	+	+														+	+			+				
<i>Ptilotus astrolasius</i>																		+						
<i>Ptilotus auriculifolius</i>								+						+				+		+	+	+		
<i>Ptilotus calostachyus</i>								+									+	+		2%				
<i>Ptilotus clementii</i>																				+				
<i>Ptilotus fusiformis</i>																				+				
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	+																							
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>			+	+	+	+	+	+	+	+	+	+	+		+									
<i>Ptilotus helipteroides</i>	+	+																+						
<i>Ptilotus incanus</i>																								
<i>Ptilotus macrocephalus</i>	+		+	+				+		+	+	+	+			+						+		
<i>Ptilotus nobilis</i>	+	2%					+			+								+		+				
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			+				+			+				+				+			+	+		
<i>Ptilotus polystachyus</i>																		+						
<i>Ptilotus rotundifolius</i>																				+				
<i>Ptilotus schwartzii</i>	+	+																+						
<i>Rhagodia eremaea</i>		+	+		+		+	+		+		+		+		+	+		2%		+			
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																								
<i>Rhodanthe floribunda</i>																								
<i>Rhodanthe margarethae</i>																								
<i>Rhynchosia minima</i>				+				+				+									+			
<i>Rostellularia adscendens</i> var. <i>clementii</i>	+	+	+	+						+	+	+	+											
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																								
<i>Salsola australis</i>	+	+		+				+				+			+	+	+		+			+		
<i>Samolus repens</i> var. <i>floribundus</i>																								
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																								
<i>Santalum lanceolatum</i>																								
<i>Scaevola spinescens</i>									+	+				+										
<i>Schizachyrium fragile</i>																		+						
<i>Schoenoplectus dissachanthus</i>																								
<i>Schoenoplectus laevis</i>																								
<i>Sclerolaena beaugleholei</i>																								
<i>Sclerolaena cornishiana</i>	+		+													+						+		
<i>Sclerolaena costata</i>				+	+							+												
<i>Sclerolaena cuneata</i>					+	+			+	+				+		+			1%					
<i>Sclerolaena densiflora</i>					+	+			+						+				+					
<i>Sclerolaena diacantha</i>																			+					
<i>Sclerolaena eriacantha</i>																								
<i>Sclerolaena glabra</i>						+		+	+						+		+							
<i>Sclerolaena recurvicauspis</i>																								
<i>Sclerolaena tetragona</i>																								

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Project Area	Christmas Creek Life of Mine Survey Area																							
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<i>Senna artemisioides</i> subsp. <i>helmsii</i>	+	+	+	1%		+	+	+	+							+		+						
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																								
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)			+		+	+				+		+					+		+					
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>			+							+		+				+	+		+		+			
<i>Senna glaucifloia</i> x <i>ferraria</i>																					+			
<i>Senna glaucifolia</i>	+		+								+						+	+						
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																								
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	+																	+		+				
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																								
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																								
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>	+	+			+		+											+		+				
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																								
<i>Senna hamersleyensis</i>																								
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																								
<i>Senna notabilis</i>	+	+	+			+	+		+						+			+			+	+		
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																								
<i>Senna sericea</i>																								
<i>Senna</i> sp.																								
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)				+					+					+	+									
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																	+							
<i>Senna stricta</i>		+																						
<i>Senna venusta</i>																								
<i>Sesbania cannabina</i>																								
<i>Setaria dielsii</i>			+					+		+	+											+		
<i>Setaria verticillata</i>				+			+		+							+								
<i>Sida arenicola</i>																								
<i>Sida echinocarpa</i>																								
<i>Sida ectogama</i>	2%	3%																						
<i>Sida fibulifera</i>		+			+			+				+		+			+					+		
<i>Sida platycalyx</i>																								
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																								
<i>Sida</i> sp.																								
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)		+																						
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																					+			
<i>Sida</i> sp. Pilbara (ferruginous form)																					+			
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)							+		+										+		+			
<i>Sida spinosa</i>																								
<i>Solanum horridum</i>																		+			+			
<i>Solanum lasiophyllum</i>	+	+						+	+			+				+	+		+			+		
<i>Solanum phlomoides</i>	+	+																		+		+		
<i>Solanum</i> sp.																								
<i>Solanum sturtianum</i>																								
<i>Sonchus oleraceus</i>																								
<i>Spermacoce brachystema</i>	+																							
<i>Sporobolus australasicus</i>	1%	+	+	1%		+	+	8%	4%			4%	1%	+	10%	2%	1%	+	+		1%	+		+
<i>Sporobolus virginicus</i>																								
<i>Stemodia grossa</i>																								
<i>Stemodia viscosa</i>																								
<i>Stenopetalum nutans</i>					+																			
<i>Streptoglossa bubakii</i>			+	+		+	+	+	+		+	+	+											
<i>Streptoglossa cylindriceps</i>															+									
<i>Streptoglossa decurrens</i>																								
<i>Streptoglossa liatroides</i>																								
<i>Streptoglossa odora</i>																								
<i>Striga squamigera</i>				+						+	+		+											
<i>Swainsona kingii</i>																								
<i>Swainsona tanamiensis</i>																								

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Survey Area																							
Year	2011																							
Taxa / Site	XB67	XB68	XB69	XB70	XB71	XB72	XB73	XB74	XB75	XB76	XB77	XB78	XB79	XB80	XB81	XB82	XB83	XB84	XB85	XB86	XB87	XB88	XBCMNO1	XBCMNO2
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>												+												
<i>Tecticornia auriculata</i>																								
<i>Tecticornia globulifera</i>																								
<i>Tecticornia indica</i>																								
<i>Tecticornia indica</i> subsp. <i>bidens</i>						+																		
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																								
<i>Tecticornia medusa</i>																								
<i>Tecticornia</i> sp. (sterile)																								
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)																								
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)																								
<i>Tephrosia clementii</i>	+	+															+							
<i>Tephrosia oxalidea</i>																								
<i>Tephrosia rosea</i>	+			+			+		+										+					
<i>Tephrosia rosea</i> var. Fortescue creeks																					+			
<i>Tephrosia</i> sp.																								
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																					+			
<i>Tephrosia supina</i>																				+				
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																								
<i>Themeda triandra</i>								+						+										
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>																				+	+			
<i>Tragus australianus</i>		+		+										+										
<i>Trianthema glossostigma</i>	+	+																+						
<i>Trianthema triquetra</i>				+		+	+	+	+	+		+	+	+	+	+	+		+					
<i>Trianthema turgidifolia</i>						+								+										
<i>Trianthema ufoensis</i>																								
<i>Tribulus astrocarpus</i>	+	+			+			+	+			+				+	+							
<i>Tribulus hirsutus</i>																								
<i>Tribulus occidentalis</i>																								
<i>Tribulus suberosus</i>		+																+		+				
<i>Tribulus terrestris</i>			+					+				+	+			+					+			
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	+	+											+					+			+	+		
<i>Triodia basedowii</i>																								
<i>Triodia epactia</i>																								
<i>Triodia epactia/pungens</i>																				+				
<i>Triodia longiceps</i>																					+			
<i>Triodia pungens</i>																		7%						
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																		5%		+				
<i>Triodia wiseana</i>																								
<i>Triraphis mollis</i>													+											
<i>Triumfetta clementii</i>																								
<i>Typha domingensis</i>																								
<i>Urochloa occidentalis</i>			+	+					+		+								+					
<i>Urochloa pubigera</i>																								
<i>Vachellia farnesiana</i>								+	+	1%	+	+	3%	+	1%							+		+
<i>Vigna</i> sp. central (M.E. Trudgen 1626)			+																					
<i>Wahlenbergia tumidifructa</i>																			+					
<i>Xerochloa laniflora</i>						+													+					
<i>Zaleya galericulata</i>													+											

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCMNO3	XBMNO1	XBMNO2	XBMNO3	XBMNO4	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Abutilon amplum</i>																		
<i>Abutilon cryptopetalum</i>																		
<i>Abutilon cunninghamii</i>																		
<i>Abutilon fraseri</i>																		
<i>Abutilon lepidum</i>															+			
<i>Abutilon macrum</i>																		
<i>Abutilon otocarpum</i>																		
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																		
<i>Abutilon</i> sp.																		
<i>Acacia acradenia</i>																+		
<i>Acacia adsurgens</i>																		
<i>Acacia</i> aff. <i>aneura</i>																		
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	+								1%		10%		+					
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)								15%								+		
<i>Acacia ampliceps</i>																		
<i>Acacia ancistrocarpa</i>																		
<i>Acacia aneura</i>																		
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																		
<i>Acacia aneura</i> var. <i>intermedia</i>													+					
<i>Acacia ayersiana</i>																		
<i>Acacia bivenosa</i>									+									
<i>Acacia colei</i> var. <i>colei</i>																		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	20%		2%	1%						3%			+	+	+			
<i>Acacia cowleana</i>															2%			
<i>Acacia inaequilatera</i>																		
<i>Acacia maitlandii</i>							+				2%	+			4%	1%		
<i>Acacia marramamba</i>																		
<i>Acacia monticola</i>																+		
<i>Acacia paraneura</i>																		
<i>Acacia pruinocarpa</i>	5%						+		5%								+	
<i>Acacia pyrifolia</i>	+			4%			+			+	2%	2%	3%	1%		2%		
<i>Acacia rhodophloia</i>																		
<i>Acacia sericophylla</i>																		
<i>Acacia sibirica</i>																		
<i>Acacia</i> sp.																		
<i>Acacia synchronicia</i>								+	4%								+	+
<i>Acacia tenuissima</i>																		
<i>Acacia tetragonophylla</i>	1%	+								+	+		1%					
<i>Acacia trachycarpa</i>		+	2%	+	+					+				4%				
<i>Acacia tumida</i> var. <i>pilbarensis</i>						3%	25%						+					
<i>Acacia xiphophylla</i>																		
<i>Acetosa vesicaria</i>																		
<i>Achyranthes aspera</i>										+								
<i>Aerva javanica</i>	+																	
<i>Aeschynomene indica</i>																		
<i>Alternanthera angustifolia</i>																		
<i>Alternanthera denticulata</i>																		
<i>Alternanthera nana</i>																		
<i>Alternanthera nodiflora</i>																		
<i>Alysicarpus muelleri</i>																		
<i>Amaranthus interruptus</i>												+	+	+	+			
<i>Amaranthus undulatus</i>										+						+		
<i>Ammannia baccifera</i>										+								
<i>Ammannia multiflora</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCM03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Amphipogon sericeus</i>											+				3%			
<i>Amyema fitzgeraldii</i>																		
<i>Androcalva luteiflora</i>											+					+		
<i>Angianthus tomentosus</i>																		
<i>Anthobolus leptomerioides</i>																		
<i>Argemone ochroleuca</i>										+				+				
<i>Aristida contorta</i>								+									+	
<i>Aristida holathera</i> var. <i>holathera</i>																		
<i>Aristida inaequiglumis</i>																		
<i>Aristida latifolia</i>																		
<i>Aristida obscura</i>																		
<i>Aristida pruinosa</i>																		
<i>Aristida</i> sp.																		
<i>Atalaya hemiglauca</i>						+	+			+		+	+	+		+		
<i>Atriplex bunburyana</i>																	1%	+
<i>Atriplex codonocarpa</i>																		
<i>Atriplex flabelliformis</i>																		
<i>Austrobryonia pilbarensis</i>																		
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																		
<i>Bidens bipinnata</i>									+	+	+	+	+		+			
<i>Blumea tenella</i>																		
<i>Boerhavia burbidgeana</i>																		
<i>Boerhavia coccinea</i>												+						
<i>Boerhavia paludosa</i>								+									+	
<i>Boerhavia repleta</i>																		
<i>Bonamia rosea</i>																		
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)						+	+									+		
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>																		
<i>Bothriochloa ewartiana</i>	+																	
<i>Brachyachne convergens</i>																		
<i>Brachyachne prostrata</i>																		+
<i>Bulbostylis barbata</i>						+	+		+						+	+		
<i>Bulbostylis turbinata</i>																		
<i>Calandrinia ptychosperma</i>																		
<i>Calandrinia</i> sp.																		
<i>Calandrinia stagnensis</i>																		
<i>Calotis porphyroglossa</i>																		
<i>Calotis squamigera</i>																		
<i>Calytrix carinata</i>																		
<i>Capparis spinosa</i> var. <i>nummularia</i>																		
<i>Capparis umbonata</i>																		
<i>Cenchrus ciliaris</i>	90%	30%	20%	40%	20%			+		20%	20%	40%	30%	20%	15%	40%	+	
<i>Cenchrus setiger</i>																		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>																		
<i>Cheilanthes austrotenuifolia</i>										+				+				
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>																		
<i>Chenopodium auricomum</i>																		
<i>Chloris pectinata</i>								+									+	
<i>Chloris virgata</i>																		
<i>Chrysocephalum gilesii</i>																		
<i>Chrysopogon fallax</i>	+																	
<i>Citrullus colocynthis</i>										+	+							
<i>Cleome oxalidea</i>																		
<i>Cleome viscosa</i>						+	+	+		+	+		+	+	+	+		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCM03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																		
<i>Commelina ensifolia</i>																		
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																		
<i>Convolvulus</i> sp.														+				
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																		
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>						+	+											
<i>Corchorus parviflorus</i>										+		+	+		+	+		
<i>Corchorus</i> sp.																		
<i>Corchorus tridens</i>	+							+				+	+		+	+		
<i>Corymbia candida</i> subsp. <i>candida</i>	2%											+						
<i>Corymbia candida</i> subsp. <i>dipsodes</i>													4%					
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																		
<i>Corymbia hamersleyana</i>							2%		+				2%			+		
<i>Cressa australis</i>																		
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																		
<i>Cucumis maderaspatanus</i>										+	+	+	+		+	+		
<i>Cucumis melo</i> subsp. <i>agrestis</i>																		
<i>Cullen cinereum</i>																		
<i>Cullen leucanthum</i>										+								
<i>Cymbopogon ambiguus</i>													+					
<i>Cymbopogon obtectus</i>																		
<i>Cymbopogon procerus</i>																		
<i>Cymbopogon</i> sp.						+												
<i>Cyperus bulbosus</i>																		
<i>Cyperus cunninghamii</i>																		
<i>Cyperus iria</i>											+				+			
<i>Cyperus rigidellus</i>																		
<i>Cyperus squarrosus</i>																		
<i>Cyperus vaginatus</i>														+				
<i>Dactyloctenium radulans</i>	+							+						+			+	+
<i>Dampiera candicans</i>						+												
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																		
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																		
<i>Dicladanthera forrestii</i>																		
<i>Dicladanthera</i> sp.																		
<i>Digitaria brownii</i>																		
<i>Digitaria ctenantha</i>																		
<i>Dissocarpus paradoxus</i>																		
<i>Dodonaea coriacea</i>							+											
<i>Dodonaea pachyneura</i>						+												
<i>Dodonaea petiolaris</i>							+		+									
<i>Duperreya commixta</i>							+					+						
<i>Dysphania plantaginella</i>																		
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>							+			+	+				+			
<i>Dysphania sphaerosperma</i>																		
<i>Echinochloa colona</i>																		
<i>Ehretia saligna</i> var. <i>saligna</i>	+																	
<i>Eleocharis papillosa</i>																		
<i>Elytrophorus spicatus</i>																		
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>																		
<i>Enneapogon caeruleascens</i>																		
<i>Enneapogon lindleyanus</i>												+						
<i>Enneapogon polyphyllus</i>																	+	
<i>Enneapogon robustissimus</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCMNO3	XBMNO1	XBMNO2	XBMNO3	XBMNO4	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Enteropogon ramosus</i>																		
<i>Eragrostis cumingii</i>																		
<i>Eragrostis curvula</i>																		
<i>Eragrostis desertorum</i>																	+	
<i>Eragrostis dielsii</i>																		
<i>Eragrostis elongata</i>																		
<i>Eragrostis eriopoda</i>																		
<i>Eragrostis leptocarpa</i>																		
<i>Eragrostis pergracilis</i>																		
<i>Eragrostis tenellula</i>																		
<i>Eragrostis xerophila</i>								+										
<i>Eremophea spinosa</i>																		
<i>Eremophila cuneifolia</i>																	+	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>													+					
<i>Eremophila lanceolata</i>																		
<i>Eremophila latrobei</i>																		
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>																		
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																		
<i>Eremophila latrobei</i> x <i>forrestii</i>																		
<i>Eremophila longifolia</i>													+					
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																		
<i>Eremophila spongiorcarpa</i>																	4%	
<i>Eremophila youngii</i> subsp. <i>lepidota</i>																	+	
<i>Eriachne benthamii</i>																		
<i>Eriachne helmsii</i>																		
<i>Eriachne lanata</i>																		
<i>Eriachne mucronata</i>						+	+											
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																		
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>																		
<i>Eriachne tenuiculmis</i>										+		+				+		
<i>Eucalyptus gamophylla</i>																		
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>						2%	+											
<i>Eucalyptus victrix</i>		3%	3%	20%	2%					8%	1%	2%		8%	1%	1%		
<i>Euphorbia australis</i>																		
<i>Euphorbia biconvexa</i>																		
<i>Euphorbia boophthona</i>							+											
<i>Euphorbia coghlanii</i>										+	+			+	+			
<i>Euphorbia</i> sp. (site 1089)																		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>															+			
<i>Fimbristylis dichotoma</i>																		
<i>Fimbristylis microcarya</i>																		
<i>Fimbristylis simulans</i>																		
<i>Flaveria trinervia</i>																		
<i>Frankenia ambita</i>																		
<i>Frankenia setosa</i>																		
<i>Glycine canescens</i>																		
<i>Gnephosis arachnoidea</i>																		
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																		
<i>Gomphrena cunninghamii</i>																		
<i>Gomphrena kanisii</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCM03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Goodenia forrestii</i>																		
<i>Goodenia lamprosperma</i>																		
<i>Goodenia microptera</i>																		
<i>Goodenia muelleriana</i>																		
<i>Goodenia nuda</i>											+	+				+		
<i>Goodenia prostrata</i>																		
<i>Goodenia</i> sp.																		
<i>Goodenia stobbsiana</i>							+											
<i>Goodenia triodiophila</i>																		
<i>Gossypium australe</i> (Burrup Peninsula form)																		
<i>Gossypium robinsonii</i>						1%	4%			+		+		+	+	1%		
<i>Grevillea berryana</i>																		
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>						3%	1%			+	+	+						
<i>Hakea chordophylla</i>						1%												
<i>Hakea lorea</i> subsp. <i>lorea</i>																		
<i>Haloragis gossei</i>																		
<i>Heliotropium europaeum</i>																		
<i>Heliotropium heteranthum</i>																		
<i>Heliotropium pachyphyllum</i>																		
<i>Hibiscus burtonii</i>																		
<i>Hibiscus coatesii</i>						+	+											
<i>Hibiscus gardneri</i>																		
<i>Hibiscus goldsworthii</i>																		
<i>Hibiscus</i> sp.						+												
<i>Hibiscus sturtii</i>																		
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>						+	+											
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>																		
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																		
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																		
<i>Hibiscus verdcourtii</i>																		
<i>Hybanthus aurantiacus</i>						+	+			+	+	+	+	+	+	+		
<i>Indigofera colutea</i>																		
<i>Indigofera monophylla</i>						12%	1%				+	+	+		1%	+		
<i>Indigofera</i> sp.																		
<i>Ipomoea coptica</i>																		
<i>Ipomoea lonchophylla</i>																		
<i>Ipomoea muelleri</i>	+							+										
<i>Ipomoea plebeia</i>																		
<i>Ipomoea polymorpha</i>																		
<i>Iseilema dolichotrichum</i>																		
<i>Iseilema macratherum</i>																		
<i>Iseilema membranaceum</i>																		
<i>Iseilema</i> sp.																		
<i>Iseilema vaginiflorum</i>																		
<i>Isotropis atropurpurea</i>																		
<i>Jasminum didymum</i> subsp. <i>lineare</i>						+	+		+				+					
<i>Keraudrenia nephrosperma</i>																		
<i>Lawrenzia densiflora</i>																		
<i>Lepidium muelleri-ferdinandii</i>																		
<i>Lepidium oxytrichum</i>																		
<i>Lepidium phlebopetalum</i>																		
<i>Lepidium pholidogynum</i>																		
<i>Lepidium platypetalum</i>																		
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																		
<i>Lipocarpha microcephala</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCMNO3	XBMNO1	XBMNO2	XBMNO3	XBMNO4	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Lotus cruentus</i>																		
<i>Maireana amoena</i>																		
<i>Maireana appressa</i>																		
<i>Maireana carnosae</i>																		
<i>Maireana georgei</i>																		
<i>Maireana integra</i>																		
<i>Maireana luehmannii</i>																		
<i>Maireana planifolia</i>																		
<i>Maireana planifolia</i> x <i>villosa</i>																		
<i>Maireana pyramidata</i>																		
<i>Maireana tomentosa</i>																		
<i>Maireana triptera</i>																		
<i>Maireana villosa</i>																		
<i>Malvaceae</i> sp.																		
<i>Malvastrum americanum</i>																		
<i>Marsdenia australis</i>																		
<i>Marsilea hirsuta</i>																		
<i>Melaleuca glomerata</i>										+								
<i>Melaleuca linophylla</i>		5%			1%					1%								
<i>Melaleuca xerophila</i>																		
<i>Mimulus gracilis</i>																		
<i>Mimulus repens</i>																		
<i>Mollugo molluginea</i>																		
<i>Muehlenbeckia florulenta</i>																		
<i>Muellerolimon salicorniaceum</i>																		
<i>Neptunia dimorphantha</i>																		
<i>Nicotiana benthamiana</i>																		
<i>Nicotiana heterantha</i>																		
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>														+				
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																		
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																		
<i>Nicotiana</i> sp.						+												
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)												+	+		+			
<i>Oldenlandia crouchiana</i>																		
<i>Operculina aequiseipala</i>								+		+	+					+		
<i>Panicum decompositum</i>																	+	
<i>Panicum effusum</i>																		
<i>Panicum laevinode</i>																		
<i>Paraneurachne muelleri</i>																		
<i>Paspalidium clementii</i>															+			
<i>Paspalidium tabulatum</i>																		
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																		
<i>Peripleura obovata</i>																		
<i>Perotis rara</i>															+			
<i>Petalostylis labicheoides</i>													+					
<i>Phyllanthus erwinii</i>																		
<i>Phyllanthus maderaspatensis</i>																+		
<i>Pleurocarpaea gracilis</i>																		
<i>Pluchea dentex</i>																		
<i>Pluchea dunlopii</i>																		
<i>Pluchea ferdinandi-muelleri</i>																		
<i>Pluchea rubelliflora</i>																		
<i>Pluchea tetranthera</i>																		
<i>Plumbago zeylanica</i>										+	+							

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCM03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>																		
<i>Polycarpaea holtzei</i>																		
<i>Polycarpaea longiflora</i>																		
<i>Polygala isingii</i>																		
<i>Polymeria ambigua</i>														+				
<i>Polymeria calycina</i>																		
<i>Portulaca cyclophylla</i>																		
<i>Portulaca oleracea</i>							+	+				+			+		+	+
<i>Portulaca pilosa</i>																		
<i>Psydrax latifolia</i>							+											
<i>Psydrax suaveolens</i>									+									
<i>Pterocaulon serrulatum</i>																		
<i>Pterocaulon</i> sp.										+								
<i>Pterocaulon sphacelatum</i>									+				+		+	+		
<i>Pterocaulon sphaeranthoides</i>																		
<i>Ptilotus aervoides</i>																		
<i>Ptilotus astrolasius</i>																	+	
<i>Ptilotus auriculifolius</i>						+												
<i>Ptilotus calostachyus</i>							+											
<i>Ptilotus clementii</i>						+												
<i>Ptilotus fusiformis</i>							+											
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>																		
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>								+										
<i>Ptilotus helipteroides</i>																		
<i>Ptilotus incanus</i>						2%												
<i>Ptilotus macrocephalus</i>							+											
<i>Ptilotus nobilis</i>						+						+		+	+	+		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>											+		+		+	+		
<i>Ptilotus polystachyus</i>																		
<i>Ptilotus rotundifolius</i>																		
<i>Ptilotus schwartzii</i>																		
<i>Rhagodia eremaea</i>								+										
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																		
<i>Rhodanthe floribunda</i>																		
<i>Rhodanthe margarethae</i>																		
<i>Rhynchosia minima</i>																		
<i>Rostellularia adscendens</i> var. <i>clementii</i>																		
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																		
<i>Salsola australis</i>													+	+				
<i>Samolus repens</i> var. <i>floribundus</i>																		
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																		
<i>Santalum lanceolatum</i>																		
<i>Scaevola spinescens</i>																		
<i>Schizachyrium fragile</i>																		
<i>Schoenoplectus dissachanthus</i>																		
<i>Schoenoplectus laevis</i>																		
<i>Sclerolaena beaugleholei</i>																		
<i>Sclerolaena cornishiana</i>																		
<i>Sclerolaena costata</i>																		
<i>Sclerolaena cuneata</i>																	2%	1%
<i>Sclerolaena densiflora</i>																		
<i>Sclerolaena diacantha</i>																		
<i>Sclerolaena eriacantha</i>																		
<i>Sclerolaena glabra</i>																		
<i>Sclerolaena recurvicauspis</i>																		
<i>Sclerolaena tetragona</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCMN03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Senna artemisioides</i> subsp. <i>helmsii</i>							+	+										
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)								+										
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>										+								
<i>Senna glaucifloia</i> x <i>ferraria</i>																		
<i>Senna glaucifolia</i>																		
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>						+	+		1%				+					
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																		
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>						+												
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>																		
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																		
<i>Senna hamersleyensis</i>																		
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																		
<i>Senna notabilis</i>						2%			+						+			
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																		
<i>Senna sericea</i>																		
<i>Senna</i> sp.										+								
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)																		
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																		
<i>Senna stricta</i>																		
<i>Senna venusta</i>							50%											
<i>Sesbania cannabina</i>										+				+				
<i>Setaria dielsii</i>																		
<i>Setaria verticillata</i>																		
<i>Sida arenicola</i>																		
<i>Sida echinocarpa</i>																		
<i>Sida ectogama</i>																		
<i>Sida fibulifera</i>																		
<i>Sida platycalyx</i>																		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																		
<i>Sida</i> sp.																		
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)																		
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																		
<i>Sida</i> sp. Pilbara (ferruginous form)						+												
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																		
<i>Sida spinosa</i>																		
<i>Solanum horridum</i>																		
<i>Solanum lasiophyllum</i>							+	+									+	
<i>Solanum phlomoides</i>						1%	1%											
<i>Solanum</i> sp.																		
<i>Solanum sturtianum</i>						+	+				+							
<i>Sonchus oleraceus</i>																		
<i>Spermacoce brachystema</i>																		
<i>Sporobolus australasicus</i>								+									+	+
<i>Sporobolus virginicus</i>																		
<i>Stemodia grossa</i>															+			
<i>Stemodia viscosa</i>																		
<i>Stenopetalum nutans</i>																		
<i>Streptoglossa bubakii</i>																		
<i>Streptoglossa cylindriceps</i>																		
<i>Streptoglossa decurrens</i>																		
<i>Streptoglossa liatroides</i>																		
<i>Streptoglossa odora</i>																		
<i>Striga squamigera</i>																		
<i>Swainsona kingii</i>																		
<i>Swainsona tanamiensis</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Christmas Creek Life of Mine Study Area																Fortescue Marsh	
Year	2011																2013	
Taxa / Site	XBCM03	XBMN01	XBMN02	XBMN03	XBMN04	XBR06	XBR08	XBR22	XBRH01	XBRH03	XBRH04	XBRH08	XBRH09	XBRH10	XBRH11	XBRH12	XCM01	XCM02
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																		
<i>Tecticornia auriculata</i>																		
<i>Tecticornia globulifera</i>																		
<i>Tecticornia indica</i>																		
<i>Tecticornia indica</i> subsp. <i>bidens</i>																		
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																		
<i>Tecticornia medusa</i>																		
<i>Tecticornia</i> sp. (sterile)																		
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)																		
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)																		
<i>Tephrosia clementii</i>								+										
<i>Tephrosia oxalidea</i>																		
<i>Tephrosia rosea</i>																		
<i>Tephrosia rosea</i> var. Fortescue creeks									+			+	1%					
<i>Tephrosia</i> sp.											+			+		+		
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																		
<i>Tephrosia supina</i>						+	+							+				
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																		
<i>Themeda triandra</i>										+	+	+	+		+	+		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>						+	+								+			
<i>Tragus australianus</i>																		
<i>Trianthema glossostigma</i>																		
<i>Trianthema triquetra</i>																		
<i>Trianthema turgidifolia</i>																		
<i>Trianthema ufoensis</i>																	+	+
<i>Tribulus astrocarpus</i>																		
<i>Tribulus hirsutus</i>																		
<i>Tribulus occidentalis</i>																		
<i>Tribulus suberosus</i>																		
<i>Tribulus terrestris</i>																		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																		
<i>Triodia basedowii</i>		+																
<i>Triodia epactia</i>																		
<i>Triodia epactia/pungens</i>						1%	+									+		
<i>Triodia longiceps</i>									50%	+	20%	+	1%					
<i>Triodia pungens</i>																		
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																		
<i>Triodia wiseana</i>									10%									
<i>Triraphis mollis</i>																		
<i>Triumfetta clementii</i>																		
<i>Typha domingensis</i>																		
<i>Urochloa occidentalis</i>																		
<i>Urochloa pubigera</i>																		
<i>Vachellia farnesiana</i>	+							+										
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																		
<i>Wahlenbergia tumidifructa</i>																		
<i>Xerochloa laniflora</i>																		
<i>Zaleya galericulata</i>																		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2013										2012								
Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Abutilon amplum</i>																			
<i>Abutilon cryptopetalum</i>																			
<i>Abutilon cunninghamii</i>																			
<i>Abutilon fraseri</i>																			
<i>Abutilon lepidum</i>																			
<i>Abutilon macrum</i>																			
<i>Abutilon otocarpum</i>																			
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																			
<i>Abutilon</i> sp.																			
<i>Acacia acradenia</i>																			
<i>Acacia adsurgens</i>																			
<i>Acacia</i> aff. <i>aneura</i>																			
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)									4%										
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)																			
<i>Acacia ampliceps</i>																			
<i>Acacia ancistrocarpa</i>																			
<i>Acacia aneura</i>																			
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																			
<i>Acacia aneura</i> var. <i>intermedia</i>																			
<i>Acacia ayersiana</i>																			
<i>Acacia bivenosa</i>																			
<i>Acacia colei</i> var. <i>colei</i>																			
<i>Acacia coriacea</i> subsp. <i>pendens</i>																			
<i>Acacia cowleana</i>																			
<i>Acacia inaequilatera</i>																			
<i>Acacia maitlandii</i>																			
<i>Acacia marramamba</i>																			
<i>Acacia monticola</i>																			
<i>Acacia paraneura</i>																			
<i>Acacia pruinocarpa</i>																			
<i>Acacia pyrifolia</i>																			
<i>Acacia rhodophloia</i>																			
<i>Acacia sericophylla</i>																			
<i>Acacia sibirica</i>																			
<i>Acacia</i> sp.																			
<i>Acacia synchronicia</i>		+			2%	+	+	1%	1%	1%				+		+			
<i>Acacia tenuissima</i>																			
<i>Acacia tetragonophylla</i>								+											
<i>Acacia trachycarpa</i>																			
<i>Acacia tumida</i> var. <i>pilbarensis</i>																			
<i>Acacia xiphophylla</i>				8%															
<i>Acetosa vesicaria</i>																			
<i>Achyranthes aspera</i>																			
<i>Aerva javanica</i>																			
<i>Aeschynomene indica</i>																			
<i>Alternanthera angustifolia</i>																			
<i>Alternanthera denticulata</i>																			
<i>Alternanthera nana</i>																			
<i>Alternanthera nodiflora</i>														+					
<i>Alysicarpus muelleri</i>																			
<i>Amaranthus interruptus</i>																			
<i>Amaranthus undulatus</i>																			
<i>Ammannia baccifera</i>																			
<i>Ammannia multiflora</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2013										2012								
Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Amphipogon sericeus</i>																			
<i>Amyema fitzgeraldii</i>																			
<i>Androcalva luteiflora</i>																			
<i>Angianthus tomentosus</i>																			
<i>Anthobolus leptomerioides</i>																			
<i>Argemone ochroleuca</i>																			
<i>Aristida contorta</i>	1%	+			+											+			
<i>Aristida holathera</i> var. <i>holathera</i>																			
<i>Aristida inaequiglumis</i>																			
<i>Aristida latifolia</i>																			
<i>Aristida obscura</i>																			
<i>Aristida pruinosa</i>																			
<i>Aristida</i> sp.																			
<i>Atalaya hemiglauca</i>																			
<i>Atriplex bunburyana</i>		+			+	5%	+												
<i>Atriplex codonocarpa</i>						+													
<i>Atriplex flabelliformis</i>																			
<i>Austrobryonia pilbarensis</i>																			
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																			
<i>Bidens bipinnata</i>																			
<i>Blumea tenella</i>																			
<i>Boerhavia burbidgeana</i>																			
<i>Boerhavia coccinea</i>																			
<i>Boerhavia paludosa</i>			+		+	+		+	+										
<i>Boerhavia repleta</i>																			
<i>Bonamia rosea</i>																			
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																			
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>																			
<i>Bothriochloa ewartiana</i>																			
<i>Brachyachne convergens</i>																			
<i>Brachyachne prostrata</i>																			
<i>Bulbostylis barbata</i>																			
<i>Bulbostylis turbinata</i>																			
<i>Calandrinia ptychosperma</i>																			
<i>Calandrinia</i> sp.																			
<i>Calandrinia stagnensis</i>																			
<i>Calotis porphyroglossa</i>																			
<i>Calotis squamigera</i>																			
<i>Calytrix carinata</i>																			
<i>Capparis spinosa</i> var. <i>nummularia</i>																			
<i>Capparis umbonata</i>																			
<i>Cenchrus ciliaris</i>	+		+		+	+			3%	+			+	+		+			
<i>Cenchrus setiger</i>																			
<i>Centipeda minima</i> subsp. <i>macrocephala</i>														+					
<i>Cheilanthes austrotenuifolia</i>																			
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>																			
<i>Chenopodium auricomum</i>																			
<i>Chloris pectinata</i>					+											1%			
<i>Chloris virgata</i>																			
<i>Chrysocephalum gilesii</i>																			
<i>Chrysopogon fallax</i>																			
<i>Citrullus colocynthis</i>																			
<i>Cleome oxalidea</i>																			
<i>Cleome viscosa</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2013										2012								
Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																			
<i>Commelina ensifolia</i>																			
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																			
<i>Convolvulus</i> sp.																			
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																			
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>																			
<i>Corchorus parviflorus</i>																			
<i>Corchorus</i> sp.																			
<i>Corchorus tridens</i>																			
<i>Corymbia candida</i> subsp. <i>candida</i>																			
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																			
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																			
<i>Corymbia hamersleyana</i>																			
<i>Cressa australis</i>																			
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																			
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																			
<i>Cucumis maderaspatanus</i>																			
<i>Cucumis melo</i> subsp. <i>agrestis</i>														+					
<i>Cullen cinereum</i>														+					
<i>Cullen leucanthum</i>																			
<i>Cymbopogon ambiguus</i>																			
<i>Cymbopogon obtectus</i>																			
<i>Cymbopogon procerus</i>																			
<i>Cymbopogon</i> sp.																			
<i>Cyperus bulbosus</i>											+	+	+				+	+	
<i>Cyperus cunninghamii</i>																			
<i>Cyperus iria</i>														+					
<i>Cyperus rigidellus</i>																			
<i>Cyperus squarrosus</i>																			
<i>Cyperus vaginatus</i>																			
<i>Dactyloctenium radulans</i>	+	+			+		+	+		+			+	+	+	+			
<i>Dampiera candicans</i>																			
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																			
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																			
<i>Dicladanthera forrestii</i>																			
<i>Dicladanthera</i> sp.																			
<i>Digitaria brownii</i>																			
<i>Digitaria ctenantha</i>																			
<i>Dissocarpus paradoxus</i>																			
<i>Dodonaea coriacea</i>																			
<i>Dodonaea pachyneura</i>																			
<i>Dodonaea petiolaris</i>																			
<i>Duperreya commixta</i>																			
<i>Dysphania plantaginella</i>													+						
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>																			
<i>Dysphania sphaerosperma</i>																			
<i>Echinochloa colona</i>																			
<i>Ehretia saligna</i> var. <i>saligna</i>																			
<i>Eleocharis papillosa</i>																			
<i>Elytrophorus spicatus</i>																			
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>														+	+				
<i>Enneapogon caeruleascens</i>																+			
<i>Enneapogon lindleyanus</i>																			
<i>Enneapogon polyphyllus</i>					+								+			+			
<i>Enneapogon robustissimus</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2013										2012								
Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Enteropogon ramosus</i>					+	+								+		+			
<i>Eragrostis cumingii</i>																			
<i>Eragrostis curvula</i>																			
<i>Eragrostis desertorum</i>	+															+			
<i>Eragrostis dielsii</i>																			
<i>Eragrostis elongata</i>																+			
<i>Eragrostis eriopoda</i>																			
<i>Eragrostis leptocarpa</i>																			
<i>Eragrostis pergracilis</i>		+	+			+	+	+					25%	+	+	+		1%	65%
<i>Eragrostis tenellula</i>														+		+			
<i>Eragrostis xerophila</i>							+												
<i>Eremophea spinosa</i>																			
<i>Eremophila cuneifolia</i>							1%			+									
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>			+		+		+												
<i>Eremophila lanceolata</i>																			
<i>Eremophila latrobei</i>																			
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>																			
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																			
<i>Eremophila latrobei</i> x <i>forrestii</i>																			
<i>Eremophila longifolia</i>																			
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																			
<i>Eremophila spongiorcarpa</i>	1%	3%	6%	+	+	10%	3%						+	+	+	8%			
<i>Eremophila youngii</i> subsp. <i>lepidota</i>			2%	3%		5%	+							+					
<i>Eriachne benthamii</i>																			
<i>Eriachne helmsii</i>																			
<i>Eriachne lanata</i>																			
<i>Eriachne mucronata</i>																			
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																+			
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>																			
<i>Eriachne tenuiculmis</i>																			
<i>Eucalyptus gamophylla</i>																			
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																			
<i>Eucalyptus victrix</i>																			
<i>Euphorbia australis</i>																			
<i>Euphorbia biconvexa</i>																			
<i>Euphorbia boophthona</i>																			
<i>Euphorbia coghlanii</i>																			
<i>Euphorbia</i> sp. (site 1089)																			
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																			
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																			
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>																			
<i>Fimbristylis dichotoma</i>																			
<i>Fimbristylis microcarya</i>																			
<i>Fimbristylis simulans</i>																			
<i>Flaveria trinervia</i>																			
<i>Frankenia ambita</i>			+			+	5%												
<i>Frankenia setosa</i>																			
<i>Glycine canescens</i>																			
<i>Gnephosis arachnoidea</i>													+						
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																			
<i>Gomphrena cunninghamii</i>																			
<i>Gomphrena kanisii</i>					+											+			

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Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Goodenia forrestii</i>																			
<i>Goodenia lamprosperma</i>																			
<i>Goodenia microptera</i>																			
<i>Goodenia muelleriana</i>																			
<i>Goodenia nuda</i>																			
<i>Goodenia prostrata</i>																			
<i>Goodenia</i> sp.																			
<i>Goodenia stobbsiana</i>																			
<i>Goodenia triodiophila</i>																			
<i>Gossypium australe</i> (Burrup Peninsula form)																			
<i>Gossypium robinsonii</i>																			
<i>Grevillea berryana</i>																			
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>																			
<i>Hakea chordophylla</i>																			
<i>Hakea lorea</i> subsp. <i>lorea</i>																			
<i>Haloragis gossei</i>																			
<i>Heliotropium europaeum</i>											+	+		+					
<i>Heliotropium heteranthum</i>																			
<i>Heliotropium pachyphyllum</i>																			
<i>Hibiscus burtonii</i>																			
<i>Hibiscus coatesii</i>																			
<i>Hibiscus gardneri</i>																			
<i>Hibiscus goldsworthii</i>																			
<i>Hibiscus</i> sp.																			
<i>Hibiscus sturtii</i>																			
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																			
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>																			
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																+			
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																			
<i>Hibiscus verdcourtii</i>																			
<i>Hybanthus aurantiacus</i>																			
<i>Indigofera colutea</i>																			
<i>Indigofera monophylla</i>																			
<i>Indigofera</i> sp.																			
<i>Ipomoea coptica</i>																			
<i>Ipomoea lonchophylla</i>																			
<i>Ipomoea muelleri</i>																+			
<i>Ipomoea plebeia</i>																			
<i>Ipomoea polymorpha</i>																			
<i>Iseilema dolichotrichum</i>																			
<i>Iseilema macratherum</i>																			
<i>Iseilema membranaceum</i>																			
<i>Iseilema</i> sp.																			
<i>Iseilema vaginiflorum</i>		+														+			
<i>Isotropis atropurpurea</i>																			
<i>Jasminum didymum</i> subsp. <i>lineare</i>																			
<i>Keraudrenia nephrosperma</i>																			
<i>Lawrenzia densiflora</i>																		+	
<i>Lepidium muelleri-ferdinandii</i>																			
<i>Lepidium oxytrichum</i>																			
<i>Lepidium phlebopetalum</i>																			
<i>Lepidium pholidogynum</i>																			
<i>Lepidium platypetalum</i>																			
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																			
<i>Lipocarpha microcephala</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Lotus cruentus</i>																			
<i>Maireana amoena</i>							+								+				
<i>Maireana appressa</i>																			
<i>Maireana carnosae</i>					+	+	+												
<i>Maireana georgei</i>																			
<i>Maireana integra</i>																+			
<i>Maireana luehmannii</i>															+				
<i>Maireana planifolia</i>																			
<i>Maireana planifolia</i> x <i>villosa</i>																			
<i>Maireana pyramidata</i>			1%		1%	+	+			1%									
<i>Maireana tomentosa</i>																			
<i>Maireana triptera</i>					+			+							+				
<i>Maireana villosa</i>																			
<i>Malvaceae</i> sp.																			
<i>Malvastrum americanum</i>														+					
<i>Marsdenia australis</i>																			
<i>Marsilea hirsuta</i>																			
<i>Melaleuca glomerata</i>												+		12%					
<i>Melaleuca linophylla</i>																			
<i>Melaleuca xerophila</i>																			
<i>Mimulus gracilis</i>																			
<i>Mimulus repens</i>											3%	+					35%		
<i>Mollugo molluginea</i>																			
<i>Muehlenbeckia florulenta</i>											+	+	1%	+			50%	35%	+
<i>Muellerolimon salicorniaceum</i>																			
<i>Neptunia dimorphantha</i>																			
<i>Nicotiana benthamiana</i>																			
<i>Nicotiana heterantha</i>												+	+	1%		+	3%	1%	
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>																			
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																			
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																			
<i>Nicotiana</i> sp.																			
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)																			
<i>Oldenlandia crouchiana</i>																			
<i>Operculina aequiseipala</i>																			
<i>Panicum decompositum</i>		+					+	+		+						+			
<i>Panicum effusum</i>																			
<i>Panicum laevinode</i>																			
<i>Paraneurachne muelleri</i>																			
<i>Paspalidium clementii</i>																			
<i>Paspalidium tabulatum</i>																			
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																			
<i>Peripleura obovata</i>																			
<i>Perotis rara</i>																			
<i>Petalostylis labicheoides</i>																			
<i>Phyllanthus erwinii</i>																			
<i>Phyllanthus maderaspatensis</i>																			
<i>Pleurocarpaea gracilis</i>																			
<i>Pluchea dentex</i>																			
<i>Pluchea dunlopii</i>														+		+			
<i>Pluchea ferdinandi-muelleri</i>																			
<i>Pluchea rubelliflora</i>														2%	+	+		+	
<i>Pluchea tetranthera</i>																			
<i>Plumbago zeylanica</i>																			

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Project Area	Fortescue Marsh Christmas Creek Study Area																		
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Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>																			
<i>Polycarpaea holtzei</i>																			
<i>Polycarpaea longiflora</i>																			
<i>Polygala isingii</i>																			
<i>Polymeria ambigua</i>																			
<i>Polymeria calycina</i>																			
<i>Portulaca cyclophylla</i>																			
<i>Portulaca oleracea</i>		+	+		+	+	+	+	+	+					+	+			
<i>Portulaca pilosa</i>					+	+	+	+						+	+	+			
<i>Psydrax latifolia</i>																			
<i>Psydrax suaveolens</i>																			
<i>Pterocaulon serrulatum</i>																			
<i>Pterocaulon</i> sp.																			
<i>Pterocaulon sphacelatum</i>																			
<i>Pterocaulon sphaeranthoides</i>														+	+	+			
<i>Ptilotus aervoides</i>																			
<i>Ptilotus astrolasius</i>																			
<i>Ptilotus auriculifolius</i>																			
<i>Ptilotus calostachyus</i>																			
<i>Ptilotus clementii</i>																			
<i>Ptilotus fusiformis</i>																			
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>																			
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>																			
<i>Ptilotus helipteroides</i>																			
<i>Ptilotus incanus</i>																			
<i>Ptilotus macrocephalus</i>																			
<i>Ptilotus nobilis</i>					+										+				
<i>Ptilotus obovatus</i> var. <i>obovatus</i>																			
<i>Ptilotus polystachyus</i>																			
<i>Ptilotus rotundifolius</i>																			
<i>Ptilotus schwartzii</i>																			
<i>Rhagodia eremaea</i>			+		+			+											
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																			
<i>Rhodanthe floribunda</i>																			
<i>Rhodanthe margarethae</i>																			
<i>Rhynchosia minima</i>																			
<i>Rostellularia adscendens</i> var. <i>clementii</i>																			
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																			
<i>Salsola australis</i>			+		+			+											
<i>Samolus repens</i> var. <i>floribundus</i>																			
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																			
<i>Santalum lanceolatum</i>																			
<i>Scaevola spinescens</i>														+					
<i>Schizachyrium fragile</i>																			
<i>Schoenoplectus dissachanthus</i>																			
<i>Schoenoplectus laevis</i>																			
<i>Sclerolaena beaugleholei</i>																			
<i>Sclerolaena cornishiana</i>																			
<i>Sclerolaena costata</i>																			
<i>Sclerolaena cuneata</i>	+	+		3%	5%	+	1%	1%	+	2%						+			
<i>Sclerolaena densiflora</i>		+	+	1%		+	+												
<i>Sclerolaena diacantha</i>																+			
<i>Sclerolaena eriacantha</i>					+														
<i>Sclerolaena glabra</i>																			
<i>Sclerolaena recurvicauspis</i>																			
<i>Sclerolaena tetragona</i>																			

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Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2013										2012								
Taxa / Site	XCM03R	XCM04	XCM05R	XCM06R	XCM07	XCM08	XCM09	XCM10	XCM11	XCM12R	FMA01	FMA02	FMA03	FMA04	FMA05	FMA06	FMA07	FMA08	FMA09
<i>Senna artemisioides</i> subsp. <i>helmsii</i>					+		+												
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)					+			2%		2%									
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>																			
<i>Senna glaucifloia</i> x <i>ferraria</i>																			
<i>Senna glaucifolia</i>																			
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																			
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																			
<i>Senna hamersleyensis</i>																			
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																			
<i>Senna notabilis</i>									+										
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																			
<i>Senna sericea</i>																			
<i>Senna</i> sp.																			
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)										+									
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																			
<i>Senna stricta</i>																			
<i>Senna venusta</i>																			
<i>Sesbania cannabina</i>																			
<i>Setaria dielsii</i>																			
<i>Setaria verticillata</i>																			
<i>Sida arenicola</i>																			
<i>Sida echinocarpa</i>																			
<i>Sida ectogama</i>																			
<i>Sida fibulifera</i>																+			
<i>Sida platycalyx</i>																			
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																			
<i>Sida</i> sp.																			
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)																			
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																			
<i>Sida</i> sp. Pilbara (ferruginous form)																			
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																			
<i>Sida spinosa</i>																			
<i>Solanum horridum</i>																			
<i>Solanum lasiophyllum</i>					+				+										
<i>Solanum phlomoides</i>																			
<i>Solanum</i> sp.																			
<i>Solanum sturtianum</i>																+			
<i>Sonchus oleraceus</i>																			
<i>Spermacoce brachystema</i>																			
<i>Sporobolus australasicus</i>					+			+								+			
<i>Sporobolus virginicus</i>														2%					
<i>Stemodia grossa</i>														+		+			
<i>Stemodia viscosa</i>																			
<i>Stenopetalum nutans</i>																			
<i>Streptoglossa bubakii</i>																+			
<i>Streptoglossa cylindriceps</i>																			
<i>Streptoglossa decurrens</i>																			
<i>Streptoglossa liatroides</i>																			
<i>Streptoglossa odora</i>																			
<i>Striga squamigera</i>																			
<i>Swainsona kingii</i>												+		+		+	1%	+	
<i>Swainsona tanamiensis</i>																			

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<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																			
<i>Tecticornia auriculata</i>												2%		+					+
<i>Tecticornia globulifera</i>											5%								
<i>Tecticornia indica</i>																			
<i>Tecticornia indica</i> subsp. <i>bidens</i>	20%										+		4%	80%	20%	50%	5%		
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																			
<i>Tecticornia medusa</i>											+								
<i>Tecticornia</i> sp. (sterile)															20%			3%	
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)												55%		+				1%	
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)											25%	1%	30%	1%	1%			10%	35%
<i>Tephrosia clementii</i>																			
<i>Tephrosia oxalidea</i>																			
<i>Tephrosia rosea</i>																			
<i>Tephrosia rosea</i> var. Fortescue creeks																			
<i>Tephrosia</i> sp.																			
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																			
<i>Tephrosia supina</i>																			
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																			
<i>Themeda triandra</i>																			
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>																			
<i>Tragus australianus</i>																			
<i>Trianthema glossostigma</i>																			
<i>Trianthema triquetra</i>					+	8%	2%								+	+			
<i>Trianthema turgidifolia</i>																			
<i>Trianthema ufoensis</i>					+	+		+											
<i>Tribulus astrocarpus</i>																			
<i>Tribulus hirsutus</i>																			
<i>Tribulus occidentalis</i>																			
<i>Tribulus suberosus</i>																			
<i>Tribulus terrestris</i>																			
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																			
<i>Triodia basedowii</i>																			
<i>Triodia epactia</i>																			
<i>Triodia epactia/pungens</i>																			
<i>Triodia longiceps</i>																			
<i>Triodia pungens</i>																			
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																			
<i>Triodia wiseana</i>																			
<i>Triraphis mollis</i>																+			
<i>Triumfetta clementii</i>																			
<i>Typha domingensis</i>																			
<i>Urochloa occidentalis</i>																			
<i>Urochloa pubigera</i>																			
<i>Vachellia farnesiana</i>																			
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																			
<i>Wahlenbergia tumidifructa</i>																			
<i>Xerochloa laniflora</i>																+			
<i>Zaleya galericulata</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2012																		
Taxa / Site	FMA10	FMA11	FMA12	FMA13	FMA14	FMA15	FMA16	FMA17	FMA18	FMA19	FMA20	FMA21	FMA22	FMA23	FMA24	FMA25	FMA26	FMA27	FMA28
<i>Abutilon amplum</i>																			
<i>Abutilon cryptopetalum</i>																			
<i>Abutilon cunninghamii</i>																			
<i>Abutilon fraseri</i>							+												
<i>Abutilon lepidum</i>							+												
<i>Abutilon macrum</i>																			
<i>Abutilon otocarpum</i>								+											
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																			
<i>Abutilon</i> sp.																			
<i>Acacia acradenia</i>																			
<i>Acacia adsurgens</i>																			
<i>Acacia</i> aff. <i>aneura</i>																			
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)										+									
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)																			
<i>Acacia ampliceps</i>																		+	
<i>Acacia ancistrocarpa</i>																			
<i>Acacia aneura</i>																			
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																			
<i>Acacia aneura</i> var. <i>intermedia</i>																			
<i>Acacia ayersiana</i>																			
<i>Acacia bivenosa</i>																			
<i>Acacia colei</i> var. <i>colei</i>																			
<i>Acacia coriacea</i> subsp. <i>pendens</i>																			
<i>Acacia cowleana</i>																			
<i>Acacia inaequilatera</i>																			
<i>Acacia maitlandii</i>																			
<i>Acacia marramamba</i>																			
<i>Acacia monticola</i>																			
<i>Acacia paraneura</i>																			
<i>Acacia pruinocarpa</i>																			
<i>Acacia pyrifolia</i>																			
<i>Acacia rhodophloia</i>																			
<i>Acacia sericophylla</i>																			
<i>Acacia sibirica</i>																			
<i>Acacia</i> sp.																			
<i>Acacia synchronicia</i>							+	1%	+	1%					1%				
<i>Acacia tenuissima</i>																			
<i>Acacia tetragonophylla</i>							1%	+											
<i>Acacia trachycarpa</i>																			
<i>Acacia tumida</i> var. <i>pilbarensis</i>																			
<i>Acacia xiphophylla</i>							20%												
<i>Acetosa vesicaria</i>																			
<i>Achyranthes aspera</i>																			
<i>Aerva javanica</i>						+						1%							
<i>Aeschynomene indica</i>														+					
<i>Alternanthera angustifolia</i>																			
<i>Alternanthera denticulata</i>																			
<i>Alternanthera nana</i>																			
<i>Alternanthera nodiflora</i>										+				+					
<i>Alysicarpus muelleri</i>																			
<i>Amaranthus interruptus</i>																			
<i>Amaranthus undulatus</i>			+																
<i>Ammannia baccifera</i>																			
<i>Ammannia multiflora</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Amphipogon sericeus</i>																			
<i>Amyema fitzgeraldii</i>																			
<i>Androcalva luteiflora</i>																			
<i>Angianthus tomentosus</i>						+													
<i>Anthobolus leptomerioides</i>																			
<i>Argemone ochroleuca</i>																			
<i>Aristida contorta</i>				+			+	+	+						+				+
<i>Aristida holathera</i> var. <i>holathera</i>																			
<i>Aristida inaequiglumis</i>																			
<i>Aristida latifolia</i>																	+		
<i>Aristida obscura</i>																			
<i>Aristida pruinosa</i>																			
<i>Aristida</i> sp.																			
<i>Atalaya hemiglauca</i>																			
<i>Atriplex bunburyana</i>										+									
<i>Atriplex codonocarpa</i>																			
<i>Atriplex flabelliformis</i>			+																
<i>Austrobryonia pilbarensis</i>																			
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																			
<i>Bidens bipinnata</i>																			
<i>Blumea tenella</i>																			
<i>Boerhavia burbidgeana</i>																			
<i>Boerhavia coccinea</i>												+							
<i>Boerhavia paludosa</i>									+										
<i>Boerhavia repleta</i>							+												+
<i>Bonamia rosea</i>																			
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																			
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>																			
<i>Bothriochloa ewartiana</i>																			
<i>Brachyachne convergens</i>																			
<i>Brachyachne prostrata</i>																			
<i>Bulbostylis barbata</i>																			
<i>Bulbostylis turbinata</i>																			
<i>Calandrinia ptychosperma</i>																			
<i>Calandrinia</i> sp.																			
<i>Calandrinia stagnensis</i>																			
<i>Calotis porphyroglossa</i>																			
<i>Calotis squamigera</i>																			
<i>Calytrix carinata</i>																			
<i>Capparis spinosa</i> var. <i>nummularia</i>																			
<i>Capparis umbonata</i>																			
<i>Cenchrus ciliaris</i>				+		+	+	+	+	+		1%			+		+		+
<i>Cenchrus setiger</i>			+					+											
<i>Centipeda minima</i> subsp. <i>macrocephala</i>										+				+					
<i>Cheilanthes austrotenuifolia</i>																			
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>																			
<i>Chenopodium auricomum</i>								+											
<i>Chloris pectinata</i>			+	+					+	+		5%		3%			+	+	+
<i>Chloris virgata</i>																			
<i>Chrysocephalum gilesii</i>																			
<i>Chrysopogon fallax</i>																			
<i>Citrullus colocynthis</i>																			
<i>Cleome oxalidea</i>																			
<i>Cleome viscosa</i>							+	+				+							

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																			
<i>Commelina ensifolia</i>																			
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																			
<i>Convolvulus</i> sp.																			
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																			
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>																			
<i>Corchorus parviflorus</i>																			
<i>Corchorus</i> sp.																			
<i>Corchorus tridens</i>																			
<i>Corymbia candida</i> subsp. <i>candida</i>																			
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																			
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																			
<i>Corymbia hamersleyana</i>																			
<i>Cressa australis</i>		+																	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																			
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																			
<i>Cucumis maderaspatanus</i>																			
<i>Cucumis melo</i> subsp. <i>agrestis</i>										+									
<i>Cullen cinereum</i>		15%		+										+					
<i>Cullen leucanthum</i>																			
<i>Cymbopogon ambiguus</i>																	+		
<i>Cymbopogon oblectus</i>																			
<i>Cymbopogon procerus</i>																			
<i>Cymbopogon</i> sp.																			
<i>Cyperus bulbosus</i>						+					+							+	
<i>Cyperus cunninghamii</i>																			
<i>Cyperus iria</i>										+				+					
<i>Cyperus rigidellus</i>																			
<i>Cyperus squarrosus</i>																			
<i>Cyperus vaginatus</i>																			
<i>Dactyloctenium radulans</i>				+				+	+	+		+					+		+
<i>Dampiera candicans</i>																			
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																			
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>																			
<i>Dicladanthera forrestii</i>																			
<i>Dicladanthera</i> sp.																			
<i>Digitaria brownii</i>														+					
<i>Digitaria ctenantha</i>																			
<i>Dissocarpus paradoxus</i>																			
<i>Dodonaea coriacea</i>																			
<i>Dodonaea pachyneura</i>																			
<i>Dodonaea petiolaris</i>																			
<i>Duperreya commixta</i>																			
<i>Dysphania plantaginella</i>																		+	
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>																			
<i>Dysphania sphaerosperma</i>																			
<i>Echinochloa colona</i>										+				+					
<i>Ehretia saligna</i> var. <i>saligna</i>																			
<i>Eleocharis papillosa</i>																			
<i>Elytrophorus spicatus</i>																			
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>							+	+											
<i>Enneapogon caeruleus</i>			+				+	+							+		+		
<i>Enneapogon lindleyanus</i>																			
<i>Enneapogon polyphyllus</i>			+	+			+	+									+		
<i>Enneapogon robustissimus</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Enteropogon ramosus</i>			+				+	+	+	+				+	+				+
<i>Eragrostis cumingii</i>																			
<i>Eragrostis curvula</i>																			
<i>Eragrostis desertorum</i>							2%												
<i>Eragrostis dielsii</i>																			
<i>Eragrostis elongata</i>																			
<i>Eragrostis eriopoda</i>																			
<i>Eragrostis leptocarpa</i>																			
<i>Eragrostis pergracilis</i>	50%	+	+	35%	3%	1%	1%	15%	+	+				+	50%		1%	+	1%
<i>Eragrostis tenellula</i>		+								+				+					
<i>Eragrostis xerophila</i>																			
<i>Eremophea spinosa</i>																			
<i>Eremophila cuneifolia</i>															+				
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>				+			+								+				
<i>Eremophila lanceolata</i>																			
<i>Eremophila latrobei</i>																			
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>																			
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																			
<i>Eremophila latrobei</i> x <i>forrestii</i>																			
<i>Eremophila longifolia</i>																			
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																			
<i>Eremophila spongiorcarpa</i>			+	1%			+	2%	1%	3%				+	1%	+	20%		+
<i>Eremophila youngii</i> subsp. <i>lepidota</i>									+										
<i>Eriachne benthamii</i>																			
<i>Eriachne helmsii</i>																			
<i>Eriachne lanata</i>																			
<i>Eriachne mucronata</i>																			
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																			
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>																			
<i>Eriachne tenuiculmis</i>																			
<i>Eucalyptus gamophylla</i>																			
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																			
<i>Eucalyptus victrix</i>																			
<i>Euphorbia australis</i>				+			+	+							1%				
<i>Euphorbia biconvexa</i>																			
<i>Euphorbia boophthona</i>																			
<i>Euphorbia coghlanii</i>																			
<i>Euphorbia</i> sp. (site 1089)																			
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																			
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>																			
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>																			
<i>Fimbristylis dichotoma</i>																			
<i>Fimbristylis microcarya</i>																			
<i>Fimbristylis simulans</i>																			
<i>Flaveria trinervia</i>				+		+		+							+	+			
<i>Frankenia ambita</i>					+	+						+		+				+	
<i>Frankenia setosa</i>																			
<i>Glycine canescens</i>																			
<i>Gnephosis arachnoidea</i>					+									+				+	
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																			
<i>Gomphrena cunninghamii</i>																			
<i>Gomphrena kanisii</i>				+											+		+		

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Goodenia forrestii</i>				+			+	+							+				
<i>Goodenia lamprosperma</i>																			
<i>Goodenia microptera</i>																			
<i>Goodenia muelleriana</i>																			
<i>Goodenia nuda</i>																			
<i>Goodenia prostrata</i>																			
<i>Goodenia</i> sp.																			
<i>Goodenia stobbsiana</i>																			
<i>Goodenia triodiophila</i>																			
<i>Gossypium australe</i> (Burrup Peninsula form)																			
<i>Gossypium robinsonii</i>																			
<i>Grevillea berryana</i>																			
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>																			
<i>Hakea chordophylla</i>																			
<i>Hakea lorea</i> subsp. <i>lorea</i>																			
<i>Haloragis gossei</i>																			
<i>Heliotropium europaeum</i>					+									+				+	
<i>Heliotropium heteranthum</i>																			
<i>Heliotropium pachyphyllum</i>							1%								+				
<i>Hibiscus burtonii</i>																			
<i>Hibiscus coatesii</i>																			
<i>Hibiscus gardneri</i>																			
<i>Hibiscus goldsworthii</i>																			
<i>Hibiscus</i> sp.																			
<i>Hibiscus sturtii</i>																			
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																			
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>																			
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																			
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																			
<i>Hibiscus verdcourtii</i>																			
<i>Hybanthus aurantiacus</i>																			
<i>Indigofera colutea</i>																			
<i>Indigofera monophylla</i>																			
<i>Indigofera</i> sp.																			
<i>Ipomoea coptica</i>				+										+					
<i>Ipomoea lonchophylla</i>																			
<i>Ipomoea muelleri</i>										+									
<i>Ipomoea plebeia</i>																			
<i>Ipomoea polymorpha</i>																			
<i>Iseilema dolichotrichum</i>																			
<i>Iseilema macratherum</i>																			
<i>Iseilema membranaceum</i>																			
<i>Iseilema</i> sp.																			
<i>Iseilema vaginiflorum</i>										+									
<i>Isotropis atropurpurea</i>																			
<i>Jasminum didymum</i> subsp. <i>lineare</i>																			
<i>Keraudrenia nephrosperma</i>																			
<i>Lawrenzia densiflora</i>				+	+	+	+	+	+						+				+
<i>Lepidium muelleri-ferdinandii</i>																			
<i>Lepidium oxytrichum</i>																			
<i>Lepidium phlebopetalum</i>																			
<i>Lepidium pholidogynum</i>																			
<i>Lepidium platypetalum</i>																			
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																			
<i>Lipocarpha microcephala</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Lotus cruentus</i>										+				+					
<i>Maireana amoena</i>									+			3%					+		
<i>Maireana appressa</i>																			
<i>Maireana carnosa</i>																			
<i>Maireana georgei</i>																			
<i>Maireana integra</i>				+											+		+		
<i>Maireana luehmannii</i>		+	+			+													+
<i>Maireana planifolia</i>																			
<i>Maireana planifolia</i> x <i>villosa</i>																			
<i>Maireana pyramidata</i>							+								+				
<i>Maireana tomentosa</i>																			
<i>Maireana triptera</i>															+				
<i>Maireana villosa</i>																			
<i>Malvaceae</i> sp.																			
<i>Malvastrum americanum</i>							+			+				+					
<i>Marsdenia australis</i>																			
<i>Marsilea hirsuta</i>										+			8%	+					
<i>Melaleuca glomerata</i>								3%		+		60%			+	6%			
<i>Melaleuca linophylla</i>																			
<i>Melaleuca xerophila</i>																			
<i>Mimulus gracilis</i>																			
<i>Mimulus repens</i>														+				1%	
<i>Mollugo molluginea</i>																			
<i>Muehlenbeckia florulenta</i>		+	+							1%	1%		2%			+			
<i>Muellerolimon salicorniaceum</i>					1%	+								1%				1%	
<i>Neptunia dimorphantha</i>																			
<i>Nicotiana benthamiana</i>																			
<i>Nicotiana heterantha</i>	+	2%	2%	+	+	+			+	+	+	20%		+		10%	+	+	+
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>																			
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																			
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																			
<i>Nicotiana</i> sp.																			
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)																			
<i>Oldenlandia crouchiana</i>																			
<i>Operculina aequisepala</i>																			
<i>Panicum decompositum</i>												+							
<i>Panicum effusum</i>																			
<i>Panicum laevinode</i>																			
<i>Paraneurachne muelleri</i>																			
<i>Paspalidium clementii</i>																			
<i>Paspalidium tabulatum</i>																			
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)														6%					
<i>Peripleura obovata</i>								+							+				
<i>Perotis rara</i>																			
<i>Petalostylis labicheoides</i>																			
<i>Phyllanthus erwinii</i>																			
<i>Phyllanthus maderaspatensis</i>																			
<i>Pleurocarpaea gracilis</i>																			
<i>Pluchea dentex</i>																			
<i>Pluchea dunlopii</i>			+																
<i>Pluchea ferdinandi-muelleri</i>																			
<i>Pluchea rubelliflora</i>			1%	+						1%				+					
<i>Pluchea tetranthera</i>																			
<i>Plumbago zeylanica</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2012																		
Taxa / Site	FMA10	FMA11	FMA12	FMA13	FMA14	FMA15	FMA16	FMA17	FMA18	FMA19	FMA20	FMA21	FMA22	FMA23	FMA24	FMA25	FMA26	FMA27	FMA28
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>																			
<i>Polycarpaea holtzei</i>																			
<i>Polycarpaea longiflora</i>																			
<i>Polygala isingii</i>																			
<i>Polymeria ambigua</i>																			
<i>Polymeria calycina</i>																			
<i>Portulaca cyclophylla</i>																			
<i>Portulaca oleracea</i>			+						+										
<i>Portulaca pilosa</i>				+													+		
<i>Psydrax latifolia</i>																			
<i>Psydrax suaveolens</i>																			
<i>Pterocaulon serrulatum</i>																			
<i>Pterocaulon</i> sp.																			
<i>Pterocaulon sphacelatum</i>																			
<i>Pterocaulon sphaeranthoides</i>		+	5%	+		+	+	+						+		+	1%		+
<i>Ptilotus aervoides</i>																			
<i>Ptilotus astrolasius</i>																			
<i>Ptilotus auriculifolius</i>															+				
<i>Ptilotus calostachyus</i>																			
<i>Ptilotus clementii</i>																			
<i>Ptilotus fusiformis</i>																			
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>																			
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>																			
<i>Ptilotus helipteroides</i>															+				
<i>Ptilotus incanus</i>																			
<i>Ptilotus macrocephalus</i>																			
<i>Ptilotus nobilis</i>				+			+	+							+				+
<i>Ptilotus obovatus</i> var. <i>obovatus</i>							+								+				
<i>Ptilotus polystachyus</i>																			
<i>Ptilotus rotundifolius</i>																			
<i>Ptilotus schwartzii</i>																			
<i>Rhagodia eremaea</i>							+												
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																			
<i>Rhodanthe floribunda</i>																			
<i>Rhodanthe margarethae</i>																			
<i>Rhynchosia minima</i>																			
<i>Rostellularia adscendens</i> var. <i>clementii</i>																			
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																			
<i>Salsola australis</i>							+	+	+								+		
<i>Samolus repens</i> var. <i>floribundus</i>						1%				1%		+			+	+		+	
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																			
<i>Santalum lanceolatum</i>																			
<i>Scaevola spinescens</i>																			
<i>Schizachyrium fragile</i>																			
<i>Schoenoplectus dissachanthus</i>																			
<i>Schoenoplectus laevis</i>																			
<i>Sclerolaena beaugleholei</i>																			
<i>Sclerolaena cornishiana</i>				+			+	+							1%				
<i>Sclerolaena costata</i>																			
<i>Sclerolaena cuneata</i>									+								+		
<i>Sclerolaena densiflora</i>																			
<i>Sclerolaena diacantha</i>																			
<i>Sclerolaena eriacantha</i>																			
<i>Sclerolaena glabra</i>																			
<i>Sclerolaena recurvicauspis</i>																			
<i>Sclerolaena tetragona</i>																			

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<i>Senna artemisioides</i> subsp. <i>helmsii</i>																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>																			
<i>Senna glaucifloia</i> x <i>ferraria</i>																			
<i>Senna glaucifolia</i>							+												
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																			
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																			
<i>Senna hamersleyensis</i>																			
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																			
<i>Senna notabilis</i>																	+		
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																			
<i>Senna sericea</i>																			
<i>Senna</i> sp.																			
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)				+				+							+		+		
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																			
<i>Senna stricta</i>																			
<i>Senna venusta</i>																			
<i>Sesbania cannabina</i>																			
<i>Setaria dielsii</i>			+																
<i>Setaria verticillata</i>																			
<i>Sida arenicola</i>																			
<i>Sida echinocarpa</i>																			
<i>Sida ectogama</i>																			
<i>Sida fibulifera</i>				+			+	+											+
<i>Sida platycalyx</i>																			
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																			
<i>Sida</i> sp.																			
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)																			
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																			
<i>Sida</i> sp. Pilbara (ferruginous form)																			
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																			
<i>Sida spinosa</i>																			
<i>Solanum horridum</i>				+			+										+		
<i>Solanum lasiophyllum</i>				+		+	+	+							+				+
<i>Solanum phlomoides</i>																			
<i>Solanum</i> sp.																			
<i>Solanum sturtianum</i>							+												
<i>Sonchus oleraceus</i>												1%							
<i>Spermacoce brachystema</i>																			
<i>Sporobolus australasicus</i>							+		+	+		+					+		
<i>Sporobolus virginicus</i>					+				+	80%			1%	5%		2%		1%	1%
<i>Stemodia grossa</i>			+	+			+	+							+				
<i>Stemodia viscosa</i>																			
<i>Stenopetalum nutans</i>																			
<i>Streptoglossa bubakii</i>			+			+		+	+						+		+		
<i>Streptoglossa cylindriceps</i>																			
<i>Streptoglossa decurrens</i>																	+		
<i>Streptoglossa liatroides</i>																			
<i>Streptoglossa odora</i>							+												
<i>Striga squamigera</i>																			
<i>Swainsona kingii</i>	3%		+	+		+			+		1%	+				2%	+	+	+
<i>Swainsona tanamiensis</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Project Area	Fortescue Marsh Christmas Creek Study Area																		
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<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																			
<i>Tecticornia auriculata</i>	75%	2%																	+
<i>Tecticornia globulifera</i>																			
<i>Tecticornia indica</i>																			
<i>Tecticornia indica</i> subsp. <i>bidens</i>			80%	20%	10%	10%		1%	80%	15%	35%		60%	50%	2%	50%	40%	20%	60%
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>												1%							
<i>Tecticornia medusa</i>																			
<i>Tecticornia</i> sp. (sterile)												1%							
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)		80%	1%		2%	1%				5%		1%			+	15%		1%	
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+		1%		35%	30%			+	+	15%		+	25%	+	+		40%	+
<i>Tephrosia clementii</i>																			
<i>Tephrosia oxalidea</i>																			
<i>Tephrosia rosea</i>																			
<i>Tephrosia rosea</i> var. Fortescue creeks																			
<i>Tephrosia</i> sp.																			
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																			
<i>Tephrosia supina</i>																			
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																			
<i>Themeda triandra</i>																			
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>																			
<i>Tragus australianus</i>																			
<i>Trianthema glossostigma</i>																			
<i>Trianthema triquetra</i>				+			+		+								+		
<i>Trianthema turgidifolia</i>																			
<i>Trianthema ufoensis</i>																			
<i>Tribulus astrocarpus</i>																			
<i>Tribulus hirsutus</i>							+												
<i>Tribulus occidentalis</i>							+	+											
<i>Tribulus suberosus</i>																			
<i>Tribulus terrestris</i>																			
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																			
<i>Triodia basedowii</i>																			
<i>Triodia epactia</i>																			
<i>Triodia epactia/pungens</i>																			
<i>Triodia longiceps</i>																			
<i>Triodia pungens</i>																			
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																			
<i>Triodia wiseana</i>																			
<i>Triraphis mollis</i>			+				+	+	+										
<i>Triumfetta clementii</i>																			
<i>Typha domingensis</i>					+								+						
<i>Urochloa occidentalis</i>																			
<i>Urochloa pubigera</i>																			
<i>Vachellia farnesiana</i>										5%									
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																			
<i>Wahlenbergia tumidifructa</i>																			
<i>Xerochloa laniflora</i>									+										
<i>Zaleya galericulata</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Taxa / Site	FMA29	FMA30	FMA31	FMA32	FMA33	FMA34	FMA35	FMA36	FMA37	FMA38	FMA39	FMA40	FMA41	FMA42	FMA43	FMA44	FMA45	FMA46	FMA47	
<i>Abutilon amplum</i>							+	+												
<i>Abutilon cryptopetalum</i>																				
<i>Abutilon cunninghamii</i>																				
<i>Abutilon fraseri</i>						+														
<i>Abutilon lepidum</i>																				
<i>Abutilon macrum</i>																				
<i>Abutilon otocarpum</i>																				
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																				
<i>Abutilon</i> sp.																				
<i>Acacia acradenia</i>																				
<i>Acacia adsurgens</i>																				
<i>Acacia</i> aff. <i>aneura</i>																				
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)								50%												
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)																	15%			
<i>Acacia ampliceps</i>		1%																		
<i>Acacia ancistrocarpa</i>																				
<i>Acacia aneura</i>																				
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																				
<i>Acacia aneura</i> var. <i>intermedia</i>																				
<i>Acacia ayersiana</i>																				
<i>Acacia bivenosa</i>																				
<i>Acacia colei</i> var. <i>colei</i>																				
<i>Acacia coriacea</i> subsp. <i>pendens</i>							+						+				1%			
<i>Acacia cowleana</i>																				
<i>Acacia inaequilatera</i>																				
<i>Acacia maitlandii</i>																				
<i>Acacia marramamba</i>																				
<i>Acacia monticola</i>																				
<i>Acacia paraneura</i>																				
<i>Acacia pruinocarpa</i>																				
<i>Acacia pyrifolia</i>																				
<i>Acacia rhodophloia</i>																				
<i>Acacia sericophylla</i>																				
<i>Acacia sibirica</i>																				
<i>Acacia</i> sp.																				
<i>Acacia synchronicia</i>	+						+	+			+	20%		+			+			
<i>Acacia tenuissima</i>																				
<i>Acacia tetragonophylla</i>							+	+									+			
<i>Acacia trachycarpa</i>																				
<i>Acacia tumida</i> var. <i>pilbarensis</i>																				
<i>Acacia xiphophylla</i>												+								
<i>Acetosa vesicaria</i>																				
<i>Achyranthes aspera</i>																				
<i>Aerva javanica</i>		12%		+													2%			
<i>Aeschynomene indica</i>					+		+	+		+			+							
<i>Alternanthera angustifolia</i>																				
<i>Alternanthera denticulata</i>																				
<i>Alternanthera nana</i>																				
<i>Alternanthera nodiflora</i>					+		+	+					+			+			+	
<i>Alysicarpus muelleri</i>																				
<i>Amaranthus interruptus</i>																				
<i>Amaranthus undulatus</i>		+																		
<i>Ammannia baccifera</i>																				
<i>Ammannia multiflora</i>							+													

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<i>Amphipogon sericeus</i>																			
<i>Amyema fitzgeraldii</i>																			
<i>Androcalva luteiflora</i>																			
<i>Angianthus tomentosus</i>																			
<i>Anthobolus leptomerioides</i>																			
<i>Argemone ochroleuca</i>																			
<i>Aristida contorta</i>	+																		
<i>Aristida holathera</i> var. <i>holathera</i>																			
<i>Aristida inaequiglumis</i>																			
<i>Aristida latifolia</i>																			
<i>Aristida obscura</i>																			
<i>Aristida pruinosa</i>																			
<i>Aristida</i> sp.																			
<i>Atalaya hemiglauca</i>																			
<i>Atriplex bunburyana</i>		+					+	+											
<i>Atriplex codonocarpa</i>						+		+											
<i>Atriplex flabelliformis</i>																			
<i>Austrobryonia pilbarensis</i>																			
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>												+					+		
<i>Bidens bipinnata</i>								+											
<i>Blumea tenella</i>																			
<i>Boerhavia burbidgeana</i>																			
<i>Boerhavia coccinea</i>		+																	
<i>Boerhavia paludosa</i>												+							
<i>Boerhavia repleta</i>						+		+						+			+		
<i>Bonamia rosea</i>																			
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																			
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>												+							
<i>Bothriochloa ewartiana</i>																			
<i>Brachyachne convergens</i>																			
<i>Brachyachne prostrata</i>																			
<i>Bulbostylis barbata</i>								+											
<i>Bulbostylis turbinata</i>																			
<i>Calandrinia ptychosperma</i>								+											
<i>Calandrinia</i> sp.																			
<i>Calandrinia stagnensis</i>																			
<i>Calotis porphyroglossa</i>																			
<i>Calotis squamigera</i>																			
<i>Calytrix carinata</i>																			
<i>Capparis spinosa</i> var. <i>nummularia</i>																			
<i>Capparis umbonata</i>																			
<i>Cenchrus ciliaris</i>	+	+		+	+	+	+	5%			+	5%		1%	+		5%		
<i>Cenchrus setiger</i>								+						+			50%		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>					+		+												
<i>Cheilanthes austrotenuifolia</i>																			
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>																			
<i>Chenopodium auricomum</i>	+						+												
<i>Chloris pectinata</i>	+			+	+	+	+					+		1%	+		+	3%	
<i>Chloris virgata</i>																			
<i>Chrysocephalum gilesii</i>																			
<i>Chrysopogon fallax</i>								+											
<i>Citrullus colocynthis</i>		1%		+				+									+		
<i>Cleome oxalidea</i>																			
<i>Cleome viscosa</i>		71%						+									+		

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<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																			
<i>Commelina ensifolia</i>																			
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>																			
<i>Convolvulus</i> sp.																			
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																			
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>																			
<i>Corchorus parviflorus</i>																			
<i>Corchorus</i> sp.																			
<i>Corchorus tridens</i>							+										+		
<i>Corymbia candida</i> subsp. <i>candida</i>																			
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																			
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																			
<i>Corymbia hamersleyana</i>																			
<i>Cressa australis</i>										3%			+			+	+		+
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																			
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																			
<i>Cucumis maderaspatanus</i>																			
<i>Cucumis melo</i> subsp. <i>agrestis</i>																			
<i>Cullen cinereum</i>					5%							+					1%		
<i>Cullen leucanthum</i>																			
<i>Cymbopogon ambiguus</i>																			
<i>Cymbopogon obtectus</i>																			
<i>Cymbopogon procerus</i>																			
<i>Cymbopogon</i> sp.																			
<i>Cyperus bulbosus</i>			+	+												+		+	+
<i>Cyperus cunninghamii</i>	+															+			
<i>Cyperus iria</i>					+		+												
<i>Cyperus rigidellus</i>																			
<i>Cyperus squarrosus</i>																			
<i>Cyperus vaginatus</i>																			
<i>Dactyloctenium radulans</i>	+			+		+	+	+			+			+	+		15%	+	
<i>Dampiera candicans</i>																			
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																			
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>														+					
<i>Dicladanthera forrestii</i>																			
<i>Dicladanthera</i> sp.																			
<i>Digitaria brownii</i>																			
<i>Digitaria ctenantha</i>																			
<i>Dissocarpus paradoxus</i>															+				
<i>Dodonaea coriacea</i>																			
<i>Dodonaea pachyneura</i>																			
<i>Dodonaea petiolaris</i>																			
<i>Duperreya commixta</i>																			
<i>Dysphania plantaginella</i>		1%															+		
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>					+		+												
<i>Dysphania sphaerosperma</i>																			
<i>Echinochloa colona</i>					+		+												
<i>Ehretia saligna</i> var. <i>saligna</i>																			
<i>Eleocharis papillosa</i>									70%	10%			8%			80%			+
<i>Elytrophorus spicatus</i>																			
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>							+	+				+					+		
<i>Enneapogon caeruleus</i>		+		+		+					+				+				
<i>Enneapogon lindleyanus</i>																			
<i>Enneapogon polyphyllus</i>	+	+		+	+	+								+	+				
<i>Enneapogon robustissimus</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Project Area	Fortescue Marsh Christmas Creek Study Area																		
Year	2012																		
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<i>Enteropogon ramosus</i>	+				+	+		+						+					
<i>Eragrostis cumingii</i>																			
<i>Eragrostis curvula</i>																			
<i>Eragrostis desertorum</i>								+											
<i>Eragrostis dielsii</i>																			
<i>Eragrostis elongata</i>							+	+											
<i>Eragrostis eriopoda</i>												+							
<i>Eragrostis leptocarpa</i>																			
<i>Eragrostis pergracilis</i>	+		12%	40%	1%	+					35%	3%		+	1%	+	+	15%	1%
<i>Eragrostis tenellula</i>	+				1%	+	3%	+				+		+	+				
<i>Eragrostis xerophila</i>																			
<i>Eremophea spinosa</i>																			
<i>Eremophila cuneifolia</i>								+											
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>								+				+							
<i>Eremophila lanceolata</i>																			
<i>Eremophila latrobei</i>																			
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>							+	+											
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																			
<i>Eremophila latrobei</i> x <i>forrestii</i>																			
<i>Eremophila longifolia</i>								+											
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																			
<i>Eremophila spongiorcarpa</i>	+				+	+	+	+			+	1%		30%	+		+		
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+				+	+	+	1%											
<i>Eriachne benthamii</i>																			
<i>Eriachne helmsii</i>																			
<i>Eriachne lanata</i>																			
<i>Eriachne mucronata</i>																			
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																			
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>																			
<i>Eriachne tenuiculmis</i>																			
<i>Eucalyptus gamophylla</i>																			
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																			
<i>Eucalyptus victrix</i>																	+		
<i>Euphorbia australis</i>											+								
<i>Euphorbia biconvexa</i>																			
<i>Euphorbia boophthona</i>																			
<i>Euphorbia coghlanii</i>												+		+					
<i>Euphorbia</i> sp. (site 1089)																			
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																			
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>						+		+				+					+		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>																			
<i>Fimbristylis dichotoma</i>																			
<i>Fimbristylis microcarya</i>																			
<i>Fimbristylis simulans</i>																			
<i>Flaveria trinervia</i>																			
<i>Frankenia ambita</i>			+				+	+									+		
<i>Frankenia setosa</i>																			
<i>Glycine canescens</i>							+	+											
<i>Gnephosis arachnoidea</i>																			
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																			
<i>Gomphrena cunninghamii</i>																			
<i>Gomphrena kanisii</i>					+														

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<i>Goodenia forrestii</i>						+					+	+		+					
<i>Goodenia lamprosperma</i>																			
<i>Goodenia microptera</i>																			
<i>Goodenia muelleriana</i>																			
<i>Goodenia nuda</i>																			
<i>Goodenia prostrata</i>					+														
<i>Goodenia</i> sp.																			
<i>Goodenia stobbsiana</i>																			
<i>Goodenia triodiophila</i>																			
<i>Gossypium australe</i> (Burrup Peninsula form)																			
<i>Gossypium robinsonii</i>																			
<i>Grevillea berryana</i>																			
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>																			
<i>Hakea chordophylla</i>																			
<i>Hakea lorea</i> subsp. <i>lorea</i>																			
<i>Haloragis gossei</i>																			
<i>Heliotropium europaeum</i>																+	+		+
<i>Heliotropium heteranthum</i>																			
<i>Heliotropium pachyphyllum</i>											+								
<i>Hibiscus burtonii</i>																			
<i>Hibiscus coatesii</i>																			
<i>Hibiscus gardneri</i>																			
<i>Hibiscus goldsworthii</i>																			
<i>Hibiscus</i> sp.																			
<i>Hibiscus sturtii</i>																			
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																			
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>																			
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																			
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																			
<i>Hibiscus verdcourtii</i>																			
<i>Hybanthus aurantiacus</i>																			
<i>Indigofera colutea</i>																			
<i>Indigofera monophylla</i>																			
<i>Indigofera</i> sp.																			
<i>Ipomoea coptica</i>							+	+											
<i>Ipomoea lonchophylla</i>																			
<i>Ipomoea muelleri</i>	+							+											
<i>Ipomoea plebeia</i>																			
<i>Ipomoea polymorpha</i>																			
<i>Iseilema dolichotrichum</i>																			
<i>Iseilema macratherum</i>																			
<i>Iseilema membranaceum</i>																			
<i>Iseilema</i> sp.																			
<i>Iseilema vaginiflorum</i>																			
<i>Isotropis atropurpurea</i>																			
<i>Jasminum didymum</i> subsp. <i>lineare</i>																			
<i>Keraudrenia nephrosperma</i>																			
<i>Lawrencia densiflora</i>											1%			+					
<i>Lepidium muelleri-ferdinandii</i>																			
<i>Lepidium oxytrichum</i>																			
<i>Lepidium phlebopetalum</i>																			
<i>Lepidium pholidogynum</i>																			
<i>Lepidium platypetalum</i>																			
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																			
<i>Lipocarpha microcephala</i>																			

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<i>Lotus cruentus</i>						+											+		
<i>Maireana amoena</i>						+								+					
<i>Maireana appressa</i>																			
<i>Maireana carnosae</i>								+											
<i>Maireana georgei</i>																			
<i>Maireana integra</i>																			
<i>Maireana luehmannii</i>				+		+									+				
<i>Maireana planifolia</i>																			
<i>Maireana planifolia</i> x <i>villosa</i>																			
<i>Maireana pyramidata</i>											+	+							
<i>Maireana tomentosa</i>																			
<i>Maireana triptera</i>								+											
<i>Maireana villosa</i>																			
<i>Malvaceae</i> sp.																			
<i>Malvastrum americanum</i>					+		+	+									+		
<i>Marsdenia australis</i>																			
<i>Marsilea hirsuta</i>							+	+	40%	70%			10%			7%			2%
<i>Melaleuca glomerata</i>		20%					35%	2%									+		
<i>Melaleuca linophylla</i>																			
<i>Melaleuca xerophila</i>																			
<i>Mimulus gracilis</i>																			
<i>Mimulus repens</i>																			+
<i>Mollugo molluginea</i>																			
<i>Muehlenbeckia florulenta</i>			1%		+				20%	15%			1%	+		25%			75%
<i>Muellerolimon salicorniaceum</i>																			
<i>Neptunia dimorphantha</i>					+									+					
<i>Nicotiana benthamiana</i>																			
<i>Nicotiana heterantha</i>		+	+	+	+	+	+	+								+	+	5%	7%
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>																			
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																			
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																			
<i>Nicotiana</i> sp.																			
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)																			
<i>Oldenlandia crouchiana</i>																			
<i>Operculina aequiseipala</i>																			
<i>Panicum decompositum</i>																			
<i>Panicum effusum</i>																			
<i>Panicum laevinode</i>																			
<i>Paraneurachne muelleri</i>																			
<i>Paspalidium clementii</i>								+											
<i>Paspalidium tabulatum</i>																			
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																			
<i>Peripleura obovata</i>																			
<i>Perotis rara</i>																			
<i>Petalostylis labicheoides</i>																			
<i>Phyllanthus erwinii</i>																			
<i>Phyllanthus maderaspatensis</i>																			
<i>Pleurocarpaea gracilis</i>																			
<i>Pluchea dentex</i>																			
<i>Pluchea dunlopii</i>					+														
<i>Pluchea ferdinandi-muelleri</i>																			
<i>Pluchea rubelliflora</i>	+				+	+	3%	+									+		
<i>Pluchea tetranthera</i>																			
<i>Plumbago zeylanica</i>																			

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<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>								+											
<i>Polycarpaea holtzei</i>																			
<i>Polycarpaea longiflora</i>																			
<i>Polygala isingii</i>																			
<i>Polymeria ambigua</i>																			
<i>Polymeria calycina</i>																			
<i>Portulaca cyclophylla</i>																			
<i>Portulaca oleracea</i>	+	+				+	+							+					
<i>Portulaca pilosa</i>	+				+	+								+	+		+		
<i>Psydrax latifolia</i>																			
<i>Psydrax suaveolens</i>																			
<i>Pterocaulon serrulatum</i>																			
<i>Pterocaulon</i> sp.																			
<i>Pterocaulon sphacelatum</i>																			
<i>Pterocaulon sphaeranthoides</i>	+				+	+		+				+		+			+		
<i>Ptilotus aervoides</i>																			
<i>Ptilotus astrolasius</i>																			
<i>Ptilotus auriculifolius</i>																			
<i>Ptilotus calostachyus</i>																			
<i>Ptilotus clementii</i>																			
<i>Ptilotus fusiformis</i>																			
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>																			
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>					+		+												
<i>Ptilotus helipteroides</i>																			
<i>Ptilotus incanus</i>																			
<i>Ptilotus macrocephalus</i>																			
<i>Ptilotus nobilis</i>		+				+					+								
<i>Ptilotus obovatus</i> var. <i>obovatus</i>																			
<i>Ptilotus polystachyus</i>																			
<i>Ptilotus rotundifolius</i>																			
<i>Ptilotus schwartzii</i>																			
<i>Rhagodia eremaea</i>												+							
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																			
<i>Rhodanthe floribunda</i>																			
<i>Rhodanthe margarethae</i>																			
<i>Rhynchosia minima</i>																			
<i>Rostellularia adscendens</i> var. <i>clementii</i>																			
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																			
<i>Salsola australis</i>											+			+					
<i>Samolus repens</i> var. <i>floribundus</i>		+											+			2%	+		
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																			
<i>Santalum lanceolatum</i>																			
<i>Scaevola spinescens</i>							+	+				+							
<i>Schizachyrium fragile</i>																			
<i>Schoenoplectus dissachanthus</i>									+	5%			+			+			
<i>Schoenoplectus laevis</i>																			
<i>Sclerolaena beaugleholei</i>																			
<i>Sclerolaena cornishiana</i>							+				+	+							
<i>Sclerolaena costata</i>																			
<i>Sclerolaena cuneata</i>	+						+	1%						+					
<i>Sclerolaena densiflora</i>														+	+				
<i>Sclerolaena diacantha</i>																			
<i>Sclerolaena eriacantha</i>								+											
<i>Sclerolaena glabra</i>																			
<i>Sclerolaena recurvicuspis</i>																			
<i>Sclerolaena tetragona</i>																			

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<i>Senna artemisioides</i> subsp. <i>helmsii</i>																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)								+											
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>																			
<i>Senna glaucifloia</i> x <i>ferraria</i>																			
<i>Senna glaucifolia</i>																			
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>																			
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																			
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>																			
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																			
<i>Senna hamersleyensis</i>																			
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																			
<i>Senna notabilis</i>			+					+											
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>																			
<i>Senna sericea</i>																			
<i>Senna</i> sp.					+	+	+	+											
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)					+	+	+	+											
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																			
<i>Senna stricta</i>																			
<i>Senna venusta</i>																			
<i>Sesbania cannabina</i>		+			+														
<i>Setaria dielsii</i>		+																	
<i>Setaria verticillata</i>		+																	
<i>Sida arenicola</i>																			
<i>Sida echinocarpa</i>																			
<i>Sida ectogama</i>																			
<i>Sida fibulifera</i>					+	+		+			+						+		
<i>Sida platycalyx</i>																			
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>								+											
<i>Sida</i> sp.																			
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)																			
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																			
<i>Sida</i> sp. Pilbara (ferruginous form)																			
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																			
<i>Sida spinosa</i>																			
<i>Solanum horridum</i>																			
<i>Solanum lasiophyllum</i>		+															+		
<i>Solanum phlomoides</i>																			
<i>Solanum</i> sp.																			
<i>Solanum sturtianum</i>												+							
<i>Sonchus oleraceus</i>																			
<i>Spermacoce brachystema</i>																			
<i>Sporobolus australasicus</i>	+	+				+		+				+		+	+		+		
<i>Sporobolus virginicus</i>	+	+			4%	+	20%	2%		+			+	+			+		
<i>Stemodia grossa</i>							+					+							
<i>Stemodia viscosa</i>																			
<i>Stenopetalum nutans</i>																			
<i>Streptoglossa bubakii</i>		+		+		+		+			+								
<i>Streptoglossa cylindriceps</i>																			
<i>Streptoglossa decurrens</i>																			
<i>Streptoglossa liatroides</i>																			
<i>Streptoglossa odora</i>	+										+								
<i>Striga squamigera</i>																			
<i>Swainsona kingii</i>	+	+	12%	1%										+			+	50%	6%
<i>Swainsona tanamiensis</i>																			

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<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>																			
<i>Tecticornia auriculata</i>	+		+	50%	+			+										45%	+
<i>Tecticornia globulifera</i>																			
<i>Tecticornia indica</i>		2%	1%																
<i>Tecticornia indica</i> subsp. <i>bidens</i>					60%	40%	2%	4%			+			30%	31%				
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																			
<i>Tecticornia medusa</i>																			
<i>Tecticornia</i> sp. (sterile)	20%					+				+			45%			1%			4%
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)																	+		9%
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)		4%	70%	+	1%						1%				+				
<i>Tephrosia clementii</i>																			
<i>Tephrosia oxalidea</i>																			
<i>Tephrosia rosea</i>																			
<i>Tephrosia rosea</i> var. Fortescue creeks																			
<i>Tephrosia</i> sp.																			
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																			
<i>Tephrosia supina</i>																			
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)																			
<i>Themeda triandra</i>																			
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>																			
<i>Tragus australianus</i>											+				+				
<i>Trianthema glossostigma</i>								+											
<i>Trianthema triquetra</i>	+	+				+	+	+			+			+	+		+		
<i>Trianthema turgidifolia</i>																			
<i>Trianthema ufoensis</i>																			
<i>Tribulus astrocarpus</i>																			
<i>Tribulus hirsutus</i>																			
<i>Tribulus occidentalis</i>																			
<i>Tribulus suberosus</i>																			
<i>Tribulus terrestris</i>																			
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																			
<i>Triodia basedowii</i>																			
<i>Triodia epactia</i>																			
<i>Triodia epactia/pungens</i>																			
<i>Triodia longiceps</i>																			
<i>Triodia pungens</i>																			
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																			
<i>Triodia wiseana</i>																			
<i>Triraphis mollis</i>												+							
<i>Triumfetta clementii</i>																			
<i>Typha domingensis</i>																			
<i>Urochloa occidentalis</i>																			
<i>Urochloa pubigera</i>																			
<i>Vachellia farnesiana</i>		+						+					+			25%			
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																			
<i>Wahlenbergia tumidifructa</i>																			
<i>Xerochloa laniflora</i>																			
<i>Zaleya galericulata</i>																			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
Year	2012																
Taxa / Site	FMA48	FMA49	FMA50	FMA51	FMA60R	FMA61R	FMA62R	FMA63R	FMA64R	FMA65R	FMA70R	FMA71R	FMA72R	FMA73R	FMA74R	FMA75R	FMA76R
<i>Abutilon amplum</i>																	
<i>Abutilon cryptopetalum</i>																	
<i>Abutilon cunninghamii</i>																	
<i>Abutilon fraseri</i>																	
<i>Abutilon lepidum</i>																	
<i>Abutilon macrum</i>													+				
<i>Abutilon otocarpum</i>																	
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)																	
<i>Abutilon</i> sp.																	
<i>Acacia acradenia</i>																	
<i>Acacia adsurgens</i>																	
<i>Acacia</i> aff. <i>aneura</i>																	
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)														5%	+		
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)																	
<i>Acacia ampliceps</i>							10%										
<i>Acacia ancistrocarpa</i>																	
<i>Acacia aneura</i>																	
<i>Acacia aneura</i> (grey bushy form; MET 15 732)																	
<i>Acacia aneura</i> var. <i>intermedia</i>																	
<i>Acacia ayersiana</i>																	
<i>Acacia bivenosa</i>																	
<i>Acacia colei</i> var. <i>colei</i>																	
<i>Acacia coriacea</i> subsp. <i>pendens</i>														2%			
<i>Acacia cowleana</i>																	
<i>Acacia inaequilatera</i>																	
<i>Acacia maitlandii</i>																	
<i>Acacia marramamba</i>																	
<i>Acacia monticola</i>																	
<i>Acacia paraneura</i>																	
<i>Acacia pruinocarpa</i>																	
<i>Acacia pyrifolia</i>																	
<i>Acacia rhodophloia</i>																	
<i>Acacia sericophylla</i>																	
<i>Acacia sibirica</i>																	
<i>Acacia</i> sp.																	
<i>Acacia synchronicia</i>								+	3%	+		+		3%	1%	+	
<i>Acacia tenuissima</i>																	
<i>Acacia tetragonophylla</i>							1%										
<i>Acacia trachycarpa</i>																	
<i>Acacia tumida</i> var. <i>pilbarensis</i>																	
<i>Acacia xiphophylla</i>									3%								
<i>Acetosa vesicaria</i>																	
<i>Achyranthes aspera</i>																	
<i>Aerva javanica</i>	+							+								+	
<i>Aeschynomene indica</i>																	
<i>Alternanthera angustifolia</i>																	
<i>Alternanthera denticulata</i>																	
<i>Alternanthera nana</i>																	
<i>Alternanthera nodiflora</i>							+							+			
<i>Alysicarpus muelleri</i>																	
<i>Amaranthus interruptus</i>																	
<i>Amaranthus undulatus</i>				+													
<i>Ammannia baccifera</i>																	
<i>Ammannia multiflora</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
Year	2012																
Taxa / Site	FMA48	FMA49	FMA50	FMA51	FMA60R	FMA61R	FMA62R	FMA63R	FMA64R	FMA65R	FMA70R	FMA71R	FMA72R	FMA73R	FMA74R	FMA75R	FMA76R
<i>Amphipogon sericeus</i>																	
<i>Amyema fitzgeraldii</i>														+			
<i>Androcalva luteiflora</i>																	
<i>Angianthus tomentosus</i>																	
<i>Anthobolus leptomerioides</i>																	
<i>Argemone ochroleuca</i>																	
<i>Aristida contorta</i>				+							+						
<i>Aristida holathera</i> var. <i>holathera</i>																	
<i>Aristida inaequiglumis</i>																	
<i>Aristida latifolia</i>				+				+									
<i>Aristida obscura</i>																	
<i>Aristida pruinosa</i>																	
<i>Aristida</i> sp.																	
<i>Atalaya hemiglauca</i>																	
<i>Atriplex bunburyana</i>									1%			+		4%	1%		
<i>Atriplex codonocarpa</i>												+					
<i>Atriplex flabelliformis</i>																	
<i>Austrobryonia pilbarensis</i>																	
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>																	
<i>Bidens bipinnata</i>																	
<i>Blumea tenella</i>																	
<i>Boerhavia burbidgeana</i>																	
<i>Boerhavia coccinea</i>																	
<i>Boerhavia paludosa</i>																	
<i>Boerhavia repleta</i>														+			
<i>Bonamia rosea</i>																	
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)																	
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>																	
<i>Bothriochloa ewartiana</i>														+			
<i>Brachyachne convergens</i>																	
<i>Brachyachne prostrata</i>																	
<i>Bulbostylis barbata</i>																	
<i>Bulbostylis turbinata</i>																	
<i>Calandrinia ptychosperma</i>																	
<i>Calandrinia</i> sp.																	
<i>Calandrinia stagnensis</i>												+					
<i>Calotis porphyroglossa</i>																	
<i>Calotis squamigera</i>																	
<i>Calytrix carinata</i>																	
<i>Capparis spinosa</i> var. <i>nummularia</i>																	
<i>Capparis umbonata</i>																	
<i>Cenchrus ciliaris</i>	+	+	+		+								+	20%	2%	3%	+
<i>Cenchrus setiger</i>						+		+						5%	+		+
<i>Centipeda minima</i> subsp. <i>macrocephala</i>														+			
<i>Cheilanthes austrotenuifolia</i>																	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>																	
<i>Chenopodium auricomum</i>																	
<i>Chloris pectinata</i>	+	+	+	+	+	+		+			+		+			+	+
<i>Chloris virgata</i>																	
<i>Chrysocephalum gilesii</i>																	
<i>Chrysopogon fallax</i>																	
<i>Citrullus colocynthis</i>																	
<i>Cleome oxalidea</i>																	
<i>Cleome viscosa</i>														+			

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
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<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>																	
<i>Commelina ensifolia</i>																	
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>				+													
<i>Convolvulus</i> sp.																	
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>																	
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>																	
<i>Corchorus parviflorus</i>																	
<i>Corchorus</i> sp.																	
<i>Corchorus tridens</i>																	
<i>Corymbia candida</i> subsp. <i>candida</i>																	
<i>Corymbia candida</i> subsp. <i>dipsodes</i>																	
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>																	
<i>Corymbia hamersleyana</i>																	
<i>Cressa australis</i>																	
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>																	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>																	
<i>Cucumis maderaspatanus</i>																	
<i>Cucumis melo</i> subsp. <i>agrestis</i>																	
<i>Cullen cinereum</i>	+		+	2%				3%								+	
<i>Cullen leucanthum</i>																	
<i>Cymbopogon ambiguus</i>																	
<i>Cymbopogon oblectus</i>																	
<i>Cymbopogon procerus</i>																	
<i>Cymbopogon</i> sp.																	
<i>Cyperus bulbosus</i>	+																
<i>Cyperus cunninghamii</i>																	
<i>Cyperus iria</i>																	
<i>Cyperus rigidellus</i>																	
<i>Cyperus squarrosus</i>																	
<i>Cyperus vaginatus</i>																	
<i>Dactyloctenium radulans</i>	+	+	+					+		+		+	+	+	+	+	+
<i>Dampiera candicans</i>																	
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>																	
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>								+									
<i>Dicladanthera forrestii</i>																	
<i>Dicladanthera</i> sp.																	
<i>Digitaria brownii</i>																	
<i>Digitaria ctenantha</i>																	
<i>Dissocarpus paradoxus</i>																	
<i>Dodonaea coriacea</i>																	
<i>Dodonaea pachyneura</i>																	
<i>Dodonaea petiolaris</i>																	
<i>Duperreya commixta</i>																	
<i>Dysphania plantaginella</i>			+	+													
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>																	
<i>Dysphania sphaerosperma</i>																	
<i>Echinochloa colona</i>																	
<i>Ehretia saligna</i> var. <i>saligna</i>																	
<i>Eleocharis papillosa</i>																	
<i>Elytrophorus spicatus</i>																	
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>									2%				+				
<i>Enneapogon caeruleus</i>			+	+	+	+		+	+							+	
<i>Enneapogon lindleyanus</i>																	
<i>Enneapogon polyphyllus</i>	+	+	+			+		2%		+						+	2%
<i>Enneapogon robustissimus</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
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<i>Enteropogon ramosus</i>											+			+	+		
<i>Eragrostis cumingii</i>																	
<i>Eragrostis curvula</i>																	
<i>Eragrostis desertorum</i>																	
<i>Eragrostis dielsii</i>																	
<i>Eragrostis elongata</i>											+						
<i>Eragrostis eriopoda</i>																	
<i>Eragrostis leptocarpa</i>																	
<i>Eragrostis pergracilis</i>	50%	25%	+	1%	2%		+	+	5%	1%	2%	1%	20%		1%	2%	
<i>Eragrostis tenellula</i>	+			+			+				+		+	3%	+		1%
<i>Eragrostis xerophila</i>																	
<i>Eremophea spinosa</i>																	
<i>Eremophila cuneifolia</i>																	
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>																	
<i>Eremophila lanceolata</i>																	
<i>Eremophila latrobei</i>																	
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>																	
<i>Eremophila latrobei</i> subsp. <i>glabra</i>																	
<i>Eremophila latrobei</i> x <i>forrestii</i>																	
<i>Eremophila longifolia</i>																	
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>																	
<i>Eremophila spongiorcarpa</i>		+	+	+	+		+	+	+	+	3%	11%	50%	3%	28	15%	+
<i>Eremophila youngii</i> subsp. <i>lepidota</i>			+										+				
<i>Eriachne benthamii</i>																	
<i>Eriachne helmsii</i>																	
<i>Eriachne lanata</i>																	
<i>Eriachne mucronata</i>																	
<i>Eriachne pulchella</i> subsp. <i>dominii</i>																	
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>																	
<i>Eriachne tenuiculmis</i>																	
<i>Eucalyptus gamophylla</i>																	
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																	
<i>Eucalyptus victrix</i>														2%			
<i>Euphorbia australis</i>																	
<i>Euphorbia biconvexa</i>																	
<i>Euphorbia boophthona</i>																	
<i>Euphorbia coghlanii</i>																	
<i>Euphorbia</i> sp. (site 1089)																	
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>																	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>											+						
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>																	
<i>Fimbristylis dichotoma</i>																	
<i>Fimbristylis microcarya</i>																	
<i>Fimbristylis simulans</i>																	
<i>Flaveria trinervia</i>																	
<i>Frankenia ambita</i>																	
<i>Frankenia setosa</i>											3%				+		
<i>Glycine canescens</i>													+				
<i>Gnephosis arachnoidea</i>																	
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>																	
<i>Gomphrena cunninghamii</i>																	
<i>Gomphrena kanisii</i>	+	+						+								+	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
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<i>Goodenia forrestii</i>									+	+							
<i>Goodenia lamprosperma</i>																	
<i>Goodenia microptera</i>																	
<i>Goodenia muelleriana</i>																	
<i>Goodenia nuda</i>																	
<i>Goodenia prostrata</i>																	
<i>Goodenia</i> sp.																	
<i>Goodenia stobbsiana</i>																	
<i>Goodenia triodiophila</i>																	
<i>Gossypium australe</i> (Burrup Peninsula form)																	
<i>Gossypium robinsonii</i>																	
<i>Grevillea berryana</i>																	
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>																	
<i>Hakea chordophylla</i>																	
<i>Hakea lorea</i> subsp. <i>lorea</i>																	
<i>Haloragis gossei</i>																	
<i>Heliotropium europaeum</i>																	
<i>Heliotropium heteranthum</i>																	
<i>Heliotropium pachyphyllum</i>																	
<i>Hibiscus burtonii</i>																	
<i>Hibiscus coatesii</i>																	
<i>Hibiscus gardneri</i>																	
<i>Hibiscus goldsworthii</i>																	
<i>Hibiscus</i> sp.																	
<i>Hibiscus sturtii</i>																	
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>																	
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>																	
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>																	
<i>Hibiscus sturtii</i> var. <i>truncatus</i>																	
<i>Hibiscus verdcourtii</i>																	
<i>Hybanthus aurantiacus</i>																	
<i>Indigofera colutea</i>																	
<i>Indigofera monophylla</i>																	
<i>Indigofera</i> sp.																	
<i>Ipomoea coptica</i>													+				
<i>Ipomoea lonchophylla</i>																	
<i>Ipomoea muelleri</i>							+							+			
<i>Ipomoea plebeia</i>																	
<i>Ipomoea polymorpha</i>																	
<i>Iseilema dolichotrichum</i>																	
<i>Iseilema macratherum</i>																	
<i>Iseilema membranaceum</i>																	
<i>Iseilema</i> sp.																	
<i>Iseilema vaginiflorum</i>																	
<i>Isotropis atropurpurea</i>																	
<i>Jasminum didymum</i> subsp. <i>lineare</i>																	
<i>Keraudrenia nephrosperma</i>																	
<i>Lawrenzia densiflora</i>								+	+		+	+					
<i>Lepidium muelleri-ferdinandii</i>																	
<i>Lepidium oxytrichum</i>																	
<i>Lepidium phlebopetalum</i>																	
<i>Lepidium pholidogynum</i>																	
<i>Lepidium platypetalum</i>																	
<i>Leptochloa fusca</i> subsp. <i>fusca</i>																	
<i>Lipocarpha microcephala</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
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Taxa / Site	FMA48	FMA49	FMA50	FMA51	FMA60R	FMA61R	FMA62R	FMA63R	FMA64R	FMA65R	FMA70R	FMA71R	FMA72R	FMA73R	FMA74R	FMA75R	FMA76R
<i>Lotus cruentus</i>																	
<i>Maireana amoena</i>																	
<i>Maireana appressa</i>																	
<i>Maireana carnosae</i>												+					
<i>Maireana georgei</i>																	
<i>Maireana integra</i>																	
<i>Maireana luehmannii</i>	+	+	+	+				+			+						
<i>Maireana planifolia</i>																	
<i>Maireana planifolia</i> x <i>villosa</i>																	
<i>Maireana pyramidata</i>												+		4%			
<i>Maireana tomentosa</i>																	
<i>Maireana triptera</i>																	
<i>Maireana villosa</i>																	
<i>Malvaceae</i> sp.																	
<i>Malvastrum americanum</i>														+			
<i>Marsdenia australis</i>																	
<i>Marsilea hirsuta</i>							15%										
<i>Melaleuca glomerata</i>									+				+				
<i>Melaleuca linophylla</i>																	
<i>Melaleuca xerophila</i>																	
<i>Mimulus gracilis</i>																	
<i>Mimulus repens</i>																	
<i>Mollugo molluginea</i>																	
<i>Muehlenbeckia florulenta</i>			+				+										
<i>Muellerolimon salicorniaceum</i>											+						
<i>Neptunia dimorphantha</i>																	
<i>Nicotiana benthamiana</i>																	
<i>Nicotiana heterantha</i>	+	1%	+	5%	+	1%		+			+		1%			+	
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>																	
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>																	
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>																	
<i>Nicotiana</i> sp.																	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)																	
<i>Oldenlandia crouchiana</i>																	
<i>Operculina aequiseipala</i>																	
<i>Panicum decompositum</i>																+	
<i>Panicum effusum</i>																	
<i>Panicum laevinode</i>																	
<i>Paraneurachne muelleri</i>																	
<i>Paspalidium clementii</i>																	
<i>Paspalidium tabulatum</i>																	
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)																	
<i>Peripleura obovata</i>				+													
<i>Perotis rara</i>																	
<i>Petalostylis labicheoides</i>																	
<i>Phyllanthus erwinii</i>																	
<i>Phyllanthus maderaspatensis</i>																	
<i>Pleurocarpaea gracilis</i>																	
<i>Pluchea dentex</i>																	
<i>Pluchea dunlopii</i>				+													
<i>Pluchea ferdinandi-muelleri</i>																	
<i>Pluchea rubelliflora</i>				+									+	+			
<i>Pluchea tetranthera</i>																	
<i>Plumbago zeylanica</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
Year	2012																
Taxa / Site	FMA48	FMA49	FMA50	FMA51	FMA60R	FMA61R	FMA62R	FMA63R	FMA64R	FMA65R	FMA70R	FMA71R	FMA72R	FMA73R	FMA74R	FMA75R	FMA76R
<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>																	
<i>Polycarpaea holtzei</i>																	
<i>Polycarpaea longiflora</i>																	
<i>Polygala isingii</i>																	
<i>Polymeria ambigua</i>																	
<i>Polymeria calycina</i>																	
<i>Portulaca cyclophylla</i>																	
<i>Portulaca oleracea</i>			+													+	+
<i>Portulaca pilosa</i>			+	+							+		+				
<i>Psydrax latifolia</i>																	
<i>Psydrax suaveolens</i>																	
<i>Pterocaulon serrulatum</i>																	
<i>Pterocaulon</i> sp.																	
<i>Pterocaulon sphacelatum</i>																	
<i>Pterocaulon sphaeranthoides</i>			+	+				+			1%		+	+		1%	
<i>Ptilotus aervoides</i>																	
<i>Ptilotus astrolasius</i>																	
<i>Ptilotus auriculifolius</i>																	
<i>Ptilotus calostachyus</i>																	
<i>Ptilotus clementii</i>																	
<i>Ptilotus fusiformis</i>																	
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>																	
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>														+			
<i>Ptilotus helipteroides</i>																	
<i>Ptilotus incanus</i>																	
<i>Ptilotus macrocephalus</i>																	
<i>Ptilotus nobilis</i>																+	
<i>Ptilotus obovatus</i> var. <i>obovatus</i>																	
<i>Ptilotus polystachyus</i>																	
<i>Ptilotus rotundifolius</i>																	
<i>Ptilotus schwartzii</i>																	
<i>Rhagodia eremaea</i>																	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)																	
<i>Rhodanthe floribunda</i>																	
<i>Rhodanthe margarethae</i>																	
<i>Rhynchosia minima</i>													+				
<i>Rostellularia adscendens</i> var. <i>clementii</i>																	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>																	
<i>Salsola australis</i>									+								+
<i>Samolus repens</i> var. <i>floribundus</i>													+				
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)																	
<i>Santalum lanceolatum</i>																	
<i>Scaevola spinescens</i>																	
<i>Schizachyrium fragile</i>																	
<i>Schoenoplectus dissachanthus</i>																	
<i>Schoenoplectus laevis</i>																	
<i>Sclerolaena beaugleholei</i>																	
<i>Sclerolaena cornishiana</i>									+	+							
<i>Sclerolaena costata</i>																	
<i>Sclerolaena cuneata</i>			+							+					+		+
<i>Sclerolaena densiflora</i>												+					
<i>Sclerolaena diacantha</i>																	
<i>Sclerolaena eriacantha</i>																	
<i>Sclerolaena glabra</i>																	
<i>Sclerolaena recurvicauspis</i>															+		
<i>Sclerolaena tetragona</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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<i>Senna artemisioides</i> subsp. <i>helmsii</i>																	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>																	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)														+			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>																	
<i>Senna glaucifloia</i> x <i>ferraria</i>																	
<i>Senna glaucifolia</i>																	
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>																	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>																	
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>																	
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>																	
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>																	
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>																	
<i>Senna hamersleyensis</i>																	
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)																	
<i>Senna notabilis</i>																	
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>													+				
<i>Senna sericea</i>																	
<i>Senna</i> sp.																	
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)													+	+		+	
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)																	
<i>Senna stricta</i>																	
<i>Senna venusta</i>																	
<i>Sesbania cannabina</i>																	
<i>Setaria dielsii</i>																	
<i>Setaria verticillata</i>																+	
<i>Sida arenicola</i>																	
<i>Sida echinocarpa</i>																	
<i>Sida ectogama</i>																	
<i>Sida fibulifera</i>			+								+	+	+				
<i>Sida platycalyx</i>																	
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>																	
<i>Sida</i> sp.																	
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)																	
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)																	
<i>Sida</i> sp. Pilbara (ferruginous form)																	
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)																	
<i>Sida spinosa</i>																	
<i>Solanum horridum</i>											+		+				
<i>Solanum lasiophyllum</i>																+	
<i>Solanum phlomoides</i>																	
<i>Solanum</i> sp.																	
<i>Solanum sturtianum</i>																	
<i>Sonchus oleraceus</i>																	
<i>Spermacoce brachystema</i>																	
<i>Sporobolus australasicus</i>			+	+				+			+	+	+	+	+		+
<i>Sporobolus virginicus</i>						25%	60%						+				
<i>Stemodia grossa</i>									+				+				
<i>Stemodia viscosa</i>																	
<i>Stenopetalum nutans</i>																	
<i>Streptoglossa bubakii</i>		+	+									+				+	
<i>Streptoglossa cylindriceps</i>																	
<i>Streptoglossa decurrens</i>																	
<i>Streptoglossa liatroides</i>																	
<i>Streptoglossa odora</i>											+						
<i>Striga squamigera</i>																	
<i>Swainsona kingii</i>	+	1%	+	1%	+	+	+	+			+		+			+	
<i>Swainsona tanamiensis</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area																
Year	2012																
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<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>												+					
<i>Tecticornia auriculata</i>	45%	+		3%		+		1%									
<i>Tecticornia globulifera</i>																	
<i>Tecticornia indica</i>																	
<i>Tecticornia indica</i> subsp. <i>bidens</i>	+	40%	45%	50%	8%	65%	5%	35%	+	+	65%		45%		+	60%	75%
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>																	
<i>Tecticornia medusa</i>																	
<i>Tecticornia</i> sp. (sterile)																	
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)		1%		2%		3%					+						
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)	+	2%	1%	1%				+		+	+						+
<i>Tephrosia clementii</i>																	
<i>Tephrosia oxalidea</i>																	
<i>Tephrosia rosea</i>																	
<i>Tephrosia rosea</i> var. Fortescue creeks																	
<i>Tephrosia</i> sp.																	
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)																	
<i>Tephrosia supina</i>																	
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)														+			
<i>Themeda triandra</i>																	
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>																	
<i>Tragus australianus</i>																	
<i>Trianthema glossostigma</i>												2%			+		
<i>Trianthema triquetra</i>			+							+		+		+	+		+
<i>Trianthema turgidifolia</i>																	
<i>Trianthema ufoensis</i>																	
<i>Tribulus astrocarpus</i>																	
<i>Tribulus hirsutus</i>																	
<i>Tribulus occidentalis</i>																	
<i>Tribulus suberosus</i>																	
<i>Tribulus terrestris</i>																	
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>																	
<i>Triodia basedowii</i>																	
<i>Triodia epactia</i>																	
<i>Triodia epactia/pungens</i>																	
<i>Triodia longiceps</i>																	
<i>Triodia pungens</i>																	
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)																	
<i>Triodia wiseana</i>																	
<i>Triraphis mollis</i>																	
<i>Triumfetta clementii</i>																	
<i>Typha domingensis</i>																	
<i>Urochloa occidentalis</i>																	
<i>Urochloa pubigera</i>																	
<i>Vachellia farnesiana</i>							20%								+		
<i>Vigna</i> sp. central (M.E. Trudgen 1626)																	
<i>Wahlenbergia tumidifructa</i>																	
<i>Xerochloa laniflora</i>											+					+	
<i>Zaleya galericulata</i>																	

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
APPENDIX G
SITE BY SPECIES MATRIX

Project Area	Fortescue Marsh Christmas Creek Study Area														All Surveys
Year	2012														2011-2013
Taxa / Site	FMA77R	FMA78R	FMA79R	FMA80R	FMA81R	FMA82R	FMA83R	FMA84R	FMA85R	FMA86R	FMA87R	FMA88R	FMA89R	FMA90R	OPPCOLL
<i>Abutilon amplum</i>							+								2%
<i>Abutilon cryptopetalum</i>															
<i>Abutilon cunninghamii</i>															
<i>Abutilon fraseri</i>															
<i>Abutilon lepidum</i>															
<i>Abutilon macrum</i>															
<i>Abutilon otocarpum</i>															
<i>Abutilon oxycarpum</i> subsp. Prostrate (A.A. Mitchell PRP 1266)															
<i>Abutilon</i> sp.															
<i>Acacia acradenia</i>															
<i>Acacia adsurgens</i>															
<i>Acacia</i> aff. <i>aneura</i>															
<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)															
<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)															
<i>Acacia ampliceps</i>															
<i>Acacia ancistrocarpa</i>															
<i>Acacia aneura</i>															
<i>Acacia aneura</i> (grey bushy form; MET 15 732)															
<i>Acacia aneura</i> var. <i>intermedia</i>															
<i>Acacia ayersiana</i>															
<i>Acacia bivenosa</i>															
<i>Acacia colei</i> var. <i>colei</i>															
<i>Acacia coriacea</i> subsp. <i>pendens</i>	+			+					+						
<i>Acacia cowleana</i>															
<i>Acacia inaequilatera</i>															
<i>Acacia maitlandii</i>															
<i>Acacia marramamba</i>															
<i>Acacia monticola</i>															
<i>Acacia paraneura</i>															
<i>Acacia pruinocarpa</i>															
<i>Acacia pyrifolia</i>															
<i>Acacia rhodophloia</i>															6%
<i>Acacia sericophylla</i>															
<i>Acacia sibirica</i>															
<i>Acacia</i> sp.															lots
<i>Acacia synchronicia</i>	12%	+	1%	18%	1%				2%		1%	+		2%	
<i>Acacia tenuissima</i>															
<i>Acacia tetragonophylla</i>	1%													4%	
<i>Acacia trachycarpa</i>															1 ind
<i>Acacia tumida</i> var. <i>pilbarensis</i>															
<i>Acacia xiphophylla</i>															
<i>Acetosa vesicaria</i>															10%
<i>Achyranthes aspera</i>															
<i>Aerva javanica</i>															
<i>Aeschynomene indica</i>						+									
<i>Alternanthera angustifolia</i>															
<i>Alternanthera denticulata</i>															
<i>Alternanthera nana</i>															
<i>Alternanthera nodiflora</i>				+			+		+					+	
<i>Alysicarpus muelleri</i>															1%
<i>Amaranthus interruptus</i>															
<i>Amaranthus undulatus</i>															1-4%
<i>Ammannia baccifera</i>															
<i>Ammannia multiflora</i>															

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Taxa / Site	FMA77R	FMA78R	FMA79R	FMA80R	FMA81R	FMA82R	FMA83R	FMA84R	FMA85R	FMA86R	FMA87R	FMA88R	FMA89R	FMA90R	OPPCOLL
<i>Amphipogon sericeus</i>															
<i>Amyema fitzgeraldii</i>															
<i>Androcalva luteiflora</i>															
<i>Angianthus tomentosus</i>															
<i>Anthobolus leptomerioides</i>															
<i>Argemone ochroleuca</i>															
<i>Aristida contorta</i>		+					+			+	+				
<i>Aristida holathera</i> var. <i>holathera</i>															
<i>Aristida inaequiglumis</i>															50 ind
<i>Aristida latifolia</i>											+				
<i>Aristida obscura</i>															
<i>Aristida pruinosa</i>															8 ind
<i>Aristida</i> sp.															
<i>Atalaya hemiglauca</i>	+														
<i>Atriplex bunburyana</i>					+										
<i>Atriplex codonocarpa</i>	+														
<i>Atriplex flabelliformis</i>															
<i>Austrobryonia pilbarensis</i>															
<i>Bergia perennis</i> subsp. <i>obtusifolia</i>															1%
<i>Bidens bipinnata</i>															
<i>Blumea tenella</i>															
<i>Boerhavia burbidgeana</i>															
<i>Boerhavia coccinea</i>										+					10 ind
<i>Boerhavia paludosa</i>															
<i>Boerhavia repleta</i>		+													
<i>Bonamia rosea</i>															
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)															
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>															
<i>Bothriochloa ewartiana</i>				2%											
<i>Brachyachne convergens</i>															
<i>Brachyachne prostrata</i>															
<i>Bulbostylis barbata</i>															
<i>Bulbostylis turbinata</i>															
<i>Calandrinia ptychosperma</i>															
<i>Calandrinia</i> sp.															
<i>Calandrinia stagnensis</i>															
<i>Calotis porphyroglossa</i>															
<i>Calotis squamigera</i>															
<i>Calytrix carinata</i>															
<i>Capparis spinosa</i> var. <i>nummularia</i>															2%
<i>Capparis umbonata</i>															3%
<i>Cenchrus ciliaris</i>	+	+	2%	5%	1%		+	+	+		+	+			
<i>Cenchrus setiger</i>	29%				+							+			
<i>Centipeda minima</i> subsp. <i>macrocephala</i>				+											
<i>Cheilanthes austrotenuifolia</i>															
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>															
<i>Chenopodium auricomum</i>			+		+										
<i>Chloris pectinata</i>						+	3%	+	+		+		1%		
<i>Chloris virgata</i>															
<i>Chrysocephalum gilesii</i>															
<i>Chrysopogon fallax</i>															
<i>Citrullus colocynthis</i>															
<i>Cleome oxalidea</i>															
<i>Cleome viscosa</i>										+					

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<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>															
<i>Commelina ensifolia</i>															
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>															
<i>Convolvulus</i> sp.															
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>															
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>															
<i>Corchorus parviflorus</i>															
<i>Corchorus</i> sp.															
<i>Corchorus tridens</i>															
<i>Corymbia candida</i> subsp. <i>candida</i>															
<i>Corymbia candida</i> subsp. <i>dipsodes</i>															
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>															
<i>Corymbia hamersleyana</i>															
<i>Cressa australis</i>															
<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>															
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>															
<i>Cucumis maderaspatanus</i>															
<i>Cucumis melo</i> subsp. <i>agrestis</i>															
<i>Cullen cinereum</i>				+	+									+	1%
<i>Cullen leucanthum</i>															
<i>Cymbopogon ambiguus</i>									+						1%
<i>Cymbopogon obtectus</i>															
<i>Cymbopogon procerus</i>															
<i>Cymbopogon</i> sp.															
<i>Cyperus bulbosus</i>															
<i>Cyperus cunninghamii</i>															
<i>Cyperus iria</i>															
<i>Cyperus rigidellus</i>															
<i>Cyperus squarrosus</i>															
<i>Cyperus vaginatus</i>															
<i>Dactyloctenium radulans</i>		+			+	+			+	+	+				
<i>Dampiera candicans</i>															7%
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>															
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>				+	+	+	+								
<i>Dicladanthera forrestii</i>															30 ind
<i>Dicladanthera</i> sp.															
<i>Digitaria brownii</i>															
<i>Digitaria ctenantha</i>															
<i>Dissocarpus paradoxus</i>															
<i>Dodonaea coriacea</i>															
<i>Dodonaea pachyneura</i>															
<i>Dodonaea petiolaris</i>															
<i>Duperreya commixta</i>															
<i>Dysphania plantaginella</i>															
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>															
<i>Dysphania sphaerosperma</i>															
<i>Echinochloa colona</i>				+										+	
<i>Ehretia saligna</i> var. <i>saligna</i>															2%
<i>Eleocharis papillosa</i>															60%
<i>Elytrophorus spicatus</i>															
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	+								+					+	
<i>Enneapogon caeruleus</i>			+				+			+		+			10 ind
<i>Enneapogon lindleyanus</i>															
<i>Enneapogon polyphyllus</i>			+		+		+			+	+		+		
<i>Enneapogon robustissimus</i>															5 ind

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT
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Project Area	Fortescue Marsh Christmas Creek Study Area														All Surveys
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Taxa / Site	FMA77R	FMA78R	FMA79R	FMA80R	FMA81R	FMA82R	FMA83R	FMA84R	FMA85R	FMA86R	FMA87R	FMA88R	FMA89R	FMA90R	OPPCOLL
<i>Enteropogon ramosus</i>					+			+	+	+		+	+		
<i>Eragrostis cumingii</i>															
<i>Eragrostis curvula</i>															5%
<i>Eragrostis desertorum</i>															
<i>Eragrostis dielsii</i>															
<i>Eragrostis elongata</i>															
<i>Eragrostis eriopoda</i>															
<i>Eragrostis leptocarpa</i>															
<i>Eragrostis pergracilis</i>			1%	1%			+		+	15%	15%	35%	+	13%	
<i>Eragrostis tenellula</i>	+			1%	1%	+			+					+	
<i>Eragrostis xerophila</i>		+	+												
<i>Eremophea spinosa</i>		+	+												
<i>Eremophila cuneifolia</i>		+													500 ind
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>															
<i>Eremophila lanceolata</i>															
<i>Eremophila latrobei</i>															
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>															
<i>Eremophila latrobei</i> subsp. <i>glabra</i>															3%
<i>Eremophila latrobei</i> x <i>forrestii</i>															
<i>Eremophila longifolia</i>															
<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>															
<i>Eremophila spongiorcarpa</i>	+	+	11%	1%	15%	+	3%	+	+	+	4%	+	+	1%	100+ ind
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	+				+	+	+		+						
<i>Eriachne benthamii</i>				+			+								
<i>Eriachne helmsii</i>															
<i>Eriachne lanata</i>															
<i>Eriachne mucronata</i>															
<i>Eriachne pulchella</i> subsp. <i>dominii</i>															
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>															
<i>Eriachne tenuiculmis</i>															
<i>Eucalyptus gamophylla</i>															
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>															
<i>Eucalyptus victrix</i>	2%			3%											
<i>Euphorbia australis</i>												+			
<i>Euphorbia biconvexa</i>															3%
<i>Euphorbia boophthona</i>															1%
<i>Euphorbia coghlanii</i>															
<i>Euphorbia</i> sp. (site 1089)															
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>															
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>															
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>															
<i>Fimbristylis dichotoma</i>															
<i>Fimbristylis microcarya</i>															
<i>Fimbristylis simulans</i>															
<i>Flaveria trinervia</i>										+		+		+	
<i>Frankenia ambita</i>															
<i>Frankenia setosa</i>		+													
<i>Glycine canescens</i>															
<i>Gnephosis arachnoidea</i>															
<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>															20 ind
<i>Gomphrena cunninghamii</i>															
<i>Gomphrena kanisii</i>							+								

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<i>Goodenia forrestii</i>			1%									+			
<i>Goodenia lamprosperma</i>															
<i>Goodenia microptera</i>															
<i>Goodenia muelleriana</i>															1 ind
<i>Goodenia nuda</i>															1%
<i>Goodenia prostrata</i>															2 ind
<i>Goodenia</i> sp.															POP
<i>Goodenia stobbsiana</i>															
<i>Goodenia triodiophila</i>															1%
<i>Gossypium australe</i> (Burrup Peninsula form)															
<i>Gossypium robinsonii</i>															
<i>Grevillea berryana</i>															
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>															
<i>Hakea chordophylla</i>															
<i>Hakea lorea</i> subsp. <i>lorea</i>															
<i>Haloragis gossei</i>															
<i>Heliotropium europaeum</i>															
<i>Heliotropium heteranthum</i>															
<i>Heliotropium pachyphyllum</i>															
<i>Hibiscus burtonii</i>															
<i>Hibiscus coatesii</i>															
<i>Hibiscus gardneri</i>															
<i>Hibiscus goldsworthii</i>															3%
<i>Hibiscus</i> sp.															
<i>Hibiscus sturtii</i>															
<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>															
<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>															
<i>Hibiscus sturtii</i> var. <i>platychlamys</i>															
<i>Hibiscus sturtii</i> var. <i>truncatus</i>															
<i>Hibiscus verdcourtii</i>															
<i>Hybanthus aurantiacus</i>															2%
<i>Indigofera colutea</i>															
<i>Indigofera monophylla</i>															
<i>Indigofera</i> sp.															
<i>Ipomoea coptica</i>															
<i>Ipomoea lonchophylla</i>															
<i>Ipomoea muelleri</i>	+			+	+										
<i>Ipomoea plebeia</i>															20 ind
<i>Ipomoea polymorpha</i>															
<i>Iseilema dolichotrichum</i>															
<i>Iseilema macratherum</i>															
<i>Iseilema membranaceum</i>															
<i>Iseilema</i> sp.															
<i>Iseilema vaginiflorum</i>							2%								
<i>Isotropis atropurpurea</i>															
<i>Jasminum didymum</i> subsp. <i>lineare</i>															
<i>Keraudrenia nephrosperma</i>															
<i>Lawrenzia densiflora</i>										+		+			
<i>Lepidium muelleri-ferdinandii</i>															
<i>Lepidium oxytrichum</i>															
<i>Lepidium phlebopetalum</i>															
<i>Lepidium pholidogynum</i>															
<i>Lepidium platypetalum</i>															
<i>Leptochloa fusca</i> subsp. <i>fusca</i>						+									
<i>Lipocarpha microcephala</i>															

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<i>Lotus cruentus</i>				+	+										
<i>Maireana amoena</i>			+												
<i>Maireana appressa</i>												2%			
<i>Maireana carnosa</i>		+													
<i>Maireana georgei</i>															
<i>Maireana integra</i>															
<i>Maireana luehmannii</i>							+	+	+			+	+		
<i>Maireana planifolia</i>															
<i>Maireana planifolia</i> x <i>villosa</i>															
<i>Maireana pyramidata</i>					+							+			
<i>Maireana tomentosa</i>															
<i>Maireana triptera</i>										+		+			
<i>Maireana villosa</i>															
<i>Malvaceae</i> sp.															
<i>Malvastrum americanum</i>	+											+		+	
<i>Marsdenia australis</i>															
<i>Marsilea hirsuta</i>									1%						
<i>Melaleuca glomerata</i>														25%	
<i>Melaleuca linophylla</i>															
<i>Melaleuca xerophila</i>															1 ind
<i>Mimulus gracilis</i>															
<i>Mimulus repens</i>															
<i>Mollugo molluginea</i>															
<i>Muehlenbeckia florulenta</i>	+														
<i>Muellerolimon salicorniaceum</i>															100+
<i>Neptunia dimorphantha</i>	+			+										+	
<i>Nicotiana benthamiana</i>															10%
<i>Nicotiana heterantha</i>							+	2%		+		+	+	+	100+
<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>															1%
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>															
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>															1%
<i>Nicotiana</i> sp.															
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)															
<i>Oldenlandia crouchiana</i>															1%
<i>Operculina aequisepala</i>															6%
<i>Panicum decompositum</i>	+			+	+						+				
<i>Panicum effusum</i>															
<i>Panicum laevinode</i>															
<i>Paraneurachne muelleri</i>															
<i>Paspalidium clementii</i>															
<i>Paspalidium tabulatum</i>															
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)															
<i>Peripleura obovata</i>															
<i>Perotis rara</i>															
<i>Petalostylis labicheoides</i>															10 ind
<i>Phyllanthus erwinii</i>															
<i>Phyllanthus maderaspatensis</i>															2%
<i>Pleurocarpaea gracilis</i>															
<i>Pluchea dentex</i>							+								
<i>Pluchea dunlopii</i>					+		+		1%		1%	+	+	+	
<i>Pluchea ferdinandi-muelleri</i>											+				
<i>Pluchea rubelliflora</i>				2%	+		+	1%	+		1%		+	+	
<i>Pluchea tetranthera</i>															
<i>Plumbago zeylanica</i>															

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<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>															
<i>Polycarpaea holtzei</i>															
<i>Polycarpaea longiflora</i>															
<i>Polygala isingii</i>															
<i>Polymeria ambigua</i>															
<i>Polymeria calycina</i>															
<i>Portulaca cyclophylla</i>															50%
<i>Portulaca oleracea</i>										+					
<i>Portulaca pilosa</i>								+							
<i>Psydrax latifolia</i>															
<i>Psydrax suaveolens</i>															
<i>Pterocaulon serrulatum</i>															
<i>Pterocaulon</i> sp.															
<i>Pterocaulon sphacelatum</i>															
<i>Pterocaulon sphaeranthoides</i>				+	1%	+	3%	+	+	+	5%	+	+	20%	
<i>Ptilotus aervoides</i>															
<i>Ptilotus astrolasius</i>															
<i>Ptilotus auriculifolius</i>															+
<i>Ptilotus calostachyus</i>															
<i>Ptilotus clementii</i>															
<i>Ptilotus fusiformis</i>															
<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>															
<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>															
<i>Ptilotus helipteroides</i>															
<i>Ptilotus incanus</i>															
<i>Ptilotus macrocephalus</i>															
<i>Ptilotus nobilis</i>										+	+	+		+	
<i>Ptilotus obovatus</i> var. <i>obovatus</i>											+				
<i>Ptilotus polystachyus</i>															
<i>Ptilotus rotundifolius</i>															
<i>Ptilotus schwartzii</i>															
<i>Rhagodia eremaea</i>															1%
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)															1%
<i>Rhodanthe floribunda</i>															3%
<i>Rhodanthe margarethae</i>															5%
<i>Rhynchosia minima</i>														+	+
<i>Rostellularia adscendens</i> var. <i>clementii</i>															1%
<i>Rostellularia adscendens</i> var. <i>latifolia</i>															
<i>Salsola australis</i>		+													5 ind
<i>Samolus repens</i> var. <i>floribundus</i>														+	
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)															20%
<i>Santalum lanceolatum</i>															
<i>Scaevola spinescens</i>															
<i>Schizachyrium fragile</i>															
<i>Schoenoplectus dissachanthus</i>															+
<i>Schoenoplectus laevis</i>															
<i>Sclerolaena beaugleholei</i>			+												
<i>Sclerolaena cornishiana</i>										+		1%			
<i>Sclerolaena costata</i>															
<i>Sclerolaena cuneata</i>		2%							+	+					
<i>Sclerolaena densiflora</i>		1%													
<i>Sclerolaena diacantha</i>															
<i>Sclerolaena eriacantha</i>															
<i>Sclerolaena glabra</i>															
<i>Sclerolaena recurvicauspis</i>															
<i>Sclerolaena tetragona</i>															

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<i>Senna artemisioides</i> subsp. <i>helmsii</i>															
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>															
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)															
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>															
<i>Senna glaucifloia</i> x <i>ferraria</i>															
<i>Senna glaucifolia</i>			+												
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>															+
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>															
<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>															
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>															
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>															
<i>Senna glutinosa</i> subsp. x <i>luerssenii</i> x <i>S. stricta</i>															
<i>Senna hamersleyensis</i>															
<i>Senna hamersleyensis</i> x sp. Karijini(M.E. Trudgen 10392)															
<i>Senna notabilis</i>															
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>															
<i>Senna sericea</i>															
<i>Senna</i> sp.															
<i>Senna</i> sp. Karijini (M.E. Trudgen 10392)			+									+			
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)															
<i>Senna stricta</i>															
<i>Senna venusta</i>															
<i>Sesbania cannabina</i>															
<i>Setaria dielsii</i>														+	
<i>Setaria verticillata</i>															
<i>Sida arenicola</i>															
<i>Sida echinocarpa</i>															
<i>Sida ectogama</i>															
<i>Sida fibulifera</i>			+		+							+		+	
<i>Sida platycalyx</i>															
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>															
<i>Sida</i> sp.															
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)															
<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)															
<i>Sida</i> sp. Pilbara (ferruginous form)															
<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)															
<i>Sida spinosa</i>															
<i>Solanum horridum</i>										+					
<i>Solanum lasiophyllum</i>										+		+		+	
<i>Solanum phlomoides</i>															
<i>Solanum</i> sp.															
<i>Solanum sturtianum</i>															1%
<i>Sonchus oleraceus</i>															
<i>Spermacoce brachystema</i>															
<i>Sporobolus australasicus</i>		+		+							+				
<i>Sporobolus virginicus</i>	40%			40%	35%	2%	2%							35%	
<i>Stemodia grossa</i>							+	+			+	+		+	
<i>Stemodia viscosa</i>															1%
<i>Stenopetalum nutans</i>															
<i>Streptoglossa bubakii</i>		+								+	+	+	+		
<i>Streptoglossa cylindriceps</i>															
<i>Streptoglossa decurrens</i>															
<i>Streptoglossa liatroides</i>															
<i>Streptoglossa odora</i>															
<i>Striga squamigera</i>															1%
<i>Swainsona kingii</i>			+	+	+		+	+	+	+	+		+	+	
<i>Swainsona tanamiensis</i>															100+

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<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>															
<i>Tecticornia auriculata</i>						+							+		
<i>Tecticornia globulifera</i>															+
<i>Tecticornia indica</i>															
<i>Tecticornia indica</i> subsp. <i>bidens</i>	1%		20%	1%	50%	75%	65%	80%	35%	2%	35%	11%	60%	15%	
<i>Tecticornia indica</i> subsp. <i>leiostachya</i>															+
<i>Tecticornia medusa</i>															+
<i>Tecticornia</i> sp. (sterile)															
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106)						+							15%		15%
<i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)			+			+				+	+		+		
<i>Tephrosia clementii</i>															
<i>Tephrosia oxalidea</i>															
<i>Tephrosia rosea</i>															
<i>Tephrosia rosea</i> var. Fortescue creeks															
<i>Tephrosia</i> sp.															
<i>Tephrosia</i> sp. Fortescue (A.A. Mitchell 606) (formerly <i>T. densa</i>)															
<i>Tephrosia supina</i>															
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)															
<i>Themeda triandra</i>															1%
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>															
<i>Tragus australianus</i>												+			
<i>Trianthema glossostigma</i>			+												
<i>Trianthema triquetra</i>		+								+	+				
<i>Trianthema turgidifolia</i>															
<i>Trianthema ufoensis</i>	+														
<i>Tribulus astrocarpus</i>															
<i>Tribulus hirsutus</i>															
<i>Tribulus occidentalis</i>															
<i>Tribulus suberosus</i>															
<i>Tribulus terrestris</i>															
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>															5 ind
<i>Triodia basedowii</i>															
<i>Triodia epactia</i>															
<i>Triodia epactia/pungens</i>															
<i>Triodia longiceps</i>															5 ind
<i>Triodia pungens</i>															
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)															
<i>Triodia wiseana</i>															
<i>Triraphis mollis</i>															
<i>Triumfetta clementii</i>															
<i>Typha domingensis</i>															
<i>Urochloa occidentalis</i>															
<i>Urochloa pubigera</i>															
<i>Vachellia farnesiana</i>	1%			2%	1%		+								8 ind
<i>Vigna</i> sp. central (M.E. Trudgen 1626)															
<i>Wahlenbergia tumidifructa</i>															1%
<i>Xerochloa laniflora</i>		+							+						
<i>Zaleya galericulata</i>															

APPENDIX H

FLORA INVENTORY

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX H

SPECIES INVENTORY

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Acanthaceae	<i>Dicladantha forrestii</i>	x				x
	<i>Dicladantha</i> sp.					x
	<i>Rostellularia adscendens</i> var. <i>clementii</i>	x				x
	<i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3)			x		x
Aizoaceae	<i>Trianthema glossostigma</i>	x				x
	<i>Trianthema triquetra</i>	x				x
	<i>Trianthema turgidifolia</i>					x
	<i>Trianthema ufoensis</i>					x
	<i>Zaleya galericulata</i>					x
Amaranthaceae	<i>Achyranthes aspera</i>					x
	* <i>Aerva javanica</i>	x		x		x
	<i>Alternanthera angustifolia</i>					x
	<i>Alternanthera denticulata</i>					x
	<i>Alternanthera nana</i>	x				x
	<i>Alternanthera nodiflora</i>	x				x
	<i>Alternanthera</i> sp.		x			
	<i>Amaranthus interruptus</i>	x				x
	<i>Amaranthus undulatus</i>	x				x
	<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>	x				x
	<i>Gomphrena cunninghamii</i>	x				x
	<i>Gomphrena kanisii</i>	x				x
	<i>Ptilotus aervoides</i>	x				x
	<i>Ptilotus astrolasius</i>	x				x
	<i>Ptilotus auriculifolius</i>	x				x
	<i>Ptilotus calostachyus</i>	x			x	x
	<i>Ptilotus carinatus</i>	x				
	<i>Ptilotus clementii</i>	x				x
	<i>Ptilotus fusiformis</i>	x				x
	<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	x				x
	<i>Ptilotus gomphrenoides</i> var. <i>gomphrenoides</i>	x				x
	<i>Ptilotus helipteroides</i>	x				x
	<i>Ptilotus incanus</i>					x
	<i>Ptilotus macrocephalus</i>	x				x
	<i>Ptilotus nobilis</i>	x				x
	<i>Ptilotus obovatus</i> var. <i>obovatus</i>	x			x	x
	<i>Ptilotus polystachyus</i>	x				x

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Amaranthaceae	<i>Ptilotus rotundifolius</i>	x				x
	<i>Ptilotus schwartzii</i>	x				x
Apocynaceae	<i>Marsdenia australis</i>					x
Araliaceae	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	x				x
Asteraceae	<i>Angianthus tomentosus</i>		x			x
	* <i>Bidens bipinnata</i>	x		x		x
	<i>Blumea tenella</i>	x				x
	<i>Calotis plumifera</i>	x				
	<i>Calotis porphyroglossa</i>					x
	<i>Calotis squamigera</i> (P1)					x
	<i>Centipeda minima</i> subsp. <i>macrocephala</i>	x				x
	<i>Chrysocephalum gilesii</i>					x
	* <i>Flaveria trinervia</i>	x				x
	<i>Gnephosis arachnoidea</i>					x
	<i>Peripleura obovata</i>					x
	<i>Pleurocarpaea gracilis</i> (P3)					x
	<i>Pluchea dentex</i>					x
	<i>Pluchea dunlopia</i>					x
	<i>Pluchea ferdinandi-muelleri</i>	x				x
	<i>Pluchea rubelliflora</i>	x	x			x
	<i>Pluchea tetranthera</i>					x
	<i>Pterocaulon serrulatum</i>	x				x
	<i>Pterocaulon</i> sp.					x
	<i>Pterocaulon sphacelatum</i>					x
	<i>Pterocaulon sphaeranthoides</i>	x				x
	<i>Rhodanthe floribunda</i>	x				x
	<i>Rhodanthe margarethae</i>	x				x
	<i>Rutidosis helichrysoides</i>	x				
	* <i>Sonchus oleraceus</i>					x
	<i>Streptoglossa bubakii</i>	x				x
	<i>Streptoglossa cylindriceps</i>					x
	<i>Streptoglossa decurrens</i>					x
	<i>Streptoglossa liatroides</i>	x				x
	<i>Streptoglossa odora</i>					x
Boraginaceae	<i>Ehretia saligna</i> var. <i>saligna</i>	x				x
	* <i>Heliotropium europaeum</i>					x
	<i>Heliotropium curassavicum</i>		x		x	
	<i>Heliotropium heteranthum</i>	x				x
	<i>Heliotropium pachyphyllum</i>	x				
	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	x				x
Brassicaceae	<i>Lepidium echinatum</i>	x				
	<i>Lepidium muelleri-ferdinandii</i>	x				x
	<i>Lepidium oxytrichum</i>					x
	<i>Lepidium pedicellum</i>	x				

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Brassicaceae	<i>Lepidium phlebopetalum</i>	x				x
	<i>Lepidium pholidogynum</i>					x
	<i>Lepidium platypetalum</i>					x
	<i>Stenopetalum decipiens</i>	x				
	<i>Stenopetalum nutans</i>	x				x
Campanulaceae	<i>Wahlenbergia tumidifructa</i>	x				x
Capparaceae	<i>Capparis spinosa</i> var. <i>nummularia</i>					x
	<i>Capparis umbonata</i>					x
Caryophyllaceae	<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>	x				x
	<i>Polycarpaea holtzei</i>	x				x
	<i>Polycarpaea longiflora</i>	x				x
Chenopodiaceae	<i>Atriplex bunburyana</i>					x
	<i>Atriplex codonocarpa</i>					x
	<i>Atriplex flabelliformis</i> (P3)				x	x
	<i>Chenopodium auricomum</i>					x
	<i>Dissocarpus paradoxus</i>					x
	<i>Dysphania kalpari</i>	x				
	<i>Dysphania plantaginella</i>					x
	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	x				x
	<i>Dysphania sphaerosperma</i>					x
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	x				x
	<i>Eremophea spinosa</i>					x
	<i>Maireana amoena</i>					x
	<i>Maireana appressa</i>					x
	<i>Maireana carnosae</i>					x
	<i>Maireana georgei</i>	x				x
	<i>Maireana integra</i>					x
	<i>Maireana luehmannii</i>				x	x
	<i>Maireana planifolia</i>	x				x
	<i>Maireana planifolia</i> x <i>villosa</i>	x				x
	<i>Maireana pyramidata</i>					x
	<i>Maireana</i> sp.				x	
	<i>Maireana thesioides</i>	x				
	<i>Maireana tomentosa</i>					x
	<i>Maireana triptera</i>					x
	<i>Maireana villosa</i>	x				x
	<i>Rhagodia eremaea</i>	x				x
	<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	x		x	x	x
	<i>Salsola australis</i>	x				x
	<i>Sclerolaena beaughleholei</i>					x
	<i>Sclerolaena cornishiana</i>	x				x
	<i>Sclerolaena costata</i>	x				x
	<i>Sclerolaena cuneata</i>		x			x

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Chenopodiaceae	<i>Sclerolaena densiflora</i>				X	X
	<i>Sclerolaena diacantha</i>					X
	<i>Sclerolaena eriacantha</i>					X
	<i>Sclerolaena glabra</i>					X
	<i>Sclerolaena</i> sp.		X		X	
	<i>Sclerolaena recurvicauspis</i>					X
	<i>Sclerolaena tetragona</i>					X
	<i>Tecticornia auriculata</i>		X			X
	<i>Tecticornia globulifera</i> (P1) (formerly <i>T. sp.</i> Fortescue Marsh)				X	X
	<i>Tecticornia indica</i>					X
	<i>Tecticornia indica</i> subsp. <i>bidens</i>		X		X	X
	<i>Tecticornia indica</i> subsp. <i>leiostachya</i>		X		X	X
	<i>Tecticornia medusa</i> (P3) (formerly <i>T. sp.</i> Roy Hill)				X	X
	<i>Tecticornia</i> sp. (sterile)		X			X
	<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106 (P1))				X	X
	<i>Tecticornia</i> sp. <i>Dennys Crossing</i> (K.A. Shepherd & J. English KS 552)				X	X
Cleomaceae	<i>Cleome oxalidea</i>					X
	<i>Cleome viscosa</i>	X	X			X
Commelinaceae	<i>Commelina ensifolia</i>					X
Convolvulaceae	<i>Bonamia media</i>	X				
	<i>Bonamia rosea</i>					X
	<i>Bonamia</i> sp. <i>Dampier</i> (A.A. <i>Mitchell PRP 217</i>)					X
	<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	X				X
	<i>Convolvulus</i> sp.					X
	<i>Cressa australis</i>				X	X
	<i>Duperreya commixta</i>	X				X
	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	X				X
	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	X				X
	<i>Ipomoea coptica</i>					X
	<i>Ipomoea lonchophylla</i>					X
	<i>Ipomoea muelleri</i>	X				X
	<i>Ipomoea plebeia</i>					X
	<i>Ipomoea polymorpha</i>					X
	<i>Operculina aequisejala</i>	X				X
	<i>Polymeria ambigua</i>					X
	<i>Polymeria calycina</i>	X				X
Cucurbitaceae	<i>Austrobryonia pilbarensis</i>					X
	* <i>Citrullus colocynthis</i>	X				X
	<i>Cucumis maderaspatanus</i>	X				X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Cucurbitaceae	* <i>Cucumis melo</i> subsp. <i>agrestis</i>	x				x
Cyperaceae	<i>Bulbostylis barbata</i>	x				x
	<i>Bulbostylis turbinata</i>	x				x
	<i>Cyperus bulbosus</i>					x
	<i>Cyperus cunninghamii</i>					x
	<i>Cyperus iria</i>					x
	<i>Cyperus rigidellus</i>					x
	<i>Cyperus squarrosus</i>					x
	<i>Cyperus vaginatus</i>					x
	<i>Eleocharis geniculata</i>		x			
	<i>Eleocharis papillosa</i> (P3)					x
	<i>Fimbristylis dichotoma</i>	x				x
	<i>Fimbristylis microcarya</i>	x				x
	<i>Fimbristylis simulans</i>	x				x
	<i>Lipocarpha microcephala</i>					x
	<i>Schoenoplectus dissachanthus</i>					x
	<i>Schoenoplectus laevis</i>					x
Elatinaceae	<i>Bergia perennis</i> subsp. <i>obtusifolia</i>					x
Euphorbiaceae	<i>Euphorbia coghlanii</i>	x				x
	<i>Euphorbia australis</i>	x				x
	<i>Euphorbia biconvexa</i>	x				x
	<i>Euphorbia boophthona</i>	x				x
	<i>Euphorbia</i> sp.	x			x	x
	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>					x
Fabaceae	<i>Acacia acradenia</i>	x			x	x
	<i>Acacia adsurgens</i>	x				x
	<i>Acacia</i> aff. <i>aneura</i>					x
	<i>Acacia</i> aff. <i>aneura</i> (grey flat, recurved tips; MET 15828)	x				
	<i>Acacia</i> aff. <i>aneura</i> (long, flat, recurved; FMR 35.3)	x			x	x
	<i>Acacia</i> aff. <i>aneura</i> (narrow fine veined; site 1259)	x			x	x
	<i>Acacia ampliceps</i>		x			x
	<i>Acacia ancistrocarpa</i>	x			x	x
	<i>Acacia aneura</i>					x
	<i>Acacia aneura</i> (flat curved; MET 15548)	x				
	<i>Acacia aneura</i> (grey bushy form; MET 15 732)	x				x
	<i>Acacia aneura</i> var. <i>intermedia</i>					x
	<i>Acacia aneura</i> var. <i>longicarpa</i>	x				
	<i>Acacia aneura</i> var. <i>microcarpa</i>				x	
	<i>Acacia ayersiana</i>	x			x	x
	<i>Acacia bivenosa</i>	x			x	x
	<i>Acacia catenulata</i>	x				

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Fabaceae	<i>Acacia colei</i> var. <i>colei</i>					X
	<i>Acacia coriacea</i> subsp. <i>pendens</i>	X			X	X
	<i>Acacia cowleana</i>					X
	<i>Acacia inaequilatera</i>				X	X
	<i>Acacia maitlandii</i>	X			X	X
	<i>Acacia marramamba</i>	X			X	X
	<i>Acacia monticola</i>	X				X
	<i>Acacia paraneura</i>	X				X
	<i>Acacia pruinocarpa</i>	X			X	X
	<i>Acacia pyrifolia</i>	X			X	X
	<i>Acacia rhodophloia</i>	X			X	X
	<i>Acacia sericophylla</i>		X			X
	<i>Acacia sibirica</i>	X				X
	<i>Acacia</i> sp.					X
	<i>Acacia synchronicia</i>	X	X		X	X
	<i>Acacia tenuissima</i>					X
	<i>Acacia tetragonophylla</i>	X			X	X
	<i>Acacia trachycarpa</i>	X				X
	<i>Acacia tumida</i> var. <i>pilbarensis</i>	X			X	X
	<i>Acacia xiphophylla</i>	X				X
	<i>Aeschynomene indica</i>					X
	<i>Alysicarpus muelleri</i>	X				X
	<i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>	X				X
	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	X				X
	<i>Cullen cinereum</i>	X	X			X
	<i>Cullen leucanthum</i>	X				X
	<i>Glycine canescens</i>	X				X
	<i>Indigofera colutea</i>	X				X
	<i>Indigofera georgei</i>	X				
	<i>Indigofera linifolia</i>	X				
	<i>Indigofera linnaei</i>	X				
	<i>Indigofera monophylla</i>	X				X
	<i>Indigofera</i> sp.					X
	<i>Indigofera trita</i>	X				
	<i>Isotropis atropurpurea</i>	X				X
	<i>Lotus cruentus</i>					X
	<i>Neptunia dimorphantha</i>	X				X
	<i>Petalostylis cassioides</i>	X				
	<i>Petalostylis labicheoides</i>	X			X	X
	<i>Rhynchosia minima</i>					X
	<i>Senna artemisioides</i> subsp. <i>helmsii</i>	X				X
	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	X				X
	<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (thinly sericeous)	X				X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Fabaceae	<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	x				x
	<i>Senna artemisioides</i> subsp. <i>x sturtii</i>	x				
	<i>Senna charlesiana</i>	x				
	<i>Senna glaucifolia</i>	x			x	x
	<i>Senna glaucifolia</i> x <i>ferraria</i>					x
	<i>Senna glutinosa</i>	x				
	<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>					x
	<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	x			x	x
	<i>Senna glutinosa</i> subsp. <i>glutinosa</i> x <i>stricta</i>	x				x
	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	x				x
	<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	x			x	x
	<i>Senna glutinosa</i> subsp. <i>x luerssenii</i> x <i>S. stricta</i>					x
	<i>Senna hamersleyensis</i>	x				x
	<i>Senna hamersleyensis</i> x sp. <i>Karijini</i> (M.E. Trudgen 10392)					x
	<i>Senna notabilis</i>	x				x
	<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i>					x
	<i>Senna sericea</i>					x
	<i>Senna</i> sp.					x
	<i>Senna</i> sp. <i>Karijini</i> (M.E. Trudgen 10392)					x
	<i>Senna</i> sp. <i>Meekatharra</i> (E. Bailey 1-26)	x				x
	<i>Senna stricta</i>	x				x
	<i>Senna symonii</i>	x				
	<i>Senna venusta</i>					x
	<i>Sesbania cannabina</i>	x	x			x
	<i>Swainsona formosa</i>	x				
	<i>Swainsona kingii</i>	x				x
	<i>Swainsona leana</i>	x				
	<i>Swainsona tanamiensis</i>					x
	<i>Tephrosia clementii</i>	x				x
	<i>Tephrosia</i> sp. <i>Fortescue</i> (A.A. Mitchell 606) (formerly <i>T. densa</i>)					x
	<i>Tephrosia rosea</i>					x
	<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186) (formerly <i>T. rosea</i> var. <i>glabrior</i>)	x				x
	<i>Tephrosia</i> sp.					x
	<i>Tephrosia oxalidea</i> (formerly <i>T. sp.</i> Cathedral Gorge)					x
	<i>Tephrosia supina</i>					x
	* <i>Vachellia farnesiana</i>			x		x

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Fabaceae	<i>Vigna</i> sp. central (M.E. Trudgen 1626) (P2)					X
Frankeniaceae	<i>Frankenia ambita</i>		X		X	X
	<i>Frankenia irregularis</i>		X			X
	<i>Frankenia setosa</i>					X
Gentianaceae	<i>Schenkia clementii</i>		X			
Goodeniaceae	<i>Dampiera candidans</i>	X				X
	<i>Dampiera cinerea</i>	X				
	<i>Goodenia forrestii</i>					X
	<i>Goodenia lamprosperma</i>					X
	<i>Goodenia microptera</i>	X				X
	<i>Goodenia muelleriana</i>	X				X
	<i>Goodenia nuda</i> (P4)	X		X		X
	<i>Goodenia prostrata</i>	X				X
	<i>Goodenia</i> sp.	X				X
	<i>Goodenia stobbsiana</i>	X				X
	<i>Goodenia triodiophila</i>	X				X
	<i>Scaevola spinescens</i>	X	X		X	X
Haloragaceae	<i>Haloragis gossei</i>	X				X
Lamiaceae	<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	X				X
	<i>Dicrastylis cordifolia</i>	X				
Loranthaceae	<i>Amyema fitzgeraldii</i>	X				X
Lythraceae	<i>Ammannia baccifera</i>					X
	<i>Ammannia multiflora</i>	X				X
Malvaceae	<i>Abutilon amplum</i>					X
	<i>Abutilon cryptopetalum</i>	X				X
	<i>Abutilon cunninghamii</i>	X				X
	<i>Abutilon fraseri</i>	X				X
	<i>Abutilon lepidum</i>	X				X
	<i>Abutilon macrum</i>	X				X
	<i>Abutilon otocarpum</i>	X				X
	<i>Abutilon oxycarpum</i> subsp. <i>Prostrate</i> (A.A. Mitchell PRP 1266)	X				X
	<i>Abutilon</i> sp.					X
	<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	X				X
	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	X				X
	<i>Corchorus parviflorus</i>	X				X
	<i>Corchorus</i> sp.					X
	<i>Corchorus tridens</i>	X				X
	<i>Gossypium australe</i> (Burrup Peninsula form)					X
	<i>Gossypium robinsonii</i>	X				X
	<i>Hibiscus burtonii</i>	X				X
	<i>Hibiscus coatesii</i>					X
	<i>Hibiscus gardneri</i>	X				X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Malvaceae	<i>Hibiscus goldsworthii</i>					X
	<i>Hibiscus</i> sp.					X
	<i>Hibiscus sturtii</i>	X				X
	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	X				X
	<i>Hibiscus sturtii</i> var. <i>grandiflorus</i>					X
	<i>Hibiscus sturtii</i> var. <i>platychlamys</i>	X				X
	<i>Hibiscus sturtii</i> var. <i>truncatus</i>					X
	<i>Hibiscus verdcourtii</i>	X				X
	<i>Keraudrenia nephrosperma</i>	X			X	X
	<i>Lawrenzia densiflora</i>					X
	<i>Malvaceae</i> sp.					X
	* <i>Malvastrum americanum</i>					X
	<i>Melhanianthus oblongifolia</i>	X				
	<i>Androcalva luteiflora</i>	X				X
	<i>Sida arenicola</i>					X
	<i>Sida clementii</i>	X				
	<i>Sida echinocarpa</i>					X
	<i>Sida ectogama</i>					X
	<i>Sida fibulifera</i>	X				X
	<i>Sida platycalyx</i>	X				X
	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>					X
	<i>Sida</i> sp.					X
	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	X				X
	<i>Sida</i> sp. <i>excedentifolia</i> (J.L. Egan 1925)	X				X
	<i>Sida</i> sp. Pilbara (ferruginous form)					X
	<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)					X
	<i>Sida spinosa</i>					X
	<i>Triumfetta clementii</i>					X
Marsileaceae	<i>Marsilea hirsuta</i>					X
	<i>Marsilea drummondii</i>		X			
Molluginaceae	<i>Mollugo molluginea</i>	X				X
Myrtaceae	<i>Calytrix carinata</i>				X	X
	<i>Corymbia candida</i> subsp. <i>candida</i>	X				X
	<i>Corymbia candida</i> subsp. <i>dipsodes</i>	X			X	X
	<i>Corymbia deserticola</i> subsp. <i>deserticola</i>					X
	<i>Corymbia ferriticola</i>				X	
	<i>Corymbia hamersleyana</i>	X			X	X
	<i>Eucalyptus gamophylla</i>					X
	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	X			X	X
	<i>Eucalyptus victrix</i>	X			X	X
	<i>Melaleuca glomerata</i>				X	X
	<i>Melaleuca linophylla</i>					X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Myrtaceae	<i>Melaleuca xerophila</i>					X
Nyctaginaceae	<i>Boerhavia burbridgeana</i>					X
	<i>Boerhavia coccinea</i>	X				X
	<i>Boerhavia paludosa</i>					X
	<i>Boerhavia repleta</i>	X				X
Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>	X				X
Orobanchaceae	<i>Striga curviflora</i>	X				
	<i>Striga squamigera</i>					X
Papaveraceae	* <i>Argemone ochroleuca</i>	X		X		X
	* <i>Argemone mexicana</i>			X		
Phrymaceae	<i>Mimulus gracilis</i>		X			X
	<i>Mimulus repens</i>					X
	<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)		X			X
Phyllanthaceae	<i>Notoleptopus decaisnei</i> var. <i>decaisnei</i>	X				
	<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)					X
	<i>Phyllanthus aridus</i> (P3)			X		
	<i>Phyllanthus erwinii</i>	X				X
	<i>Phyllanthus maderaspatensis</i>	X				X
	<i>Sauropus</i> sp. Central Ranges (D.J. Edinger et. al. 2420)	X				
Plantaginaceae	<i>Stemodia grossa</i>	X				X
	<i>Stemodia viscosa</i>					X
Plumbaginaceae	<i>Muellerolimon salicorniaceum</i>		X		X	X
	<i>Plumbago zeylanica</i>					X
Poaceae	<i>Amphipogon sericeus</i>	X			X	X
	<i>Aristida contorta</i>	X			X	X
	<i>Aristida holathera</i> var. <i>holathera</i>	X				X
	<i>Aristida inaequiglumis</i>	X				X
	<i>Aristida latifolia</i>	X				X
	<i>Aristida obscura</i>	X				X
	<i>Aristida pruinosa</i>					X
	<i>Aristida</i> sp.				X	X
	<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>					X
	<i>Bothriochloa ewartiana</i>	X				X
	<i>Brachyachne convergens</i>	X				X
	<i>Brachyachne prostrata</i>					X
	* <i>Cenchrus ciliaris</i>	X		X		X
	* <i>Cenchrus setiger</i>	X		X		X
	<i>Chloris pectinata</i>	X				X
	* <i>Chloris virgata</i>					X
	<i>Chrysopogon fallax</i>	X				X
	<i>Cymbopogon ambiguus</i>	X			X	X
	<i>Cymbopogon obtectus</i>	X				X
	<i>Cymbopogon procerus</i>	X				X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Poaceae	<i>Cymbopogon</i> sp.					X
	<i>Dactyloctenium radulans</i>	X				X
	<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	X				X
	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>					X
	<i>Digitaria brownii</i>	X				X
	<i>Digitaria ctenantha</i>	X				X
	* <i>Echinochloa colona</i>			X		X
	<i>Elytrophorus spicatus</i>					X
	<i>Enneapogon caeruleus</i>	X				X
	<i>Enneapogon lindleyanus</i>	X				X
	<i>Enneapogon polyphyllus</i>	X				X
	<i>Enneapogon robustissimus</i>	X				X
	<i>Enteropogon ramosus</i>	X	X			X
	<i>Eragrostis cumingii</i>	X				X
	* <i>Eragrostis curvula</i>					X
	<i>Eragrostis desertorum</i>					X
	<i>Eragrostis dielsii</i>		X			X
	<i>Eragrostis elongata</i>					X
	<i>Eragrostis eriopoda</i>	X				X
	<i>Eragrostis leptocarpa</i>	X	X			X
	<i>Eragrostis pergracilis</i>	X				X
	<i>Eragrostis setifolia</i>	X				
	<i>Eragrostis tenellula</i>	X				X
	<i>Eragrostis xerophila</i>					X
	<i>Eriachne benthamii</i>					X
	<i>Eriachne flaccida</i>	X				
	<i>Eriachne helmsii</i>	X				X
	<i>Eriachne lanata</i>	X				X
	<i>Eriachne mucronata</i>	X				X
	<i>Eriachne obtusa</i>	X				
	<i>Eriachne pulchella</i> subsp. <i>dominii</i>	X				X
	<i>Eriachne pulchella</i> subsp. <i>pulchella</i>					X
	<i>Eriachne</i> sp.		X			
	<i>Eriachne tenuiculis</i>	X				X
	<i>Eulalia aurea</i>	X				
	<i>Iseilema dolichotrichum</i>					X
	<i>Iseilema eremaeum</i>	X				
	<i>Iseilema macrathetrum</i>					X
	<i>Iseilema membranaceum</i>	X				X
	<i>Iseilema</i> sp.					X
	<i>Iseilema vaginiflorum</i>	X				X
	<i>Leptochloa fusca</i> subsp. <i>fusca</i>					X
	<i>Panicum decompositum</i>	X				X
	<i>Panicum effusum</i>	X				X
	<i>Panicum laevinode</i>	X				X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Poaceae	<i>Paraneurachne muelleri</i>	x				x
	<i>Paspalidium clementii</i>	x				x
	<i>Paspalidium tabulatum</i>					x
	<i>Perotis rara</i>	x				x
	<i>Schizachyrium fragile</i>	x				x
	<i>Setaria dielsii</i>	x				x
	* <i>Setaria verticillata</i>	x		x		x
	<i>Sporobolus australasicus</i>	x	x			x
	<i>Sporobolus virginicus</i>					x
	<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3)					x
	<i>Themeda triandra</i>	x			x	x
	<i>Tragus australianus</i>	x				x
	<i>Triodia basedowii</i>	x			x	x
	<i>Triodia epactia</i>	x			x	x
	<i>Triodia epactia/pungens</i>					x
	<i>Triodia longiceps</i>	x			x	x
	<i>Triodia pungens</i>					x
	<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)					x
	<i>Triodia wiseana</i>					x
	<i>Triraphis mollis</i>	x				x
	<i>Urochloa occidentalis</i>					x
	<i>Urochloa pubigera</i>					x
	<i>Xerochloa laniflora</i>					x
Polygalaceae	<i>Polygala isingii</i>	x				x
Polygonaceae	* <i>Acetosa vesicaria</i>	x		x		x
	<i>Muehlenbeckia florulenta</i>					x
Portulacaceae	<i>Calandrinia ptychosperma</i>	x				x
	<i>Calandrinia</i> sp.					x
	<i>Calandrinia stagnensis</i>					x
	<i>Portulaca cyclophylla</i>					x
	* <i>Portulaca oleracea</i>	x				x
	<i>Portulaca pilosa</i>	x				x
Primulaceae	<i>Samolus repens</i> var. <i>floribundus</i>				x	x
	<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)					x
Proteaceae	<i>Grevillea berryana</i>	x				x
	<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>				x	
	<i>Grevillea</i> sp.	x				
	<i>Grevillea wickhamii</i>				x	
	<i>Grevillea wickhamii</i> subsp. <i>aprica</i>				x	
	<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	x				x
	<i>Hakea chordophylla</i>	x			x	x
	<i>Hakea lorea</i> subsp. <i>lorea</i>	x				x

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Pteridaceae	<i>Cheilanthes austrotenuifolia</i>					X
	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	X				X
Rubiaceae	<i>Oldenlandia crouchiana</i>					X
	<i>Psydrax latifolia</i>	X			X	X
	<i>Psydrax suaveolens</i>	X				X
	<i>Spermacoce brachystema</i>	X				X
	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>					X
Santalaceae	<i>Anthobolus leptomerioides</i>	X				X
	<i>Santalum lanceolatum</i>	X				X
Sapindaceae	<i>Atalaya hemiglauca</i>	X				X
	<i>Dodonaea coriacea</i>	X				X
	<i>Dodonaea pachyneura</i>					X
	<i>Dodonaea petiolaris</i>	X			X	X
Scrophulariaceae	<i>Eremophila cuneifolia</i>	X				X
	<i>Eremophila forrestii</i>				X	
	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	X				X
	<i>Eremophila lanceolata</i>	X				X
	<i>Eremophila latrobei</i>					X
	<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	X				X
	<i>Eremophila latrobei</i> subsp. <i>glabra</i>					X
	<i>Eremophila latrobei</i> x <i>forrestii</i>					X
	<i>Eremophila longifolia</i>	X				X
	<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>					X
	<i>Eremophila spongiocarpa</i> (P1)		X		X	X
	<i>Eremophila youngii</i> subsp. <i>lepidota</i> (P4)					X
Solanaceae	<i>Nicotiana benthamiana</i>					X
	<i>Nicotiana heterantha</i> (P1)					X
	<i>Nicotiana occidentalis</i>		X			
	<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>	X			X	X
	<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>					X
	<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>					X
	<i>Nicotiana</i> sp.					X
	<i>Nicotiana simulans</i>	X				
	<i>Solanum horridum</i>	X				X
	<i>Solanum lasiophyllum</i>	X				X
	<i>Solanum phlomoides</i>	X				X
	<i>Solanum</i> sp.					X
	<i>Solanum sturtianum</i>	X				X
Typhaceae	<i>Typha domingensis</i>		X			X
Violaceae	<i>Hybanthus aurantiacus</i>	X				X
Zygophyllaceae	<i>Tribulus astrocarpus</i>	X				X
	<i>Tribulus hirsutus</i>					X

Family	Taxa	Biota 2004a	Mattiske 2007	FMG Database 2011	ENV 2010a	ENV Surveys 2011 to 2013
Zygophyllaceae	<i>Tribulus occidentalis</i>					x
	<i>Tribulus suberosus</i>	x			x	x
	* <i>Tribulus terrestris</i>					x
Total number taxa	541 taxa across all studies	304	33	14	68	485
Total number genera	181 genera across all studies	127	25	14	35	170
Total number families	54 families across all studies	43	17	10	20	53

APPENDIX I

LOCATIONS OF CONSERVATION SIGNIFICANT FLORA

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX I

LOCATION OF CONSERVATION SIGNIFICANT FLORA

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Calotis squamigera</i> (P1)	N/A	765284	7521022					X
<i>Eremophila spongiocarpa</i> (P1)	N/A	769127	7517702		X			
	N/A	774820	7516480					X
	N/A	784464	7510373					X
	N/A	776581	7515186					X
	N/A	782229	7513606					X
	N/A	772549	7516938					X
	52	772532	7516328		X			
<i>Nicotiana heterantha</i> (P1)	N/A	775849	7517815					X
	N/A	775565	7515402					X
	N/A	772528	7515878					X
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer <i>et al.</i> KS 1063) (P1)	CD01	772554	7514997				X	
	CD02	783341	7506483				X	
	CD03	783577	7509250				X	
	CD04	770611	7515987				X	
	CD08	769826	7515577				X	
	CD14	780506	7507012				X	
	CD15	780734	7509500				X	
	CD16	781968	7508263				X	
<i>Tecticornia</i> sp. Fortescue Marsh (K.A. Shepherd <i>et al.</i> KS 1055) (P1)	CD01	772554	7514997				X	
	CD04	770611	7515987				X	
	CD05	768382	7514715				X	
<i>Vigna</i> sp. central (M.E. Trudgen 1626) (P2)	XB44	760824	7526610					X
	XB69	762583	7521925					X
<i>Atriplex flabelliformis</i> (P3)	CD13	778717	7508563				X	
<i>Phyllanthus aridus</i> (P3)	N/A	781723	7518740			X		
	N/A	781703	7518746			X		
	N/A	781722	7518749			X		
	N/A	781708	7518773			X		
	N/A	781747	7518917			X		
	N/A	781752	7518923			X		
	N/A	781757	7518930			X		
	N/A	781753	7518940			X		
	N/A	777205	7521381			X		
	N/A	777222	7521385			X		

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Phyllanthus aridus</i> (P3)	N/A	776948	7521408			X		
	N/A	777202	7521501			X		
	N/A	775513	7524219			X		
	N/A	775513	7524219			X		
	N/A	775611	7524315			X		
	N/A	775611	7524315			X		
	N/A	775564	7524337			X		
	N/A	775564	7524337			X		
	N/A	775569	7524344			X		
	N/A	775651	7524382			X		
	N/A	775600	7524387			X		
	N/A	775600	7524387			X		
	N/A	775663	7524436			X		
	N/A	775663	7524436			X		
	N/A	775656	7524458			X		
	N/A	775656	7524458			X		
	N/A	775659	7524473			X		
	N/A	775677	7524491			X		
	N/A	775677	7524491			X		
	N/A	775700	7524542			X		
	N/A	775700	7524542			X		
	N/A	775727	7524562			X		
	N/A	775744	7524582			X		
	N/A	775750	7524605			X		
	N/A	775750	7524605			X		
	N/A	775760	7524621			X		
	N/A	775754	7524633			X		
	N/A	775754	7524633			X		
	N/A	775753	7524652			X		
	N/A	775760	7524669			X		
	N/A	775773	7524682			X		
	N/A	775773	7524682			X		
	N/A	775776	7524712			X		
	N/A	775776	7524712			X		
	N/A	775780	7524729			X		
	N/A	775835	7524744			X		
	N/A	775835	7524744			X		
	N/A	775863	7524753			X		
	N/A	775863	7524753			X		
	N/A	773731	7525142			X		
	N/A	773746	7525267			X		
	N/A	773925	7525279			X		
	N/A	775049	7526601			X		
	N/A	775056	7526654			X		
	N/A	775042	7526725			X		

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Phyllanthus aridus</i> (P3)	N/A	775045	7526764			X		
	N/A	775621	7526989			X		
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	CDR34	790864	7518008				X	
	N/A	793562	7521247			X		
	N/A	793883	7521143			X		
	N/A	798836	7519014					X
	N/A	783765	7523623					X
	N/A	758342	7523573					X
	N/A	785527	7516889					X
	N/A	791308	7520072					X
	N/A	784731	7519039					X
	N/A	781614	7523576					X
	N/A	783615	7519452					X
	N/A	786838	7520342					X
	N/A	787090	7520324					X
	N/A	787197	7520352					X
	N/A	787343	7520319					X
	N/A	787440	7520201					X
	N/A	786837	7520341					X
	N/A	786749	7520320					X
	N/A	786545	7520362					X
	N/A	786388	7520187					X
	N/A	786325	7520135					X
	N/A	786296	7519858					X
	N/A	786296	7519752					X
	N/A	786301	7519675					X
	N/A	786248	7519509					X
	N/A	786216	7519340					X
	N/A	786174	7519190					X
	N/A	786108	7519109					X
	N/A	786041	7518972					X
	N/A	786087	7518806					X
	N/A	786079	7518531					X
	N/A	786008	7518377					X
	N/A	786003	7518259					X
	N/A	785982	7518151					X
	N/A	786000	7517981					X
	N/A	785980	7517831					X
	N/A	785964	7517763					X
	N/A	785925	7517686					X
	N/A	785927	7517651					X
	N/A	785915	7517532					X
	N/A	785910	7517505					X
	N/A	785880	7517381					X
	N/A	785822	7517286					X

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	N/A	785859	7517277					X
	N/A	785881	7517267					X
	N/A	785968	7517219					X
	N/A	786141	7517189					X
	N/A	786299	7517220					X
	N/A	786343	7517272					X
	N/A	786420	7517284					X
	N/A	786587	7517208					X
	N/A	786660	7517156					X
	N/A	786952	7517152					X
	N/A	787000	7517156					X
	N/A	787089	7517218					X
	N/A	787105	7517248					X
	N/A	787278	7517401					X
	N/A	787350	7517406					X
	N/A	787439	7517593					X
	N/A	787448	7517708					X
	N/A	787471	7517786					X
	N/A	787502	7517996					X
	N/A	787598	7518546					X
	N/A	787598	7518639					X
	N/A	787577	7518998					X
	N/A	787603	7519123					X
	N/A	787601	7519372					X
	N/A	787611	7519643					X
	N/A	787646	7519903					X
	N/A	787767	7520077					X
	N/A	792877	7519561					X
	N/A	777387	7518794					X
	N/A	782426	7517558					X
	N/A	782526	7517391					X
	N/A	782533	7517377					X
	N/A	782540	7517360					X
	N/A	782564	7517346					X
	N/A	782597	7517326					X
	N/A	791482	7518362					X
	N/A	788068	7520012					X
	N/A	788165	7519988					X
	N/A	788338	7519769					X
	N/A	788436	7519494					X
	N/A	788068	7520011					X
	N/A	788164	7519987					X
	N/A	788337	7519768					X
	N/A	788436	7519493					X
	N/A	788379	7519108					X

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	N/A	788411	7518709					X
	N/A	788410	7518656					X
	N/A	788447	7518365					X
	N/A	788524	7517999					X
	N/A	788535	7517902					X
	N/A	788591	7517613					X
	N/A	788702	7517677					X
	N/A	789019	7517820					X
	N/A	789291	7517910					X
	N/A	789556	7518027					X
	N/A	789642	7518066					X
	N/A	789905	7518133					X
	N/A	789893	7518384					X
	N/A	789899	7518533					X
	N/A	789977	7518654					X
	N/A	790056	7518896					X
	N/A	789907	7519325					X
	N/A	789945	7519553					X
	N/A	789773	7519721					X
	N/A	789675	7519733					X
	N/A	789283	7519909					X
	N/A	788572	7520076					X
	N/A	788393	7520090					X
	N/A	793464	7518614					X
	N/A	793601	7518771					X
	N/A	793813	7519070					X
	N/A	793793	7519146					X
	N/A	793294	7519486					X
	N/A	793083	7519599					X
	N/A	800874	7518454					X
	N/A	800944	7518405					X
	N/A	801184	7518315					X
	N/A	801232	7518319					X
	N/A	801304	7518348					X
	N/A	801320	7518353					X
	N/A	801329	7518244					X
	N/A	800882	7518681					X
	N/A	800833	7518688					X
	N/A	800704	7518843					X
	N/A	782872	7517472					X
	N/A	782895	7517547					X
	N/A	782892	7517584					X
	N/A	782978	7517706					X
	N/A	782957	7517935					X
	N/A	782925	7517992					X

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	N/A	782912	7518021					X
	N/A	782799	7518095					X
	N/A	782711	7518199					X
	N/A	782527	7518157					X
	N/A	782364	7517982					X
	N/A	788379	7519108					X
	N/A	788592	7517614					X
	N/A	793464	7518615					X
	N/A	797096	7520467					X
<i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3)	N/A	783473	7525118			X		
	XB18	787295	7515849					X
	XB20	790394	7516431					X
<i>Tecticornia medusa</i> (P3)	CD02	783341	7506483				X	
	CD13	778717	7508563				X	
	CD14	780506	7507012				X	
	CD16	781968	7508263				X	
	CD18	775206	7510512				X	
<i>Eremophila youngii</i> subsp. <i>lepidota</i> (P4)	N/A	778214	7514573					X
	N/A	785145	7515144					X
	N/A	784464	7510373					X
	N/A	776581	7515186					X
<i>Goodenia nuda</i> (P4)	N/A	787661	7516047			X		
	N/A	790768	7516562			X		
	N/A	790840	7516656			X		
	N/A	790844	7516671			X		
	N/A	781935	7517660			X		
	N/A	782177	7518767			X		
	N/A	781560	7518842			X		
	N/A	780767	7519089			X		
	N/A	780334	7519226			X		
	N/A	780869	7519280			X		
	N/A	780023	7519305			X		
	N/A	780287	7519375			X		
	N/A	780212	7520206			X		
	N/A	777776	7522116			X		
	N/A	792845	7518473			X		
	N/A	782205	7519047			X		
	N/A	780728	7519882			X		
	N/A	780328	7523285			X		
	N/A	782767	7523554			X		
	N/A	789750	7516314	X				
	N/A	790394	7516431					X
	N/A	758808	7526463					X
	N/A	790835	7520126					X
	N/A	768157	7523093					X

Taxa	Site Number	Easting	Northing	Survey				
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV (2010a)	ENV Surveys 2011 to 2013
<i>Goodenia nuda</i> (P4)	N/A	768313	7525397					X
	N/A	763883	7525613					X
	N/A	763883	7525613					X
	N/A	769809	7523903					X

APPENDIX J

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 18/03/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Julia Mattner		PHONE: 9214 6100	
ROLE: Principal Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7519014		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: 798836		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB10.09</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: 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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Rostellularia adscendens var. latifolia (R.Br) R.M.Barker</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>20/03/2011</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE : _____	<u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): _____
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		Method used:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required)	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	No. satellites: _____	Map used: _____
WGS84 <input type="checkbox"/>	Lat / Northing: <u>7515849</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
Unknown <input type="checkbox"/>	Long / Easting: <u>787295</u>		
	ZONE: <u>50K</u>		
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
		Shire road reserve <input type="checkbox"/>	
		Other Crown reserve <input type="checkbox"/>	
		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>		Area observed (m ²): _____
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>		Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:	
Alive	<u>+</u>	
Dead		
		Area of pop (m ²): _____
QUADRATS PRESENT: No. <u>XB18.09</u> Size <u>50x50 m</u>		Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive		
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/>		
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent 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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>	Gravel _____				
Closed depression <input type="checkbox"/>	Specific Landform Element: _____				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Isolated Trees (Corymbia ferritcola subsp. ferritcola)
2. Tall Open Shrubland (Acacia aff. aneura (long, flat, recurved; FMR 35.3), A. pruinocarpa and Atalaya hemiglaucula)
3. Sparse Tussock Grassland (Cenchrus ciliaris, Chloris pectinata and Sporobolus australasicus)
4. Low Sparse Herbland (*Cucumis melo subsp. agrestis, Corchorus tridens and *Bidens bipinnata)

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3) and A. ayersiana)
2. Tall Sparse Shrubland (Acacia aneura (grey bushy form; MET 15 732)
3. Low Sparse Shrubland (Ptilotus schwartzii)
4. Low Isolated Hummock Grasses (Triodia sp. Shovelanna Hill (S. van Leeuwen 3835))

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>20/03/2011</u>		CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Julia Mattner</u>		PHONE: <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input type="checkbox"/> Unknown <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/> Lat / Northing: <u>7516431</u> Long / Easting: <u>790394</u> ZONE: <u>50K</u>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE:					
Nature reserve <input type="checkbox"/> National park <input type="checkbox"/> Conservation park <input type="checkbox"/>		Timber reserve <input type="checkbox"/> State forest <input type="checkbox"/> Water reserve <input type="checkbox"/>		Private property <input type="checkbox"/> Pastoral lease <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Rail reserve <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____								
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____								
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>								
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>								
TOTAL POP'N STRUCTURE:								
	Mature:	Juveniles:	Seedlings:	Totals:				
Alive	+							
Dead								
Area of pop (m ²): _____								
Note: Pls record count as numbers (not percentages) for database.								
QUADRATS PRESENT: No. <u>XB20.02</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____								
Summary Quad. Totals: Alive								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> </tr> </table>								
REPRODUCTIVE STATE:								
Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3) , Hakea lorea and A. tetragonophylla) over
2. Low Sparse Shrubland (*Malvastrum americanum, Tephrosia rosea and Ptilotus obovatus
3. Sparse Tussock Grassland (*Cenchrus ciliaris, Sporobolus australasicus and Chrysopogon fallax)
4. Low Open Herbland (Ipomoea muelleri, *Cucumis melo and *Citrullus colocynthis, Corchorus tridens and *Bidens bipinnata Low Open Herbland

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire Age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 18/03/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Julia Mattner		PHONE: 9214 6100	
ROLE: Principal Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7519014		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: 798836		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>	
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB10.09</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: 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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3) and A. ayersiana)
2. Tall Sparse Shrubland (Acacia aneura (grey bushy form; MET 15 732)
3. Low Sparse Shrubland (Ptilotus schwartzii)
4. Low Isolated Hummock Grasses (Triodia sp. Shovelanna Hill (S. van Leeuwen 3835))

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Rostellularia adscendens var. latifolia (R.Br) R.M.Barker</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>20/03/2011</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
		Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7515849</u>		GPS <input checked="" type="checkbox"/>
WGS84 <input type="checkbox"/>	Long / Easting: <u>787295</u>		Differential GPS <input type="checkbox"/>
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>		Map <input type="checkbox"/>
		No. satellites: _____	Map used: _____
		Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
		Shire road reserve <input type="checkbox"/>	
		Other Crown reserve <input type="checkbox"/>	
		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/>		Partial survey <input type="checkbox"/>	Full survey <input checked="" type="checkbox"/>	Area observed (m ²): _____
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input type="checkbox"/>		Extrapolation <input type="checkbox"/>	Estimate <input checked="" type="checkbox"/>	Count method: _____
		(Refer to field manual for list)		
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
		Area of pop (m ²): _____		
		Note: Pls record count as numbers (not percentages) for database.		
QUADRATS PRESENT:	No. <u>XB18.09</u>	Size <u>50x50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" 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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>	Gravel _____				
Closed depression <input type="checkbox"/>	Specific Landform Element: _____				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Isolated Trees (Corymbia ferritcola subsp. ferritcola)
2. Tall Open Shrubland (Acacia aff. aneura (long, flat, recurved; FMR 35.3), A. pruinocarpa and Atalaya hemiglaucula)
3. Sparse Tussock Grassland (Cenchrus ciliaris, Chloris pectinata and Sporobolus australasicus)
4. Low Sparse Herbland (*Cucumis melo subsp. agrestis, Corchorus tridens and *Bidens bipinnata)

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>20/03/2011</u>		CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Julia Mattner</u>		PHONE: <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: <u>7516431</u>		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: <u>790394</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: <u>50K</u>			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB20.02</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" 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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3) , Hakea lorea and A. tetragonophylla) over
2. Low Sparse Shrubland (*Malvastrum americanum, Tephrosia rosea and Ptilotus obovatus)
3. Sparse Tussock Grassland (*Cenchrus ciliaris, Sporobolus australasicus and Chrysopogon fallax)
4. Low Open Herbland (Ipomoea muelleri, *Cucumis melo and *Citrullus colocynthis, Corchorus tridens and *Bidens bipinnata Low Open Herbland

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

Fire Age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Submitter of Record: Damian Buller

Role: Botanist

Signed: _____

Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Rostellularia adscendens var. latifolia</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>20/03/2011</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh.</u>	
Reserve No.: _____	
DEC DISTRICT: <u>Pilbara</u>	LGA: _____ Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7516431</u>
WGS84 <input type="checkbox"/>	Long / Easting: <u>790394</u>
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: _____ Map used: _____	
Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____	
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____	
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)	
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:
Alive	<u>+</u>
Dead	
Area of pop (m ²): _____	
Note: Pls record count as numbers (not percentages) for database.	
QUADRATS PRESENT:	No. <u>XB20.05</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive	
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" 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			
• Weeds			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tall Sparse Shrubland (Acacia aff. aneura (long, flat, recurved; FMR 35.3) , Hakea lorea and A. tetragonophylla) over
2. Low Sparse Shrubland (*Malvastrum americanum, Tephrosia rosea var. glabrior and Ptilotus obovatus
3. Sparse Tussock Grassland (*Cenchrus ciliaris, Sporobolus australasicus and Chrysopogon fallax)
4. Low Open Herbland (Ipomoea muelleri, *Cucumis melo and *Citrullus colocynthis, Corchorus tridens and *Bidens bipinnata)

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Submitter of Record: Damian Buller

Role: Botanist

Signed: _____

Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)	TPFL Pop. No.: _____
OBSERVATION DATE: 21/03/2011	CONSERVATION STATUS: P3 <input type="checkbox"/> New population <input type="checkbox"/>
OBSERVER/S: Julia Mattner	PHONE: 9214 6100
ROLE: Principal Botanist	ORGANISATION: ENV. Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)	
Reserve No.: _____	
DEC DISTRICT: Pilbara	LGA: _____ Land manager present: <input type="checkbox"/>
DATUM: GDA94 / MGA94 <input checked="" type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input type="checkbox"/> Unknown <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: 7520072 Long / Easting: 791308 ZONE: 50K METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE: Nature reserve <input type="checkbox"/> Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/> National park <input type="checkbox"/> State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Conservation park <input type="checkbox"/> Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m²): _____															
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m²: _____															
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)															
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>																
TOTAL POP'N STRUCTURE:																
<table border="1"> <thead> <tr> <th></th> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td>Alive</td> <td>1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dead</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Alive	1				Dead					Area of pop (m²): _____ Note: Pls record count as numbers (not percentages) for database.
	Mature:	Juveniles:	Seedlings:	Totals:												
Alive	1															
Dead																
QUADRATS PRESENT: No. <u>XB26</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/>	Total area of quadrats (m²): _____															
Summary Quad. Totals: Alive																
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input checked="" type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/> Percentage in flower: _____%																

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ **Sheet No.:** _____ **Record Entered in Database** ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>	<u>Basalt</u>				
Closed depression <input type="checkbox"/>	Specific Landform Element: _____				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3)) over
2. Sparse Shrubland (Dodonaea petiolaris, Eremophila latrobei, Senna glutinosa and Hakea lorea) over
3. Tussock Grassland (Eriachne helmsii, Eriachne pulchella subsp. pulchella and Perotis rara)
- 4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 21/03/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Julia Mattner		PHONE: 9214 6100	
ROLE: Principal Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7519039		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: 784731		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB30</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent 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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland (Acacia aff. aneura (narrow fine veined; site 1259), Acacia pruinocarpa and Hakea lorea) over
2. Sparse Shrubland (Psydrax latifolia, Eremophila latrobei, P. suaveolens, Senna ferraria x glaucifolia and S. helmsii)
3. Low Open Herbland (Commelina ensifolia, *Bidens bipinnata, Corchorus tridens and Tribulus astrocarpus)
- 4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 21/03/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Julia Mattner		PHONE: 9214 6100	
ROLE: Principal Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7519039		No. satellites: _____ Map used: _____	
WGS84 <input type="checkbox"/>		Long / Easting: 784731		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	1			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB32.04</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: 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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (narrow fine veined; site 1259), Acacia pruinocarpa and Hakea lorea subsp. lorea Low Open Woodland
2. Psydrax latifolia, Eremophila latrobei subsp. filiformis, Psydrax suaveolens, Senna ferraria x glaucifolia and Senna helmsii Mid Sparse Shrubland
3. Commelina ensifolia, *Bidens bipinnata, Corchorus tridens and Tribulus astrocarpus Low Open Herbland.
- 4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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

TAXON: <u>Vigna sp. Central</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>23/03/2011</u>	CONSERVATION STATUS: <u>P2</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7526610</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>760824</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input type="checkbox"/>	Full survey <input checked="" type="checkbox"/>	Area observed (m ²): _____
EFFORT:	Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____	
POP'N COUNT ACCURACY:	Actual <input type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				
				Area of pop (m ²): _____
				Note: Pls record count as numbers (not percentages) for database.
QUADRATS PRESENT:	No. <u>XB44.08</u>	Size <u>50x50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input checked="" 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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

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HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input checked="" type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input type="checkbox"/>	<u>pebbles</u>				
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element:				
	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) and Acacia synchronicia Tall Sparse Shrubland
2. Eremophila forrestii subsp. forrestii, Eremophila lanceolata, Senna artemisioides subsp. oligophylla (thinly sericeous) and Eremophila latrobei x forrestii Low Sparse Shrubland
3. Enneapogon polyphyllus, Eragrostis xerophila, Aristida contorta and *Cenchrus ciliaris Low Isolated Tussock Grasses
4. Bulbostylis barbata Low Sparse Sedgeland

ASSOCIATED

SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: young

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

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

TAXON: <u>Goodenia nuda</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>01/05/2011</u>	CONSERVATION STATUS: <u>P4</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Hayden Adjuk</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7526463</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>758808</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>
		Rail reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/>
		SLK/Pole _____ to _____
		Shire road reserve <input type="checkbox"/>
		Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input type="checkbox"/>	Full survey <input checked="" type="checkbox"/>	Area observed (m ²): _____
EFFORT:	Time spent surveying (minutes): _____	No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY:	Actual <input checked="" type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input type="checkbox"/>	Count method: _____
	(Refer to field manual for list)			
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				
	Area of pop (m ²): _____			
	Note: Pls record count as numbers (not percentages) for database.			
QUADRATS PRESENT:	No. <u>XB65.10</u>	Size <u>50 x 50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent 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	_____	_____	_____
• Old gridlines nearby	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input checked="" type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input type="checkbox"/>	<u>with mantle of gravel</u>				
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element:				
	(Refer to field manual for additional values)				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3), Acacia pruinocarpa, Grevillea wickhamii subsp. hispidula, Senna glutinosa subsp. x luerssenii and Senna glutinosa subsp. glutinosa Tall Sparse Shrubland
2. Eremophila latrobei subsp. filiformis, Acacia ancistrocarpa, Senna glutinosa subsp. x luerssenii, Eremophila forrestii subsp. forrestii and Keraudrenia nephrosperma Mid Isolated Shrubs
3. Senna notabilis, Hybanthus aurantiacus, Solanum lasiophyllum and Senna notabilis Low Sparse Shrubland
4. Triodia pungens and Triodia longiceps Low Open Hummock Grassland over Trianthema glossostigma, Goodenia prostrata, Polycarpaea holtzei and Gomphrena cunninghamii Low Sparse Herbland

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: moderate

SPECIMEN: Collectors No: s.n. WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Submitter of Record: Damian Buller

Role: Botanist

Signed: _____

Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Calotis squamigera</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>01/05/2011</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE _____	<u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): _____
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No.: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7521022</u>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/>
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>765284</u>	No. satellites: _____	Map used: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/>
			Other Crown reserve <input type="checkbox"/>
Specify other: <u>mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____								
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____						
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>								
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>					
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:				
Alive	<u>1</u>			<u>+</u> %				
Dead								
Area of pop (m ²): _____ <small>Note: Pls record count as numbers (not percentages) for database.</small>								
QUADRATS PRESENT: No. <u>XB66.19</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____								
Summary Quad. Totals: Alive								
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> <td style="width:25%; height: 20px;"></td> </tr> </table>								
REPRODUCTIVE STATE:								
Clonal <input type="checkbox"/>	Vegetative <input checked="" type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input type="checkbox"/>					
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent 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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input type="checkbox"/>	<u>gravel</u>				
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element:				
	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia xiphophylla, Acacia aff. aneura (long, flat, recurved; FMR 35.3), Acacia synchronicia, Psyrax latifolia and Psyrax suaveolens Tall Sparse Shrubland
2. Rhagodia eremaea, Eremophila latrobei subsp. filiformis and Senna artemisioides subsp. helmsii Mid Isolated Shrubs
3. Sporobolus australasicus, Eragrostis leptocarpa, Enteropogon ramosus and Chrysopogon fallax Low Sparse Tussock Grassland
4. Sclerolaena cuneata, *Bidens bipinnata, Calandrinia ptychosperma and *Cucumis melo subsp. agrestis Low Sparse Herbland

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old

SPECIMEN: Collectors No: s.n. WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Submitter of Record: Damian Buller

Role: Botanist

Signed: _____

Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Vigna sp. Central</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>01/05/2011</u>		CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM's <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: <u>7521925</u>		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: <u>762583</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: <u>50K</u>			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____					
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____					
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)					
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>					
TOTAL POP'N STRUCTURE:					
	Mature:	Juveniles:	Seedlings:	Totals:	
Alive	<u>1</u>			<u>+</u> %	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Dead					
QUADRATS PRESENT: No. <u>XB69.18</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____					
Summary Quad. Totals: Alive					
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" 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, cattle tracks			
• Weeds			
• Nearby pipeline			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input checked="" type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>	<u>Mantle of gravel</u>				
Closed depression <input type="checkbox"/>	Specific Landform Element: _____				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) Low Woodland
2. Senna artemisioides subsp. helmsii, Senna artemisioides subsp. oligophylla x helmsii, Rhagodia eremaea, Abutilon aff. lepidium (1) and Senna artemisioides subsp. oligophylla Tall Isolated Shrubs
3. Eremophila lanceolata, Senna glaucifolia and Ptilotus obovatus Low Isolated Shrubs
4. *Cenchrus ciliaris, Aristida contorta and Enneapogon polyphyllus Low Sparse Tussock Grassland over Bulbostylis barbata and Bulbostylis turbinata Low Sparse Sedgeland over Corchorus tridens, *Bidens bipinnata, Boerhavia paludosa and Ipomoea muelleri Low Sparse Herbland.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Old

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Submitter of Record: Damian Buller

Role: Botanist

Signed: _____

Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>02/05/2011</u>	CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u> <u>Northern edge of Fortescue Marsh.</u>	
Reserve No.: _____	
DEC DISTRICT: <u>Pilbara</u>	LGA: _____ Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7517815</u>
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>775849</u>
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>
METHOD USED:	
GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
No. satellites: _____ Map used: _____	
Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE:	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____	
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____	
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)	
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:
Alive	<u>1</u> _____ _____ _____
Dead	_____ _____ _____
Area of pop (m ²): _____	
Note: Pls record count as numbers (not percentages) for database.	
QUADRATS PRESENT:	No. <u>XB71.17</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive	_____
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" 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 <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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	_____	_____	_____
• Weeds	_____	_____	_____
• Tracks	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) and Acacia aff. aneura (narrow fine veined; site 1259) Low Open Woodland
2. Acacia synchronicia and Acacia tetragonophylla Tall Sparse Shrubland
3. Eremophila lanceolata, Senna glutinosa subsp. x luerssenii, Sida fibulifera and Senna artemisioides subsp. oligophylla Low Isolated Trees
4. *Cenchrus ciliaris, Chloris pectinata, Aristida contorta and Eragrostis leptocarpa Mid Sparse Tussock Grassland.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old _____

SPECIMEN: Collectors No: _____ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila youngii subsp. lepidota Chinnock</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>02/05/2011</u>	CONSERVATION STATUS: <u>P4</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh.</u>			
			Reserve No.: _____
DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	No. satellites: _____ Map used: _____
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7515186</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>776581</u>		
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>		
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____	Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>10+</u>			<u>1%</u>
Dead				
Area of pop (m ²): <u>5</u>				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>XB72.02</u>	Size <u>50x50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	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 <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Open Woodland (Acacia aff. aneura (long, flat, recurved; FMR 35.3))
2. Sparse Shrubland (Acacia synchronicia, Eremophila youngii subsp. lepidota and Eremophila forrestii subsp. forrestii)
3. Low Sparse Shrubland (Atriplex bunburyana, Eremophila spongiocarpa, Maireana pyramidata, Senna notabilis and S. artemisioides subsp. helmsii)
4. Low Tussock Grassland (*Cenchrus ciliaris, Eragrostis leptocarpa and Eragrostis tenellula)

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: very old

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila spongiocarpa Chinnock</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>02/05/2011</u>	CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh.</u>	
DEC DISTRICT: <u>Pilbara</u>	LGA: _____ Reserve No.: _____
DATUM: GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7515186</u> Long / Easting: <u>776581</u> ZONE: <u>50</u>
METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE: Nature reserve <input type="checkbox"/> Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/> National park <input type="checkbox"/> State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Conservation park <input type="checkbox"/> Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m²): _____															
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m²: _____															
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/>	Count method: _____ (Refer to field manual for list)															
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>																
TOTAL POP'N STRUCTURE:																
<table border="1"> <thead> <tr> <th></th> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td>Alive</td> <td><u>5+</u></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dead</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Alive	<u>5+</u>				Dead					Area of pop (m²): <u>5</u> Note: Pls record count as numbers (not percentages) for database.
	Mature:	Juveniles:	Seedlings:	Totals:												
Alive	<u>5+</u>															
Dead																
QUADRATS PRESENT: No. <u>XB72.17</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/>	Total area of quadrats (m²): _____															
Summary Quad. Totals: Alive																
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent 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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ **Sheet No.:** _____ **Record Entered in Database** ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) Low Open Woodland
2. Acacia synchronicia, Eremophila youngii subsp. lepidota and Eremophila forrestii subsp. forrestii Mid Sparse Shrubland
3. Atriplex bunburyana, Eremophila spongiocarpa, Maireana pyramidata, Senna notabilis and Senna artemisioides subsp. helmsii Low Sparse Shrubland
4. *Cenchrus ciliaris, Eragrostis leptocarpa and Eragrostis tenellula Low Tussock Grassland

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: very old

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila spongiocarpa Chinnock</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>03/05/2011</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u> <u>Northern edge of Fortescue Marsh.</u>		
DEC DISTRICT: <u>Pilbara</u>		Reserve No.: _____
LGA: _____	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7513606</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>782229</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB76.09</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS:	Healthy <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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	_____	_____	_____
• Weeds	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3), Acacia synchronicia, Acacia tetragonophylla and Atalaya hemiglaucula Tall Sparse Shrubland
2. Atriplex bunburyana, Senna artemisioides subsp. oligophylla and Ptilotus obovatus Low Sparse Shrubland
3. *Vachellia farnesiana Tall Sparse Shrubland
4. *Cenchrus setiger, *Cenchrus ciliaris and Eragrostis leptocarpa Mid Closed Tussock Grassland over Ipomoea muelleri, Boerhavia burbridgeana Low Sparse Herbland

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: very old

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila spongiocarpa Chinnock</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>04/05/2011</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u> <u>Northern edge of Fortescue Marsh.</u>		
DEC DISTRICT: <u>Pilbara</u>		Reserve No.: _____
LGA: _____	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7510373</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>784464</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>10+</u>			<u>2%</u>
Dead				
Area of pop (m ²): <u>10</u> Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB80.07</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input checked="" type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input checked="" type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input type="checkbox"/>	<u>mantle of gravel</u>				
Closed depression <input type="checkbox"/>	Specific Landform Element:				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) Melaleuca glomerata and Acacia synchronicia Tall Open Shrubland
2. Eremophila youngii subsp. lepidota, *Vachellia farnesiana and Muehlenbeckia florulenta Mid Sparse Shrubland
3. Maireana pyramidata, Eremophila spongicarpa and Atriplex bunburyana Low Sparse Shrubland
4. Eriachne benthamii, Eragrostis desertorum and *Cenchrus ciliaris Low Sparse Tussock Grassland

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila youngii subsp. lepidota Chinnock</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>04/05/2011</u>	CONSERVATION STATUS: <u>P4</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh.</u>		
Reserve No.: _____		
DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7510373</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>784464</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>10+</u>			
Dead				
Area of pop (m ²): <u>5</u>				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XB80.12</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia aff. aneura (long, flat, recurved; FMR 35.3) Melaleuca glomerata and Acacia synchronicia Tall Open Shrubland
2. Eremophila youngii subsp. lepidota, *Vachellia farnesiana and Muehlenbeckia florulenta Mid Sparse Shrubland
3. Maireana pyramidata, Eremophila spongocarpa and Atriplex bunburyana Low Sparse Shrubland
4. Eriachne benthamii, Eragrostis desertorum and *Cenchrus ciliaris Low Sparse Tussock Grassland

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: old

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____
OBSERVATION DATE: 01/05/2011	CONSERVATION STATUS: P3	New population <input type="checkbox"/>
OBSERVER/S: James Sansom	PHONE: 9214 6100	
ROLE: Biologist	ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____	Reserve No.: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 7520012	No. satellites: _____	Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: 0788068	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
Unknown <input type="checkbox"/>	ZONE: 50K		
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/>
			Other Crown reserve <input type="checkbox"/>
			Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>		Area observed (m ²): _____
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>		Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>
TOTAL POP'N STRUCTURE:	Mature:	Juveniles: Seedlings: Totals:
Alive	2	
Dead		
QUADRATS PRESENT: No. <u>XBB10</u> Size _____		Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive		
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/>	Percentage in flower: _____%
	Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/>	

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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 01/05/2011		CONSERVATION STATUS: P3	
OBSERVER/S: James Sansom		PHONE: 9214 6100	
ROLE: Biologist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 100 km North/North-West of Newman.

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7518615		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 0793464		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>					Area observed (m²): _____		
EFFORT: Time spent surveying (minutes): _____					No. of minutes spent / 100 m²: _____		
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>					Count method: _____		
					(Refer to field manual for list)		
WHAT COUNTED:		Plants <input checked="" type="checkbox"/>		Clumps <input type="checkbox"/>		Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:		Mature:		Juveniles:		Seedlings:	
Alive		2					
Dead							
						Area of pop (m²): _____	
						Note: Pls record count as numbers (not percentages) for database.	
QUADRATS PRESENT:		No. <u>XBB19</u>		Size _____		Data attached <input type="checkbox"/>	
						Total area of quadrats (m²): _____	
Summary Quad. Totals: Alive							
REPRODUCTIVE STATE:		Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <input type="checkbox"/>	
		Immature fruit <input type="checkbox"/>		Fruit <input type="checkbox"/>		Dehiscent 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 03/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: James Sansom		PHONE: 9214 6100	
ROLE: Biologist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman.

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7520467		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 797096		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	2			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBB21</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>22/03/2011</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Hayden Ajduk</u>	PHONE <u>9214 6100</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No: _____
DATUM:		Land manager present: <input type="checkbox"/>
COORDINATES: (If UTM coords provided, Zone is also required)		
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	METHOD USED:
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7525613</u>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>763883</u>	No. satellites: _____ Map used: _____
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

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

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>22/05/2011</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Hayden Ajduk</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
Land manager present: <input type="checkbox"/>		
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7525613</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>763883</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

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

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

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

TAXON: <u>Eremophila spongiorarpa</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>24/03/2011</u>		CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Hayden Ajduk</u>		PHONE: <u>9214 6100</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh.</u>			
DEC DISTRICT: <u>Pilbara</u>		LGA: _____	
DATUM:		Reserve No.: _____	
COORDINATES: (If UTM coords provided, Zone is also required)		Land manager present: <input type="checkbox"/>	
DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
Lat / Northing: <u>7516938</u>		No. satellites: _____ Map used: _____	
Long / Easting: <u>772549</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
ZONE: <u>50K</u>			
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>100</u>			<u>100</u>
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA11</u> Size <u>Opp Coll</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

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HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: (Refer to field manual for additional values) _____					

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>30/04/2011</u>	CONSERVATION STATUS: <u>P4</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Hayden Adjuk</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7523903</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>769809</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				

Area of pop (m²): _____
 Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. XBOPHA106 Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				
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REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☒ Flower ☒
 Immature fruit ☐ Fruit ☐ Dehiscent fruit ☐ 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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 01/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Hayden Ajduk		PHONE: 9214 6100	
ROLE: Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7520324		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 0787090		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	Population			
Dead				
				Area of pop (m ²): <u>2000</u>
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA117</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mulga

2.

3.

4.

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 01/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Hayden Ajduk		PHONE: 9214 6100	
ROLE: Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7519561		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 792877		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	2			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA119</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mulga

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 01/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Hayden Ajduk		PHONE: 9214 6100	
ROLE: Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7518362		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 0791482		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	3			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA123</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mulga

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 02/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Hayden Ajduk		PHONE: 9214 6100	
ROLE: Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
 Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7518454		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 800874		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>	
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	Population			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA125</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mulga

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)		TPFL Pop. No.: _____	
OBSERVATION DATE: 03/05/2011		CONSERVATION STATUS: P3 New population <input type="checkbox"/>	
OBSERVER/S: Hayden Ajduk		PHONE: 9214 6100	
ROLE: Botanist		ORGANISATION: ENV. Australia	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara		LGA: _____		Reserve No.: _____	
		Land manager present: <input type="checkbox"/>			
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: 7518794		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: 777387		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: 50K			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	Population			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPHA137</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <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+)			
•	<u>L</u>	<u>M</u>	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mulga

2.

3.

4.

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: Rhagodia sp. Hamersley (M. Trudgen 17794)	TPFL Pop. No.: _____
OBSERVATION DATE: 03/05/2011	CONSERVATION STATUS: P3 <input type="checkbox"/> New population <input type="checkbox"/>
OBSERVER/S: Hayden Ajduk	PHONE: 9214 6100
ROLE: Botanist	ORGANISATION: ENV. Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: Pilbara	LGA: _____	Reserve No.: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: 7517472	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: 782872	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: 50K	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m ²): _____
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m ² : _____
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:
Alive	population
Dead	
QUADRATS PRESENT:	No. <u>XBOPHA140</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2000</u>
Summary Quad. Totals: Alive	
REPRODUCTIVE STATE:	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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1.

2.

3.

4.

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha</u>		TPFL Pop. No: _____	
OBSERVATION DATE: <u>24/03/2011</u>		CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>	
ROLE: <u>Principal Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u> <u>Northern edge of Fortescue Marsh</u>			
DEC DISTRICT: <u>Pilbara</u>		LGA: _____	
DATUM:		Reserve No: _____	
COORDINATES: (If UTM coords provided, Zone is also required)		Land manager present: <input type="checkbox"/>	
DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
GDA94 / MGA94 <input type="checkbox"/>	Lat / Northing: <u>7515878</u>	No. satellites: _____	Map used: _____
AGD84 / AMG84 <input type="checkbox"/>	Long / Easting: <u>772528</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
WGS84 <input checked="" type="checkbox"/>	ZONE: <u>50K</u>		
Unknown <input type="checkbox"/>			
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/>
			Other Crown reserve <input type="checkbox"/>
Specify other: <u>mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				
				Area of pop (m ²): _____
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBOPJM19</u> Size <u>Opportunistic Collection</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>			
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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input checked="" type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia low open heath

2.

3.

4.

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT: Cattle in vicinity

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila spongiorarpa</u>		TPFL Pop. No.: _____
OBSERVATION DATE: <u>02/05/2011</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>		PHONE <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).</u> <u>Northern edge of Fortescue Marsh</u>			
			Reserve No.: _____
DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input checked="" type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7516480</u>	No. satellites: _____	Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>774820</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>		
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____	Specify other: <u>mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____		(Refer to field manual for list)		
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>3+</u>			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>XBOPJM113</u>	Size <u>Opp Coll</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. _____
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>02/05/2011</u>	CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Julia Mattner</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Principal Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u> <u>Northern edge of Fortescue Marsh.</u>	
Reserve No: _____	
DEC DISTRICT: <u>Pilbara</u>	LGA: _____ Land manager present: <input type="checkbox"/>
DATUM: GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7515402</u> Long / Easting: <u>775565</u> ZONE: <u>50K</u>
METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE: Nature reserve <input type="checkbox"/> Timber reserve <input type="checkbox"/> Private property <input type="checkbox"/> Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/> National park <input type="checkbox"/> State forest <input type="checkbox"/> Pastoral lease <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Conservation park <input type="checkbox"/> Water reserve <input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____ Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/>	Area observed (m²): _____															
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m²: _____															
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)															
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>																
TOTAL POP'N STRUCTURE:																
<table border="1"> <thead> <tr> <th></th> <th>Mature:</th> <th>Juveniles:</th> <th>Seedlings:</th> <th>Totals:</th> </tr> </thead> <tbody> <tr> <td>Alive</td> <td><u>1</u></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dead</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Mature:	Juveniles:	Seedlings:	Totals:	Alive	<u>1</u>				Dead					Area of pop (m²): _____ Note: Pls record count as numbers (not percentages) for database.
	Mature:	Juveniles:	Seedlings:	Totals:												
Alive	<u>1</u>															
Dead																
QUADRATS PRESENT: No. <u>XBOPJM114</u> Size <u>Opportunistic Collection</u> Data attached <input type="checkbox"/>	Total area of quadrats (m²): _____															
Summary Quad. Totals: Alive																
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%															

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ **Sheet No.:** _____ **Record Entered in Database** ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input checked="" type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values) _____				

CONDITION OF SOIL:

Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia low open heath

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>20/03/2011</u>		CONSERVATION STATUS: <u>P4</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>James Sansom</u>		PHONE: <u>9214 6100</u>	
ROLE: <u>Biologist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>Approximately 110 km NW of Newman (FMG Christmas Creek Minesite)</u>																							
Reserve No.: _____																							
DEC DISTRICT: <u>Pilbara</u>		LGA: _____ Land manager present: <input type="checkbox"/>																					
<table style="width:100%;"> <tr> <td style="width:25%;">DATUM:</td> <td style="width:35%;">COORDINATES: (If UTM coords provided, Zone is also required)</td> <td colspan="2">METHOD USED:</td> </tr> <tr> <td>GDA94 / MGA94 <input type="checkbox"/></td> <td>DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/></td> <td colspan="2">GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/></td> </tr> <tr> <td>AGD84 / AMG84 <input type="checkbox"/></td> <td>Lat / Northing: <u>7520126</u></td> <td>No. satellites: _____</td> <td>Map used: _____</td> </tr> <tr> <td>WGS84 <input checked="" type="checkbox"/></td> <td>Long / Easting: <u>790835</u></td> <td>Boundary polygon captured: <input type="checkbox"/></td> <td>Map scale: _____</td> </tr> <tr> <td>Unknown <input type="checkbox"/></td> <td>ZONE: <u>50</u></td> <td colspan="2"></td> </tr> </table>				DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:		GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>		AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7520126</u>	No. satellites: _____	Map used: _____	WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>790835</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____	Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:																					
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>																					
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7520126</u>	No. satellites: _____	Map used: _____																				
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>790835</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____																				
Unknown <input type="checkbox"/>	ZONE: <u>50</u>																						
LAND TENURE:																							
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>																				
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>																				
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____																				
			Shire road reserve <input type="checkbox"/>																				
			Other Crown reserve <input type="checkbox"/>																				
Specify other: <u>mining tenement</u>																							

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____																				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____																				
POP'N COUNT ACCURACY: Actual <input checked="" type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input type="checkbox"/> Count method: _____ (Refer to field manual for list)																				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>																				
<table style="width:100%;"> <tr> <th style="width:15%;">TOTAL POP'N STRUCTURE:</th> <th style="width:20%;">Mature:</th> <th style="width:20%;">Juveniles:</th> <th style="width:20%;">Seedlings:</th> <th style="width:25%;">Totals:</th> </tr> <tr> <td>Alive</td> <td><u>1</u></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dead</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	Alive	<u>1</u>				Dead					
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:																
Alive	<u>1</u>																			
Dead																				
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.																				
QUADRATS PRESENT: No. <u>XBRH04.06</u> Size _____ Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____																				
Summary Quad. Totals: Alive																				
<table style="width:100%;"> <tr> <td style="width:25%;">REPRODUCTIVE STATE:</td> <td style="width:25%;">Clonal <input type="checkbox"/></td> <td style="width:25%;">Vegetative <input type="checkbox"/></td> <td style="width:25%;">Flowerbud <input checked="" type="checkbox"/></td> </tr> <tr> <td></td> <td>Immature fruit <input type="checkbox"/></td> <td>Fruit <input type="checkbox"/></td> <td>Dehiscent fruit <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Flower <input checked="" type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Percentage in flower: _____%</td> </tr> </table>					REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>		Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>				Flower <input checked="" type="checkbox"/>				Percentage in flower: _____%
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>																	
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>																	
			Flower <input checked="" 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+)			
• Weeds			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>			<u>Skeletal soils</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: _____ (Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Eucalyptus victrix Low Open Woodland
2. Acacia aff. aneura (long, flat, recurved; FMR 35.3), Acacia pyrifolia var. pyrifolia and Acacia maitlandii Mid Sparse Shrubland
3. Triodia longiceps Mid Sparse Hummock Grassland
4. *Cenchrus ciliaris, Themeda triandra and Amphipogon sericeus (Newman form BR2-21) Mid Sparse Tussock Grassland.

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: young

SPECIMEN:	Collectors No: <u>s.n.</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/> Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 20/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>		TPFL Pop. No.: _____	
OBSERVATION DATE: <u>21/03/2011</u>		CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>	
OBSERVER/S: <u>Hayden Ajduk</u>		PHONE <u>9214 6100</u>	
ROLE: <u>Botanist</u>		ORGANISATION: <u>ENV. Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>		LGA: _____		Reserve No.: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>		DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>		GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>		Lat / Northing: <u>7523093</u>		No. satellites: _____ Map used: _____	
WGS84 <input checked="" type="checkbox"/>		Long / Easting: <u>768157</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
Unknown <input type="checkbox"/>		ZONE: <u>50K</u>			
LAND TENURE:					
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"/>		Rail reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>		Water reserve <input type="checkbox"/>		MRWA road reserve <input type="checkbox"/>	
		Pastoral lease <input type="checkbox"/>		Shire road reserve <input type="checkbox"/>	
		UCL <input type="checkbox"/>		Other Crown reserve <input type="checkbox"/>	
		SLK/Pole _____ to _____		Specify other: <u>mining tenement</u>	

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input type="checkbox"/> Full survey <input checked="" type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ <small>(Refer to field manual for list)</small>				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>XBRH08</u> Size <u>50x50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): _____				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" type="checkbox"/>				
Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehiscent 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input checked="" type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input checked="" type="checkbox"/>	<u>mixed</u>		<u>Skeletal soils</u>		
Closed depression <input type="checkbox"/>	Specific Landform Element:				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Open Woodland (Eucalyptus victrix and Corymbia ferritcola subsp. ferritcola)
2. Sparse Shrubland (Acacia pyrifolia var. pyrifolia, Acacia maitlandii and Gossypium robinsonii)
3. Isolated Hummock Grasses (Triodia longiceps)
4. Open Tussock Grassland (*Cenchrus ciliaris)

ASSOCIATED

SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Goodenia nuda</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>22/03/2011</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Hayden Ajduk</u>	PHONE: <u>9214 6100</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>ENV. Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Approximately 110 km NW of Newman (FMG Christmas Creek Minesite).

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>7525397</u>	No. satellites: _____ Map used: _____
WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>768313</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50K</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____
		Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
		Specify other: <u>mining tenement</u>

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input type="checkbox"/>	Full survey <input checked="" type="checkbox"/>	Area observed (m ²): _____
EFFORT:	Time spent surveying (minutes): _____	No. of minutes spent / 100 m ² : _____		
POP'N COUNT ACCURACY:	Actual <input type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	+			
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>XBRH12</u>	Size <u>50x50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent 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+)			
• Weeds	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input checked="" type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other:		Specify other:	Specify other:	
Drainage line <input checked="" type="checkbox"/>	<u>mixed</u>		<u>Skeletal soils</u>		
Closed depression <input type="checkbox"/>	Specific Landform Element:				
Wetland <input type="checkbox"/>	(Refer to field manual for additional values)				

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.)
; 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Open Woodland (Eucalyptus victrix and Corymbia ferritcola)
2. Sparse Shrubland (Acacia pyrifolia, A. maitlandii and Gossypium robinsonii)
3. Isolated Hummock Grasses (Triodia epactia/pungens)
4. Open Tussock Grassland (*Cenchrus ciliaris and Themeda triandra)

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Fire age: Moderate

SPECIMEN:	Collectors No: _____	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____
ATTACHED:	Map <input type="checkbox"/> Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: _____		

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 15/09/2011

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Heliotropium europaeum L.</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>26/04/2012</u>	CONSERVATION STATUS: _____ New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM: <input type="checkbox"/> GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Unknown	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7518115</u> Long / Easting: <u>762720</u> ZONE: <u>50</u>	METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE:		
<input type="checkbox"/> Nature reserve <input type="checkbox"/> National park <input type="checkbox"/> Conservation park	<input type="checkbox"/> Timber reserve <input type="checkbox"/> State forest <input type="checkbox"/> Water reserve	<input type="checkbox"/> Private property <input type="checkbox"/> Pastoral lease <input type="checkbox"/> UCL <input type="checkbox"/> Rail reserve <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> SLK/Pole _____ to _____
<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve Specify other: <u>Mining tenement</u>		

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			<u>1</u>
Dead				

Area of pop (m²): _____
 Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. FMA01.07 Size 50 x 50 m Data attached ☐ Total area of quadrats (m²): 2500

Summary Quad. Totals: Alive

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REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☒ Flower ☒
 Immature fruit ☐ Fruit ☐ Dehiscent fruit ☐ 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+)			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input checked="" type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Sandy clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values)				

CONDITION OF SOIL: Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), Tecticornia globulifera and Tecticornia indica subsp. bidens low open heath

2. Mimulus repens and *Heliotropium europaeum scattered herbs

3. Cyperus bulbosus scattered sedges

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very Old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd:

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd:

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV507 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: Damian Buller Role: Botanist Signed: Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: Sheet No.: Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha Symon & Kenneally</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>26/04/2012</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE : <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7518476</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>762660</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Specify other: <u>Mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____	
EFFORT: Time spent surveying (minutes): _____	No. of minutes spent / 100 m ² : _____
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)	
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:
Alive	<u>50+</u> <u> </u> <u> </u> <u>50+</u>
Dead	<u> </u> <u> </u> <u> </u> <u> </u>
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.	
QUADRATS PRESENT:	No. <u>FMA02.04</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2500</u>
Summary Quad. Totals: Alive	<u> </u> <u> </u> <u> </u> <u> </u>
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input type="checkbox"/> Percentage in flower: _____%

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
• _____	_____	_____	_____
• _____	_____	_____	_____
• _____	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input checked="" type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input checked="" type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: (Refer to field manual for additional values)				

CONDITION OF SOIL: Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata scattered low trees
2. Tecticornia auriculata and Muehlenbeckia florulenta open shrubland
3. Tecticornia indica subsp. Bidens and Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low open heath
4. Mimulus repens, Nicotiana heterantha, Swainsona kingii and *Heliotropium europaeum scattered herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd:

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd:

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV504 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: Damian Buller Role: Botanist Signed: Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: Sheet No.: Record Entered in Database ☐

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.

TAXON:	Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	TPFL Pop. No:	
OBSERVATION DATE:	26/04/2012	CONSERVATION STATUS:	P3 <input type="checkbox"/> New population <input type="checkbox"/>
OBSERVER/S:	Damian Buller and Julia Mattner	PHONE:	(08) 9214 6100
ROLE:	Botanist and Principal Botanist, respectively	ORGANISATION:	ENV Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: Pilbara		LGA:	Reserve No:
		Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input checked="" type="checkbox"/> UTM	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	<input type="checkbox"/> No. satellites: <input type="checkbox"/> Map used: <input type="checkbox"/>
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: 7518476	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	<input type="checkbox"/> Map scale: <input type="checkbox"/>
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: 762660		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: 50		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/> Specify other: Mining tenement

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	
Alive	100+			100+	Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.
Dead					

QUADRATS PRESENT: No. FMA02.05 Size 50 x 50 m Data attached ☐ Total area of quadrats (m²): 2500

Summary Quad. Totals: Alive ☐ ☐ ☐ ☐

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

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

COMMENT:

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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input checked="" type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input checked="" type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			Clay <input type="checkbox"/>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>	Specific Landform Element: _____ (Refer to field manual for additional values)				

CONDITION OF SOIL: Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata scattered low trees
2. Tecticornia auriculata and Muehlenbeckia florulenta open shrubland
3. Tecticornia indica subsp. Bidens and Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552) low open heath
4. Mimulus repens, Nicotiana heterantha, Swainsona kingii and *Heliotropium europaeum scattered herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: ____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: ____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: ____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV510 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: ____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: ____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: ____

Submitter of Record: Damian Buller Role: Botanist Signed: ____ Date: 17/08/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eremophila spongiorarpa Chinnock</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>26/04/2012</u>	CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>		LGA: _____		Reserve No: _____	
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:	
<input type="checkbox"/> GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Unknown		<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input checked="" type="checkbox"/> UTM's Lat / Northing: <u>7518544</u> Long / Easting: <u>762702</u> ZONE: <u>50</u>		<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____	
LAND TENURE:					
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve	<input type="checkbox"/> Shire road reserve	<input type="checkbox"/> Other Crown reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve	<input type="checkbox"/> Specify other: <u>Mining tenement</u>	
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL	<input type="checkbox"/> SLK/Pole _____ to _____		

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____					
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____					
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)					
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>					
TOTAL POP'N STRUCTURE:					
	Mature:	Juveniles:	Seedlings:	Totals:	
Alive	<u>5+</u>			<u>5+</u>	Area of pop (m ²): _____ <small>Note: Pls record count as numbers (not percentages) for database.</small>
Dead					
QUADRATS PRESENT: No. <u>FMA03.03</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2500</u>					
Summary Quad. Totals: Alive					
REPRODUCTIVE STATE:					
Clonal <input type="checkbox"/>		Vegetative <input type="checkbox"/>		Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>		Fruit <input checked="" type="checkbox"/>		Dehisced fruit <input type="checkbox"/> Percentage in flower: _____ %	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
•			
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Please return completed form to DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Sandy clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English 552), Tecticornia indica subsp. bidens, Muehlenbeckia florulenta and Eremophila spongiorcarpa low open heath

2. Eragrostis pergracilis, Dactyloctenium radulans, *Cenchrus ciliaris and Enneapogon polyphyllus open tussock grassland

3. Cyperus bulbosus scattered sedges

4. Nicotiana heterantha and Gnephosis arachnoidea scattered herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd:

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd:

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV499 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: Damian Buller Role: Botanist Signed: Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: Sheet No.: Record Entered in Database ☐

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.

TAXON: <u>Eremophila youngii subsp. lepidota Chinnock</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>26/04/2012</u>	CONSERVATION STATUS: <u>P4</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM: _____		
COORDINATES: (If UTM coords provided, Zone is also required)		
<input type="checkbox"/> GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Unknown	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7518754</u> Long / Easting: <u>762752</u> ZONE: <u>50</u>	METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE:		
<input type="checkbox"/> Nature reserve <input type="checkbox"/> National park <input type="checkbox"/> Conservation park	<input type="checkbox"/> Timber reserve <input type="checkbox"/> State forest <input type="checkbox"/> Water reserve	<input type="checkbox"/> Private property <input type="checkbox"/> Pastoral lease <input type="checkbox"/> UCL <input type="checkbox"/> Rail reserve <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> SLK/Pole _____ to _____
<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve Specify other: <u>Mining tenement</u>		

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			<u>1</u>
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>FMA04.14</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2500</u>				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/> Vegetative <input checked="" 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 <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

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

CONDITION OF SOIL:

Specific **Landform** Element:
(Refer to field manual for additional values)

Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata high shrubland over Tecticornia indica subsp. bidens, Scaevola spinescens and Eremophila youngii subsp. lepidota open heath

2. Tecticornia indica subsp. bidens, Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552, Tecticornia auriculata, Eremophila spongiocarpa and Muehlenbeckia florulenta low open heath

3. mixed tussock grasses with Pluchea rubelliflora and Pluchea dunlopia very open herbs

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd:

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd:

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV502 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: Damian Buller Role: Botanist Signed: Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: Sheet No.: Record Entered in Database ☐

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.

TAXON: <u>Atriplex flabelliformis Paul G. Wilson</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>27/04/2012</u>	CONSERVATION STATUS: <u>P3</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No.: _____
DATUM: <u>GDA94 / MGA94</u> <input type="checkbox"/> <u>AGD84 / AMG84</u> <input type="checkbox"/> <u>WGS84</u> <input checked="" type="checkbox"/> <u>Unknown</u> <input type="checkbox"/>		
COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7518244</u> Long / Easting: <u>766274</u> ZONE: <u>50</u>		
METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>
		Rail reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/>
		SLK/Pole _____ to _____
		Shire road reserve <input type="checkbox"/>
		Other Crown reserve <input type="checkbox"/>
		Specify other: <u>Mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>				
TOTAL POP'N STRUCTURE:				
	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			<u>1</u>
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT: No. <u>FMA12.05</u> Size <u>50 x 50 m</u> Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2500</u>				
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:				
Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input checked="" type="checkbox"/>	
Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%	

CONDITION OF PLANTS: Healthy <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Poor <input type="checkbox"/> Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Eremophila spongiocarpa scattered shrubs

2. Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106) and Tecticornia sp. Denny's Crossing (K.A. Shepherd & J. English KS 552) low closed heath

3. Triraphis mollis, Chloris pectinata, Enteropogon ramosus, Enneapogon polyphyllus and Enneapogon caerulescens scattered tussock grasses

4. Pterocaulon sphaeranthoides, Pluchea dunlopia, Pluchea rubelliflora, Nicotiana heterantha and Swainsona kingii very open herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: ____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV501 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: ____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON:	Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)		TPFL Pop. No:	
OBSERVATION DATE:	29/04/2012	CONSERVATION STATUS:	P3	New population <input type="checkbox"/>
OBSERVER/S:	Damian Buller and Julia Mattner		PHONE	(08) 9214 6100
ROLE:	Botanist and Principal Botanist, respectively		ORGANISATION:	ENV Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT:	Pilbara	LGA:		Reserve No:	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:		
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees	<input type="checkbox"/> DegMinSec	<input checked="" type="checkbox"/> UTM	<input checked="" type="checkbox"/> GPS	<input type="checkbox"/> Differential GPS
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing:	7515573	No. satellites:	Map used: _____	
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting:	775590	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____	
<input type="checkbox"/> Unknown	ZONE:	50			
LAND TENURE:					
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve	<input type="checkbox"/> Shire road reserve	
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve	<input type="checkbox"/> Other Crown reserve	
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL	<input type="checkbox"/> SLK/Pole _____ to _____	Specify other: <u>Mining tenement</u>	

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

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

Area of pop (m²): _____
Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. FMA19.02 Size 50 x 50 m Data attached ☐ Total area of quadrats (m²): 2500

Summary Quad. Totals: Alive _____

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

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

COMMENT:

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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input checked="" type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

- *Vachellia farnesiana, Acacia synchronicia, Melaleuca glomerata and Acacia aptaneura high open shrubland
- Eremophila spongiorcarpa open shrubland
- Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Muehlenbeckia florulenta and Samolus repens var. floribundus low shrubland
- Sporobolus virginicus, Eragrostis pergracilis, Echinochloa colona, *Cenchrus ciliaris, Chloris pectinata and Enteropogon ramosus closed tussock grassland with Pluchea rubelliflora, Lotus cruentus, *Malvastrum americanum, Marsilea hirsuta and Nicotiana heterantha very open herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Old Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN: Collectors No: ENV513 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 17/08/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha Symon & Kenneally</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>29/04/2012</u>	CONSERVATION STATUS: <u>P1</u> New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No: _____
Land manager present: <input type="checkbox"/>		
DATUM: <input type="checkbox"/> GDA94 / MGA94 <input type="checkbox"/> AGD84 / AMG84 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Unknown	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/> Lat / Northing: <u>7515573</u> Long / Easting: <u>775590</u> ZONE: <u>50</u>	METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: _____ Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE:		
<input type="checkbox"/> Nature reserve <input type="checkbox"/> National park <input type="checkbox"/> Conservation park	<input type="checkbox"/> Timber reserve <input type="checkbox"/> State forest <input type="checkbox"/> Water reserve	<input type="checkbox"/> Private property <input type="checkbox"/> Pastoral lease <input type="checkbox"/> UCL <input type="checkbox"/> Rail reserve <input type="checkbox"/> MRWA road reserve <input type="checkbox"/> SLK/Pole _____ to _____
<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve Specify other: <u>Mining tenement</u>		

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	20+			20+
Dead				

Area of pop (m²): _____
 Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. FMA19.04 Size 50 x 50 m Data attached ☐ Total area of quadrats (m²): 2500

Summary Quad. Totals: Alive

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REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☒
 Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ 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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>			Clay <input type="checkbox"/>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

- *Vachellia farnesiana, Acacia synchronicia, Melaleuca glomerata and Acacia aptaneura high open shrubland
- Eremophila spongiorcarpa open shrubland
- Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Muehlenbeckia florulenta and Samolus repens var. floribundus low shrubland
- Sporobolus virginicus, Eragrostis pergracilis, Echinochloa colona, *Cenchrus ciliaris, Chloris pectinata and Enteropogon ramosus closed tussock grassland with Pluchea rubelliflora, Lotus cruentus, *Malvastrum americanum, Marsilea hirsuta and Nicotiana heterantha very open herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Old Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN: Collectors No: ENV505 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Maireana amoena</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>29/04/2012</u>	CONSERVATION STATUS: _____ New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): _____
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>	LGA: _____	Reserve No: _____
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7514710</u>	No. satellites: _____ Map used: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>775357</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>	
LAND TENURE:		
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 type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>
		Rail reserve <input type="checkbox"/>
		MRWA road reserve <input type="checkbox"/>
		Shire road reserve <input type="checkbox"/>
		Other Crown reserve <input type="checkbox"/>
		Specify other: <u>Mining tenement</u>

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

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

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

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

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

Area of pop (m²): _____
 Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. FMA21.01 Size 50 x 50 m Data attached ☐ Total area of quadrats (m²): 2500

Summary Quad. Totals: Alive _____

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☐
 Immature fruit ☐ Fruit ☒ Dehiscent fruit ☐ 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+)			
• _____	_____	_____	_____
• _____	_____	_____	_____
• _____	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input checked="" type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata low open forest

2. Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Maireana amoena, *Aerva javanica and Samolus repens var. floribundus low open shrubland

3. Chloris pectinata, *Cenchrus ciliaris, Dactyloctenium radulans and Sporobolus australasicus very open tussock grassland

4. Nicotiana heterantha, *Sonchus oleraceus and Cleome viscosa open herbs

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV500 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 17/08/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON:	Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)		TPFL Pop. No:	
OBSERVATION DATE:	29/04/2012	CONSERVATION STATUS:	P3	New population <input type="checkbox"/>
OBSERVER/S:	Damian Buller and Julia Mattner		PHONE	(08) 9214 6100
ROLE:	Botanist and Principal Botanist, respectively		ORGANISATION:	ENV Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT:	Pilbara	LGA:		Reserve No:	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:		
	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
<input type="checkbox"/> GDA94 / MGA94	Lat / Northing: 7514710		No. satellites:	Map used: _____	
<input type="checkbox"/> AGD84 / AMG84	Long / Easting: 775357		Boundary polygon captured: <input type="checkbox"/>	Map scale: _____	
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	ZONE: 50				
<input type="checkbox"/> Unknown					
LAND TENURE:					
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>	
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>	
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: Mining tenement	

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input checked="" type="checkbox"/>	Full survey <input type="checkbox"/>	Area observed (m ²):	_____
EFFORT:	Time spent surveying (minutes):		No. of minutes spent / 100 m ² :		
POP'N COUNT ACCURACY:	Actual <input type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input checked="" type="checkbox"/>	Count method:	_____
(Refer to field manual for list)					
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>		
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:	
Alive	5+			5+	Area of pop (m ²): _____
Dead					Note: Pls record count as numbers (not percentages) for database.
QUADRATS PRESENT:	No. <u>FMA21.06</u>	Size <u>50 x 50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): <u>2500</u>	
Summary Quad. Totals: Alive					
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input type="checkbox"/>	
	Immature fruit <input type="checkbox"/>	Fruit <input checked="" 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input checked="" type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata low open forest

2. Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Maireana amoena, *Aerva javanica and Samolus repens var. floribundus low open shrubland

3. Chloris pectinata, *Cenchrus ciliaris, Dactyloctenium radulans and Sporobolus australasicus very open tussock grassland

4. Nicotiana heterantha, *Sonchus oleraceus and Cleome viscosa open herbs

ASSOCIATED

SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV511 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 17/08/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON:	Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	TPFL Pop. No:	
OBSERVATION DATE:	30/04/2012	CONSERVATION STATUS:	P3 <input type="checkbox"/> New population <input type="checkbox"/>
OBSERVER/S:	Damian Buller and Julia Mattner	PHONE:	(08) 9214 6100
ROLE:	Botanist and Principal Botanist, respectively	ORGANISATION:	ENV Australia

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: Pilbara		LGA:		Reserve No:	
				Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)			METHOD USED:	
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees	<input type="checkbox"/> DegMinSec	<input checked="" type="checkbox"/> UTM	<input checked="" type="checkbox"/> GPS	<input type="checkbox"/> Differential GPS
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: 7518225			No. satellites: _____	
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: 768085			Map used: _____	
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: 50			Boundary polygon captured: <input type="checkbox"/>	
LAND TENURE:			Map scale: _____		
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve	<input type="checkbox"/> Shire road reserve	
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve	<input type="checkbox"/> Other Crown reserve	
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL	<input type="checkbox"/> SLK/Pole _____ to _____	Specify other: <u>Mining tenement</u>	

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input checked="" type="checkbox"/>	Full survey <input type="checkbox"/>	Area observed (m²): _____
EFFORT:	Time spent surveying (minutes): _____		No. of minutes spent / 100 m²: _____	
POP'N COUNT ACCURACY:	Actual <input type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input checked="" type="checkbox"/>	Count method: _____
(Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	20+			20+
Dead				
Area of pop (m²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMA25.01</u>	Size <u>50 x 50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m²): <u>2500</u>
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	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 <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input checked="" type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Melaleuca glomerata high shrubland
2. Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Eremophila spongicarpa and Muehlenbeckia florulenta open heath
3. Samolus repens var. floribundus low scattered shrubs
4. Paraneurachne muelleri very open tussock grassland with Nicotiana heterantha and Swainsona kingii open herbs

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV512 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 17/08/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha Symon & Kenneally</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>04/05/2012</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE : <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7506953</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>785975</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Specify other: <u>Mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>100+</u>			<u>100+</u>
Dead				
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMA46.02</u>	Size <u>50 x 50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): <u>2500</u>
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%

CONDITION OF PLANTS:	Healthy <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Sandy clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia auriculata open heath

2. Eragrostis pergracilis, Chloris pectinata and Dactyloctenium radulans open tussock grassland

3. Swainsona kingii and Nicotiana heterantha herbs

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very Old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN: Collectors No: ENV506 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Nicotiana heterantha Symon & Kenneally</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>05/05/2012</u>	CONSERVATION STATUS: <u>P1</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE : <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7510775</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>782920</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
			Specify other: <u>Mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>100+</u>			<u>100+</u>
Dead				
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMA51.05</u>	Size <u>50 x 50 m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): <u>2500</u>
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____%

CONDITION OF PLANTS:	Healthy <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			<u>Clay</u>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia auriculata scattered shrubs
2. Tecticornia indica subsp. bidens, Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 106), Tecticornia sp. Dennys Crossing (K.A. Shepherd & J. English KS 552), Eremophila spongicarpa and Maireana luehmannii low open heath
3. Eragrostis pergracilis, Chloris pectinata, Aristida latifolia and Aristida contorta scattered tussock grasses
4. Nicotiana heterantha, Cullen cinereum, Swainsona kingii, Pterocaulon sphaeranthoides and Peripleura obovata scattered herbs

ASSOCIATED

SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN: Collectors No: ENV503 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Themeda sp. Hamersley (M.E. Trudgen 11431)</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>06/06/2012</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): <u>90 km N of Newman town site, Western Australia</u>

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	<input type="checkbox"/> No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7513477</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	<input type="checkbox"/> Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>782145</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Specify other: <u>Mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			<u>1</u>
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMA73.06</u>	Size <u>50 x 50m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): <u>2500</u>
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input checked="" type="checkbox"/>	Flower <input checked="" type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehisced fruit <input type="checkbox"/>	Percentage in flower: _____ %

CONDITION OF PLANTS:	Healthy <input checked="" type="checkbox"/>	Moderate <input type="checkbox"/>	Poor <input type="checkbox"/>	Senescent <input type="checkbox"/>
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+)			
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input checked="" type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Eucalyptus victrix and Acacia aptaneura low open woodland
2. Acacia synchronicia high open shrubland
3. Atriplex bunburyana, Maireana pyramidata and Eremophila spongiocarpa low shrubland
4. *Cenchrus ciliaris, *Cenchrus setiger and Eragrostis tenellula tussock grassland over mixed very open herbs

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☒ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV496 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Sclerolaena recurvicauspis (W.Fitzg.) Domin</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>06/06/2012</u>	CONSERVATION STATUS: _____	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
		Land manager present: <input type="checkbox"/>	
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	<input type="checkbox"/> No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7513126</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	<input type="checkbox"/> Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>781515</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Specify other: <u>Mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>		Area observed (m ²): _____
EFFORT: Time spent surveying (minutes): _____		No. of minutes spent / 100 m ² : _____
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>		Count method: _____
(Refer to field manual for list)		
WHAT COUNTED:	Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature: Juveniles: Seedlings: Totals:	
Alive	<u>5+</u>	Area of pop (m ²): _____
Dead		Note: Pls record count as numbers (not percentages) for database.
QUADRATS PRESENT:	No. <u>FMA74.01</u> Size <u>50 x 50m</u>	Data attached <input type="checkbox"/> Total area of quadrats (m ²): <u>2500</u>
Summary Quad. Totals: Alive		
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/> Vegetative <input type="checkbox"/> Flowerbud <input checked="" type="checkbox"/> Flower <input checked="" 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Acacia synchronicia, *Vachellia farnesiana and Acacia aptaneura scattered tall shrubs
2. Eremophila spongiorcarpa, Atriplex bunburyana, Tecticornia indica subsp. bidens, Sclerolaena cuneata and Sclerolaena recurvicauspis low open heath
3. Eragrostis pergracilis, Eragrostis tenellula, *Cenchrus ciliaris and *Cenchrus setiger very open tussock grassland
- 4.

ASSOCIATED

SPECIES:

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: Very old Year: Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV495 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eragrostis curvula</u>	TPFL Pop. No: _____
OBSERVATION DATE: <u>28/04/2012</u>	CONSERVATION STATUS: _____ New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>	PHONE: <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
DATUM:		COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> AGD84 / AMG84	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	<input type="checkbox"/> Unknown <input type="checkbox"/>	Lat / Northing: <u>7518290</u>	No. satellites: _____ Map used: _____
		Long / Easting: <u>768367</u>	Boundary polygon captured: <input type="checkbox"/> Map scale: _____
LAND TENURE:		ZONE: <u>50</u>	
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/>
			Other Crown reserve <input type="checkbox"/>
			Specify other: <u>Mining tenement</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	100+			100+
Dead				
Area of pop (m ²): _____				
Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMAJM01.01</u>	Size <u>Opp coll</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input type="checkbox"/>
	Immature fruit <input checked="" 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input checked="" type="checkbox"/>			Clay <input type="checkbox"/>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Tecticornia with mixed grasses

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.) _____

SPECIMEN: Collectors No: ENV497 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to Administrative Officer, Flora, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

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.

TAXON: <u>Eleocharis papillosa Latz</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>03/05/2012</u>	CONSERVATION STATUS: <u>P3</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Damian Buller and Julia Mattner</u>		PHONE <u>(08) 9214 6100</u>
ROLE: <u>Botanist and Principal Botanist, respectively</u>	ORGANISATION: <u>ENV Australia</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
90 km N of Newman town site, Western Australia

DEC DISTRICT: <u>Pilbara</u>		LGA: _____	Reserve No: _____
Land manager present: <input type="checkbox"/>			
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)		METHOD USED:
<input type="checkbox"/> GDA94 / MGA94	<input type="checkbox"/> DecDegrees <input type="checkbox"/> DegMinSec <input checked="" type="checkbox"/> UTM	<input checked="" type="checkbox"/> GPS <input type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	<input type="checkbox"/> No. satellites: _____ Map used: _____
<input type="checkbox"/> AGD84 / AMG84	Lat / Northing: <u>7509464</u>	<input type="checkbox"/> Boundary polygon captured: <input type="checkbox"/>	<input type="checkbox"/> Map scale: _____
<input type="checkbox"/> WGS84 <input checked="" type="checkbox"/>	Long / Easting: <u>783769</u>		
<input type="checkbox"/> Unknown <input type="checkbox"/>	ZONE: <u>50</u>		
LAND TENURE:			
<input type="checkbox"/> Nature reserve	<input type="checkbox"/> Timber reserve	<input type="checkbox"/> Private property	<input type="checkbox"/> Rail reserve
<input type="checkbox"/> National park	<input type="checkbox"/> State forest	<input type="checkbox"/> Pastoral lease	<input type="checkbox"/> MRWA road reserve
<input type="checkbox"/> Conservation park	<input type="checkbox"/> Water reserve	<input type="checkbox"/> UCL <input type="checkbox"/> SLK/Pole _____ to _____	<input type="checkbox"/> Shire road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Specify other: <u>Mining tenement</u>			

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/> Area observed (m ²): _____				
EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m ² : _____				
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/> Count method: _____ (Refer to field manual for list)				
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1000+</u>			<u>1000+</u>
Dead				
Area of pop (m ²): _____ Note: Pls record count as numbers (not percentages) for database.				
QUADRATS PRESENT:	No. <u>FMAJM03.02</u>	Size <u>Opp coll</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m ²): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input type="checkbox"/>
	Immature fruit <input checked="" type="checkbox"/>	Fruit <input checked="" 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+)			
•			
•			
•			

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

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input checked="" type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>		Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	0-10% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	30-50% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____	50-100% <input type="checkbox"/>	Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>			Clay <input type="checkbox"/>		
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
Specific Landform Element: _____ (Refer to field manual for additional values)					
CONDITION OF SOIL: Dry <input type="checkbox"/> Moist <input checked="" type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/>					

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Muehlenbeckia and Tecticornia over Sporobolus over Eleocharis papillosa and Marsilea

2.

3.

4.

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

SPECIMEN: Collectors No: ENV498 WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other: _____

Submitter of Record: Damian Buller Role: Botanist Signed: _____ Date: 26/07/2012

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

RECORDS: Please forward to Administrative Officer, Flora, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database ☐

APPENDIX K

LOCATION OF INTRODUCED FLORA

CHRISTMAS CREEK LOM FLORA AND VEGETATION ASSESSMENT

APPENDIX K

LOCATION OF INTRODUCED FLORA

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Acetosa vesicaria</i>	OPPCOLL	769170	7522911	X			
	OPPCOLL	765364	7522947				X
	FMC02	779569	7524001	X			
	OPPCOLL	769170	7522911			X	
	OPPCOLL	779569	7524001			X	
<i>*Aerva javanica</i>	OPPCOLL	761340	7528757				X
	OPPCOLL	778373	7524053				X
	FMR42	781298	7518951	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	760284	7524879	X			
	OPPCOLL	781445	7516844				X
	FMR41	781964	7519242	X			
	OPPCOLL	783399	7523318				X
	OPPCOLL	787720	7513716				X
	FMR37	789833	7516260	X			
	OPPCOLL	791250	7508810				X
	OPPCOLL	792317	7516985				X
	OPPCOLL	794339	7517711				X
	FMC11	795844	7519251	X			
	OPPCOLL	801179	7517459				X
	OPPCOLL	792907	7512915			X	
	OPPCOLL	789767	7516334			X	
	OPPCOLL	800051	7516599			X	
	OPPCOLL	781312	7518883			X	
	OPPCOLL	782023	7519203			X	
	OPPCOLL	795844	7519251			X	
	OPPCOLL	769170	7522911			X	
	OPPCOLL	769207	7523134			X	
	OPPCOLL	766830	7523423			X	
	OPPCOLL	760329	7524792			X	
	OPPCOLL	759001	7525019			X	
	OPPCOLL	756791	7525706			X	
<i>*Argemone mexicana</i>	OPPCOLL	796000	7519100			X	
	OPPCOLL	760284	7524879			X	
	OPPCOLL	760176	7525616			X	
	OPPCOLL	760350	7525850			X	
	OPPCOLL	760400	7525850			X	

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Argemone ochroleuca</i>	OPPCOLL	760284	7524879	X			
	OPPCOLL	760359	7525666				X
	OPPCOLL	794061	7515781				X
	OPPCOLL	796005	7519490				X
	OPPCOLL	760403	7525757			X	
<i>*Bidens bipinnata</i>	OPPCOLL	760533	7524916	X			
	OPPCOLL	765420	7522834	X			
	OPPCOLL	769143	7522932	X			
	OPPCOLL	794844	7512143	X			
	OPPCOLL	799066	7516749	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	756852	7524149				X
	OPPCOLL	758342	7523573				X
	OPPCOLL	760607	7524179				X
	OPPCOLL	760745	7524834				X
	OPPCOLL	760838	7522291				X
	OPPCOLL	760951	7520790				X
	OPPCOLL	762166	7525636				X
	OPPCOLL	762293	7523225				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	763634	7523124				X
	OPPCOLL	763886	7525611				X
	OPPCOLL	765284	7521022				X
	OPPCOLL	765523	7524510				X
	OPPCOLL	765618	7522069				X
	OPPCOLL	766384	7524301				X
	OPPCOLL	768157	7523093				X
	OPPCOLL	768508	7524356				X
	OPPCOLL	770270	7518820				X
	OPPCOLL	771050	7524280				X
	OPPCOLL	772752	7520452				X
	OPPCOLL	773024	7523383				X
	FMR18	773246	7522659	X			
	OPPCOLL	773901	7523150				X
	FMC16	774780	7523309	X			
	OPPCOLL	775124	7523911				X
	OPPCOLL	775849	7517815				X
	FMC15	776332	7523577	X			
	OPPCOLL	776569	7519458				X
	OPPCOLL	777209	7521970				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X
	OPPCOLL	778373	7524053				X
	OPPCOLL	778844	7524859				X
<i>*Bidens bipinnata</i>	OPPCOLL	779339	7519773				X

Taxa	Site Number	Easting	Northing	Survey			
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Bidens bipinnata</i>	OPPCOLL	780345	7515145				X
	OPPCOLL	781614	7523576				X
	FMR41	781964	7519242	X			
	OPPCOLL	782229	7513606				X
	OPPCOLL	783615	7519452				X
	OPPCOLL	783765	7523623				X
	FMR16	784075	7518055	X			
	OPPCOLL	784731	7519039				X
	OPPCOLL	785145	7515144				X
	FMR39	785150	7517650	X			
	OPPCOLL	785527	7516889				X
	FMC03	785773	7521416	X			
	OPPCOLL	786314	7514672				X
	OPPCOLL	787295	7515849				X
	OPPCOLL	787409	7520072				X
	FMC19	787722	7520236	X			
	FMR15	788219	7515876	X			
	FMC14	788839	7519633	X			
	FMR38	789533	7516064	X			
	FMR37	789833	7516260	X			
	OPPCOLL	790394	7516431				X
	OPPCOLL	790835	7520126				X
	OPPCOLL	793751	7520010				X
	OPPCOLL	796005	7519490				X
	OPPCOLL	798358	7516668				X
	FMC07	798424	7518661	X			
	OPPCOLL	798836	7519014				X
	OPPCOLL	800050	7517710				X
	OPPCOLL	800057	7516966				X
	OPPCOLL	800279	7516875				X
	OPPCOLL	802320	7519194				X
<i>*Cenchrus ciliaris</i>	OPPCOLL	760284	7524879	X			
	OPPCOLL	760533	7524916	X			
	OPPCOLL	765420	7522834	X			
	OPPCOLL	789833	7516260	X			
	OPPCOLL	795844	7519251	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	756852	7524149				X
	OPPCOLL	758342	7523573				X
	OPPCOLL	758342	7523573				X
	OPPCOLL	760359	7525666				X
	OPPCOLL	760607	7524179				X
	OPPCOLL	760745	7524834				X
	OPPCOLL	760824	7526610				X
	OPPCOLL	760838	7522291				X

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Cenchrus ciliaris</i>	OPPCOLL	760951	7520790				X
	OPPCOLL	761340	7528757				X
	OPPCOLL	761356	7528773				X
	OPPCOLL	762293	7523225				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	763634	7523124				X
	OPPCOLL	763886	7525611				X
	OPPCOLL	765284	7521022				X
	OPPCOLL	766384	7524301				X
	OPPCOLL	768157	7523093				X
	OPPCOLL	768892	7522882				X
	OPPCOLL	770270	7518820				X
	OPPCOLL	770723	7526667				X
	OPPCOLL	772752	7520452				X
	OPPCOLL	773024	7523383				X
	FMR18	773246	7522659	X			
	OPPCOLL	773901	7523150				X
	FMC16	774780	7523309	X			
	OPPCOLL	775849	7517815				X
	OPPCOLL	776569	7519458				X
	OPPCOLL	776581	7515186				X
	OPPCOLL	777209	7521970				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X
	OPPCOLL	778373	7524053				X
	OPPCOLL	778401	7522693				X
	OPPCOLL	779339	7519773				X
	FMC02	779569	7524001	X			
	OPPCOLL	780200	7518317				X
	OPPCOLL	780345	7515145				X
	FMR46	780582	7520292	X			
	FMR17	781126	7519418	X			
	OPPCOLL	781445	7516844				X
	OPPCOLL	781661	7517895				X
	FMR40	781874	7519367	X			
	FMR41	781964	7519242	X			
	OPPCOLL	782229	7513606				X
	OPPCOLL	783399	7523318				X
	OPPCOLL	783765	7523623				X
	FMR16	784075	7518055	X			
	OPPCOLL	784464	7510373				X
	OPPCOLL	785145	7515144				X
	FMC03	785773	7521416	X			
	OPPCOLL	786314	7514672				X
	OPPCOLL	787295	7515849				X

Taxa	Site Number	Easting	Northing	Survey			
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Cenchrus ciliaris</i>	OPPCOLL	787409	7520072				X
	OPPCOLL	787720	7513716				X
	FMC19	787722	7520236	X			
	FMR15	788219	7515876	X			
	OPPCOLL	788445	7512231				X
	FMR38	789533	7516064	X			
	OPPCOLL	789820	7513290				X
	FMR37	789833	7516260	X			
	OPPCOLL	790394	7516431				X
	OPPCOLL	790394	7516431				X
	OPPCOLL	790604	7514784				X
	OPPCOLL	790835	7520126				X
	OPPCOLL	791250	7508810				X
	OPPCOLL	792317	7516985				X
	OPPCOLL	792317	7516985				X
	OPPCOLL	794061	7515781				X
	OPPCOLL	794339	7517711				X
	FMC11	795844	7519251	X			
	OPPCOLL	796005	7519490				X
	OPPCOLL	796005	7519490				X
	OPPCOLL	800279	7516875				X
	OPPCOLL	801179	7517459				X
<i>*Cenchrus setiger</i>	OPPCOLL	794844	7512143	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	769143	7522932	X			
	OPPCOLL	760284	7524879	X			
	OPPCOLL	760533	7524916	X			
	OPPCOLL	756840	7525979				X
	OPPCOLL	756852	7524149				X
	OPPCOLL	760607	7524179				X
	OPPCOLL	760838	7522291				X
	OPPCOLL	760951	7520790				X
	OPPCOLL	761340	7528757				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	773901	7523150				X
	OPPCOLL	776569	7519458				X
	OPPCOLL	778373	7524053				X
	OPPCOLL	780345	7515145				X
	OPPCOLL	781445	7516844				X
	OPPCOLL	782229	7513606				X
	OPPCOLL	783399	7523318				X
	OPPCOLL	785145	7515144				X
	FMC19	787722	7520236	X			
	OPPCOLL	788445	7512231				X
	FMR37	789833	7516260	X			

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Cenchrus setiger</i>	OPPCOLL	791250	7508810				X
	OPPCOLL	792731	7512704				X
	FMC11	795844	7519251	X			
<i>*Chloris virgata</i>	OPPCOLL	794844	7512143	X			
	XB70	776569	7519458				X
	XB71	775849	7517815				X
	XB72	776581	7515186				X
	XB74	781445	7516844				X
	XB75	780345	7515145				X
	XB76	782229	7513606				X
	XB77	785145	7515144				X
	XB78	787720	7513716				X
	XB80	784464	7510373				X
	XB85	770270	7518820				X
<i>*Citrullus colocynthis</i>	OPPCOLL	762166	7525636				X
	OPPCOLL	768508	7524356				X
	OPPCOLL	771050	7524280				X
	OPPCOLL	773024	7523383				X
	OPPCOLL	775849	7517815				X
	OPPCOLL	776569	7519458				X
	OPPCOLL	777209	7521970				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X
	OPPCOLL	778373	7524053				X
	OPPCOLL	779339	7519773				X
	OPPCOLL	780200	7518317				X
	OPPCOLL	780345	7515145				X
	FMC17	780512	7523905	X			
	FMR42	781298	7518951	X			
	OPPCOLL	781614	7523576				X
	FMR40	781874	7519367	X			
	OPPCOLL	782229	7513606				X
	OPPCOLL	783399	7523318				X
	OPPCOLL	783615	7519452				X
	OPPCOLL	783765	7523623				X
	OPPCOLL	784731	7519039				X
	OPPCOLL	785145	7515144				X
	OPPCOLL	785527	7516889				X
	OPPCOLL	787409	7520072				X
	OPPCOLL	790394	7516431				X
	OPPCOLL	791308	7520072				X
	OPPCOLL	793751	7520010				X
	OPPCOLL	794061	7515781				X
	OPPCOLL	794339	7517711				X

Taxa	Site Number	Easting	Northing	Survey			
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Citrullus colocynthis</i>	OPPCOLL	798358	7516668				X
	OPPCOLL	798836	7519014				X
	OPPCOLL	800279	7516875				X
<i>*Cucumis melo subsp. agrestis</i>	OPPCOLL	760284	7524879	X			
	OPPCOLL	760533	7524916	X			
	OPPCOLL	769143	7522932	X			
	OPPCOLL	789833	7516260	X			
	OPPCOLL	794844	7512143	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	756840	7525979				X
	OPPCOLL	756852	7524149				X
	OPPCOLL	758808	7526463				X
	OPPCOLL	760951	7520790				X
	OPPCOLL	761340	7528757				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	763155	7525622				X
	OPPCOLL	763634	7523124				X
	OPPCOLL	765284	7521022				X
	OPPCOLL	765284	7521022				X
	OPPCOLL	765618	7522069				X
	OPPCOLL	770270	7518820				X
	FMR18	773246	7522659	X			
	OPPCOLL	773901	7523150				X
	OPPCOLL	778373	7524053				X
	FMR17	781126	7519418	X			
	FMR42	781298	7518951	X			
	FMR40	781874	7519367	X			
	OPPCOLL	783399	7523318				X
	FMR16	784075	7518055	X			
	OPPCOLL	785145	7515144				X
	FMC19	787722	7520236	X			
	FMR15	788219	7515876	X			
	OPPCOLL	788445	7512231				X
	FMR38	789533	7516064	X			
	FMR37	789833	7516260	X			
	OPPCOLL	791250	7508810				X
<i>*Echinochloa colona</i>	OPPCOLL	775849	7517815				X
	OPPCOLL	776569	7519458				X
	OPPCOLL	776581	7515186				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X
	OPPCOLL	782229	7513606				X
	OPPCOLL	785145	7515144				X
	OPPCOLL	786314	7514672				X

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Echinochloa colona</i>	OPPCOLL	760284	7524879				
<i>*Flaveria trinervia</i>	OPPCOLL	760951	7520790				X
	FMC19	787722	7520236	X			
	FMR37	789833	7516260	X			
	OPPCOLL	800051	7516599				
	OPPCOLL	760284	7524879				
<i>*Malvastrum americanum</i>	OPPCOLL	760838	7522291				X
	OPPCOLL	794844	7512143			X	
	OPPCOLL	788219	7515876			X	
	OPPCOLL	789533	7516064			X	
	OPPCOLL	789833	7516260			X	
	OPPCOLL	795844	7516599			X	
	OPPCOLL	800051	7516599			X	
	OPPCOLL	785150	7517650			X	
	OPPCOLL	784075	7518055			X	
	OPPCOLL	781964	7519242			X	
	OPPCOLL	781114	7519418			X	
	OPPCOLL	773246	7522659			X	
	OPPCOLL	765420	7522834			X	
	OPPCOLL	769143	7522932			X	
	OPPCOLL	774780	7523309			X	
	OPPCOLL	794318	7523799			X	
	OPPCOLL	779569	7524001			X	
	OPPCOLL	760533	7524916			X	
	OPPCOLL	760951	7520790				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	772752	7520452				X
	FMR18	773246	7522659	X			
	OPPCOLL	773901	7523150				X
	FMC16	774780	7523309	X			
	OPPCOLL	776569	7519458				X
	OPPCOLL	776581	7515186				X
	OPPCOLL	778373	7524053				X
	FMC02	779569	7524001	X			
	FMR46	780582	7520292	X			
	FMR17	781126	7519418	X			
	OPPCOLL	781445	7516844				X
	FMR40	781874	7519367	X			
	FMR41	781964	7519242	X			
	OPPCOLL	782229	7513606				X
	FMR16	784075	7518055	X			
	OPPCOLL	784464	7510373				X
	OPPCOLL	785145	7515144				X
	50	786271	7508214		X		
	FMR15	788219	7515876	X			

Taxa	Site Number Easting Northing			Survey			
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Malvastrum americanum</i>	OPPCOLL	788445	7512231				X
	FMR38	789533	7516064	X			
	FMR37	789833	7516260	X			
	OPPCOLL	791250	7508810				X
	FMC11	795844	7519251	X			
	OPPCOLL	801179	7517459				X
	OPPCOLL	760284	7524879	X			
	OPPCOLL	760533	7524916	X			
	OPPCOLL	765420	7522834	X			
	OPPCOLL	769143	7522932	X			
	OPPCOLL	794844	7512143	X			
<i>*Portulaca oleracea</i>	OPPCOLL	756852	7524149				X
	OPPCOLL	756852	7524149				X
	OPPCOLL	758342	7523573				X
	OPPCOLL	758808	7526463				X
	OPPCOLL	760607	7524179				X
	OPPCOLL	760824	7526610				X
	OPPCOLL	760838	7522291				X
	OPPCOLL	760951	7520790				X
	OPPCOLL	761340	7528757				X
	OPPCOLL	762166	7525636				X
	OPPCOLL	762293	7523225				X
	OPPCOLL	762583	7521925				X
	OPPCOLL	763634	7523124				X
	OPPCOLL	763886	7525611				X
	OPPCOLL	765284	7521022				X
	OPPCOLL	765523	7524510				X
	OPPCOLL	765618	7522069				X
	OPPCOLL	766384	7524301				X
	OPPCOLL	766541	7525994				X
	OPPCOLL	768157	7523093				X
	OPPCOLL	768508	7524356				X
	OPPCOLL	770270	7518820				X
	OPPCOLL	771050	7524280				X
	OPPCOLL	772442	7517919				X
	OPPCOLL	772752	7520452				X
	OPPCOLL	773024	7523383				X
	OPPCOLL	773901	7523150				X
	OPPCOLL	775124	7523911				X
	OPPCOLL	775849	7517815				X
	OPPCOLL	776569	7519458				X
	OPPCOLL	776581	7515186				X
	OPPCOLL	777209	7521970				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Portulaca oleracea</i>	OPPCOLL	778373	7524053				X
	OPPCOLL	778844	7524859				X
	OPPCOLL	779339	7519773				X
	OPPCOLL	780200	7518317				X
	OPPCOLL	780345	7515145				X
	OPPCOLL	781445	7516844				X
	OPPCOLL	781445	7516844				X
	OPPCOLL	781614	7523576				X
	OPPCOLL	781661	7517895				X
	OPPCOLL	782229	7513606				X
	OPPCOLL	783399	7523318				X
	OPPCOLL	783615	7519452				X
	OPPCOLL	783765	7523623				X
	OPPCOLL	784464	7510373				X
	OPPCOLL	784731	7519039				X
	OPPCOLL	785145	7515144				X
	OPPCOLL	785527	7516889				X
	OPPCOLL	786314	7514672				X
	OPPCOLL	787295	7515849				X
	OPPCOLL	787409	7520072				X
	OPPCOLL	787720	7513716				X
	OPPCOLL	788445	7512231				X
	OPPCOLL	789820	7513290				X
	OPPCOLL	790394	7516431				X
	OPPCOLL	790604	7514784				X
	OPPCOLL	790604	7514784				X
	OPPCOLL	791250	7508810				X
	OPPCOLL	791308	7520072				X
	OPPCOLL	792731	7512704				X
	OPPCOLL	793751	7520010				X
	OPPCOLL	798358	7516668				X
	OPPCOLL	800057	7516966				X
	OPPCOLL	800284	7519609				X
	OPPCOLL	801179	7517459				X
	OPPCOLL	802360	7519133				X
<i>*Prosopis glandulosa</i>	OPPCOLL	792871	7512795			X	
	OPPCOLL	792907	7512965			X	
	OPPCOLL	793367	7513621			X	
	OPPCOLL	793516	7514104			X	
	OPPCOLL	793526	7514458			X	
	OPPCOLL	793640	7514919			X	
	OPPCOLL	793828	7515371			X	
	OPPCOLL	794363	7517765			X	
<i>*Setaria verticillata</i>	OPPCOLL	760951	7520790				X
	OPPCOLL	773024	7523383				X

Taxa				Survey			
	Site Number	Easting	Northing	Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Setaria verticillata</i>	OPPCOLL	776569	7519458				X
	OPPCOLL	777422	7520814				X
	OPPCOLL	778214	7514573				X
	OPPCOLL	779339	7519773				X
	FMC02	779569	7524001	X			
	OPPCOLL	780345	7515145				X
	OPPCOLL	781614	7523576				X
	FMR41	781964	7519242	X			
	OPPCOLL	783615	7519452				X
	FMR16	784075	7518055	X			
	OPPCOLL	784731	7519039				X
	FMR37	789833	7516260	X			
	OPPCOLL	792731	7512704				X
	OPPCOLL	765420	7522834	X			
	OPPCOLL	769143	7522932	X			
	OPPCOLL	794844	7512143	X			
	OPPCOLL	799221	7517754	X			
	OPPCOLL	800051	7516599	X			
	OPPCOLL	794844	7512143			X	
	OPPCOLL	789833	7516260			X	
	OPPCOLL	800051	7516599			X	
	OPPCOLL	799221	7517754			X	
	OPPCOLL	784075	7518055			X	
	OPPCOLL	781964	7519242			X	
	OPPCOLL	765420	7522834			X	
	OPPCOLL	769143	7522932			X	
	OPPCOLL	779569	7524001			X	
	OPPCOLL	787295	7515849				X
<i>*Sonchus oleraceus</i>	OPPCOLL						X
<i>*Tribulus terrestris</i>	OPPCOLL	762583	7521925				X
	OPPCOLL	781445	7516844				X
	OPPCOLL	783399	7523318				X
	OPPCOLL	787720	7513716				X
	OPPCOLL	792731	7512704				X
<i>*Vachellia farnesiana</i>	OPPCOLL	773901	7523150				X
	OPPCOLL	780200	7518317				X
	OPPCOLL	780345	7515145				X
	OPPCOLL	781445	7516844				X
	OPPCOLL	781661	7517895				X
	FMR40	781874	7519367	X			
	FMR41	781964	7519242	X			
	OPPCOLL	794844	7512143	x			
	OPPCOLL	782229	7513606				X
	OPPCOLL	785145	7515144				X
	OPPCOLL	786314	7514672				X

Taxa	Site Number	Easting	Northing	Survey			
				Biota (2004a)	Mattiske (2007)	FMG Database (2010)	ENV Surveys 2011 to 2013
<i>*Vachellia farnesiana</i>	OPPCOLL	787295	7515849				X
	OPPCOLL	787720	7513716				X
	FMR15	788219	7515876	X			
	OPPCOLL	788445	7512231				X
	FMR38	789533	7516064	X			
	OPPCOLL	789820	7513290				X
	FMR37	789833	7516260	X			
	OPPCOLL	790394	7516431				X
	OPPCOLL	791250	7508810				X
	OPPCOLL	792317	7516985				X
	OPPCOLL	794339	7517711				X
	OPPCOLL	800622	7517097				X
	OPPCOLL	802216	7519198				X
	OPPCOLL	793504	7514214			X	
	OPPCOLL	790618	7516777			X	
	OPPCOLL	781797	7518294			X	

Australian Geocentric 1994 (GDA94), Zone 50K

Report

Christmas Creek Vegetation Health Monitoring and Management Plan – Annual Report, December 2013

Environment

28/02/2014

CC-RP-EN-0058


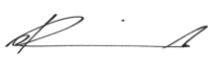

12306-13-PSR-1RevC_140228



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	Christmas Creek – Vegetation Health Monitoring and Management Program – Annual Report			CC-RP-EN-0058 12306-13-PSR-1RevC_140228
Revision Number	C			28/02/2014
Status	DRAFT			
Author	Tonja Boyd	 Signature	17/12/2013	
Checked	Robert Archibald	 Signature	17/12/2013	
Approved	Sam Atkinson	 Signature	17/12/2013	
Confidentiality	Choose an item.	Publish on Extranet	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Review Date	28/02/2014			

Revision History (to be completed for each version retained by Document Control)

Author	Checker	Approver	Rev No.	Status	Issued Date
S. Tsang/R. Archibald	T. Boyd	S. Atkinson	B	DRAFT	3/02/2014
T. Boyd	S. Atkinson	S. Pearse	C	DRAFT	28/02/2014

This document was prepared on behalf of
Fortescue Metals Group Limited by:



Approved by Fortescue:	First Name Surname Here	Signature	Click here to enter a date.
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ABBREVIATIONS

Abbreviation	Definition
°C	Degrees Celsius
%	Per cent
ANOVA	Analysis of Variance
Astron	Astron Environmental Services
BoM	Bureau of Meteorology
CCS	Crown Condition Score
cm ²	Centimetres Squared
DBH	Diameter-at-Breast-Height-over-Bark
DEC	Department of Environment and Conservation
DI	Drawdown Impact
DR	Drawdown Reference
EI	Eastern Impact
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ER	Eastern Reference
Fortescue	Fortescue Metals Group Pty Ltd
g	Grams
m	Metres
Md	Midday
mm	Millimetres
MPa	Mega Pascals
NMDS	Non-metric Multidimensional Scaling
Pd	Predawn
PERMANOVA	Permutational Multivariate Analysis of Variance
PFC	Projected Foliar Cover
SI	Samphire Impact
SR	Samphire Reference
the Program	Vegetation Health Monitoring and Management Program
the Project	Christmas Creek Water Management Scheme Project
the Project area	Christmas Creek Mine Site
VHMMP	Vegetation Health Monitoring and Management Plan
VPD	Vapour Pressure Deficit
w/w %	Percentage Weight for Weight
WI	Western Impact
WR	Western Reference

GLOSSARY

Adaptive management – An approach to management that is based on making decisions as part of an on-going process of monitoring, review and adaptation.

Atmospheric demand – The demand for water from soil and vegetated surfaces owing to weather conditions which determines the rate of water vapour exchange between the given surface and the atmosphere; this represents the amount of water used by vegetation (de Jager & van Zyl 1989).

Basal area – The sum of the cross-sectional areas of all the stems of a tree at diameter at breast height over bark.

Dewater – Process to exclude groundwater from entering a mine via pumping.

Diameter at breast height over bark (DBH) – Measurement of tree trunk diameter (over bark) taken at breast height (1.3 m from the ground).

Drawdown – Decline in water level (usually referring to groundwater) resulting from the rate of extraction exceeding the rate of replenishment.

Ecosystem function – The capacity of a system to provide and maintain essential regulatory, habitat, production and information processes and structures via complex interactions between biotic and abiotic components in order to maintain biodiversity.

Ecosystem service value – The value of processes or materials that are provided by ecosystems; such as clean water, climate regulation and nutrient cycling.

Edaphic – Of or relating to soil, usually in relation to soil properties.

Epicormic growth – Activation and growth of dormant buds in stems of trees that often arise after stress, such as from physical damage (e.g. fire or insect attack) or from physiological changes (e.g. water deficit).

Groundwater – Water found in the saturated zone of a soil profile.

Groundwater abstraction – The removal of groundwater for industrial, commercial or domestic use.

Groundwater reinjection – The return of excess groundwater to the groundwater system (aquifer) following dewatering and abstraction in order to conserve water for future use and to minimise environmental effects.

Keystone species – Species which provide high ecosystem service value to the community, or species with high conservation value of which little precise knowledge regarding ecosystem function is known.

Leaf water potential – The energy state of water within the conducting tissue of a leaf as measured in units of pressure. Leaf water potential is positively correlated with water status of the leaf and whole plant. So, in general, higher plant water contents equate with higher leaf water potential.

Life history – The descriptive account of the stages through which an organism passes during its existence, starting from birth through to death.

Phenology – The study of periodic biological phenomena, such as flowering, in relation to the seasons and/or climate.

Phreatophyte – A plant which is either wholly or partly reliant on groundwater for all or part of the year in order to meet its water demands.

Phyllode – A flat, leaf-like petiole functioning as a photosynthetic organ, usually in the absence of a leaf blade.

Saddle – A low point on a ridge or interfluvies, generally a divide between the heads of streams flowing in opposite directions.

Soil moisture – Water contained in the pore spaces of a soil.

Species zonation – The distribution of species across different geographical zones, such as the variation in depth to groundwater.

Stressor – Environmental factor that reduces plant performance.

Water status – Loose term that describes how well a plant's requirements for water are being met, combining factors such as leaf water potential, stomatal conductance and transpiration (Lambers et al. 1998).

Water table – The surface below which soil strata are saturated with water.

EXECUTIVE SUMMARY

Fortescue Metals Group Pty Ltd (Fortescue) operates a series of iron ore mines in the Pilbara region of Western Australia, including the Chichester Operations. The Christmas Creek mine site is one of two operating iron ore mines which form the Chichester Operations. Mining commenced at the Christmas Creek mine site in 2008. Mining post-2011 required access to ore below the water table and a subsequent increase in dewatering. The Christmas Creek Water Management Scheme project (the Project) was approved as per Ministerial Statement 871 in August 2011. According to Ministerial conditions, Fortescue is required to manage groundwater abstraction and disposal (dewatering and injection) to ensure:

1. There is no adverse impact on native vegetation communities attributable to the project outside the predicted impact areas.
2. Within the proposed impact areas there is no mortality of keystone plant species or significant changes in habitat characteristics attributable to the project.

The Vegetation Health Monitoring and Management Plan (VHMMP [CC-PL-EN-0004 Rev2]) was designed to satisfy Condition 8 of Ministerial Statement 871. This plan specifies monitoring management triggers for the four keystone plant species and their associated habitats identified as occurring within the Project area: *Acacia aneura* (mulga), *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Tecticornia* spp. (samphire). Despite *Eucalyptus camaldulensis* being mapped within the Project area, none were identified as occurring within the monitoring sites.

The plan outlines that an initial exceedance of a trigger value necessitates an increased frequency of monitoring and additional analysis to determine whether the cause of the exceedance is due to the dewatering or injection (Level 1 Vegetation Management Response Trigger). If Level 1 investigations identify that significant adverse differences attributable to the Project are determined or predicted to occur without management intervention then a Level 2 Vegetation Management Response Trigger is exceeded. If this occurs, the VHMMP requires further monitoring be undertaken along with management intervention and subsequent additional reporting obligations.

Results of the 2013 monitoring surveys indicate that Level 1 monitoring management triggers have been exceeded in all three communities. As such, Fortescue is required to implement the responses as outlined under Section 11 (Corrective Action) of the VHMMP (CC-PL-EN-0004 Rev2) which involves increased frequency of monitoring and a further analysis of cause and effect. However, excluding the results specific to monitoring management triggers, when all trends within the three communities were examined, there was no strong indication that an impact has occurred, especially for the phreatophytic and samphire communities; further investigation as directed by the VHMMP (CC-PL-EN-0004 Rev2) is necessary to confirm this.

At mulga monitoring sites, Level 1 triggers have been exceeded for midday water potential (EI3), canopy cover (EI3 and EI4) and multivariate values for all ecophysiological parameters

(EI3). Despite the exceedances, overall, the condition of mulga in both eastern and western areas as assessed by visual health ratings was good with reference and potential impact sites comparable and trending similarly in 2013. There have also been no deaths of sample trees to date. Declining soil moisture at both the reference and potential impact sites at the end of the dry season (November 2013) indicates that if mounding is occurring, groundwater remains below 0.5 m depth and therefore, below the depth of the majority of mulga roots.

In the phreatophytic community, monitoring management triggers were exceeded for predawn water potential for both potential impact sites during 2013 and for potential impact site DI1 in the multivariate control chart analysis in November 2013. Further investigation of the exceedances is likely to indicate that groundwater drawdown was not the cause of the trends observed and that the trees are maintaining good health. If dewatering was having an effect at the monitoring sites then water potential would be expected to be significantly lower than at the reference site and displaying a negative trend.

Two of the monitoring management triggers were exceeded in monitoring of the samphire community: height of samphires was significantly greater in the potential impact area and there was a difference in the multivariate analysis of height and tip die back (health). Reporting against the monitoring management trigger in relation to community composition change was not possible due to the inability to identify species because of the absence of reproductive structures on the plants at both reference and potential impact sites. Despite the exceedances, samphire communities within both the reference and potential impact areas appear in relatively good health. Further, health of samphires is rated as higher in the potential impact site than at the reference site. Differences in height and trends in health may be due to inherent site differences such as depth of soil and soil salinity as potential impact sites are somewhat further from the centre of the Fortescue Marsh than reference sites.

Based on the findings of the 2013 monitoring surveys, the following recommendations are made:

- To address the exceedances of the Level 1 monitoring management triggers, Fortescue implement the responses as outlined under Section 11 (Corrective Action) in the VHMMP (CC-PL-EN-0004 Rev2).
- Fortescue initiates a review of the VHMMP (CC-PL-EN-0004 Rev2) to assess the suitability of the current monitoring management triggers, the limits that have been set and the statistical analyses that are specified to assess them.

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1. INTRODUCTION

1.1 Project Background

Fortescue Metals Group Pty Ltd (Fortescue) has developed the Pilbara Iron Ore and Infrastructure Project, which involves a series of iron ore mines in the Pilbara region of Western Australia. Included in the Pilbara Iron Ore and Infrastructure Project are the Chichester Operations, which has two operating iron ore mines, Cloudbreak and Christmas Creek. The Christmas Creek mine site (the Project area) is located approximately 110 km north of Newman, in the central Pilbara region (Figure 1). Mining commenced in the Project area in 2008.

Prior to 2011, mining within the Project area had been undertaken above the water table. Ongoing mining required access to ore below the water table, so an increase in dewatering is required. Fortescue submitted a proposal (the Christmas Creek Water Management Scheme Project (the Project)) to the Environmental Protection Authority (EPA) to request the dewatering rate at Christmas Creek be increased to 50 gigalitres per annum and that surplus water be injected into the groundwater aquifers. Under Section 40 of the *Environmental Protection Act 1986* the Project required assessment at the level of 'Assessment on Proponent Information' (EPA 2011). The Project was approved by the State Minister for Environment as per Ministerial Statement 871 (MS 871) on 1 August 2011 and by the Federal Minister for Sustainability, Environment, Water, Population and Communities under *Environment, Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval reference EPBC2010/5706, on 11 August 2011.

The Minister set out in the conditions of approval (MS 871, Condition 8-1) that Fortescue should manage groundwater abstraction and disposal (dewatering and injection) to ensure:

1. There is no adverse impact on native vegetation communities attributable to the project outside the predicted impact areas¹.
2. Within the proposed impact areas there is no mortality of keystone plant species or significant changes in habitat characteristics attributable to the project.

Requirements for monitoring were also specified in MS 871. Condition 8-2 requires Fortescue to prepare a Vegetation Health Monitoring and Management Plan (VHMMP) for the Project to verify and ensure that the requirements of Condition 8-1 shall be met. Condition 8-4 requires that monitoring was undertaken prior to injection activities and is to continue until the Chief Executive Officer of the Office of the EPA determines that monitoring may cease.

¹The *predicted/proposed impact areas* are defined in Schedule 2 of MS 871 and are provided in Figures 1 & 2

Figure 1: Location of Christmas Creek mine site.

The current VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) uses the framework developed by the International Union for the Conservation of Nature in order to:

- understand the current state of vegetation potentially affected by modified groundwater levels from dewatering and injection activities
- determine the pressures or threats to that vegetation
- evaluate and select adaptive management responses (Astron 2012a).

The VHMMP is designed to address the scientific rationale, vegetation health and community monitoring, and monitoring schedules required to satisfy Condition 8 of MS 871 and Condition 13 of EPBC2010/5706 (Astron 2012a).

1.2 Keystone Species and Habitats

Keystone plant species identified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) are those species occurring in vegetation communities that provide high ecosystem service value to the community, or are species within communities of high conservation value of which little precise knowledge regarding ecosystem function is known (Astron 2012a, p.7). Keystone plant species and their associated habitats in the Project area as identified in the VHMMP are described below.

1.2.1 Mulga Communities

Mulga communities in the Project area are generally dominated by members of the mulga (*Acacia aneura*) species complex, ranging from low woodland through low open forests to mixed *Acacia* species scrub (Astron 2012a). Mulga communities occur over a broad range of landscape positions in the Project area including along drainage lines and in upslope positions including on saddles between broad drainage areas (Astron 2012a). Baseline groundwater monitoring indicated that depth to groundwater in areas of mulga communities ranges from around 3 m to greater than 15 m. Characteristics of mulga communities which are targeted for the monitoring of habitat and community health include cover, life history stage, and indicative health using measures of water status of dominant *Acacia* species. Comparison between sites allows for an assessment of any adverse impacts on mulga communities.

1.2.2 Phreatophytic Communities

Keystone plant species of the Project area which are restricted to major drainage lines are the phreatophytic riparian trees river red gum (*Eucalyptus camaldulensis*) and the more predominant coolibah (*E. victrix*) (Astron 2012a). Both species grow in open woodland formations in areas where baseline depth to groundwater ranges from about 3 m to greater than 15 m (Astron 2012a). *E. camaldulensis* are not present at any of the current monitoring sites. To

ensure that habitat characteristics are being maintained, monitoring under the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) measures foliage density, canopy health, recruitment and tree water status.

1.2.3 Samphire Communities

Samphire communities of the Project area are largely comprised of *Tecticornia* species and shrubs such as *Muellerolimon salicorniaceum*, *Sesbania cannabina*, *Cullen cinereum* and *Frankenia* species (Astron 2012a). Samphire communities are restricted to marsh areas and range from the outer to fringing areas of marsh. The water table is typically between 2 and 5 m deep near the marsh fringe and shallows towards the centre of the marsh (Astron 2012a). Zonation of samphire species in the Project area is likely to reflect edaphic and water quality conditions as well as varying species tolerances to stressors such as drought, salinity and waterlogging. Zonation also likely reflects varying degrees of groundwater dependence (Astron 2012a). Monitoring focuses on species distribution and plant health. Although taxonomic identification of samphires is problematic, changes in distribution will indicate changes in habitat characteristics and allow for adaptive management to be implemented.

1.3 Environmental Management

As part of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), a series of environmental management objectives were developed with respect to mitigating potential impacts. These were to:

- prevent adverse impact on native vegetation communities attributable to the Project outside the predicted impact areas
- prevent mortality of keystone plant species or significant changes in habitat characteristics attributable to the Project within the dewatering and mounding impact areas.

In order to meet the goals and objectives of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), a detailed monitoring program (the Program) was included as part of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a). The VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) outlines monitoring management triggers for each of the three vegetation communities with the three keystone species in Tables 6, 7 and 8 of the VHMMP. The plan outlines that an initial exceedance of a trigger value necessitates additional analysis to determine whether the cause of the exceedance was due to the dewatering or injection (Level 1 Vegetation Management Response Trigger). Specifically, the response is:

- re-examination of groundwater levels to validate that groundwater is within water management trigger levels
- increase in vegetation monitoring frequency

- compilation of rainfall, soils, and groundwater monitoring information for detailed statistical analyses using generalized linear modelling/multiple regression approach. The outcome of these analyses is to partition the degree of variance towards predictors of the vegetation impact.

If the investigations undertaken in the Level 1 response identify that significant adverse differences attributable to the project are determined or predicted to occur without management intervention, a Level 2 Vegetation Management Response Trigger is exceeded. In this case the response as outlined in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) involves additional monitoring as well as management intervention and various reporting obligations.

Fortescue engaged Astron Environmental Services (Astron) to implement the monitoring program. Baseline surveys were undertaken in 2011 and ongoing monitoring commenced in 2012. In 2013, Fortescue again engaged Astron to implement the monitoring program associated with the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a).

1.4 Report Outline

This document reports on the findings of the two field surveys undertaken in the Program in 2013, the first between 21 and 29 May and the second between 4 and 11 November. The objective of each survey was to measure the state of keystone species and associated habitats at a number of permanent monitoring sites. The broad monitoring hypothesis is that measurements of ecological parameters within keystone vegetation habitat or of keystone species at potential impact sites (drawdown impact areas or mounding impact areas), do not alter significantly beyond the natural variation of the reference sites. Results are presented with reference to monitoring management triggers as outlined in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a).

2. METHODOLOGY

2.1 Design of the Monitoring Program

Monitoring potential impacts on keystone species involves taking repeat measurements at previously installed potential impact and reference sites. Potential impact sites are located in the dewatering zone, where drawdown is predicted to occur and may have an effect on phreatophytic vegetation (coolibah communities), and two reinjection zones (eastern and western), where groundwater mounding is predicted to occur. Groundwater mounding may have an effect on mulga and samphire communities. Clearing of vegetation for operational areas or ore-body mapping had destroyed all three eastern baseline mulga monitoring sites established in 2011. Consequently, in 2012, reinstallation of all eastern mulga monitoring sites, including both reference and potential mounding impact sites, was required. In May 2013 an additional western potential mounding impact site was installed to replace the removal of an existing site which posed a potential health and safety issue: namely irrigation with treated effluent water. An additional potential dewatering impact site was also installed in May 2013. The structure of the monitoring program as of November 2013 is summarised in Table 1.

Table 1: Details of the monitoring sites in the Vegetation Health Monitoring and Management Program.

Monitoring Sites	Site Label	Site Type	Keystone Species	Potential Impact	No. of Sample Trees	No. of Transects	No. of Soil Bores
Western Reference 1	WR1	Reference	Mulga	n/a	30*#	3	4
Western Impact 2	WI2	Potential Impact	Mulga	Mounding	30*	3	4
Western Impact 3	WI3	Potential Impact	Mulga	Mounding	30*	3	4
Eastern Reference 2	ER2	Reference	Mulga	n/a	30*#	3	4
Eastern Impact 3	EI3	Potential Impact	Mulga	Mounding	30*#	3	4
Eastern Impact 4	EI4	Potential Impact	Mulga	Mounding	30*	3	4
Dewatering Reference 1	DR1	Reference	Phreatophytic	n/a	30*	3	n/a
Dewatering Impact 1	DI1	Potential Impact	Phreatophytic	Drawdown	30*	3	n/a
Dewatering Impact 2	DI2	Potential Impact	Phreatophytic	Drawdown	30*	3	n/a
Samphire Reference	SR3-6	Reference	Samphire	n/a	n/a	4	n/a
Samphire Impact	SI1-4	Potential Impact	Samphire	Mounding	n/a	4	n/a

Notes:

*includes a subset of 10 trees subject to quantitative measurements (quantitative sample).

#includes trees that are also monitored as part of MS707 conditions

The location of all currently monitored sites across the lease area is shown in Figure 2. Reference sites for mulga, coolibah and samphire communities are located outside of the predicted impact zones.

Figure 2: Monitoring site locations within the Project area.

The monitoring criteria and data analyses according to type of potential impact were specified in the VHMMP the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) (Error! Not a valid bookmark self-reference.). All monitoring criteria have been met; however, some variations in the approach to analyses were necessary (Error! Not a valid bookmark self-reference.). Further details regarding statistical analyses, including variations from additional analyses specified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) that were not listed in Table 5 of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), are covered in Section 2.12 below. The measurements taken to meet the monitoring criteria as outlined in Error! Not a valid bookmark self-reference. at the reference and potential impact sites include a combination of both qualitative and quantitative assessments and these are summarised in

Table 3. These measurements were taken in accordance with the descriptions in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) with the exception of soil moisture. In the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), soil moisture was to be collected at 1 m depth, but penetration beyond 0.5 m was not possible.

Table 2: Summary of monitoring to be conducted as outlined in Table 5 of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) and any variations necessary in 2013.

Potential Impact	Monitoring Criteria	Data Analysis	Data Analysis (2013)
Groundwater decline due to dewatering.	Qualitative Phreatophytic tree health assessments	Non-parametric ANOVA (Zar 2009)	As specified – Kruskal-Wallis test (a non-parametric ANOVA)
	Quantitative Digital Canopy Photography	Univariate Control Chart – Level 1 management response required in exceedance of 1 Standard Deviation in percentage canopy cover	As specified.
		ANOVA – Level 1 management response required if significant differences normalised data and $p < 0.05$ detected	As specified.
	Quantitative health assessments	Multivariate Control Charts of multiple ecophysiological variables – Level 1 management response required in exceedance of 90% Confidence Interval in Control Chart trend (Anderson and Thompson 2004)	As specified – where sufficient data available (that is, at least three time periods)
		ANOVA – Level 1 management response required if significant differences (normalised data, $p < 0.05$) detected	As specified
Groundwater rise due to reinjection	Qualitative Mulga health assessments	Non-parametric ANOVA (Zar 2009)	As specified – Kruskal-Wallis test (a non-parametric ANOVA)
	Quantitative Mulga water status health assessments	Multivariate Control Charts of multiple ecophysiological variables – Level 1 management response required in exceedance of 90% Confidence Interval in Control Chart trend.	As specified – where sufficient data available (that is, at least three time periods)
		ANOVA – Level 1 management response required if significant differences (normalised data, $p < 0.05$) detected.	As specified
		Tests of association between soil moisture measurements and water status	As specified – correlation analysis
	Samphire community analysis	Multivariate control charts of species presence and cover. Control limit set to 90% Confidence Interval.	Not conducted as species identification has not been possible due to an absence of reproductive parts

Potential Impact	Monitoring Criteria	Data Analysis	Data Analysis (2013)
		Per-MANOVA. Identification of significant species changes. Between year shifts in Samphire community represented in pairwise Analysis of Similarity Ordination Plots (Clarke and Warwick 2001).	Not conducted as species identification has not been possible due to an absence of reproductive parts
	Samphire health	Univariate Control Chart – Level 1 management response required in exceedance of 1 Standard Deviation in tip die off and height.	As specified for height but not for tip die off; calculation of 1 standard deviation not possible for these data due to the 3-category scale of measurement
		MANOVA – Level 1 management response required if significant differences ($p < 0.05$) detected.	A non-parametric equivalent to MANOVA (PERMANOVA) was used due to the data not meeting the assumptions required for parametric tests

Table 3: A summary of methods used in the monitoring program.

Measurement	Method	Sample no. per site	Description	Reference
Climate and Weather	Rainfall and vapour pressure deficit	n/a	Calculation of atmospheric demand from saturated and actual vapour pressure.	Bureau of Meteorology (2013a; 2013b), FMG Cloudbreak station and Webb (2010)
Soil Moisture	Gravimetric soil moisture	4 holes	Soil sampled from 0.4 to 0.5 m	n/a
Predawn Leaf Water Potential	Scholander pressure chamber	10 trees (4 sub-samples per tree)	Shoots are collected before dawn and tested in a pressure chamber. Measures water stress in relation to soil moisture availability.	Turner (1988)
Midday Leaf Water Potential	Scholander pressure chamber	10 trees (4 sub-samples per tree)	Shoots are collected at midday and tested in a pressure chamber. Measures water stress in relation to soil moisture availability and atmospheric loss.	Turner (1988)
Projected Foliar Cover (PFC)	Digital canopy photography	10 trees	Photographs taken looking skyward from permanently marked points.	MacFarlane et al. (2007a; 2007b)
Understorey Composition and Cover	Permanent transects	3 transects	Percentage cover estimates of different species along a fixed line.	Bullock (2006)
Diameter at Breast Height (DBH)	Manual diameter measurement	30 trees	Annual measure of tree diameter.	West (2009)
Visual Health Assessment	Qualitative visual assessment	30 trees	Visual scoring system of tree health characteristics.	Souter et al. (2009) Grimes (1978)
Samphire Community Health	Permanent transects	4 transects	Measure of cover and health of samphire.	Bullock (2006)

2.2 Climate and Weather

Climate data was sourced from the Bureau of Meteorology (BoM) Newman AERO weather station (no. 007176) and from Christmas Creek rainfall monitoring. Vapour pressure deficit is calculated according to Webb (2010).

2.3 Soil Moisture

Four holes in May 2013 and three in November 2013 were excavated by crowbar and shovel to a depth of 0.5 m at the mulga monitoring potential impact and reference sites to determine if mounding affected the level of moisture in soil. Soil samples were taken immediately following excavation of each hole from a depth between 0.4 m and 0.5 m. Samples were sealed in double zip-lock plastic bags that were rolled before closing to remove air pockets. The bags were placed in an esky and kept cool for transport to Perth. Gravimetric moisture analysis was completed by a National Association of Testing Authorities accredited laboratory.

2.4 Predawn and Midday Leaf Water Potential

At reference and potential impact sites, four excised shoots were sampled from the canopy of each quantitative sample tree of the keystone phreatophytic or mulga species, both before dawn and again at midday using a pole pruner. The shoots were immediately sealed in large, zip-lock plastic bags and kept chilled in an esky until water potential was measured using a pressure chamber (Model 1000, PMS Instrument Company, Oregon, USA), usually within one and a half hours of collection.

2.5 Projected Foliar Cover

Digital photographs were taken beneath the canopy of each mulga or phreatophytic tree in the quantitative subset at the reference and potential impact sites. An Olympus Toughshot 12 megapixel camera was mounted on a tripod, pointed skyward and levelled above a fixed position marked by a 600 mm star picket with a yellow cap placed on top. The photographs were taken aligning an arrow on the tripod directly towards the centre of the bole of each tree. The photographs were taken between 7 am and 10 am to reduce glare which can cause the canopy density to be underestimated.

Each photograph was processed by Adobe Photoshop Elements v7.0 using the method developed by MacFarlane et al. (2007a; 2007b). Sky pixels were differentiated from canopy pixels (stem and leaves) so that a relative proportion of canopy cover for each tree in the image was determined. This allows a measure of canopy cover change to be calculated when photography is repeated over time. As stated in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), data from these images can only be used to interpret changes in foliar cover on a temporal scale.

2.6 Stem Diameter - Basal Area

Measuring stem diameter can provide information on tree water relations, tree growth, habitat dynamics, and seasonal and climatic changes when examined over time. For each tree within the reference and potential impact sites, the standard method of measuring stem diameter was used where a diameter tape is placed around the stem at breast height (1.3 m from the ground);

this method is known as the diameter-at-breast-height-over-bark, or DBH. During 2013, DBH was measured at the two newly installed sites – WI3 and DI2. Previously collected data are presented for all other sites currently part of the monitoring program.

2.7 Qualitative Visual Health Assessment

2.7.1 Mulga Communities

All mulga sample trees at each reference and mounding potential impact site were allocated a Grimes Grimes density score between 0 and 9 (Figure 3) and a series of health rating scores for canopy health based on two sets of health criteria (Fortescue criteria and Astron criteria), new tip growth and reproduction (

Table 4). If mistletoe was present a score based on the same criteria as tip growth and reproduction was recorded for the tree.

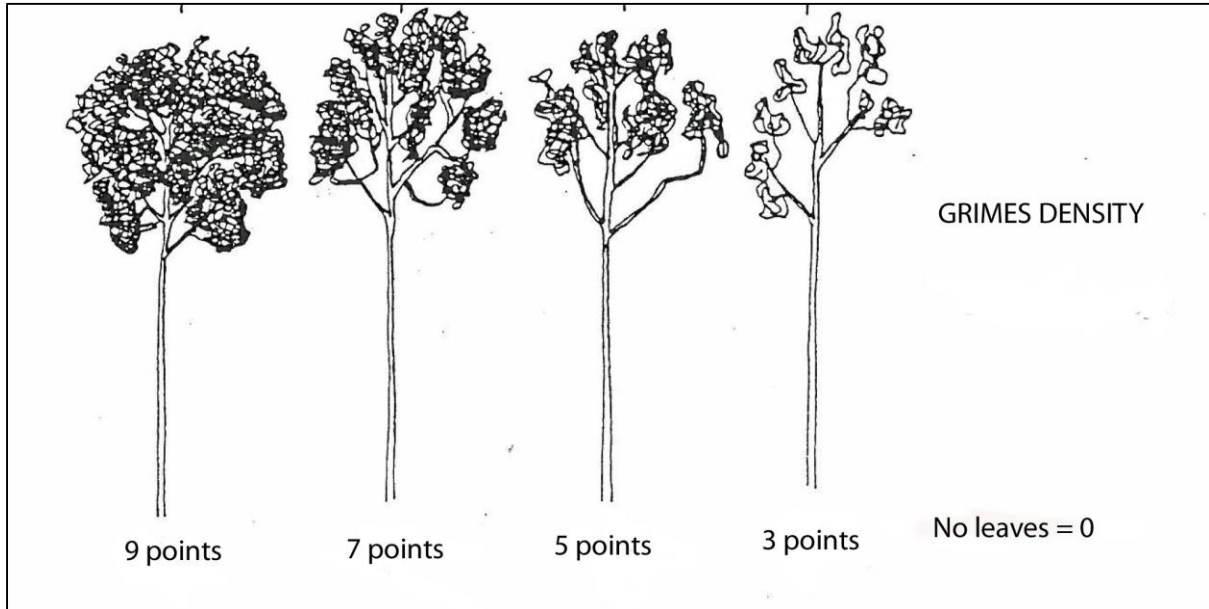


Figure 3: Grimes density scores.

Table 4: Mulga visual health score ratings (Astron 2009; Fortescue 2012). *PFC = projected foliar cover.

Mulga visual condition assessment		
Score	Health rating	Health rating/description
Canopy health score (Fortescue criteria)		
0	Dead	No phyllodes on canopy and branch ends dry and brittle when snapped (indicating no xylem flow). Bark exfoliating or flaking off.
1	Highly stressed	Pronounced shrivelling (greater than 20%) of buds or shoot tips. If total phyllode loss, then branch ends not dry and brittle when snapped. Evidence of epicormic or adventitious re-sprouting from branchlets.
2	Slightly stressed	Largely full canopy cover, some phyllodes may appear desiccated with brown/yellow hues, less than 20% shrivelling of buds or shoot tips.
3	Alive	Full canopy cover of healthy, green phyllodes present. No shrivelling of buds or shoot tips.
Canopy health score (Astron (2009) criteria)		
1	Dead	Plants beyond regenerative ability (0-5% PFC*) (fire impact excluded) Mostly dead branches Occasional epicormic shoots, mostly dead Cambium under bark no longer green
2	Poor	Plants with (very) sparse canopy (5-40% PFC) Dead branchlets and branches Senescence of older and recent leaves Dying of epicormic shoots Cambium under bark green, indicating potential to regenerate
3	Fair	Tips of branchlets dying or dead (40-60% PFC) Leaves more susceptible to insect damage Noticeable leaf senescence of older leaves Epicormic shoots (stress related)
4	Good	Plants not as densely green (60-80% PFC) Some yellowing and drying of old leaves Young leaves green to yellow-green Occasional leaf insect damage
5	Excellent	Plants appearing vigorous and green (>80% PFC) Very little leaf senescence Very little insect damage on leaves
New tip growth (growth of new shoots from branch tips) and reproduction scores		
1	Absent	Effect is not visible
2	Scarce	Effect is present within the assessable crown but not readily visible
3	Common	Effect is clearly visible throughout the assessable crown
4	Prolific	Effect dominates the appearance of the assessable crown

2.7.2 Phreatophytic Communities

All sample trees at the reference and potential drawdown impact sites were visually assessed using the method of Souter et al. (2009). The method is based on a conceptual model of the symptoms of decline due to water stress and signs of recovery as conditions improve (Souter et al. 2009). The assessment consisted of both a crown condition score (CCS) and crown condition trajectory. CCS was based on a percentage estimate of crown extent and crown density using a category scale from 0 to 5 (Table 5). Crown extent refers to the amount of foliage on the outer edge of the crown, whilst crown density refers to the amount of foliage within the crown boundary. These scores were added and then 1 was subtracted (except when the value was 0) to derive a total CCS between 0 and 9. The subtraction of 1 was carried out to achieve an evenly distributed scale; if the scores were simply added, a score of 1 would not be possible because a “minimal” crown extent (score of 1) with a crown density score of 0 indicating no leaves, or vice versa, cannot exist. A score of 0 corresponds to no leaves; and a CCS of 9 indicates a tree that has maximum extent and density.

Abundance ratings were used to derive the crown condition trajectory. Three recovery attributes (epicormic growth, reproduction and crown tip growth) and three decline attributes (leaf die-off, leaf damage and mistletoe abundance) were rated from 0 (absent) to 3 (attribute dominates the appearance of the tree). Recovery and decline attributes were summed separately with one additional point added to the decline total if cracked bark was present. Epicormic growth was not counted if it was inactive. A crown condition trajectory was derived by summing both the recovery and decline totals. If recovery exceeded decline by more than one point trees were classified in the recovery trajectory, and vice versa for the decline trajectory. Trees were classified as stable if the difference was one point or less.

Table 5: Category scale used to assess crown extent, crown density, crown condition (extent and density) and abundance based on Souter et al. 2009. Abundance ratings applicable to epicormic growth, reproduction, crown tip growth, leaf die-off, leaf damage and mistletoe.

Crown Extent and Crown Density		
Score	Description	Percentage (%)
0	None	0
1	Minimal	1-10
2	Sparse	11-25
3	Medium	26-75
4	Major	76-90
5	Maximum	91-100
Crown Condition Score (Extent and Density)		
Score	Description (Extent/Density)	
0	No Leaves	
1	Minimal/Minimal	
2	Sparse/Minimal	
3	Medium/Minimal Sparse/Sparse	

Crown Extent and Crown Density

4	Major/Minimal Medium/Sparse
5	Major/Sparse Medium/Medium
6	Maximum/Sparse Major/Medium
7	Maximum/Medium Major/Major
8	Maximum/Major
9	Maximum/Maximum

Abundance Rating

Rating	Description	Definition
0	Absent	Attribute not present
1	Scarce	Attribute is present but not readily visible
2	Common	Attribute is clearly visible throughout the crown
3	Abundant	Attribute dominates the appearance of the crown

2.8 Vegetation Composition and Cover

A measure of habitat characteristics was captured using replicate 20 m line intercept transects in all dewatering and reinjection (drawdown and mounding respectively) reference and potential impact monitoring sites, including in samphire communities. Along each transect, a tape measure was laid out and the live extent of the crown that was intercepted by the tape for each species present was recorded. For each plant, the estimated foliage density within the intercepted section of the crown was also recorded along with the species. The presence and cover of weed species along each transect was also noted. Cover for each plant was calculated as the length of the crown along the transect multiplied by the percentage foliar cover estimate. Cover by species was calculated as the sum of the cover for each plant.

2.9 Samphire Community Health

Samphire community health was monitored along replicate 20 m transects, four located within the area of potential mounding impact and four located within a suitable reference area. Along each transect, the start and end point of each individual intercepting the transect was recorded, as well as the individual's height. A health score was assigned based on the percentage of tip browning (D. Huxtable, pers. comm.) (Table 6). Samphire species identification requires collection and examination of the fruiting material for each plant. The phenology of fruiting in samphire can be episodic and collection of fruits suitable for identification of different species that are morphologically similar is required (S. van Leeuwin, DEC, pers. comm.). One species of samphire was flowering during the May 2013 survey. Plant material was collected and transported back to Perth for identification by a suitably qualified and trained botanist.

Table 6: Health score associated with samphire communities; each individual plant is allocated a score based on per cent of tip browning observed.

Score	Category	Percentage of Tip Browning (%)
1	Poor	76 - 100
2	Moderate	26 - 75
3	Healthy	0 - 25

2.10 Leaf Litter Collection

As a trial to test methods that may improve the effectiveness of the Program, leaf litter fall was assessed by installing leaf litter traps during the May 2012 monitoring trip underneath the canopy of mulga at sites WI1 and WR1; a total of 12 traps were installed, six at each site. Each trap consisted of a 1,500 mm star picket with two black plastic buckets attached to the top. Holes were punched in the base of each bucket to allow water to drain. Holes punched in the sides of each bucket allowed them to be wired to the top of the star picket. The mulga phyllodes were removed from the traps during the November 2012 and May 2013 monitoring surveys and

placed in paper bags. The samples were taken back to Perth, dried and weighed. Four traps were missing or destroyed by the May 2013 survey, two at site WR1 and two at site WI1 and could not be sampled. Site WI1 was decommissioned and all traps at that site were removed during May 2013. Traps were retained at WR1 and leaf litter was again collected in November 2013. Between the May and November 2013 surveys, one further trap was missing or destroyed at WR1.

2.11 Secondary Pressures

There are a number of secondary pressures that could affect vegetation at a regional scale and which may be evident within the Project area. These secondary pressures are taken into account as part of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) and measurement and/or assessment incorporated into the Program. Each of these identified secondary pressures is outlined below.

2.11.1 Weeds

The presence of weeds was captured along line intercept transects as part of the vegetation composition and cover assessment. A qualitative assessment of weed cover across each of the potential impact and reference sites was recorded based on the same abundance rating scale used for the qualitative visual health assessments (Table 5).

2.11.2 Grazing

At each monitoring site the extent of grazing by cattle was assessed using the abundance rating scale. This data will be considered in conjunction with vegetation composition and cover data over time and reported on if changes in vegetation composition and cover are identified and if a statistical correlation with grazing pressure becomes evident.

2.11.3 Fire

In the event of fire within any of the monitoring sites, impacts to vegetation will be assessed as a component of on-ground monitoring activities. During monitoring events, the extent of any fire damage was again assessed using the abundance rating scale.

2.11.4 Climatic Variability

If any significant shift in the perennial plant communities between matched reference and potential impacts sites becomes evident, an assessment of climatic information will be used to indicate if seasonal factors or regional climate variability effects are influencing vegetation response.

2.12 Statistical Analysis

All monitoring sites were allocated to one of three site groups (Table 7). Differences between reference and impact sites were calculated at November 2013 and May 2013. Differences over time at each site were then calculated between:

- the latest 'end-of-dry' season measurements (November 2013) and measurements from the same season of the previous year (November 2012)
- the latest 'end-of-wet' season measurements (May 2013) and measurements from the same season of the previous monitoring period (May 2012)

Table 7: Site group according to type of potential impact and location for each of the eight monitoring sites.

Site Group	Impact	Reference
Drawdown	DI1 and DI2	DR1
Eastern mounding	EI3 and EI4	ER2
Western mounding	WI2 and WI3	WR1

For standard statistical analyses, all leaf water potential, PFC, tree health data (Astron criteria) and parameters for samphire (health, cover and height) were analysed using similar methods. Prior to performing statistical tests, data were checked for normality and equal variance using Shapiro's test and by inspection of boxplots. If both assumptions were met, ANOVA (parametric tests) were conducted to examine the difference between each site within each site group. Whenever the P-value of the ANOVA test was less than 0.05, a Tukey's HSD test was conducted to compare each site within each group. If the data did not fit the assumptions for parametric tests, transformations were attempted to achieve normally distributed data. If these transformations did not succeed, the Kruskal-Wallis test (a non-parametric ANOVA) was applied. If the P-value of this test was less than 0.05, a multiple comparison test was applied to identify differences between sites within groups. No analyses were performed on canopy health (Fortescue criteria), tip growth or reproduction scores.

Leaf water potential data from mulga and phreatophytic communities, PFC data for phreatophytic communities, and height and tip die off (health) for samphire, were also subject to control chart analysis as specified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a). Multivariate control charts were produced using predawn and midday water potential, and PFC according to the procedure of Anderson and Thompson (2004) with the control limit set at 90%. In order to run the procedure, mean values for each of these variables at each site were calculated. Univariate control charts were prepared for PFC in phreatophytic communities, and height of samphire in samphire communities, with control limits established at one standard deviation from the mean. It was not possible to construct a control chart for tip die off for samphire using one standard deviation as a control limit as was specified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a). This is because of the simple 3-category scale used to rate die off. As the time series of data available was minimal, all time periods were used to calculate

the control limits for both multivariate and univariate control charts. Further, three time points were required to construct a control chart.

Height and tip die off (health) data were also subject to multivariate analysis as specified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a). However, multivariate analysis of variance (MANOVA) as specified in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) was not possible due to data not conforming to assumptions of normality and equal variance. Therefore, the non-parametric equivalent test, PerMANOVA was used with the Gower distance measure used to construct the distance matrix. This analysis followed the procedures outlined in Clarke and Gorley (2006) and was carried out using the appropriate modules of Primer v6 (Clarke & Gorley 2006). Significance was set at $P < 0.05$.

Where deaths of sample trees for mulga or phreatophytic trees were recorded at a potential impact site, survivorship analysis was undertaken using the method of Kaplan and Meier (1958). Calculations were conducted in Excel and statistical significance was deemed to be $P < 0.05$. In Tables 6 and 7 of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), analysis of death using control charts was specified; however, this type of analysis is unsuitable for count data such as this, particular with no deaths recorded at most sites to date. Therefore, control charts have not been prepared in this instance.

Gravimetric soil moisture data were checked for normality and equal variance prior to separation into eastern and western mounding groups for analyses. In one analysis, a linear model was built to include the effect of site and time together. Linear models were tested using ANOVA to determine which of these two factors contributed to the difference, and Tukey's HSD test was conducted if any significant difference was detected. In a second analysis, the association between soil moisture and water potential (midday and predawn separately) was tested using correlation. The value for water potential for the tree adjacent to each hole used to sample soil moisture was assigned as the response variable. These analysis were also performed using R (Version 2.15.0, R Development Core Team 2011). Significant results were deemed to be $P < 0.05$.

Comparisons of understorey community data between sites over time (May 2012 to May 2013 and November 2012 to November 2013) within phreatophytic and mulga communities was achieved with non-metric multidimensional scaling (NMDS) ordination and PerMANOVA based on 9999 actual permutations. Bray-Curtis distances were used in both NMDS and PerMANOVA following square root transformations. PerMANOVA analyses followed the procedures outlined in Clarke and Gorley (2006) and were carried out using the appropriate modules of Primer v6 (Clarke & Gorley 2006). Significance was set at $P < 0.05$. Due to the unavailability of reproductive material on samphire plants, species identification was not possible and the multivariate analyses as outlined in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) for were not able to be run.

3. RESULTS

3.1 Climate and Weather

In the 12 months November 2012 to October 2013 Christmas Creek weather station recorded 435 mm of rainfall, well above the long-term Newman AERO average of 314 mm and well above Newman AERO's annual rainfall of 341 mm. Above-average rainfall was recorded at Christmas Creek in December 2012 and May and June 2013 (Figure 4). In 2011/2012 Newman AERO recorded 453 mm, 44% higher than the long-term mean annual rainfall for this region (314 mm) and in 2010/2011 annual rainfall (416 mm) was approximately 33% above average.

Maximum monthly VPD in the Pilbara is usually recorded from October to February and is associated with high temperatures. In the 12 months to the end of October 2013, monthly average VPD was highest in November 2012, steadily decreasing to a minimum in June 2013. Seasonally low monthly VPD was recorded in January 2013 due to cloud associated with rainfall events. Monthly VPD has been steadily increasing since June 2013.

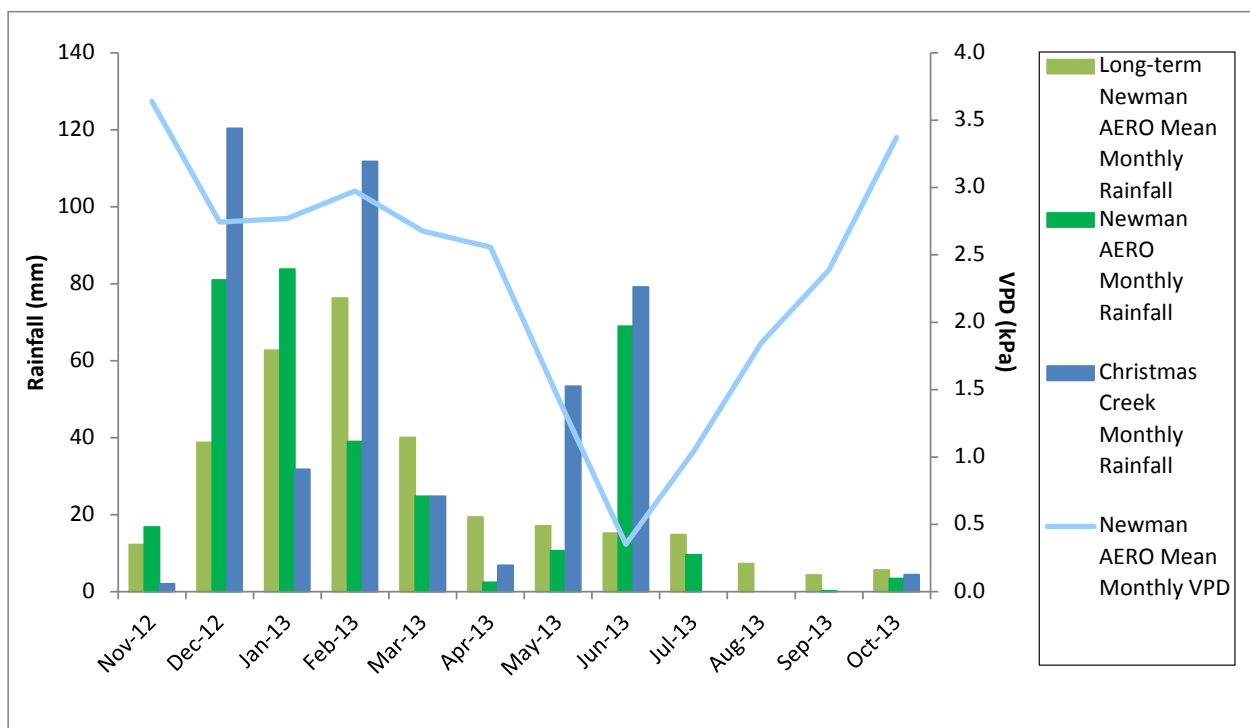


Figure 4: Long-term mean monthly rainfall (1950 to 2013), Newman AERO and Christmas Creek monthly rainfall, and mean monthly vapour pressure deficit (VPD) of the Project area region. Monthly rainfall (November 2012 to October 2013) obtained from the BoM Newman AERO weather station (#007176) and FMG Christmas Creek weather station. VPD was calculated according to Webb (2010) using Newman AERO data.

3.2 Mulga Communities

3.2.1 Soil Moisture

Mean gravimetric soil moisture content at the eastern mulga sites declined from a high recorded in May 2013 to a low in November 2013 (Figure 5). The eastern reference site (ER2) recorded the highest mean gravimetric soil moisture in May and November 2013 and potential impact site EI3 recorded the lowest. There was considerable variation within sites in May 2013. There was a significant difference between sites over time for mean gravimetric soil moisture (ANOVA, $F_{2,5} = 4.03$ $P = 0.028$) with Tukey's pairwise comparison indicating a difference between the reference site and potential impact site EI3 when all results were compared over time ($P = 0.026$).

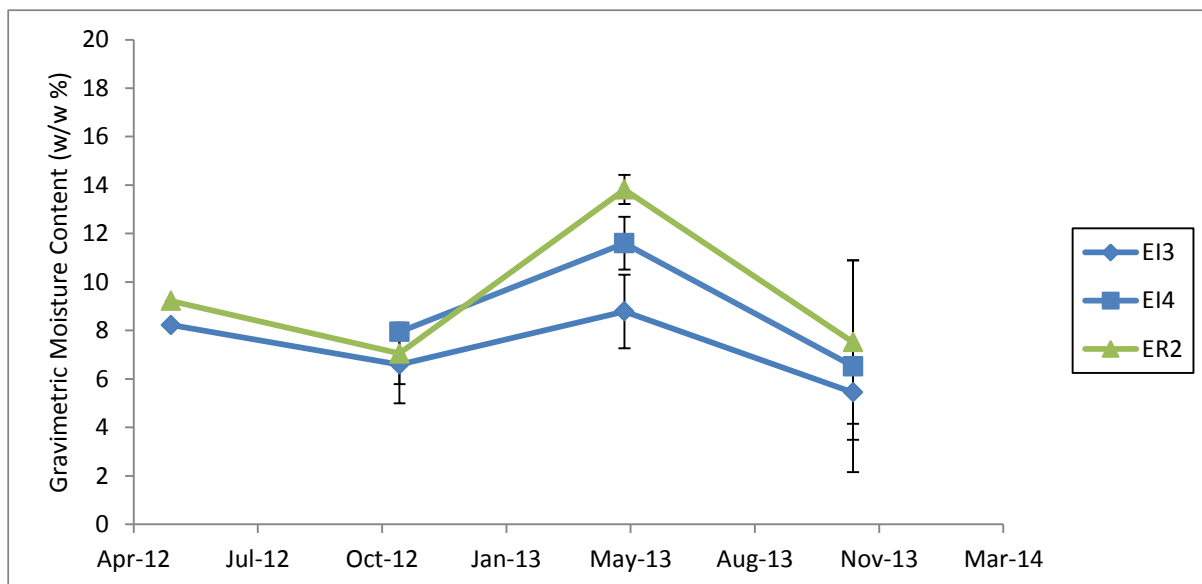


Figure 5: Mean gravimetric moisture content of soil collected at eastern potential impact sites (EI3 and EI4) and reference site (ER2) between May 2012 and November 2013 at depths between 0.4 and 0.5 m (n= 4 for May 2012 to May 2013; n = 3 November 2013). Error bars represent standard deviation.

At the western mulga sites, mean gravimetric soil moisture content has fluctuated seasonally since August 2011 (Figure 6). The highest soil moisture content was recorded at the western reference site (WR1) in both May and November 2013; there was some variation within the site. The soil moisture content at both of the western potential impact sites was similar in May and November 2013 and there was less variation within the potential impact sites than within the reference site. Mean gravimetric soil moisture content at the western reference site was significantly different to both western potential impact sites since monitoring commenced (ANOVA, $F_{2,5} = 18.68$ $P < 0.001$) with Tukey's pairwise comparison indicating a difference between the reference site and both potential impact sites when all results were compared over time ($P < 0.001$).

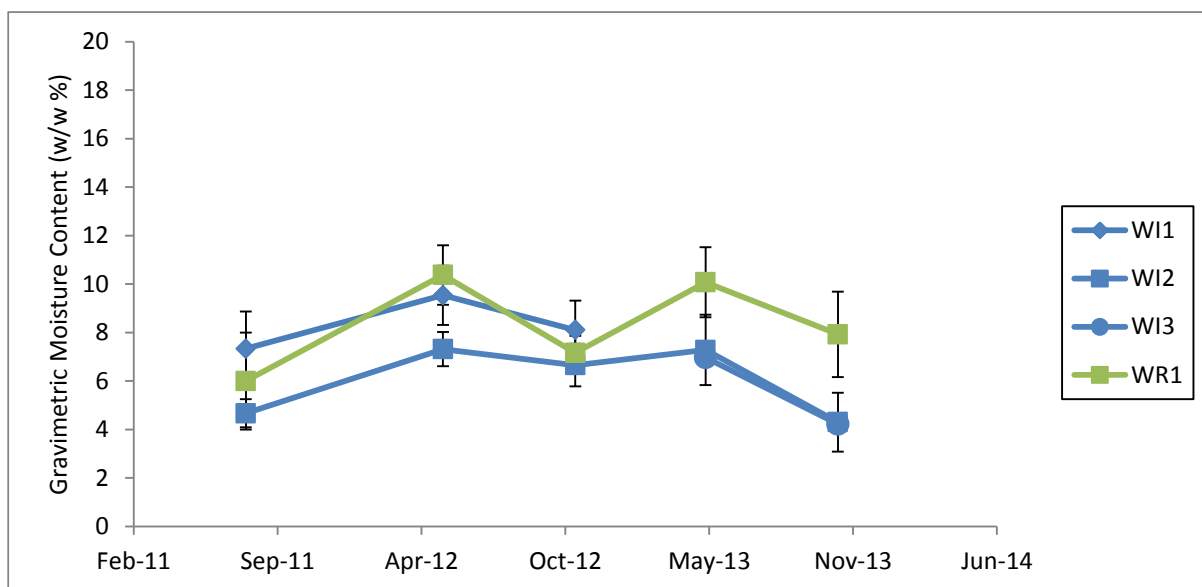


Figure 6: Mean gravimetric moisture content of soil collected at western potential impact sites (WI1, WI2 and WI3) and reference site (WR1) between August 2011 and November 2013 at depths between 0.4 and 0.5 m (n= 4 August 2011 and May 2013; n = 3 November 2013). Error bars represent standard deviation.

3.2.2 Leaf Water Potential

Mean predawn and midday leaf water potentials have trended similarly over time at all of the eastern mulga sites (Figure 7). A strong seasonal influence on leaf water potentials at all sites is evident. Both predawn and midday water potentials remain the highest at potential impact site EI3, while remaining similar at the reference site ER2 and potential impact site EI4.

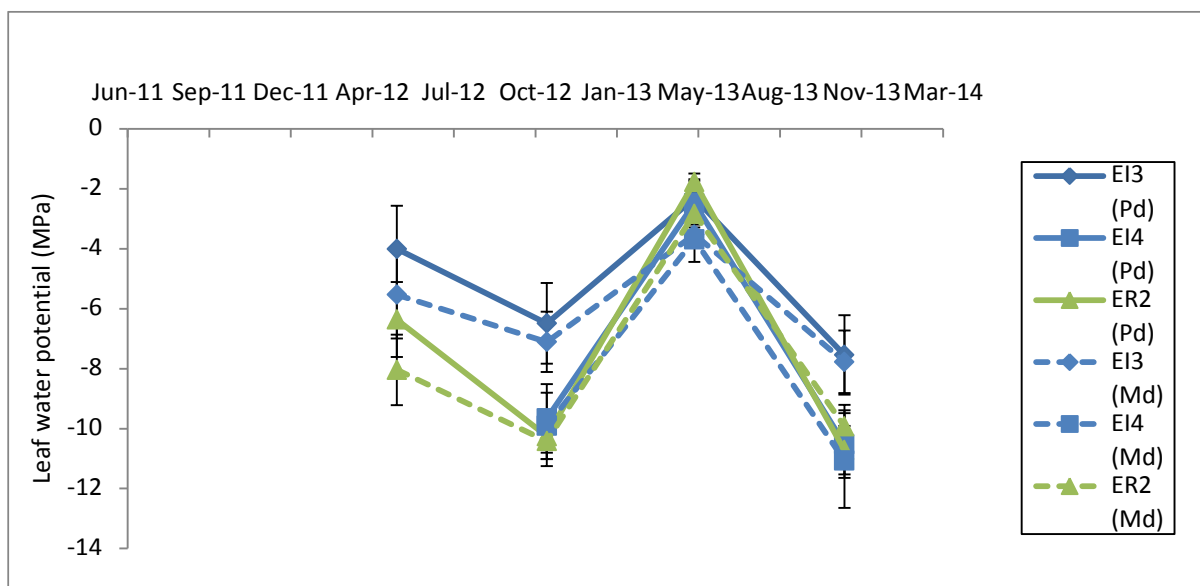


Figure 7: Mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from May 2012 to November 2013 (n= 10). Error bars represent standard deviation.

Comparison of predawn water potential and midday water potential between reference and potential impact sites was significant at the eastern sites in May and November 2013 (Table 8). Post-hoc comparisons revealed significant differences between reference sites and potential impact sites for both parameters at both times. There was one incidence when midday water potential was significantly greater than at the reference site, representing an exceedance of the Level 1 monitoring management trigger: EI3 in November 2013 (Figure 7 and Table 8).

Table 8: Results of ANOVA and Kruskal Wallis tests comparing predawn and midday water potential between monitoring sites in the Eastern reference and potential impact areas. Where ANOVA or Kruskal Wallis test was significant, Tukey's pairwise comparisons or multiple comparison after Kruskal Wallis test was conducted to determine if potential impact sites were different to reference sites.

	Predawn				Midday			
			Sig. diff. to reference?				Sig. diff. to reference?	
	F or χ^2	P	EI3	EI4	F or χ^2	P	EI3	EI4
May	32.6 (χ^2)	< 0.001	Yes	Yes	43.9 (χ^2)	< 0.001	Yes	Yes
November	68.2 (χ^2)	< 0.001	Yes	No	64.35 (F)	< 0.001	Yes	Yes

Year-on-year change between May 2012 and May 2013 saw an increase in predawn leaf water potentials at EI3 and ER2 (Figure 8). The greater than 4 MPa increase in predawn leaf water potential at ER2 was significantly different (ANOVA $F_{1,18} = 20.09$ $P < 0.001$; HSD $P < 0.001$) to the less than 2 MPa increase recorded at EI3. Similarly, the greater than 5 MPa increase in midday leaf water potential recorded at ER2 was significantly different (ANOVA $F_{1,18} = 28.08$ $P < 0.001$; HSD $P < 0.001$) to the 2 MPa increase recorded at EI3.

Change in predawn leaf water potential between November 2012 and November 2013 was similar at all eastern mulga sites, recording a slight decrease (Figure 8). At ER2, a small increase (less than 1 MPa) in midday leaf water potential was recorded between November 2012 and November 2013. The small declines recorded at EI3 and EI4 over the same period were significantly different (ANOVA $F_{2,27} = 8.369$ $P = 0.001$; HSD $P = 0.027$ and $P = 0.001$ respectively) to the increase recorded at the reference site.

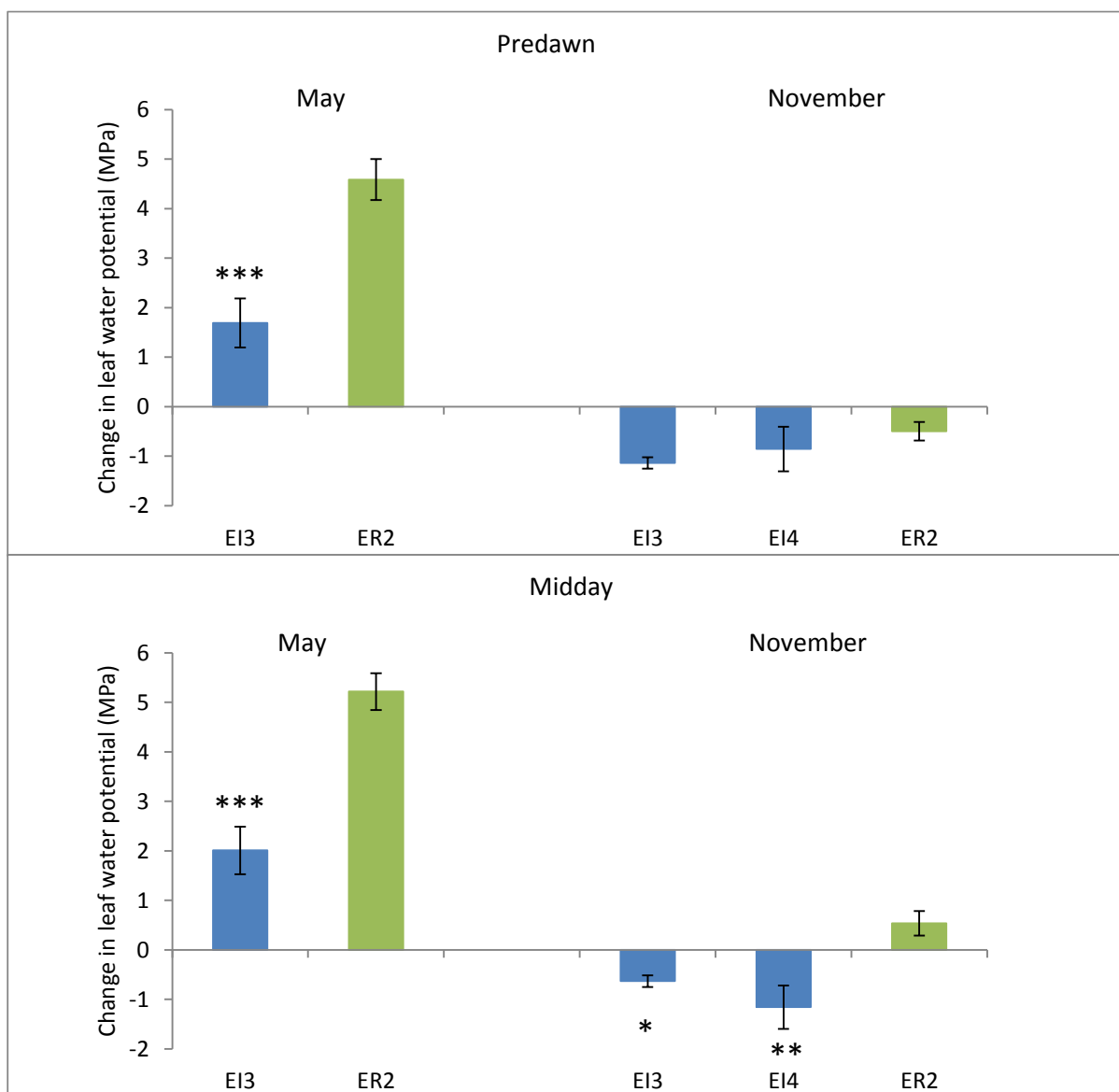


Figure 8: Change in mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Acacia aneura* at eastern potential impact site (EI3) and reference site (ER2) (n= 10) between May 2012 and May 2013 and at eastern potential impact sites (EI3 and EI4) and reference site (ER2) (n= 10) between November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = $P < 0.05$; ** = $P < 0.01$; *** = $P < 0.001$).

Mean predawn and midday leaf water potentials have trended similarly over time at the western mulga sites (Figure 9). A seasonal influence on leaf water potentials at all sites is evident. Both predawn and midday water potentials at WI2 were higher than at the reference site in May and November 2012 but by May 2013 there was little separating both potential impact sites WI2 and WI3 from the reference site WR1. This trend continued in November 2013.

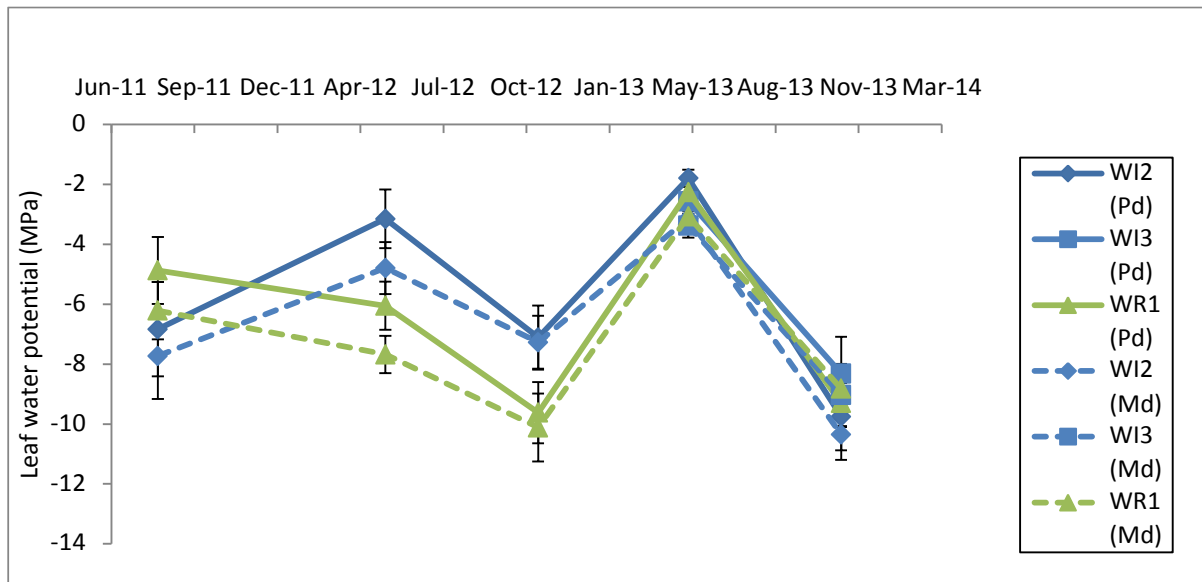


Figure 9: Mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from August 2011 to November 2013 (n= 10). Error bars represent standard deviation.

Comparison of predawn water potential and midday water potential between sites revealed significant differences at the western sites in May and November 2013 (Table 9). Post-hoc comparisons indicated significant differences between reference sites and potential impact sites for both parameters at both times. There was no incidence where midday water potential at a potential impact site was significantly greater than at the associated reference site, the situation that would result in an exceedance of a Level 1 monitoring management trigger (Figure 9 and Table 9).

Table 9: Results of ANOVA and Kruskal Wallis tests comparing predawn and midday water potential between monitoring sites in the Western reference and potential impact areas. Where ANOVA or Kruskal-Wallis test was significant, Tukey's pairwise comparisons or multiple comparison after Kruskal Wallis test was conducted to determine if potential impact sites were different to reference sites.

	Predawn				Midday			
			Sig. diff. to reference?				Sig. diff. to reference?	
	F or χ^2	P	WI2	W13	χ^2	P	WI2	W13
May	62.5 (χ^2)	<0.001	Yes	Yes	11.3 (χ^2)	< 0.001	No	Yes
November	24.5 (χ^2)	<0.001	Yes	No	29.95 (F)	< 0.001	Yes	No

Change between May 2012 and May 2013 saw an increase in predawn leaf water potentials at WI2 and WR1 (Figure 10). The 4 MPa increase in predawn leaf water potential at WR1 was significantly different (ANOVA $F_{1,18} = 36.74$ $P < 0.001$; HSD $P < 0.001$) to the less than 2 MPa increase recorded at WI2. Similarly, the greater than 4 MPa increase in midday leaf water potential recorded at WR1 was significantly different (Kruskal-Wallis $\chi^2 = 14.286$ $P < 0.001$) to the less than 2 MPa increase recorded at WI2.

Change in predawn leaf water potential between November 2012 and November 2013 was significantly different (ANOVA $F_{1,18} = 65.25$ $P < 0.001$; HSD $P < 0.001$) between WI2 and WR1 (Figure 10). The potential impact site recorded a decrease of greater than 2 MPa in predawn leaf water potential while WR1 recorded a small increase. Similarly, the change in midday leaf water potential recorded between November 2012 and November 2013 was significantly different (ANOVA $F_{1,18} = 17.04$ $P < 0.001$; HSD $P < 0.001$) between WI2 and WR1. WR1 recorded a greater than 1 MPa increase in midday leaf water potentials over the year, whereas WI2 recorded a greater than 3 MPa decrease.

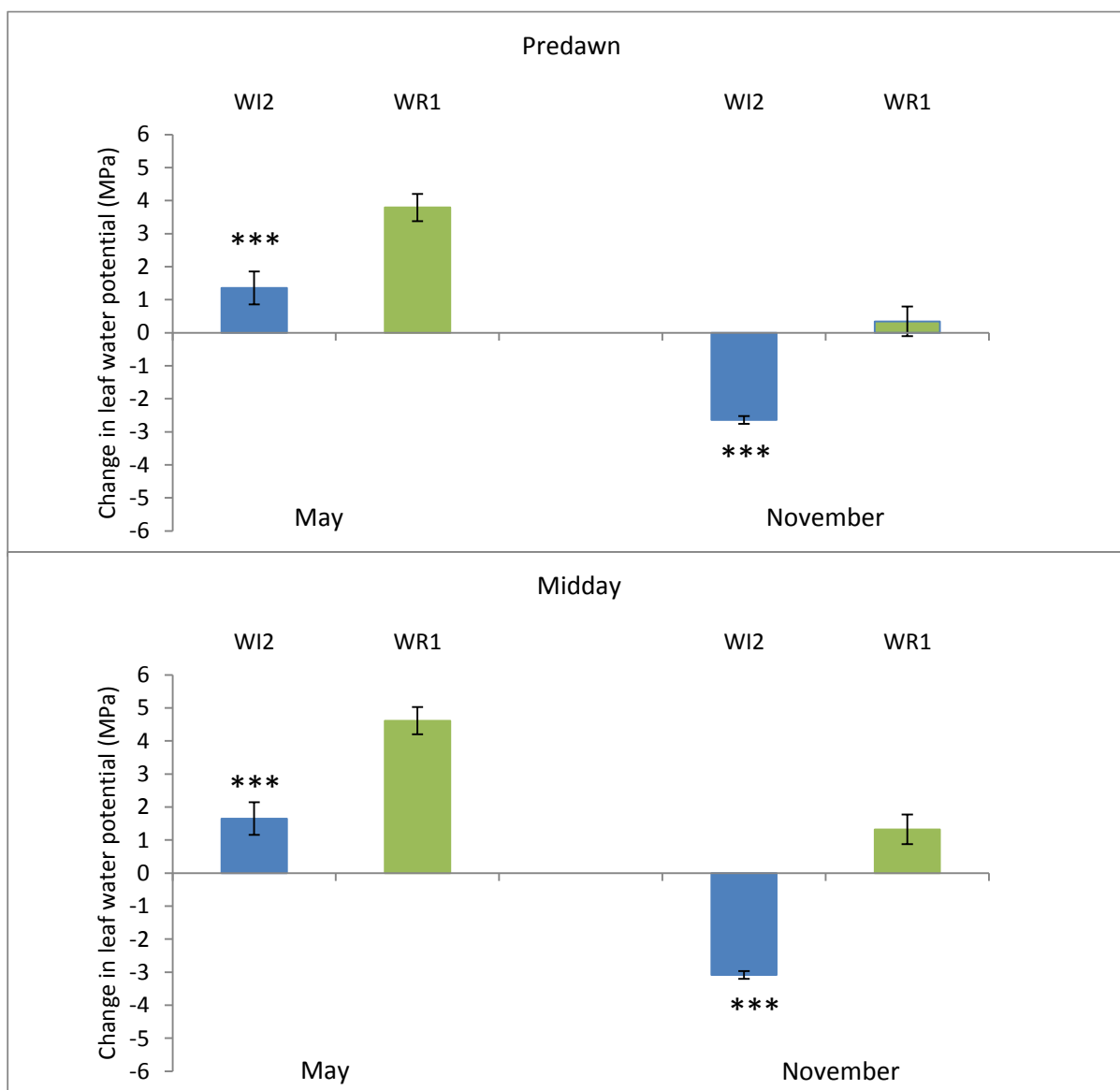


Figure 10: Change in mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Acacia aneura* at western potential impact site (WI2) and reference site (WR1) (n= 10) between May 2012 and May 2013 and between November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (***) = $P < 0.001$).

Correlation tests between water potential values and soil moisture content did not reveal any significant associations between these variables (Table 10).

Table 10: Tests of association between water potential of trees and soil moisture content (0.4 to 0.5 m depth) in 2013.

Date	Predawn			Midday		
	Correlation Co-efficient	P	n	Correlation Co-efficient	P	n
May	0.325	0.151	21	-0.284	0.253	21
November	0.387	0.083	18	0.030	0.906	18

3.2.3 Projected Foliar Cover

Mean PFC remained relatively stable at the eastern reference site ER2 between November 2012 and November 2013 (Figure 11). While mean PFC declined at potential impact site EI3 between May and November 2013, there was a notable increase at potential impact site EI4 over the same period.

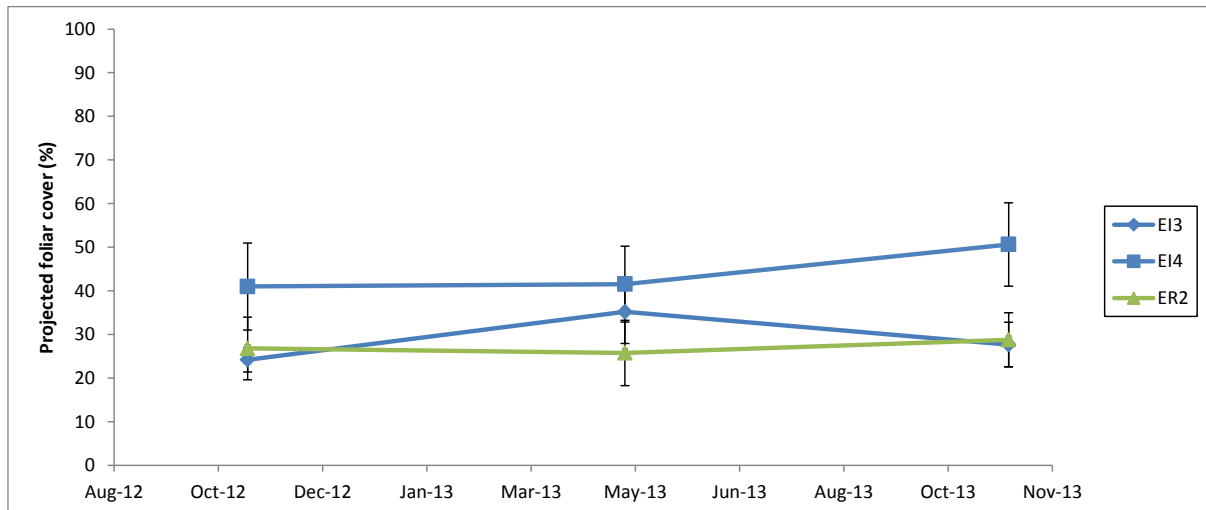


Figure 11: Mean projected foliar cover (%) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from November 2012 to November 2013 (n= 10). Error bars represent standard deviation.

The seasonal (May to November 2013) decrease in mean PFC at EI3 was significantly different (ANOVA $F_{2,27} = 35.08$ $P < 0.001$; HSD $P < 0.001$) to the increase recorded at ER2 (Figure 12). Conversely, the seasonal increase in mean PFC recorded at EI4 ($> 5\%$) was significantly different (ANOVA $F_{2,27} = 35.08$ $P < 0.001$; HSD $P = 0.014$) to the increase at ER2 ($< 5\%$). Mean PFC increased at all sites year-on-year (November 2012 to November 2013) with ER2 recording the smallest increase over the period. The large annual increase recorded at EI4 was significantly different (ANOVA $F_{2,27} = 9.01$ $P < 0.001$; HSD $P = 0.001$) to the reference site.

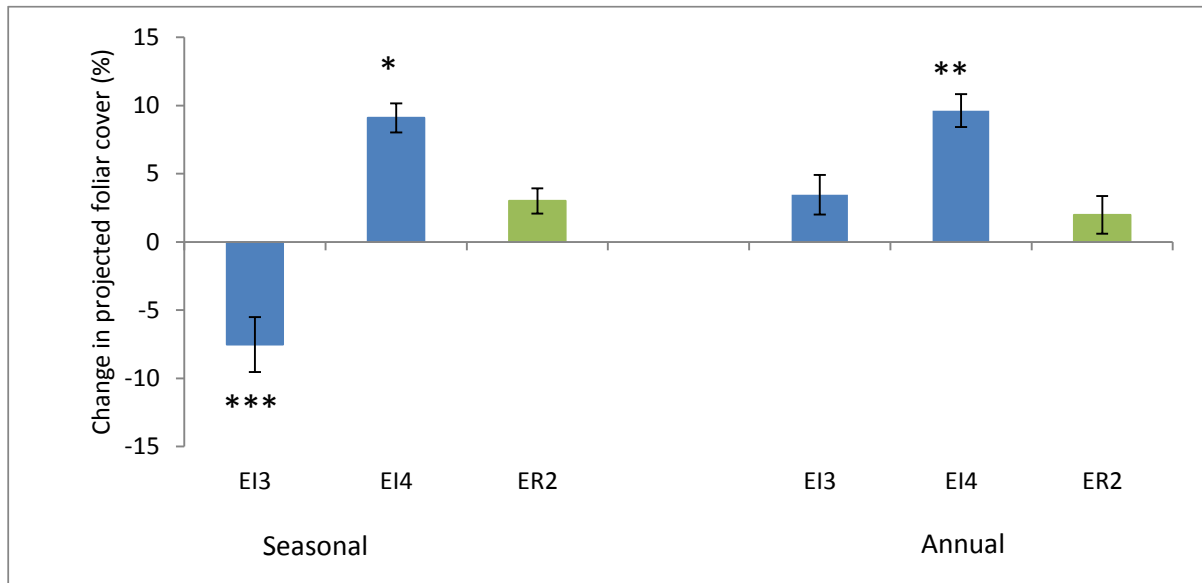


Figure 12: Change in mean projected foliar cover (%) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) (n= 10) seasonally: May 2013 to November 2013 and annually: November 2012 to November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = $P < 0.05$; ** = $P < 0.01$; *** = $P < 0.001$).

Mean PFC increased at potential impact site WI2 and reference site WR1 between May and November 2013 and declined slightly at potential impact site WI3 (Figure 13). While the increase at WR1 was considerable, PFC remains lower than recorded in November 2012.

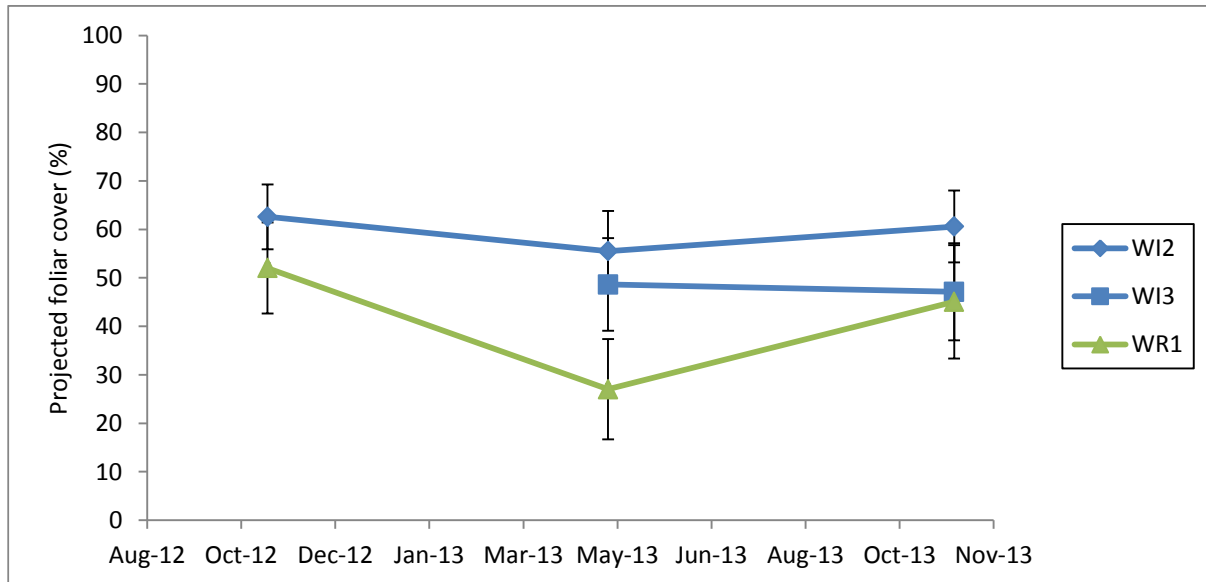


Figure 13: Mean projected foliar cover of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from November 2012 to November 2013 (n= 10). Error bars represent standard deviation.

A small seasonal (May to November 2013) decrease in mean PFC at WI3 was significantly different (ANOVA $F_{2,27} = 8.236$ $P = 0.002$; HSD $P = 0.001$) to the large seasonal increase recorded at WR1, and the smaller seasonal increase recorded at WI2 was also significantly different (ANOVA $F_{2,27} = 8.236$ $P = 0.002$; HSD $P = 0.035$) to the change at WR1 (Figure 14).

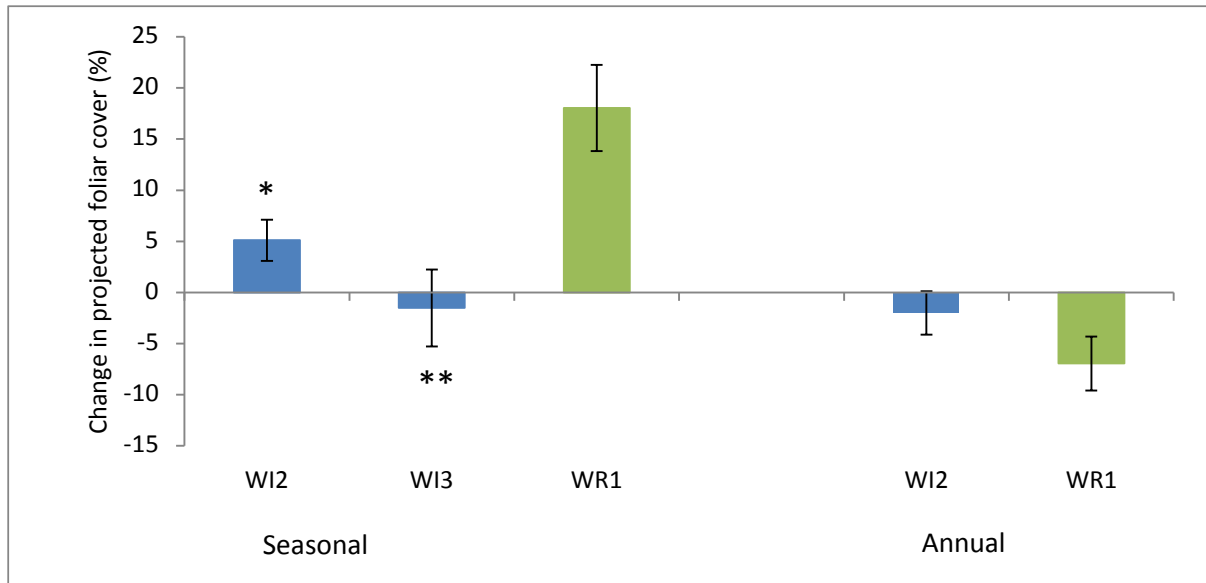


Figure 14: Seasonal change (May to November 2013) in mean projected foliar cover of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) ($n = 10$) and annual change (November 2012 to November 2013) between WI1 and WR1. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = $P < 0.05$; ** = $P < 0.01$).

3.2.4 Multivariate Analysis of Ecophysiological Variables

Multivariate control charts for the three ecophysiological variables indicated a marginal exceedance of the 90% limit (Level 1 trigger) for site EI4 in May 2013 (Figure 15). There were no other exceedances of the 90% limit for any of the other potential impact sites. The value for reference site WR1 was higher than the 90% limit in May 2013 (Figure 16).

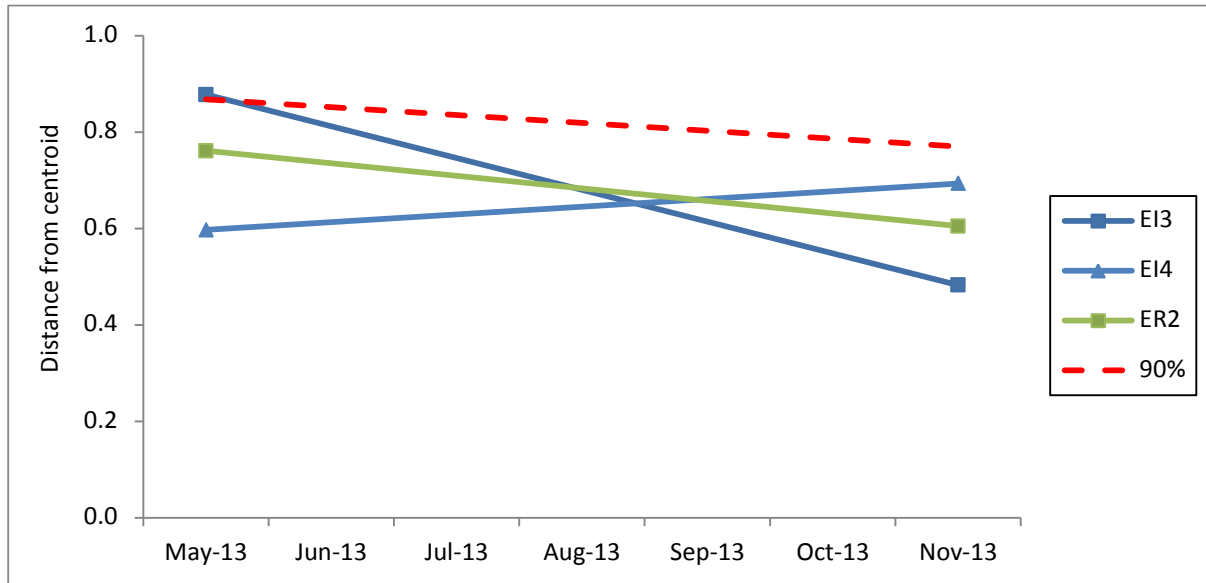


Figure 15: Multivariate control chart of predawn and midday water potential and PFC for *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from May 2013 to November 2013. The 90% line represents the control limit representing the Level 1 monitoring management trigger.

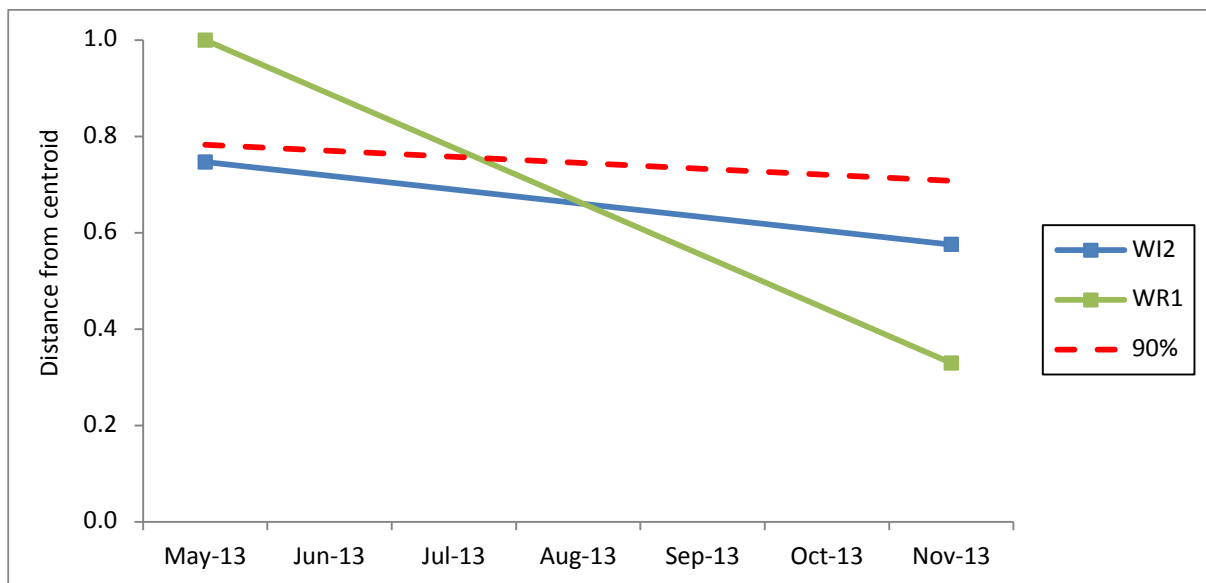


Figure 16: Multivariate control chart of predawn and midday water potential and PFC for *Acacia aneura* at western potential impact sites (WI2) and reference site (WR1) from May 2013 to November 2013. The 90% line represents the control limit representing the Level 1 monitoring management trigger. There were an insufficient number of time series data points to construct values for WR3.

3.2.5 Visual Health Assessment

Grimes Density

Mean Grimes density has remained stable at all eastern mulga sites since May 2012. All sites recorded a similar mean Grimes density in May and November 2013 (Figure 17). A small decrease in mean Grimes density was recorded at EI3 and ER2 between May 2012 and May 2013 (Figure 18). The small annual decrease in mean PFC at EI3 was significantly different (Kruskal-Wallis $\chi^2 = 17.63$ $P < 0.001$; multiple comparison $P < 0.05$) to the increase recorded at ER2.

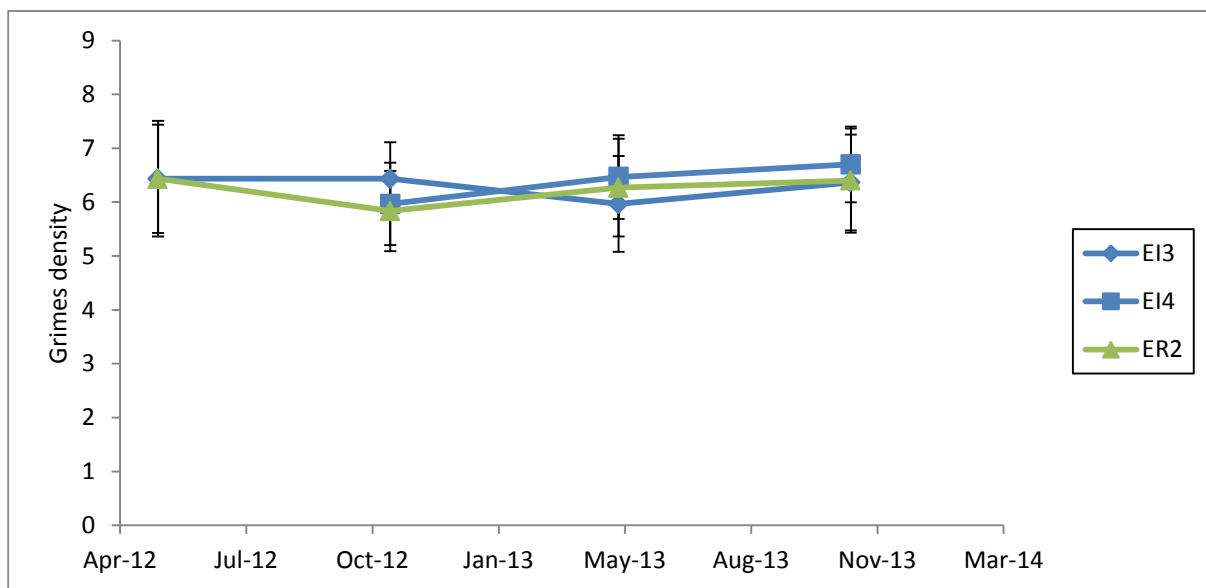


Figure 17: Mean Grimes density of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from May 2012 to November 2013 (n= 30). Error bars represent standard deviation.

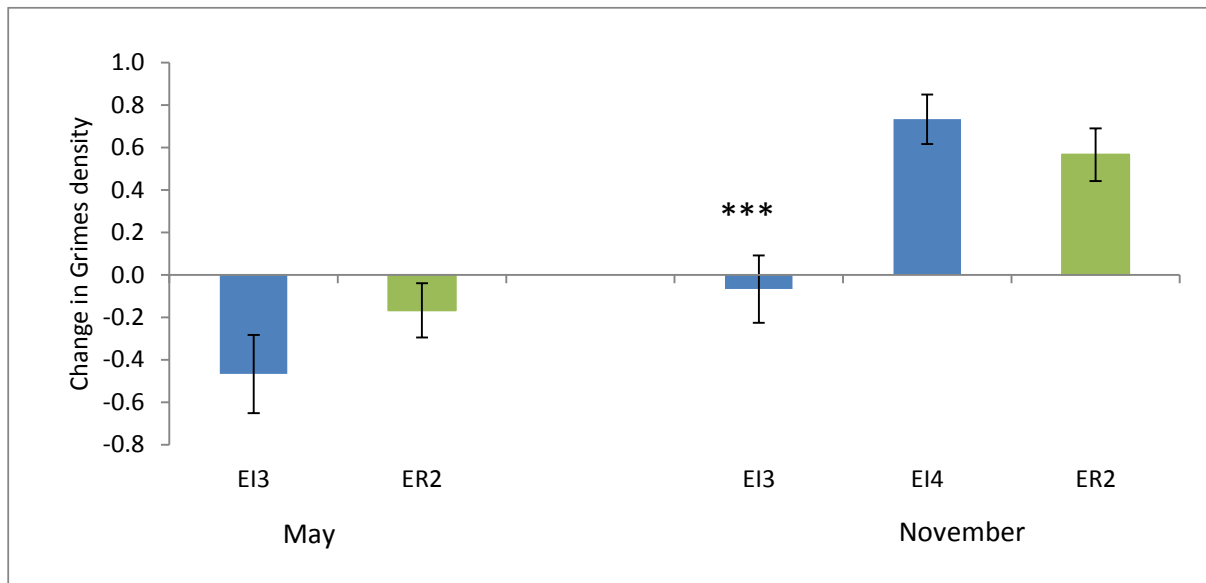


Figure 18: Change in mean Grimes density of *Acacia aneura* at eastern potential impact site (EI3) and reference site (ER2) (n= 30) between May 2012 and May 2013 and between potential impact sites (EI3 and EI4) and reference site (ER2) between November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = P < 0.05).

Mean Grimes density remained higher at the two potential impact sites (WI2 and WI3) in May and November 2013 compared to the western reference site (WR1) (Figure 19). There was little difference between WI2 and WI3 in 2013. The increase in mean Grimes density at WI2 between May 2012 and May 2013 was significantly different (Kruskal-Wallis $\chi^2 = 7.132$ P = 0.008; multiple comparison P < 0.05) to the decrease recorded at WR1 (Figure 20). Similarly, the increase at WI2 between November 2012 and November 2013 was significantly different (Kruskal-Wallis $\chi^2 = 9.384$ P = 0.002; multiple comparison P < 0.05) to the smaller increase at WR1 over the same period.

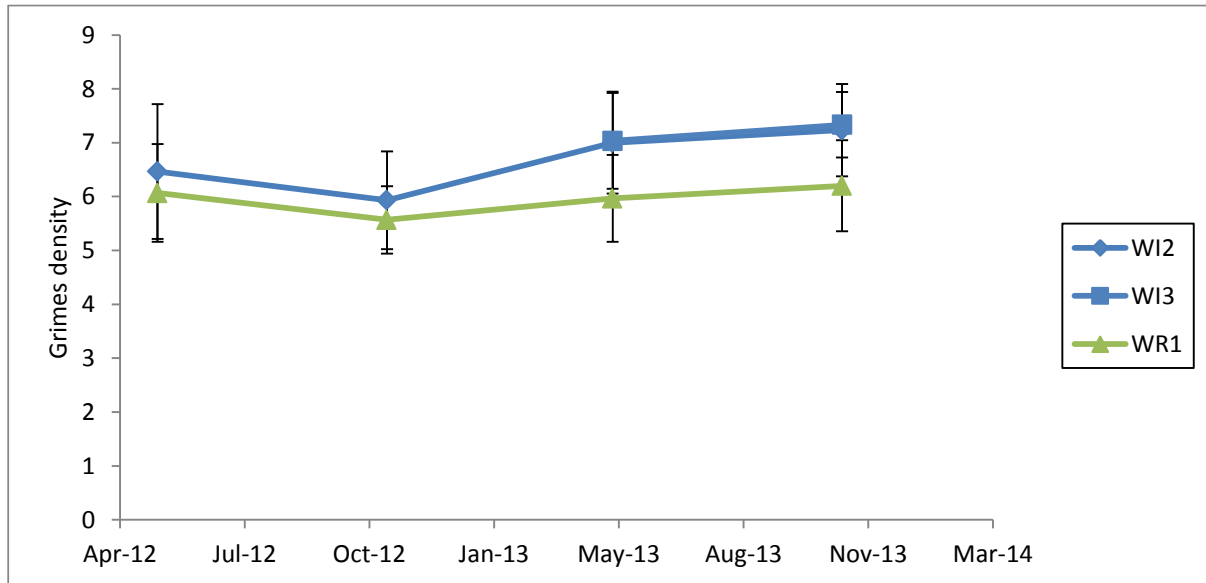


Figure 19: Mean Grimes density of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from May 2012 to November 2013 (n= 30). Error bars represent standard deviation.

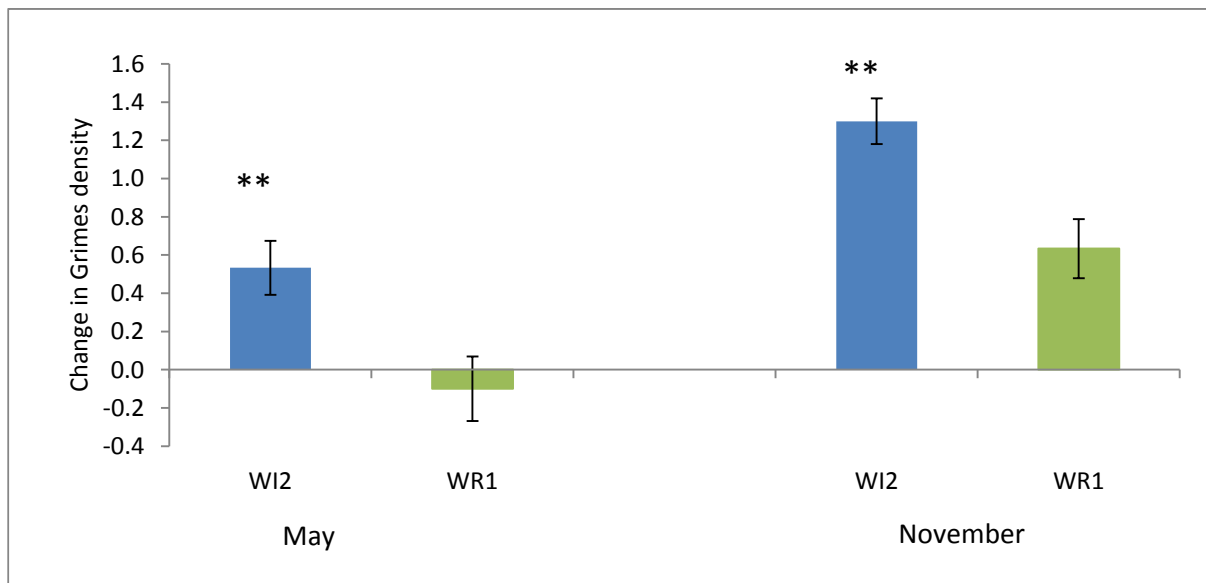


Figure 20: Change in mean Grimes density of *Acacia aneura* at western potential impact site (WI2) and reference site (WR1) (n= 30) between May 2012 and May 2013 and November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = $P < 0.05$).

Tree Health Rating

The mean tree health rating (Astron criteria) of eastern mulga remained relatively stable between May and November 2013 at all sites, although at marginally lower levels than in May 2012 (Figure 21). However, the mean tree health rating of mulga at EI3 declined markedly in May 2013 compared to levels recorded in November 2012.

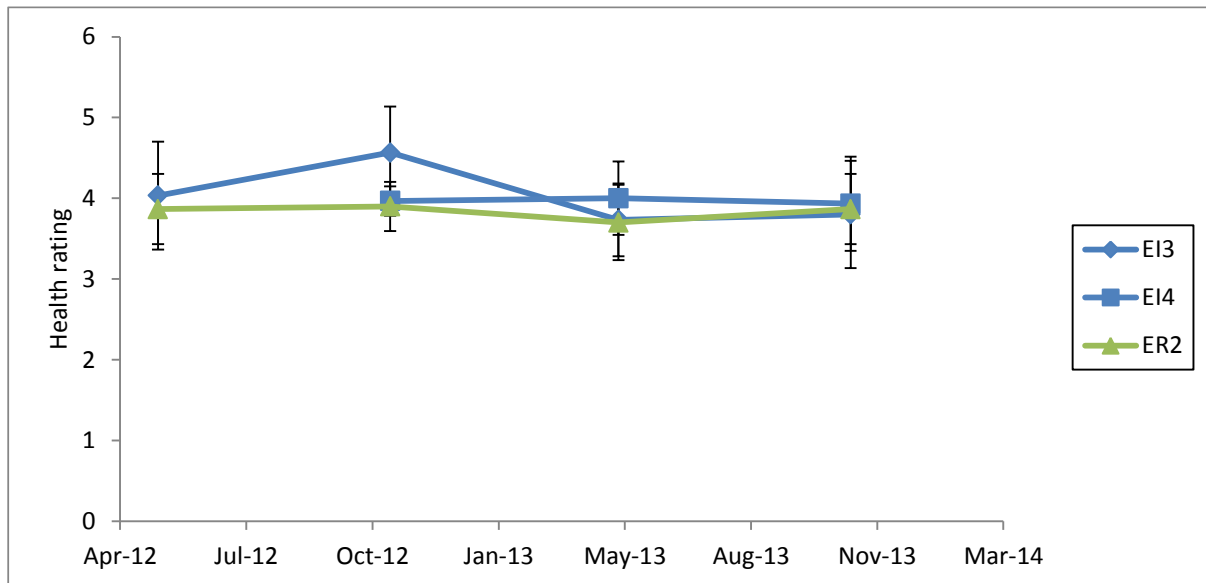


Figure 21: Mean health rating (1 to 5) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from May 2012 to November 2013 (n= 30). Error bars represent standard deviation.

The small decrease in the tree health rating at EI3 between May 2012 and May 2013 was similar to that recorded at ER2 (Figure 22). However, the larger decrease recorded at EI3 between November 2012 and November 2013 was significantly different (Kruskal-Wallis $\chi^2 = 46.431$ $P < 0.001$; multiple comparison $P < 0.05$) to the small decrease recorded at ER2 and EI4.

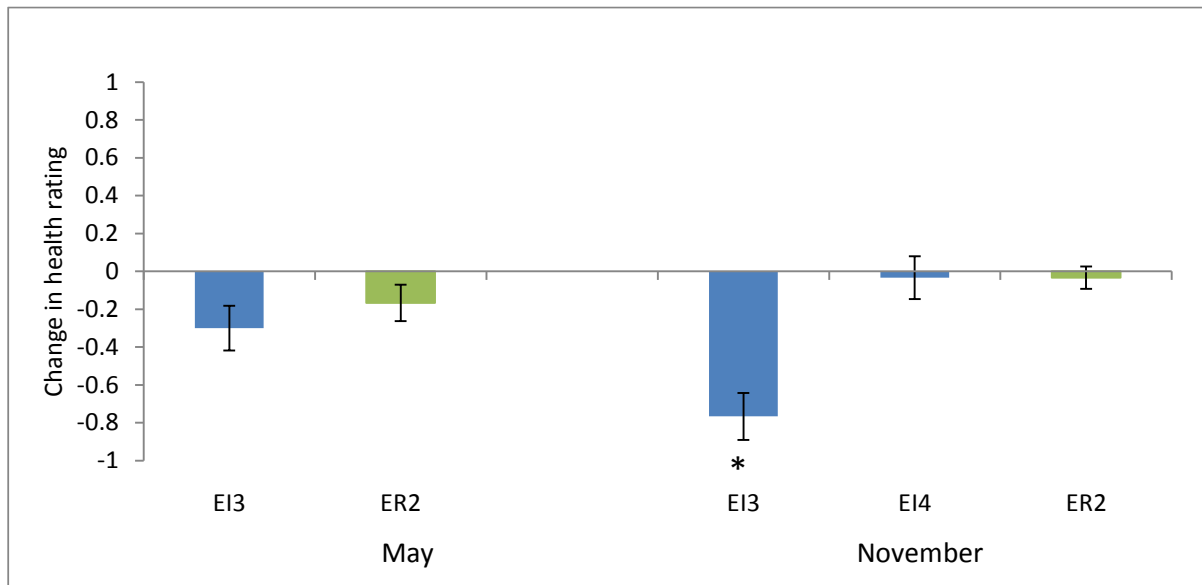


Figure 22: Change in mean health rating (1 to 5) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) (n= 30) between May 2012 and May 2013 and November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites (* = $P < 0.05$).

Using Fortescue criteria, the mean health rating of eastern mulga has varied little since May 2013 (Figure 23). The largest change has been at EI4 and ER2 between November 2012 and May 2013 when the mean health rating increased from around 2 to almost 3. The mean health rating has been steadily declining at EI3 between November 2012 and November 2013.

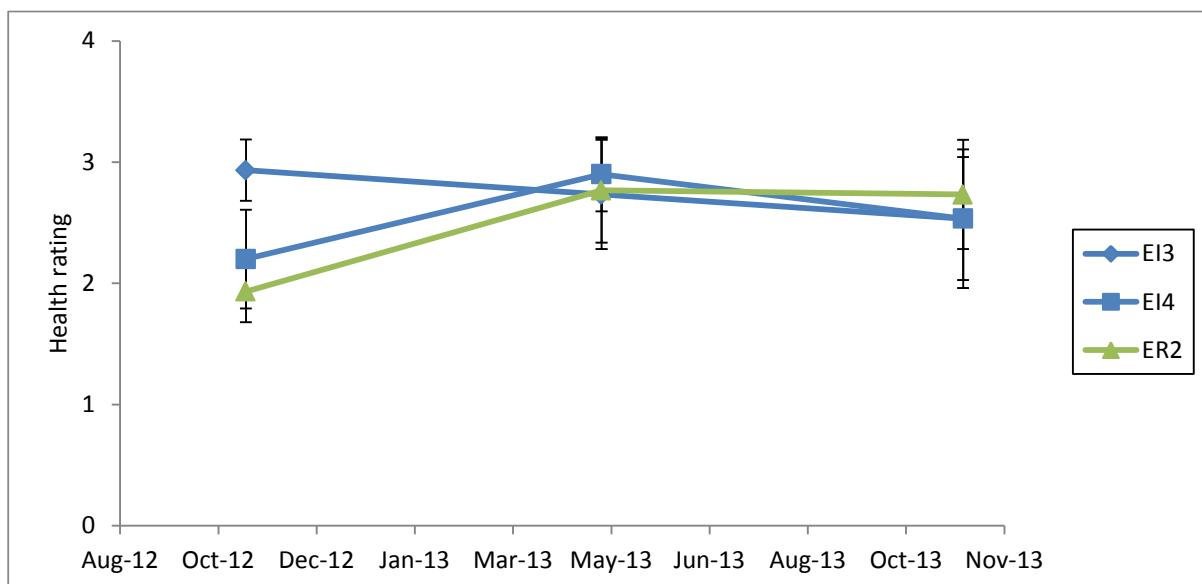


Figure 23: Mean health rating (0 to 3) of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

The mean tree health rating (Astron criteria) of western mulga have trended similarly since May 2012, with health ratings remaining consistently higher at the potential impact (WI2 and WI3) sites than at the reference (WR1) site (Figure 24). Mean tree health ratings decreased between May 2012 and May 2013 at both WI2 and WR1 and increased at both sites between November 2012 and November 2013 (Figure 25).

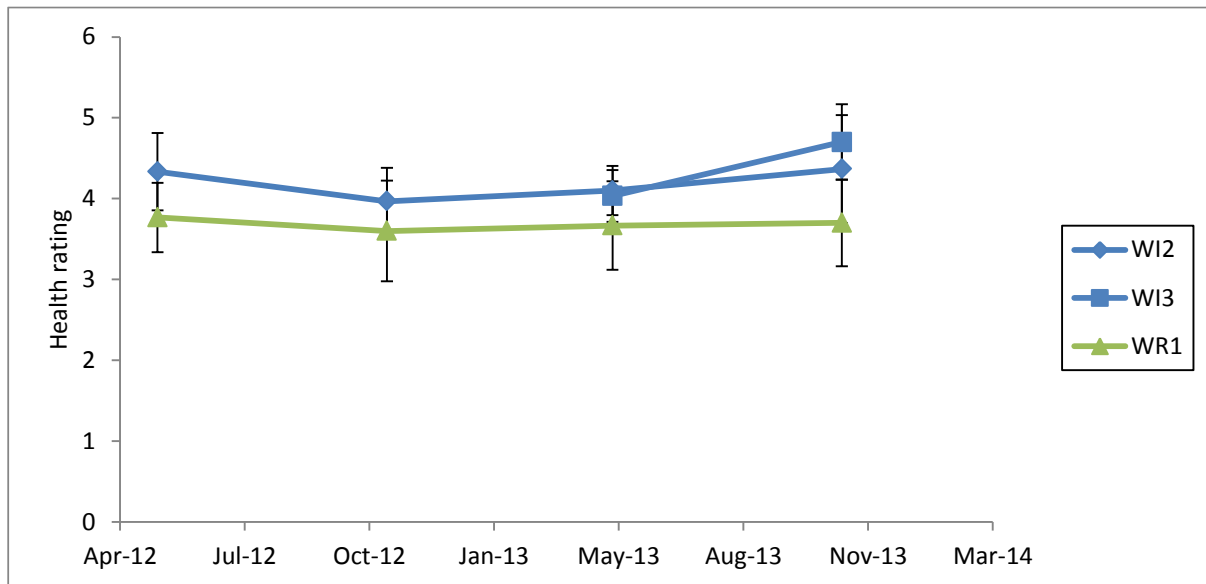


Figure 24: Mean health rating (1 to 5) of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from May 2012 to November 2013 (n= 30). Error bars represent standard deviation.

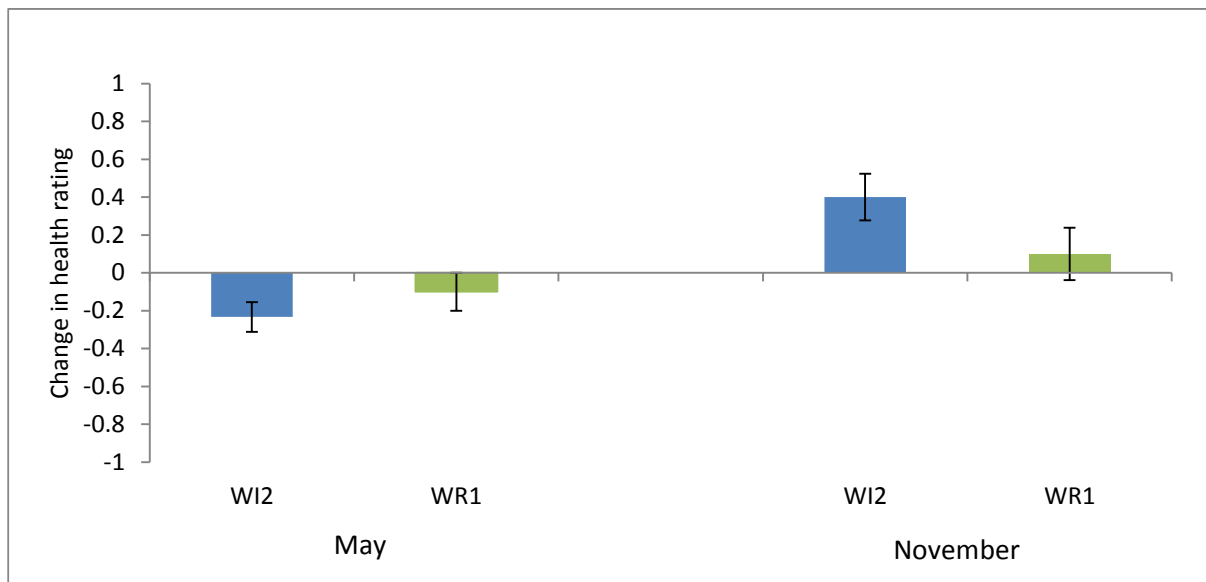


Figure 25: Change in mean health rating (1 to 5) of *Acacia aneura* at western potential impact site (WI2) and reference site (WR1) (n= 30) between May 2012 and May 2013 and November 2012 and November 2013. Error bars represent standard error. There were no significant differences between sites.

The mean health rating (Fortescue criteria) has been close to the maximum at both of the western mulga potential impact sites since May 2013, after increasing from 2 at WI2 (Figure 26). The mean tree health rating has been slightly lower at the western reference site since May 2013.

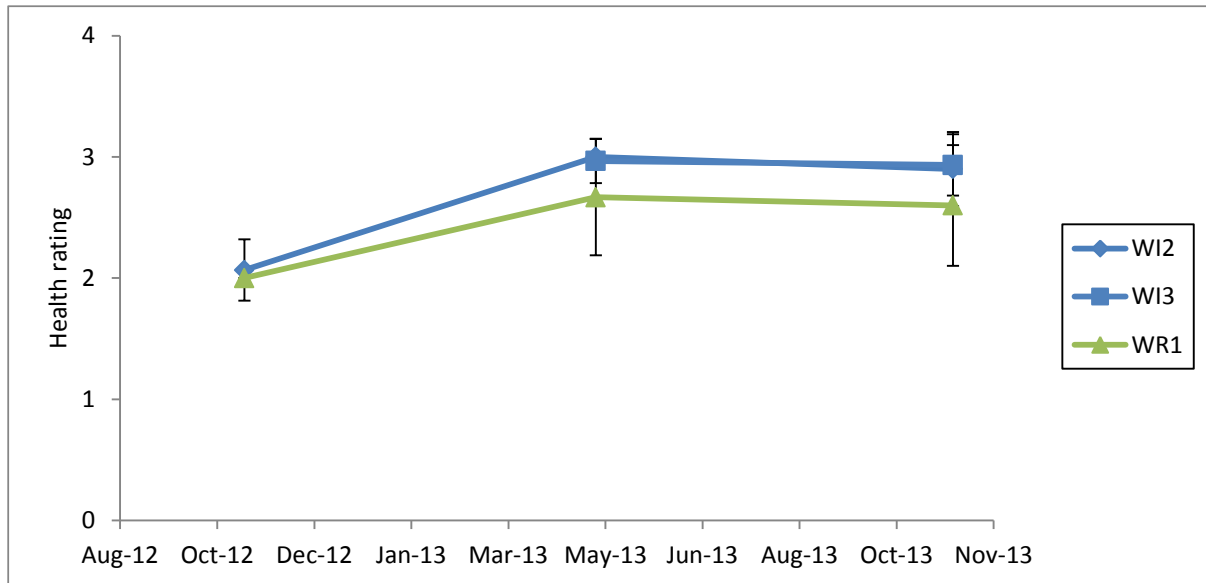


Figure 26: Mean health rating (0 to 3) of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

Reproduction

The mean abundance of reproduction increased at all eastern mulga sites in November 2013, where little to no reproduction had previously been recorded at these two sites (Figure 27). Similarly, mean reproduction scores increased at all western mulga sites in November 2013, although similar levels of reproduction had been recorded at the WI2 site in November 2012 (Figure 28). Variation within sites was notable across the eastern and western areas.

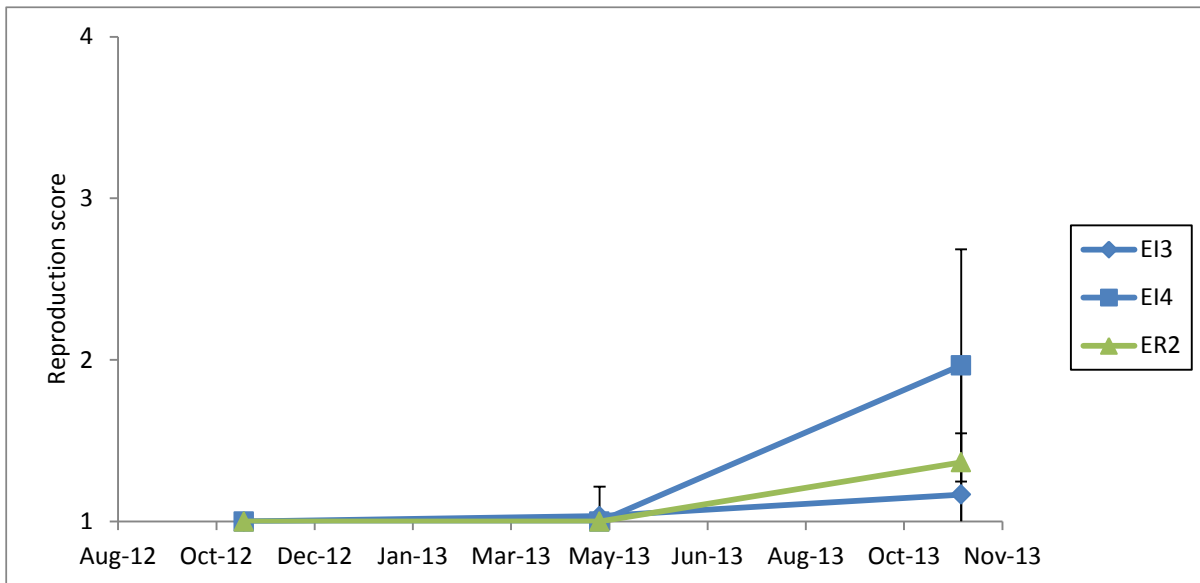


Figure 27: Mean reproduction score of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

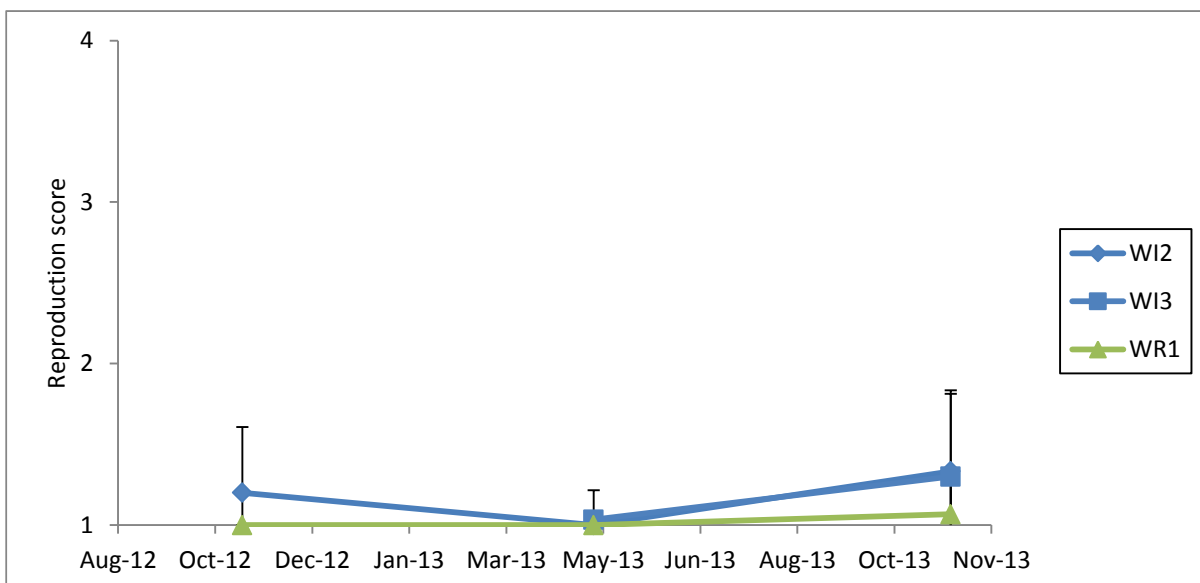


Figure 28: Mean reproduction score of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

Tip Growth

Tip growth was absent from all mulga sites in November 2013, similar to November 2012, declining from absent to common in May 2013 (Figure 29; Figure 30). Variation within sites in May 2013 was notable, with tip growth abundance ranging from absent to common at most sites.

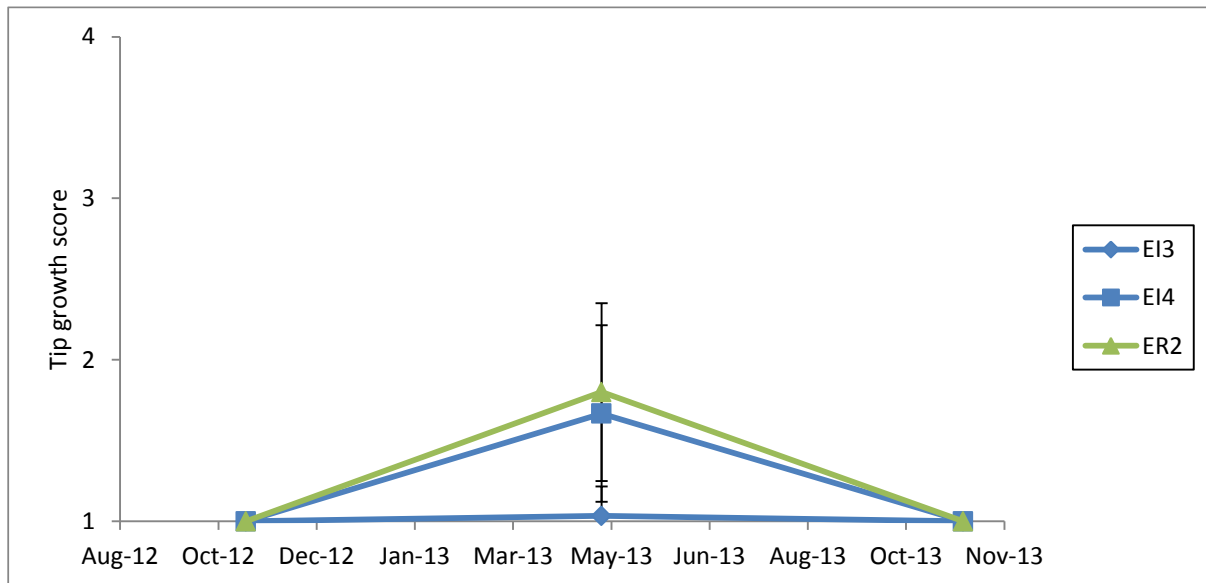


Figure 29: Mean tip growth score of *Acacia aneura* at eastern potential impact sites (EI3 and EI4) and reference site (ER2) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

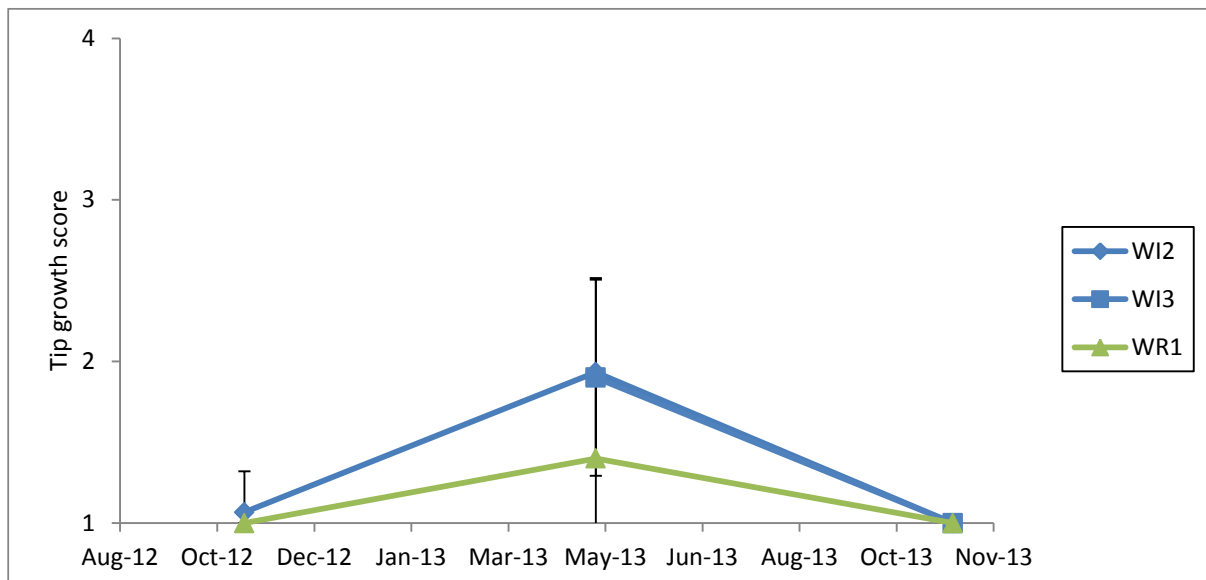


Figure 30: Mean tip growth score of *Acacia aneura* at western potential impact sites (WI2 and WI3) and reference site (WR1) from November 2012 to November 2013 (n= 30). Error bars represent standard deviation.

3.2.6 Leaf Litter Collection

There was a considerable increase in the mean weight of leaf litter collected at both WI1 and WR1 between November 2012 and May 2013 (Table 11). The mean weight of leaf litter collected over the two time periods was consistently greater at the western mulga reference site compared to that collected at the potential impact site. Only a small decrease in mean weight of leaf litter was recorded between May and November 2013 at WR1. Leaf litter traps were removed from WI1 during the May 2013 monitoring survey.

Table 11: Mean weight of leaf litter (grams) \pm standard error collected during November 2012 and May 2013 at WI1 and WR1 and at WR1 in November 2013; (n = number of samples at each site).

Collection date	WI1	WR1
November 2012	2.75 \pm 0.50 g (n = 5)	4.09 \pm 0.58 g (n = 6)
May 2013	4.95 \pm 1.22 g (n = 4)	7.01 \pm 3.07 g (n = 4)
November 2013	No data	6.54 \pm 0.97 g (n = 3)

3.2.7 Monitoring Management Triggers

Two management triggers were exceeded for the mulga vegetation community (Table 12): midday water potential was significantly greater at site EI3 than at the reference site in November 2013 and changes in PFC at the reference sites were significantly different from the changes in both mounding impact sites. No deaths of mulga sample trees were found in 2013.

Table 12: Results for Mulga vegetation communities in 2013 in relation to monitoring management triggers in the VHMP (CC-PL-EN-0004 Rev 2) (Astron 2012a)

Trigger	Trigger Exceeded	Description
Midday leaf water potentials significantly greater in mounding impact areas in comparison to reference	Yes	Midday leaf water potentials were significantly greater at EI3 in November 2013
Percentage canopy cover of Mulga trees significantly greater than or less than reference in reinjection zones	Yes	Increase in percentage canopy cover of Mulga trees was significantly different at EI4 in May and November 2013 and EI3 in May 2013.
Death of keystone Mulga trees significantly greater than or less than reference	No	No deaths of sample trees occurred in 2013
Multivariate control chart of multiple ecophysiological variables – Level 1 management response required in exceedance of 90% confidence interval in control chart trend	Yes	Exceedance of the 90% level occurred at EI3 in May 2013

3.3 Phreatophytic Communities

3.3.1 Leaf Water Potential

Mean predawn leaf water potential declined in all of the phreatophytic communities between May and November 2013 (Figure 31). Since August 2011 there has been a steadily declining trend at both the potential impact and reference phreatophytic communities. This trend has been similar for midday leaf water potentials at all phreatophytic monitoring sites. The decrease in predawn leaf water potential at potential impact site DI1 between May 2012 and May 2013 was significantly different to the larger decrease at reference site DR1 (ANOVA $F_{1,18} = 6.61$ $P = 0.019$; HSD $P = 0.019$) (Figure 32). Change in predawn leaf water potentials at the two sites between November 2012 and November 2013 was similar, as was the change in midday leaf water potentials over the two periods.

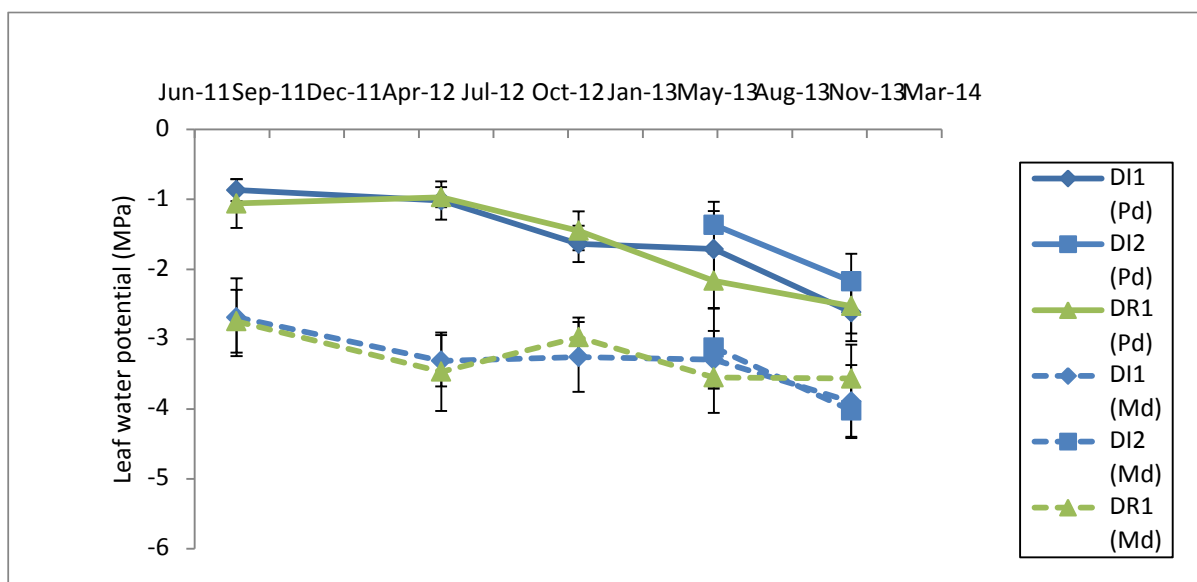


Figure 31: Mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Eucalypts victrix* at drawdown potential impact sites (DI1 and DI2) and reference site (DR1) from August 2011 to November 2013 (n= 10). Error bars represent standard deviation.

Site differences for both predawn water potential and midday water potential were significant in May and November 2013 (Table 13). Post-hoc comparisons revealed significant differences between reference sites and potential impact sites for both parameters at both times. Predawn water potential at both potential impact sites was greater than at the reference sites in May 2013 and greater at potential impact site DI2 than at the reference site in November 2013 (Figure 31 and Table 13). These differences represent exceedances of the Level 1 monitoring management trigger.

Table 13: Results of ANOVA comparing predawn and midday water potential between monitoring sites in the reference and potential drawdown areas. Where the ANOVA test was significant, Tukey's pairwise comparisons were conducted to determine if potential impact sites were different to reference sites.

	Predawn				Midday			
			Sig. diff. to reference?				Sig. diff. to reference?	
	F	P	DI1	DI2	χ^2	P	DI1	DI2
May	34.7	<0.001	Yes	Yes	7.4	0.001	No	Yes
November	11.8	<0.001	No	Yes	10.2	< 0.001	Yes	Yes

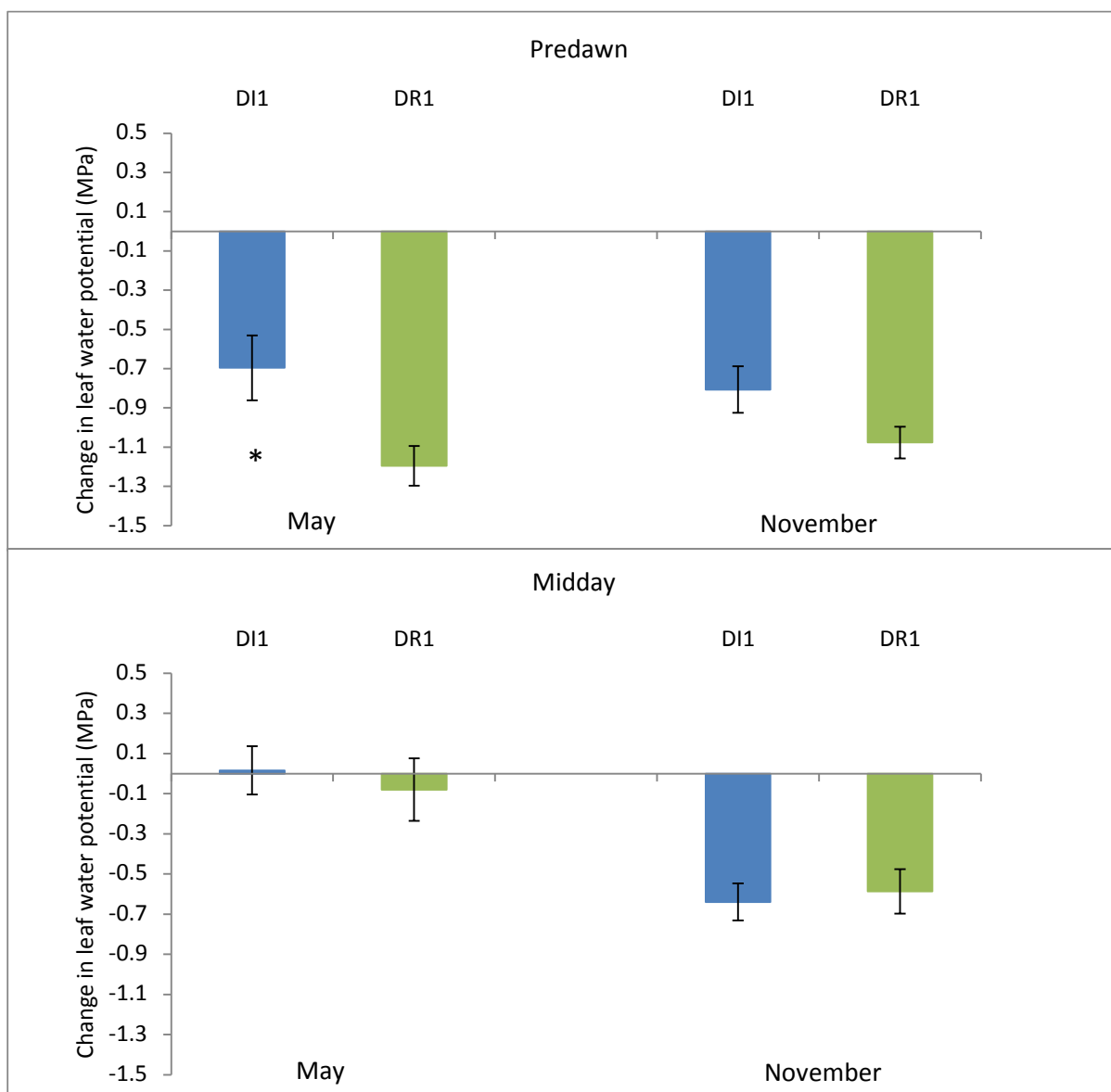


Figure 32: Change in mean predawn (Pd) and midday (Md) leaf water potential (MPa) of *Eucalypts victrix* at drawdown potential impact site (DI1) and reference site (DR1) (n= 10) between May 2012 and May 2013 and November 2012 and November 2013. Error bars represent standard error. Asterisk (*) indicates significant difference between sites ($P < 0.05$).

3.3.2 Projected Foliar Cover

Mean PFC at the three phreatophytic communities (DI1, DI2 and DR1) has remained relatively stable since November 2012, although a slight decline in PFC has been recorded at each site since monitoring began (Figure 33). Seasonally, a small increase in PFC was recorded at the potential impact site DI1 (Figure 34); this increase was not significantly different to the decrease recorded at the reference site (DR1) (ANOVA $F_{2,26} = 2.566$ $P = 0.096$). The annual decrease at both DI1 and DR1 was similar.

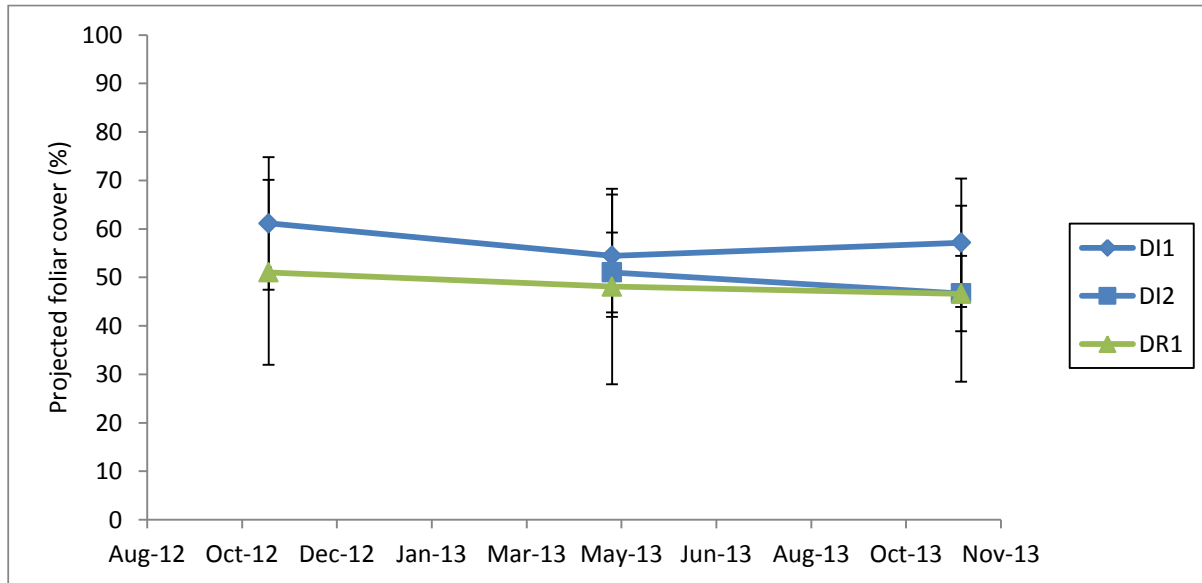


Figure 33: Mean projected foliar cover (%) of *Eucalyptus victrix* at drawdown potential impact sites (DI1 and DI2) and reference site (DR1) from November 2012 to November 2013 (n= 10). Error bars represent standard deviation.

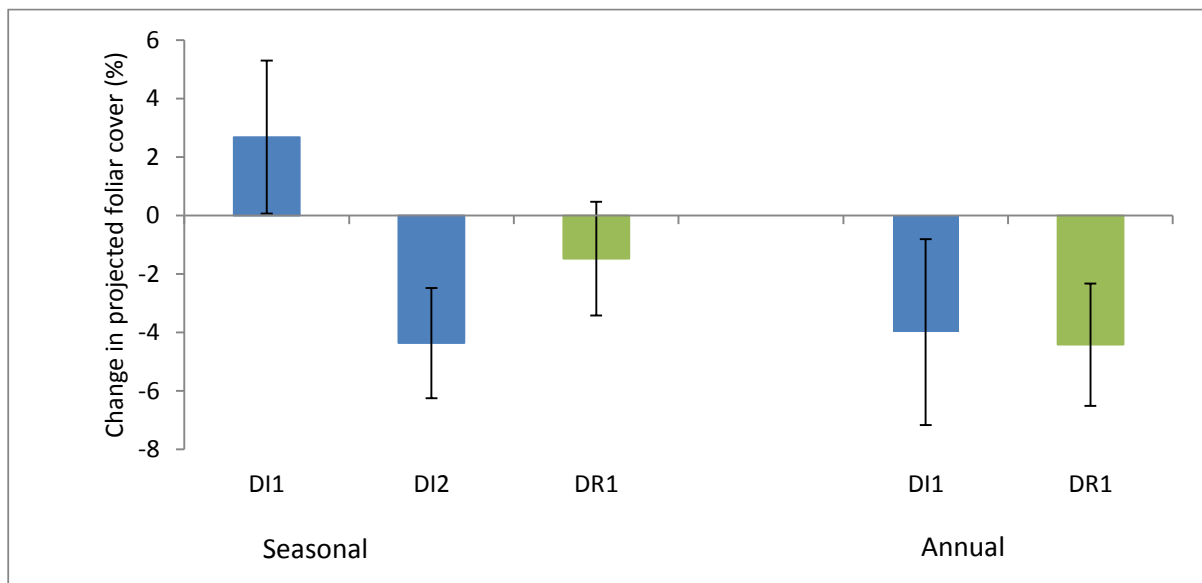


Figure 34: Change in seasonal (May to November 2013) mean projected foliar cover (%) of *Eucalyptus victrix* at drawdown potential impact sites (DI1 and DI2) and reference site (DR1) (n= 10) and annual change (November 2012 to November 2013) at DI1 and DR1. Error bars represent standard error. No significant difference was found between sites.

Control chart analysis indicated the PFC at potential impact site DI1 was within one standard deviation of the mean (Figure 35). Mean PFC at the reference site (DR1) in November 2013 exceeded one standard deviation below the mean (Figure 36). Potential impact site DI2 has not been monitored for long enough to enable a control chart to be constructed.

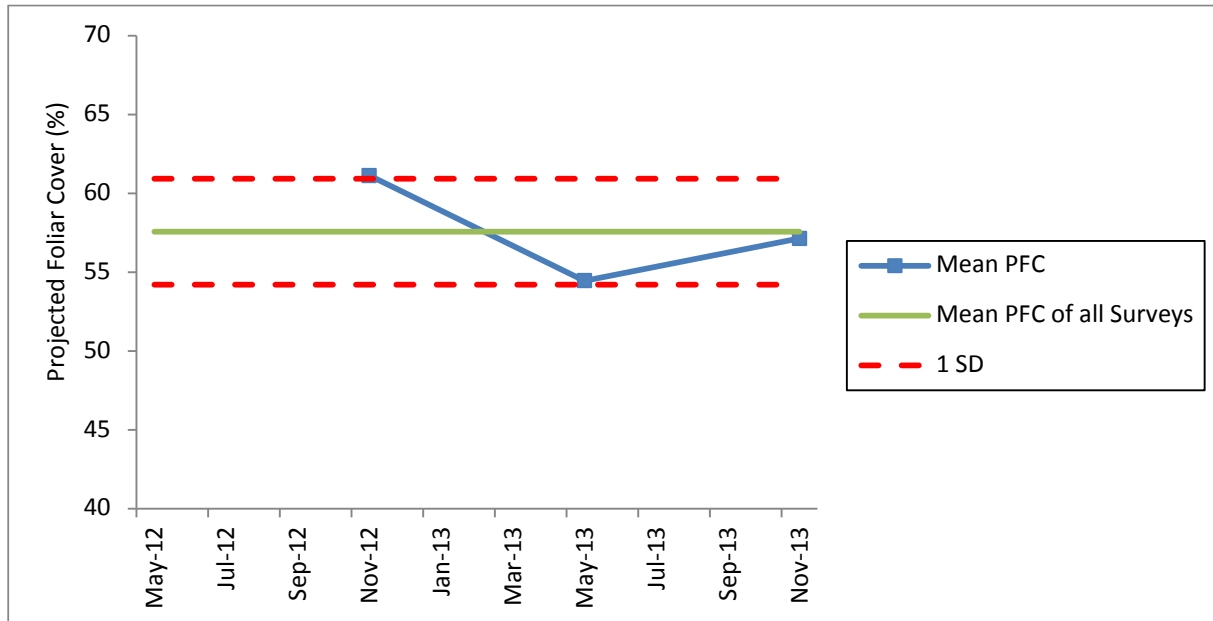


Figure 35: Control chart for PFC for *Eucalyptus victrix* at drawdown potential impact site DI1 (n = 10 at all times). Control limit is one standard deviation (SD) from the mean.

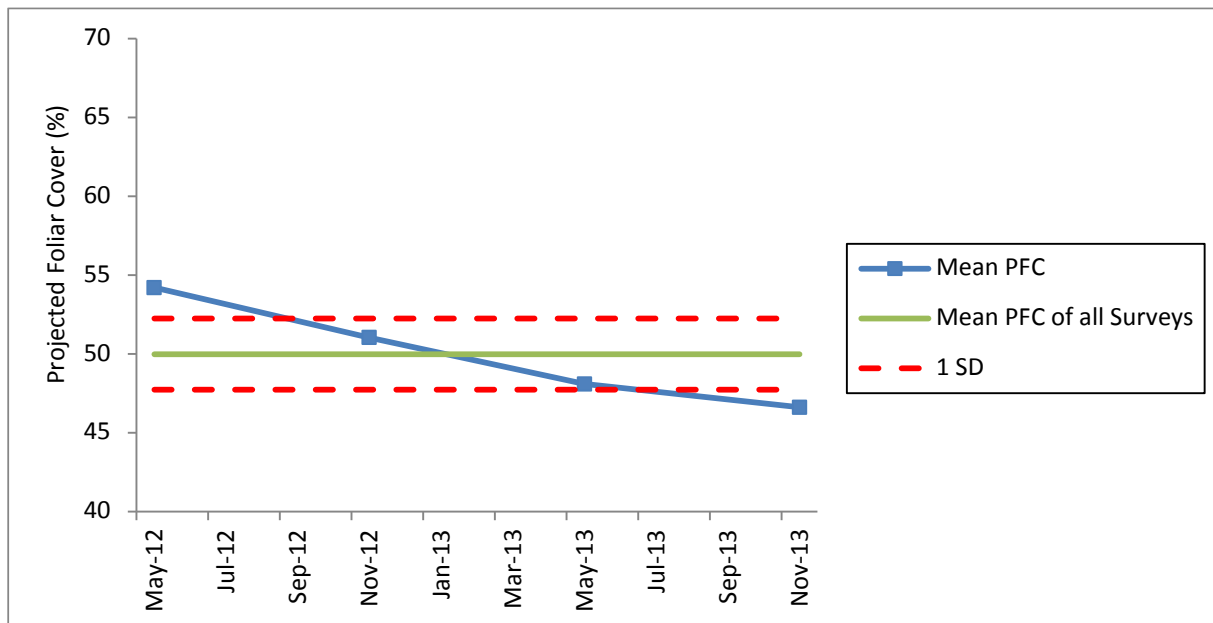


Figure 36: Control chart for PFC for *Eucalyptus victrix* at drawdown potential impact site DR1 (n = 10 at all times). Control limit is one standard deviation (SD) from the mean.

3.3.3 Multivariate Analysis of Ecophysiological Variables

Multivariate control charts for the three ecophysiological variables indicated that the potential impact site DI1 exceeded the 90% limit (Level 1 trigger) in November 2013, while the value for the reference site DR1 remained in control (Figure 37).

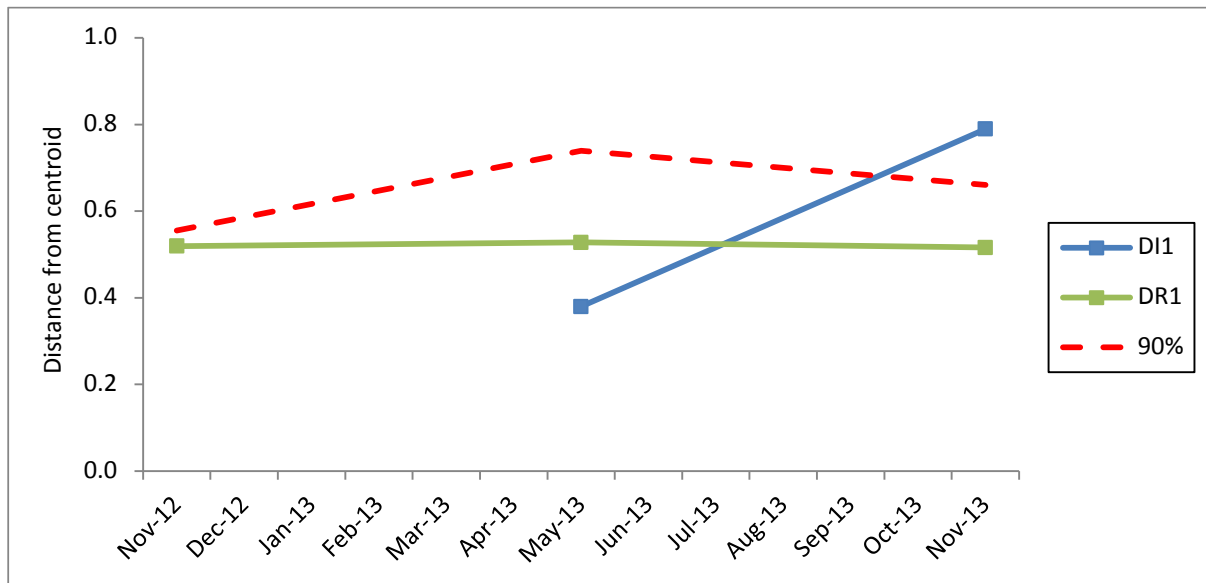


Figure 37: Multivariate control chart of predawn and midday water potential and PFC for *Eucalyptus victrix* at drawdown potential impact sites (DI1) and reference site (DRI) from November 2012 to November 2013. The 90% line represents the control limit representing the Level 1 monitoring management trigger. There were an insufficient number of time series data points to construct values for DI2.

3.3.4 Visual Health Assessment

Crown Condition Score

In November 2013, mean CCS at the three phreatophytic sites was similar, with values decreasing at both DR1 and DI1 between May and November 2013 and increasing marginally at site DI2 (Figure 38). The annual change between May 2012 and May 2013 was similar at DI1 and DR1, while the decrease in mean CCS between November 2012 and November 2013 was significantly different at DI1 compared to DR1 (Kruskal-Wallis $\chi^2 = 18.28$ $P < 0.001$; Multiple comparison $P < 0.05$) (Figure 39).

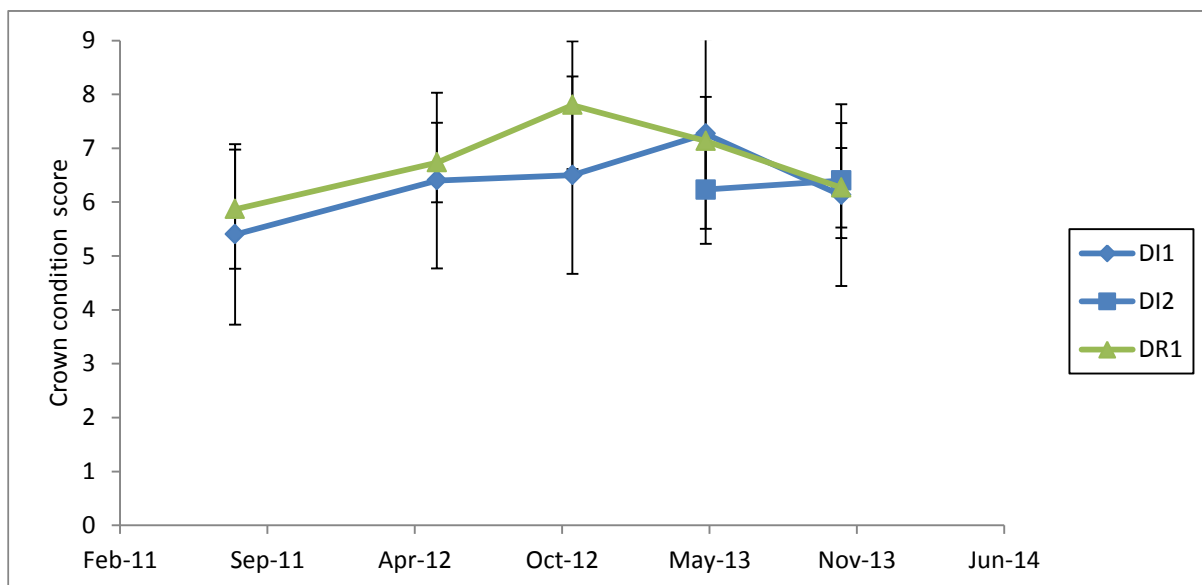


Figure 38: Mean crown condition score of *Eucalyptus victrix* at drawdown potential impact sites (DI1 and DI2) and reference site (DR1) from August 2011 to November 2013 (n= 30). Error bars represent standard deviation.

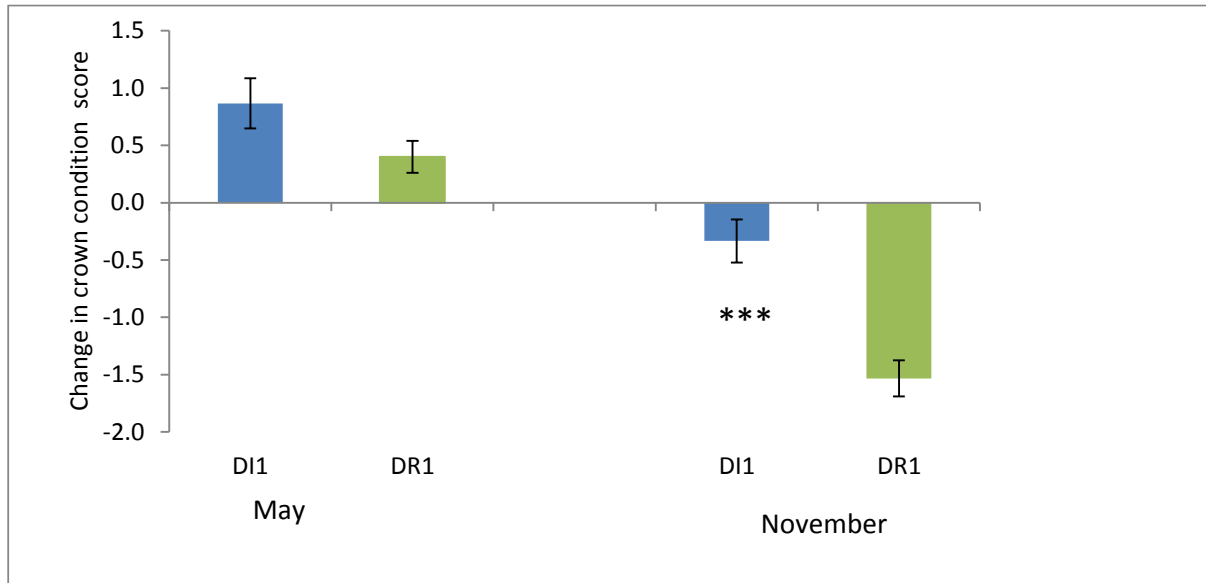


Figure 39: Change in mean crown condition score of *Eucalypts victrix* at drawdown potential impact site (DI1) and reference site (DR1) (n= 30) between May 2012 and May 2013 and November 2012 and November 2013. Error bars represent standard error. Asterisk (***) indicates significant difference between sites ($P < 0.001$).

Crown Condition Trajectory

The number of trees on a recovery trajectory decreased at the potential impact site DI1 and at the reference site DR1 between November 2012 and November 2013, with the number of trees on a decline trajectory increasing over the same period at DR1 (Figure 40). The number of trees on a recovery trajectory at DI1 was at the lowest level in November 2013. One tree was recorded as dead at DI1 in 2013. Survivorship analysis indicated no significant difference between the number of deaths at this site and the reference site: $\theta = 1$, $P = 0.317$.

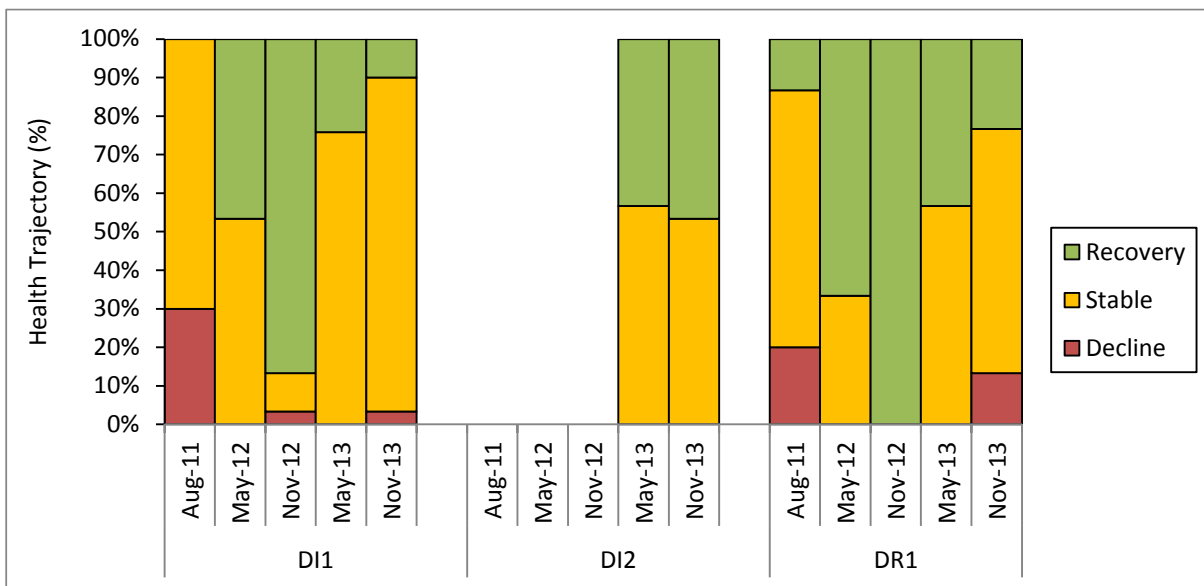


Figure 40: Percentage of *Eucalypts victrix* in different health trajectories (recovery, stable and decline) based on Souter et al. 2009 at drawdown potential impact sites (DI1 and DI2) and reference site (DR1) (n= 30) from August 2011 to November 2013.

3.3.5 Monitoring Management Triggers

Monitoring management triggers for phreatophytic communities were exceeded for predawn water potential and in the multivariate analysis of ecophysiological variables (Table 14).

Table 14: Results for phreatophytic vegetation communities in 2013 in relation to monitoring management triggers in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) .

Trigger	Trigger Exceeded	Description
Pre-dawn leaf water potentials significantly greater in dewatering zones in comparison to reference	Yes	Values significantly greater at potential impact sites DI1 and DI2 in May 2013 and again at DI2 in November 2013 compared to reference sites.
Percentage canopy cover significantly greater than reference ($p < 0.05$) and/or greater than 1 Standard Deviation from the control chart mean	No	Change in PFC was not significantly greater between potential impact and reference sites and control chart analysis indicates DI1 is in control.
Death of keystone tree species significantly greater than reference ($p < 0.05$) and/or greater than 1 Standard Deviation from the control chart centerline	No	Death of one tree (at DI1) did not lead to a significant difference between potential impact and reference sites in the survival analysis.
Multivariate control chart of multiple ecophysiological variables – Level 1 management response required in exceedance of 90% confidence interval in control chart trend	Yes	Exceedance of control limit at potential impact site DI1 in November 2013

3.4 Mean Basal Area

Mean basal area of the sample trees across the eastern and western mulga sites was similar. The mulga trees at the western potential impact site (WI3) were the largest of the trees across the six sites (Figure 41). Site WI3 had the greatest spread of individuals across size classes and also contained the two largest individual mulga trees. Mean basal area of trees at the phreatophytic potential drawdown site DI1 is the smallest of the three phreatophytic communities and the least variable for mean basal area per tree. The variation within the phreatophytic communities was considerably greater than the variation recorded in the mulga communities.

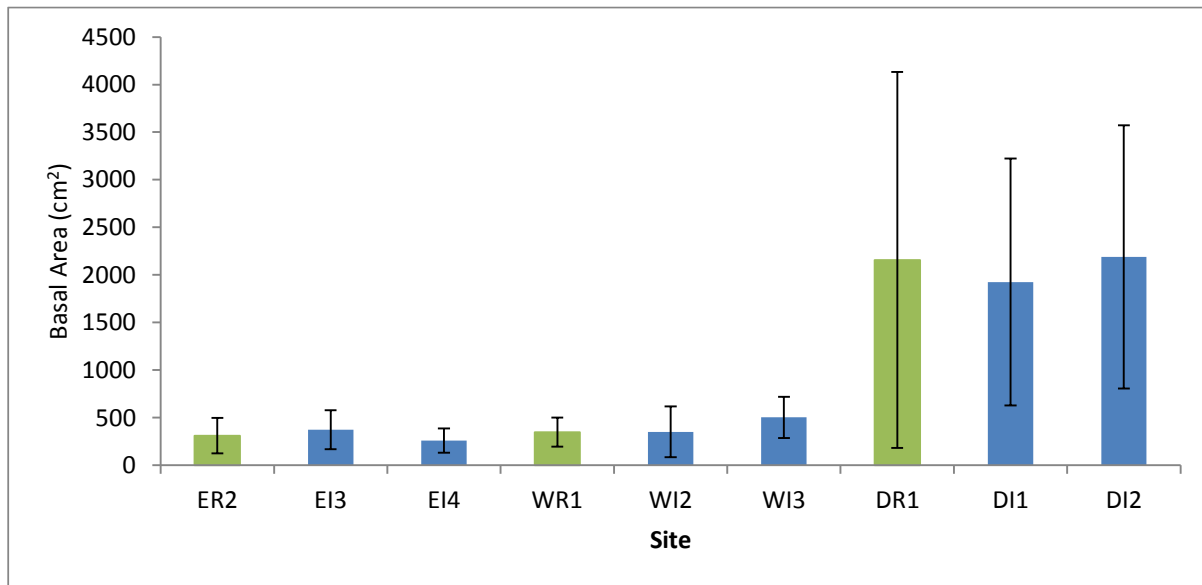


Figure 41: Mean basal area (cm²) at each site. Error bars indicate standard deviation.

3.5 Vegetation Composition and Cover

Community composition and cover for eastern mulga has changed similarly over time at the potential impact and reference sites (Figure 42). There has been no significant difference (PerMANOVA; $P > 0.05$) between any of the eastern mulga sites over the four survey periods analysed.

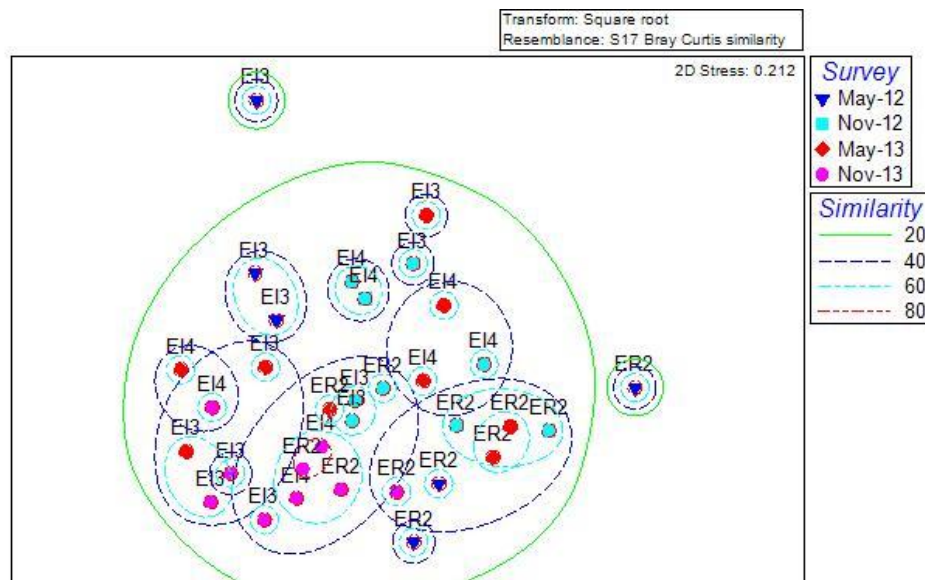


Figure 42: Non-metric multi-dimensional scaling (NMDS) plot of vegetation community composition along transects at all eastern mulga sites ($n = 3$ per site).

There has been no clear trend over time in community composition and cover at western mulga sites when potential impact and reference sites were compared in an NMDS (Figure 43). In November 2012 there was a significant difference (PerMANOVA; P (Monte Carlo) = 0.049) between sites WI2 and WR1 which is also evident in the ordination, however by May 2013 this difference was no longer evident (PerMANOVA; P = 0.094).

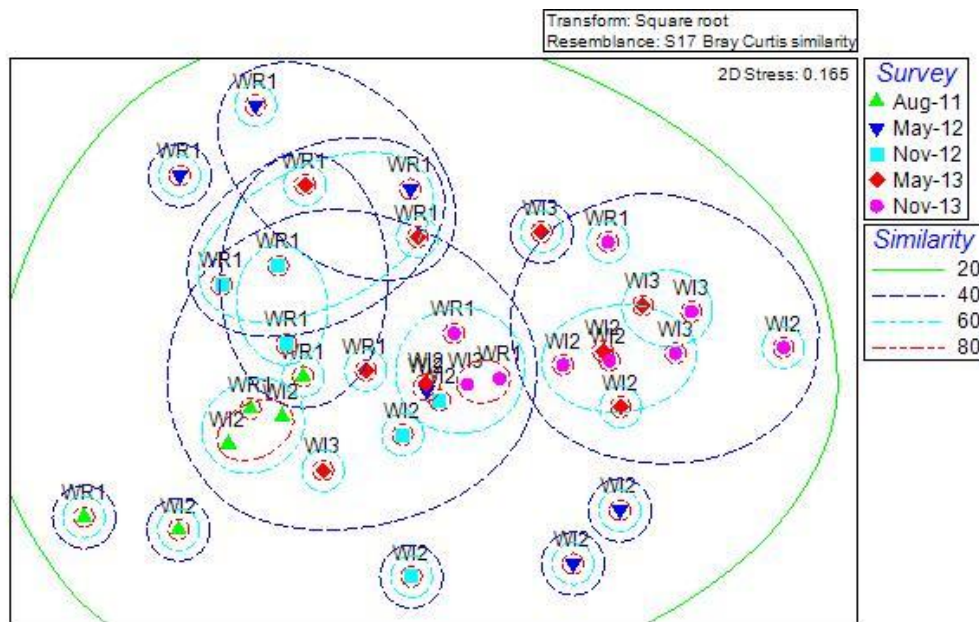


Figure 43: Non-metric multi-dimensional scaling (NMDS) plot for vegetation community composition along transects at all western mulga sites ($n = 3$ per site).

Community composition and cover at the phreatophytic potential impact and reference sites has changed similarly over time (Figure 44). There has been no significant difference (PerMANOVA; $P > 0.05$) between any of the phreatophytic sites over time.

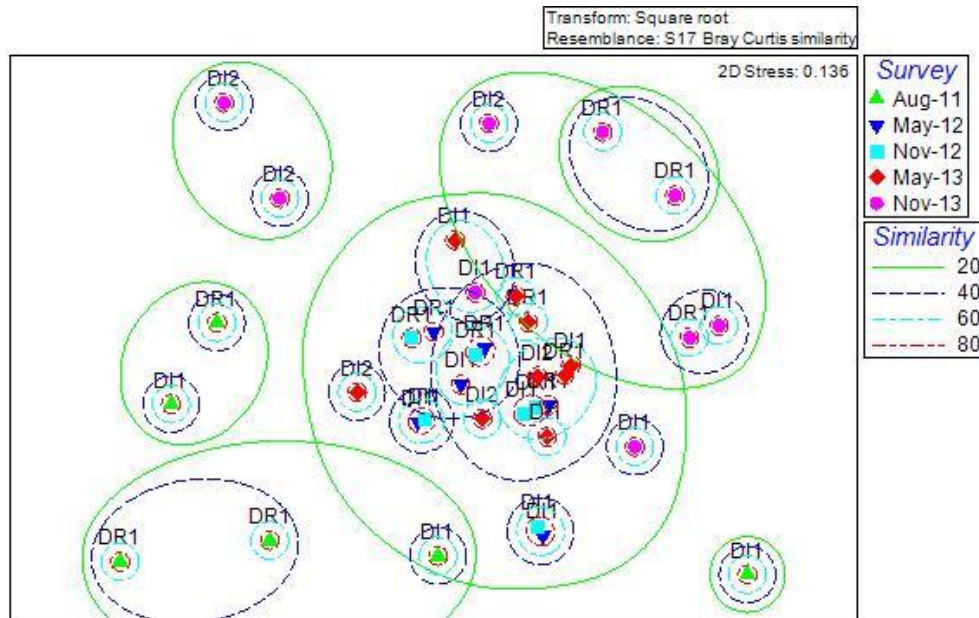


Figure 44: Non-metric multi-dimensional scaling (NMDS) for vegetation community composition along transects at all phreatophytic sites (n = 3 per site).

3.5.1 Weeds

Weed species were present at both of the eastern mulga potential impact sites in every period that monitoring occurred (Figure 45). Weed species richness (5) was greatest at EI3 in November 2013. The eastern mulga reference site had only one weed species recorded, **Portulaca oleracea*, during one survey in May 2013.

Weed species richness was greatest at the western reference site in May 2013 (Figure 46). **Malvastrum americanum* was first recorded at WR1 in May 2012 and was recorded again in May and November 2013. **Bidens bipinnata* was present at WI3 in November 2013 but was dead, therefore not included in the live extent. WI2 remains weed free along the line intercept transects.

For the phreatophytic community, **Aerva javanica* was recorded at potential impact site DI2 in May 2013 and this is the only weed species that has been identified as a serious environmental weed in the Fortescue (2011) Weed Management Plan (45-PL-EN-0013) (Figure 47).

**Cenchrus ciliaris* was the most common weed species at each of the phreatophytic sites in May 2013. In November 2013, **C. ciliaris* was again present at all sites but live plants were only recorded along the line intercept transects at potential impact site DI1. **Malvastrum*

americanum was again recorded at the reference site DR1 after first being recorded at this site in May 2012.

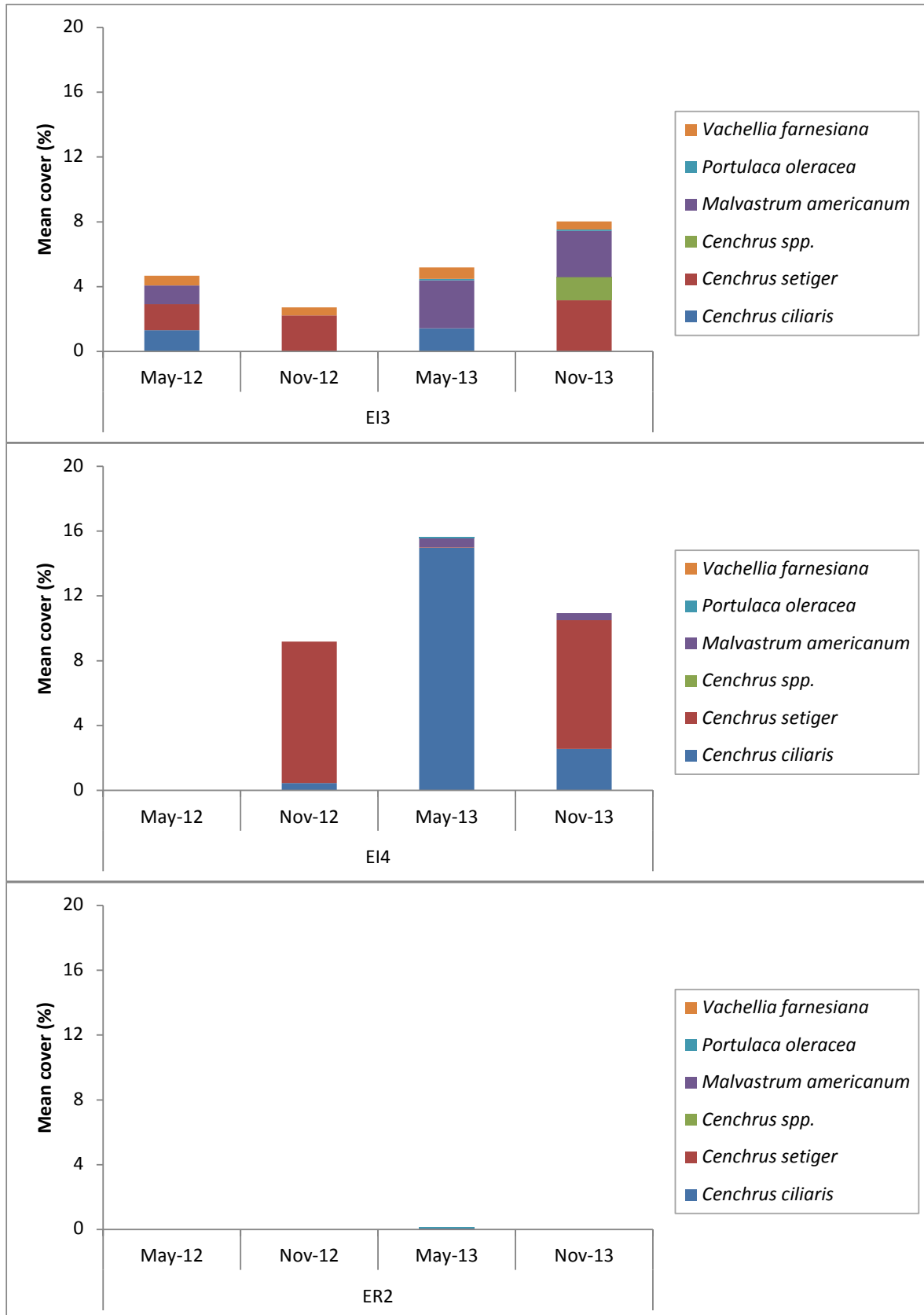


Figure 45: Mean cover (%) of weed species along three transects per eastern mulga potential impact and reference sites between May 2012 and November 2013.

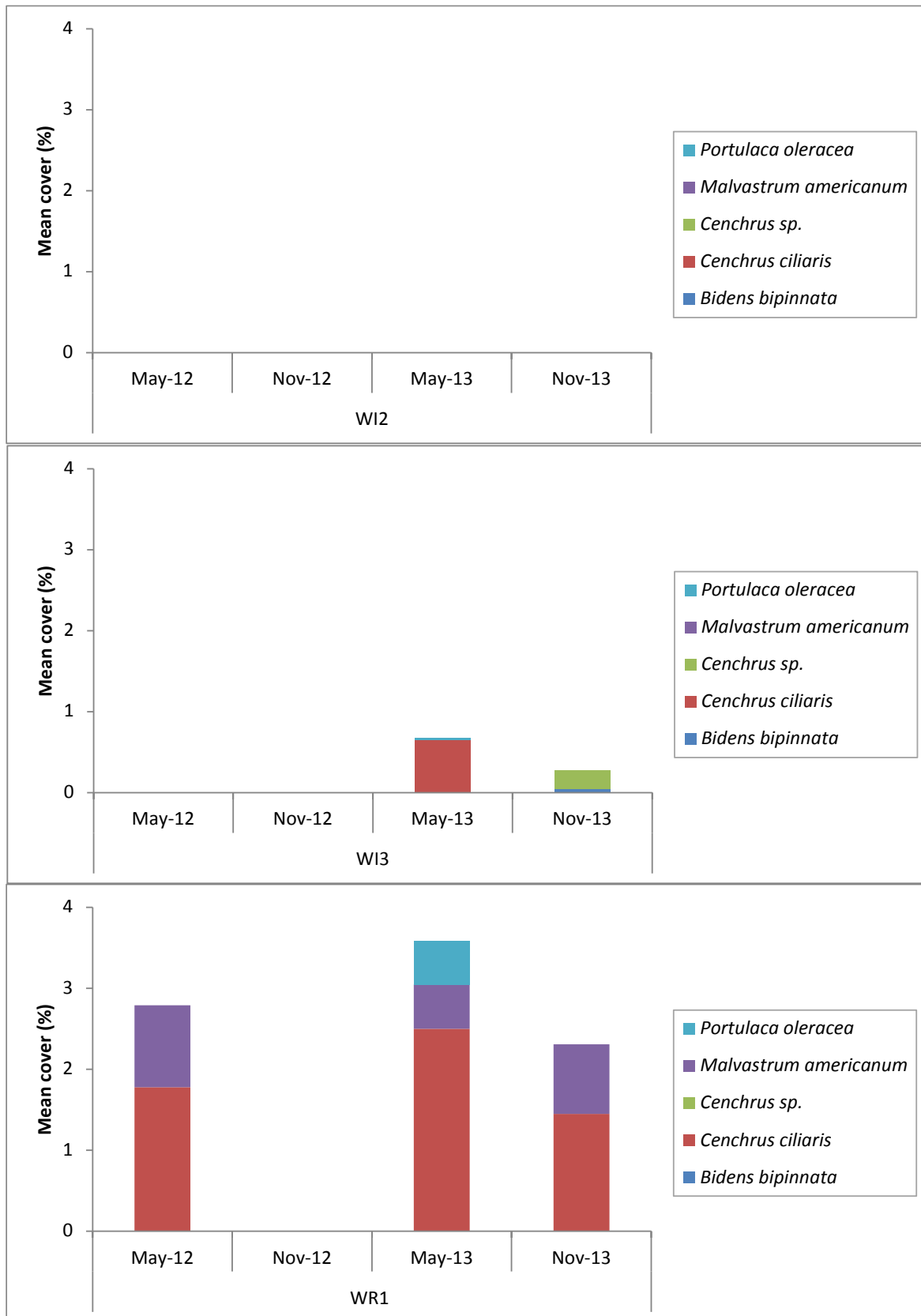


Figure 46: Mean cover (%) of weed species along three transects per western potential impact and reference sites between May 2012 and November 2013.

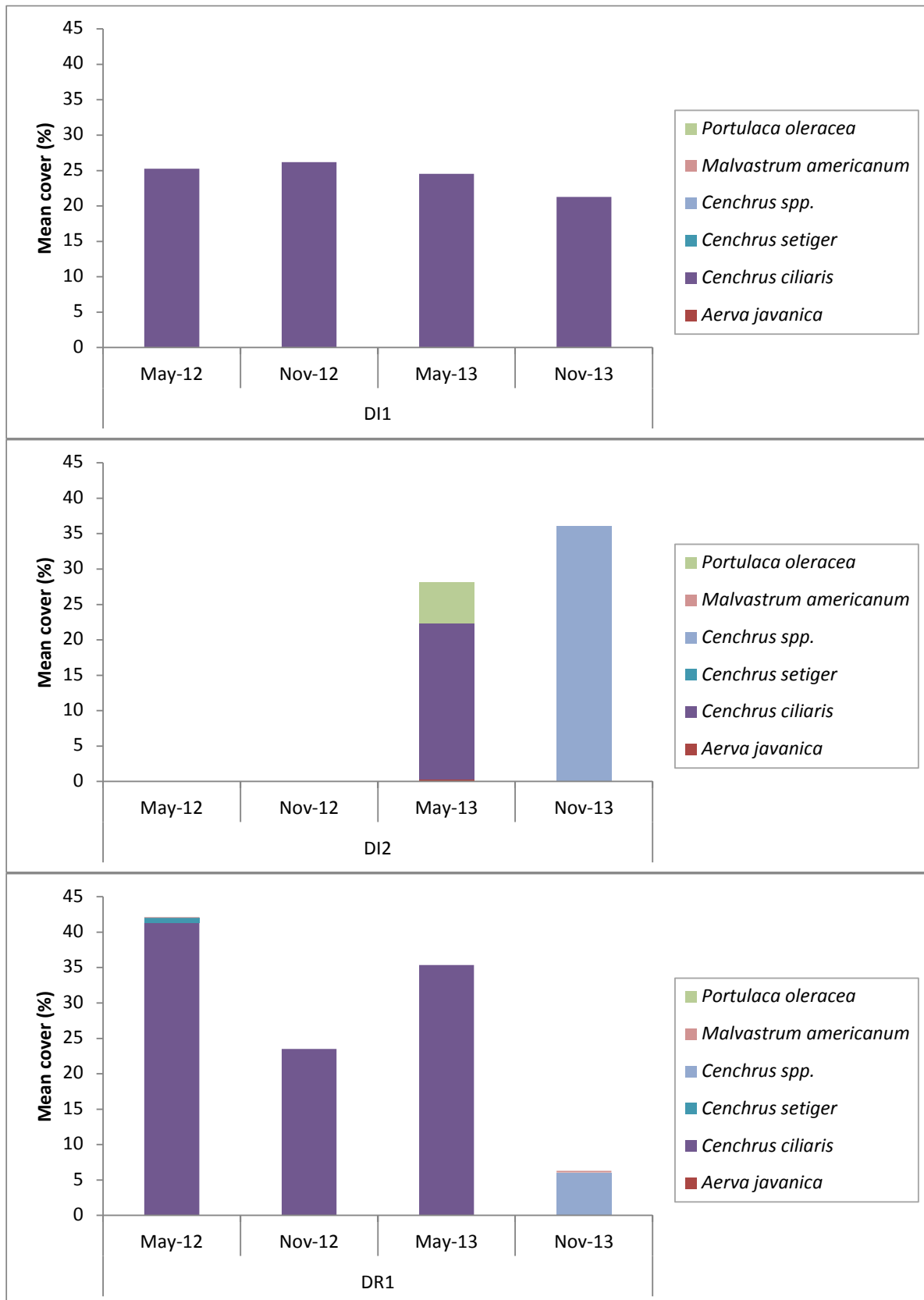


Figure 47: Mean cover (%) of weed species along three transects per drawdown potential impact and reference sites between May 2012 and November 2013.

3.6 Samphire Communities

3.6.1 Percentage Cover

Trends in mean percentage cover of samphire species have been generally comparable between the potential impact and reference communities (Figure 48). Cover remains higher within the potential impact communities, although variation across transects is considerably greater than within the reference communities. Mean percentage cover decreased between May 2012 and May 2013 across potential impact and reference communities and increased between November 2012 and November 2013 (Figure 49). No significant differences were found between the communities (May ANOVA $F_{1,6} = 1.328$ $P = 0.293$; November ANOVA $F_{1,6} = 0.26$ $P = 0.628$).

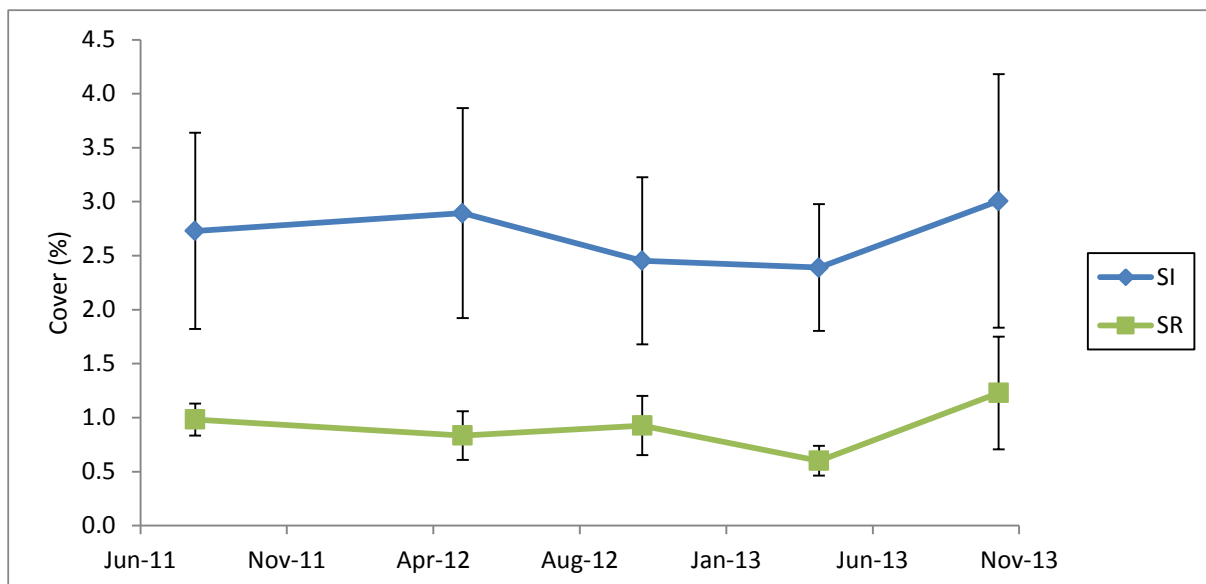


Figure 48: Mean cover (%) of samphire species along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas (n = 4) between September 2011 and November 2013. Error bars represent standard deviation.

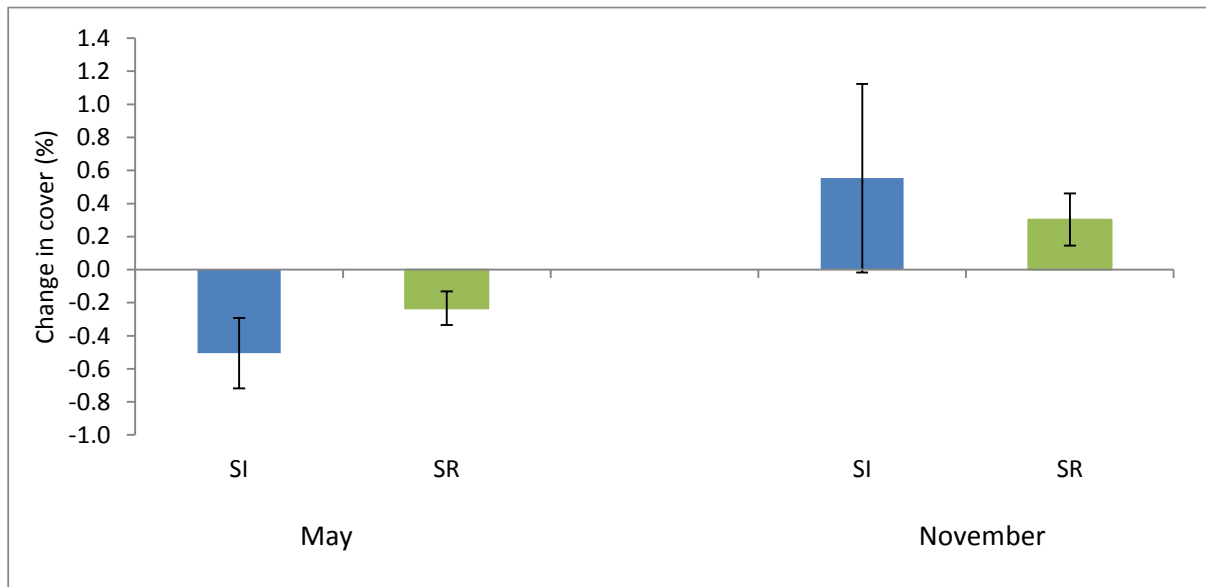


Figure 49: Change in mean cover (%) of samphire species along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas (n = 4) between May 2012 and May 2013, and November 2012 and November 2013. Error bars represent standard error. No significant difference was found between sites.

3.6.2 Health Score

The mean health of samphire at the potential impact site was higher (less tip die off) in May 2013 and similar in November 2013 when compared to the reference site. These differences were significant in May (ANOVA $F_{1,6} = 7.46$, $P = 0.034$) but not in November (Kruskal-Wallis $\chi^2 = 0.11$, $P = 0.741$). Mean values in these areas changed similarly between September 2011 and May 2013 (Figure 50). In November 2013, this trend changed when the mean health score of samphire communities in the potential impact area declined while the health of reference communities increased. Between May 2012 and May 2013 the mean health of potential impact and reference samphire communities changed very little at both sites (ANOVA $F_{1,6} = 0.004$, $P = 0.953$) (Figure 51). The increase in mean health in the two areas between November 2012 and November 2013 was significantly different (ANOVA $F_{1,6} = 72.58$, $P < 0.001$).

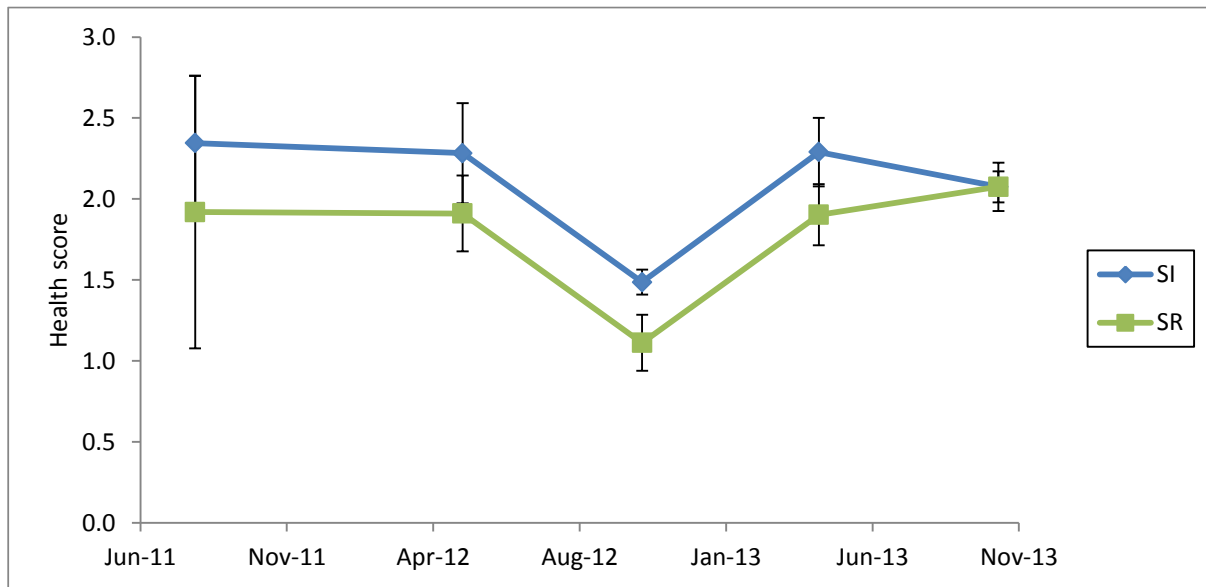


Figure 50: Mean health score of samphire species along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas (n = 4) between September 2011 and November 2013. Error bars represent standard deviation.

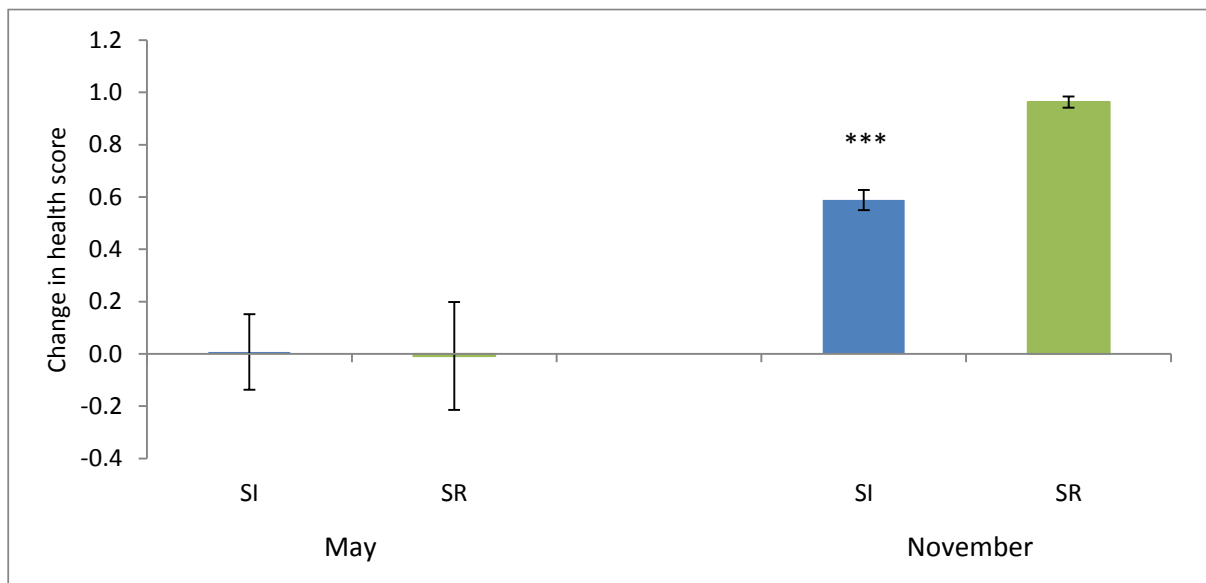


Figure 51: Change in mean health score of samphire species along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas (n = 4) between May 2012 and May 2013, and November 2012 and November 2013. Error bars represent standard error. Asterisks (***) represent significant difference between potential impact and reference areas ($P < 0.001$).

3.6.3 Height

The mean height of samphire in the potential impact and reference areas has followed a similar pattern since September 2011 although there has been a greater degree of variation within the potential impact area (Figure 52). In May 2013 and November 2013, mean height of samphire was greater in the potential impact area compared to reference area and these differences were significant: ANOVA $F_{1,6} = 34.81$, $P = 0.001$ (May 2013) and ANOVA $F_{1,6} = 23.47$, $P = 0.003$ (November 2013). Change in samphire height between May 2012 and May 2013 (ANOVA $F_{1,6} = 0.936$, $P = 0.371$) and November 2012 and November 2013 (ANOVA $F_{1,6} = 2.211$, $P = 0.188$) has not been significantly different between the potential impact and reference sites (Figure 53). Change within the potential impact areas between November 2012 and November 2013 was greater than that seen within the reference area over the same period.

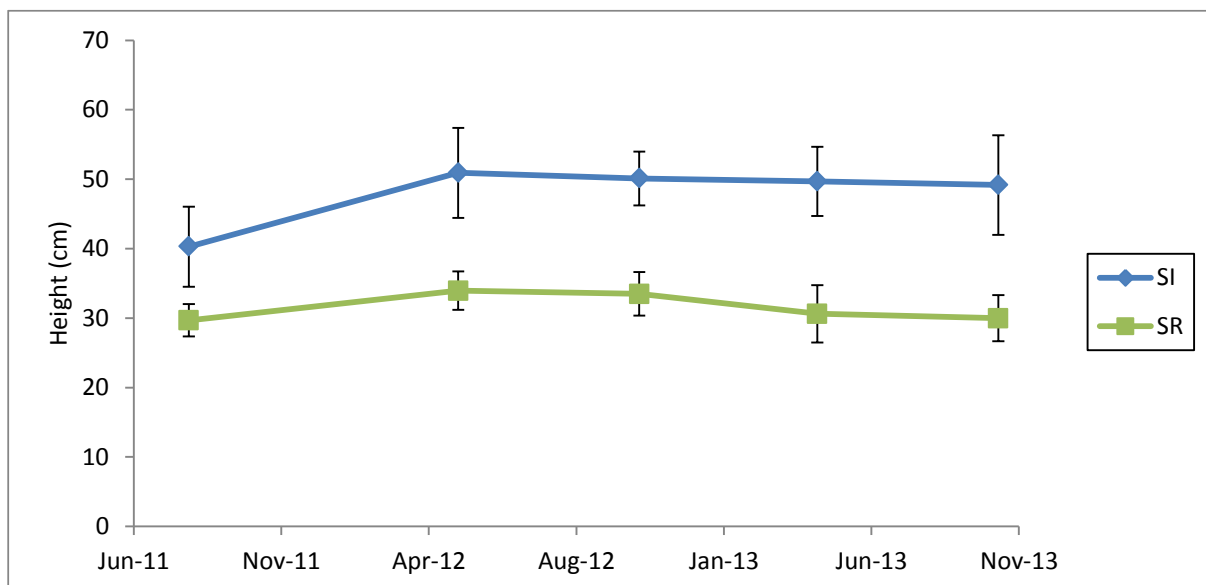


Figure 52: Mean samphire height along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas ($n = 4$) between September 2011 and November 2013. Error bars represent standard deviation.

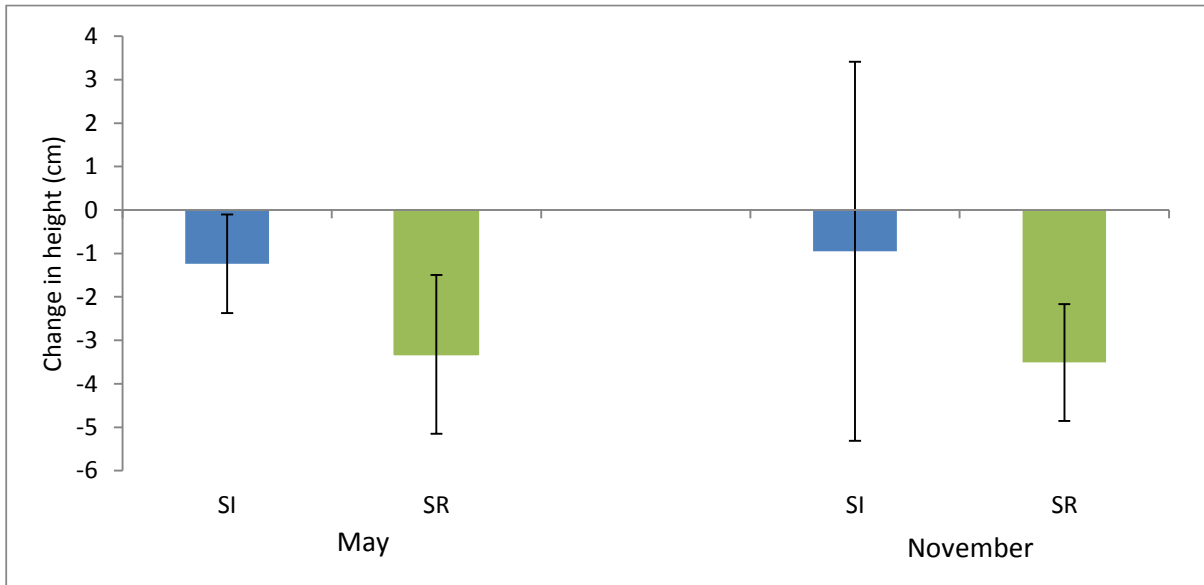


Figure 53: Change in mean samphire height along permanent transects within potential impact (SI1-4) and reference (SR3-6) areas (n = 4) between May 2012 and May 2013, and November 2012 and November 2013. Error bars represent standard error. No significant difference was found between sites.

Control chart analysis revealed that mean height at the potential impact and reference sites was in control during 2013 (Figure 54 and Figure 55).

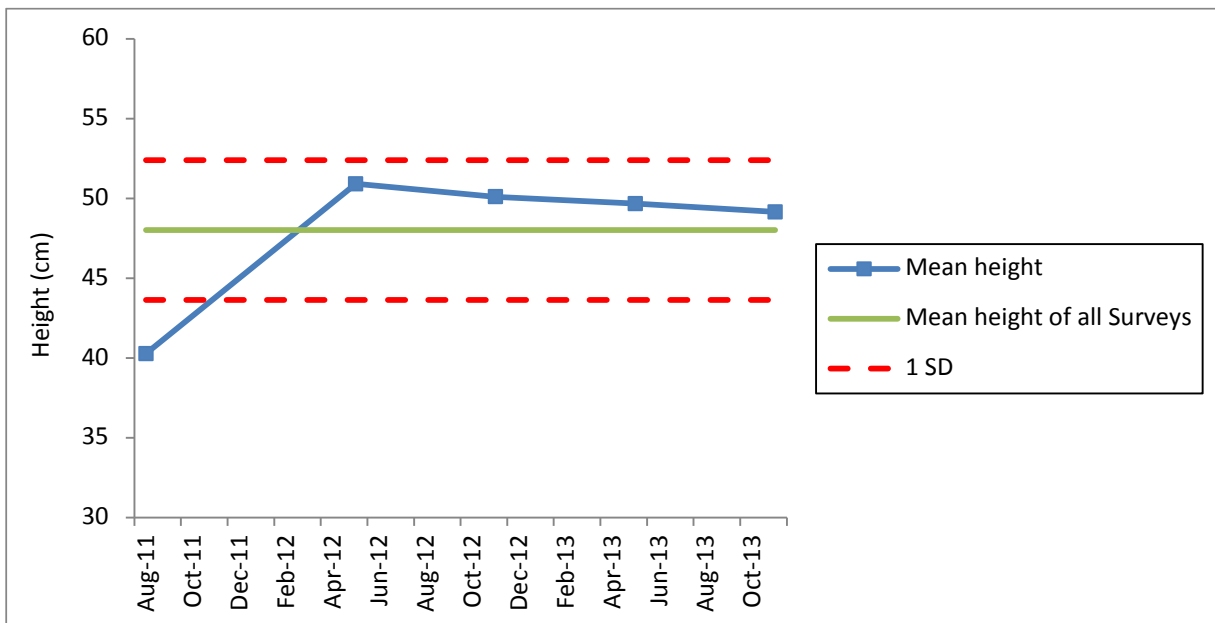


Figure 54: Control chart for height of samphire along permanent transects within potential impact area SI1-4 (n = 4). Control limit is one standard deviation (SD) from the mean.

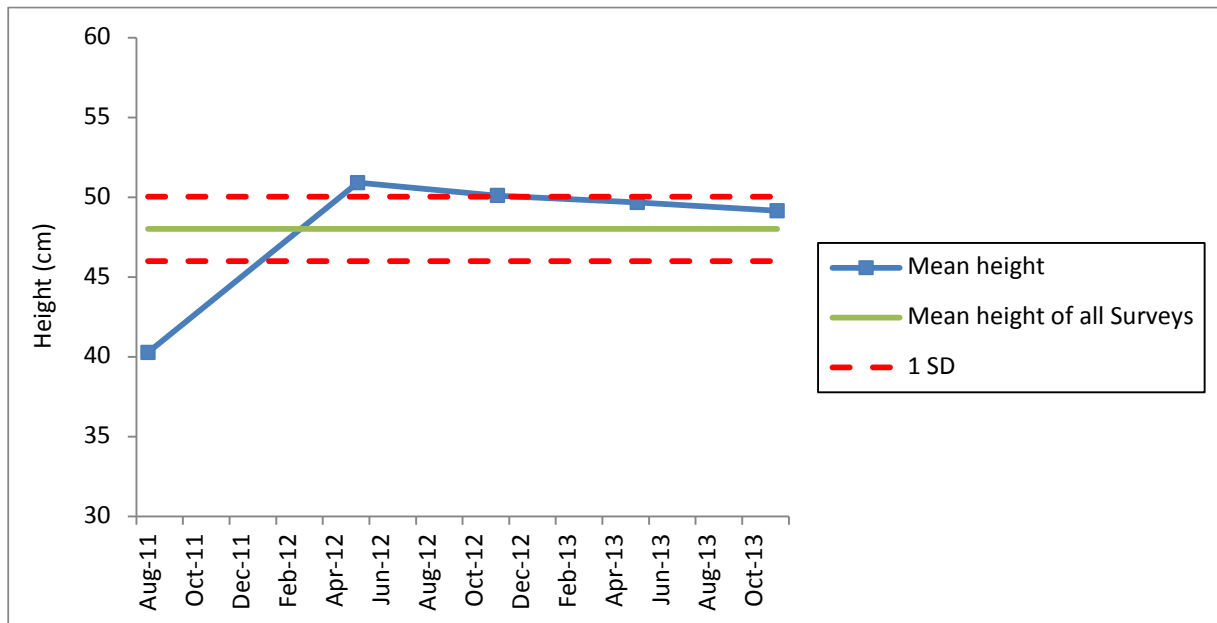


Figure 55: Control chart for height of samphire along permanent transects within reference SR3-6 area (n = 4). Control limit is one standard deviation (SD) from the mean.

3.6.4 Multivariate Analysis: Height and Health

There were significant differences between the reference and potential impact site in the PerMANOVA analysis of multivariate data (height and health [tip die off]): pseudo $F = 40.1$, $P = 0.001$ (May 2013), pseudo $F = 24.7$ and $P = 0.001$ (November 2013).

3.6.5 Monitoring Management Triggers

Level 1 monitoring management triggers have been exceeded for the samphire community (

Table 15). The exceedances related to the greater mean height (lower tip die off) and mean health of samphire in the potential mounding impact area in comparison to the reference sites, and the multivariate difference for height and health between the two areas. Results for species composition were unable to be assessed against the trigger.

Table 15: Results for samphire vegetation communities in 2013 in relation to monitoring management triggers in the VHMP (CC-PL-EN-0004 Rev 2) (Astron 2012a)

Trigger	Trigger Exceeded	Description
Plant species composition within communities within mounding areas does not alter significantly as measured by non-parametric multivariate analyses from vegetation transects in reference areas (identification with reliable reproductive material from surveyed plants)	N/A	Specimens with reproductive material were not available; hence they were unable to be identified to species level. As a result, the multivariate analysis could not be undertaken
Tip die off or tip growth of samphire plants is not significantly greater in mounding impact areas in comparison to reference areas	Yes (Figure 51)	<ul style="list-style-type: none"> • Mean height of samphires significantly greater at mounding impact sites in 2013 compared to reference sites. • Significantly lower tip die off (greater health) at mounding impact sites compared to reference sites in May 2013.
Univariate control chart – Level 1 management response required in exceedance of 1 standard deviation in tip die off and height	No	<ul style="list-style-type: none"> • Not applicable to tip die off (health) • Mean heights at potential impact sites were within control limits
MANOVA – Level 1 management response required if significant differences ($P < 0.05$) detected	Yes	<ul style="list-style-type: none"> • Non-parametric equivalent test to MANOVA (PerMANOVA) indicated a significant difference between potential impact and reference sites.

4. DISCUSSION

4.1 Mulga Communities

The overarching hypothesis for monitoring of mulga communities was that groundwater reinjection would not adversely affect mulga communities in areas of potential mounding impacts beyond natural variation recorded at reference sites. Based on the management monitoring triggers that have been set, this monitoring hypothesis must be rejected for the eastern potential impact sites (EI3 and EI4). Level 1 triggers have been exceeded for midday water potential (EI3), canopy cover (EI3 and EI4) and multivariate values for all ecophysiological parameters (EI3). Therefore, Fortescue needs to implement the responses as outlined in the VHMMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) with respect to increased frequency of monitoring and a further analysis of cause and effect.

Despite the exceedance of the Level 1 trigger, overall, the condition of mulga in both eastern and western areas as assessed by visual health ratings is good, with reference and potential impact sites comparable and trending similarly. There have been no deaths of sample trees to date. Thus, it is not readily apparent as to whether mounding has had an impact at this stage or the exceedances are a natural phenomenon.

Contrasting trends in water potential and PFC between reference and potential impact sites were apparent. However, at present, it is unclear as to whether mounding accounts for these differences. Trends for PFC vary between potential impact sites in comparison to the reference sites whereas water potential is generally trending lower at potential impact sites than at the reference. If groundwater was rising within the root zone of mulga, and this groundwater was not saline, water potential would be expected to increase, at least in the early stages of mounding; it is less clear as to whether ongoing rise would lead to a reduction or a further increase in water potential. The declining soil moisture at both the reference and potential impact sites at the end of the dry season (November 2013) indicates that if mounding is occurring, groundwater remains below 0.5 m depth. The lack of correlation between water potential and soil moisture content at 0.5 m suggests that stores of moisture below this depth may be influencing the water status of mulga. The majority of mulga roots are found in the 0 to 0.5 m depth zone, but fine roots can extend down to 1.6 m (Astron 2012b). Regardless, if any impact from mounding is present, water potential measures are capturing seasonal response to changing water availability, generally becoming more negative after the dry season and indicating a strong physiological response to available water. Inherent site factors such as differences in topography and soil type may account for the differences in trends that have been observed. Additional data would need to be examined to evaluate whether this is the case.

Grimes density and health scores do not as yet reveal clear trends attributable to changing water availability, making interpretation difficult. Early indications suggest phenological processes such as phyllode development, flowering and fruit set in mulga may be associated

with rainfall and temperature changes and therefore may be useful indicators of increasing soil water availability.

Leaf litter trap trial

Seasonal change in litter fall within a site can lend valuable information to understanding mulga phenology and response to environmental change. Whether or not mulga phyllode shed occurs to some degree as a response to drought is not clearly understood. While Winkworth (1973) suggested that mulga phyllode shedding peaks at times of increased soil moisture, the mean weight of phyllodes collected at the western reference site in November 2013 (at the end of the dry season) was not considerably different to that collected in May 2013 (at the end of the wet season). The stability in the mean weight of phyllodes collected between May and November 2013 appears to belie the considerable increase in PFC recorded at this site over the same period but does appear to correspond to the stable Grimes density measure.

While there has been some difficulty with this element of the Program owing to the loss of field infrastructure between surveys it would be helpful to retain leaf litter traps at the western reference site throughout 2014 in order to continue to investigate if there is a relationship between water availability and phyllode drop. The scientific literature is surprisingly lacking in manuscripts providing detailed understanding of mulga physiology. Change in phyllode litter collected over seasons and years may reveal interesting information on mulga growth dynamics and findings may yield observations that can be used to guide future research and development of mulga monitoring methods.

4.2 Phreatophytic Vegetation

The overarching hypothesis for monitoring of phreatophytic communities was that groundwater abstraction would not adversely affect phreatophytic communities in areas of potential drawdown beyond natural variation recorded at reference sites. However, monitoring management triggers were exceeded for both potential impact sites during 2013 for predawn water potential and for the multivariate control chart analysis of potential impact site DI2 in November 2013. Therefore, Fortescue will need to implement the responses as outlined in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) with respect to increased frequency of monitoring and a further analysis of cause and effect.

Further investigation of the exceedance is likely to indicate that groundwater drawdown was not the cause of the trends observed and that the trees are maintaining good health. If dewatering was having an effect at the monitoring sites then water potential values would be expected to be significantly lower than at the reference site and displaying a negative trend. This highlights a need for the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) to be revised so that this monitoring management trigger can be amended to account for the likely effect of groundwater drawdown: lower water potential at the potential impact sites. Further support for an absence of impact is the fact that trends in water potential in 2013 were similar if not slightly better at the

potential impact sites than at the reference site. Trends for tree health also provide no evidence of any impact with visual health ratings similar between reference and potential impact sites. One tree death was recorded at potential impact site DI1 in 2013; however, the dead tree has been in poor or declining health since the Program commenced in August 2011; therefore no association between the death and dewatering is apparent. A replacement tree has been incorporated in to the monitoring program at this site.

4.3 Samphire Communities

The overarching hypothesis for monitoring of samphire communities was that groundwater reinjection would not adversely affect samphire communities in areas of potential mounding impacts beyond natural variation recorded at reference sites. This hypothesis must be rejected as monitoring management triggers were exceeded: height of samphires was significantly greater in the potential impact area, health was significantly higher in the potential impact area in May 2013 and there was a difference in the multivariate analysis of height and tip die back (health) between the potential impact and reference areas. Therefore, Fortescue will need to implement the responses as outlined in the VHMMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) with respect to increased frequency of monitoring and a further analysis of cause and effect. Reporting against the monitoring management trigger in relation to community composition change was not possible due to the inability to identify species in the absence of reproductive structures being present on the plants at both reference and potential impact sites. There has been one occasion, during the May 2013 survey, when flowering samphire material was collected at potential impact site SI3 and subsequently identified as *Tecticornia indica*.

Overall, samphire communities within both the reference and potential impact areas appear in relatively good health. However, the significantly smaller increase in health recorded at the potential impact site in comparison to the reference site provides a further indication of a difference between potential impact and reference sites. Differences in height and trends in health may be due to inherent site differences. Potential impact sites are somewhat further from the centre of the Fortescue Marsh, and the decline in health may be a seasonal response to drying conditions. Further, the depth to any hard layer or saline water table may be greater here, allowing plants to grow taller. Despite the decline, mean health across both areas remains moderate and mean percentage cover and height of samphires in the potential impact area remain greater than in the reference areas. For these reasons, it is unlikely that mounding has had an adverse impact on samphires to date.

4.4 Secondary Pressures

Grazing by cattle, fire, seasonal variability and weeds have the potential to degrade vegetation communities. Cattle and evidence of grazing is persistent throughout the project area, although cattle evidence is low at WI2. Fire had not disturbed any of the monitoring sites in 2013, although there is some evidence of historic fire events at WI3 and ER2. The weather of 2013

was typical for the Pilbara. Weeds were present at all mulga and phreatophytic monitoring sites in May 2013 likely owing to favourable climatic conditions. Weeds were not apparent at WI2 in November 2013 but were present at all other sites. Only samphire species have been monitored in the Fortescue Marsh area following the baseline survey and observations and photographic evidences suggests there has been little change since that time. Monitoring of weed species and cover should resume in this community in 2014.

5. EVALUATION OF THE PROGRAM

5.1 Soil moisture monitoring

Since acceptance of the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a), Fortescue has completed an investigation of mulga root architecture and determined that mulga roots do not penetrate to depths much greater than 1 m and all large, and the majority of fine, roots are found in the top 0.5 m of soil (Astron 2012b). Soil sampling for gravimetric moisture content at a depth of 0.5 m is therefore likely to indicate whether soil moisture is increasing in the vicinity of mulga roots as a result of mounding due to reinjection of water. Use of hand tools for soil sampling is a better approach than machinery because it is minimally disturbing to the monitoring sites.

5.2 Changes in monitoring sites

During 2013 the western potential impact site WI1 was decommissioned and all infrastructure associated with monitoring was removed. This site was immediately adjacent to the camp waste water irrigation area, and it was felt that if any impact was observed it may not be possible to assign cause to either mounding or irrigation. In May 2013, a new western potential impact site was installed further west of WI1 and downslope of reinjection bores in the vicinity of groundwater monitoring bores in order to better represent vegetation in the western mounding area.

5.3 Maintaining seasonal consistency

The Program should be implemented during the same months, May and November, in coming years. This will ensure that monitoring captures annual fluctuations in monitored parameters which will better guide management decisions and reduce artefacts arising in data analysis and interpretation. The merit of this approach is becoming apparent in the current data set with seasonal fluctuations in soil moisture and leaf water potentials strongly evident. With a further year of data recorded at the same seasonal intervals, patterns and response to environmental conditions in mulga phenology will become more apparent. This will guide further refinements of mulga monitoring methods across the Pilbara.

5.4 Evaluation of the VHMMP

The current monitoring management triggers in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) and associated statistical tests should be reviewed and revised now that several years' data are available. The following issues exist with the present triggers or the analyses specified to determine whether a trigger has been exceeded:

- Some triggers are arguably too conservative; for example, one standard deviation is used as the trigger in univariate control charts whereas two or three standard deviations are generally adopted as common practice for monitoring trigger levels (see Gove et al 2013).
- Rather than comparing values at reference and potential impact sites at the latest point in time, analyses should account for differences between sites under baseline conditions (for example, by using baseline values as covariates) or triggers should refer to statistical differences in trends.
- Some triggers are unable to be reported against; for example, the multivariate analysis of samphire community composition is not possible because species are unable to be identified consistently during the monitoring surveys.
- The description of the trigger in some cases could better align with potential impacts; for example, predawn water potential should be expected to be significantly lower, rather than significantly greater, at potential dewatering impact sites.

6. CONCLUSION

This report has highlighted the exceedance of Level 1 monitoring management triggers in all three communities during 2013. As such, Fortescue is required to implement the responses as outlined under Section 11 (Corrective Action) in the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) which involves increased frequency of monitoring and a further analysis of cause and effect. Excluding the results specific to the triggers, when all trends for the parameters measured in the three communities were examined, there was no strong indication that an impact has occurred, especially for the phreatophytic and samphire communities. However, further investigation as directed by the VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) will be necessary to confirm this. Additional surveys, undertaken in August and February, should include primary monitoring parameters as set out in the Significant Flora and Vegetation Monitoring Guidelines (FMG 2012 45-GU-EN-0001), particularly:

- population structure – an age class assessment of each Mulga survey tree and any recent deaths
- condition assessment – visual health assessments of keystone species present at each site
- climate data.

Data on secondary parameters such as groundwater help to explain and confirm the cause of shifts in vegetation health and ultimately may contribute to the development of robust management triggers and thresholds (FMG 2012 45-GU-EN-0001). Groundwater data (a secondary monitoring parameter) should be sourced in order that primary parameters can be analysed and interpreted in context. The installation of piezometers or monitoring bores at each monitoring site would greatly inform the Program. It should be noted that additional surveys are not recommended as a permanent inclusion of the VHMMP at this stage and should be reviewed on an on-going basis.

It is also recommended that the present VHMMP (CC-PL-EN-0004 Rev 2) (Astron 2012a) undergo a review and the suitability of the current monitoring management triggers are assessed now that two years of monitoring data has been collected.

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