Flora and Vegetation of the Proposed Cape Preston Rail Corridor West Pilbara Iron Ore Project

2007 - 2008

Prepared by:

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1. Introduction

1.1 Background and Study Area

API Management Pty Ltd (API) is proposing to develop the West Pilbara Iron Ore Project (WPIOP). The WPIOP is based on eight iron ore deposits found in five locations located between 35 and 80 km south to south west of Pannawonica, along the western fringe of the Hamersley ranges. The ore bodies are goethite-hematite Channel Iron Deposits (CIDs) which are detrital iron-rich material transported into Tertiary river systems and preserved in paleodrainage channels that exist as mesa landforms.

The proposed mine areas extend over 55 km on the Red Hill and Mt Stuart Pastoral Stations and unallocated Crown Land. A railway will be constructed between the deposits and roads will be constructed to enable access between the mine sites and associated infrastructure. Botanical surveys of these areas have been reported separately (Western Botanical, 2009a, b). A railway line is proposed to a port at Dixon Island (207 km). One hundred kilometres of this proposed rail alignment (referred to here as the Cape Preston rail alignment), from the northern most deposit of Cochrane was surveyed by Western Botanical (Figure 1).

The corridor surveyed (the study area) is generally 200 m wide, with areas of up to 500 m over major rivers such as the Robe River and Fortescue River. The size of the total study area is 2398 ha. The area to be impacted is anticipated to be generally 100 m wide, similarly with some wider areas over major rivers. The proposed impact area encompasses 925.7 ha. The study area traverses three pastoral leases, from Red Hill at the southern end, through Yarraloola, and the northwest terminates on Mardie Station.

1.2 Scope and Objectives of the Study

The purpose of this report is to provide baseline information for the purposes of enfironmenal impact assessment at the Public Environmental Review (PER) level of assessment set by the Environmental Protection Authority (EPA) under the *Environmental Protection Act 1986*.

This report documents the flora and vegetation surveys of the study area conducted by Western Botanical during September 2007 to September 2008. Prior to commencing the survey, consultation was undertaken with the Department of Environment and other botanists experienced in flora and vegetation survey in the Pilbara, to ensure that the level of survey and methodology would be comparable with other datasets collated from these sources.

The level of survey appropriate for this project was determined at Level 2, as defined by the Environmental Protection Authority (2004). According to the EPA (2004), the scale and nature of the impact of the proposed West Pilbara Iron Ore Project meet the criteria of the 'high' and 'moderate' characteristics (Appendix 2-Table 3 in EPA 2004) for the Pilbara Bioregion. A detailed Level 2 survey requires "one or more visits in the main flowering season and visits in other seasons; and replication of plots in vegetation units, and great coverage and displacement of plots over the target area" (EPA 2004). The purpose of a comprehensive survey according to the EPA (2004) is "to enhance the level of knowledge at the locality scale and the context at the local scale". The work was structured with longer-term study and multiple visits.

The study aims to provide detailed baseline information on the vegetation and flora of the proposed Cape Preston Rail Corridor; develop an inventory of flora; survey for rare flora (if seasonally appropriate); describe the vegetation; indicate plant communities of conservation interest; and identify habitat areas for rare flora surveys.

Author: K. McMaster ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Nov 2009 ~ A3 ~ Rev: A ~ CAD Ref g1505_WB_Rpt0911R_00.dgn

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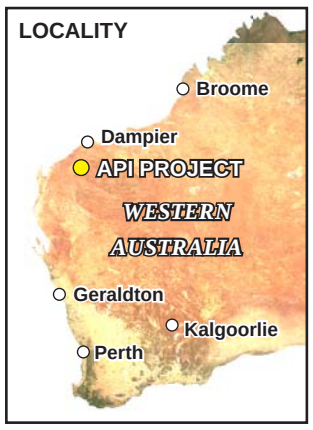
API



N

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Scale 1:600,000
MGA94 (Zone 50)

Dampier
Karratha
Cape Preston
Highway
Millstream
Coastal Route
Fortescue Road House
Rail
Link
Fortescue River
Proposed
Robe River
Road
Dampier - Bunbury Natural Gas Pipeline
West
Millstream
Pannawonica
River
Yalleen Camp
Peedamulla
North
Cochrane Jewel
Red Hill Station
Kens Bore
Cardo Bore North
Cane River
Cardo Bore East
Upper Cane
CARDO OUTCAMP
Trinity Bore
Catho Well
Paraburdoo
Road
Nanutarra
Mt Stuart Station

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE VEGETATION OVERVIEW
Author: K. McMaster Date: November 2009

1.3 Physiography and Geology

The physiography of the Pilbara region is related to the underlying rocks. Geologically, the area is divided into coastal plains, uplands and a transition zone (Williams 1968). The majority of the study area travels through the transition zone, the landforms comprise mesas and hills with some plain and plains with scattered hills.

Beard (1975) described eight physiographic units or natural regions for the Fortescue Botanical District (Pilbara Region). The Cape Preston Rail Corridor study area traverses five of these:

- Onslow Coastal Plain (13.9% of Study Area) – a plain extending from Mary Anne Point to Cape Preston. It comprises extensive plains dominated by neutral and alkaline soils and gravels and plains dominated by alkaline red soils and areas of cracking and non-cracking clay soils.

- Abydos Plain (4.3% of Study Area) – this continues the Onslow Coastal Plain further east, from Cape Preston to Pardoo Creek. The coastal portion is alluvial, the majority is granite. The granite further inland outcrops in small hills, ranges and dykes.

- Chichester Plateau (28.1% of Study Area) – a long, narrow unit that is bounded on the south side by the Fortescue draining. Comprising mainly rocks of basalt, with siltstone, mudstone, shale, dolomite and jaspilite included.

- Stuart Hills (53% of the Study Area) - Principally plains, gently undulating from breakaways and residuals capped by Robe pisolites, also stony hills and steeply dissected pediments on fine-grained sandstone, shale and dolomite.

- Hamersley Plateau (0.4% of the Study Area) – A compact unit bounded to the west, north and east by a well-marked abrupt escarpment. Comprised predominantly of jaspilite and dolomite with some shale, siltstone and volcanics.

1.4 Land Systems

Land system mapping is a natural classification of land based predominantly on biophysical features (Van Vreeswyk *et al.* 2004). The rangeland land system mapping provides a level of assessment over the Pilbara bioregion encompassing, flora, vegetation, geomorphology, soils, and site type ecology and resource condition. The Cape Preston Rail study area intersects ten land systems (Table 1).

The proportion of the land systems occurring in the study area comprise between 0.01 and 0.62% of the total area of the land system in the Pilbara (Table 2). Rocklea and Newman are two of the most extensive land systems throughout the region, the study area occurs on the western margins of their distribution. Four land systems are considered to have a limited distribution; Paraburdoo, Nanutarra, Peedamulla and Sherlock land systems. Sherlock Land System comprises only 0.1% of the Pilbara.

Table 1 Land systems intersected by the study area

(Descriptions from Van Vreeswyk *et al.* 2004)

Land System	Description
Boolgeeda	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands; occurring broadly throughout the study area
Capricorn	Hills and ridges of sandstone and dolomite supporting shrubby hard and soft spinifex grasslands; occurring in the southern section of the study area
Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands; occurring in the central and southern sections of the study area
Nanutarra	Low mesas and hills of sedimentary rocks supporting soft and hard spinifex grasslands; occurring in the central section of the study area
Paraburdoo	Basalt derived stony Gilgai plains and stony plains supporting snakewood and mulga shrublands with spinifex and tussock grasses; occurring in the northern section of the study area
Peedamulla	Gravelly plains supporting hard spinifex grasslands and minor snakewood shrublands; occurring in the central section of the study area
River	Active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands; occurring in the central and southern sections of the study area
Rocklea	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands; occurring in the northern section of the study area
Sherlock	Stony alluvial plains supporting snakewood shrublands with patchy tussock grasses and spinifex grasslands; occurring in the southern section of the study area
Urandy	Stony plains, alluvial plains and drainage lines supporting shrubby soft spinifex grasslands; occurring in the most southern section of the study area

Table 2 Distribution of Land systems within the Cape Preston Rail Study Area

Land system	Distribution	Total Area (Ha) Pilbara Bioregion	Amount of Land system within the Study Area	
			Ha	% of total in Pilbara Bioregion
Boolgeeda	Extensive throughout the Pilbara; the Cape Preston Rail study area is at the western limit of distribution.	774,800	751.3	0.10
Capricorn	Widespread in the Hamersley and Chichester subregions; numerous occurrences in the southern half of the Cape Preston Rail study area.	529,600	94.0	0.02
Newman	Extensive throughout the Hamersley Range. The Cape Preston Rail study area is at the western limit of distribution of this land system.	1,458,000	260.2	0.02
Nanutarra	Limited distribution in the western section of the Hamersley subregion. Few occurrences on the northern half of the Cape Preston Rail study area at its western distribution.	69,700	433.2	0.62
Paraburdoo	Restricted to small pockets in the Roebourne and northern Chichester subregions. The Cape Preston Rail study area occurs on the western limit of distribution of this land system.	56,500	146.9	0.26
Peedamulla	Occurs as a narrow band along the boundary of the Hamersley and Roebourne subregions. The Cape Preston study area is on the eastern limit of distribution of this land system.	58,700	31.7	0.05
River	Occurs in major river systems throughout the Pilbara; occurs in the Robe and Fortescue rivers in the Cape Preston Rail study area.	408,800	139.0	0.03
Rocklea	Extensive throughout the Pilbara. Cape Preston Rail study area is on the western limit of the distribution.	2,299,300	303.7	0.01
Sherlock	Limited distribution in association with river systems in the western sections of the Hamersley and Chichester subregions. Few occurrences in the Cape Preston Rail study area.	19,200	64.2	0.33
Urandy	Scattered distribution throughout the Pilbara, The Cape Preston Rail study area is on the western limit of distribution.	131,100	173.7	0.13

1.5 Botanical Context and Existing Data

1.5.1 Bioregional Setting

Thackway and Cresswell (1995) developed the Interim Biogeographic Regionalisation of Australia (IBRA) comprising 85 biogeographic regions. The regions were derived by compiling climate, lithology/geology, landform, vegetation, flora and fauna, land use, and other attributes as needed. The best data and information available at the time for each State and Territory was used including field knowledge, published resource and environmental reports, continental data sets, and existing biogeographic regionalisations (Commonwealth of Australia 1999). The IBRA was designed principally as a framework for examining deficiencies in the National Reserve System and subsequent allocations of federal funding to the states. In Western Australia the bioregions were based on the work of Beard (1990), a compilation of the project "Vegetation Survey of Western Australia", comprising survey work undertaken between 1964 and 1981.

It is commonly understood that the level of biodiversity in Western Australia is significantly more variable at a finer spatial scale than is accounted for by IBRA. An audit of the knowledge and gaps in available data was more recently undertaken by the Department of Conservation and Land Management (now DEC) (McKenzie and May 2003). Outcomes of the audit included summaries of the significant components of biodiversity in each subregion and bioregion.

The study area is located within the Pilbara Bioregion. The Pilbara Bioregion comprises four subregions; the study area traverses three of these subregions. From the south it traverses the Hamersley subregion, and then skirts the south-eastern edge of the Roebourne subregion and the western edge of the Chichester subregion (Kendrick & Stanley, 2003; Figure 2).

1.5.2 Regional Vegetation Mapping

The study area lies within the Fortescue Botanical District of the Eremaean Botanical Province (Beard 1975). Mapped by Beard (1975) at 1:1,000,000, he described the Pilbara region as generally characterised by tree and shrub steppe communities dominated by *Eucalyptus* trees, *Acacia* shrubs, *Triodia pungens* and *T. wiseana* grasses, with some mulga (*Acacia aneura*) occurring in valleys and short-grass plains on alluvia (Beard, 1990). The Hamersley escarpment is dominated by spinifex vegetation, mulga is known to occur in valleys and on basaltic rocks, while grass savannah occur on valley plains (Beard 1990).

The mapping (Beard 1975) as interpreted by Shepherd *et al.*. (2002) describes ten vegetation types for the study area (Table 3).

The biodiversity of the Pilbara is considered to be rich but poorly understood. The Department of Environment and Conservation undertook a Pilbara Bioregional study during 2002-2007, which has not yet been published. It will hopefully provide a more recent, detailed regional perspective on the flora and vegetation of the Pilbara.

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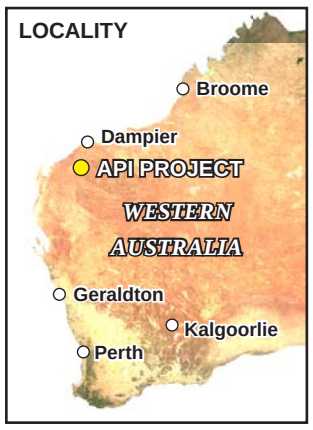

N

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Scale 1:600,000
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Dampier
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Fortescue
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Pannawonica
PIL2
River
Yalleen Camp
Peedamulla
North
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Jewel
Red Hill Station
PIL3
Kens Bore
Cane
River
Cardo Bore North
Cardo Bore East
Upper Cane
CARDO OUTCAMP
Trinity Bore
Catho Well
Paraburdoo
Road
Mt Stuart Station
Nanutarra

PIL Pilbara

There are four major components to the Pilbara Craton.
(1) Chichester. Archaean granite and basalt plains supporting shrub steppe characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grasses. Snappy Gum tree steppes occur on ranges.
(2) The Fortescue Plains. Alluvial plains and river frontages. Salt marsh, mulga-bunch grass, and short grass communities on alluvial plains. River Gum woodlands fringe the drainage lines. This is the northern limit of Mulga (*Acacia aneura*).
(3) Hamersley. Mountainous area of Proterozoic sedimentary ranges and plateaux with Mulga low woodland over bunch grasses on fine textured soils and Snappy Gum over *Triodia brizoides* on skeletal sandy soils of the ranges.
(4) Roebourne. Quaternary alluvial plains with a grass savanna of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia translucens* over *Triodia pungens* . Samphire, *Sporobolus* and Mangal occur on marine alluvial flats. Arid tropical with summer rain.

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE INTERIM BIOGEOGRAPHIC REGIONALISATION FOR AUST (IBRA)

Author: K. McMaster Date: November 2009

Table 3 Beard (1975) Vegetation types in the Study Area (Shepherd *et al.*, 2002)

Vegetation Association No. (Shepherd *et al.*)	Vegetation Description
29	Sparse Low woodland; mulga (*Acacia aneura*), discontinuous in scattered groups
82	Hummock grasslands, low tree steppe; snappy gum (*Eucalyptus leucophloia*) over soft spinifex (*Triodia epactia/ T. pungens*)
93	Hummock grasslands, shrub steppe; kanji over soft spinifex
157	Hummock grasslands, grass steppe; hard spinifex (*Triodia wiseana*)
173	Hummock grasslands, shrub steppe; kanji (*Acacia inaequilatera*) over soft spinifex (*Triodia epactia/ T. pungens*) & hard spinifex (*T. wiseana*) on basalt
175	Short bunch grassland – savanna/grassplain (Pilbara)
601	Mosaic: Sedgeland; various sedges with very sparse snakewood/Hummock grasslands, shrub-steppe; kanji (*Acacia inaequilatera*) over soft spinifex (*Triodia epactia/ T. pungens*)
603	Hummock grasslands, sparse shrub steppe; *Acacia bivenosa* over hard spinifex (*Triodia wiseana*)
605	Hummock grasslands, shrub steppe; *Acacia pachycarpa* & waterwood (*Acacia coriacea*) over soft spinifex (*Triodia epactia/ T. pungens*)
620	Hummock grasslands, shrub steppe; snakewood (*Acacia xiphophylla*) over soft spinifex (*Triodia epactia/ T. pungens*)

1.5.3 Detailed Botanical Surveys

There have been numerous studies undertaken in many parts of the Pilbara over the past twenty years. These studies have predominantly focussed on areas of high mineralisation particularly for iron ore. However, there is still no environmental geology or regolith mapping at a scale of more than 1:250,000, no quantitative (quadrat-based) regional flora or fauna survey, and little data on the ecological requirements of many components including hummock grasses, particularly the effects of fire, or studies on the spread and impact of weed species such as buffel grass and kapok.

Many localised studies have been undertaken for mining development projects. Historically the eastern Pilbara has dominated these studies south to Tom Price and east to Marble Bar. Recently, a number of iron ore prospects along the coastal plain near Cape Preston have been surveyed and exploited (Halpern *et al.* 2001). Few studies have occurred in the western part of the Pilbara, the southern end of the study area, other than in the mesas of the Robe River valley, near Pannawonica, for Rio Tinto (formerly Robe River Iron Pty Ltd). A number of these surveys are particularly pertinent to this current study (Biota 2006; 2005a; 2005b). Floristically, the area is considered to be poorly collected.

2. Methods

2.1 Desktop Survey

Prior to commencement of field survey, a database search of known Declared Rare Flora (DRF), priority-listed flora and Threatened Ecological Communities (TEC) was obtained from the Department of Environment and Conservation (DEC), (DEC 2008a;b;c). Using the list provided, a field herbarium was compiled at the WA Herbarium to assist field identification.

2.2 Study Team and Survey Timing

2.2.1 Reconnaissance Surveys

Three reconnaissance surveys were undertaken:

- Denise True completed a reconnaissance of the rail and mining areas for two days on the 27th and 28th February 2007 (2 person days). The initial two-day survey included a biologist from Biota (undertaking terrestrial fauna surveys), Dan Kamien, accompanied by three engineers from Calibre Engineering. The purpose of the reconnaissance was to drive the proposed rail alignment (Version 4) to Cape Preston and provide a site visit to the study area and accommodation facilities.

- Denise True, Geoff Cockerton and Shapelle McNee completed a reconnaissance for three days from the 20th – 22nd March 2007 (9 person days). The survey provided an overview of the study area from the northern end of the proposed rail line at Cape Preston, and included the majority of the resource areas of Cochrane, Jewell, Kens Bore and Upper Cane. Photographs and locations of flora collected and vegetation descriptions were recorded using a handheld Garmin 76 GPS and a digital camera.

- Denise True and Shapelle McNee completed a reconnaissance for three days from the 2nd – 4th April 2007 (6 person days). The survey included two biologists from Biota (Roy Teale and Garth Humphreys). A helicopter was utilised to survey along the finalised Cape Preston rail corridor, and each of the resource areas. Photographs and locations of flora collected and vegetation descriptions were recorded using a handheld Garmin 76 GPS and a digital camera. The aerial view of the mesas assisted in providing a regional perspective of the vegetation landscapes.

2.2.2 Field Survey

The study area was surveyed over a two-year period, September 2007- September 2008 (Table 4). The principal survey periods were September and November in 2007, and May - June in 2008. A total of 102 field person days were undertaken in total.

Table 4 Field Surveys of the Proposed Cape Preston Rail Corridor

Dates of Survey	Personnel	No. Person Days
24/9/07 - 27/9/07	Denise True, Shapelle McNee, Cassie Adam, Daniel Brassington, Amy Douglas, Kellie McMaster (4 days)	24
07/11/07 - 14/11/07	Denise True, Hayley Hughes, Daniel Brassington, Kellie McMaster, Cassie Adam (8 days)	40
22/5/08 - 25/5/08	Denise True, Gemma Lindschau, Cassie Adam, Amy Douglas, Andrew Taylor, Bridget Watkins (4 days); Kellie McMaster (2 days)	26
22/06/08	Denise True, Rebecca Graham, Cassie Adam, Bridget Watkins, Amy Douglas, Kellie McMaster, Gemma Lindschau, Andrew Taylor (1 day)	8
3/07/08	Denise True, Hayley Hughes, Andrew Taylor, Bridget Watkins (1 day)	4
Total No. Field Days		**102**

2.2.3 Seasonal Conditions during the Survey Period

The climate of the Pilbara region is typically described as arid tropical, with summer rainfall averaging between 250-300 mm per annum (Beard, 1990). The records of three Bureau of Meteorology recording stations along the length of the study area were examined (Figure 3). Red Hill is at the southern end of the study area, Pannawonica is in the middle and Mardie is at the northern end on the coastal strip.

Since 1971, Pannawonica recording station has shown an average annual rainfall of 375.2 mm, with an average annual maximum temperature of 34.6 °C and an average annual minimum temperature of 19.6 °C. Nearby meteorological stations in the region (Red Hill, Emu Creek Station, Onslow, Karratha, and Mardie Station) show similar low rainfalls and high temperatures. Most rainfall occurs between December and May, with little rain through the rest of the year. Rainfall at Pannawonica may be higher than other areas in the region due to its higher elevation (200 m), while rainfall and temperatures at Mardie are influenced by the coastal location.

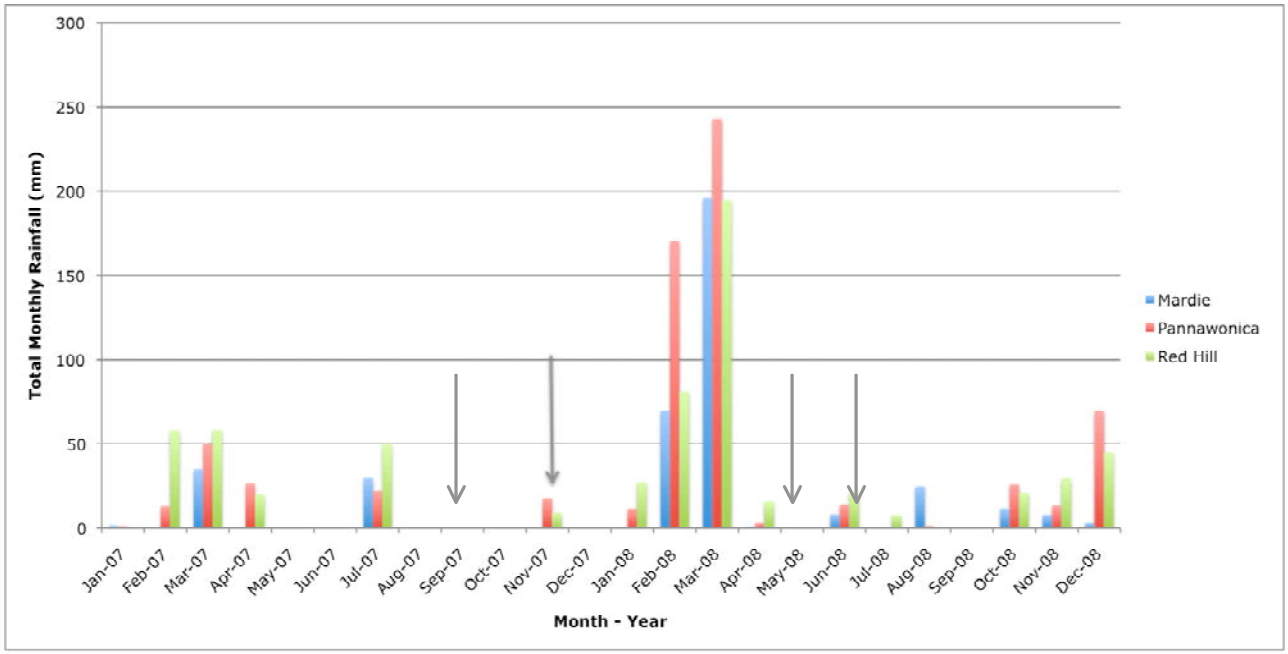

Figure 3 Monthly rainfall from nearby recording stations Jan 07 – Dec 08 (supplied by the Bureau of Meteorology)

Note: Arrows indicate the main survey periods, September and November 2007; May and June 2008.

The 2007 surveys were conducted during a prolonged dry period (Figure 3). As an arid tropical climate, the highest rainfalls are usually recorded during the 'cyclone' season December to March. Historically, during this time, the mean monthly rainfall recorded at Red Hill Station since 1898 was 185 mm to 437 mm. The recorded total precipitation in 2007 at Red Hill was 194 mm; Pannawonica received 130.2 mm and Mardie had 66 mm for 2007. The majority of this was recorded in February and March with a bit more in July. The 2008 rainfall was significantly higher; Red Hill recorded 442.8 mm; Pannawonica 552 mm and Mardie 321.4 mm.

2.3 Vegetation Mapping

Vegetation was described using a vegetation structural table of Specht as modified by Aplin (1979). This version included a hummock grassland stratum and recorded cover less than 2 percent (Appendix 1).

The vegetation codes follow closely that of Biota (2006) to provide some consistency and enable comparison, with nearby studies. The vegetation codes are based on abbreviations of the dominant species in each vegetation type, arranged by stratum. The codes are formulated using the first capital letter of the genus, and the first lower case letter of the species name e.g. *Acacia ancistrocarpa* = Aa. Where there are numerous species with the same species first letter, the second or third letter is also used e.g. *Acacia atkinsiana* = Aatk.

The study area was mostly situated on plains, low hills and foot slopes of adjacent ranges and mesas. Numerous creeks rising in the ranges crossed perpendicular to the alignment. In these situations plains with numerous minor creeklines were mapped as a unit rather than delineate the creeklines individually.

Vegetation boundaries were drafted on to 1:10,000 aerial photograph base maps in the field. The vegetation descriptions were based on the collation of relevés and vegetation descriptions from foot traverses and the detailed floristic data provided by quadrats. According to the National Vegetation Inventory System, taking into account the range in structure and floristic variation in each vegetation type, the vegetation mapping is classified as vegetation association to sub-association level.

2.4 Floristic Assessment

A total of 29 permanent quadrats were established on the proposed Cape Preston Rail Corridor (Table 5). The locations of the quadrats were chosen to represent the major vegetation types occurring within the study area and to help detect rare flora.

Table 5 Distribution of Recording Sites in the Study Area

Cape Preston Rail Corridor	No. Sites Recorded
Quadrats	29
Relevés	200
Vegetation Site Descriptions	95
Total No. Sites	**324**

In addition to the quadrats, a total of 324 detailed site recordings were also undertaken within the resource areas (Table 5). These included 200 relevés, which are unpegged sampling sites equivalent in description to a quadrat, and 95 vegetation site descriptions. The relevés were mostly used to describe vegetation types in places where permanent quadrats were difficult to access or to establish, such as the free face of a mesa. Similarly the vegetation site descriptions were usually associated with opportunistic collections of flora in habitats such as gorges or creeklines.

As with the quadrats, each relevé and vegetation description location was recorded with a hand held GPS and photographs were taken. Each change in vegetation along the length of the corridor was recorded. The vegetation was mapped onto 1:10,000 aerial photography base maps for the width of the corridor.

The quadrat size of 50 m by 50 m is accepted as the standard area required to adequately sample the flora of the Pilbara. In narrow vegetation types such as creeks and gorges, transects were utilised. A transect was the width of the creek vegetation by a length of up to 120 m.

Each quadrat was permanently pegged with four aluminium droppers to physically mark each corner. Quadrats were generally established in teams of two and three. Use of an optical square and compass ensured that the quadrats were correctly positioned and can be accurately re-instated if loss of some markers occurs. Two photographs of each site were taken using a 6 mega-pixel digital camera.

The details recorded for each quadrat included:

- Location recorded at each permanent stake using a hand-held GPS Garmin 76 (accurate to approximately 5 m). Coordinates were recorded in WGS 84, Zone 50.

- Vegetation description based on structural table of Specht (1970) as modified by Aplin (1979) using height and cover of dominant species.

- The condition of the vegetation as affected by seasonal conditions such as recent rains or extended dry season, evidence of fire and any signs of ground disturbance such as grazing or exploration activities were recorded and quantified.

- Percent Foliage Cover was estimated for each species.

- Landform and substrate were recorded in detail using a modified version of the DEC BIF form.

The centre line of the rail corridor was uploaded into each hand held Garmin 76 GPS to ensure accurate location of the field teams within the Cape Preston Rail Corridor.

The majority of the study area was surveyed by foot traverse (89 km) in teams of two and three; a 23 km section was undertaken by vehicle traverse where the alignment coincided with an existing track. A portion of the proposed rail line (13.15 km) was not surveyed as it was recently burnt and very little vegetation had regenerated at the time of survey (Table 6).

Table 6 Surveyed and Unsurveyed Burnt Areas of the Proposed Cape Preston Rail Corridor

Location (chainage km)	Surveyed Recently Burnt Areas (km)	Unsurveyed Recently Burnt Areas (km)
73500 - 74000	0.3	
75000 - 75100	0.1	
75800 - 75850	0.05	
77300 - 77400	0.1	
77625 - 77665	0.4	
78100 - 79000		0.9
79000 - 80500		1.45
90600 - 92000		1.4
92700 - 97600		1.2
97600 - 97800	0.2	
98800 - 103100		4.3
104000 - 106500	2.5	
107800 - 110000	2.2	
110600 - 111250	0.65	
113000 - 116900		3.9
Total distance (km)	**6.5**	**13.15**

2.5 Specimen Collection and Identification

An inventory of vascular flora was compiled for each habitat unit. Any taxa not readily identified in the field were collected, pressed and verified at the WA Herbarium. For each population of significant flora encountered, the likely impact of the proposed clearing was estimated.

Voucher specimens were collected from all populations of significant flora. Specimens of significant species and other good quality collections will be lodged at the WA Herbarium. A number of specimens were of insufficient flowering material due to the poor season, and specialist expertise was called upon to assist in the determinations.

2.6 Taxonomy and Nomenclature

The nomenclature and conservation status for plant species in this report was verified using the most recent listing by the WA Herbarium. As well, reference to the collections held by Malcolm Trudgen was used.

Acacia trudgeniana and *A. inaequilatera* are related, similar species that apparently occur throughout the study area. Both have characteristics such as thick corky bark, spiny stipules and the spine tipped phyllodes being markedly asymmetrical, which cause difficulties in field identification.

The two species are not known to be sympatric (B.R Maslin and S. van Leeuwen 2008), *A. trudgeniana* occurring on flat, low undulating plains, and *A. inaequilatera* higher in the landscape. However, this was not always reflected in the data collected in the current study.

There are no collections of *A. trudgeniana* from the study area in the WA Herbarium (DEC 2009). Specimens collected throughout the study have been variously identified as both species by a specialist. This has led to confusion with regard to accurate identification. As such, all specimens recorded in this study have been treated as *A. inaequilatera*. All material collected from the study area will be submitted to the WA Herbarium for further determination.

2.7 Data Management and Floristic Analysis

Species composition, community structure and landform information recorded from individual quadrats, relevés and detailed site descriptions from the study area, were entered into an MS Access database developed by Malcolm Trudgen and Ted Griffin.

To investigate the conservation value of the vegetation of the study area, a numerical analysis of the floristic data was undertaken by Malcolm Trudgen and Ted Griffin (Griffin & Trudgen, 2009). The floristic data from quadrats and relevés with more than 10 taxa from the current study, was combined with data from other projects to provide a regional perspective. This regional dataset contains two thousand eight hundred and eighty three sites (2,883).

Reconciliation of flora species names was undertaken prior to running data analysis using the PATN (Belbin 1987) numerical classification package. This involved reducing some infra-specific names to the relevant species names; combining some taxa where confusion was likely to have occurred in field observations and identifications; and omitting some records that were considered ambiguous (Griffin and Trudgen 2009). The PATN modules used were ASO (calculation of similarity matrix), FUSE (classification), DEND (representation of classification) and SSH (a form of ordination) to display relationship of sites to the whole data set.

Within and among the data sets utilised there are variations in, seasonal conditions, the time of survey, the quality of field observation and the standard of variation. However, for most of this larger data set, the majority of identifications or confirmation of species was performed by M.E. Trudgen. Furthermore, M. E. Trudgen was either present during many of the surveys or liaised closely on survey design for these data sets. For the survey work undertaken by Western Botanical in this study, M.E. Trudgen provided confirmation of all species identifications and liaised on survey design.

2.8 Limitations of the Study

A substantial level of detailed survey has been conducted during this study (See Section 2.4). However, in assessing the results of this survey the following aspects of the study need to be considered.

A regional representation and assessment of the conservation significance of the vegetation is problematic as few other detailed surveys have been undertaken at a similar scale in this part of the Pilbara. To help address this issue of a lack of regional data in the public forum, consultation with other botanists working in this region was undertaken to ensure that data collection, management and synthesis are consistent. To this end, the utilisation of a database developed by botanist Malcolm Trudgen and Ted Griffin, was made to integrate the data from the current study with this broader data set.

Consultation undertaken with the Department of Environment and Conservation (DEC) confirmed that to adequately represent the floristics of the region, environmental impact assessments in the Pilbara region are typically conducted over at least two seasons. The majority of surveys of the study area were conducted during 2007, including most of the quadrat establishment (all but two), and particularly the foot traverses of the majority of the corridor. All of the quadrats were re-scored in 2008 and some additional searches for rare flora were undertaken. However, the difference in survey effort and timing has been reflected in the statistical analysis with the inclusion of relevés (only recorded in 2007) with quadrats scored in both 2007 and 2008. Essentially a large proportion of the flora was not present (annuals and ephemerals) in data collected only in 2007.

Much of the study area has been burnt in the past ten years. A compilation of satellite data provided by Department of Land Information (DLI) shows that few parts of the study area remain unburnt in the last decade (Figure 4). Patches of the rail line (6.5 km) between Cochrane at the southern end, and north of the Pannawonica Road had been burnt as recent as January 2007 (Section 2.4). These areas were not surveyed in detail and vegetation boundaries could not be determined accurately within the vicinity of the burnt areas. Vegetation growth in arid tropical areas can be prolific with good seasonal rains. However, the 2008 sampling season was not sufficient to qualify as comprehensive sampling over these burnt areas.

Thorough searches for rare flora have not been carried out over extensive parts of the Cape Preston Rail Corridor. A large portion of survey effort was conducted during the dry period of 2007, reducing the likelihood of locating priority species.

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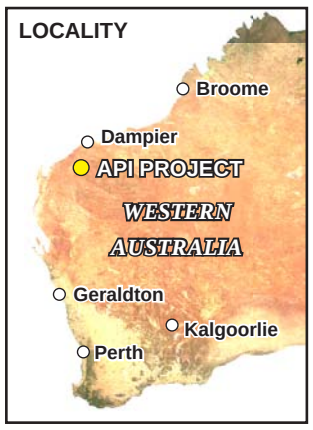
API

LOCALITY



N

0 10km

Scale 1:600,000
MGA94 (Zone 50)

Dampier
Karratha
Cape Preston
Highway
Millstream
Coastal
Route
Fortescue Road House
Rail
Link
Fortescue
River
Proposed
Robe
West
Road
Dampier - Bunbury Natural Gas Pipeline
Millstream
Pannawonica
River
Yalleen Camp
Peedamulla
North
Cane
River
Cochrane
Jewel
Red Hill Station
Kens Bore
Cardo Bore North
Cardo Bore East
Upper Cane
CARDO OUTCAMP
Trinity Bore
Catho Well
Paraburdoo
Road
Mt Stuart Station
Nanutarra

FIRE LEGEND

- FIRE BURNT AREA 1998
- FIRE BURNT AREA 1999
- FIRE BURNT AREA 2000
- FIRE BURNT AREA 2001
- FIRE BURNT AREA 2002
- FIRE BURNT AREA 2003
- FIRE BURNT AREA 2004
- FIRE BURNT AREA 2005
- FIRE BURNT AREA 2006
- FIRE BURNT AREA 2007

Source: DLI, 2007

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE FIRE HISTORY

Author: K. McMaster Date: November 2009

3. Vegetation

3.1 Overview of Vegetation

Sixty eight vegetation types were identified and mapped across the Cape Preston rail corridor study area (Appendix 2).

Stony Plains, Hills and Breakaways comprised the majority of the study area, one tenth of the study area consisted of clayey plains, and the remainder the sum of the numerous minor creeklines and a few major drainage lines such as the vegetation of the Robe River and Fortescue River and tributaries (Table 7).

Table 7 Area of Vegetation landform elements within the Study Area

Landform	Proportion of the Study Area (%)
Stony Plains	40
Stony Hills and Breakaways	32
Creeklines - including major, minor and associated floodplains	17
Clayey Plains	11

Representative photographs for many of the vegetation types are provided in Appendix 3. The raw data and locations of quadrats and relevés are provided in Appendices 4 and 5. A matrix of species recorded in each vegetation type is provided in Appendix 6. The vegetation types are described below, detailing the associated species, land systems and landform.

The vegetation types which covered the largest proportion of the study area were P1a (532.45 ha or 22%) and S7d (347.59 ha or 14.5%). These same vegetation types also cover the largest area within the proposed impact area (P1a- 197.60 ha or 21.3%; S7d- 135.35 ha or 14.6%). Vegetation types with the most restricted extent across the study area were S8d (0.39 ha or 0.02%) and S4j (0.57 ha or 0.02%). Forty four vegetation types had areas less than 1% of the study area and 29 of these extend over less than 0.5% of the study area. Vegetation types S4j, S6a and S13c are present in the study area, but are not included in any proposed impact areas. Vegetation types with the most restricted distributions within the proposed impact area are P1c (0.0002 ha or < 0.001 %) and S13b (0.0069 ha or 0.001%). Appendix 7 shows the area each vegetation type covers in the study area and the proposed impact area.

3.2 Vegetation Types of the Cape Preston Rail Corridor

Stony Plain (P)

1. *Acacia atkinsiana*, *A. bivenosa* Shrublands

P1a AatkAbAaTw *Acacia atkinsiana*, *A. bivenosa* and *A. ancistrocarpa* high shrubland to open shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred on stony plains with numerous minor drainage lines where *Triodia epactia* was dominant rather than *T. wiseana*. It was one of the most common vegetation types throughout the rail corridor. It occurs predominantly on the Boolgeeda Land System, with lesser amounts on the Capricorn, Nanutarra, Peedamulla, Sherlock and Urandy Land Systems. Some areas had been burnt within the last 3 years and *Senna notabilis* was recorded at this seral stage but not generally in the older post-fire vegetation. Associated species: *Acacia inaequilatera, A. tumida* var. *pilbarensis, Bulbostylis barbata, Cleome viscosa, Corchorus incanus* ssp. *incanus, Corchorus parviflorus, Corymbia hamersleyana, Eriachne pulchella* ssp. *dominii, Eragrostis exigua, E. lanicaulis, Eremophila longifolia, Grevillea wickhamii* ssp. *hispidula, Hakea lorea* ssp. *lorea, Hibiscus sturtii* var. aff. *grandiflorus, Indigofera monophylla, Keraudrenia nephrosperma, Paspalidium clementii, Petalostylis labicheoides, Polycarpaea longiflora, Ptilotus astrolasius* var. *astrolasius, P. calostachyus* var. *calostachyus, Senna artemisioides* ssp. *oligophylla, S. glutinosa* ssp. *glutinosa, Stylobasium spathulatum, Sida arsiniata, Tephrosia uniovulata, Trichodesma zeylanicum* var. *zeylanicum* and *Triumfetta clementii.* Sites CP040, CP052, CP057, CP102, CP106, CP110, CP122, CP126, CP133, CP172, CP174, CP174, CP234, CP236, CP237, CP241, CP247, CP251, CP253, CP259, CP275, CP277, CP295, CP305, CP367, CP369, CP387, CP389, CP391.

P1c ChAatkAbTwTe *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana, A. bivenosa* open shrubland over *Triodia wiseana, T. epactia* very open to closed hummock grassland

This vegetation type was found within the proposed mine area mostly along the proposed transport corridor (Western Botanical, 2009). Within the mine area it predominantly occurred predominantly on the Boolgeeda Land System with a proportion on the Capricorn Land System. Associated species include: *Acacia ancistrocarpa*, *A. aneura, A. synchronicia, Bonamia rosea, Eremophila cuneifolia, Eriachne pulchella* ssp. *pulchella, Eucalyptus leucophloia* ssp. *leucophloia, Goodenia microptera, Grevillea wickhamii* ssp. *hispidula, Hakea lorea* ssp. *lorea, Hibiscus sturtii* var. aff. *grandiflorus, Paraneurachne muelleri, Ptilotus astrolasius* var. *astrolasius, Senna glutinosa* ssp. *glutinosa, Solanum diversiflorum* and *S. lasiophyllum.* All sites surveyed within this vegetation type were within the proposed mine area (Western Botanical, 2009). These sites were; BOR239, BOR241, HR008, HR055, HR058, TC146, TC147. Thus, this vegetation type is not included in the vegetation by species matrix (Appendix 6).

2. Acacia Shrublands

P2a AaAbAiAsTeTw *Acacia ancistrocarpa*, *A. bivenosa*, *A. inaequilatera* and *A. synchronicia* open shrubland over *Triodia epactia* and *T. wiseana* open hummock grassland

This vegetation type occurred on stony plains, on the Urandy Land System at one location in the southern part of the study area. Associated species: *Gossypium australe* (Burrup Peninsula form), *Grevillea wickhamii* ssp. *hispidula, Hakea lorea* ssp. *lorea, Ptilotus astrolasius* var. *astrolasius, P. calostachyus* var. *calostachyus, Tephrosia uniovulata, Senna artemisioides* ssp. *oligophylla, Sida* aff. *echinocarpa* (MET 15350) and *Sida pilbarensis.* Site CP142.

P2e ChAbApyTw *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. pyrifolia* var. *pyrifolia* shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred on stony plains, recorded in the northern section of the study area (29 - 33 km). It occurred predominantly on Paraburdoo Land System and to a lesser extent on Rocklea Land System. Associated species: *Acacia inaequilatera, A. ancistrocarpa, Corymbia hamersleyana, *Cenchrus ciliaris, Senna artemisioides* aff. ssp. *oligophylla* (thinly sericeous), *Senna glutinosa* ssp. *glutinosa, Scaevola spinescens* (broad form) and *Eremophila forrestii* ssp. *forrestii.* Sites CP380, CP362, CP336, CP378, CP408, CP338.

P2f ChAiAbTw *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland.

This vegetation type occurred on stony plains with numerous minor drainage lines, it was sampled from the middle section of the study area at approximately the (74 km). It occurred on the Nanutarra Land System. Associated species: *A. ancistrocarpa, A. atkinsiana, A. tumida* var. *pilbarensis, Bonamia rosea, Codonocarpus cotinifolius, Corchorus parviflorus, Grevillea wickhamii* ssp. *hispidula, Senna glutinosa* ssp. *glutinosa, Scaevola spinescens* (broad form), *Eremophila forrestii* ssp. *forrestii, Ptilotus exaltatus* var. *exaltatus, P. astrolasius* var. *astrolasius, P. calostachyus* var. *calostachyus, Tephrosia uniovulata* and *Solanum diversiflorum.* Site CP323.

3. *Acacia synchronicia* Shrublands

P3b AsAbAaTwPTc *Acacia synchronicia*, *A. bivenosa* (*A. ancistrocarpa*) open shrubland to shrubland over *Triodia wiseana* very open hummock grassland over *Ptilotus calostachyus* var. *calostachyus* very open herbs

This vegetation type occurred on stony plains dissected by numerous, minor drainage lines in northern section of the proposed rail line from Du Boulay Creek to Fortescue River. The drainage lines area dominated by *Acacia ancistrocarpa, Triodia epactia.* Following good rains, grasses and sedges including *Aristida contorta, Eriachne pulchella* ssp. *pulchella, Bulbostylis barbata* and *Fimbristylis dichotoma* form a tussock grassland/sedgeland (more than 60% cover). This vegetation type occurred north of the Fortescue River on the Boolgeeda, Newman, Rocklea and Paraburdoo Land Systems. Associated species: *Acacia bivenosa, A. inaequilatera, A. tumida* var. *pilbarensis, A. pyrifolia* var. *pyrifolia, Corymbia hamersleyana, Petalostylis labicheoides, Tephrosia uniovulata, Senna artemisioides* ssp. *oligophylla, Senna glutinosa* ssp. *pruinosa, Ptilotus astrolasius* var. *astrolasius, P. auriculifolius, P. exaltatus* var. *exaltatus* and *P. helipteroides* var. *helipteroides.* Sites CP018, CP176, CP415, CP419, CP407, CP403, CP417, CP429, CP411, CP436, CP423, CP425, CP427, CP405, CP442, CP402, CP413, CP409.

4. Hard Spinifex Hummock Grasslands

P4b ChAaTw ***Corymbia hamersleyana*** **scattered low trees over** ***Acacia ancistrocarpa*** **scattered shrubs over** ***Triodia wiseana*** **hummock grassland**

This vegetation type occurred on stony plains on the Boolgeeda and Capricorn Land Systems It was sampled from one location at the southern end of the study area (124 km). Associated species: *Acacia bivenosa, A. inaequilatera, A. maitlandii, A. synchronicia, Corchorus parviflorus, Gossypium australe* (Burrup Peninsula form)*, Grevillea pyramidalis* ssp. *leucadendron, Hakea lorea* ssp. *lorea, Ptilotus astrolasius* var. *astrolasius, Senna artemisioides* ssp. *oligophylla, S. glutinosa* ssp. *pruinosa* and *Tephrosia uniovulata.* Sites CP245, CP492, CP493.

5. Snakewood Shrublands

P5a AxAatkAaTeTw ***Acacia xiphophylla*** **low open woodland to high open shrubland over** ***A. atkinsiana*** **and** ***A. ancistrocarpa*** **open shrubland over** ***Triodia epactia*** **and** ***T. wiseana*** **very open hummock grassland**

This vegetation type occurred on stony plains with numerous minor drainage lines, it was sampled from two locations, from the middle section of the study area (73 km) and from the southern section, south of the Robe River. It occurred mainly on the Nanutarra and Sherlock Land Systems. Associated species: *A. bivenosa, A. synchronicia, Corymbia hamersleyana, Ptilotus exaltatus* var. *exaltatus* and *P. astrolasius* var. *astrolasius.* Sites CP329, CP263.

P5b AxAbTw ***Acacia xiphophylla*** **low open woodland to high open shrubland over** ***A. bivenosa*** **open shrubland over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type occurred on stony plains predominantly on the Nanutarra and Boolgeeda Land Systems and to a lesser extent on Newman Land System. It was widespread (60 to 70 km) in the middle section of the study area. The vegetation is a mosaic of Snakewood and *A. bivenosa* across a stony plain dissected by numerous minor drainage lines dominated by *A. atkinsiana* and *A. ancistrocarpa* shrublands. Associated species: *A. inaequilatera, A. synchronicia, Corymbia hamersleyana, Senna glutinosa* ssp. *glutinosa, Scaevola spinescens* (broad form), *Eremophila forrestii* ssp*. forrestii, Ptilotus exaltatus* var. *exaltatus, Trichodesma zeylanicum* var. *zeylanicum, Indigofera monophylla, Solanum lasiophyllum, S. diversiflorum, Maireana georgei, Corchorus parviflorus* and *Trachymene oleracea* ssp. *oleracea.* Sites CP371, CP365, CP363, CP351, CP347, CP053, CP337.

P5c AxAsAatkTw ***Acacia xiphophylla*** **low open woodland to high open shrubland over** ***A. synchronicia*** **and** ***A. atkinsiana*** **open shrubland over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type occurred on stony plains, it was sampled at one location in the southern section of the study area (121 km). It occurs on the Boolgeeda and Capricorn Land Systems. Associated species: *A. inaequilatera* and *Hakea lorea* ssp. *lorea.* Site CP255.

P5d AxTw ***Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* very open hummock grassland**

This vegetation type occurred on stony plains on the pediment, it was sampled from two locations, in the middle section of the study area (70 km) and north of the Robe River. It occurs mainly on the Newman and Nanutarra Land Systems, and to a lesser extent the River and Peedamulla Land Systems. Associated species: *Acacia synchronicia, Senna artemisioides* ssp. *oligophylla, Senna glutinosa* ssp. *glutinosa, Ptilotus exaltatus* var. *exaltatus, Salsola tragus* ssp. *tragus* and *Triodia epactia.* Sites CP064, CP244.

P5e AxTwTe ***Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* and occasionally *T. epactia* very open hummock grassland**

This vegetation type occurred on stony plains, it was widespread throughout the entire study area, south of 29 km. It occurred on eight land systems mainly on Boolgeeda, Paraburdoo and Nanutarra Land Systems. Associated species: *Maireana georgei, Acacia ancistrocarpa, A. bivenosa, A. inaequilatera, A. synchronicia, Corymbia hamersleyana, Eremophila cuneifolia, Indigofera monophylla, Maireana melanocoma, Ptilotus astrolasius* var. *astrolasius, P. exaltatus* var. *exaltatus, Senna glutinosa* ssp. *glutinosa, Senna artemisioides* ssp. *oligophylla* and **Vachellia farnesiana.* Sites CP058, CP086, CP088, CP104, CP206, CP208, CP209, CP212, CP220, CP225, CP232, CP235, CP279, CP325, CP334, CP348, CP350, CP352, CP366, CP430, CP452.

6. Soft Spinifex Hummock Grasslands

P6f ChApyGpTe ***Corymbia hamersleyana* low open woodland over *Acacia pyrifolia* var. *pyrifolia, Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Triodia epactia* open hummock grassland**

This vegetation type was widespread within the proposed mine area mostly along the proposed transport corridor (Western Botanical, 2009). Within the mine area it predominantly occurred on the Urandy Land System with a proportion on the Boolgeeda and Robe Land Systems (Western Botanical, 2009). A small amount of this vegetation type (5.12 ha) extends into the very southern part of the proposed rail alignment. Associated species include: *Acacia ancistrocarpa, A. inaequilatera, A. synchronicia, Boerhavia coccinea*, *B. gardneri, Bonamia media* var. *villosa, Bulbostylis barbata, *Cenchrus ciliaris, *C. setiger, Cleome viscosa, Corchorus* aff. *parviflorus* (JW011-11), *C. sidoides* ssp. *sidoides, Cullen lachnostachys, C. leucochaites, Eremophila longifolia, Gossypium australe* (Burrup Peninsula form), *Hakea lorea* ssp. *lorea, Indigofera colutea, I. monophylla, Pentalepis trichodesmoides, Portulaca oleracea, Ptilotus astrolasius* var. *astrolasius, Senna notabilis, S. venusta, Solanum diversiflorum, Sporobolus australasicus, Tephrosia* aff. *supina* (06BP45-006), *T. rosea* var. *glabrior, Trianthema pilosa* and *Yakirra australiensis* var. *australiensis.* All sites surveyed within this vegetation type were within the proposed mine area (Western Botanical, 2009). These sites were; CP132, CP136, CP138, CR024, TC002, TC004, TC021, TC022, TC025, TC138, TC139, TC140, TC148, TC149, TC15. Thus, this vegetation type is not included in the vegetation by species matrix (Appendix 6).

Stony Hills and Breakaways (S)

1. *Acacia atkinsiana*, *A. bivenosa* Shrublands

S1a AbAatkTw *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred on rocky, low rolling hills and footslopes, it was sampled in the middle section of the study area (between 60 - 74 km). It occurred predominantly on the Newman Land System and with lesser amounts on the Boolgeeda, Nanutarra and Peedamulla Land Systems. *Acacia ancistrocarpa* and *A. synchronicia* often co-occurred. Associated species: *Acacia inaequilatera, A. tumida* var. *pilbarensis, Senna glutinosa* ssp. *glutinosa, Ptilotus exaltatus* var. *exaltatus, P. calostachyus* var. *calostachyus, Corchorus parviflorus* and *Triodia* sp. Robe River. Sites CP327, CP353, CP361, CP248.

2. *Acacia bivenosa* Open Heath over *Triodia wiseana*

S2a AarAbApyTw *Acacia arida*, *A. bivenosa* and *A. pyrifolia* var. *pyrifolia* open heath over *Triodia wiseana* hummock grassland

This vegetation type occurred on low stony rises in the northern part of the study area north of Du Boulay Creek. It occurred mostly on the Paraburdoo Land System and to a lesser extent on the Rocklea Land System. It was a mixed *Acacia* spp. shrubland with all species patchy in their distribution across the landscape. Other associated species: *Corymbia hamersleyana* and *Grevillea pyramidalis* ssp. *leucadendron.* Site CP406.

4. Acacia Shrublands

S4a AarAbAtrTw *Acacia arida*, *A. bivenosa* and *A. trachycarpa* shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred on stony hills on the Newman Land System. It was sampled in one location in the middle of the study area, about 4 km south of the Fortescue River. Associated species: *Acacia tumida* var. *pilbarensis, Grevillea pyramidalis* ssp. *leucadendron, Senna artemisioides* ssp*. oligophylla, S. glutinosa* ssp*. glutinosa* and *Tephrosia uniovulata.* Sites CP488, CP487, CP486.

S4j AtAbSgpTwPTc *Acacia tumida* var. *pilbarensis* scattered tall shrubs over *A. bivenosa* and *Senna glutinosa* ssp. *pruinosa* open shrubland over *Triodia wiseana* very open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* very open herbs

This vegetation type occurred on low rocky hills, with one small occurrence on the Nanutarra Land System in the middle of the study area (86km). Associated species: *Acacia ancistrocarpa, A. inaequilatera, Cymbopogon ambiguus, Eriachne mucronata* (typical form), *Grevillea wickhamii* ssp. *hispidula* and *Polycarpaea longiflora.* Site CP287.

5. Acacia Shrubland over *Triodia* sp. Robe River and *Triodia wiseana* Hummock Grassland

S5a AarTwTsprr *Acacia arida* open shrubland over *Triodia wiseana* and *T.* sp. Robe River hummock grassland

This vegetation type occurred on the free face of a range and the base of a gorge, in one location 2 km south of the Fortescue River. It occurred on the Newman Land System. Associated species: *Acacia ancistrocarpa, A. bivenosa, A. inaequilatera, Eucalyptus leucophloia* ssp*. leucophloia, Ficus brachypoda, Gossypium robinsonii, Terminalia canescens, Indigofera monophylla* and *Grevillea pyramidalis* ssp. *leucadendron.* Sites CP472, CP471, CP474.

6. *Acacia synchronicia* Shrublands

S6a AsTw *Acacia synchronicia* open shrubland over *Triodia wiseana* very open hummock grassland

This vegetation type occurred on low rocky hills, and was recorded in two locations in the southern section of the study area, north of the Robe River at 110 km and at 128 km. It occurred predominantly on the Newman Land System and a proportion on the Capricorn Land System. Associated species: *Acacia ancistrocarpa, A. bivenosa, A. inaequilatera, Grevillea pyramidalis* ssp. *leucadendron, Hakea lorea* ssp. *lorea, Ptilotus astrolasius* var. *astrolasius, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla* and *Sida pilbarensis.* Site CP146.

7. Hard Spinifex Hummock Grasslands

S7a AatkAaTwPTc *Acacia atkinsiana* scattered tall shrubs over *A. ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* scattered herbs

This vegetation type occurred on low rocky hills, one small occurrence was recorded in the middle section of the study area (84km), in the Nanutarra Land System. Associated species: *Corchorus parviflorus, Grevillea wickhamii* ssp. *hispidula, Keraudrenia velutina* ssp. *elliptica, Ptilotus calostachyus* var. *calostachyus, Tephrosia uniovulata* and *Tribulus suberosus.* Site CP303.

S7b AaTw *Acacia ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred on low stony hills and slopes. It was common and widespread and recorded in the northern section of the study area (26 - 45 km). It occurred in the Rocklea Land System and to a lesser extent the Paraburdoo Land System. It comprised 7% of the vegetation on the rail corridor. Following rains in 2008 the quadrat site had a good cover of grasses and herbs such as *Aristida contorta, Eriachne pulchella* ssp. *dominii, Sporobolus australasicus, Yakirra australiensis* var. *australiensis, Indigofera monophylla* (Burrup form), *Polycarpaea holtzei, Cleome viscosa, Streptoglossa decurrens* and *Ptilotus fusiformis* var. *fusiformis.* Associated species: *Acacia inaequilatera*, *A. pyrifolia* var. *pyrifolia, A. bivenosa, Corchorus incanus* ssp. *incanus, C. laniflorus*, *Gomphrena affinis* ssp. *pilbarensis, Indigofera monophylla, Tephrosia uniovulata* and *Trichodesma zeylanicum* var. *zeylanicum.* Sites CP016, CP418, CP394, CP384, CP370, CP368, CP316, CP388, CP386, CP374, CP376, CP392.

S7d AbTw ***Acacia bivenosa*** **open shrubland over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type was one of the most widespread throughout the study area (south of 44km). It occurred on low rocky hills and slopes on the Nanutarra, Newman, Boolgeeda, Rocklea, Capricorn, Paraburdoo, Urandy and River Land Systems. It is typical of the hard spinifex grasslands and isolated *Acacia* spp. shrubs of the Nanutarra and Newman Land Systems. Associated species: *Acacia ancistrocarpa, A. arida, A. inaequilatera, A. pyrifolia* var. *pyrifolia, A. synchronicia, Corchorus parviflorus, Eucalyptus leucophloia, Grevillea pyramidalis* ssp. *leucadendron, Hakea lorea* ssp. *lorea, Petalostylis labicheoides, Tephrosia uniovulata, Ptilotus astrolasius* var. *astrolasius, P. calostachyus* var. *calostachyus, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla* and *Senna glutinosa* ssp. *glutinosa.* Sites CP062, CP068, CP072, CP128, CP140, CP169, CP193, CP213, CP249, CP166, CP182, CP186, CP204, CP214, CP226, CP285, CP297, CP301, CP315, CP333, CP397, CP023, CP099, CP117, CP399, CP401, CP433, CP439, CP459, CP460, CP475, CP476, CP477, CP481.

S7e AiAbTw ***Acacia inaequilatera*** **high open shrubland over** ***A. bivenosa*** **open shrubland over** ***Triodia wiseana*** **hummock grassland**

This vegetation type occurred on low stony hills and plains on the Paraburdoo Land System. It was sampled from two areas in the northern section of the study area, adjacent to the gas pipeline (between 25 - 28 km). Other associated species: *Acacia ancistrocarpa, Hakea lorea* ssp. *lorea*, *Corchorus incanus* ssp. *incanus, Senna glutinosa* ssp. *glutinosa, Triumfetta clementii, Enneapogon caerulescens, Aristida contorta, Bonamia media* var. *villosa, Gomphrena cunninghamii, Solanum lasiophyllum, Scaevola spinescens* (broad form), *Hibiscus sturtii* var. *platychlamys, Swainsona formosa* and *Ptilotus calostachyus* var. *calostachyus* and *P. auriculifolius.* Sites CP010, CP320, CP109.

S7i AiTw ***Acacia inaequilatera*** **scattered tall shrubs over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type occurred on low rocky hills and slopes and was recorded in the southern section of the study area (south of 123 km). It occurred on the Capricorn and Boolgeeda Land Systems. Associated species: *Acacia ancistrocarpa, Corchorus parviflorus, Ptilotus astrolasius* var. *astrolasius, P. calostachyus* var. *calostachyus, Senna artemisioides* ssp. *oligophylla* and *Senna glutinosa* ssp. *glutinosa.* Sites CP039, CP074, CP078, CP080, CP150, CP152, CP175, CP189, CP215, CP221.

S7j ChAbTw ***Corymbia hamersleyana*** **scattered low trees over** ***Acacia bivenosa*** **scattered shrubs over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type occurred on low rocky hills, and was widespread throughout the study area (122 to 127 km). It occurred predominantly on the Boolgeeda Land System and a proportion on the Capricorn Land System. Associated species: *Acacia ancistrocarpa, A. inaequilatera, A. synchronicia, Eriachne helmsii*, *Gossypium australe* (Burrup Peninsula form), *Senna glutinosa* ssp. *pruinosa, S. artemisioides* ssp. *oligophylla, S. glutinosa* ssp. *glutinosa, Ptilotus astrolasius* ssp. *astrolasius, Sida pilbarensis* (green form) and *Hakea lorea* ssp. *lorea.* Sites CP037, CP154, CP217, CP243.

S7m ERfTEspbTw ***Eremophila fraseri*** **ssp.** ***fraseri*** **open shrubland over** ***Tephrosia*** **sp. B Kimberley Flora scattered low shrubs over** ***Triodia wiseana*** **open hummock grassland**

This vegetation type occurred on low rocky dolomite hills, it was sampled in the middle section of the study area, (104 km), between the Pannawonica Road and the Robe River. It occurred on the Capricorn Land System. Associated species: *Acacia bivenosa, A. trachycarpa,*

A. inaequilatera, Clerodendrum floribundum var. *angustifolium, Senna glutinosa* ssp. *pruinosa, S. artemisioides* ssp. *oligophylla, Ficus brachypoda, Pentalepis trichodesmoides, Sarcostemma viminale* ssp*. australe, Eriachne mucronata* (typical form), *Grevillea wickhamii* ssp. *hispidula* and *Polycarpaea longiflora.* Sites CP393, CP395.

S7n Tw ***Triodia wiseana* open hummock grassland**

This vegetation type occurred on low rocky hills, predominantly on the Boolgeeda Land System, with smaller amounts occurring within the Newman and Rocklea Land Systems. *Acacia inaequilatera* and *A. bivenosa* often occur sparsely. Other associated species: *A. tumida* var. *pilbarensis, A. ancistrocarpa* and *Senna glutinosa* ssp. *pruinosa*. Site CP129.

8. Low Mulga Woodlands

S8d AaneTw ***Acacia aneura* var. *intermedia* low woodland over *Triodia wiseana* open hummock grassland**

This vegetation type occurred in one small location 3 km south of the Fortescue River, on a west-facing slope of a stony hill on the Rocklea Land System. Site CP480.

13. *Terminalia* Woodlands

S13b TERcTw ***Terminalia canescens* low open woodland over *Triodia wiseana* scattered hummock grasses**

This vegetation type occurred on rocky dolomite hills, and was recorded at the southern end of the study area (124km), in one small occurrence on the Capricorn Land System. Associated species: *Abutilon dioicum, Acacia bivenosa, Aristida holathera* var. *holathera, Cleome viscosa, Cymbopogon ambiguus, Gossypium australe (*Burrup Peninsula form), *Senna glutinosa* ssp. *glutinosa* and *Sida pilbarensis.* Site CP038r.

S13c TERsGwCOpSOlTw ***Terminalia supranitifolia* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* scattered tall shrubs over *Corchorus parviflorus* and *Solanum lasiophyllum* low open shrubland over *Triodia wiseana* very open hummock grassland**

This vegetation type occurred on the freeface of a range, in the northern part of the rail corridor north of the Fortescue River, on the Nanutarra Land System. Other associated species: *Clerodendrum floribundum* var. *angustifolium, C. tomentosum* var. *lanceolatum, Cymbopogon ambiguous* and *Triumfetta appendiculata* (Mardie form). Site CP119.

Minor Creeklines (I)

1. *Acacia ancistrocarpa*, *A. bivenosa* Shrublands

I1a AaAarAbTw ***Acacia ancistrocarpa*, *A. arida* and *A. bivenosa* shrubland over *Triodia wiseana* very open hummock grassland**

This vegetation type was recorded in minor drainage lines, north of the Fortescue River, mostly in the Paraburdoo Land System. *Triodia epactia* occasionally occurred along with *Triodia wiseana* in the very open hummock grassland. Associated species: *Acacia inaequilatera, Acacia pyrifolia* var*. pyrifolia, Corymbia hamersleyana* and *Senna artemisioides* ssp. *oligophylla*. Sites CP424, CP426, CP428, CP432, CP444.

I1b AbAaTw ***Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland**

This vegetation type occurred in minor drainage lines in the north of the study area. It occurred in six land systems, predominantly in the Nanutarra and Boolgeeda Land Systems. Associated species: *Acacia pyrifolia* var*. pyrifolia, Acacia tumida* var*. pilbarensis, Hakea lorea* ssp*. lorea, Indigofera monophylla, Scaevola spinescens* (broad form), *Senna artemisioides* aff. ssp*. oligophylla* (thinly sericeous)*, Senna glutinosa* ssp*. glutinosa, Senna glutinosa* ssp*. pruinosa* and *Solanum diversiflorum*. Sites CP202, CP335, CP364, CP485.

I1d ChAaAbTw/g ***Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* open heath over *Triodia wiseana* very open hummock grassland over very open grassland**

This vegetation type was recorded in minor drainage lines in the northern section of the study area (30 - 40 km), adjacent to the North West Coastal Highway. It occurred mainly in the Rocklea Land System. Associated species: *Acacia pyrifolia, Aristida contorta, *Cenchrus ciliaris, Indigofera monophylla* (Burrup form)*, Senna artemisioides* ssp*. oligophylla, Senna glutinosa* ssp*. pruinosa* and *Triumfetta clementii*. Sites CP015, CP101, CP346, CP354, CP372.

2. *Acacia pyrifolia* High Shrublands

I2b ApyAbTwCEc ***Acacia pyrifolia* var. *pyrifolia* high open shrubland over *A. bivenosa* open shrubland over mixed low open shrubland over *Triodia wiseana* hummock grassland and **Cenchrus ciliaris* very open tussock grassland**

This vegetation type was recorded in minor drainage lines in the northern part of the study area. It occurred in the Paraburdoo Land System. The mixed low open shrubland included *Scaevola spinescens* (broad form), *Indigofera monophylla* and *Eremophila forrestii* ssp. *forrestii*. Other associated species: *Acacia ancistrocarpa, Acacia synchronicia, Dactyloctenium radulans, Cucumis maderaspatanus, Hakea lorea* ssp*. lorea, Sporobolus australasicus* and *Urochloa pubigera*. Sites CP014, CP322, CP324.

3. Acacia Shrublands

I3b CcAcPTaTe *Corymbia candida* ssp. *candida* scattered low trees over *Acacia citrinoviridis* open heath over *Ptilotus astrolasius* var. *astrolasius* low open shrubland over *Triodia epactia* open hummock grassland

This vegetation type was recorded in minor drainages north and south of the Pannawonica Road. It occurred mainly in the Nanutarra and Boolgeeda Land Systems. Associated species: *Acacia ancistrocarpa, Acacia sclerosperma* ssp. *sclerosperma, Acacia tumida* var. *pilbarensis, Aristida holathera* var. *holathera, *Cenchrus ciliaris, Hakea lorea* ssp. *lorea, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla, Stylobasium spathulatum* and **Vachellia farnesiana*. Site CP051, CP164, CP224, CP230 and CP281.

I3d ChAbAarTw *Corymbia hamersleyana* low scattered trees over *Acacia bivenosa* and *A. arida* open shrubland over *Triodia wiseana* hummock grassland

This vegetation type occurred in minor drainage lines rising in the range north of the Fortescue River, in the Newman and Boolgeeda Land Systems. *Tephrosia* sp. B Kimberley Flora (C.A. Gardner 7300) covers as much as 11% at one site within this vegetation type. Other associated species *Acacia inaequilatera, Cajanus cinereus, Indigofera monophylla, Grevillea pyramidalis* ssp*. leucadendron, Grevillea wickhamii* ssp*. hispidula* and *Terminalia canescens*. Sites CP111, CP113, CP115.

I3e ElAbAaAtTw *Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia bivenosa*, *A. ancistrocarpa* and *A. tumida* var. *pilbarensis* high open shrubland over *Triodia wiseana* hummock grassland

This vegetation occurred in a few minor drainage lines rising in rocky hills, in the middle of the study area, in the Nanutarra Land System. Associated species: *Acacia atkinsiana, Aristida holathera* var*. holathera, Bonamia rosea, Corchorus parviflorus, Goodenia stobbsiana, Hakea lorea* ssp*. lorea, Indigofera monophylla, Keraudrenia nephrosperma* and *Petalostylis labicheoides*. Sites CP192, CP194.

I3g GwAtAbTw *Grevillea wickhamii* ssp. *hispidula* and *Acacia tumida* var. *pilbarensis* open scrub over *A. bivenosa* open shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred in minor drainages between low rocky hills south of the Fortescue River, in the Newman Land System. Associated species: *Acacia arida, Acacia inaequilatera, Acacia pyrifolia* var*. pyrifolia, Corymbia hamersleyana, Grevillea pyramidalis* ssp*. leucadendron, Indigofera monophylla, Senna glutinosa* ssp*. glutinosa* and *Terminalia canescens*. Sites CP466, CP467, CP469.

I3h TERcAtrAarTwCEc *Terminalia canescens* low open woodland over *Acacia trachycarpa* high shrubland over *A. arida* shrubland over *Triodia wiseana* very open hummock grassland over **Cenchrus ciliaris* very open tussock grassland

This vegetation type was recorded in minor, stony, dissected drainage lines in the northern part of the study area, mostly in the Paraburdoo Land System. Associated species: *Acacia ancistrocarpa, Acacia pyrifolia* var*. pyrifolia, Acacia sericophylla, Acacia tumida* var*. pilbarensis, Cleome viscosa, Eucalyptus victrix, Flueggea virosa* ssp*. melanthesoides, Grevillea pyramidalis*

ssp. *leucadendron, Indigofera monophylla* (Burrup form), *Ipomoea muelleri, Tephrosia rosea* var. *clementii, Tephrosia* sp. B Kimberley Flora (C.A. Gardner 7300) and *Triodia epactia*. Sites CP013, CP328, CP356, CP358, CP360, CP382.

4. *Acacia synchronicia*, *A. bivenosa* Shrublands

I4a AbAsTeTw/g *Acacia bivenosa* and *A. synchronicia* open heath over *Triodia epactia* and *T. wiseana* very open hummock grassland over very open mixed grasses

This vegetation type occurred on floodplains associated with minor drainage lines in the northern part of the study area (38 to 42 km), in the Rocklea and Paraburdoo Land Systems. The very open mixed grasses included *Aristida contorta, Brachyachne prostrata, *Cenchrus ciliaris, Dactyloctenium radulans, Enneapogon caerulescens, Iseilema dolichotrichum* and *Sporobolus australasicus*. Other associated species: *Acacia inaequilatera, Acacia tumida* var. *pilbarensis, Boerhavia coccinea, Bulbostylis barbata, Cleome viscosa, Gomphrena cunninghamii, Goodenia forrestii, Goodenia microptera, Hakea lorea* ssp. *lorea, Hibiscus sturtii* var. *platychlamys, Indigofera colutea, Indigofera linifolia, Polycarpaea longiflora, Ptilotus astrolasius* var. *astrolasius, Ptilotus exaltatus* var. *exaltatus, Ptilotus helipteroides* var. *helipteroides, Senna artemisioides* ssp. *oligophylla, Senna notabilis, Sida arsiniata, Trianthema triquetra* var. *triquetra, Solanum lasiophyllum* and *Triodia epactia*. Sites CP019, CP021, CP414, CP438.

5. Corymbia Woodlands

I5b CcAbTeTw *Corymbia candida* ssp. *candida* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia epactia* and *T. wiseana* open hummock grassland

This vegetation type occurred in a broad drainage line in the middle of the study area (75km), in the Boolgeeda Land System. This vegetation type occurred adjacent to *Acacia xiphophylla* shrublands. Associated species: *Acacia ancistrocarpa, Acacia synchronicia, Ptilotus exaltatus* var. *exaltatus* and *Sida* sp. Pilbara. Sites CP216, CP218.

I5c CcChAtrAtPlCc *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia trachycarpa*, *A. tumida* var. *pilbarensis* and *Petalostylis labicheoides* high open shrubland over **Cenchrus ciliaris* very open tussock grassland

This vegetation type occurred, in minor drainage lines in the middle of the study area, in the Boolgeeda Land System. Associated species: *Abutilon amplum, Acacia ancistrocarpa, Acacia bivenosa, Acacia citrinoviridis, Acacia pyrifolia* var. *pyrifolia, Cleome viscosa, Corchorus incanus* ssp. *incanus, Eremophila longifolia, Gossypium robinsonii, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla, Tephrosia rosea* var. *glabrior, Trichodesma zeylanicum* var. *zeylanicum, Triumfetta clementii* and *Waltheria indica*. Sites CP240, CP373.

I5e ChAatkAbTw *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* and *A. bivenosa* shrubland over *Triodia wiseana* open hummock grassland

This vegetation type was recorded in minor drainage lines, in the middle of the study area. It occurred mainly in the Nanutarra Land System. *Triodia* sp. Robe River was recorded from one site. Associated species *Acacia synchronicia, Acacia tumida* var*. pilbarensis, *Cenchrus ciliaris, Eriachne pulchella* ssp*. dominii* and *Scaevola spinescens* (broad form). Sites CP054, CP339, CP341, CP343, CP345, CP355.

I5g ChAiAaTe *Corymbia hamersleyana* low open woodland over *Acacia inaequilatera* high open shrubland over *A. ancistrocarpa* scattered shrubs over *Triodia epactia* open hummock grassland

This vegetation type occurred in minor drainage lines in the southern part of the study area. It occurred in the Capricorn and Boolgeeda Land Systems. Associated species: *Acacia bivenosa*, *Acacia synchronicia*, *Acacia trachycarpa*, *Acacia tumida* var. *pilbarensis*, *Corchorus parviflorus*, *Grevillea pyramidalis* ssp. *leucadendron*, *Grevillea wickhamii* ssp. *hispidula*, *Hakea lorea* ssp. *lorea*, *Indigofera monophylla*, *Indigofera rugosa*, *Senna artemisioides* ssp. *oligophylla* and *Tephrosia rosea* var. *glabrior*. Sites CP134, CP148.

I5h ChAtAatkAaTw *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis*, *A. atkinsiana* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred in minor drainage lines throughout the study area. It occurred in five land systems, predominantly in the Nanutarra and Boolgeeda Land Systems. Associated species: *Acacia bivenosa, Acacia inaequilatera, Aristida holathera* var. *holathera, Aristida holathera* var. *latifolia, Bonamia rosea, *Cenchrus ciliaris, Cymbopogon ambiguus, Eragrostis* aff. *eriopoda* (WAS site 963), *Eremophila longifolia, Eriachne aristidea, Eucalyptus leucophloia* ssp. *leucophloia, Grevillea wickhamii* ssp. *hispidula, Gossypium australe* (Burrup Peninsula form), *Hakea lorea* spp. *lorea, Hibiscus sturtii* var. *campylochlamys, Indigofera monophylla, Jasminum didymum* ssp. *lineare, Keraudrenia velutina* ssp. *elliptica, Petalostylis labicheoides, Ptilotus astrolasius* var. *astrolasius, Ptilotus calostachyus* var. *calostachyus, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla, Senna glutinosa* ssp. *glutinosa, Sida pilbarensis, Tephrosia uniovulata, Trianthema pilosa, Trichodesma zeylanicum* var. *zeylanicum* and *Triodia epactia*. Sites CP050, CP066, CP108, CP112, CP116, CP171, CP131, CP135, CP168, CP170, CP184, CP188, CP231, CP239, CP246, CP299, CP307, CP309, CP377, CP381.

I5i ChAtAbTw *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* high scrub to high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland

This vegetation type occurred in minor drainage lines on the northern half of the study area (35-60km). It occurred mostly in the Rocklea and Newman Land Systems. Associated species: *Acacia ancistrocarpa, Acacia arida, Acacia atkinsiana, Acacia pyrifolia* var*. pyrifolia, Acacia synchronicia, *Cenchrus ciliaris, Cleome viscosa, Gossypium australe* (Burrup Peninsula form)*, Gossypium robinsonii, Grevillea pyramidalis* ssp*. leucadendron, Grevillea wickhamii* ssp*. hispidula, Hakea lorea* ssp*. lorea, Indigofera monophylla, Jasminum didymum* ssp*. lineare, Scaevola spinescens* (broad form)*, Senna artemisioides* ssp*. oligophylla, Senna glutinosa* ssp*. glutinosa, Senna glutinosa* ssp*. pruinosa* and *Tephrosia uniovulata.* Sites CP017, CP127, CP396, CP398, CP400, CP404, CP431, CP434, CP435, CP445, CP447, CP453, CP457, CP463, CP478, CP482, CP490.

6. Eucalyptus Woodlands

I6a EcChGpApyAtrTEsppTeTw *Eucalyptus camaldulensis* var. *obtusa* and *Corymbia hamersleyana* scattered low trees over *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Acacia pyrifolia* var. *pyrifolia* and *A. trachycarpa* open shrubland over *Tephrosia* spp. low open shrubland over *Triodia epactia* and *T. wiseana* very open hummock grassland

This vegetation was found in minor drainage lines and associated floodplains, north of the Fortescue River (44 km), mostly in the Paraburdoo Land System. The *Tephrosia* spp. low open shrubland included *T.* aff. *clementii* (8) (HD106), *T. rosea* var. *glabrior*, *T.* sp. B. Kimberley Flora and *T. uniovulata*. Other associated species: *Acacia ancistrocarpa, Acacia arida, Acacia bivenosa, Acacia tumida* var. *pilbarensis, *Cenchrus ciliaris, Cleome viscosa, Corchorus incanus* ssp. *incanus, Corchorus parviflorus, Goodenia lamprosperma, Gossypium australe* (Burrup Peninsula form), *Gossypium robinsonii, Grevillea wickhamii* ssp. *hispidula, Indigofera monophylla, Polycarpaea longiflora* (White form, M13-7), *Ptilotus astrolasius* var. *astrolasius, Sporobolus australasicus* and **Vachellia farnesiana*. Sites CP022, CP250, CP446, CP448, CP450.

I6b EcEvMgMlAcoCE/s *Eucalyptus camaldulensis* var. *obtusa* woodland over *E. victrix* low woodland over *Melaleuca glomerata*, *M. linophylla* and *Acacia coriacea* ssp. pendens high shrubland over **Cenchrus ciliaris* and **C. setiger* tussock grassland over patches of *Cyperus* spp. very open sedges

This vegetation type occurred in dissected drainages and their tributaries, in the northern section of the study area. It occurred in the Nanutarra and Rocklea Land Systems. Associated species: *Acacia ampliceps, Acacia pyrifolia* var. *pyrifolia, Acacia synchronicia*, *Cyperus bifax, Cyperus vaginatus, Eriachne* aff. *festucacea, Sesbania cannabina* and *Tephrosia rosea* var. *clementii*. Sites CP020, CP390, CP410, CP412, CP416.

7. Low Mulga Woodlands

I7a AaneERfoTw *Acacia aneura* var. *intermedia* low woodland over *Eremophila forrestii* ssp. *forrestii* open shrubland over *Triodia wiseana* open hummock grassland

This vegetation type occurred in isolated areas south of the Fortescue River, in the Nanutarra Land System. Associated species: *Abutilon* aff. *lepidum* (L), *Acacia atkinsiana, Acacia bivenosa, Acacia tumida* var. *pilbarensis, Acacia xiphophylla, Aristida contorta, Bulbostylis barbata, Cassytha capillaris, *Cenchrus ciliaris, Crotalaria medicaginea* var. *neglecta, Duperreya commixta, Eriachne pulchella* ssp. *dominii, Euphorbia boophthona, Evolvulus alsinoides* var. *decumbens, Gomphrena affinis* ssp. *pilbarensis, Hibiscus burtonii, Hibiscus sturtii* var. aff. *grandiflorus, Hybanthus aurantiacus, Indigofera monophylla* (BRO 46-12), *Isotropis atropurpea, Maireana melanocoma, Maireana planifolia, Cucumis maderaspatanus, Portulaca oleracea, Ptilotus exaltatus* var. *exaltatus, Ptilotus helipteroides* var. *helipteroides, Salsola tragus* ssp. *tragus, Sarcostemma viminale* ssp. *australe, Scaevola spinescens* (broad form), *Sclerolaena diacantha, Senna glutinosa* ssp. *glutinosa, Sida cardiophylla, Solanum diversiflorum, Solanum ellipticum, Sporobolus australasicus, Trichodesma zeylanicum* var. *zeylanicum, Triodia* sp. Robe River, *Triumfetta clementii* and *Yakirra australiensis* var. *australiensis.* Sites CP055, CP349, CP359.

8. Terminalia Woodlands

I8a TERcAarTw *Terminalia canescens* low open woodland over *Acacia arida* open shrubland over *Triodia wiseana* very open hummock grassland

This vegetation type occurred in the northern part of the study area, in a gully south of the Fortescue River, in the Newman Land System. Associated species: *Polycarpaea longiflora, Senna artemisioides* ssp*. oligophylla, Senna glutinosa* ssp*. glutinosa* and *Tinospora smilacina*. Site CP470.

Major Creeklines (A)

1. *Acacia pyrifolia* High Shrublands

A1a AtrApyTeCEc *Acacia trachycarpa* high shrubland over *A. pyrifolia* var. *pyrifolia* scattered shrubs over *Triodia epactia* very open hummock grassland over **Cenchrus ciliaris* very open tussock grassland

This vegetation type occurred on floodplains associated with tributaries of the Robe River (117km). It occurred in the Urandy Land System on brown silty clay loam soils. Associated species: *Corchorus parviflorus, Eucalyptus camaldulensis* var. *obtusa, Euphorbia coghlanii, Gossypium australe* (Burrup Peninsula form), *Grevillea pyramidalis* ssp. *leucadendron, Cucumis maderaspatanus, Senna artemisioides* ssp. *oligophylla, Stylobasium spathulatum* and *Tephrosia rosea* var. *glabrior*. Site CP160.

A1b VfAsApyTw **Vachellia farnesiana*, *Acacia synchronicia* and *A. pyrifolia* var. *pyrifolia* high shrubland over *Triodia wiseana* very open hummock grassland

This vegetation type was recorded only on the floodplain south of the Fortescue River. Most of this vegetation type was found in the River Land System, with a small area occurring in the Newman Land System. Associated species: *Acacia bivenosa, Acacia coriacea, Acacia inaequilatera, Acacia trachycarpa, Capparis spinosa* var. *nummularia, *Cenchrus ciliaris, Hakea lorea* ssp. *lorea, Ipomoea muelleri, Ptilotus astrolasius* var. *astrolasius* and *Senna glutinosa* ssp. *glutinosa*. Sites CP441, CP462, CP464, CP465.

3. Corymbia Woodlands

A3a CcChAcolAaTe *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia colei* var. *colei* and *A. ancistrocarpa* high open shrubland over *Triodia epactia* very open hummock grassland

This vegetation type was recorded in broad drainage lines across alluvial plains in the southern half of the study area (74.5km). The majority of this vegetation type occurred on the Nanutarra Land System and a small area on the Peedamulla Land System. Some areas of this vegetation had been burnt within a year of survey. Associated species: *Acacia inaequilatera*, **Cenchrus ciliaris, Eucalyptus camaldulensis* var. *obtusa, Gossypium australe* (Burrup Peninsula form), *Jasminum didymum* ssp. *lineare, Senna artemisioides* ssp. *oligophylla, Sida arsiniata*, *Tephrosia uniovulata, Trichodesma zeylanicum* var. *zeylanicum* and *Triodia wiseana*. Sites CP076, CP094, CP098, CP317, CP319.

A3c ChAaAtrTe/g *Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa* and *A. trachycarpa* scattered shrubs over *Triodia epactia* open hummock grassland over *Aristida holathera* var. *latifolia*, *Eragrostis* aff. *eriopoda* (WAS site 963) and **Cenchrus ciliaris* very open grassland

This vegetation type occurred on floodplains immediately adjacent to large drainage lines, typically on red-brown, silty clay loam soils, in the middle of the study area (70km). The majority of these floodplains were present in the Peedamulla Land System, with a small area in the Nanutarra Land System. Associated species: *Acacia atkinsiana, Acacia pyrifolia* var. *pyrifolia, Bonamia rosea, Eremophila longifolia, Gossypium australe* (Burrup Peninsula form), *Grevillea wickhamii* ssp. *hispidula, Grevillea pyramidalis* ssp. *leucadendron, Petalostylis labicheoides, Ptilotus astrolasius* var. *astrolasius, Rhynchosia minima* var. *australis, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla, Tephrosia uniovulata* and *Trichodesma zeylanicum* var. *zeylanicum*. Sites CP035, CP056, CP143, CP145, CP147, CP238.

A3e ElChCcGwTw *Eucalyptus leucophloia* ssp. *leucophloia*, *Corymbia hamersleyana* and *C. candida* ssp. *candida* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia wiseana* very open hummock grassland

This vegetation type occurred on floodplains associated with dissected drainage lines at Peters Creek (80km). It occurred mainly in the Boolgeeda Land System with a small area in the Nanutarra Land System. Associated species: *Acacia atkinsiana, Acacia trachycarpa, Acacia tumida* var. *pilbarensis, *Cenchrus ciliaris, Corchorus parviflorus, Ehretia saligna* var. *saligna, Petalostylis labicheoides, Polycarpaea longiflora* (White form, M13-7), *Senna glutinosa* ssp. *glutinosa, Triumfetta johnstonii* and *Waltheria indica*. Site CP198.

4. Eucalyptus Forests

A4a EcAcoPl *Eucalyptus camaldulensis* var. *obtusa* open forest over *Acacia coriacea* ssp. *coriacea* and *Petalostylis labicheoides* high open shrubland

This vegetation was found in the riverbed of the Fortescue River. The majority of this vegetation occurs in the River Land System. Associated species: *Acacia pyrifolia* var. *pyrifolia, Capparis spinosa* var. *nummularia, Erythrina vespertilio* and *Phyllanthus reticulatus*. Sites CP121, CP125.

A4b EcMgERAt/s/h *Eucalyptus camaldulensis* var. *obtusa* open forest over *Melaleuca glomerata* high open shrubland over *Eragrostis tenellula* scattered tussock grasses over *Cyperus bifax*, *C. difformis* and *C. vaginatus* very open sedges over patches of mixed open herbs

This vegetation type was recorded along the banks of the Robe River, in the River Land System. Patches of mixed open herbs included *Amaranthus mitchellii, Ammannia auriculata, *Argemone ochroleuca* ssp. *ochroleuca, Centipeda minima* ssp. *macrocephala, Dysphania melanocarpum* forma *leucocarpum, *Citrullus colocynthis, Cleome viscosa, *Cucumis melo* ssp. *agrestis, Dysphania kalpari, Euphorbia tannensis* ssp. *eremophila* (Burrup form), *Flaveria australasica, Goodenia lamprosperma, Helichrysum luteoalbum, Phyllanthus maderaspatensis, Pluchea rubelliflora, Pterocaulon sphaeranthoides, Stemodia grossa, Trachymene oleracea* ssp. *oleracea* and *Vigna lanceolata* var. *lanceolata*. Other associated species: *Acacia trachycarpa, Acacia tumida* var. *pilbarensis, *Cenchrus ciliaris, Gossypium robinsonii, Senna notabilis, Sesbania cannabina, Sesbania formosa* and *Typha domingensis*. Sites CP508, CP269.

5. Eucalyptus Woodlands

A5a EcAtrCEc ***Eucalyptus camaldulensis* var. *obtusa* low open woodland over *Acacia trachycarpa* high open shrubland over **Cenchrus ciliaris* very open tussock grassland**

This vegetation type was recorded in major dissected drainage lines in the southern half of the study area. It was sampled in the middle section of the study area at Peters Creek (81km) and in the southern section in a tributary south of the Robe River. It occurred in the Boolgeeda and Urandy Land Systems. Associated species: *Acacia pyrifolia* var. *pyrifolia, Adriana urticoides* var. *urticoides, *Argemone ochroleuca* ssp. *ochroleuca, Aristida holathera* var. *latifolia, Cleome viscosa, Corchorus laniflorus, Corchorus parviflorus, Euphorbia coghlanii, Gossypium australe* (Burrup Peninsula form), *Gossypium robinsonii, Grevillea wickhamii* ssp. *hispidula, Melaleuca linophylla, Phyllanthus maderaspatensis, Tephrosia rosea* var. *glabrior, Trichodesma zeylanicum* var. *zeylanicum* and *Triodia wiseana*. Sites CP158, CP200.

A5b EcCcChAsppTwTeCEc/h ***Eucalyptus camaldulensis* var. *obtusa* open woodland over *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia* spp. high shrubland over *Triodia wiseana* and *T. epactia* very open hummock grassland over **Cenchrus ciliaris* open tussock grassland over mixed patches of herb**

This vegetation type was recorded in the Robe River and tributaries. This vegetation was mostly associated with the Sherlock Land System, but smaller areas of it were also present in the Nanutarra, River and Peedamulla Land Systems. The high shrubland in this vegetation consisted of *Acacia ligulata, Acacia pyrifolia* var. *pyrifolia, Acacia sclerosperma* ssp. *sclerosperma* and *Acacia trachycarpa*. The mixed patches of herbs included *Abutilon amplum, Alternanthera nana, Amaranthus mitchellii, Blumea tenella, Boerhavia burbidgeana, Bonamia rosea, Calandrinia ptychosperma, Centipeda minima* ssp. *macrocephala Cleome viscosa, Convolvulus angustissimus* ssp. *angustissimus, Corchorus* aff. *parviflorus, Corchorus parviflorus, Crotalaria medicaginea* (Burrup form; B65-11), **Cucumis melo* ssp. *agrestis, Cullen pogonocarpum, Dichanthium sericeum* ssp. *humilius, Duperreya commixta, Dysphania melanocarpum* forma *leucopodon, Dysphania rhadinostachya* ssp. *rhadinostachya, Euphorbia biconvexa, Euphorbia boophthona* (large seed form), **Euphorbia hirta, Evolvulus alsinoides* var. *villosicalyx, Flaveria australasica, Goodenia forrestii, Goodenia lamprosperma, Goodenia nuda* (P3), *Heliotropium ovalifolium, Indigofera boviperda* ssp. *boviperda, Indigofera monophylla, Ipomoea muelleri, Leptopus decaisnei* var. *orbicularis, *Malvastrum americanum, Marsilea hirsuta, Cucumis maderaspatanus, Polycarpaea longiflora, Portulaca oleracea, Ptilotus appendiculatus* var. *appendiculatus, Ptilotus astrolasius* var. *astrolasius, Ptilotus calostachyus* var. *calostachyus, Ptilotus exaltatus* var. *exaltatus, Rhynchosia minima* var. *australis*, *Rostellularia adscendens* var. *clementii, Setaria dielsii, Sida* aff. *fibulifera* (B64-13B), *Sida* aff. *fibulifera* (FMG 125-20), *Streptoglossa bubakii, Stylobasium spathulatum, Trachymene oleracea* ssp. *oleracea* and *Vigna lanceolata* var. *lanceolata*. Other associated species *Acacia ancistrocarpa, Acacia bivenosa, Acacia citrinoviridis, Acacia inaequilatera, Gossypium robinsonii* and *Petalostylis labicheoides*. Sites CP042, CP321, CP265, CP385.

6. Herblands

A6a PlTRz ***Petalostylis labicheoides*** **scattered shrubs over** ***Trichodesma zeylanicum*** **var.** ***zeylanicum*** **very open herbland**

This vegetation type occurred on the floodplain to the north and in the riverbed of the Fortescue River. The majority of this vegetation occurred in the River Land System. Associated species: **Asphodelus fistulosus, Eucalyptus camaldulensis* var. *obtusa, Euphorbia schultzii, Grevillea wickhamii* ssp. *hispidula, Leptopus decaisnei* var. *orbicularis, Ptilotus obovatus* var. *obovatus* and *Trachymene oleracea* ssp. *oleracea*. Site CP123.

Clayey Plain (C)

2. Acacia Shrublands

C2c AiAaTe ***Acacia inaequilatera*** **high open shrubland over** ***A. ancistrocarpa*** **open shrubland over** ***Triodia epactia*** **open hummock grassland**

This vegetation type occurred on alluvial plains with silty clay soils, it was sampled in the southern end of the study area. It occurred mainly on the Urandy Land System, with some found in the River Land System and a very small amount in the Capricorn Land System. Associated species: *Acacia atkinsiana*, *Acacia bivenosa*, *Acacia synchronicia*, *Acacia trachycarpa*, *Aristida holathera* var. *holathera*, *Bonamia rosea*, **Cenchrus ciliaris*, *Cleome viscosa*, *Corchorus incanus* ssp. *incanus*, *Eremophila longifolia, Gossypium australe* (Burrup Peninsula form), *Grevillea pyramidalis* ssp. *leucadendron, Hakea lorea* ssp. *lorea*, *Indigofera monophylla, Ptilotus astrolasius* var. *astrolasius* and *Senna artemisioides* ssp. *oligophylla*. Sites CP041, CP156, CP257, CP261, CP267.

C2d AiAsTwTe ***Acacia inaequilatera*** **and** ***A. synchronicia*** **scattered tall shrubs over** ***Triodia wiseana*** **and** ***T. epactia*** **open hummock grassland**

This vegetation type occurred on silty clay loam, alluvial plains associated with the Robe River. It occurred predominantly the River and Sherlock Land Systems, and a small area in the Newman Land System. Associated species: *Acacia sclerosperma* ssp. *sclerosperma*, *Acacia trachycarpa*, **Cenchrus ciliaris*, *Corymbia candida* ssp. *candida*, *Eucalyptus camaldulensis* var. *obtusa*, *Gossypium australe* (Burrup Peninsula form), *Hakea lorea* ssp. *lorea* and **Vachellia farnesiana*. Sites CP271, CP383.

C2e CcAaAbTe ***Corymbia candida*** **ssp.** ***candida*** **scattered low trees over** ***Acacia ancistrocarpa*** **and** ***A. bivenosa*** **high open shrubland over** ***Triodia epactia*** **hummock grassland**

This vegetation type occurred on flat alluvial plains with dark red-brown clay loams, it was sampled in the plain south of the Robe River over a 4 km section. It occurred predominantly on the Urandy Land System and was the dominant community across this land system in the study area. A small area of this vegetation type was located in the Sherlock Land System. Associated species: *Gossypium australe* (Burrup Peninsula form), *Hakea lorea* ssp. *lorea*, *Ptilotus appendiculatus* var. *appendiculatus*, *Senna artemisioides* ssp. aff. *oligophylla* (thinly sericeous), *Solanum diversiflorum* and *Streptoglossa bubakii*. Sites CP162, CP509, CP531.

3. *Acacia synchronicia* Shrublands

C3a AsTe *Acacia synchronicia* open shrubland over *Triodia epactia* open hummock grassland

This vegetation type occurred on alluvial plains with silty clay loam soils, it was sampled in the middle of the study area. It occurred predominantly in the Nanutarra Land System, and to a lesser extent in the Peedamulla Land System. Associated species: *Acacia ancistrocarpa, Acacia atkinsiana, Acacia bivenosa, Corymbia hamersleyana, Eremophila forrestii* ssp. *forrestii, Ptilotus astrolasius* var. *astrolasius, Ptilotus calostachyus* var. *calostachyus, Salsola tragus* ssp. *tragus, Scaevola spinescens* (broad form), *Senna artemisioides* ssp. *oligophylla* and *Triodia wiseana.* Sites CP222, CP228, CP331.

5. Grasslands

C5a ERAxDsXi/h *Eragrostis xerophila*, *Dichanthium sericeum* ssp. *humilius* and *Xerochloa imberbis* mixed closed grassland over mixed very open herbland

This vegetation type occurred on extensive plains on cracking, clay-loams in the northern section of the study area, mainly north of the proposed rail crossing on the North West Coastal Highway, Cape Preston. This vegetation is typical of the Horseflat Land System in this region. This community appears similar to that of the Roebourne Plains PEC, but does not contain the same key species. Nevertheless, it would seem to be floristically unique, and appears unique among the grasslands typical of the Horseflat land system, just to the north of the study area. Some areas associated with lower lying drainages on the plain comprised of *Acacia coriacea* ssp. *pendens* open woodland over grassland. These wetter areas also supported a substantial population (up to 12% cover) of the invasive weed **Malvastrum americanum*. Other associated species: *Acacia bivenosa, Acacia xiphophylla, Abutilon malvifolium, Boerhavia burbidgeana, Brachyachne convergens, *Cenchrus ciliaris, Cleome viscosa, Crotalaria dissitiflora* ssp. *benthamii, Cullen graveolens, Eragrostis benthamii, Euphorbia coghlanii, Flaveria australasica* ssp. *gilgai*, *Gomphrena affinis* ssp. *pilbarensis, Heliotropium conocarpum, Indigastrum parviflorum, Indigofera linifolia, Ipomoea muelleri, Iseilema macratherum, Panicum laevinode, Pterocaulon sphaeranthoides, Ptilotus carinatus, Ptilotus exaltatus* var. *exaltatus, Ptilotus helipteroides* var. *helipteroides, Rhynchosia minima* var. *australis, Salsola tragus* ssp. *tragus, Sida* aff. *fibulifera* (HD200-6), *Sporobolus australasicus, Stemodia kingii*, *Streptoglossa bubakii, Streptoglossa tenuiflora* and *Triodia wiseana.* Site CP012.

6. Snakewood Shrublands

C6b AxTwERAx *Acacia xiphophylla* open shrubland over *Triodia wiseana* open hummock grassland over *Eragrostis xerophila* open tussock grassland

This vegetation type occurred on extensive plains on cracking, clay-loams north of the northern section of the study area. Only a small portion occurs within the study area. This vegetation is typical of the Horseflat Land System in this region. The perennial grasses *Triodia wiseana* and *Eragrostis xerophila* are dominant. However, following rainfall a mixture of other ephemeral grasses, including *Astrebla pectinata*, *Dichanthium sericeum* ssp. *humilius*, *Sporobolus australasicus*, *Dactyloctenium radulans*, *Brachyachne convergens*, *Urochloa pubigera*, *Enneapogon caerulescens* and *Panicum laevinode* are a significant component of the community. Other associated species: *Acacia ancistrocarpa*, *Acacia synchronicia*, *Streptoglossa bubakii*, *Enchylaena tomentosa* var. *tomentosa*, *Salsola tragus* ssp. *tragus*, *Ptilotus carinatus*, *Crotalaria dissitiflora* ssp. *benthamiana* and *Ptilotus exaltatus* var. *exaltatus*. Sites CP011, CP318, CP326.

7. Soft Spinifex Hummock Grasslands

C7a AiTe *Acacia inaequilatera* high open shrubland over *Triodia epactia* hummock grassland

This vegetation type occurred on alluvial plains with silty clay soils, near drainage lines in the southern part of the study area. It occurred mainly on the Urandy Land System with a small area in the Capricorn Land System. Some areas of this vegetation type were burnt in January 2007. Associated species: *Acacia ancistrocarpa*, *Acacia bivenosa*, *Bonamia rosea*, *Corchorus parviflorus*, *Eremophila longifolia*, *Eriachne mucronata* (typical form), *Grevillea pyramidalis* ssp*. leucadendron, Gossypium australe* (Burrup Peninsula form), *Hakea lorea* ssp. *lorea*, *Indigofera monophylla*, *Jasminum didymum* ssp. *lineare, Ptilotus astrolasius* var. *astrolasius, Scaevola spinescens* (Broad form), *Senna artemisioides* ssp*. oligophylla* and *Sida clementii*. Sites CP032, CP036, CP060, CP070, CP130, CP144, CP153, CP159, CP161, CP163.

C7b ApyGpTe *Acacia pyrifolia* var. *pyrifolia* scattered tall shrubs over *Grevillea pyramidalis* ssp. *leucadendron* scattered shrubs over *Triodia epactia* hummock grassland

This vegetation type occurred predominantly in the proposed mine area, on the Urandy Land system with smaller proportions on the Rocklea, Robe and Newman Land Systems. Only a small section of this vegetation type extends into the very southern end of the proposed rail alignment. Associated species: *Grevillea wickhamii*, *Acacia inaequilatera*, *A. bivenosa*, *Eucalyptus leucophloia* ssp. *leucophloia, Hakea lorea* ssp. *lorea* and *Indigofera boviperda*. All sites sampling this vegetation type were located in the proposed mine study area (Western Botanical, 2009). These sites were; HR065, TC052, TC053, TC126. As such this vegetation type is not included in the vegetation by species matrix (Appendix 6).

3.3 Vegetation of Conservation Significance

In assessing the conservation significance of the vegetation of the Study Area, the following parameters were used:

- Proportional impact on the extent of land systems in the study area
- Vegetation known to support priority species
- Known areas of plant endemism
- Range extensions of flora recorded
- Location of species at the limit of their range
- Restricted floristic grouping
- Known conservation priorities and values from published data from the region

Twenty vegetation types of the Cape Preston Rail Corridor Study Area are considered to be of conservation value as they support priority flora, occur in major drainages such as the Robe River and Fortescue River, appear to be restricted and/or are considered conservation priorities (McKenzie and May 2003).

Habitat for Priority Species:

Vegetation supporting the Priority 3 species *Flaveria australasica* ssp. *gilgai*:

- **C5a** ERAxDsXi/h - occurs at the very northern most extent of the study area in a very small area (0.79 ha), 42% of which is proposed to be impacted. This vegetation is known to extend to the north of the study area. This community appears similar to that of the Roebourne Plains PEC, but does not contain the same key species. Nevertheless, it would seem to be floristically unique, and appears unique among the grasslands typical of the Horseflat land system, just to the north of the study area. Unfortunately, the one site within this vegetation type was not included in the analysis, due to its location just outside of the most recently proposed alignment. It is recommend that data from the site CP012 be provided to DEC Pilbara flora expert Steve van Leeuwen for further analysis.

Vegetation supporting the Priority 3 species *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN:

- **P1a** AatkAbAaTw - occurred right across the study area and was a relatively common and widespread vegetation type, occurring on stony plains with numerous minor drainage lines. It is within these minor drainage lines that the P3 species *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN is most likely to occur. This vegetation type covered the largest proportion of the study area (532.45 ha or 22%) and is only proposed to have 37% of its area impacted. Other than the presence of this P3 species it is not considered of conservation significance.
- **P5b** AxAbTw – this vegetation type is also of conservation interest as a moderately widespread Snakewood vegetation type (30.75 ha of the study area with 34% proposed to be impacted). Some of this vegetation occurs on the restricted Nanutarra land system. One record of the P3 species *Indigofera* sp. Bungaroo Creek (S. van

Leeuwen 4301) PN occurred within this vegetation type. Therefore, it is also of conservation value as a habitat supporting a priority species.

- **S13b** TERcTw – this vegetation type occurs in only one very small area (1.6 ha) within the study area. However, the proposed impact should be only 0.43% of this. This vegetation type occurred on rocky dolomite hills at the southern end of the study area, and is of conservation interest as a habitat supporting a priority species.
- **I5e** ChAatkAbTw – this vegetation type is a minor drainage line which occurs mainly on the restricted Nanutarra Land System (26.8 ha). It is also of interest as *Triodia* sp. Robe River occurs as a presence in this vegetation type.
- **I7a** AaneERfoTw – this vegetation type is also of conservation interest as a mulga woodland within a minor drainage line. It only occurs in a few isolated areas south of the Fortescue River on the restricted Nanutarra land system. It only occupies 0.7 ha of the study area and 64% of this is proposed to be impacted. One record of the P3 species *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN occurred within this vegetation type. Therefore, it is also of conservation value as a habitat supporting a priority species.

Vegetation supporting the fire sensitive Priority 3 species *Terminalia supranitifolia*:

- **S13c** TERsGwCOpSOlTw - occurring on the free face of a mesa in two locations north of the Fortescue River. Located on the restricted Nanutarra land system. Only covers 0.94 ha of the study area and is not included in the proposed impact area.

<u>Communities of Established High Conservation Value:</u>

Vegetation of the Robe River and its tributaries:

- **A4b** EcMgERAt/s/h – this vegetation type occurred on the banks of the Robe River over 41.03 ha of the study area, of which 29.9% is proposed to be impacted. 0
- **A5b** EcCcChAsppTwTeCEc/h – this vegetation type occurred within the Robe River and its tributaries over 20.53 ha of the study are (15.9% proposed to be impacted). This vegetation was mostly found on the restricted Sherlock land system, but also on the restricted Nanutarra and Peedamulla land systems. This vegetation type is <u>also</u> of conservation interest as habitat for the Priority 3 species *Goodenia nuda*.

Vegetation of the Fortescue River and its floodplains:

- **A1b** VfAsApyTw – this vegetation type was recorded only on the floodplain south of the Fortescue River and extended for an area of 16.63 ha of the study area. Just over 16% of this area is proposed to be impacted.
- **A4a** EcAcoPl – this vegetation type was recorded in the dry riverbed of the Fortescue River over an area of 13.49 ha (19% proposed to be impacted).
- **A6a** PlTRz – this vegetation type occurred on the dry riverbed and floodplain to the north of the Fortescue River. It occupies an area of 21.29 ha within the study area (22.7% proposed to be impacted).

Snakewood (*Acacia xiphophylla*) communities:

- **P5b** AxAbTw – moderately widespread Snakewood vegetation type (30.75 ha of the study area with 34% proposed to be impacted). Some of this vegetation occurs on the restricted Nanutarra land system. One record of the P3 species *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN from within this vegetation type also increases its conservation value.
- **P5c** AxAsAatkTw – relatively scarce Snakewood vegetation type. This vegetation is only found in one location within the study area and only occupies 5.67 ha (0.2%). Impact is proposed to take 67.5% of this area.
- **P5d** AxTw – this snakewood vegetation occurs at only 2 locations, and some of it occurs on the restricted Nanutarra land system, with a small amount on the restricted Peedamulla land system. This vegetation type only occupies 0.6% of the study area, and the proposed impact will only affect 18.6% of this area.
- **P5e** AxTwTe – a very widespread vegetation type covering 107.06 ha of the study area. Proposed impacts will affect 34.2% of this area. Some of this vegetation type is distributed on the restricted Paraburdoo and Nanutarra land systems.
- **C6b** AxTwERAx – moderately widespread Snakewood vegetation type through the study area (29.3 ha), but with proposed impact estimated to impact over 62% of its area.

<u>Vegetation of Importance as Habitat for Species of Interest:</u>

Mulga (*Acacia aneura*) vegetation at the north-western limit of its distribution:

- **S8d** AaneTw – this mulga woodland on stony hills and breakaways, only occurs in one small location in the study area (0.4 ha) and 25% (0.1 ha) is proposed to be impacted.
- **I7a** AaneERfoTw – this mulga woodland within a minor drainage line, only occurs in a few isolated areas south of the Fortescue River on the restricted Nanutarra land system. It only occupies 0.7 ha of the study area and 64% of this is proposed to be impacted.

Habitat of *Aristida holathera* var. *latifolia*, uncommon in the Pilbara:

- **I3b** CcAcPTaTe – *Aristida holathera* var. *latifolia* and *Acacia aneura* var. *intermedia* are present in this minor drainage line vegetation type. It is a moderately widespread vegetation type within the study area (29.69 ha) and it is proposed that 39.25% of this will be impacted.
- **I5h** ChAtAatkAaTw - *Aristida holathera* var. *latifolia* is an associated species of this vegetation type, which covers 52.36 ha of the study area and 45.9% of this is proposed to be impacted.

Habitat for *Triodia* sp. Robe River at the northern limit of its known distribution:

- **S5a** AarTwTsprr – this vegetation type which provides habitat for *Triodia* sp. Robe River, a species of interest, at the northern extremity of its distribution. In fact, *Triodia* sp. Robe River is a dominant structural element of this vegetation type. However, this vegetation only occurs in one location, covering only 11.06 ha of the study area. It is proposed that 39.6% of this will fall within the impact area. *Triodia* sp. Robe River is recorded from three other sites in this study area, but in none of these is it recorded as more than only a presence.

3.4 Floristic Patterns of the Study Area

Floristic groups are not intended to be an equivalent or alternative to the mapping of vegetation types, but simply provide an additional, quantitative evaluation of how similar or unique sites may be to each other. It should also be noted that floristic groups are only based on the presence and absence of taxa, and unlike vegetation mapping, they do not account for the structure or dominance of the species in a site. The analysis provided by Griffin and Trudgen (2009) compares the sites from this study to a total of 2,883 sites across the Pilbara to provide a regional perspective on the distribution of floristic groupings found in this study. The 600 group level (the level of statistical difference at which the 2,883 sites are sorted into 600 groups) was deemed appropriate for analysis of regional representation of floristic groups (Griffin and Trudgen, 2009).

Of the groups at the 600 group level, Griffin and Trudgen (2009) identified 74 floristic groups found in the API West Pilbara Iron project areas (proposed mine area, associated infrastructure, and Cape Preston rail alignment) with a restricted distribution or poor sampling throughout the Pilbara bioregion. Of these restricted floristic units, 24 occurred along the proposed Cape Preston rail alignment (Table 8).

The likely distribution of these floristic groups was assessed by examining the representation of the sites, the extent of their vegetation types, and our knowledge of the area from three years of survey work in the Western Pilbara (Table 8). For example, some units that may be considered floristically restricted by Griffin and Trudgen (2009) data analysis, are in reality quite common, but simply under sampled within the region. Those groups that are consequently regarded as restricted or uncommon are discussed below. Those units that are considered to be under sampled are not further discussed, but should be targeted for further botanical survey work in the West Pilbara region to better determine their distribution.

According to our assessment, eight floristic units are considered to be restricted in distribution within the study area. Three of these may be under sampled. A further two floristic units are considered to be uncommon, although one of these is widespread.

600 group unit 63
This floristic unit only contains one site and it is from the API Cape Preston Rail. It is typified by the fire sensitive priority species *Terminalia supranitifolia* and would appear to be quite an uncommon vegetation type, which should be avoided if possible (Griffin and Trudgen, 2009). The only site in this floristic group is CP119. This site was mapped in vegetation type S13c.

600 group unit 94
This floristic unit only contains one site from the API Cape Preston Rail. It is typified by a woodland of *Terminalia canescens* on a dolomite geology (Griffin and Trudgen, 2009). This floristic unit appears to be either very poorly sampled or of a restricted occurrence (Griffin and Trudgen, 2009). Impacts upon this unit should be minimised. The only site in this floristic group is CP038r. This site was mapped in vegetation type S13b.

60 group unit 140
This floristic unit was represented by three sites, all from the API Cape Preston rail alignment. It is likely that this unit is restricted in distribution and only occurs in the West Pilbara (Griffin and Trudgen, 2009). All sites in this floristic unit contained *Senna glutinosa* ssp*. glutinosa*, *Indigofera monophylla* (BRO 46-12) a.k.a *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) **P3**, *Triodia wiseana, Triumfetta clementii, Eriachne pulchella, Scaevola spinescens* (broad form), *Trichodesma zeylanicum* var*. zeylanicum, Salsola tragus, Cassytha capillaris, Hybanthus*

aurantiacus, Solanum diversiflorum and *Ptilotus exaltatus* var*. exaltatus*. The sites found in this floristic until were CP053, CP054 and CP055. These are mapped in vegetation types P5b, I5e and I7a respectively.

600 group unit 146
There were only has three sites in this floristic unit, all from the API project areas, with two from the Cape Preston rail alignment. The other site was from the internal transport corridors within the mine area. This unit is restricted to the West Pilbara and is likely to have a restricted distribution (Griffin and Trudgen, 2009). All three sites in this floristic unit contained *Corymbia candida, Senna artemisioides* ssp*. oligophylla, Cucumis maderaspatanus* and *Triodia epactia*. The sites within this study area found within this floristic unit were CP162 and CP531. These were both mapped in vegetation type C2e.

600 group unit 248
This floristic unit was composed of six sites, with four from API project areas and one of those from the Cape Preston rail alignment. This unit is moderately widespread but uncommon (Griffin and Trudgen, 2009). Within this floristic unit *Acacia inaequilatera, Acacia bivenosa* and *Triodia wiseana* were founding all sites. The only site within this study area found in this floristic unit was CP472. This site was mapped in vegetation type S5a.

600 group unit 257
This floristic unit was composed of 17 sites, all from API project areas. Only one of these sites was from the Cape Preston rail alignment. This unit is restricted to the West Pilbara (Griffin and Trudgen, 2009). Further, most of the sites in this unit contain the geologically restricted species *Triodia* sp. Robe River (Griffin and Trudgen, 2009). While there are many sites in this floristic unit, they are geographically restricted (Griffin and Trudgen, 2009). Therefore, this floristic unit is likely to have a restricted occurrence (Griffin and Trudgen, 2009). Species common to all sites in this floristic unit were *Triodia wiseana* and *Triodia* sp. Robe River. *Eucalyptus leucophloia* ssp*. leucophloia* was found in 94% of sites. The only site in this floristic unit from this study area was CP474. This site occurred in vegetation type S5a.

600 group unit 129
This floristic unit contained three sites, but only one from the API data set, and this site was located on the Cape Preston Rail alignment. This unit is appears to have a West Pilbara distribution, but is likely to be poorly collected rather than very uncommon (Griffin and Trudgen, 2009). This floristic group contains *Eucalyptus camaldulensis* var*. obtusa, Melaleuca glomerata, Acacia trachycarpa, Goodenia lamprosperma, Phyllanthus maderaspatensis, Stemodia grossa, Cleome viscosa, Cyperus vaginatus, Pluchea rubelliflora, Sesbania cannabina, Pterocaulon sphaeranthoides* and *Dysphania melanocarpa* forma *melanocarpa* in all three sites. The site from this study located in this floristic unit is CP508. This site was mapped in vegetation type A4b.

600 group unit 153
This floristic unit was represented by four sites, all found within the API Cape Preston rail alignment. This unit is therefore restricted in distribution and disturbance to it should be minimised (Griffin and Trudgen, 2009). In all four sites within this floristic group *Corymbia candida, Corymbia hamersleyana* and *Acacia tumida* var. *pilbarensis* occurred. The four sites contained in this floristic group were CP135, CP198, CP240 and CP373. These were mapped in the vegetation types I5h, A3e and I5c (CP240 and CP373) respectively.

600 group unit 264
This floristic unit contained nine sites, all from the API project areas, with three from the Cape Preston Rail alignment, three from the internal transport corridor and three from the waste areas around Catho Well mesa. This unit is restricted to the West Pilbara but not uncommon

(Griffin and Trudgen, 2009). *Acacia ancistrocarpa, Tephrosia uniovulata, Ptilotus astrolasius* var*. astrolasius* and *Goodenia microptera* occurred in all nine sites. Also common were *Corymbia hamersleyana, Triodia epactia, Solanum diversiflorum* and *Trichodesma zeylanicum* var*. zeylanicum*, found in eight of nine sites. Sites within this study area that occurred in this floristic unit were CP050, CP051 and CP056. These sites occurred in vegetation types I5h, I3b and A3c respectively.

600 group unit 138

This floristic group was represented by four sites, two from the current API Cape Preston rail alignment. It is likely to be restricted to the West Pilbara, but may not be uncommon in the survey area (Griffin and Trudgen, 2009). This floristic group contained *Eucalyptus victrix, Acacia pyrifolia* var*. pyrifolia, Acacia bivenosa, Tephrosia rosea* var*. clementii* and *Cenchrus ciliaris* in all four sites. The sites found in this floristic unit were CP013 and CP020. These are mapped in vegetation types I3h and I6b respectively.

600 group unit 244

This floristic unit was composed of seven sites, three of which were from API study areas, and one of which was on the Cape Preston rail alignment. Sites were typified by Snakewood (*Acacia xiphophylla*) vegetation and were found across a variety of geologies (Griffin and Trudgen, 2009). This unit appears to be uncommon but widespread (Griffin and Trudgen, 2009). This floristic unit had *Acacia xiphophylla, Senna glutinosa* ssp*. luerssenii, Brachyachne preostrata* and *Triodia wiseana* in 85% of sites. Within this study area, the only site found in this floristic unit was CP058. This site was mapped in the vegetation type P5e.

4. Flora

4.1 General

A total of 358 taxa of vascular flora (species, subspecies and varieties) representing 53 families and 142 genera were recorded from the Cape Preston Rail Corridor (Appendix 8). This included 16 introduced flora species.

Sixty five field records and 19 flora collections could not be determined to species level with confidence due to the unavailability of good flowering material. These collections do not match any known taxa of conservation significance. These were determined as far as was possible to family or genera and are present in the vascular flora list (Appendix 8) as '*Genera*' sp. (inadequate material), but are not included in the taxa counts.

The families and genera recorded with the greatest number of taxa are presented in Tables 9 & 10. The representation of Poaceae, Malvaceae, Mimosaceae, Papilionaceae and Amaranthaceae is typical of the flora of the Pilbara. The 2008 surveys following fairly significant rainfall in the northern half of the study area resulted in a significant increase in the number of Poaceae genera, from 39 to 54, and a subsequent increase in species richness recorded. Twenty one families and 81 genera were represented by only one taxon.

Table 8 Vascular Flora Families with the highest number of species recorded from the Cape Preston Rail Corridor

FAMILY	No. Taxa
Poaceae	54
Malvaceae	34
Papilionaceae	34
Mimosaceae	27
Amaranthaceae	21
Euphorbiaceae	17
Asteraceae	17
Convolvulaceae	15
Tiliaceae	14
Chenopodiaceae	12
Caesalpiniaceae	12
Myrtaceae	8

Table 9 Vascular Flora Genera with the highest number of species recorded from the Cape Preston Rail Corridor

Genus	No. Taxa
Acacia	26
Ptilotus	16
Sida	12
Senna	11
Euphorbia	10
Hibiscus	10
Corchorus	9
Eriachne	8
Indigofera	8

The most frequently recorded species were *Triodia wiseana*, *Acacia bivenosa*, *A. ancistrocarpa, A. inaequilatera*, *Corymbia hamersleyana, Acacia synchronicia, A. pyrifolia* var. *pyrifolia, A. atkinsiana*, *Senna glutinosa* ssp. *glutinosa,* the weed **Cenchrus ciliaris*, *A. tumida* var. *pilbarensis, S. artemisioides* ssp. *oligophylla, Triodia epactia* and *Hakea lorea* ssp. *lorea* (Table 11). One hundred and nine species were recorded from only a single record. This reflects the patchy distributions and ephemeral nature of the flora of the Pilbara.

Table 10 Most frequently recorded taxa in the study area

	No. Records				
Species	**Quadrat**	**Relevé**	**Vegetation description**	**Individual specimen collection**	**TOTAL**
Triodia wiseana	23	179	69	6	**277**
Acacia bivenosa	22	155	57	1	**235**
Acacia ancistrocarpa	19	112	41	2	**174**
Acacia inaequilatera	15	75	21	1	**112**
Corymbia hamersleyana	9	61	30	2	**102**
Acacia synchronicia	14	64	18	1	**97**
Acacia pyrifolia var. *pyrifolia*	12	51	21	1	**85**
Acacia atkinsiana	9	59	13	3	**84**
Senna glutinosa ssp. *glutinosa*	13	50	11		**74**
**Cenchrus ciliaris*	17	40	11		**68**
Acacia tumida var. *pilbarensis*	5	42	18	1	**66**
Senna artemisioides ssp. *oligophylla*	14	43	5		**62**
Triodia epactia	11	41	8	1	**61**
Hakea lorea ssp. *lorea*	11	43	2		**56**
Ptilotus astrolasius var. *astrolasius*	12	32	5		**49**
Acacia trachycarpa	10	30	8	1	**49**
Grevillea wickhamii ssp. *hispidula*	6	28	7	2	**43**
Indigofera monophylla	16	23	3	1	**43**
Acacia xiphophylla	4	18	17	2	**41**
Ptilotus calostachyus	4	29	7		**40**
Corchorus parviflorus	7	26	5	1	**39**
Tephrosia uniovulata	9	21	7		**37**
Trichodesma zeylanicum var. *zeylanicum*	17	16	3	1	**37**
Scaevola spinescens (broad form)	11	23	3		**37**
Acacia arida	4	22	6	1	**33**
Gossypium australe (Burrup Peninsula form)	11	18	3	1	**33**
Grevillea pyramidalis ssp. *leucadendron*	6	17	9		**32**
Ptilotus exaltatus	15	16	1	1	**33**
Senna glutinosa ssp. *pruinosa*	8	16	5	1	**30**

4.2 Flora of Conservation Significance

A search of the DEC Threatened (Declared Rare Flora) database, Priority Species List and the Western Australian Herbarium Specimen database (DEC 2008 b and c) for the study area indicated 8 priority species known to occur in the vicinity of the study area (Table 12).

Table 11 Flora of conservation significance known to be in the locality of the Study Area

Priority Flora	Conservation Status
Abutilon uncinatum	1
Goodenia pallida	1
Gunniopsis sp. Fortescue (ME Trudgen11019)	1
Acacia glaucocaesia	3
Goodenia nuda	3
Owenia acidula	3
Rhynchosia bungarensis	3
Terminalia supranitifolia	3

4.2.1 Rare and Priority Flora Recorded

No flora gazetted as Declared Rare Flora (DRF) under the *Wildlife Conservation Act 1950*, were recorded in the Proposed Cape Preston Rail Corridor survey area. Four Priority Three species were recorded in the study area. *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN was recorded in six locations, *Terminalia supranitifolia* was recorded in two locations, while *Goodenia nuda* and *Flaveria australasica* ssp. *gilgai* were recorded in one location each (Table 13).

Table 12 Locations of Priority Three Flora within the Study Area (Zone 50K) WGS84

Species	Location	Habitat	No.	Easting mE	Northing mN
Flaveria australasica ssp. *gilgai*	Quadrat CP012	Alluvial plain	1	422895	7664784
Goodenia nuda	Quadrat CP042	Minor drainage line	1	404472	7592374
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Relevé CP038r	Crest/upper slope low mesa	1	405915	7581111
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Quadrat CP052	Rocky pediment	1	406923	7638180
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Quadrat CP053	Broad pediment	1	401794	7632621
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Quadrat CP054	Pediment drainage	1	401829	7632742
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Quadrat CP055	Drainage line	1	402214	7635978
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN	Quadrat CP057	Plain	1	396726	7616142
Terminalia supranitifolia	Relevé CP119	Free face	1	412494	7644863
Terminalia supranitifolia	WPI-187	Debris slope	3	412407	7647146

Flaveria australasica* ssp. *gilgai **Priority 3**

An annual, erect, compact herb 20 - 40 mm with yellow flowers forming a compact hemispheral head (Plate 1; DEC 2009). It is known from seven collections and occurs in the west Pilbara on red cracking clay soils, from Dampier to Tom Price (Figure 5; DEC 2009).

F. australasica ssp. *gilgai* was recorded from one location at the very northern end of the study area on an alluvial plain with red-brown, soft, cracking silty clay loam. *F. australasica* ssp. *gilgai* was recorded in May 2008. The vegetation at this site was described as *Eragrostis xerophila* very open tussock grassland.

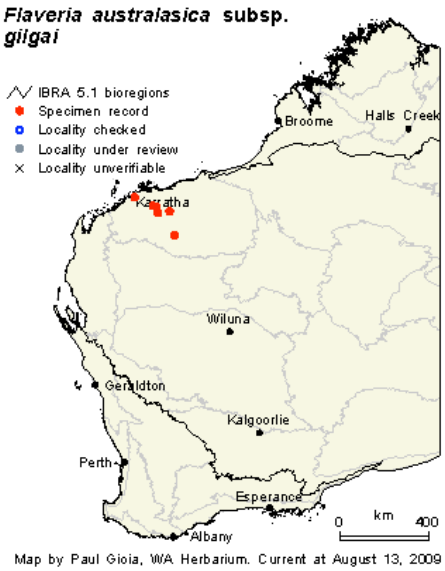


Figure 5 Distribution of *Flaveria australasica* ssp. *gilgai*.

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Plate 1: *Flaveria australasica* ssp. *gilgai* P3

Goodenia nuda **Priority 3**

An erect to ascending herb 0.5 m. Flowers are yellow, from April to August (Plate 2). It is known to occur in the west and east Pilbara, and has one known occurrence in the Little Sandy Desert (Figure 6; DEC 2009).

G. nuda was recorded from one location in the southern section of the Cape Preston Rail Corridor in a minor drainage line with hard setting, firm, brown, silty clay loam. *G. nuda* was recorded in June 2008, three to four months after rainfall, from a site previously surveyed in October 2007. The vegetation at this site was described as *Eucalyptus camaldulensis* var. *obtusa* open woodland, over *Corymbia hamersleyana* and *C. candida* ssp. *candida* low open forest, over *Acacia trachycarpa* and *A. ligulata* high shrubland, over *Triodia wiseana* and *T. epactia* very open hummock grassland, over *Cenchrus *ciliaris* and *Eragrostis exigua* tussock grassland.

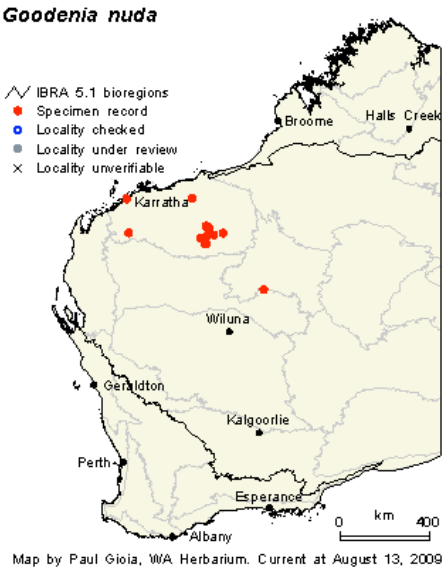

Figure 6 Distribution of *Goodenia nuda*

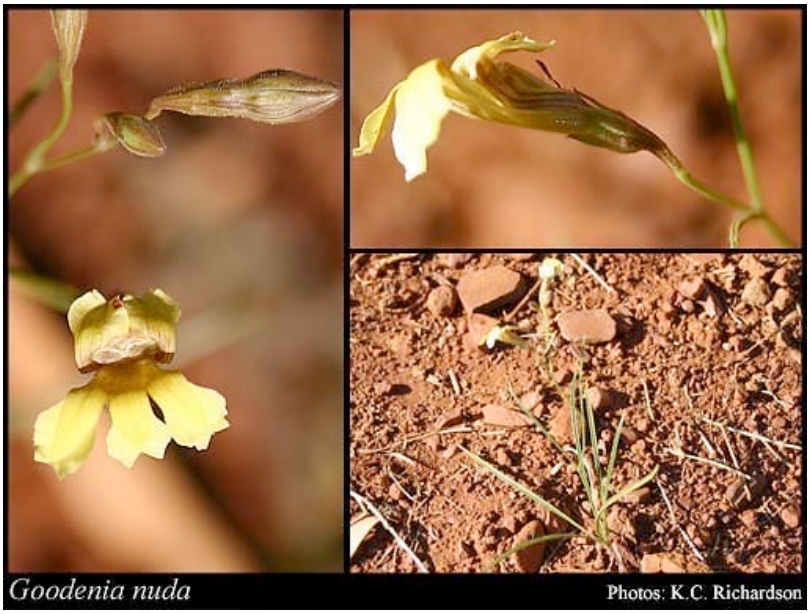

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Plate 2: *Goodenia nuda* P3

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN Priority 3

An upright spreading perennial shrub to 2.3 m, known to occur from only six records from the WA Herbarium in low landscapes on slopes with skeletal red, gritty, soil and near creek banks. Very little is known about *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN, it appears to be restricted to the Pilbara region (Figure 7) with all records in close proximity to the Study area.

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN was found in six locations through out the Cape Preston rail corridor (Plate 3).

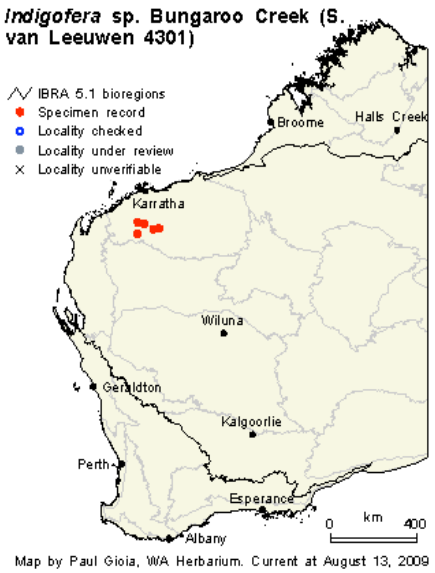

Figure 7 Distribution of *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN

Plate 3: *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) PN P3

Terminalia supranitifolia **Priority 3**

A spreading, tangled shrub or tree 1.5-3 m. Flowers are green to yellow, from May to July and December. It occurs in pebbly, coarse sand amongst rocky landforms; rock piles, outcrops, valley walls, rocky slopes and rocky plateaus. It is only known from near Karratha in the Pilbara region (DEC 2009).

Terminalia supranitifolia was found at two locations in the northern section of the Cape Preston Rail Corridor (Plate 4). The first location was a free face of a cliff on a range in vegetation described as, *T. supranitifolia* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* and *Acacia arida* scattered tall shrubs, over *Triodia wiseana* very open hummock grassland. Three *T. supranitifolia* plants were also recorded opportunistically on a debris slope, growing to a height of 4 m. This species has previously been recorded from; Burrup Peninsula in the Pistol Ranges, in the Valley of Bungaroo Creek, Dampier Island, Yarraloola and Hearson Cove (Figure 8).

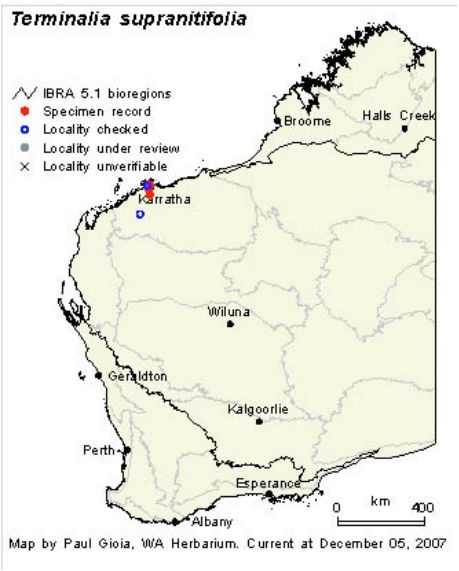

Figure 8 Distribution of *Terminalia supranitifolia*

Plate 4: *Terminalia supranitifolia* (P3) growing on a rocky free face to the north of the rail corridor, north of the Fortescue River

4.2.2 Flora of taxonomic interest

Acacia aneura Mulga

Acacia aneura (Plate 5) varieties occur all over the state, all flowering between February and June/October and seven varieties are known to occur in the Pilbara bioregion. One variety was recorded within the study area (Table 14) with a brief description and the location. Some of these records occur at the north-western extremity of the distribution of *Acacia aneura*.

Table 13 Locations and Descriptions of Mulga (*Acacia aneura* var. *intermedia)* recorded within the study area

Site	Type	Zone	Easting	Northing	Vegetation
CP055	Quadrat	50	402214	7635978	*Acacia aneura* var. *intermedia* low woodland over *Eremophila forrestii* ssp. *forrestii* scattered shrubs over *Triodia wiseana* open hummock grassland
CP224	Relevé	50	400927	7628915	*Corymbia candida* ssp. *candida* low open woodland over *Acacia ancistrocarpa* open scrub over *Triodia epactia* hummock grassland
CP293	Vegetation Description	50	400278	7606517	*Acacia aneura* var. *intermedia* over *Triodia wiseana*
CP349	Vegetation Description	50	402473	7635096	*Acacia aneura* var. *intermedia* low woodland
CP357	Vegetation Description	50	402745	7635912	*Acacia aneura* var. *intermedia* low woodland
CP359	Relevé	50	402511	7635923	*Acacia aneura* var. *intermedia* low open woodland over *A. tumida* var. *pilbarensis*, *A. bivenosa*, *A. atkinsiana* and *A. xiphophylla* high open shrubland over *Triodia wiseana* scattered hummock grasses over *Cenchrus ciliaris* very open grassland
CP480	Relevé	50	409273	7641023	*Acacia aneura* var. *intermedia* low woodland over *Triodia wiseana* open hummock grassland

Plate 5: *Acacia aneura* over *Triodia wiseana*

Triodia sp. Robe River

Triodia sp. Robe River (Plate 6) is a hummocking Spinifex common in rocky slopes and mesa free faces. *Triodia* sp. Robe River was first recognised as a distinct taxon in 1991 by Malcolm Trudgen carrying out work for the Robe River Iron Mesa J project. It occurs on the slopes of most mesas in the Robe Valley. At the time, one or two collections in the herbarium suggested a wider occurrence of what was thought to be the same entity in the Red Hill area, but it was not collected (M. Trudgen pers. comm.).

The collections made by Western Botanical were confirmed by Malcolm Trudgen as the same entity, extending the known distribution of the species. *Triodia* sp. Robe River is not very widespread with a geographic range of less than 100 km and may be geographically restricted. It is known from a significant number of populations (M. Trudgen pers. comm.). It was recorded in a few isolated areas, north of Pannawonica and south of the Fortescue River on the proposed Cape Preston Rail Corridor (Table 15), and further south throughout the resource areas on Red Hill and Mt Stuart Stations.

The conservation status of the species and the associated vegetation is being reviewed.

Table 14 Locations of *Triodia* sp. *Robe River* in the Study Area

Site	Type	Zone	Easting	Northing	Vegetation
CP226	Relevé	50	400890	7629003	*Clerodendrum floribundum* var. *angustifolium* scattered low trees over *Tephrosia* sp. B Kimberley Flora (C.A. Gardner 7300) low scattered shrubs over *Triodia* sp. Robe River very open hummock grassland
CP353	Relevé	50	402532	7635542	*Acacia atkinsiana* and *A. bivenosa* open shrubland over *Triodia wiseana* and *T.* sp. Robe River open hummock grassland
CP355	Relevé	50	402604	7635695	*Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* scattered hummock grasses over *Cenchrus ciliaris* open tussock grassland
CP359	Relevé	50	402511	7635923	*Acacia aneura* var. *intermedia* low open woodland over *A. tumida* var. *pilbarensis, A. bivenosa*, *A. atkinsiana* and *A. xiphophylla* high open shrubland over *Triodia wiseana* scattered hummock grasses over *Cenchrus ciliaris* very open grassland
CP361	Relevé	50	402745	7635912	*Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland
CP472	Relevé	50	410724	7642564	*Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia arida* shrubland over *Triodia wiseana* open hummock grassland
CP474	Relevé	50	410600	7642291	*Ficus brachypoda* low open woodland over *Triodia wiseana* and *T.* sp. Robe River hummock grassland
CP547	Vegetation Description	50	410801	7642582	*Triodia* sp. Robe River
API-3004	Individual Collection	50	402574	7635735	

Plate 6: *Triodia* sp. Robe River

4.2.3 Range extensions

***Aristida holathera* var. *latifolia* B.K. Simon**

Aristida holathera var. *latifolia* is a grass from the Poaceae family that is poorly known, previously recorded from three localities near Broome. It was collected at three locations in the middle of the Cape Preston rail corridor study area, north of the Robe River in two quadrats and one relevé (Table 16). This is a significant range extension of *Aristida holathera* var. *latifolia* of more than 900 km. It was recorded in drainage lines of *Corymbia hamersleyana* and *Corymbia candida* ssp. *candida* over *Acacia* spp. shrublands over *Triodia wiseana* and/or *Triodia epactia* hummock grasslands.

Table 15 Locations of *Aristida holathera* var. *latifolia* in the Study Area

Site	Type	Zone	Easting	Northing	Vegetation
CP050	Quadrat	50	396760	7616846	*Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* high open shrubland over *A. ancistrocarpa* and *A. atkinsiana* open shrubland over *Triodia wiseana* and *T. epactia* open hummock grassland over *Eragrostis* aff. *eriopoda* (WAS Site 963)
CP051	Quadrat	50	397801	7614765	*Corymbia candida* ssp. *candida* scattered low trees over *Acacia atkinsiana, A. ancistrocarpa* and *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia epactia* and *T. wiseana* hummock grassland
CP184	Relevé	50	397144	7619070	*Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* and *A. ancistrocarpa* high shrubland over *Triodia wiseana* very open hummock grassland

4.3 Introduced Species

Fifteen introduced species were identified during the proposed Cape Preston Rail vegetation survey (Table 17; Appendix 9). Descriptions of each species follow.

Only one of these species, *Argemone ochroleuca* ssp. *ochroleuca* (Mexican Poppy) is listed as a declared plant under the *Agriculture and Related Resources Protection Act, 1976* (Department of Agriculture and Food Western Australia 2007). This annual herb is difficult to control as it produces very large quantities of seed that can stay dormant for many years (Dep. Agriculture and Food, 2007). With its preferred habitat of creek and riverbeds, which are prone to flooding, this seed can easily spread over large distances (Biota, 2006).

Reduction of weed infestation generally, and of Mexican Poppy specifically, may be addressed by the construction and implementation a Weed Hygiene and Management Plan by the proponent in consultation with the DEC. Management methods that may be implemented to assist in the control of Mexican Poppy include the avoidance of any disturbance to surface drainage features wherever practicable. This often entails the reduction of vehicle movement within and around surface drainage features to a minimum (Biota, 2005b).

Table 16 Records of Introduced Species and Preferred Habitats within the Study Area

Adapted from DEC 2009; Hussey *et al.*. 2007

Family	Species	No. Records	Broad description of preferred habitat
Asphodelaceae	**Asphodelus fistulosus*	1	Along the coastline but also along road and rail verges
Asteraceae	**Sonchus oleraceus*	1	Disturbed soils, including wasteland and roadsides
Cucurbitaceae	**Citrullus colocynthis*	1	Disturbed areas, floodplains and creeks
	**Cucumis melo* ssp. *agrestis*	8	Riverbeds, drainage lines and floodplains
Euphorbiaceae	**Euphorbia hirta*	1	Alluvial soils in drainage lines and creeks
Malvaceae	**Malvastrum americanum*	5	River and creek margins and cracking clays
Mimosaceae	**Vachellia farnesiana*	16	Disturbed areas, creek and river banks, road and rail verges
Papaveraceae	**Argemone ochroleuca* ssp. *ochroleuca*	2	Coarse seed banks and gravel riverbeds
Passifloraceae	**Passiflora foetida* var. *hispida*	1	Coastal areas and disturbed banks of creeks and rivers.
Poaceae	**Cenchrus ciliaris*	68	Disturbed soils particularly cleared pastoral land, creek and riverbanks and floodplains
	**Cenchrus setiger*	2	Along watercourses
	**Cynodon dactylon*	1	Wetlands and river edges
	**Echinochloa colona*	2	Creeks, swamps and irrigated crops
	**Setaria verticillata*	2	Disturbed areas, river edges and shrublands
Portulacaceae	**Portulaca oleracea*	13	Disturbed areas
Sterculiaceae	**Melochia pyramidata*	1	Disturbed natural vegetation, bare areas, river banks, creek banks and dry watercourses

Plate 7: ****Argemone ochroleuca* **ssp. ***ochroleuca***

**Asphodelus fistulosus* (Onion weed) is an annual or biennial herb 0.2-0.4 m. Flowers are white, from June to October. It occurs on sand, clay or calcareous soils (DEC 2009). Onion weed has become a widespread, intrusive weed in calcareous soils from Exmouth to Eucla. It is especially dominant along the coastline but is also found on road and rail verges, which have facilitated its dispersal into bushland and pastoral areas (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Cenchrus ciliaris* (Buffel grass) is a tufted, or sometimes stoloniferous, perennial herb 0.2-1.5 m. Flowers are purple, from February to October. It occurs in white, red or brown sand, stony red loams or cracking black clays (DEC 2009). Buffel grass has become a particularly serious weed from Geraldton to the Pilbara, Kimberley and adjoining desert and is spread through nearly all vegetation types. It was sowed widely across pastoral areas as stock pasture and is now prominent throughout creek lines, river edges and roadsides. As well as out-competing native vegetation for habitat and resources, it severely alters fire regimes by producing large quantities of highly flammable fuel that is prone to more regular fires (Hussey *et al.* 2007). This species was recorded in 68 locations in the study area.

**Cenchrus setiger* (Birdwood grass) is an erect, tussocky, stoloniferous, perennial herb 0.5 m. Flowers are cream to purple, from April to May. It occurs in brown sands, red loam and pindan soils on sand dunes, plains, rangelands, stony hillsides and floodplains (DEC 2009). Birdwood grass, like its relative *C. ciliaris*, was introduced as a pasture source and has since become a widespread weed along the watercourses from the Kimberley to Geraldton (Hussey *et al.* 2007). This species was recorded in two locations in the study area.

**Citrullus colocynthis* (Colocynth) is a trailing perennial herb or climber. Flowers are yellow, from January to October. It occurs in sandy and rocky areas, stony loams, clay soils and wet soils. It also thrives in disturbed areas and on floodplains (DEC 2009). Colocynth is distributed throughout the wetlands and creeks of the Kimberley and Pilbara regions. It is possible its true abundance is under-represented due to its resemblance to *C. lanatus* (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Cucumis melo* ssp. *agrestis* (Ulcardo melon) is a trailing annual herb or climber. Flowers are yellow, from February to June and September to October (DEC 2009). This species was recorded in eight locations in the study area.

**Cynodon dactylon* (Couch) is a rhizomatous, prostrate perennial herb 0.05-0.3 m. Flowers are green to purple, from June to November/February. It occurs in sand, loam or clay (DEC 2009). Couch has commonly been used as a lawn cover and has now spread to invade numerous wetlands and river edges across the state (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Echinochloa colona* (Awnless barnyard grass) is a tufted annual herb 0.2-0.6(-0.9) m. Flowers are green to purple, from February to July. It occurs in black sand and black clay near watercourses and swamps (DEC 2009). Awnless barnyard grass is a widespread weed throughout the Kimberley and Pilbara in creeks, swamps and irrigated crops (Hussey *et al.* 2007). This species was recorded in two locations in the study area.

**Euphorbia hirta* (Asthma plant) is an erect or decumbent, many-branched annual herb 0.1-0.8 m. Flowers are yellow, green or white, from January to October. It occurs in alluvial soils, particularly along watercourses (DEC 2009). Asthma plant is a common weed that spreads from the Kimberley south to Onslow, Carnarvon and Cue (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Malvastrum americanum* (Spiked *Malvastrum) is an erect perennial herb or shrub 0.5-1.3 m. Flowers are yellow to orange, from April to July. It is found in orange/red/yellow sands, gritty alluvial sand, black/brown clay, alluvial cracking clays, limestone and calcrete situated on stony ridges, hillsides, floodplains and along drainage lines (DEC 2009). Spiked *Malvastrum is widely distributed across the Kimberley and Pilbara regions from river and creek margins to wastelands and numerous arid zone vegetation types. It is also inedible to herbivores, which allows it to spread further and more successfully (Hussey *et al.* 2007). This species was recorded in five locations in the study area.

**Melochia pyramidata* (Pyramid flower) is a sprawling to erect annual or perennial, herb or shrub, 0.3–1.5 m. Flowers are white, pink, blue, purple, from March to October. It is found in alluvium, sand and black clay along river banks, creek banks and dry watercourses growing in disturbed natural vegetation, on bare areas (DEC 2009). *Melochia pyramidata* is commonly found near rivers, creeks and irrigated crops in the Kimberley and the Pilbara (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Passiflora foetida* var. *hispida* is a woody climbing vine 9 m. Flowers are cream, white or blue, from February to November. It occurs in coastal areas and on river and creek banks (DEC 2009). *P. foetida* var. *hispida* is particularly common across the disturbed banks of rivers and creeks from the Kimberley to Carnarvon (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Portulaca oleracea* (Purslane) is a succulent, prostrate to decumbent annual, herb, to 0.2 m. Flowers are yellow, from April to May. It occurs in clay loam, sandy soils and is found in disturbed areas throughout Western Australia (DEC 2009). Under water stress the plant

becomes reddish. Purslane is a common and widespread weed of horticulture, paddocks and gardens (Hussey *et al.* 2007). This species was recorded in 13 locations in the study area.

**Setaria verticillata* (Whorled pigeon grass) is a loosely tufted annual herb 0.1-1.3 m. Flowers from December to June and it is found in sands, clays and loams (DEC 2009). Whorled pigeon grass has become a regular and widespread weed from the Kimberley to the Pilbara in disturbed areas, river edges and shrublands (Hussey *et al.* 2007). This species was recorded in two locations in the study area.

**Sonchus oleraceus* (Common sow thistle) is an erect annual herb 1.5 m. Flowers are yellow, from January to December. It occurs in a variety of soils, particularly in disturbed areas (DEC 2009). Common sow thistle is broadly distributed across Western Australia in gardens, market gardens, wasteland and on roadsides (Hussey *et al.* 2007). This species was recorded in one location in the study area.

**Vachellia farnesiana* (Mimosa bush) is an erect, spreading, thicket-forming, thorny tree or shrub 4 m (Plate 8). Flowers are yellow, from June to August. It occurs in gravel and stony sandy, clay or loam soils situated in low-lying areas, on river and creek banks and in disturbed areas (DEC 2009). Mimosa bush is distributed widely from the Kimberley to Carnarvon and Wiluna and occasionally as far south as Muchea. It is found throughout creek lines, rivers, roadsides and disturbed floodplains across the pastoral districts. It appears to spread rapidly along the disturbed verges of transport corridors, which have contributed to the development of its vast coverage (Hussey *et al.* 2007). This species was recorded in sixteen locations in the study area.

Plate 8: *Vachellia farnesiana in flower

5. Discussion

5.1 General

The study area is a long, narrow corridor 100 km long and 200-500 m wide that traverses three subregions of the Pilbara bioregion and eleven land systems. Sixty eight vegetation types were described for the study area. These can be summarised as:

> Hummock grasslands of *Triodia wiseana* (Hard Spinifex) and/or *Triodia epactia* (Soft Spinifex) with a scattered shrub over storey of *Acacia ancistrocarpa, A. bivenosa* and/or *A. inaequilatera* on plains and stony rises.
>
> Shrublands of *Acacia xiphophylla* with an understorey of Hard Spinifex *Triodia wiseana* and/or Soft Spinifex *Triodia epactia* hummock grasslands, and herbs varying in density on plains.
>
> Open Woodland of *Corymbia hamersleyana* with Shrublands of combinations of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia atkinsiana* over *Triodia wiseana* open hummock grassland on plains.
>
> Open Forest/Low Woodlands of *Eucalyptus camaldulensis* and/or *Eucalyptus victrix* and *Melaleuca glomerata* high open shrubland in the Robe River.
>
> Low Woodlands of *Corymbia ferriticola* ssp. *ferriticola* and *Corymbia hamersleyana* over *Acacia ancistrocarpa* and *Acacia inaequilatera* high shrubland, over *Triodia wiseana* and/or *T. epactia* very open hummock grassland in drainage lines.
>
> Shrublands of *Acacia bivenosa* and *Acacia ancistrocarpa* over *Triodia wiseana* open hummock grassland in minor drainage lines.
>
> Scattered low trees of *Eucalyptus leucophloia* ssp. *leucophloia* over *Acacia bivenosa*, over *Triodia wiseana* on hills and ranges.

A total of 358 taxa were recorded over two survey seasons. The study area comprised moderate to high species richness comparable with other studies in the western Pilbara (Biota 2006).

No Declared Rare Flora pursuant to the *Wildlife Conservation Act 1950,* were recorded from the study area. Three Priority 3 flora (*Goodenia nuda, Terminalia supranitifolia* and *Flaveria australasica* ssp*. gilgai*) were recorded from the study area.

Additional species of interest from the study area include *Triodia* sp. Robe River, *Aristida holathera* var. *latifolia* and *Acacia aneura*. Consideration should be given to avoid these additional species of interest.

The majority of the vegetation of the study area was in good to excellent condition. Buffel grass **Cenchrus ciliaris* was noted to be associated with low-lying areas subject to grazing. It was recorded at 87 locations.

The study area has been subject to an intense fire history over the past decade. A number of areas were burnt at the beginning of 2007. The DLI fire history data has been captured at a large scale from aerial and satellite information, but it indicates that very few parts of the study area have remained unburnt in the past ten years. Nearly 17 km of the Cape Preston rail corridor were burnt prior to the commencement of survey (during January 2007).

5.2 Conservation Significance

The study area encompasses ten Beard Vegetation Associations, all of which are considered to be a priority for conservation through reservation. Four of these are high priority, four are medium and 3 are low priority (Kendrick 2003).

Seventeen vegetation types of the Cape Preston Rail Corridor are considered to be of high conservation value as they support priority flora, occur in major drainages such as the Robe River and Fortescue River, appear to be restricted and/or are considered conservation priorities (McKenzie and May 2003).

In assessing the conservation significance of the vegetation of the Cape Preston Study Area, the following parameters were used:

- Proportional impact on the extent of land systems in the study area
- Vegetation known to support priority species
- Known areas of plant endemism
- Range extensions of flora recorded
- Location of species at the limit of their range
- Restricted floristic grouping
- Known conservation priorities and values from published data from the region

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Appendix 1 Vegetation Structural Table of Specht as modified by Aplin (1979)

Life form and height of tallest stratum	Projective foliage cover of tallest stratum as %	Description
Trees over 30 metres	70-100	High closed forest
	30-70	High open forest
	10-30	High woodland
	2-10	High open woodland
	Under 2	Scattered tall trees
Trees 10-30 metres	70-100	Closed forest
	30-70	Open forest
	10-30	Woodland
	2-10	Open woodland
	Under 2	Scattered trees
Trees under 10 metres	70-100	Low closed forest
	30-70	Low open forest
	10-30	Low woodland
	2-10	Low open woodland
	Under 2	Scattered low trees
Shrubs over 2 metres	70-100	Closed scrub
	30-70	Open scrub
	10-30	High shrubland
	2-10	High open shrubland
	Under 2	Scattered tall shrubs
Shrubs 1-2 metres	70-100	Closed heath
	30-70	Open heath
	10-30	Shrubland
	2-10	Open shrubland
	Under 2	Scattered shrubs
Shrubs under 1 metre	70-100	Low closed heath
	30-70	Low open heath
	10-30	Low shrubland
	2-10	Low open shrubland
	Under 2	Scattered low shrubs
Herbs/Sedges/Grasses	70-100	Closed herb, sedge, grassland
	30-70	Herb, sedge, grassland
	10-30	Open herb, sedge, grassland
	2-10	Very open herb, sedge, grassland
	Under 2	Scattered, herbs, sedges, grasses

Grasses then divided into:
Tussock grasslands (perennial tussock species, e.g. *Eragrostis* species);
Hummock grasslands (*Triodia* and *Plectrachne* species that form hummocks)
Curly spinifex grassland (Plectrachne pungens, which does not form hummocks)
Annual tussock grassland (e.g. annual *Sorghum* species)
The "curly Spinifex grassland" division follows J.S Beard.

Appendix 2 Vegetation of Study Area

Author: K. McMaster ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Nov 2009 ~ A3 ~ ~ CAD Ref g1505_WB_Rpt0911R_00_Leg01.dgn

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API

Stony Plain (P)

1. *Acacia atkinsiana, A. bivenosa* Shrublands

P1a	AatkAbAaTw	*Acacia atkinsiana* , *A. bivenosa* and *A. ancistrocarpa* high shrubland to open shrubland over *Triodia wiseana* open hummock grassland
P1c	ChAatkAbTwTe	*Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana, A. bivenosa* open shrubland over *Triodia wiseana, T. epactia* very open to closed hummock grassland

2. Acacia Shrublands

P2a	AaAbAiAsTeTw	*Acacia ancistrocarpa* , *A. bivenosa* , *A. inaequilatera* and *A. synchronicia* open shrubland over *Triodia epactia* and *T. wiseana* open hummock grassland
P2e	ChAbApyTw	*Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. pyrifolia* var. *pyrifolia* shrubland over *Triodia wiseana* open hummock grassland
P2f	ChAiAbTw	*Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland

3. *Acacia synchronicia* Shrublands

P3b	AsAbAaTwPTc	*Acacia synchronicia* , *A. bivenosa* (*A. ancistrocarpa*) open shrubland to shrubland over *Triodia wiseana* very open hummock grassland over *Ptilotus calostachyus* var. *calostachyus* very open herbs

4. Hard Spinifex Hummock Grasslands

P4b	ChAaTw	*Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* scattered shrubs over *Triodia wiseana* hummock grassland

5. Snakewood Shrublands

P5a	AxAatkAaTeTw	*Acacia xiphophylla* low open woodland to high open shrubland over *A. atkinsiana* and *A. ancistrocarpa* open shrubland over *Triodia epactia* and *T. wiseana* very open hummock grassland
P5b	AxAbTw	*Acacia xiphophylla* low open woodland to high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
P5c	AxAsAatkTw	*Acacia xiphophylla* low open woodland to a high open shrubland over *A. synchronicia* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland
P5d	AxTw	*Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* very open hummock grassland
P5e	AxTwTe	*Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* and occasionally *T. epactia* very open hummock grassland

6. Soft Spinifex Hummock Grasslands

P6f	ChApyGpTe	*Corymbia hamersleyana* low open woodland over *Acacia pyrifolia* var. *pyrifolia, Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Triodia epactia* open hummock grassland

Stony Hills and Breakaways (S)

1. *Acacia atkinsiana, A. bivenosa* Shrublands

S1a	AbAatkTw	*Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland

2. *Acacia bivenosa* Open Heath over *Triodia wiseana*

S2a	AarAbApyTw	*Acacia arida, A. bivenosa* and *A. pyrifolia* var. *pyrifolia* open heath over *Triodia wiseana* hummock grassland

4. Acacia Shrublands

S4a	AarAbAtrTw	*Acacia arida, A. bivenosa* and *A. trachycarpa* shrubland over *Triodia wiseana* open hummock grassland
S4j	AtAbSgpTwPTc	*Acacia tumida* var. *pilbarensis* scattered tall shrubs over *A. bivenosa* and *Senna glutinosa* ssp. *pruinosa* open shrubland over *Triodia wiseana* very open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* very open herbs.

5. Acacia Shrubland over *Triodia* sp. Robe River and *Triodia wiseana* Hummock Grassland

S5a	AarTwTsprr	*Acacia arida* open shrubland over *Triodia wiseana* and *T*. sp. Robe River (M.E. Trudgen MET 12,369) hummock grassland

6. *Acacia synchronicia* Shrublands

S6a	AsTw	*Acacia synchronicia* open shrubland over *Triodia wiseana* very open hummock grassland

7. Hard Spinifex Hummock Grasslands

S7a	AatkAaTwPTc	*Acacia atkinsiana* scattered tall shrubs over *A. ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* scattered herbs
S7b	AaTw	*Acacia ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland
S7d	AbTw	*Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
S7e	AiAbTw	*Acacia inaequilatera* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland
S7i	AiTw	*Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* open hummock grassland
S7j	ChAbTw	*Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland
S7m	ERfTEspbTw	*Eremophila fraseri* ssp. *fraseri* open shrubland over *Tephrosia* sp. B Kimberley Flora scattered low shrubs over *Triodia wiseana* open hummock grassland
S7n	Tw	*Triodia wiseana* open hummock grassland

8. Low Mulga Woodlands

S8d	AaneTw	*Acacia aneura* var. *intermedia* low woodland over *Triodia wiseana* open hummock grassland

13. Terminalia Woodlands

S13b	TERcTw	*Terminalia canescens* low open woodland over *Triodia wiseana* scattered hummock grasses
S13c	TERsGwCOpSOlTw	*Terminalia supranitifolia* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* scattered tall shrubs over *Corchorus parviflorus* and *Solanum lasiophyllum* low open shrubland over *Triodia wiseana* very open hummock grassland

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT
CAPE PRESTON TO COCHRANE
VEGETATION LEGEND
Sheet 1 of 3

Author: K. McMaster Date: November 2009

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API

Minor Creekline (I)

1. *Acacia ancistrocarpa, A. bivenosa* Shrublands

I1a	AaAarAbTw	*Acacia ancistrocarpa, A. arida* and *A. bivenosa* shrubland over *Triodia wiseana* very open hummock grassland
I1b	AbAaTw	*Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland
I1d	ChAaAbTw/g	*Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* open heath over *Triodia wiseana* very open hummock grassland over very open grassland

2. *Acacia pyrifolia* High Shrublands

I2b	ApyAbTwCEc	*Acacia pyrifolia* var. *pyrifolia* high open shrubland over *A. bivenosa* open shrubland over mixed low open shrubland over *Triodia wiseana* hummock grassland and *Cenchrus ciliaris* very open tussock grassland

3. Acacia Shrublands

I3b	CcAcPTaTe	*Corymbia candida* ssp. *candida* scattered low trees over *Acacia citrinoviridis* open heath over *Ptilotus astrolasius* var. *astrolasius* low open shrubland over *Triodia epactia* open hummock grassland
I3d	ChAbAarTw	*Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. arida* open shrubland over *Triodia wiseana* hummock grassland
I3e	ElAbAaAtTw	*Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia bivenosa* , *A. ancistrocarpa* and *A. tumida* var. *pilbarensis* high open shrubland over *Triodia wiseana* hummock grassland
I3g	GwAtAbTw	*Grevillea wickhamii* ssp. *hispidula* and *Acacia tumida* var. *pilbarensis* open scrub over *A. bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
I3h	TERcAtrAarTwCEc	*Terminalia canescens* low open woodland over *Acacia trachycarpa* high shrubland over *A. arida* shrubland over *Triodia wiseana* very open hummock grassland over *Cenchrus ciliaris* very open tussock grassland

4. *Acacia synchronicia, A. bivenosa* Shrublands

I4a	AbAsTeTw/g	*Acacia bivenosa* and *A. synchronicia* open heath over *Triodia epactia* and *T. wiseana* very open hummock grassland over very open mixed grasses

5. Corymbia Woodlands

I5b	CcAbTeTw	*Corymbia candida* ssp. *candida* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia epactia* and *T. wiseana* open hummock grassland
I5c	CcChAtrAtPlCc	*Corymbia hamersleyana* and *C. candida* ssp. *candida* low open woodland over *Acacia trachycarpa* , *A. tumida* var. *pilbarensis* and *Petalostylis labicheoides* high open shrubland over *Cenchrus ciliaris* very open tussock grassland
I5e	ChAatkAbTw	*Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* and *A. bivenosa* shrubland over *Triodia wiseana* open hummock grassland
I5g	ChAiAaTe	*Corymbia hamersleyana* low open woodland over *Acacia inaequilatera* high open shrubland over *A. ancistrocarpa* scattered shrubs over *Triodia epactia* open hummock grassland
I5h	ChAtAatkAaTw	*Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis, A. atkinsiana* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland
I5i	ChAtAbTw	*Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* open scrub to high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland

6. Eucalyptus Woodlands

I6a	EcChGpApyAtrTEsppTeTw	*Eucalyptus camaldulensis* var. *obtusa and Corymbia hamersleyana* scattered low trees over *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Acacia pyrifolia var. pyrifolia and A. trachycarpa* open shrubland over *Tephrosia* spp. low open shublan
I6b	EcEvMgMlAcoCE/s	*Eucalyptus camaldulensis* var. *obtusa* woodland over *E. victrix* low woodland over *Melaleuca glomerata* , *M. linophylla* and *Acacia coriacea* ssp. *pendens* high shrubland over *Cenchrus ciliaris* and *C. setiger* tussock grassland over patches of *Cyperus* spp. very o

7. Low Mulga Woodlands

I7a	AaneERfoTw	*Acacia aneura* var. *intermedia* low woodland over *Eremophila forrestii* ssp. *forrestii* open shrubland over *Triodia wiseana* open hummock grassland

8. Terminalia Woodlands

I8a	TERcAarTw	*Terminalia canescens* low open woodland over *Acacia arida* open shrubland over *Triodia wiseana* very open hummock grassland

Major Creekline (A)

1. *Acacia pyrifolia* High Shrublands

A1a	AtrApyTeCEc	*Acacia trachycarpa* high shrubland over *A. pyrifolia* var. *pyrifolia* scattered shrubs over *Triodia epactia* very open hummock grassland over *Cenchrus ciliaris* very open tussock grassland
A1b	VfAsApyTw	*Vachellia farnesiana* , *Acacia synchronicia* and *A. pyrifolia* var. *pyrifolia* high shrubland over *Triodia wiseana* very open hummock grassland

3. Corymbia Woodlands

A3a	CcChAcolAaTe	*Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia colei var. colei* and *A. ancistrocarpa* high open shrubland over *Triodia epactia* very open hummock grassland
A3c	ChAaAtrTe/g	*Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa* and *A. trachycarpa* scattered shrubs over *Triodia epactia* open hummock grassland over *Aristida holothera* var. *latifolia, Eragrostis* aff. *eriopoda* (WAS site 963) and *Cenchrus ciliaris* very op
A3e	ElChCcGwTw	*Eucalyptus leucophloia* ssp. *leucophloia, Corymbia hamersleyana* and *C. candida* ssp. *candida* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia wiseana* very open hummock grassland

4. Eucalyptus Forests

A4a	EcAcoPl	*Eucalyptus camaldulensis* var. *obtusa* open forest over *Acacia coriacea* ssp. *coriacea* and *Petalostylis labicheoides* high open shrubland
A4b	EcMgERAt/S/H	*Eucalyptus camaldulensis* var. *obtusa* open forest over *Melaleuca glomerata* high open shrubland over *Eragrostis tenellula* scattered tussock grasses over *Cyprus bifax, C. difformu* s and *C. vaginatus* very open sedges over patches of mixed open herbs

5. Eucalyptus Woodlands

A5a	EcAtrCEc	*Eucalyptus camaldulensis* var. *obtusa* low open woodland over *Acacia trachycarpa* high open shrubland over *Cenchrus ciliaris* very open tussock grassland
A5b	EcCcChAsppTwTeCEc/H	*Eucalyptus camaldulensis* var. *obtusa* open woodland over *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia* spp. high shrubland over *Triodia wiseana* and *T. epactia* very open hummock grassland over *Cenchrus ciliaris* open tussock

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT
CAPE PRESTON TO COCHRANE
VEGETATION LEGEND
Sheet 2 of 3

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6. Herblands

	A6a	PlTRz	*Petalostylis labicheoides* scattered shrubs over *Trichodesma zeylanicum* var. *zeylanicum* very open herbland

Clayey Plain (C)

2. Acacia shrublands

	C2c	AiAaTe	*Acacia inaequilatera* high open shrubland over *A. ancistrocarpa* open shrubland over *Triodia epactia* open hummock grassland
	C2d	AiAsTwTe	*Acacia inaequilatera* and *A. synchronicia* scattered tall shrubs over *Triodia wiseana* and *T. epactia* open hummock grassland
	C2e	CcAaAbTe	*Corymbia candida* ssp. *candida* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* high open shrubland over *Triodia epactia* hummock grassland

3. *Acacia synchronicia* Shrublands

	C3a	AsTe	*Acacia synchronicia* open shrubland over *Triodia epactia* open hummock grassland

5. Grasslands

	C5a	ERAxDsXi/h	*Eragrostis xerophila* , *Dichanthium sericium* ssp. *humilis* and *Xerochloa imberbis* mixed closed grassland over mixed very open herbland

6. Snakewood Shrublands

	C6b	AxTwERAx	*Acacia xiphophylla* open shrubland over *Triodia wiseana* open hummock grassland over *Eragrostis xerophila* open tussock grassland

7. Soft Spinifex Hummock Grasslands

	C7a	AiTe	*Acacia inaequilatera* high open shrubland over *Triodia epactia* hummock grassland
	C7b	ApyGpTe	*Acacia pyrifolia* var. *pyrifolia* scattered tall shrubs over *Grevillea pyramidalis* ssp. *leucadendron* scattered shrubs over *Triodia epactia* hummock grassland

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT
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VEGETATION LEGEND
Sheet 3 of 3

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API

N

0 250 500m

Scale 1:25,000
MGA94 (Zone 50)

418000mE 420000mE 422000mE

7664000mN 7662000mN 7660000mN 7658000mN 7656000mN

NORTH WEST COASTAL HIGHWAY

pipeline (gas)

underground

Flaveria australasica ssp. gilgae

S7b I2b S7e S7b S7e S7e S7e I2b C6b P5e P5e P2e P5e P2e I1d P5e I1d P5e I3h P5e P5e P2e I1b P5e P5e S7b I1d P2e S7b P5e P2e I3h P5e S7b I6b P5e S7b I5i I5i S7b I5i I5i P3b P3b

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT
CAPE PRESTON TO COCHRANE
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API

7658000mN
7656000mN
7654000mN
7652000mN
7650000mN

414000mE
416000mE
418000mE

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

Carrawar Well
gravel stockpile
landing ground
HIGHWAY
(gas)
pipeline
underground
COASTAL
WEST
NORTH
Du
Boulay
Creek

l5i
S7b
P3b
P5e
S2a
l6b
l4a
l1d
l1a
l6a
S7d

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE VEGETATION
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API

408000mE 410000mE 412000mE 414000mE

7648000mN 7646000mN 7644000mN 7642000mN 7640000mN

Churdoo Pool

N

0 250 500m

Scale 1:25,000
MGA94 (Zone 50)

FORTESCUE RIVER

Bilanoo Pool

Koolumba Pool

BILANOO HILL

Fortescue River Roadhouse

landing ground

landing ground

telephone line (disused)

flying fox

COASTAL HIGHWAY

WEST NORTH

P3b l5i S7d l5i S7d Terminalia supranitifolia l5i S7d P3b l5i S7d l5i l5i P3b l3d S7d l3d Terminalia supranitifolia S13c S7d P5e l3d l3d S7d A6a A4a A4a A1b S7d S7d l3g S7d l8a S7d l5i l5i S8d S7d l5i S7d P5e S7d l1b

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT
CAPE PRESTON TO COCHRANE
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404000mE
406000mE
408000mE
410000mE
7640000mN
7638000mN
7636000mN
7634000mN
7632000mN

HIGHWAY
WEST COASTAL
NORTH
Six Mile Creek

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN

S7n
S7d
I5i
P5e
S8d
I1b
S4a
I5h
P1a
P5b
S7d
I5e
S1a
I5c
I5e
P5b
P1a

0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE VEGETATION

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398000mE
400000mE
402000mE
404000mE
7636000mN
7634000mN
7632000mN
7630000mN
7628000mN

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

scrape
scrape

Indigofera sp. Bungaroo Creek
(S. van Leeuwen 4301) PN

Indigofera sp. Bungaroo Creek
(S. van Leeuwen 4301) PN

Trevarton Creek

HIGHWAY
COASTAL
WEST
NORTH

P5b P1a I5e S1a I1b I7a S7d P5d I5h I5c A3c P5e I3b C3a P5a

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE VEGETATION
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API

396000mE
398000mE
400000mE
402000mE
7628000mN
7626000mN
7624000mN
7622000mN
7620000mN

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

NORTH
HIGHWAY
COASTAL
HIGHWAY
WESTERN
NORTH
HIGHWAY
1
scrape
gravel pit
Peters Ck
Peter Creek

P5a
S1a
S7d
P5e
I1b
P2f
I1b
A3a
A5b
P5e
P5e
P5e
I5b
I1b
S7d
S7d
I1b
P5e
I1b
I1b
P5e
I1b
S7d
P5e
I1b
P5e
S7d
I5h
P1a
P1a
A3e
A5a
A3e
S7d
A3e
S7d
I3e
I3e
S7d
I5h
S7d
S7d

WEST PILBARA IRON ORE PROJECT
PROPOSED RAIL ALIGNMENT
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API

394000mE
396000mE
398000mE
400000mE

7618000mN
7616000mN
7614000mN
7612000mN

N

0 250 500m

Scale 1:25,000
MGA94 (Zone 50)

HIGHWAY
COASTAL
WEST
NORTH

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN

I3e S7d
I5h S7d
S7d
S7d
S7d
P1a
I5h
P1a
P1a I5h
S7a
S7d
S7d
S7d S7d
I5h
I5h
S7d
P1a
S4j
S7d P5e
P5e
P5e
P5e P5e
S7d
P1a
I5h
P1a
P1a I5h P1a
P1a
S7d
S7d I5h
S7d
I3b
P1a
I5h
S7d
S7d
P1a

WEST PILBARA IRON ORE PROJECT

PROPOSED RAIL ALIGNMENT CAPE PRESTON TO COCHRANE VEGETATION

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API

398000mE
400000mE
402000mE
7610000mN
7608000mN
7606000mN
7604000mN
7602000mN

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

P1a
I5h
S7d
P5e
I3b
PANNAWONICA ROAD
MILLSTREAM ROAD
metal stockpile

WEST PILBARA IRON ORE PROJECT
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API

400000mE
402000mE
404000mE
406000mE

7602000mN
7600000mN
7598000mN
7596000mN
7594000mN

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

P5e
P1a
I5h
S7d
S7m
A5b
C2d
P5d
P1c
S6a

White Gate Well
mine (abandoned)
ROAD
DEEPDALE-YARRALOOLA
Wooroo Creek
THREE PEAK HILL
CHADADOOMUNOO ROCKS
ROBE
Gap Well

WEST PILBARA IRON ORE PROJECT
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API

402000mE
406000mE
408000mE
404000mE

7594000mN
7592000mN
7590000mN
7588000mN
7586000mN

ROBE RIVER

A5b
A4b
C2c
P5a
C2c
A5b
Goodenia nuda
Dixie Well
P5a
P5a
P5e
C2e
P5e
C2c
A5a
A1a
A5a
A5a
C2c
Pryde Well
P1a
C2c

landing ground
Yallingarrie Well

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

WEST PILBARA IRON ORE PROJECT
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404000mE
406000mE
408000mE
410000mE
7584000mN
7582000mN
7580000mN
7578000mN
7576000mN

Pryde Well
Bitherabooga Bore
Red Hill Mines
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN

P1a
C2c
P1a
S7d
P5c
P1a
P5e
S7d
P1a
S7j
S7i
S7i
S7i
P4b
S13b
S7i
S7i
I5g
S7d
S7j
I5g
I5g
S7j
I5g
S7j
S7j
I5g
S7i
S7i
S7i
I5g
P5e
C7b
P2a
P5e
P6f
S7d
C7a
P6f

N
0 250 500m
Scale 1:25,000
MGA94 (Zone 50)

WEST PILBARA IRON ORE PROJECT
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CAPE PRESTON TO COCHRANE
VEGETATION
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Appendix 3 Representative Photographs of the Vegetation of the Study Area

Stony Hills and Breakaways

S1a AbAatkTw *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site 361, November 2007)

S4a AarAbAtrTw *Acacia* arida, *A. bivenosa* and *A. trachycarpa* shrubland over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP487, September 2007)

S4j AtAbSgpTwPTc *Acacia tumida* var. *pilbarensis* scattered tall shrubs over *A. bivenosa* and *Senna glutinosa* ssp. *pruinosa* open shrubland over *Triodia wiseana* very open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* very open herbs on stony hills and breakaways (Site CP287, November 2007)

S6a AsTw *Acacia synchronicia* open shrubland over *Triodia wiseana* very open hummock grassland on stony hills and breakaways (Site CP146, October 2007)

S7a AatkAaTwPTc *Acacia atkinsiana* scattered tall shrubs over *A. ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland and *Ptilotus calostachyus* var. *calostachyus* scattered herbs on stony hills and breakaways (Site CP303, November 2007)

S7b AaTw *Acacia ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP368, September 2007)

S7d AbTw *Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP439, September 2007)

S7i AiTw *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP215, October 2007)

S7j ChAbTw *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP037, October 2007)

S7m ERfTEspbTw *Eremophila fraseri* ssp. *fraseri* open shrubland over *Tephrosia* sp. B Kimberley Flora scattered low shrubs over *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP393, November 2007)

S7n Tw *Triodia wiseana* open hummock grassland on stony hills and breakaways (Site CP129, September 2007)

S13b TERcTw *Terminalia canescens* low open woodland over *Triodia wiseana* scattered hummock grasses on stony hills and breakaways (Site CPr038, October 2007)

S13c TERsGwCOpSOlTw *Terminalia supranitifolia* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* scattered tall shrubs over *Corchorus parviflorus* and *Solanum lasiophyllum* low open shrubland over *Triodia wiseana* very open hummock grassland on stony hills and breakaways (Site CP119, September 2007)

Stony Plains

P1a AatkAbAaTw *Acacia atkinsiana*, *A. bivenosa* and *A. ancistrocarpa* high shrubland to open shrubland over *Triodia wiseana* open hummock grassland on a stony plain (Site CP040, October 2007)

P1a AatkAbAaTw *Acacia atkinsiana*, *A. bivenosa* and *A. ancistrocarpa* high shrubland to open shrubland over *Triodia wiseana* open hummock grassland on a stony plain (Site CP040 Rescore, June 2008)

P2d ChAaTw *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* scattered shrubs over *Triodia wiseana* hummock grassland on a stony plain (Site CP492, October 2007)

P3b AsAbAaTwPTc *Acacia synchronicia*, *A. bivenosa* (*A. ancistrocarpa*) open shrubland to shrubland over *Triodia wiseana* very open hummock grassland over *Ptilotus calostachyus* var. *calostachyus* very open herbs on a stony plain (Site CP402, September 2007)

P5a AxAatkAaTeTw *Acacia xiphophylla* low open woodland to high open shrubland over *A. atkinsiana* and *A. ancistrocarpa* open shrubland over *Triodia epactia* and *T. wiseana* very open hummock grassland on a stony plain (Site CP329, November 2007)

P5b AxAbTw *Acacia xiphophylla* low open woodland to high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* open hummock grassland on a stony plain (Site CP337, November 2007)

P5c AxAsAatkTw *Acacia xiphophylla* low open woodland to high open shrubland over *A. synchronicia* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland on a stony plain (Site CP255, October 2007)

P5d AxTw *Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* very open hummock grassland on a stony plain (Site CP064, October 2007)

P5e AxTwTe *Acacia xiphophylla* low open woodland to high open shrubland over *Triodia wiseana* and occasionally *T. epactia* very open hummock grassland on a stony plain (Site CP325, September 2007)

P6c ChAaAiTe *Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa* and *A. inaequilatera* shrubland over *Triodia epactia* hummock grassland on a stony plain (Site CP132, October 2007)

Clayey Plains

C2a AbSCsTw *Acacia bivenosa* open shrubland over *Scaevola spinescens* scattered low shrubs over *Triodia wiseana* hummock grassland on a clayey plain (Site CP519, May 2008)

C2c AiAaTe *Acacia inaequilatera* high open shrubland over *A. ancistrocarpa* open shrubland over *Triodia epactia* open hummock grassland on a clayey plain (Site CP041 Rescore, June 2008)

C2d AiAsTwTe *Acacia inaequilatera* and *A. synchronicia* scattered tall shrubs over *Triodia wiseana* and *T. epactia* open hummock grassland on a clayey plain (Site CP383, November 2007)

C2e CcAaAbTe *Corymbia candida* ssp. *candida* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* high open shrubland over *Triodia epactia* hummock grassland on a clayey plain (Site CP162, October 2007)

C3a AsTe *Acacia synchronicia* open shrubland over *Triodia epactia* open hummock grassland on a clayey plain (Site CP222, November 2007)

C5a ERAxDsXi/h *Eragrostis xerophila*, *Dichanthium sericeum* ssp. *humilius* and *Xerochloa imberbis* mixed closed grassland over mixed very open herbland on a clayey plain (Site CP012, September 2007)

C5a ERAxDsXi/h *Eragrostis xerophila*, *Dichanthium sericeum* ssp. *humilius* and *Xerochloa imberbis* mixed closed grassland over mixed very open herbland on a clayey plain (Site CP012 Rescore, May 2008)

C6b AxTwERAx *Acacia xiphophylla* open shrubland over *Triodia wiseana* open hummock grassland over *Eragrostis xerophila* open tussock grassland on a clayey plain (Site CP011 Rescore, May 2008)

C7a AiTe *Acacia inaequilatera* high open shrubland over *Triodia epactia* hummock grassland on a clayey plain (Site CP060, October 2007)

C7a AiTe *Acacia inaequilatera* high open shrubland over *Triodia epactia* hummock grassland on a clayey plain (Site CP032, October 2007)

Major Creeklines

A1a AtrApyTeCEc *Acacia trachycarpa* high shrubland over *A. pyrifolia* var. *pyrifolia* scattered shrubs over *Triodia epactia* very open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland on major creekline floodplains (Site CP160, October 2007)

A1b VfAsApyTw *Vachellia *farnesiana*, *Acacia synchronicia* and *A. pyrifolia* var. *pyrifolia* high shrubland over *Triodia wiseana* very open hummock grassland on major creekline floodplains (Site CP441, September 2007)

A2a AcoAiAtrGpCEcEUa *Acacia coriacea* ssp. *coriacea*, *A. inaequilatera*, *A. trachycarpa* and *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Cenchrus *ciliaris* and *Eulalia aurea* grassland on a major creekline (Site CP504, June 2008)

A3a CcChAcolAaTe *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia colei* var. *colei* and *A. ancistrocarpa* high open shrubland over *Triodia epactia* very open hummock grassland on a major creekline (Site CP094, October 2007)

A3c ChAaAtrTe/g *Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa* and *A. trachycarpa* scattered shrubs over *Triodia epactia* open hummock grassland over *Aristida holathera* var. *latifolia*, *Eragrostis* aff. *eriopoda* (WAS site 963) and *Cenchrus *ciliaris* very open grassland on major creekline floodplains (Site CP035 Rescore, July 2008)

A3e ElChCcGwTw *Eucalyptus leucophloia* ssp. *leucophloia*, *Corymbia hamersleyana* and *C. candida* ssp. *candida* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia wiseana* very open hummock grassland on major creekline floodplains (Site CP198, November 2007)

A4a EcAcoPl *Eucalyptus camaldulensis* var. *obtusa* open forest over *Acacia coriacea* ssp. *coriacea* and *Petalostylis labicheoides* high open shrubland on a major creekline (Site CP125, September 2007)

A4b EcMgERAt/s/h *Eucalyptus camaldulensis* var. *obtusa* open forest over *Melaleuca glomerata* high open shrubland over *Eragrostis* tenellula scattered tussock grasses over *Cyperus bifax*, *C. difformis* and *C. vaginatus* very open sedges over patches of mixed open herbs on a major creekline (Site CP508, June 2008)

A5a EcAtrCEc *Eucalyptus camaldulensis* var. *obtusa* low open woodland over *Acacia trachycarpa* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland on a major creekline (Site CP200, November 2007)

A5b EcCcChAsppTwTeCEc/h *Eucalyptus camaldulensis* var. *obtusa* open woodland over *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia* spp. high shrubland over *Triodia wiseana* and *T. epactia* very open hummock grassland over *Cenchrus *ciliaris* open tussock grassland over mixed patches of herbs on a major creekline (Site CP042, October 2007)

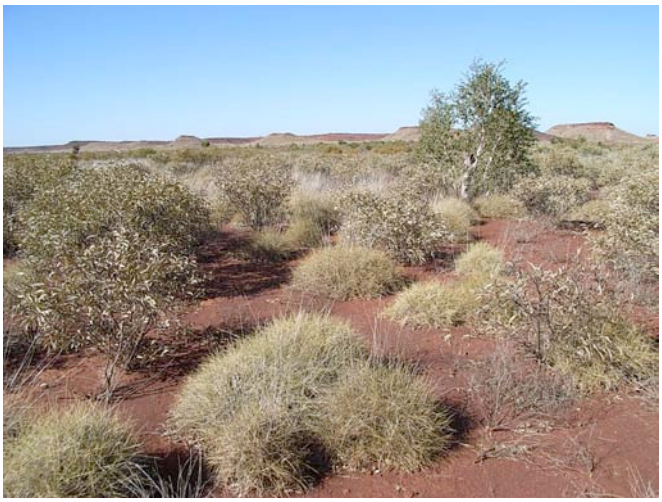
A6a PlTRz *Petalostylis labicheoides* scattered shrubs over *Trichodesma zeylanicum* var. *zeylanicum* very open herbland on major creekline floodplains (Site CP123, September 2007)

Minor Creeklines

I1b AbAaTw *Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland on minor creeklines (Site CP335, November 2007)

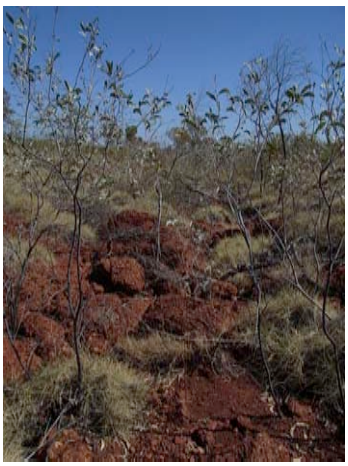
I1d ChAaAbTw/g *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* open heath over *Triodia wiseana* very open hummock grassland over very open grassland on minor creeklines (Site CP101, September 2007)

I2b ApyAbTwCEc *Acacia pyrifolia* var. *pyrifolia* high open shrubland over *A. bivenosa* open shrubland over mixed low open shrubland over *Triodia wiseana* hummock grassland and *Cenchrus *ciliaris* very open tussock grassland on minor creeklines (Site CP014, September 2007)



I3b CcAcPTaTe *Corymbia candida* ssp. *candida* scattered low trees over *Acacia citrinoviridis* open heath over *Ptilotus astrolasius* var. *astrolasius* low open shrubland over *Triodia epactia* open hummock grassland on minor creeklines (Site CP164, November 2007)

I3d ChAbAarTw *Corymbia hamersleyana* low scattered trees over *Acacia bivenosa* and *A. arida* open shrubland over *Triodia wiseana* hummock grassland on minor creeklines (Site CP115, September 2007)



I3e ElAbAaAtTw *Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia bivenosa*, *A. ancistrocarpa* and *A. tumida* var. *pilbarensis* high open shrubland over *Triodia wiseana* hummock grassland on minor creeklines (Site CP192, November 2007)

I3h TERcAtrAarTwCEc *Terminalia canescens* low open woodland over *Acacia trachycarpa* high shrubland over *A. arida* shrubland over *Triodia wiseana* very open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland on minor creeklines (Site CP013, September 2007)

I5b CcAbTeTw *Corymbia candida* ssp. *candida* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia epactia* and *T. wiseana* open hummock grassland on minor creeklines (Site CP218, November 2007)

I5c CcChAtrAtPlCEc *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia trachycarpa*, *A. tumida* var. *pilbarensis* and *Petalostylis labicheoides* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland on minor creeklines (Site CP383, November 2007)

I5e ChAatkAbTw *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* and *A. bivenosa* shrubland over *Triodia wiseana* open hummock grassland on minor creeklines (Site CP341, November 2007)

I5g ChAiAaTe *Corymbia hamersleyana* low open woodland over *Acacia inaequilatera* high open shrubland over *A. ancistrocarpa* scattered shrubs over *Triodia epactia* open hummock grassland on minor creeklines (Site CP134, November 2007)

I5h ChAtAatkAaTw *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis*, *A. atkinsiana* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland on minor creeklines (Site CP171, October 2007)

I5j ChAtAbTw *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* high scrub to high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland on minor creeklines (Site CP017, September 2007)

I6a EcChGpApyAtrTEsppTeTw *Eucalyptus camaldulensis* var. *obtusa* and *Corymbia hamersleyana* scattered low trees over *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Acacia pyrifolia* var. *pyrifolia* and *A. trachycarpa* open shrubland over *Tephrosia* spp. low open shrubland over *Triodia epactia* and *T. wiseana* very open hummock grassland on minor creeklines (Site CP022 Rescore, May 2008)

I6b EcEvMgMlAcoCE/s *Eucalyptus camaldulensis* var. *obtusa* woodland over *E. victrix* low woodland over *Melaleuca glomerata*, *M. linophylla* and *Acacia coriacea* ssp. pendens high shrubland over *Cenchrus *ciliaris* and *C. setiger* tussock grassland over patches of *Cyperus* spp. very open sedges on minor creeklines (Site CP020, September 2007)

I7a AaneERfoTw *Acacia aneura* var. *intermedia* low woodland over *Eremophila forrestii* ssp. *forrestii* open shrubland over *Triodia wiseana* open hummock grassland on minor creeklines (Site CP055 Rescore, May 2008)

I8a TERcAarTw *Terminalia canescens* low open woodland over *Acacia arida* open shrubland over *Triodia wiseana* very open hummock grassland on minor creeklines (Site CP470, September 2007)

I4a AbAsTeTw/g *Acacia bivenosa* and *A. synchronicia* open heath over *Triodia epactia* and *T. wiseana* very open hummock grassland over very open mixed grasses on minor creeklines, floodplain (Site CP019 Rescore, May 2008)

Appendix 4 Summary of Site Data from Relevés and Quadrats within the Study Area

West Pilbara Iron **Site** CP012 **Quadrat size** 50 x 50 m
Described Daniel Brassington **Survey Date** 22/09/2007
Habitat Flat open alluvial plain
Soil Soft, cracking clay, silty loam, reddish brown in colour
Vegetation *Eragrostis xerophila* very open tussock grassland
Veg Condition Very good, no effective disturbance except grazing by hoofed animals
Fire Age Unknown

West Pilbara Iron **Site** CP013 **Quadrat size** 110 x 10 m
Described Daniel Brassington **Survey Date** 22/09/2007
Denise True 25/05/2008
Habitat Stony creek bed
Soil Loose sandy loam soils
Vegetation *Eucalyptus victrix* scattered low trees over *Acacia arida* and *A. trachycarpa* open shrubland over *Cenchrus *ciliaris* open tussock grassland
Veg Condition Very good, no effective disturbance except grazing by hoofed animals
Fire Age 12 years

West Pilbara Iron **Site** CP014 **Quadrat size** 50 x 50 m
Described Kellie McMaster **Survey Date** 23/09/2007
Cassie Adam 22/05/2008
Habitat Flat plain
Soil Firm, brown, clay-loam, with surface flake
Vegetation *Acacia pyrifolia* var. *pyrifolia* and *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland over very open mixed tussock grasses
Veg Condition Very good
Fire Age Unknown
Notes *Cenchrus ciliaris* runs in a strip down the centre of the plot

West Pilbara Iron **Site** CP015 **Quadrat size** 50 x 50 m
Described Kellie McMaster **Survey Date** 23/09/2007
Cassie Adam 22/05/2008
Habitat Flat broad drainage between low hills
Soil Firm, hard setting, clay loam, brown-red in colour
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* open scrub over *Triodia wiseana* open hummock grassland over very open *Aristida contorta* tussock grassland
Veg Condition Excellent, no effective disturbance except grazing by hoofed animals
Fire Age Unknown

West Pilbara Iron **Site** CP016
Described Kellie McMaster **Survey Date** 23/09/2007 **Quadrat size** 50 x 50 m
Denise True 22/05/2008

Habitat Upper slope of low stony rise in an alluvial plain
Soil Firm, dark red brown, sandy clay loam
Rock Metamorphic
Vegetation *Acacia ancistrocarpa* high open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good, no effective disturbance except grazing by hoofed animals
Fire Age Unknown

West Pilbara Iron **Site** CP017 **Quadrat size** 120 x 10 m

Described Cassie Adam **Survey Date** 24/09/2007
Denise True 22/05/2008
Habitat Drainage line
Soil Firm, loose, red-brown, sandy clay loam
Vegetation *Acacia tumida* var. *pilbarensis* closed scrub over *A. ancistrocarpa, A. pyrifolia* var. *pyrifolia* and *A. bivenosa* shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Excellent, no effective disturbance
Fire Age > 10 yrs

West Pilbara Iron **Site** CP018 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 24/09/2007
Cassie Adam 22/05/2008
Habitat Alluvial plain or pediment between drainage lines on low hills
Vegetation *Acacia synchronicia* open shrubland over *Triodia wiseana* very open hummock grassland over *Aristida contorta* tussock grassland and *Bulbostylis barbata* very open sedgeland
Veg Condition Excellent
Fire Age < 5 yrs

West Pilbara Iron **Site** CP019 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 24/09/2007
Cassie Adam 25/05/2008
Habitat Slight rise to the south west of a riverbed in undulating country
Soil Loose, red-brown, silty clay loam
Vegetation *Acacia bivenosa* open scrub over *Triodia wiseana* very open hummock grassland
Veg Condition Excellent
Fire Age > 10 yrs
Notes Triodia cover not uniform

West Pilbara Iron **Site** CP020 **Quadrat size** 30 x 70 m

Described Kellie McMaster **Survey Date** 25/09/2007
Cassie Adam 23/05/2008
Habitat Densely vegetated riverbed
Soil Loose, dark brown, silty loam
Vegetation *Eucalyptus camaldulensis* var. *obtusa* and *E. victrix* open forest over *Acacia coriacea* ssp. *pendens, Melaleuca linophylla* and *M. glomerata* high shrubland over *Cenchrus *setiger* and *C. ciliaris* tussock grassland
Veg Condition Excellent, no effective disturbance except grazing by hoofed animals
Fire Age < 10 yrs
Notes Patches of sedges, *Melaleuca, Acacia* and *Cenchrus spp. occurring throughout the plot

West Pilbara Iron **Site** CP021

Described Kellie McMaster **Survey Date** 25/09/2007 **Quadrat size** 50 x 50 m
Denise True 23/05/2008
Habitat Alluvial flood plain
Soil Firm, loose, brown (red when dry) sandy clay loam
Vegetation *Acacia synchronicia* scattered tall shrubs over *A. bivenosa* and *Senna artemisioides* ssp.

oligophylla low open shrubland over *Triodia epactia* and *T. wiseana* open hummock grassland over *Aristida contorta* scattered tussock grasses

Veg Condition Excellent except grazing

Fire Age < 5 yrs

Notes Site is between an *Acacia tumida* dominated drainage and an *Acacia xiphophylla* (snakewood) community

West Pilbara Iron **Site** CP022 **Quadrat size** 30 x 70 m

Described Kellie McMaster **Survey Date** 25/09/2007
Cassie Adam 23/05/2008

Habitat Low flat rise between two dissected drainages

Soil Firm, loose, dark reddish brown, clayey sand

Vegetation *Corymbia hamersleyana* scattered low trees over *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *Acacia trachycarpa* and *A. pyrifolia* var. *pyrifolia* shrubland over *Triodia epactia* and *T. wiseana* open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland

Veg Condition Excellent, no effective disturbance except grazing by hoofed animals

Fire Age No recent evidence

Notes Presence of cryptograms

West Pilbara Iron **Site** CP023 **Quadrat size** 50 x 50 m

Described Cassie Adam **Survey Date** 26/09/2007
Denise True 23/05/2008

Habitat SE upper slope of a small hill opposite a small drainage line

Soil Loose, firm soil

Rock Layered, unknown sedimentary rock

Vegetation *Acacia bivenosa* and *Petalostylis labicheoides* open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Excellent, no effective disturbance

Fire Age Approx 10 yrs

West Pilbara Iron **Site** CP037 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 21/10/2007
Denise True 20/06/2008

Habitat Low rises/ pediment/ alluvial plain

Soil Firm, red-brown, loose, loamy sand

Rock Channel Iron Deposit (CID)

Vegetation *Corymbia hamersleyana* low open woodland over *Acacia bivenosa, A. ancistrocarpa* and *A. inaequilatera* open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Excellent, no effective disturbance except grazing by hoofed animals

Fire Age > 5 years

West Pilbara Iron **Site** CP038r **Relevé** 50 x 50 m

Described Kellie McMaster **Survey Date** 22/10/2007
Denise True 20/06/2008

Habitat Community on dolomite on the crest and upper slope of a low mesa featuring outcropping

Rock White dolomite

Vegetation *Terminalia canescens* low open woodland over *Triodia wiseana* very open hummock

grassland

Veg Condition Excellent, no effective disturbance

Fire Age >20 years

West Pilbara Iron **Site** CP039 **Quadrat size** 50 x 50 m

Described Cassie Adam **Survey Date** 24/10/2007
Rebecca Graham 22/06/2008

Habitat Open rocky scree slope and pediment

Soil Firm, brown, silty clay loam

Rock Dolorite

Vegetation *Acacia inaequilatera* scattered shrubs over *A. bivenosa* low scattered shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Very Good

Fire Age >5 years

West Pilbara Iron **Site** CP040 **Quadrat size** 50 x 50 m

Described Daniel Brassington **Survey Date** 24/10/2007
Rebecca Graham 20/06/2008

Habitat Flat, alluvial plain

Soil Loose, firm, silty clay loam

Vegetation *Acacia atkinsiana* shrubland over *Triodia wiseana* and *T. epactia* open hummock grassland

Veg Condition Very good, no effective disturbance except grazing by hoofed animals

Fire Age Approx 10 yrs

West Pilbara Iron **Site** CP041 **Quadrat size** 50 x 50 m

Described Cassie Adam **Survey Date** 24/10/2007
Rebecca Graham 20/06/2008

Habitat Pediment, alluvial plain and low rolling hills

Soil Firm, loose, dark red-brown, silty clay loam

Vegetation *Acacia trudgeniana* high open shrubland over *A. ancistrocarpa* open shrubland over *Cleome viscosa* and *Bonamia rosea* low shrubland over *Triodia epactia* open hummock grassland

Veg Condition Excellent, no effective disturbance except grazing by hoofed animals

Fire Age Unknown

Notes Termite mounds present

West Pilbara Iron **Site** CP042 **Quadrat size** 120 x 10 m

Described Amy Douglas **Survey Date** 24/10/2007
Rebecca Graham 20/06/2008

Habitat Woodland in drainage line

Soil Hard setting, firm, brown, silty clay loam

Vegetation *Eucalyptus camaldulensis* var. *obtusa* open woodland over *Corymbia hamersleyana* and *C. candida* ssp. *candida* low open forest over *Acacia trachycarpa* and *A. ligulata* high shrubland over *Triodia wiseana* and *T. epactia* very open hummock grassland over *Cenchrus *ciliaris* and *Eragrostis exigua* tussock grassland

Veg Condition Good, no effective disturbance except grazing by hoofed animals

Fire Age Approx 10 years

West Pilbara Iron **Site** CP050 **Quadrat size** 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Denise True 24/05/2008

Habitat Drainage line

Soil Loose, red-brown, silty clay loam

Rock Nil exposed

Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* high open shrubland over *A. ancistrocarpa* and *A. atkinsiana* open shrubland over *Triodia wiseana* and *T. epactia* open hummock grassland over *Eragrostis* aff. *eriopoda* (WAS site 963) and *Aristida holathera* var. *latifolia* very open tussock grassland

Veg Condition Good, no effective disturbance

Fire Age 5-10 years

West Pilbara Iron **Site** CP051 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 9/11/2007
Kellie McMaster 24/05/2008

Habitat Wide, flat drainage line

Soil Red-brown, silty clay loam

Rock Channel Iron Deposit (CID)

Vegetation *Corymbia candida* ssp. *candida* scattered low trees over *Acacia atkinsiana, A, ancistrocarpa* and *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia epactia* and *T. wiseana* hummock grassland

Veg Condition Excellent, no effective disturbance except grazing by hoofed animals

Fire Age > 5 years

West Pilbara Iron **Site** CP052 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 12/11/2007
Cassie Adam 23/05/2008

Habitat Rocky pediment

Soil Loose, firm, dark red-brown covering under lag gravel

Vegetation *Acacia atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Excellent

Fire Age Unknown

West Pilbara Iron **Site** CP053 **Quadrat size** 50 x 50 m

Described Kellie McMaster **Survey Date** 12/11/2007
Cassie Adam 24/05/2008

Habitat Broad pediment with open shrubland between low hills on alluvial plain with drainages between

Soil Dusky red, silty clay loam

Vegetation *Acacia xiphophylla* high open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good, no effective disturbance except grazing by hoofed animals

Fire Age Long unburnt

West Pilbara Iron **Site** CP054 **Quadrat size** 70 x 30 m

Described Kellie McMaster **Survey Date** 12/11/2007
Kellie McMaster 24/05/2008

Habitat Pediment drainage between snakewood communities

Soil Sandy clay loam, fine loose, firm

Rock Channel Iron Deposit (CID)

Vegetation *Acacia bivenosa* high shrubland over *Triodia wiseana* open hummock grassland over *Eriachne pulchella* ssp. *dominii* scattered tussock grasses

Veg Condition Excellent, no effective disturbance except grazing by hoofed animals

Fire Age Unknown

West Pilbara Iron **Site** CP055 **Quadrat size** 150 x 10 m

Described Kellie McMaster **Survey Date** 12/11/2007
Kellie McMaster 25/05/2008

Habitat Drainage line coming down from a hogback/ old mesa through pediment

Soil Red-brown, silty clay-loam

Vegetation *Acacia aneura* var. *intermedia* low woodland over *Eremophila forrestii* ssp. *forrestii* scattered shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Good

Fire Age Unknown

Notes Lots of dead/dry trees. Transect is 150 m following the *Acacia aneura* community, not in a straight line.

West Pilbara Iron **Site** CP056 **Quadrat size** 50 x 50 m

Described Daniel Brassington **Survey Date** 13/11/2007
Denise True 24/05/2008

Habitat Alluvial plain just above a broad river

Soil Firm, hard setting, brown, silty clay loam

Vegetation *Corymbia hamersleyana* low open woodland over mixed *Acacia* spp. scattered shrubs over *Triodia epactia* open hummock grassland over *Eragrostis* aff. *eriopoda* (WAS site 963), *Aristida holathera* var. *latifolia* and *Cenchrus *ciliaris* open tussock grassland

Veg Condition Very good, no effective disturbance except grazing by hoofed animals

Fire Age <10 years

West Pilbara Iron **Site** CP057 **Quadrat size** 50 x 50 m

Described Hayley Hughes **Survey Date** 13/11/2007
Cassie Adam 24/05/2008

Habitat Plain with mesas to the north and east

Soil Loose, orange-brown, silty clay loam

Vegetation *Acacia atkinsiana* high shrubland over *A. bivenosa* shrubland over *Triodia wiseana* closed hummock grassland

Veg Condition Excellent

Fire Age > 5 years

West Pilbara Iron **Site** CP058 **Quadrat size** 50 x 50 m

Described Cassie Adam **Survey Date** 13/11/2007
Rebecca Graham 20/06/2008
Habitat Pediment of tilted mesa/ rolling hills with small drainage line
Soil Loose, hard setting, dark reddish brown soil
Vegetation *Acacia xiphophylla* high shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age > 10 years

West Pilbara Iron **Site** CP111 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Broad incised creek line
Vegetation *Corymbia hamersleyana* low scattered trees over *Acacia bivenosa* and *A. arida* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP113 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Alluvial plain between ranges 80 m in height
Vegetation *Acacia inaequilatera*, *Grevillea wickhamii* ssp. *hispidula* and *Vachellia *farnesiana* scattered tall shrubs over *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Evidence of disturbance shown by tractor tracks
Fire Age Unknown

West Pilbara Iron **Site** CP115 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Incised creek line
Vegetation *Corymbia hamersleyana* low open woodland over *Tephrosia* sp. B Kimberly Flora (C.A. Gardener 7300) low shrubland over *Triodia wiseana* scattered hummock grasses
Veg Condition Very good
Fire Age 5-8 years

West Pilbara Iron **Site** CP117 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Rocky lower slope, pediment of range
Vegetation *Corchorus parviflorus* and *Ptilotus calostachyus* var. *calostachyus* low open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age < 5 years

West Pilbara Iron **Site** CP119 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Free face of range
Vegetation *Terminalia supranitifolia* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* and *Acacia arida* scattered tall shrubs over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP123 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Stony river and flood plain
Vegetation *Eucalyptus camaldulensis* var. *obtusa* scattered low trees over *Petalostylis labicheoides* and *Grevillea wickhamii* ssp. *hispidula* scattered shrubs over *Trichodesma zeylanicum* var. *zeylanicum* low open shrubland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP125 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 25/09/2007
Habitat Plain
Soil Deep loam soils
Vegetation *Eucalyptus camaldulensis* var. *obtusa* open forest over *Acacia coriacea* ssp. *coriacea* and *Petalostylis labicheoides* high open shrubland over very open annual tussock grassland
Veg Condition Very good
Fire Age Unknown
Notes Grassy plain from forest to range base

West Pilbara Iron **Site** CP129 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 26/09/2007
Habitat Rocky, low, rolling hills
Vegetation *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP131 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 26/09/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia atkinsiana* and *A. tumida* var. *pilbarensis* high shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP133 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 26/09/2007

Habitat

Vegetation *Acacia bivenosa, A. atkinsiana* and *Acacia synchronicia* shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP135 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 26/09/2007

Habitat Incised creek line

Vegetation *Corymbia candida* ssp. *candida* and *C. hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* and *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP150 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 23/10/2007

Habitat Hilltop

Rock Pale calcrete in appearance

Vegetation *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* and *Eremophila fraseri* ssp. *fraseri* scattered shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Excellent

Fire Age Unknown

West Pilbara Iron **Site** CP152 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 23/10/2007

Habitat Pediment

Vegetation *Acacia inaequilatera* and *A. bivenosa* open shrubland over *Triodia wiseana* open hummock

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP154 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 23/10/2007

Habitat Low exposed hill

Rock Pale grey-orange yellow exposed bedrock

Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age < 10 years

West Pilbara Iron **Site** CP156 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 23/10/2007
Habitat Alluvial plain
Soil Firm, reddish brown, clay loam
Vegetation *Acacia inaequilatera* high open shrubland, over *A. ancistrocarpa* open shrubland over *Triodia epactia* very open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Lots of dead ephemeral species present at site. Shrubs become sparser as discontinuous lag gravel appears to the north.

West Pilbara Iron **Site** CP158 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 23/10/2007
Habitat River/ Drainage line
Soil Sandy silty loam on banks
Vegetation *Eucalyptus camaldulensis* var. *obtusa* low woodland over *Acacia trachycarpa* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP160 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 23/10/2007
Habitat Alluvial plain
Soil Brown, silty clay loam
Vegetation *Acacia trachycarpa* high shrubland over *Triodia epactia* very open hummock grassland over *Cenchrus ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP162 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 23/10/2007
Habitat Broad open area on an alluvial plain
Soil Dark reddish brown, clay loam
Vegetation *Corymbia candida* ssp. *candida* scattered low trees over *Acacia trachycarpa, A. bivenosa* and *A. ancistrocarpa* high open shrubland over *Triodia epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes A few areas in this vegetation type occur on low rocky rises, where the species composition is the same, but a little less dense, and *Ptilotus astrolasius* and *Acacia atkinsiana* occur.

West Pilbara Iron **Site** CP164 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Broad drainage line
Soil Red-brown, sandy clay loam
Vegetation *Corymbia candida* ssp. *candida* scattered low trees over *Acacia citrinoviridis* open heath over *Triodia epactia* open hummock grassland

Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP166 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Top of low rocky hill
Soil Firm, loose, fine, red brown, sandy loam
Rock Channel Iron Deposit (CID) and dolomite
Vegetation *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Typical CID style rocks on the top of the hill, and dolomite present on the sides and towards the base of the hill.

West Pilbara Iron **Site** CP168 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Minor drainage between low rocky rises and pediment/ alluvial plain
Soil Silty clay loam
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* and *A. ancistrocarpa* open scrub over *A. bivenosa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP170 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Drainage line in plain/pediment
Soil Loose, firm, red brown, sandy silty loam
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis*, *A. atkinsiana* and *A. ancistrocarpa* high open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP172 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Alluvial plain
Soil Loose, firm, red brown, silty clay loam
Vegetation *Acacia synchronicia, A. bivenosa, A. ancistrocarpa* and *A. atkinsiana* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP174 **Relevé** ~50 x 50 m

Described Hayley Hughes **Survey Date** 8/11/2007
Habitat Pediment crossed by minor drainage lines
Vegetation *Acacia bivenosa* and *A. ancistrocarpa* scattered shrubs over *Triodia wiseana* very open

hummock grassland
Veg Condition Very good
Fire Age < 2 years
Notes Species covers increase in the minor drainages as compared with the low hills

West Pilbara Iron **Site** CP176 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Low rocky hills dissected with small drainages
Soil Firm, loose, sandy clay loam
Vegetation *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Moving south through this vegetation type, the community remains the same, except that *Acacia ancistrocarpa* appears and the cover of *Acacia bivenosa* increases

West Pilbara Iron **Site** CP178 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Drainage line
Soil Firm, loose, red brown, clay silt loam
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP180 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 8/11/2007
Habitat Low hills with minor drainages.
Soil Firm, loose, fine soil.
Vegetation *Acacia bivenosa* and *A. ancistrocarpa* open shrubland over *Triodia wiseana* open hummock
Veg Condition Very good
Fire Age Unknown
Notes Patchy distributions of *Acacias* over the vegetation type

West Pilbara Iron **Site** CP182 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 9/11/2007
Habitat Alluvial plain/ pediment
Soil Firm, loose, red brown, silty clay loam
Vegetation *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP184 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007
Habitat Drainage line
Soil Red brown, sandy clay loam
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* and *A.*

ancistrocarpa high shrubland over *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP186 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007

Habitat Pediment/alluvial plain

Soil Firm, loose, red brown, silty clay loam

Vegetation *Acacia bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP192 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007

Habitat Dissected drainage line

Soil Red brown, silty clay loam

Rock Conglomerate

Vegetation *Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia tumida* var. *pilbarensis* high open shrubland over *Acacia bivenosa* open shrubland over *Triodia wiseana* hummock open grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP194 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007

Habitat Alluvial plain/ drainage

Soil Red brown, silty clay loam

Vegetation *Acacia ancistrocarpa* and *Acacia bivenosa* high shrubland over *Triodia wiseana* hummock

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP198 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007

Habitat Dissected drainage with an associated flood plain

Rock Conglomerate

Vegetation *Eucalyptus leucophloia* ssp. *leucophloia*, *Corymbia hamersleyana* and *C. candida* ssp. *candida* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* high open shrubland over *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP200 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 9/11/2007

Habitat Dissected river bed

Soil Soft, loose, gritty sand

Vegetation *Eucalyptus camaldulensis* var. *obtusa* low open woodland over *Grevillea wickhamii* ssp.

hispidula and *Acacia trachycarpa* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland

Veg Condition Very good

Fire Age Unknown

Notes Wide riverbed, *Eucalyptus camaldulensis* occurs in the riverbed, all other species occur on the riverbanks. High cover of *Cenchrus *ciliaris* on riverbanks, which is mostly dead.

West Pilbara Iron **Site** CP202 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007

Habitat Drainage in pediment/ alluvial plain

Soil Firm, loose, brown, clay loam.

Vegetation *Acacia ancistrocarpa* high open shrubland over *A. bivenosa* shrubland over *Triodia wiseana*

open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP204 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 10/11/2007

Habitat Alluvial plain/ pediment

Soil Firm and loose

Vegetation *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP206 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007

Habitat Alluvial plain

Soil Fine, loose, orange brown, silty clay loam

Vegetation *Acacia xiphophylla* high open shrubland over *Triodia wiseana* scattered hummock grasses

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP208 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007

Habitat Alluvial plain

Soil Fine, loose, orange brown, silty clay loam, with some surface flaking in places

Vegetation *Acacia xiphophylla* high shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP212 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007

Habitat Alluvial plain

Soil Fine, loose, orange brown, silty clay loam, with some surface flaking in places

Vegetation *Acacia xiphophylla* high open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP214 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007
Habitat Low rocky rise
Soil Firm, loose, red brown soil
Rock White quartz
Vegetation *Acacia bivenosa* and *A. ancistrocarpa* low scattered shrubs over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes *Acacia bivenosa* cover is very patchy, ranging from a presence in some areas up to 2% in others.

West Pilbara Iron **Site** CP216 **Relevé** ~50 x 50 m

Described Kellie McMaster **Survey Date** 10/11/2007
Habitat Alluvial plain
Vegetation *Acacia bivenosa* low scattered shrubs over *Triodia epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP217 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 21/10/2007
Habitat Plain
Soil Sandy silt with pebbles in patches
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia synchronicia* scattered tall shrubs over *A. bivenosa* scattered shrubs over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP218 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 10/11/2007
Habitat Alluvial plain
Soil Firm, loose, clay loam
Vegetation *Corymbia candida* ssp. *candida* low open woodland over *Triodia epactia* and *T. wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Small patch of *Corymbia* woodland amongst a larger *Acacia xiphophylla* site.

West Pilbara Iron **Site** CP219 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 21/10/2007
Habitat Creek line running parallel to the range to the east
Vegetation *Corymbia hamersleyana* scattered low trees over *Senna artemisioides* ssp. *oligophylla* open shrubland over *Tephrosia* sp. B Kimberly Flora (C.A. Gardener 7300) and *Jasminum didymum* ssp. *lineare* low open shrubland over *Triodia wiseana* very open hummock

grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP220 **Relevé** ~50 x 50 m
Described Kellie McMaster **Survey Date** 10/11/2007
Habitat Alluvial plain
Vegetation *Acacia bivenosa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP221 **Relevé** ~ 50 x 50 m
Described Denise True **Survey Date** 21/10/2007
Habitat Pediment and debris slope
Rock Dolomite
Vegetation *Acacia inaequilatera* scattered tall shrubs over *Tephrosia* sp. B Kimberly Flora (C.A. Gardener 7300) low scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP222 **Relevé** ~50 x 50 m
Described Kellie McMaster **Survey Date** 11/11/2007
Habitat Alluvial plain/ pediment
Soil Dusty red, silty clay loam, with some surface flake
Vegetation *Acacia synchronicia* open shrubland over *Triodia epactia* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP224 **Relevé** ~50 x 50 m
Described Kellie McMaster **Survey Date** 11/11/2007
Habitat Pediment
Soil Dusty red, silty clay loam, with some surface flake
Vegetation *Corymbia candida* ssp. *candida* low open woodland over *Acacia ancistrocarpa* open scrub over *Triodia epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP226 **Relevé** ~50 x 50 m
Described Kellie McMaster **Survey Date** 11/11/2007
Habitat Top of a low mesa
Rock Channel Iron Deposit (CID)
Vegetation *Clerodendrum floribundum* var. *angustifolium* scattered low trees over *Tephrosia* sp. B Kimberley Flora (C.A. Gardner 7300) low scattered shrubs over *Triodia* sp. Robe River very open hummock grassland
Veg Condition Very good
Fire Age Unknown

Notes A small community, restricted to the outcropping on the eastern end of the mesa. Surrounded by *Acacia bivenosa, A. inaequilatera,* and *Senna glutinosa* ssp. *glutinosa* scattered shrubs over *Triodia wiseana* hummock grassland.

West Pilbara Iron **Site** CP228 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Broad alluvial plain
Soil Sandy clay loam
Vegetation *Acacia atkinsiana* high shrubland over *Triodia epactia* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP230 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Alluvial plain
Vegetation *Corymbia candida* ssp. *candida* scattered low trees over *Acacia atkinsiana* scattered shrubs over *Triodia epactia* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes A line of *Corymbia* trees running roughly east-west, immediately south of a *Acacia xiphophylla* community

West Pilbara Iron **Site** CP232 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Broad pediment, from a low hill/mesa to the east
Soil Sandy clay loam
Vegetation *Acacia xiphophylla* high open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP234 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Very shallow drainage within an alluvial plain
Soil Sandy clay loam
Vegetation *Acacia atkinsiana* high shrubland over *Triodia wiseana* and *T. epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP236 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Open alluvial plain
Vegetation *Acacia atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes A vehicle track runs near to this area

West Pilbara Iron **Site** CP238 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Broad drainage line/system
Soil Reddish brown, silty clay loam
Vegetation *Corymbia hamersleyana* low open woodland over *Grevillea wickhamii* ssp. *hispidula* scattered tall shrubs over *Acacia ancistrocarpa* scattered shrubs over *Triodia epactia* open hummock grassland over *Aristida* sp. (WPI-751) and *Cenchrus *ciliaris* scattered tussock grasses
Veg Condition Very good
Fire Age Unknown
Notes A long band of vegetation adjacent to river/drainage

West Pilbara Iron **Site** CP240 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Deeply incised stony river bed
Vegetation *Corymbia hamersleyana* and *C. candida* ssp. *candida* low open woodland over *Acacia trachycarpa* and *Petalostylis labicheoides* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown
Notes Almost no grasses or low herbs growing in the stony river bed, approximately 20 m wide

West Pilbara Iron **Site** CP242 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Rocky hills
Vegetation *Acacia bivenosa* and *A. synchronicia* open shrubland over *Triodia wiseana* open hummock
Veg Condition Very good
Fire Age Unknown
Notes Some *Corymbia hamersleyana* and *Acacia ancistrocarpa* in gullies between the hills. Vegetation is denser in gullies.

West Pilbara Iron **Site** CP243 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007
Habitat Low hill
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *Ptilotus astrolasius* var. *astrolasius* low scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP244 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007
Habitat Alluvial plain/ pediment
Vegetation *Acacia xiphophylla* high shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP245 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 22/10/2007

Habitat Low hill

Soil Dark red-brown, clay loam

Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* scattered shrubs over *Ptilotus astrolasius* var. *astrolasius* scattered low shrubs over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP246 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007

Habitat Drainage line

Vegetation *Corymbia hamersleyana* scattered trees over *Acacia atkinsiana* high shrubland over *Triodia*

wiseana closed hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP247 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007

Habitat Plain dissected by numerous drainage lines

Soil Red-brown, silty clay loam

Vegetation *Acacia bivenosa, A. ancistrocarpa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP248 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 11/11/2007

Habitat Broad pediment

Vegetation *Acacia bivenosa* high open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Very good

Fire Age Unknown

Notes This site is south of an *Acacia xiphophylla* patch. Overall the vegetation is mapped together as dissected pediment *Acacia bivenosa* and *Acacia synchronicia* over *Triodia wiseana*, with higher percentage covers in drainages, with occasional *Acacia xiphophylla* over *Triodia wiseana* patches.

West Pilbara Iron **Site** CP249 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007

Habitat Debris slope of a degraded mesa.

Vegetation *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* open shrubland over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP251 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007
Habitat Drainage line
Vegetation *Acacia atkinsiana* shrubland over *Triodia wiseana* and *T. epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP253 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007
Habitat Drainage line
Soil Red-brown, sandy clay loam
Vegetation *Acacia bivenosa* and *A. synchronicia* high open shrubland over *A. atkinsiana* open shrubland
over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP255 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007
Habitat Plain
Vegetation *Acacia xiphophylla* high open shrubland over *A. synchronicia* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP257 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/10/2007
Habitat Plain
Soil Brown, silty clay loam
Vegetation *Acacia atkinsiana* high shrubland over *Triodia wiseana* and *T. epactia* open hummock grassland
Veg Condition Very good
Fire Age < 5 years
Notes *Triodia wiseana* changes to almost 100% *Triodia epactia* to the north of the site, and *Acacia atkinsiana* changes to *Acacia ancistrocarpa*

West Pilbara Iron **Site** CP259 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 23/10/2007
Habitat Plain
Soil Red, silty clay loam
Vegetation *Acacia ancistrocarpa* and *A. atkinsiana* high shrubland over *A. bivenosa* open shrubland over
Triodia wiseana and *T. epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Termite mound

West Pilbara Iron **Site** CP261 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 23/10/2007
Habitat Alluvial plain
Soil Brown, silty clay loam
Vegetation *Acacia inaequilatera* high open shrubland over *Hakea lorea* ssp. *lorea* scattered shrubs over
Ptilotus astrolasius var. *astrolasius* scattered low shrubs over *Triodia epactia* open hummock
Veg Condition *Triodia* grazed by cattle
Fire Age Unknown
Notes Termite mound

West Pilbara Iron **Site** CP263 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 24/10/2007
Habitat Plain
Vegetation *Acacia xiphophylla* high open shrubland over *A. atkinsiana* and *A. ancistrocarpa* scattered shrubs over *Triodia epactia* and *T. wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP265 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 24/10/2007
Habitat Drainage line
Soil Red-brown, cracking, silty clay soils
Vegetation *Eucalyptus camaldulensis* var. *obtusa* open woodland over *Corymbia hamersleyana* and *C. candida* ssp. *candida* low open woodland over *Acacia trachycarpa* high shrubland over *Petalostylis labicheoides* scattered shrubs over *Triodia wiseana* and *T. epactia* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP267 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 24/10/2007
Habitat Plain
Soil Cracking, silty clay soils
Vegetation *Acacia inaequilatera* scattered tall shrubs over *A. ancistrocarpa* scattered shrubs over *Triodia epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP269 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 24/10/2007
Habitat Drainage line, Robe River bed
Soil Sandy, silty clay soils
Vegetation *Eucalyptus camaldulensis* var. *obtusa* open forest over *Melaleuca glomerata* low woodland over *Cyperus vaginatus* very open sedgeland over *Stemodia grossa* very open herbland
Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP271 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 24/10/2007
Habitat Drainage line, Robe River
Soil Silty clay loam
Vegetation *Eucalyptus camaldulensis* var. *obtusa* scattered trees over *Corymbia candida* ssp. *candida* scattered low trees over *Acacia synchronicia, A. sclerosperma* ssp. *sclerosperma* and *A. trachycarpa* high shrubland over *Triodia epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP277 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 8/11/2007
Habitat Pediment
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age 4-5 years

West Pilbara Iron **Site** CP279 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 8/11/2007
Habitat Plain
Vegetation *Acacia xiphophylla* high shrubland over *Acacia ancistrocarpa, A. bivenosa* and *Senna glutinosa* ssp. *glutinosa* scattered shrubs over *Maireana georgei* scattered low shrubs over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP281 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 8/11/2007
Habitat Broad drainage line
Soil Silty soils
Vegetation *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia ancistrocarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP285 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 8/11/2007
Habitat Pediment
Vegetation *Ptilotus calostachyus* var. *calostachyus* low open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP287 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 8/11/2007

Habitat Mesa slope and free face

Vegetation *Acacia tumida* var. *pilbarensis* scattered tall shrubs over *A. bivenosa, Senna glutinosa* ssp. *pruinosa* and *Ptilotus calostachyus* var. *calostachyus* open shrubland over *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP289 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 8/11/2007

Habitat Alluvial plain and drainage line

Soil Silty soil

Vegetation *Acacia bivenosa, A. ancistrocarpa* and *A. atkinsiana* shrubland over *Acacia synchronicia* low scattered shrubs over *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP291 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 8/11/2007

Habitat Alluvial plain

Soil Orange-brown, silty clay loam

Vegetation *Acacia atkinsiana* and *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland

Veg Condition Previous disturbance

Fire Age Unknown

West Pilbara Iron **Site** CP295 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007

Habitat Alluvial plain

Vegetation *Acacia bivenosa*, *A. ancistrocarpa* and *A. atkinsiana* high open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP297 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Low hills
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP299 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Drainage line
Soil Silty soils
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa* and *A. tumida* var. *pilbarensis* high open shrubland over *Triodia epactia* very open hummock grassland over *Eragrostis* aff. *eriopoda* (WAS site 963) very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP301 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Rolling hills and the end of drainage line
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP303 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Low rocky hills
Vegetation *Acacia atkinsiana* scattered tall shrubs over *A. ancistrocarpa* and *Codonocarpus cotinifolius* open shrubland over *Ptilotus calostachyus* var. *calostachyus* low scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age < 5 years

West Pilbara Iron **Site** CP305 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Numerous drainage lines feeding onto plain
Vegetation *Acacia tumida* var. *pilbarensis*, *A. ancistrocarpa* and *A. atkinsiana* high open shrubland over
Triodia wiseana hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Termite mound, and occasional large bare areas

West Pilbara Iron **Site** CP307 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Drainage line
Soil Sandy, silty clay loam
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* and *A. atkinsiana* high open shrubland over *Triodia wiseana* and *T. epactia* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP309 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 9/11/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* low open woodland over *Petalostylis labicheoides* and *Acacia tumida* var. *pilbarensis* open shrubland over *Triodia epactia* and *T. wiseana* very open hummock
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP315 **Relevé** ~ 50 x 50 m

Described Hayley Hughes **Survey Date** 10/11/2007
Habitat Low rolling hills with minor drainage lines
Vegetation *Acacia ancistrocarpa* scattered tall shrubs over A*. bivenosa* scattered shrubs over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Approx 10 years

West Pilbara Iron **Site** CP316 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Hill.
Rock Basalt and white quartz
Vegetation *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP317 **Relevé** ~ 50 x 50 m

Described Hayley Hughes **Survey Date** 10/11/2007
Habitat Wide, broad drainage line sloping towards an alluvial plain
Vegetation *Corymbia candida* ssp. *candida* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *A. ancistrocarpa* open shrubland over *Triodia epactia* and *T. wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Burnt patch to the west

West Pilbara Iron **Site** CP320 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Low rolling hills
Vegetation *Acacia inaequilatera* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP322 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Minor drainage line
Vegetation *Acacia ancistrocarpa, A. pyrifolia* var. *pyrifolia* and *A. bivenosa* high open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Wash area

West Pilbara Iron **Site** CP323 **Relevé** ~ 50 x 50 m

Described Hayley Hughes **Survey Date** 10/11/2007
Habitat Undulating stony plain
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes *Acacia tumida, Grevillea wickhamii* and *Triodia wiseana* drainage line 80 m to the north of this site

West Pilbara Iron **Site** CP324 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Drainage line
Vegetation *Acacia bivenosa, A. synchronicia* and *A. pyrifolia* var. *pyrifolia* shrubland over *Triodia wiseana* hummock grassland over *Cenchrus *ciliaris* open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP325 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 10/11/2007
Vegetation *Acacia xiphophylla* high open shrubland over *Senna glutinosa* ssp. *glutinosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP327 **Relevé** ~ 50 x 50 m

Described Hayley Hughes **Survey Date** 10/11/2007
Habitat Pediment plain
Vegetation *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP328 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Flat plain
Vegetation *Eucalyptus victrix* scattered low trees over *Acacia trachycarpa* high shrubland over *Triodia wiseana* hummock grassland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown
Notes Stony ridge drop off to the south

West Pilbara Iron **Site** CP329 **Relevé** ~ 50 x 50 m

Described Hayley Hughes **Survey Date** 10/11/2007
Habitat Flat plain with numerous minor drainage lines running north - south
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia xiphophylla* high open shrubland over *A. bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP330 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Alluvial plain/ pediment
Vegetation *Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP332 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Alluvial plain/ pediment
Vegetation *Acacia pyrifolia* var. *pyrifolia* high open shrubland over *A. bivenosa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP333 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 11/11/2007
Habitat Low rolling hills
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP335 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Drainage line
Soil Red-brown, silty clay loam
Vegetation *Acacia ancistrocarpa* and *A. tumida* var. *pilbarensis* high open shrubland over *Acacia bivenosa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP336 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia coriacea* ssp. *pendens*, *A. pyrifolia* var. *pyrifolia* and *A. inaequilatera* high shrubland over *A. bivenosa, A. ancistrocarpa* and *A. trachycarpa* open heath
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP337 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Alluvial plain/ pediment
Soil Orange-brown, silty clay loam
Vegetation *Acacia xiphophylla* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP338 **Relevé** ~50 x 50 m

Described Cassie Adam **Survey Date** 22/09/2007
Habitat Alluvial plain/ pediment
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP340 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Alluvial plain/ pediment
Vegetation *Acacia bivenosa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Site is south of an *Acacia xiphophylla* community

West Pilbara Iron **Site** CP341 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Drainage line
Soil Orange-brown, firm, loose, silty clay loam soils, with a sandy surface
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. atkinsiana* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP342 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Drainage line
Vegetation *Acacia bivenosa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP346 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* high open shrubland over *A. bivenosa* and *A. pyrifolia* var. *pyrifolia* open shrubland over *Cenchrus *ciliaris* open tussock
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP347 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Vegetation *Acacia xiphophylla* high shrubland over *A. bivenosa* scattered shrubs over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes High cover of *Triodia wiseana* compared to other *Acacia xiphophylla* sites

West Pilbara Iron **Site** CP350 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Alluvial plain
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* and *A. bivenosa* open scrub over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Site is an *Acacia ancistrocarpa* and *Corymbia hamersleyana* thicket. Adjacent to this is a more open vegetation type (*Corymbia hamersleyana* scattered low trees, over *Acacia bivenosa* open shrubland, over *Triodia wiseana* hummock grassland).

West Pilbara Iron **Site** CP351 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Stony plain
Soil Red-brown, clay loam soils
Vegetation *Acacia atkinsiana* high open shrubland over *A. bivenosa* scattered shrubs over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP353 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Low rocky hill
Vegetation *Acacia atkinsiana* and *A. bivenosa* open shrubland over *Triodia wiseana* and *T*. sp. Robe River open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP354 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Alluvial plain
Vegetation *Acacia ancistrocarpa* open heath over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Edge of *Acacia xiphophylla* community

West Pilbara Iron **Site** CP355 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* scattered hummock grasses over *Cenchrus *ciliaris* open tussock grassland
Veg Condition Very good
Fire Age Unknown
Notes Series of low mesas and low rolling hills

West Pilbara Iron **Site** CP356 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Drainage line with a stony creek bed
Vegetation *Acacia arida* and *A. trachycarpa* open heath over *Triodia wiseana* scattered hummock grasses over *Cenchrus *ciliaris* scattered tussock grasses
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP358

Described Amy Douglas **Survey Date** 23/09/2007 **Relevé** ~50 x 50 m
Habitat Alluvial plain
Vegetation *Acacia pyrifolia* var. *pyrifolia* and *Grevillea pyramidalis* ssp. *leucadendron* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP359 **Relevé** ~ 50 x 50 m

Described Cassie Adam **Survey Date** 11/11/2007
Habitat Drainage line
Soil Silty soils
Vegetation *Acacia aneura* var. *intermedia* low open woodland over *A. tumida* var. *pilbarensis*, *A. bivenosa, A. atkinsiana* and *A. xiphophylla* high open shrubland over *Triodia wiseana* scattered hummock grasses over *Cenchrus *ciliaris* very open grassland
Veg Condition Very good
Fire Age 5-10 years

West Pilbara Iron **Site** CP361 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Range
Vegetation *Acacia bivenosa* and *A. atkinsiana* open shrubland over *Triodia wiseana* open hummock
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP362 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Shallow valley
Vegetation *Acacia ancistrocarpa* and *Acacia bivenosa* open heath over *Cenchrus *ciliaris* open tussock
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP363 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Flat plain with drainage line
Vegetation *Acacia xiphophylla* high open shrubland over *A. bivenosa, A. ancistrocarpa* and *A. synchronicia* open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP364 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Vegetation *Acacia ancistrocarpa* open heath over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP367 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Stony plain
Vegetation *Acacia atkinsiana, A. bivenosa* and *A. synchronicia* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP368 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Alluvial plain
Vegetation *Acacia ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP372 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Drainage line.
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* open heath over *Triodia wiseana* scattered hummock grasses
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP373 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Drainage line
Soil Silty clay loam
Vegetation *Corymbia candida* ssp. *candida* and *C. hamersleyana* low open woodland over *Acacia trachycarpa* high open shrubland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP374 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Upper slope of a hill
Vegetation *Acacia inaequilatera* scattered tall shrubs over *A. ancistrocarpa* and *A. bivenosa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP376 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Vegetation *Acacia bivenosa* open heath over *Triodia wiseana* very open hummock grassland
Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP377 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Drainage line
Soil Silty soils
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia tumida* var. *pilbarensis* and *A. bivenosa* high open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP378 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia bivenosa* open heath
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP382 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Drainage line with a stony creek bed
Vegetation *Eucalyptus victrix* scattered low trees over *Acacia trachycarpa* open scrub over *A. tumida* var. *pilbarensis* open shrubland over *Triodia epactia* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP384 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 23/09/2007
Habitat Lower slope of hill
Rock Basalt
Vegetation *Acacia ancistrocarpa* and *A. pyrifolia* var. *pyrifolia* open shrubland over *Tephrosia uniovulata* low shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP387 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Plain
Vegetation *Acacia atkinsiana* and *A. bivenosa* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP393 **Relevé** ~ 50 x 50 m

Described Denise True **Survey Date** 12/11/2007
Habitat Gully with range on either side

Vegetation *Eremophila fraseri* ssp. *fraseri* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP397 **Relevé** ~ 50 x 50 m
Described Denise True **Survey Date** 12/11/2007
Habitat Pediment
Soil Brown, silty soil
Vegetation *Acacia bivenosa, Corchorus parviflorus* and *Solanum* sp. low shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age < 5 years

West Pilbara Iron **Site** CP399 **Relevé** ~ 50 x 50 m
Described Amy Douglas **Survey Date** 25/09/2007
Habitat Hill top
Vegetation *Acacia bivenosa* shrubland over *Tephrosia uniovulata* low shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP400 **Relevé** ~50 x 50 m
Described Amy Douglas **Survey Date** 23/09/2007
Habitat Adjacent to drainage line
Vegetation *Acacia citrinoviridis* closed scrub over *A. ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP401 **Relevé** ~ 50 x 50 m
Described Amy Douglas **Survey Date** 25/09/2007
Habitat Hill top
Vegetation *Senna glutinosa* ssp. *pruinosa* open shrubland over *Acacia bivenosa* low shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP405 **Relevé** ~ 50 x 50 m
Described Amy Douglas **Survey Date** 25/09/2007
Habitat Lower hill slope
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP406 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Plain/ pediment
Vegetation *Acacia bivenosa, A. arida* and *A. pyrifolia* var. *pyrifolia* open heath over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Acacia shrubland, with all species quite patchy in their distribution across the landscape.

West Pilbara Iron **Site** CP407

Described Amy Douglas **Survey Date** 25/09/2007 **Relevé** ~ 50 x 50 m
Habitat Drainage line off large hill, located on the pediment of the hill
Vegetation *Acacia ancistrocarpa* shrubland over *Tephrosia uniovulata* low shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP408 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Plain/ pediment
Vegetation *Acacia bivenosa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes *Cenchrus ciliaris* replaces *Triodia wiseana* in a narrow band of this vegetation type running along side a creek

West Pilbara Iron **Site** CP409 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Vegetation *Acacia bivenosa* and *A. synchronicia* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP413 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat Gravel pit
Vegetation *Acacia bivenosa* and *A. synchronicia* high shrubland over *Triodia wiseana* scattered hummock grasses
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP414

Described Daniel Brassington **Survey Date** 24/09/2007 **Relevé** ~50 x 50 m
Habitat Flat plain
Vegetation *Acacia bivenosa* open heath over *Triodia wiseana* and *T. epactia* very open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Heavily grazed

Fire Age Unknown

West Pilbara Iron **Site** CP415 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat Small drainage line
Vegetation *Acacia ancistrocarpa* open heath over *Ptilotus calostachyus* var. *calostachyus* shrubland over
Triodia wiseana scattered hummock grasses
Veg Condition Very good
Fire Age Unknown
Notes Lots of *Ptilotus calostachyus* var. *calostachyus* in between drainage lines

West Pilbara Iron **Site** CP417 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat
Vegetation *Ptilotus calostachyus* var. *calostachyus* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP420 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Flat plain dissected by drainage lines
Soil Well drained soils
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Spinifex in drainage lines is long unburnt, however, charring is still evident on dead branches of shrubs nearby.

West Pilbara Iron **Site** CP426 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Drainage line
Vegetation *Acacia arida* and *A. ancistrocarpa* open heath over *Triodia wiseana* scattered hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP428 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Wide drainage line
Vegetation *Acacia ancistrocarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP433 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat Small hill between drainage lines
Vegetation *Ptilotus calostachyus* var. *calostachyus* open heath over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP434 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Wide drainage line
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis* open scrub
over *Cenchrus *ciliaris* tussock grassland
Veg Condition Site is heavily grazed by cattle
Fire Age Unknown

West Pilbara Iron **Site** CP436 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Alluvial plain
Vegetation Acacia synchronicia open shrubland over Triodia epactia very open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Site is between a river and an area of *Acacia xiphophylla*

West Pilbara Iron **Site** CP437 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat Drainage line
Vegetation *Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia bivenosa* and *Senna*
glutinosa ssp. *pruinosa* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP438

Described Daniel Brassington **Survey Date** 24/09/2007 **Relevé** ~50 x 50 m
Habitat Alluvial plain
Vegetation *Acacia bivenosa* and *A. tumida* var. *pilbarensis* shrubland over *Triodia epactia* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes *Triodia epactia* drops out at the edge of this vegetation type

West Pilbara Iron **Site** CP439 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Habitat Foothill pediment and slope
Vegetation *Acacia bivenosa* and *A. ancistrocarpa* scattered tall shrubs over *A. pyrifolia* var. *pyrifolia* scattered shrubs over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP441 **Relevé** ~ 50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007
Vegetation *Acacia synchronicia* and *Vachellia *farnesiana* high open shrubland over *Ptilotus astrolasius* var. *astrolasius* open shrubland over *Triodia wiseana* very open hummock grassland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP444 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Drainage system
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia ancistrocarpa* open shrubland over
Triodia wiseana and *T. epactia* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP446 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007
Habitat Drainage line
Vegetation *Corymbia hamersleyana* low open woodland over *A. ancistrocarpa, A. arida, A. bivenosa, A. pyrifolia* var. *pyrifolia* and *A. tumida* var. *pilbarensis* shrubland over *Triodia wiseana* and T. epactia open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP447 **Relevé** ~ 50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa, Senna artemisioides* ssp. *oligophylla* and *A. pyrifolia* var. *pyrifolia* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP449 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007

Vegetation *Acacia bivenosa* open scrub over *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

Notes *Acacia bivenosa* thicket

West Pilbara Iron **Site** CP452 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007

Habitat Alluvial plain

Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia inaequilatera* high open shrubland over *A. bivenosa* open shrubland over *Triodia wiseana* very open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP454 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 24/09/2007

Habitat Alluvial plain

Vegetation *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa* and *A. ancistrocarpa* shrubland over *Triodia wiseana* open hummock grassland over *Cenchrus *ciliaris* open tussock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP458 **Relevé** ~50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007

Habitat River bank edge

Vegetation *Grevillea wickhamii* ssp. *hispidula* and *Senna glutinosa* ssp. *glutinosa* high open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP459

Described Amy Douglas **Survey Date** 25/09/2007 **Relevé** ~ 50 x 50 m

Vegetation *Grevillea wickhamii* ssp. *hispidula*, *Acacia arida* and *A. tumida* var. *pilbarensis* high shrubland over *A. pyrifolia* var. *pyrifolia* and *Senna artemisioides* ssp. *oligophylla* open shrubland over *Triodia wiseana* hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP460 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007

Habitat Small hill

Vegetation *Triodia wiseana* open hummock grassland

Veg Condition Very good

Fire Age Unknown

West Pilbara Iron **Site** CP462 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Drainage line
Vegetation *Acacia bivenosa* open heath over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP463 **Relevé** ~50 x 50 m

Described Amy Douglas **Survey Date** 25/09/2007
Vegetation *Acacia ancistrocarpa* open scrub over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP464 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Drainage basin
Soil Mainly brown, clay loam
Vegetation *Acacia coriacea, A. inaequilatera* and *Vachellia *farnesiana* high shrubland over *Capparis spinosa* var. *nummularia* open shrubland over *Cenchrus *ciliaris* very open tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP465

Described Shapelle McNee **Survey Date** 26/09/2007 **Relevé** ~ 50 x 50 m
Habitat River edge leading out onto flat plain
Vegetation *Acacia synchronicia* open scrub over *A. pyrifolia* var. *pyrifolia* scattered shrubs over *Triodia*
wiseana hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes 20 m cliff face on opposite side of river

West Pilbara Iron **Site** CP466 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Drainage line
Vegetation *Acacia tumida* var. *pilbarensis* high shrubland over *A. bivenosa* open shrubland over *Triodia*
wiseana hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP467 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Upper end of a broad valley
Vegetation *Grevillea wickhamii* ssp. *hispidula* and *Acacia inaequilatera* scattered tall shrubs over *A. bivenosa* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP469 **Relevé** ~50 x 50 m
Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Drainage line
Vegetation *Terminalia canescens* scattered low trees over *Grevillea wickhamii* ssp. *hispidula* open scrub
over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP470 **Relevé** ~ 50 x 50 m
Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Tip of a valley, on a hill after passing through a gorge
Vegetation *Terminalia canescens* low open woodland over *Acacia arida* open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP471 **Relevé** ~50 x 50 m
Described Daniel Brassington **Survey Date** 26/09/2007
Vegetation *Acacia arida* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP472 **Relevé** ~ 50 x 50 m
Described Daniel Brassington **Survey Date** 26/09/2007
Habitat South facing slope and ridgeline
Vegetation *Eucalyptus leucophloia* ssp. *leucophloia* scattered low trees over *Acacia arida* shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Slope terminates in an *Acacia bivenosa* and *Acacia arida* drainage line.

West Pilbara Iron **Site** CP473 **Relevé** ~ 50 x 50 m
Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Beginnings of plains/ pediment
Vegetation *Acacia bivenosa* and *A. arida* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP474 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Base of gorge
Vegetation *Ficus brachypoda* low open woodland over *Triodia wiseana* and *T*. sp. Robe River hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes *Acacia atkinsiana, A. arida, A. bivenosa*, and *A. inaequilatera* over *Triodia wiseana* near the base of pediment

West Pilbara Iron **Site** CP475 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Low stony hill
Vegetation *Acacia bivenosa* open shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP476 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat South-East facing slope
Vegetation *Senna glutinosa* ssp. *glutinosa* scattered shrubs over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP477 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Vegetation *Acacia ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age < 10 years

West Pilbara Iron **Site** CP478 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Drainage line
Vegetation *Acacia tumida* var. *pilbarensis* open scrub over *A. atkinsiana* and *A. ancistrocarpa* open shrubland over *Triodia wiseana scattered hummock grasses*
Veg Condition Very good
Fire Age < 10 years

West Pilbara Iron **Site** CP479 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Top of a hill
Vegetation *Corchorus* sp. and *Senna glutinosa* ssp. *glutinosa* open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age < 10 years

West Pilbara Iron **Site** CP480 **Relevé** ~50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat West facing slope, just up from drainage line
Soil Stony soils
Vegetation *Acacia aneura* var. *intermedia* low woodland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP481 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Rocky southern slope
Vegetation *Senna glutinosa* ssp. *glutinosa* open shrubland over *Acacia bivenosa* and *A. citrinoviridis* low
open shrubland over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP482 **Relevé** ~ 50 x 50 m

Described Daniel Brassington **Survey Date** 26/09/2007
Habitat Entering drainage system
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis* open heath
over *Triodia wiseana* very open hummock grassland over very open *Cenchrus *ciliaris* tussock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP483 **Relevé** ~50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007
Habitat Low rises between drainage lines
Vegetation Mixed scattered Acacia shrubs over Triodia wiseana open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP487 **Relevé** ~50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007
Habitat Drainage line and lower slope of hill.
Rock The lower slope of hill has lots of exposed mud-like rock
Vegetation *Acacia trachycarpa* shrubland over *Triodia wiseana* hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP488 **Relevé** ~ 50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007

Habitat Hill, near the top
Vegetation *Acacia arida* and *A. trachycarpa* open shrubland over *Triodia wiseana* very open hummock grassland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP490 **Relevé** ~50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007
Habitat Near base of small hill
Vegetation *Corymbia hamersleyana* low open woodland over *Acacia citrinoviridis* and *A. bivenosa* high open shrubland over *Senna glutinosa* ssp. *glutinosa* open shrubland
Veg Condition Very good
Fire Age Unknown

West Pilbara Iron **Site** CP491 **Relevé** ~50 x 50 m

Described Shapelle McNee **Survey Date** 26/09/2007
Vegetation *Acacia bivenosa* high open scrub over *Triodia wiseana* open hummock grassland
Veg Condition Very good
Fire Age Unknown
Notes Vegetation type continues over undulating foothills and small hills

West Pilbara Iron **Site** CP508 **Quadrat size** 120 x 10 m

Described Rebecca Graham **Survey Date** 22/06/2008
Habitat Robe River bed, with some small pools of water
Soil Firm
Rock River bed rocks
Vegetation *Eucalyptus camaldulensis* var. *obtusa* open forest over *Melaleuca glomerata* high open shrubland over *Cyperus vaginatus, C. bifax* and *C. difformis* very open sedgeland over *Eragrostis tenellula* scattered grasses over *Ammannia auriculata* and *Stemodia grossa* very open herbland
Veg Condition Excellent
Fire Age >10 years

West Pilbara Iron **Site** CP509 **Quadrat size** 50 x 50 m

Described Denise True **Survey Date** 22/06/2008
Habitat Flat in the bottom third of the landform element
Soil Firm
Vegetation *Corymbia candida* low open woodland over mixed low scattered shrubs over mixed very open herbland
Veg Condition Good
Fire Age 18 months
Notes Re-growth after 2007 fire

West Pilbara Iron **Site** CP531 **Relevé** ~50 x 50 m

Described Denise True **Survey Date** 22/06/2008

Habitat Drainage line

Vegetation *Eucalyptus camaldulensis* open forest over *Corymbia candida* ssp. *candida* low open woodland over *Acacia bivenosa, A. ancistrocarpa* and *Senna artemisioides* ssp. *oligophylla* open shrubland over *Triodia epactia* hummock grassland

Veg Condition Very good

Fire Age Unknown

Notes This is a description of the unburnt area next to quadrat CP060.

Appendix 5 Locations of all vegetation sampling sites (WGS 84, Zone 50)

Site	Easting	Northing	Latitude	Longitude
API-3000	402086	7636111	-21.37442	116.05553
API-3002	402324	7635911	-21.37624	116.057814
API-3003	402453	7635831	-21.37697	116.059054
API-3004	402574	7635735	-21.377844	116.060215
API-3005	402357	7635816	-21.3771	116.058127
CP012	422895	7664784	-21.116381	116.257536
CP013	420633	7660810	-21.1521925	116.2355675
CP014	422554	7663246	-21.13025975	116.2541815
CP015	419910	7659880	-21.160561	116.2285633
CP016	419008	7659016	-21.16832275	116.2198325
CP017	417308	7656181	-21.193866	116.203321
CP018	417393	7656163	-21.194028	116.2041438
CP019	416553	7655341	-21.201418	116.1960065
CP020	416648	7655301	-21.20178625	116.1969273
CP021	415074	7652069	-21.230908	116.181595
CP022	414050	7650921	-21.24122925	116.1716773
CP023	408103	7639383	-21.34518175	116.1137445
CP037	407255	7579554	-21.88561775	116.1022295
CP038r	405915	7581111	-21.871484	116.089354
CP039	405390	7581935	-21.86401375	116.084318
CP040	405033	7583606	-21.84889975	116.0809645
CP041	404489	7586979	-21.8184025	116.0758938
CP042	404531	7592385	-21.769569	116.076613
CP050	396780	7616871	-21.547934	116.0031763
CP051	397829	7614786	-21.56683175	116.013173
CP052	406925	7638144	-21.35630825	116.1023145
CP053	401827	7632613	-21.40600475	116.0528265
CP054	401865	7632729	-21.404959	116.0531978
CP055	402269	7635948	-21.375903	116.057281
CP056	401172	7630547	-21.4246375	116.0463915
CP057	396752	7616162	-21.55433925	116.002862
CP058	403833	7597920	-21.71953	116.070187
CP111	412390	7645321	-21.291745	116.15539
CP113	412382	7645278	-21.292133	116.15531
CP115	412413	7644939	-21.295197	116.155592
CP117	412461	7644940	-21.29519	116.156054
CP119	412494	7644863	-21.295887	116.156369
CP121	412313	7644376	-21.300278	116.154599
CP123	412273	7644304	-21.300927	116.154209
CP125	412359	7643776	-21.305701	116.155011
CP127	407729	7639157	-21.3472	116.110123
CP129	407599	7639039	-21.348259	116.108863
CP131	407096	7638321	-21.35472	116.103973
CP133	406711	7637641	-21.360843	116.100223
CP135	406835	7637542	-21.361744	116.101413

Site	Easting	Northing	Latitude	Longitude
CP150	407780	7579081	-21.88992	116.107289
CP152	407657	7579082	-21.889905	116.106099
CP154	407446	7579393	-21.887084	116.104074
CP156	404559	7586535	-21.822413	116.076545
CP158	404587	7587431	-21.81432	116.076868
CP160	404582	7587551	-21.813236	116.076827
CP162	404652	7587985	-21.809319	116.077529
CP164	398264	7611829	-21.593567	116.017196
CP166	398174	7611942	-21.592541	116.016334
CP168	398098	7612108	-21.591037	116.01561
CP170	398067	7612802	-21.584766	116.015353
CP172	398048	7612709	-21.585605	116.015164
CP174	398044	7613494	-21.578513	116.015173
CP176	398361	7610205	-21.608243	116.018034
CP178	398391	7609967	-21.610395	116.01831
CP180	398394	7609869	-21.61128	116.018333
CP182	397087	7618851	-21.530065	116.00626
CP184	397144	7619070	-21.52809	116.006824
CP186	397306	7619305	-21.525976	116.008402
CP188	397406	7619392	-21.525196	116.009373
CP190	397480	7619491	-21.524306	116.010093
CP192	397594	7619615	-21.523192	116.011202
CP194	397824	7619941	-21.520261	116.013442
CP196	397896	7620051	-21.519271	116.014144
CP198	398022	7620237	-21.517598	116.015372
CP200	398313	7620930	-21.511354	116.018223
CP202	398719	7623485	-21.488296	116.022297
CP204	398719	7623592	-21.487329	116.022303
CP206	398829	7623596	-21.487299	116.023365
CP208	398744	7623997	-21.483672	116.022569
CP210	398747	7624100	-21.482742	116.022604
CP212	398793	7624477	-21.479338	116.023071
CP214	398879	7625180	-21.472993	116.023943
CP216	398918	7625550	-21.469652	116.024342
CP217	407218	7579549	-21.885663	116.101876
CP218	398919	7625636	-21.468875	116.024357
CP219	405972	7580925	-21.873167	116.089895
CP220	398944	7625818	-21.467233	116.024609
CP221	406022	7580966	-21.872799	116.090381
CP222	400873	7628755	-21.440808	116.043399
CP224	400927	7628915	-21.439365	116.043929
CP226	400890	7629003	-21.438568	116.043577
CP228	400974	7629363	-21.435321	116.044409
CP230	401052	7629447	-21.434566	116.045167
CP232	401067	7629637	-21.43285	116.045323
CP234	401017	7629732	-21.43199	116.044846
CP236	401127	7630327	-21.42662	116.045942
CP238	401146	7630525	-21.424833	116.046137

Site	Easting	Northing	Latitude	Longitude
CP240	401163	7630646	-21.423741	116.046308
CP242	401217	7630720	-21.423075	116.046833
CP243	405396	7581777	-21.865439	116.084369
CP244	401217	7630720	-21.423075	116.046833
CP245	405442	7581760	-21.865595	116.084814
CP246	401222	7631090	-21.419733	116.046903
CP247	405255	7582476	-21.859117	116.083045
CP248	401222	7631090	-21.419733	116.046903
CP249	405213	7582714	-21.856965	116.082652
CP250	413970	7650875	-21.2416435	116.1709015
CP251	405120	7583238	-21.852227	116.081783
CP253	405113	7583332	-21.851377	116.08172
CP255	404975	7584119	-21.84426	116.080431
CP257	404875	7584629	-21.839648	116.079492
CP259	404803	7585120	-21.835208	116.078824
CP261	404678	7585821	-21.828869	116.077655
CP263	404217	7592030	-21.772755	116.073556
CP265	404464	7592383	-21.769579	116.075965
CP267	404268	7592646	-21.767193	116.074085
CP269	404048	7593808	-21.756684	116.072025
CP271	404048	7593808	-21.756684	116.072025
CP275	404931	7584300	-21.842623	116.080015
CP277	397988	7613841	-21.575375	116.014653
CP279	397786	7614206	-21.572067	116.012725
CP281	397842	7614718	-21.567445	116.013297
CP283	397645	7615221	-21.562889	116.011425
CP285	397267	7615513	-21.56023	116.007793
CP287	397211	7615695	-21.558582	116.007263
CP289	402762	7606211	-21.644569	116.060316
CP291	401224	7606197	-21.644611	116.045454
CP293	400278	7606517	-21.641667	116.036332
CP295	396899	7615894	-21.556767	116.004263
CP297	396760	7616362	-21.552531	116.0029495
CP299	396809	7616792	-21.548649	116.003449
CP301	396848	7617310	-21.543972	116.003857
CP303	396899	7617672	-21.540705	116.004372
CP305	396910	7617880	-21.538827	116.004491
CP307	396951	7618178	-21.536137	116.004905
CP309	396975	7618314	-21.53491	116.005145
CP311	397002	7618574	-21.532562	116.005422
CP313	399124	7626411	-21.461886	116.026382
CP315	399257	7626531	-21.460809	116.027672
CP317	399380	7626654	-21.459705	116.028867
CP318	422825	7663948	-21.123931	116.256825
CP319	399492	7626717	-21.459142	116.029951
CP320	422726	7663669	-21.126448	116.255859
CP321	399569	7626770	-21.458667	116.030698
CP322	422666	7663668	-21.126454	116.255281

Site	Easting	Northing	Latitude	Longitude
CP323	399729	7626873	-21.457746	116.032248
CP324	422474	7663289	-21.12987	116.253415
CP325	400363	7627451	-21.45256	116.0384
CP326	422101	7662886	-21.133495	116.249805
CP327	400435	7627669	-21.450594	116.039108
CP328	421913	7662584	-21.136216	116.247981
CP329	400597	7628067	-21.447008	116.040695
CP330	421892	7662536	-21.136649	116.247776
CP331	400766	7628470	-21.443376	116.04235
CP332	421673	7662210	-21.139589	116.2456525
CP333	401432	7632201	-21.409708	116.048994
CP334	421600	7662106	-21.140521	116.244945
CP335	401550	7632296	-21.408856	116.050138
CP336	421577	7662081	-21.140746	116.244722
CP337	401722	7632583	-21.406272	116.051814
CP338	421528	7662029	-21.141214	116.244248
CP339	402111	7633059	-21.401993	116.055595
CP340	421401	7661815	-21.143141	116.243015
CP341	402190	7633143	-21.401239	116.056362
CP342	421331	7661678	-21.144376	116.242335
CP343	402279	7633280	-21.400006	116.057228
CP344	421291	7661700	-21.144176	116.24195
CP345	402337	7633474	-21.398257	116.057799
CP346	421180	7661541	-21.145607	116.240874
CP347	402485	7634643	-21.387704	116.059294
CP348	421076	7661428	-21.146624	116.239867
CP349	402473	7635096	-21.383611	116.059204
CP350	421058	7661356	-21.147274	116.239691
CP351	402507	7635357	-21.381255	116.059547
CP352	420907	7661154	-21.149092	116.238227
CP353	402532	7635542	-21.379585	116.059799
CP354	420765	7661077	-21.149782	116.236856
CP355	402604	7635695	-21.378207	116.060503
CP356	420687	7660933	-21.151079	116.236098
CP357	402745	7635912	-21.376254	116.061875
CP358	420669	7660901	-21.151367	116.235923
CP359	402511	7635923	-21.376142	116.059619
CP360	420641	7660818	-21.152116	116.23565
CP361	402745	7635912	-21.376254	116.061875
CP362	420473	7660669	-21.153455	116.234025
CP363	403232	7623172	-21.491373	116.06584
CP364	420399	7660529	-21.154717	116.233306
CP365	403861	7636343	-21.37242	116.072663
CP366	420350	7660474	-21.155211	116.232831
CP367	404024	7636406	-21.37186	116.074239
CP368	420182	7660315	-21.156641	116.231206
CP369	404357	7636491	-21.371109	116.077456
CP370	420118	7660200	-21.157677	116.230584

Site	Easting	Northing	Latitude	Longitude
CP371	404557	7636538	-21.370695	116.079387
CP372	419896	7659925	-21.160152	116.228433
CP373	405189	7636688	-21.369374	116.085491
CP374	419844	7659909	-21.160294	116.227931
CP375	405272	7636728	-21.369017	116.086294
CP376	419655	7659607	-21.163014	116.226097
CP377	406179	7637178	-21.364999	116.095067
CP378	419608	7659584	-21.16322	116.225643
CP379	406306	7637266	-21.36421	116.096296
CP380	419388	7659172	-21.166932	116.223505
CP381	406306	7637266	-21.36421	116.096296
CP382	419278	7659059	-21.167948	116.22244
CP383	404118	7595105	-21.744971	116.072777
CP384	419229	7659089	-21.167675	116.221969
CP385	404152	7595347	-21.742787	116.07312
CP386	419210	7659084	-21.167719	116.221786
CP387	403612	7598004	-21.718755	116.068053
CP388	418792	7658727	-21.170926	116.217743
CP389	403386	7598629	-21.713097	116.065904
CP390	418396	7658409	-21.173781	116.213914
CP391	403303	7598995	-21.709786	116.065123
CP392	418390	7658377	-21.17407	116.213854
CP393	401856	7600209	-21.698739	116.051207
CP394	417907	7658031	-21.1771795	116.20918
CP395	401724	7600542	-21.695724	116.049951
CP396	417527	7657694	-21.180202	116.205509
CP397	401646	7600320	-21.697725	116.049184
CP398	417405	7656707	-21.189114	116.204286
CP399	413468	7650576	-21.244321	116.166049
CP400	417338	7656219	-21.193519	116.203617
CP401	413388	7650314	-21.246684	116.165265
CP402	417120	7656129	-21.194323	116.201512
CP403	413258	7650193	-21.247771	116.164006
CP404	417257	7656096	-21.194627	116.20283
CP405	413295	7650209	-21.247628	116.164363
CP406	416869	7655484	-21.200138	116.199063
CP407	413139	7650160	-21.248063	116.162857
CP408	416814	7655383	-21.201048	116.198528
CP409	413017	7650143	-21.248211	116.161681
CP410	416703	7655334	-21.201486	116.197456
CP411	412941	7650082	-21.248759	116.160945
CP412	416587	7655448	-21.200451	116.196344
CP413	412943	7650010	-21.249409	116.160961
CP414	416486	7655415	-21.200744	116.19537
CP415	412854	7649536	-21.253687	116.160079
CP416	416281	7655313	-21.201656	116.19339
CP417	412732	7649311	-21.255714	116.158891
CP418	416207	7654830	-21.206017	116.192653

Site	Easting	Northing	Latitude	Longitude
CP419	412697	7649143	-21.25723	116.158545
CP420	415829	7654644	-21.20768	116.189002
CP421	412610	7649114	-21.257488	116.157705
CP422	415805	7654399	-21.209892	116.188759
CP423	412546	7649022	-21.258316	116.157084
CP424	415566	7653928	-21.214136	116.186433
CP425	412438	7648775	-21.260542	116.15603
CP426	415554	7653417	-21.218752	116.186292
CP427	412420	7648698	-21.261237	116.155853
CP428	415549	7653155	-21.221119	116.186231
CP429	412330	7648453	-21.263446	116.154973
CP430	415542	7653058	-21.221995	116.186158
CP431	412284	7648381	-21.264094	116.154526
CP432	415502	7652936	-21.223095	116.185767
CP433	412285	7648180	-21.26591	116.154525
CP434	415156	7652178	-21.229927	116.182395
CP435	412201	7648044	-21.267135	116.153708
CP436	415054	7652113	-21.23051	116.181409
CP437	412181	7647875	-21.268661	116.153507
CP438	415164	7651948	-21.232006	116.182461
CP439	412100	7647577	-21.271349	116.152711
CP440	414930	7651788	-21.23344	116.180198
CP441	411844	7643679	-21.306552	116.150041
CP442	414862	7651686	-21.234359	116.179538
CP443	412307	7646938	-21.277132	116.154673
CP444	414799	7651602	-21.235114	116.178927
CP445	412301	7646859	-21.277846	116.154611
CP446	414141	7650972	-21.240775	116.172554
CP447	412239	7646846	-21.27796	116.154013
CP448	414053	7650948	-21.240988	116.171705
CP449	412333	7646696	-21.27932	116.154911
CP450	413986	7650943	-21.24103	116.171059
CP451	412338	7646604	-21.280151	116.154955
CP452	413814	7650681	-21.243389	116.169388
CP453	412354	7646482	-21.281254	116.155103
CP454	413642	7650635	-21.243796	116.167729
CP455	412370	7646388	-21.282104	116.155252
CP456	413572	7650441	-21.245545	116.167044
CP457	412374	7646317	-21.282746	116.155287
CP458	412006	7643411	-21.308986	116.1515885
CP459	412339	7646276	-21.283114	116.154947
CP460	411944	7643382	-21.309241	116.15099
CP461	412320	7646260	-21.283258	116.154763
CP462	411779	7643302	-21.309955	116.149395
CP463	412386	7646022	-21.285411	116.155387
CP464	411646	7643452	-21.308594	116.14812
CP465	411710	7643831	-21.305173	116.148757
CP466	411448	7643291	-21.310038	116.146203

Site	Easting	Northing	Latitude	Longitude
CP467	411401	7642869	-21.313853	116.145723
CP469	411104	7642678	-21.31556	116.142854
CP470	410859	7642625	-21.316026	116.14049
CP471	410756	7642584	-21.316392	116.139494
CP472	410724	7642564	-21.316571	116.139185
CP473	410518	7642444	-21.317645	116.137192
CP474	410600	7642291	-21.319031	116.137975
CP475	410252	7642141	-21.320369	116.134612
CP476	409919	7641876	-21.322746	116.131387
CP477	409803	7641779	-21.323617	116.130263
CP478	409482	7641457	-21.32651	116.127151
CP479	409375	7641368	-21.327309	116.126115
CP480	409273	7641023	-21.33042	116.125113
CP481	409213	7640802	-21.332414	116.124522
CP482	409213	7640802	-21.332414	116.124522
CP483	409137	7640536	-21.334813	116.123775
CP484	409076	7640334	-21.336635	116.123176
CP485	408900	7640033	-21.339345	116.121463
CP486	408647	7639751	-21.34188	116.119008
CP487	408469	7639667	-21.34263	116.117287
CP488	408360	7639588	-21.343338	116.116232
CP489	408076	7639404	-21.344986	116.113483
CP490	407901	7639309	-21.345836	116.11179
CP491	407856	7639372	-21.345264	116.11136
CP508	404286	7592930	-21.7646325	116.0742705
CP509	404558	7588476	-21.8048805	116.0766458
CP531	404570	7588321	-21.806279	116.076755
CP532	401620	7600940	-21.692123	116.048969
CP539	404448	7590628	-21.785432	116.075709
CP540	402087	7602279	-21.680053	116.053562
CP541	401850	7603794	-21.666354	116.051361
CP542	400638	7607604	-21.631868	116.039876
CP543	399987	7607837	-21.629727	116.0336
CP544	399454	7607922	-21.628929	116.028455
CP545	398316	7621624	-21.505085	116.018294
CP546	398459	7622507	-21.497116	116.019728
CP547	410801	7642582	-21.316412	116.139928
CP548	411474	7643457	-21.30854	116.146462
WPI-147	422645	7663321	-21.129588	116.255063
WPI-187	412407	7647146	-21.275258	116.155648
WPI-192	412343	7646519	-21.280919	116.154998
WPI-198	412319	7646261	-21.283249	116.154754
WPI-199	412319	7646261	-21.283249	116.154754
WPI-300	412407	7647146	-21.275258	116.155648
WPI-318	416884	7656331	-21.192487	116.199249
WPI-441	406961	7638074	-21.356945	116.102658
WPI-473	405300	7581725	-21.865904	116.083437
WPI-494	397947	7614025	-21.573711	116.014269

Site	Easting	Northing	Latitude	Longitude
WPI-495	397930	7614092	-21.573105	116.014109
WPI-507	396846	7617229	-21.544704	116.003833
WPI-508	396874	7617488	-21.542366	116.004119
WPI-536	401790	7600395	-21.697056	116.05058
WPI-700	412314	7645634	-21.288913	116.154673
WPI-701	412289	7645536	-21.289797	116.154427
WPI-702	412274	7645516	-21.289977	116.154281
WPI-703	412352	7645392	-21.291101	116.155027
WPI-704	412352	7645392	-21.291101	116.155027
WPI-718	409642	7641611	-21.325127	116.128702
WPI-722	406475	7639482	-21.344199	116.098049
WPI-758	398029	7612425	-21.588169	116.014963
WPI-760	398058	7613293	-21.58033	116.015296
CP036	408419	7578539	-21.89485225	116.1134445
CP140	409094	7577932	-21.900368	116.119944
CP142	408857	7578187	-21.898053	116.117664
CP144	408750	7578295	-21.897071	116.116635
CP146	408353	7578620	-21.894115	116.11281
CP148	408013	7578792	-21.892543	116.109528
WPI-738	408673	7578391	-21.8962	116.115895

Appendix 6 Species Representation in Vegetation Types for the Study Area

	Stony Plains											Stony Hills and Breakaways														Minor Creeklines																				Major Creeklines								Clayey Plain							
Vegetation Type:	P1a	P2a	P2e	P2f	P3b	P4b	P5a	P5b	P5c	P5d	P5e	S1a	S2a	S4a	S5a	S7a	S7b	S7d	S7e	S7i	S7j	S7m	S7n	S8d	S13b	I1a	I1b	I1d	I2b	I3b	I3d	I3e	I3g	I3h	I4a	I5b	I5c	I5e	I5g	I5h	I5i	I6a	I6b	I7a	I8a	A1a	A1b	A3a	A3c	A3e	A4a	A5a	A6a	C2c	C2e	C2d	C3a	C5a	C6b	C7a	C7b
Species	AatkAbAaTw	AaAbAiAsTeTw	ChAbApyTw	ChAiAbTw	AsAbAaTwPTc	ChAaTw	AxAatkAaTeTw	AxAbTw	AxAsAatkTw	AxTw	AxTwTe	AbAatkTw	AarAbApyTw	AarAbAtrTw	AarTwTsprr	AatkAaTwPTc	AaTw	AbTw	AiAbTw	AiTw	ChAbTw	ERfTEspbTw	Tw	AaneTw	TERcTw	AaAarAbTw	AbAaTw	ChAaAbTw/g	ApyAbTwCEc	CcAcPTaTe	ChAbAarTw	ElAbAaAtTw	GwAtAbTw	TERcAtrAarTwCEc	AbAsTeTw/g	CcAbTeTw	CcChAtrAtPlCc	ChAatkAbTw	ChAiAaTe	ChAtAatkAaTw	ChAtAbTw	EcChGpApyAtrTEsppTeTw	EcEvMgMlAcoCE/s	AaneERfoTw	TERcAarTw	AtrApyTeCEc	VfAsApyTw	CcChAcolAaTe	ChAaAtrTe/g	ElChCcGwTw	EcAcoPl	EcAtrCEc	PlTRz	AiAaTe	CcAaAbTe	AiAsTwTe	AsTe	ERAxDsXi/h	AxTwERAx	AiTe	ApyGpTe
Abutilon aff. *dioicum* (HD72-14)																									1																																				
Abutilon aff. *lepidum* (1) (MET 15 352)																													1						1									1					1													
Abutilon amplum																																					1						1																		1	
Abutilon dioicum															1					1		1			1						1										1																				
Abutilon fraseri											1														1																																				
Abutilon malvifolium																																																										1			
Abutilon oxycarpum																													1																																
Abutilon sp. (inadequate material)																																																			|1|									
Abutilon trudgenii MS	1																								1				1											1	1			1										1	1						
Acacia ampliceps																																											1																		
Acacia ancistrocarpa	1	1	1	1	1	1	1	1			1	1			1	1	1	1	1		1		1			1	1	1	1	1	1	1		1	1	1	1	1		1	1	1	1					1	1					1	1		1		1	1	1
Acacia aneura var. *intermedia*	1											1												1						1														1																	
Acacia arida													1	1	1			1								1		1			1		1	1	1						1	1			1		1															
Acacia atkinsiana	1			1			1	1	1		1	1			1	1		1												1		1						1		1	1			1					1	1				1	1		1				
Acacia bivenosa	1	1	1	1	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1						1	1		1			1	1
Acacia bivenosa x *sclerosperma*																																															1														
Acacia citrinoviridis	1							1										1												1							1	1			1						1														
Acacia coriacea					1																								1														1				1				1										
Acacia coriacea subsp. *coriacea*	1																																							1											1										
Acacia coriacea subsp. *pendens*			1																										1														1																		
Acacia elachantha																																																					1							
Acacia inaequilatera	1	1	1	1	1	1		1	1		1	1			1		1	1	1	1	1	1	1		1	1		1	1	1	1		1		1			1	1	1	1		1				1	1						1	1	1				1	1
Acacia pruinocarpa																		1																																										
Acacia pyrifolia var. *pyrifolia*			1		1						1		1				1	1								1	1	1	1	1	1		1	1	1		1			1	1	1	1			1	1		1		1	1				1				1	
Acacia sclerosperma subsp. *sclerosperma*																													1																								1		1					
Acacia sericophylla																																	1																											
Acacia sp. (inadequate material)	1				1																									1																														
Acacia synchronicia	1	1			1	1	1	1	1		1	1					1	1		1	1							1	1	1	1				1	1		1	1	1	1		1				1							1		1	1		1	1	1
Acacia tenuissima																		1																																									
Acacia trachycarpa	1		1		1							1		1				1			1	1						1	1					1	1		1					1	1			1	1		1	1		1		1	1	1				1	
Acacia trachycarpa x *tumida* var. *pilbarensis*																																										1																		
Acacia tumida var. *pilbarensis*	1			1	1							1		1				1					1			1	1			1	1	1	1	1	1		1	1		1	1	1		1						1											
Acacia wanyu																																					1																							
Acacia xiphophylla	1				1		1	1	1	1	1						1	1																	1								1											1				1		
Adriana urticoides var. *urticoides*																																									1										1									
Alternanthera nana																												1													1	1											1						1	
Alysicarpus muelleri																											1	1																															1	
Amaranthus cuspidifolius	1										1																															1											1							
Amaranthus undulatus																									1				1					1									1																		
Amyema preissii																																	1													1														
* *Argemone ochroleuca* subsp. *ochroleuca*																																																			1									
Aristida contorta	1				1			1									1											1							1			1		1	1			1																	
Aristida holathera var. *holathera*																									1					1		1								1														1							
Aristida holathera var. *latifolia*																													1										1									1			1									
Aristida latifolia																																																										1			
Aristida sp. (inadequate material)		1																																														1					1							
* *Asphodelus fistulosus*																																																				1								
Boerhavia burbidgeana																																																										1			
Boerhavia coccinea	1																								1					1				1	1							1	1											1	1						
Boerhavia gardneri																	1			1																																									
Boerhavia sp. (inadequate material)																																																										1			
Bonamia media var. *villosa*	1																1	1		1															1							1																			
Bonamia pannosa					1																														1					1	1								1												
Bonamia rosea	1			1													1										1	1		1		1						1		1	1	1							1						1							
Brachyachne convergens																																																										1			
Brachyachne prostrata											1																								1																										
Bulbostylis barbata	1				1												1												1						1			1			1			1					1											1	
Cajanus cinereus																														1										1	1																			
Capparis spinosa var. *nummularia*																																														1				1											
Cassytha capillaris								1				1						1																			1			1			1																		
* *Cenchrus ciliaris*	1		1		1						1							1										1	1	1				1	1		1	1		1	1	1	1	1		1	1	1	1	1		1		1		1	1	1		1	
* *Cenchrus setiger*																																										1																		
Cheilanthes austrotenuifolia																					1			1																																				

Appendix 7 Area of Vegetation Types across the Study Area and Proposed Impact Area

Vegetation code	Vegetation abbreviation	Study area (ha)	% in Study area	Impact area (ha)	% in Impact area
P1a	AatkAbAaTw	532.5	**22.2**	197.6	**21.3**
P1c	ChAatkAbTwTe	1.2	**0.1**	0.0	**0.0**
P2a	AaAbAiAsTeTw	4.5	**0.2**	1.0	**0.1**
P2e	ChAbApyTw	26.3	**1.1**	9.8	**1.1**
P2f	ChAiAbTw	25.6	**1.1**	8.2	**0.9**
P3b	AsAbAaTwPTc	74.9	**3.1**	24.2	**2.6**
P4b	ChAaTw	13.9	**0.6**	6.9	**0.7**
P5a	AxAatkAaTeTw	30.7	**1.3**	10.3	**1.1**
P5b	AxAbTw	107.1	**4.5**	36.7	**4.0**
P5c	AxAsAatkTw	5.7	**0.2**	3.8	**0.4**
P5d	AxTw	13.6	**0.6**	2.5	**0.3**
P5e	AxTwTe	119.6	**5.0**	50.2	**5.4**
P6f	ChApyGpTe	7.0	**0.3**	5.1	**0.6**
S1a	AbAatkTw	55.0	**2.3**	17.8	**1.9**
S2a	AarAbApyTw	4.3	**0.2**	0.3	**0.0**
S4a	AarAbAtrTw	18.1	**0.8**	8.9	**1.0**
S4j	AtAbSgpTwPTc	0.6	**0.0**		**0.0**
S5a	AarTwTsprr	11.1	**0.5**	4.4	**0.5**
S6a	AsTw	11.1	**0.5**		**0.0**
S7a	AatkAaTwPTc	3.5	**0.1**	2.1	**0.2**
S7b	AaTw	202.3	**8.4**	70.7	**7.6**
S7d	AbTw	347.6	**14.5**	135.4	**14.6**
S7e	AiAbTw	0.6	**0.0**	0.0	**0.0**
S7i	AiTw	26.7	**1.1**	16.0	**1.7**
S7j	ChAbTw	32.6	**1.4**	15.9	**1.7**
S7m	ERfTEspbTw	14.6	**0.6**	6.8	**0.7**
S7n	Tw	23.6	**1.0**	6.5	**0.7**
S8d	AaneTw	0.4	**0.0**	0.1	**0.0**
S13b	TERcTw	1.6	**0.1**	0.0	**0.0**
S13c	TERsGwCOpSOlTw	0.9	**0.0**		**0.0**
I1a	AaAarAbTw	6.2	**0.3**	2.0	**0.2**
I1b	AbAaTw	20.4	**0.9**	7.2	**0.8**
I1d	ChAaAbTw/g	9.5	**0.4**	3.4	**0.4**
I2b	ApyAbTwCEc	3.6	**0.1**	2.1	**0.2**
I3b	CcAcPTaTe	29.7	**1.2**	11.7	**1.3**
I3d	ChAbAarTw	7.4	**0.3**	2.6	**0.3**
I3e	ElAbAaAtTw	6.6	**0.3**	3.8	**0.4**
I3g	GwAtAbTw	13.1	**0.5**	3.1	**0.3**
I3h	TERcAtrAarTwCEc	4.5	**0.2**	2.1	**0.2**
I4a	AbAsTeTw/g	11.1	**0.5**	3.1	**0.3**
I5b	CcAbTeTw	2.9	**0.1**	1.4	**0.2**
I5c	CcChAtrAtPlCc	6.3	**0.3**	1.9	**0.2**
I5e	ChAatkAbTw	26.8	**1.1**	13.0	**1.4**
I5g	ChAiAaTe	14.8	**0.6**	8.4	**0.9**
I5h	ChAtAatkAaTw	52.4	**2.2**	24.0	**2.6**

Vegetation code	Vegetation abbreviation	Study area (ha)	% in Study area	Impact area (ha)	% in Impact area
I5i	ChAtAbTw	25.5	**1.1**	9.4	**1.0**
I6a	EcChGpApyAtrTEsppTeTw	5.9	**0.2**	2.6	**0.3**
I6b	EcEvMgMlAcoCE/s	8.2	**0.3**	2.5	**0.3**
I7a	AaneERfoTw	0.7	**0.0**	0.5	**0.0**
I8a	TERcAarTw	3.1	**0.1**	1.8	**0.2**
A1a	AtrApyTeCEc	2.7	**0.1**	2.1	**0.2**
A1b	VfAsApyTw	16.6	**0.7**	2.8	**0.3**
A3a	CcChAcolAaTe	3.6	**0.2**	1.3	**0.1**
A3c	ChAaAtrTe/g	4.8	**0.2**	2.4	**0.3**
A3e	ElChCcGwTw	22.9	**1.0**	10.2	**1.1**
A4a	EcAcoPl	13.5	**0.6**	2.6	**0.3**
A4b	EcMgERAt/S/H	41.0	**1.7**	12.3	**1.3**
A5a	EcAtrCEc	5.5	**0.2**	3.2	**0.3**
A5b	EcCcChAsppTwTeCEc/H	20.5	**0.9**	3.3	**0.4**
A6a	PlTRz	21.3	**0.9**	4.8	**0.5**
C2c	AiAaTe	80.4	**3.4**	42.3	**4.6**
C2d	AiAsTwTe	46.7	**1.9**	9.0	**1.0**
C2e	CcAaAbTe	76.3	**3.2**	46.6	**5.0**
C3a	AsTe	16.2	**0.7**	6.9	**0.7**
C5a	ERAxDsXi/h	0.8	**0.0**	0.3	**0.0**
C6b	AxTwERAx	29.3	**1.2**	18.3	**2.0**
C7a	AiTe	2.3	**0.1**	1.5	**0.2**
C7b	ApyGpTe	17.8	**0.7**	8.0	**0.9**

Appendix 8 List of Vascular Flora Recorded in the Study Area

Family	**Species**
Adiantaceae	
	Cheilanthes austrotenuifolia
Marsileaceae	
	Marsilea exarata
	Marsilea hirsuta
	Marsilea sp. (inadequate material)
Typhaceae	
	Typha domingensis
Poaceae	
	Aristida contorta
	Aristida holathera var. *holathera*
	Aristida holathera var. *latifolia*
	Aristida latifolia
	Aristida sp. (inadequate material)
	Brachyachne prostrata
	Brachyachne convergens
	**Cenchrus ciliaris*
	**Cenchrus setiger*
	Chloris pectinata
	Chrysopogon fallax
	Cymbopogon ambiguus
	Cymbopogon obtectus
	**Cynodon dactylon*
	Dactyloctenium radulans
	Dichanthium sericeum ssp. *humilius*
	Digitaria brownii
	**Echinochloa colona*
	Enneapogon caerulescens var. *caerulescens*
	Enneapogon lindleyanus
	Enneapogon polyphyllus
	Eragrostis aff. *eriopoda* (WAS site 963)
	Eragrostis cumingii
	Eragrostis exigua
	Eragrostis laniflora
	Eragrostis tenellula
	Eragrostis xerophila
	Eriachne aff. *festucacea*
	Eriachne aristidea
	Eriachne benthamii
	Eriachne helmsii
	Eriachne mucronata (typical form)
	Eriachne obtusa
	Eriachne pulchella ssp. *dominii*
	Eriachne pulchella ssp. *pulchella*
	Eriachne tenuiculmis
	Eriochloa pseudoacrotricha
	Eulalia aurea

	Iseilema dolichotrichum
	Iseilema macratherum
	Panicum laevinode
	Paraneurachne muelleri
	Paspalidium clementii
	Paspalidium tabulatum (Whim Creek form)
	Poaceae sp. (inadequate material)
	Setaria dielsii
	**Setaria verticillata*
	Sorghum plumosum
	Sporobolus australasicus
	Themeda triandra
	Triodia angusta
	Triodia epactia
	Triodia sp. Robe River
	Triodia wiseana
	Triraphis mollis
	Urochloa occidentalis
	Urochloa pubigera
	Xerochloa imberbis
	Yakirra australiensis var. *australiensis*
Cyperaceae	
	Bulbostylis barbata
	Cyperus bifax
	Cyperus cunninghamii ssp. *cunninghamii*
	Cyperus difformis
	Cyperus hesperius
	Cyperus vaginatus
	Fimbristylis dichotoma
Asphodelaceae	
	**Asphodelus fistulosus*
Moraceae	
	Ficus brachypoda
Proteaceae	
	Grevillea eriostachya
	Grevillea pyramidalis ssp. *leucadendron*
	Grevillea wickhamii ssp. *hispidula*
	Hakea lorea ssp. *lorea*
Loranthaceae	
	Amyema preissii
	Lysiana casuarinae
Chenopodiaceae	
	Dysphania kalpari
	Dysphania melanocarpa forma leucocarpa
	Dysphania rhadinostachya ssp. *rhadinostachya*
	Maireana georgei
	Maireana melanocoma
	Maireana planifolia
	Maireana villosa
	Rhagodia eremaea
	Salsola tragus ssp. *tragus*

	Sclerolaena costata
	Sclerolaena densiflora
	Sclerolaena diacantha
	Tecticornia sp. (inadequate material)
Amaranthaceae	
	**Aerva javanica*
	Alternanthera nana
	Amaranthus cuspidifolius
	Amaranthus undulatus
	Gomphrena affinis ssp. *pilbarensis*
	Gomphrena cunninghamii
	Gomphrena sp. (inadequate material)
	Ptilotus aervoides
	Ptilotus appendiculatus var. *appendiculatus*
	Ptilotus astrolasius var. *astrolasius*
	Ptilotus auriculifolius
	Ptilotus axillaris
	Ptilotus calostachyus var. *calostachyus*
	Ptilotus carinatus
	Ptilotus exaltatus var. *exaltatus*
	Ptilotus fusiformis var. *fusiformis*
	Ptilotus gomphrenoides var. *gomphrenoides*
	Ptilotus helipteroides var. *helipteroides*
	Ptilotus incanus var. *elongatus*
	Ptilotus macrocephalus
	Ptilotus obovatus var. *obovatus*
	Ptilotus polystachyus var. *arthrotrichus*
	Ptilotus polystachyus var. *polystachyus*
	Ptilotus roei
	Ptilotus sp. (inadequate material)
Nyctaginaceae	
	Boerhavia burbidgeana
	Boerhavia coccinea
	Boerhavia gardneri
	Boerhavia paludosa
Gyrostemonaceae	
	Codonocarpus cotinifolius
Aizoaceae	
	Trianthema aff. *triquetra* (M3.35)
	Trianthema pilosa
	Trianthema triquetra
Molluginaceae	
	Mollugo molluginea
Portulacaceae	
	Calandrinia ptychosperma
	Portulaca conspicua
	Portulaca intraterranea
	Portulaca sp. (inadequate material)
	**Portulaca oleracea*
Caryophyllaceae	
	Polycarpaea holtzei

	Polycarpaea longiflora
	Polycarpaea longiflora (White form, M13-7)

Menispermaceae	
	Tinospora smilacina
Lauraceae	
	Cassytha capillaris
Papaveraceae	
	**Argemone ochroleuca* ssp. *ochroleuca*
Capparaceae	
	Capparis spinosa var. *nummularia*
	Cleome viscosa
Brassicaceae	
	Lepidium platypetalum
Surianaceae	
	Stylobasium spathulatum
Mimosaceae	
	Acacia ampliceps
	Acacia ancistrocarpa
	Acacia aneura var. *intermedia*
	Acacia arida
	Acacia atkinsiana
	Acacia bivenosa
	Acacia bivenosa x *sclerosperma*
	Acacia citrinoviridis
	Acacia colei var. *colei*
	Acacia coriacea
	Acacia coriacea ssp. *coriacea*
	Acacia coriacea ssp. *pendens*
	Acacia elachantha
	Acacia inaequilatera
	Acacia ligulata
	Acacia pruinocarpa
	Acacia pyrifolia var. *pyrifolia*
	Acacia sclerosperma ssp. *sclerosperma*
	Acacia sericophylla
	Acacia sp. (inadequate material)
	Acacia synchronicia
	Acacia tenuissima
	Acacia trachycarpa
	Acacia trachycarpa x *tumida* var. *pilbarensis*
	Acacia tumida var. *pilbarensis*
	Acacia wanyu
	Acacia xiphophylla
	Neptunia dimorphantha
	**Vachellia farnesiana*
Caesalpiniaceae	
	Petalostylis labicheoides
	Senna artemisioides aff. ssp. *oligophylla* (thinly sericeous)
	Senna artemisioides ssp. *helmsii*
	Senna artemisioides ssp. *oligophylla*

	Senna artemisioides ssp. *oligophylla* x *helmsii*
	Senna artemisioides ssp. x *sturtii*
	Senna glutinosa ssp. *glutinosa*
	Senna glutinosa ssp. *glutinosa x stricta*
	Senna glutinosa ssp. *pruinosa*
	Senna glutinosa ssp. x *luerssenii*
	Senna notabilis
	Senna sp. (inadequate material)
	Senna stricta
Papilionaceae	
	Alysicarpus muelleri
	Cajanus cinereus
	Crotalaria cunninghamii
	Crotalaria dissitiflora ssp*. benthamiana*
	Crotalaria medicaginea (Burrup form; B65-11)
	Crotalaria medicaginea var. *neglecta*
	Cullen graveolens
	Cullen lachnostachys
	Cullen leucochaites
	Cullen martinii
	Cullen pogonocarpum
	Erythrina vespertilio
	Indigastrum parviflorum
	Indigastrum parviflorum (Cape Preston form; M23-12)
	Indigofera boviperda ssp. *boviperda*
	Indigofera colutea
	Indigofera linifolia
	Indigofera monophylla
	Indigofera monophylla (Burrup form)
	Indigofera monophylla (Cape Preston form)
	Indigofera monophylla (grey/green leaflet form)
	Indigofera rugosa
	Indigofera sp. (inadequate material)
	Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) PN
	Isotropis atropurpurea
	Rhynchosia minima var. *australis*
	Sesbania cannabina
	Sesbania formosa
	Tephrosia aff. *clementii* (8) (HD106)
	Tephrosia aff. *supina* (06BP45-006)
	Tephrosia aff. *supina* (MET 12,357)
	Tephrosia rosea var. *clementii*
	Tephrosia rosea var. *glabrior*
	Tephrosia sp. (inadequate material)
	Tephrosia sp. B Kimberley Flora (C.A. Gardner 7300)
	Tephrosia uniovulata
	Vigna lanceolata var. *lanceolata*
Zygophyllaceae	
	Tribulopis angustifolia
	Tribulus hirsutus
	Tribulus macrocarpus

	Tribulus suberosus
Polygalaceae	
	Polygala aff. *isingii*

Euphorbiaceae	
	Adriana urticoides var. *urticoides*
	Euphorbia australis
	Euphorbia biconvexa
	Euphorbia boophthona
	Euphorbia boophthona (Large seed form)
	Euphorbia coghlanii
	**Euphorbia hirta*
	Euphorbia sp. (B170-4)
	Euphorbia sp. (inadequate material)
	Euphorbia sp. (M80-1)
	Euphorbia sp. (site 1089)
	Euphorbia tannensis ssp. *eremophila* (Burrup form)
	Euphorbia wheeleri
	Flueggea virosa ssp. *melanthesoides*
	Leptopus decaisnei var. *orbicularis*
	Phyllanthus erwinii
	Phyllanthus maderaspatensis
	Phyllanthus reticulatus
Sapindaceae	
	Dodonaea coriacea
Tiliaceae	
	Corchorus aff. *parviflorus*
	Corchorus aff. *walcotti* (K.J. Atkins 570)
	Corchorus incanus ssp. *incanus*
	Corchorus laniflorus
	Corchorus parviflorus
	Corchorus sidoides ssp. aff. *vermicularis* (GLD NIM17-16)
	Corchorus sidoides ssp. *sidoides*
	Corchorus sp. (inadequate material)
	Corchorus tridens
	Triumfetta appendiculata
	Triumfetta appendiculata (Burrup Form)
	Triumfetta appendiculata (Mardie form)
	Triumfetta appendiculata (Red Hill form)
	Triumfetta clementii
	Triumfetta johnstonii
	Triumfetta sp. (inadequate material)
Malvaceae	
	Abutilon aff. *dioicum* (HD72-14)
	Abutilon aff. *lepidum* (1) (MET 15 352)
	Abutilon amplum
	Abutilon dioicum
	Abutilon fraseri
	Abutilon malvifolium
	Abutilon oxycarpum
	Abutilon sp. (inadequate material)

	Abutilon trudgenii MS
	Gossypium australe (Burrup Peninsula form)
	Gossypium australe (Whim Creek form)
	Gossypium robinsonii
	Hibiscus aff. *sturtii* (site 1209)
	Hibiscus brachychlaenus
	Hibiscus burtonii
	Hibiscus goldsworthii
	Hibiscus leptocladus
	Hibiscus sturtii (Site 1209)
	Hibiscus sturtii var. aff. *grandiflorus*
	Hibiscus sturtii var. *campylochlamys*
	Hibiscus sturtii var. *platychlamys*
	Hibiscus sturtii var. *platychlamys* (MET 15067)
	**Malvastrum americanum*
	Sida aff. *echinocarpa* (MET 15,350)
	Sida aff. *fibulifera* (B64-13B)
	Sida aff. *fibulifera* (FMG 125-20)
	Sida aff. *fibulifera* (HD200-6)
	Sida arsiniata
	Sida cardiophylla
	Sida clementii
	Sida echinocarpa
	Sida pilbarensis (green form)
	Sida rhytidocarpa
	Sida sp. (inadequate material)
	Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)
	Sida spinosa
Sterculiaceae	
	Keraudrenia nephrosperma
	Keraudrenia velutina ssp. *elliptica*
	Melhania sp. (CH15-39)
	**Melochia pyramidata*
	Waltheria indica
Violaceae	
	Hybanthus aurantiacus
Passifloraceae	
	**Passiflora foetida* var. *hispida*
Lythraceae	
	Ammannia auriculata
Combretaceae	
	Terminalia canescens
	Terminalia supranitifolia
Myrtaceae	
	Corymbia candida ssp. *candida*
	Corymbia hamersleyana
	Eucalyptus camaldulensis var. *obtusa*
	Eucalyptus leucophloia ssp. *leucophloia*
	Eucalyptus victrix
	Melaleuca argentea
	Melaleuca bracteata

	Melaleuca glomerata
	Melaleuca linophylla

Haloragaceae	
	Haloragis gossei var. *inflata*
Apiaceae	
	Trachymene oleracea ssp. *oleracea*
Oleaceae	
	Jasminum didymum ssp. *lineare*
Asclepiadaceae	
	Sarcostemma viminale ssp. *australe*
Convolvulaceae	
	Bonamia media var. *villosa*
	Bonamia pannosa
	Bonamia rosea
	Convolvulus angustissimus ssp. *angustissimus*
	Duperreya commixta
	Evolvulus alsinoides var. *decumbens*
	Evolvulus alsinoides var. *villosicalyx*
	Ipomoea coptica
	Ipomoea costata
	Ipomoea muelleri
	Ipomoea plebeia
	Operculina aequisepala
	Polymeria aff. *ambigua* (MET 12302)
	Polymeria calycina
	Polymeria sp. (site 1365)
Boraginaceae	
	Ehretia saligna var. *saligna*
	Heliotropium conocarpum
	Heliotropium crispatum
	Heliotropium heteranthum
	Heliotropium inexplicitum
	Heliotropium ovalifolium
	Trichodesma zeylanicum var. *zeylanicum*
Verbenaceae	
	Clerodendrum floribundum var. *angustifolium*
	Clerodendrum tomentosum var. *lanceolatum*
Solanaceae	
	Nicotiana benthamiana
	Nicotiana rosulata ssp. *rosulata*
	Nicotiana sp. (inadequate material)
	Solanum diversiflorum
	Solanum ellipticum
	Solanum gabrielae
	Solanum horridum
	Solanum lasiophyllum
	Solanum sp. (inadequate material)
Scrophulariaceae	
	Stemodia kingii
	Stemodia grossa

Acanthaceae	
	Dicliptera armata
	Rostellularia adscendens var. *clementii*

Myoporaceae	
	Eremophila forrestii ssp. *forrestii*
	Eremophila fraseri ssp. *fraseri*
	Eremophila longifolia
Rubiaceae	
	Oldenlandia crouchiana
Cucurbitaceae	
	**Citrullus colocynthis*
	Cucumis maderaspatanus
	**Cucumis melo* ssp. *agrestis*
	Trichosanthes cucumerina
Goodeniaceae	
	Goodenia forrestii
	Goodenia lamprosperma
	Goodenia microptera
	Goodenia nuda
	Goodenia stobbsiana
	Scaevola spinescens (broad form)
Asteraceae	
	Blumea tenella
	Centipeda minima ssp. *macrocephala*
	Flaveria australasica ssp. *gilgae*
	Flaveria australasica ssp. *australasica*
	Flaveria australasica ssp. *gilgae*
	Helichrysum luteoalbum
	Pentalepis trichodesmoides
	Pluchea dentex
	Pluchea dunlopii
	Pluchea rubelliflora
	Pterocaulon sp. (inadequate material)
	Pterocaulon sphacelatum
	Pterocaulon sphaeranthoides
	Streptoglossa bubakii
	Streptoglossa cylindriceps
	Streptoglossa decurrens
	Streptoglossa liatroides
	Streptoglossa odora
	Streptoglossa tenuiflora
	**Sonchus oleraceus*

Appendix 9 Location of Introduced Species from the Study Area

Argemone ochroleuca* ssp. *ochroleuca

Easting	Northing	Date	Cover	Habitat
404226	7592921	22/6/08	+	Robe River bed. Some small pools of water
404587	7587431	23/10/07	+	River/ Drainage line

Asphodelus fistulosus

Easting	Northing	Date	Cover	Habitat
412273	7644304	25/9/07	+	Stony river and flood plain

Cenchrus ciliaris

Easting	Northing	Date	Cover	Habitat
396760	7616846	9/11/07	+	Drainage line
397144	7619070	9/11/07	+	Drainage line
398022	7620237	9/11/07	+	Dissected drainage with an associated flood plain
398264	7611829	8/11/07	+	Broad drainage line
398313	7620930	9/11/07	5%	Dissected river bed
399380	7626654	10/11/07	1%	Wide, broad drainage line sloping towards an alluvial plain
399569	7626770	10/11/07		Incised drainage line
400890	7629003	11/11/07	+	Top of a low mesa
400927	7628915	11/11/07	1%	Pediment
400974	7629363	11/11/07	+	Broad alluvial plain
401017	7629732	11/11/07	+	Very shallow drainage within an alluvial plain
401052	7629447	11/11/07	+	Alluvial plain
401127	7630327	11/11/07	+	Open alluvial plain
401146	7630525	11/11/07	1%	Broad drainage line/system
401163	7630646	11/11/07	10%	Deeply incised stony river bed
401190	7630577	13/11/07	2%	Alluvial plain just above a broad river
401222	7631090	11/11/07	+	Drainage line
401829	7632742	12/11/07	+	Pediment drainage between snakewood community sites
402214	7635978	25/5/08	+	Drainage line coming down from mesa through pediment
402337	7633474	11/11/07		
402511	7635923	11/11/07	3%	Drainage line
402604	7635695	11/11/07	11%	Drainage line
402762	7606211	8/11/07	+	Alluvial plain and drainage line
404048	7593808	24/10/07	+	Drainage line, North bank of the Robe River
404226	7592921	22/6/08	+	Robe river bed. Some small pools of water
404357	7636491	12/11/07		Incised drainage line, 1.5 m drop
404453	7586983	24/10/07	+	Pediment, alluvial plain and low rolling hills
404464	7592383	24/10/07	1%	Drainage line
404472	7592374	24/10/07	32%	Woodland in drainage line
404559	7586535	23/10/07	OUT	Alluvial plain
404582	7587551	23/10/07	3%	Alluvial plain
404587	7587431	23/10/07	5%	River/ Drainage line
405189	7636688	12/11/07	2%	Drainage line
408380	7578535	20/6/08	+	Wide drainage line on an alluvial plain
409213	7640802	26/9/07	2%	Entering drainage system
411646	7643452	26/9/07	4%	Drainage basin
411710	7643831	26/9/07		River edge leading out onto flat plain
411844	7643679	26/9/07	2%	
413572	7650441	24/9/07		Ridge line
413642	7650635	24/9/07	15%	Alluvial plain

413981	7650942	25/9/07		Drainage line in alluvial plain
413986	7650943	24/9/07		River bed
414053	7650948	24/9/07		Wide bank of a river system
414066	7650952	25/9/07	4%	Low flat rise between two dissected drainages
415105	7652064	23/5/08	+	Alluvial flood plain
415156	7652178	24/9/07	35%	Wide drainage line
416486	7655415	24/9/07	3%	Plain
416587	7655448	24/9/07		Raised area within a river bed
416587	7655335	25/5/08	1.5%	Slight rise to the SW of a riverbed in undulating country
416620	7655323	25/9/07	15%	Densely vegetated riverbed
416703	7655334	24/9/07		River bed
416814	7655383	24/9/07		Plain/ pediment
417357	7656211	22/5/08	+	Drainage line between two hummock grasslands
419874	7659890	23/9/07	1%	Flat broad drainage between low hills
420473	7660669	23/9/07	12%	Shallow valley
420599	7660853	22/9/07	5%	Stony creek bed
420641	7660818	23/9/07		Drainage line
420669	7660901	23/9/07	4%	Alluvial plain
420687	7660933	23/9/07	+	Drainage line with a stony creek bed
421180	7661541	23/9/07	15%	Drainage line
421291	7661700	23/9/07		Drainage line
421401	7661815	23/9/07	+	Alluvial plain/ pediment
421577	7662081	22/9/07		Drainage line
421717	7662247	22/9/07		Alluvial plain/ pediment
421913	7662584	22/9/07		Flat plain
422474	7663289	22/9/07	10%	Drainage line
422529	7663263	22/5/08	3%	Flat plain between two snakewood communities (*Acacia xiphophylla*)
422895	7664784	22/9/07	+	Flat open alluvial plain

Cenchrus setiger

Easting	Northing	Date	Cover	Habitat
404472	7592374	20/6/08	+	Woodland in drainage line
416620	7655323	23/5/08	50%	Densely vegetated riverbed

Citrullus colocynthis

Easting	Northing	Date	Cover	Habitat
404226	7592921	22/6/08	+	Robe river bed. Some small pools of water

Cucumis melo* ssp. *agrestis

Easting	Northing	Date	Cover	Habitat
401190	7630577	24/5/08	+	Alluvial plain just above a broad river
401829	7632742	24/5/08	+	Pediment drainage between snakewood community sites
404226	7592921	22/6/08	+	Robe river bed. Some small pools of water
404472	7592374	20/6/08	+	Woodland in drainage line
405010	7583631	20/6/08	+	Flat, alluvial plain
416620	7655323	23/5/08	+	Densely vegetated riverbed
417357	7656211	22/5/08	+	Drainage line between two hummock grasslands
422529	7663263	23/9/07	+	Flat plain between two snakewood communities (*Acacia xiphophylla*)

Cynodon dactylon

Easting	Northing	Date	Cover	Habitat
416620	7655323	23/5/08	+	Densely vegetated riverbed

Echinochloa colona

Easting	Northing	Date	Cover	Habitat
404472	7592374	20/6/08	+	Woodland in drainage line
416620	7655323	23/5/08		Densely vegetated riverbed

Euphorbia hirta

Easting	Northing	Date	Cover	Habitat
404472	7592374	20/6/08	+	Woodland in drainage line

Malvastrum americanum

Easting	Northing	Date	Cover	Habitat
404472	7592374	20/6/08	1%	Woodland in drainage line
408380	7578535	20/6/08	+	Wide drainage line on an alluvial plain
416620	7655323	23/5/08	+	Densely vegetated riverbed
422529	7663263	22/5/08	+	Plain between two snakewood communities (*Acacia xiphophylla*)
422895	7664784	22/9/07	+	Flat open alluvial plain

Portulaca oleracea

Easting	Northing	Date	Cover	Habitat
397801	7614765	24/05/08	+	Wide, flat drainage line
402214	7635978	25/05/08	+	Drainage line coming down from a hogback/old mesa through pediment
404453	7586983	20/06/08	+	Pediment, alluvial plain and low rolling hills
404472	7592374	20/06/08	+	Woodland in drainage line
404579	7588451		+	
405010	7583631	20/06/08	+	Flat, alluvial plain
408380	7578535	20/06/08	+	Wide drainage line on an alluvial plain
414066	7650952	23/05/08	+	Low flat rise between two dissected drainages
416587	7655335	25/05/08	+	Slight rise to the southwest of a riverbed in undulating country
417366	7656185	22/05/08	+	Flat sparse area between drainage lines in slightly hilly country, alluvial plain or pediment
419033	7658992	22/05/08	+	Upper slope of low stony rise in an alluvial plain
419874	7659890	22/05/08	+	Flat broad drainage between low hills
422529	7663263	22/05/08	+	Flat plain between two snakewood communities (Acacia xiphophylla)

Melochia pyramidata

Easting	Northing	Date	Cover	Habitat
416620	7655323	23/5/08	+	Densely vegetated riverbed

Passiflora foetida* var. *hispida

Easting	Northing	Date	Cover	Habitat
405915	7581111	20/6/08	+	Community on dolomite on the crest and upper slope of a low mesa featuring outcropping

Setaria verticillata

Easting	Northing	Date	Cover	Habitat
408380	7578535	20/6/08	+	Wide drainage line on an alluvial plain
422529	7663263	22/5/08	+	Flat plain between two snakewood communities (*Acacia xiphophylla)*

Sonchus oleraceus

Easting	Northing	Date	Cover	Habitat
416620	7655323	23/5/08	+	Densely vegetated riverbed

Vachellia farnesiana

Easting	Northing	Date	Cover	Habitat
398264	7611829	8/11/07	+	Broad drainage line
402762	7606211	8/11/07	+	Alluvial plain and drainage line
404048	7593808	24/10/07	+	Drainage line, North bank of the Robe River
404464	7592383	24/10/07	+	Drainage line
404472	7592374	20/6/08	+	Woodland in drainage line
409094	7577932	23/10/07	+	Low rocky rise
411646	7643452	26/9/07	+ to 4%	Drainage basin
411779	7643302	26/9/07	+	Drainage line
411844	7643679	26/9/07	3%	
412382	7645278	25/9/07	+	Alluvial plain between 80 m high ranges
413981	7650942	25/9/07		Drainage line in alluvial plain
413986	7650943	24/9/07		River bed
416587	7655335	25/5/08	+	Slight rise to the SW of a riverbed in undulating country
416620	7655323	23/5/08	+	Densely vegetated riverbed
420599	7660853	22/9/07	+	Stony creek bed
422895	7664784	22/9/07	+	Flat open alluvial plain