

Millstream Transmission Corridor Level 1 Vegetation, Flora and Fauna Survey

September 2013

Prepared for
Rio Tinto Iron Ore Ltd



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Abbreviations

Abbreviation	Definition
Astron	Astron Environmental Services Pty Ltd
BOM	Bureau of Meteorology
CALM	Conservation and Land Management
DAFWA	Department of Agriculture and Food of Western Australia
DEC	Department of Environment and Conservation (now split into Department of Parks and Wildlife; Department of Environment Regulation)
DER	Department of Environment Regulation (formally Department of Environment and Conservation)
DPaW	Department of Parks and Wildlife (formally Department of Environment and Conservation)
DRF	Declared rare flora (also referred to as 'threatened flora')
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities.
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally sensitive area
GPS	Global positioning system
ha	Hectares
IBRA	Interim Biogeographical Regionalisation for Australia
IPP	Invasive Plant Prioritisation
km	Kilometre
mm	Millimetre
MNES	Matters of national environmental significance
NVCP	Native Vegetation Clearing Permit
P	Priority
PEC	Priority ecological community
PIL1	Pilbara 1 – Chichester subregion
Rio Tinto	Rio Tinto Iron Ore Ltd
RNE	Register of the National Estate
sp.	Species (singular)
The 'survey area'	The areas shown in Figure 1
T	Threatened
TEC	Threatened ecological community
TPFL	Threatened and Priority Flora Database
WAHerb	The Western Australian Herbarium
WC Act	<i>Wildlife Conservation Act 1950</i>
WONS	Weeds of National Significance

Executive Summary

Rio Tinto Iron Ore Limited plans to undertake repairs associated with transmission tower service pads and access tracks in the Millstream area, located approximately 60 kilometres south-south-east of Karratha. Astron Environmental Services Pty Ltd was commissioned to undertake an assessment on the vegetation, flora and fauna habitats, and prepare a report of sufficient standard to be used to support a Native Vegetation Clearing Permit application for the proposed repairs. The proposed works fall within six approvals request areas; AR-13-11605, AR-12-10771, AR-12-10773, AR-12-10774, AR-12-10871 and AR-12-10890. The survey area totals 26.15 hectares (ha).

The surveys were planned and implemented as a Level 1 survey in accordance with all relevant regulatory guidance. One hundred and twenty seven vascular flora species representing 74 genera and 28 families were recorded within the survey area. The families most represented were Fabaceae (legumes), Poaceae (grasses) and Amaranthaceae (Amaranths). No threatened or priority flora species were recorded within the survey area.

Fourteen vegetation associations were recorded within the survey area. Vegetation ranged from 'poor' to 'good' condition as the survey area has been previously cleared. One vegetation association is considered to represent the priority 1 plant assemblage '*Annual Sorghum grasslands on self mulching clays*', which forms part of the priority ecological community; '*Four Plant Assemblages of the Wona Land System*'. The buffer of this priority ecological community is mapped over the entirety of the survey area.

Eight introduced flora species were recorded; **Aerva javanica* (kapok bush), **Cenchrus ciliaris* (buffel grass), **C. setiger* (birdwood grass), **Citrullus colocynth* (colocynth), **Flaveria trinervia* (speedy weed), **Malvastrum americanum* (spiked malvastrum), **Portulaca oleracea* (purslane) and **Vachellia farnesiana* (mimosa bush). None of these species are listed as either a declared pest by the Department of Agriculture and Food or a Weed of National Significance by the Australian Weeds Committee. With the exception of **Portulaca oleracea*, all of these introduced species have been rated as having a rapid level of invasiveness by the Department of Environment and Conservation Invasive Plant Prioritisation Process.

Six broad fauna habitat types were identified in the survey area: major and minor drainage line, spinifex stony plain, spinifex sand plain, undulating hills and grasslands on alluvial plain. These habitat types are common and widely represented throughout the Pilbara region and are not restricted to the survey area. Habitats varied in condition from 'disturbed' to 'high quality' depending on the degree of weed infestation and clearing. Each of the habitats has been previously recorded adjacent to the survey area and are typical of what would be expected in the Pilbara region.

Twenty-four bird species, two reptile species and four mammal species were recorded opportunistically during the survey. This included the priority 4 species, Australian bustard (*Ardeotis australis*).

The results of the Level 1 vegetation, flora and fauna survey were used to assess the proposed clearing of vegetation within the survey area against the ten Clearing Principles. The proposed clearing is not likely to be at variance to any of the Clearing Principles.

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1 Introduction

1.1 Project Background

Rio Tinto Iron Ore Limited (Rio Tinto) require a vegetation, flora and fauna assessment to inform environmental approval documentation to facilitate track and service pad repairs associated with transmission towers in the Millstream area. The repair and maintenance will be conducted on existing tracks and service pads around each tower to allow vehicular and plant access for 220kV transmission line maintenance and inspection purposes. The proposed works will be conducted using a combination of front end loader, bobcat, grader, tip truck and small bulldozer to re-instate these areas to a serviceable condition whilst remaining within the previously cleared boundary. The maximum pad size will be 25m from the tower centre, in all directions, to form a 50m x 50m pad as practicable. The proposed scope of works occurs within approvals request areas AR-12-10871, AR-13-10890, AR-13-11605, AR-12-10771, AR-12-10773, AR-12-10774 and consists of 23 existing transmission tower service pads and the tracks which connect them. These areas are herein referred to as the 'survey area'.

Astron Environmental Services Pty Ltd (Astron) was commissioned to undertake the assessment and prepare a report of sufficient standard to be used to support a Native Vegetation Clearing Permit (NVCP) application for the proposed transmission service pad and track repairs. At its nearest point, the survey area is approximately 60 kilometres (km) south-east of Karratha in the Pilbara region of Western Australia (Figure 1) and is 26.15 ha.

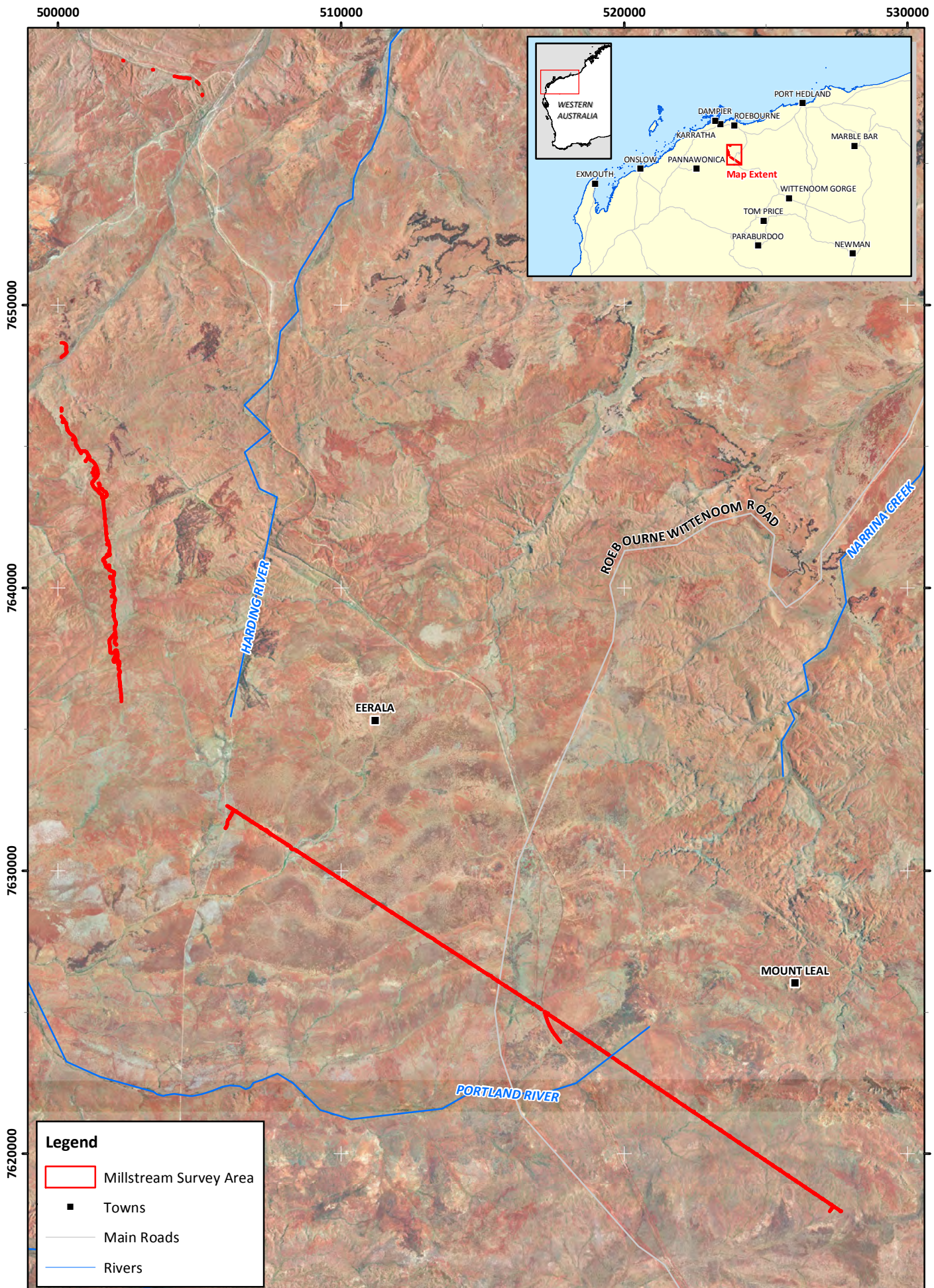
1.2 Scope and Objectives

The scope of the survey was to provide an assessment of vegetation flora, and fauna values through a desktop study and field-based assessment, to contribute data to a report of sufficient standard to support an NVCP application(s).

Astron conducted a Level 1 vegetation, flora and fauna survey in accordance with the Environmental Protection Authority (EPA) *Position Statement No.3* (EPA 2002), *Guidance Statement No. 51* (EPA 2004a), *Guidance Statement No. 56* (EPA 2004b), and the former Department of Environment and Conservation (DEC) and EPA *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010); and Rio Tinto 2013 data standards. The objectives were to undertake:

- a desktop study, including database searches and literature review of available resources.
- a vegetation and flora assessment, to include:
 - systematic survey for flora of conservation significance/ interest
 - a representative list of the vascular flora species recorded within the survey area
 - description of dominant vegetation types/associations/communities (with supporting photographs of each type with location data). Due to the linear nature and extent of previous disturbance within the survey area (which is an existing infrastructure corridor), mapping of vegetation associations was not incorporated.
 - taxonomic identification of plant specimens collected in the field
 - discussion of the significance of any flora, vegetation or ecological communities recorded including an assessment of potential impact.
- tree assessments, to include:

- inspection of trees present with each point location provided
- assessments based on conservation significance at inspection area locations
- photographs of each tree.
- a fauna and fauna habitat assessment, to include:
 - description of the dominant fauna habitat types present (with supporting photographs of each type with location data) and representation in a regional context (including the likelihood of similar habitats in surrounding uncleared areas)
 - an assessment of the significance of the habitats for fauna, including mapping of any habitats deemed significant for supporting known or potential populations of fauna of conservation value
 - opportunistic sightings, species present and their significance.



Legend

- Millstream Survey Area
- Towns
- Main Roads
- Rivers

Rio Tinto Iron Ore
 Millstream Transmission Corridor, Level 1 Survey and NVCP



Figure 1: Survey Location

Author: J. Atkinson

Date: 15-11-2013

Drawn: H. Thornton

14233-13-GDR-1Rev0_131115_MillstreamNVCP_Fig1Locn

Datum: GDA 1994
 Projection: MGA Zone 50

Kilometres

1.3 Environmental Context

1.3.1 Climate

The climate of the Pilbara region of Western Australia is classified as arid tropical with two distinct seasons: a hot wet summer (October – April) and a mild dry winter (May – September).

Based on long-term climatic data from the nearest weather station at Roebourne (Station 4035), which is approximately 72 kilometres (km) north of the centre of the survey area, the mean annual rainfall since 1887 is 314.2 millimetres (mm) (Bureau of Meteorology (BOM) 2013). The mean maximum daily temperatures range between 26.8°C and 39°C, and are above 30°C for much of the year, only falling below during the winter months of June, July and August (Figure 2).

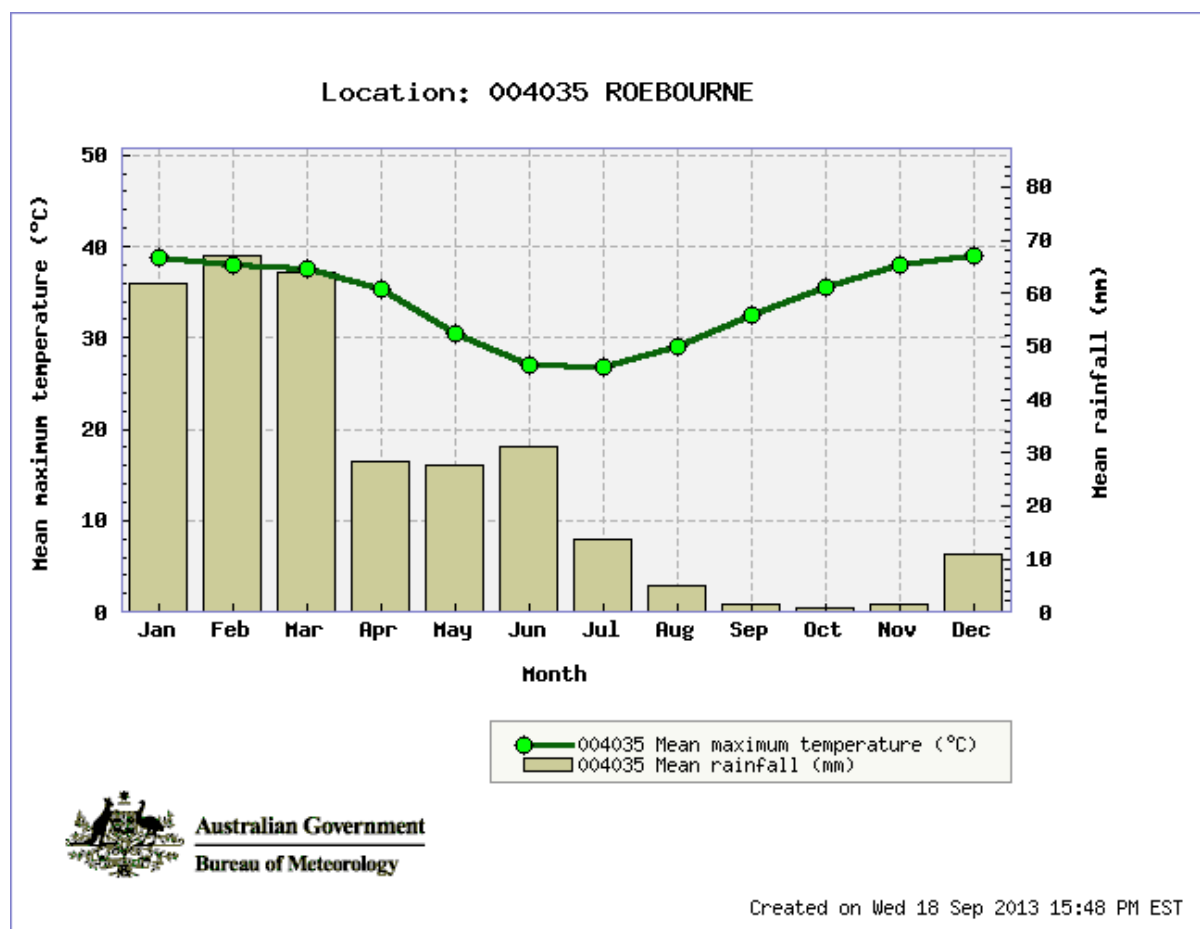


Figure 2: Climate data for Roebourne (Station 4035). Mean annual rainfall data has been calculated from 1887-2013 and mean maximum temperature has been calculated from 1919-2013 (BOM 2013).

1.3.2 Geology and Landforms

The survey area is located in the Hamersley Basin, which overlies the older Archaean Pilbara Craton. The Hamersley Basin comprises mafic and felsic volcanics, shale, siltstone, sandstone and conglomerate, as well as dolomite and banded iron formation. The sequence is extensively deformed with the rocks being faulted and folded (Van Vreeswyk et al. 2004).

The survey area occurs along the southern extent of the Chichester ranges, in the Fortescue geological group. According to 1: 2,500,000 geology mapping, the area is dominated by basalt, dacite and sandstone of Archaean origin (Department of Mines and Petroleum 2013).

The survey area is mapped as soil landscape zone 282 – Chichester Ranges of the Fortescue Province. This soil unit is described as hills and dissected plateaux, with some stony plains, on basalt and sedimentary rocks of the Hamersley Basin. Soils are predominantly stony with some red shallow loams and hard cracking clays (Tille 2006).

1.3.3 Surface Water and Hydrology

One ephemeral river, the Portland River, and many of its tributaries intersect the survey area (predominantly the southern portion between transmission pads O33 and O78). These flow into the Fortescue River, which lies approximately 13 km from the survey area at its closest point. Tributaries of Western Creek and Harding River traverse the northern portion of the survey area, eventually draining into Harding Dam located some 30 km north of the survey area. The Maitland River is also located within the vicinity of the survey area, lying 9.5 km to the north-west.

1.3.4 Pre-European Vegetation

Pre-European vegetation was surveyed, described and mapped across the Pilbara region at a scale of 1: 1,000,000 (Beard 1975). The survey area is located in the Chichester Plateau and Abydos Plain physiographic units of the Fortescue Botanical District. These two physiographic units are described as:

Chichester: a long narrow unit forming a watershed between the numerous rivers, consisting mainly of basalt, with included siltstone, mudstone, shale, dolomite and jaspilite. Vegetation is described as:

- sand plains – shrub steppe of *hakea lorea* subsp. *lorea*, usually also with much mallee-form *Eucalyptus* *gamophylla* over *Triodia basedowii* and occasionally *Triodia pungens*.
- outwash plains - shrub steppe of *hakea lorea* subsp. *lorea*, usually also with much mallee-form *Eucalyptus* *gamophylla* over *Triodia basedowii*. *Acacia pyrifolia* is perhaps rather more common.
- valley plains – mulga woodlands with other occasional trees including *Acacia pruinocarpa*, *A. xiphophylla*, *Eucalyptus microtheca* and *Corymbia dichromophloia* over sparse shrubs of *Eremophila cuneifolia* and *Senna* spp.. There is normally no ground layer except for ephemerals in season.
- flood-out zones – tree savanna formed of scattered trees of *Eucalyptus microtheca*, more rarely *Corymbia aspera*, over *Eragrostis setifolia* and *Panicum decompositum*.
- Millstream oasis – large and deep permanent pools lined by *Eucalyptus camaldulensis* and *Melaleuca leucadendron*, and some introduced date palms. The flats beside the rivers and creeks support irregular woodland of *Eucalyptus camaldulensis*, *Melaleuca glomerata* and *Acacia saligna*. The palm, *Livistona alfredii*, is a local endemic.

Abydos Plains: continues the Onslow Coastal Plain further to the east; alluvial near the coast with outcropping small hills, ranges and dykes in the western part, with granite. Vegetation is described as:

- shrub steppe – shrub steppe of the *Acacia pyrifolia*-*Triodia pungens* association. Shrubs include almost entirely of *A. pyrifolia*, *Grevillea pyramidalis* and *Hakea lorea* subsp. *lorea*. partial cover of ephemerals in season.
- dwarf-shrub steppe – sandplains covered by dwarf-shrub steppe. General cover of the hummock grass *Triodia pungens* interspersed by numerous very low spreading shrubs of *A. translucens*.
- grass plains – open plains of grass or mixed grass and spinifex.
- coastal complex – low, shrubby mangrove of *Avicennia marina* and *Rhizophora mucronata*. Occasional samphire communities immediately inland of the mangroves

Five vegetation units defined by Beard (1975), 152, 173, 175, 587 and 607 (Shepherd et al. 2002), are associated with the survey area:

152: ‘Hummock grasslands, grass steppe; soft and hard spinifex soft spinifex’

173: ‘Hummock grasslands, shrub steppe; kanji (*Acacia inaequilatera*) over soft spinifex and *Triodia wiseana* on basalt’

175: ‘Short bunch grassland – savanna/grass plain’

587: ‘Mosaic: Shrublands; snakewood (*Acacia xiphophylla*) and *A. victoriae* scrub over Hummock grasslands, shrub steppe; kanji (*A. inaequilatera*) over *Triodia pungens*’

607: ‘Hummock grasslands, low tree steppe; snappy gum (*Eucalyptus leucophloia*) and bloodwood (*Corymbia spp.*) over soft spinifex and *Triodia wiseana*’.

Table 1 summarises the current and pre-European extent of these vegetation units within the survey area and the Pilbara bioregion.

Table 1: Extent of pre-European vegetation in the survey area (Government of Western Australia 2013).

Vegetation association	Extent in survey area (ha)	Current extent in Pilbara bioregion (ha)	Pre-European extent (ha)	Proportion of Pre-European extent remaining (%)
152	0.23	306,306.40	306,407.02	99.96
173	5.54	1,748,260.83	1,753,104.09	99.72
175	10.29	524,640.19	526,957.96	99.56
587	7.68	580,696.99	580,728.60	99.99
607	2.41	120,599.81	120,789.19	99.84

1.3.5 Land Systems

Land systems of the Western Australian rangelands were mapped by the Department of Agriculture and Food (DAFWA) outlining the distributions and providing comprehensive descriptions of, biophysical resources including soil and vegetation condition. A total of 104 land systems occur in the Pilbara bioregion covering 181,723 km². Seven of these, Capricorn, McKay, River, Robe, Rocklea, Satirist and Wona, were mapped over the survey area. These land systems are described as:

- Capricorn – Hills and ridges of sandstone and dolomite supporting low shrublands or shrubby spinifex grasslands
- McKay – Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands
- River – Active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands
- Robe – Low plateaux, mesas and buttes of limonites supporting soft spinifex (and occasionally hard spinifex) grasslands
- Rocklea – Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands
- Satirist – Stony plains and low rises supporting hard spinifex grasslands, and gilgai plains supporting tussock grasslands
- Wona – Basalt upland gilgai plains supporting tussock grasslands and minor hard spinifex grasslands.

The total area of these land systems within the survey area and Pilbara Bioregion is presented in Table 2.

Table 2: Distribution of land systems within the survey area and Pilbara Bioregion (Van Vreeswyk 2004).

Land system	Total area within Pilbara Bioregion (ha)	Total area within survey area (ha)	Proportion of total within the Pilbara bioregion within the survey area (%)
Capricorn	205641	5.60	<0.1
McKay	80885	2.66	<0.1
River	72468	0.19	<0.1
Robe	102676	0.83	<0.1
Rocklea	711723	6.40	<0.1
Satirist	43498	0.75	<0.1
Wona	7780170	9.72	<0.1

1.3.6 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation for Australia (IBRA version 7) divides the Australian continent into 89 bioregions and 419 subregions (Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) 2013a). The IBRA regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna. The survey area occurs in the Pilbara Bioregion, of which approximately 5-10% is represented in the national reserve system (DSEWPaC 2013b).

The biodiversity of the 53 subregions recognised in Western Australia in 2002 was documented as part of a national audit to provide priorities for conservation action (Department of Conservation and Land Management (CALM) 2002). The survey area occurs in the Chichester subregion of the Pilbara Bioregion. The Chichester subregion was described in the audit as follows:

Chichester PIL1 – undulating granite and basalt plains including significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on the ranges (Kendrick and McKenzie 2001).

1.3.7 Western Australian Biodiversity

The bioregional summary (CALM 2002) also identified ecosystems as low, medium or high depending on their priority for reservation in the conservation estate and those considered to be ‘at risk’ within each IBRA subregion. Some of these ecosystems listed as ‘at risk’ have been classified as threatened ecological communities (TECs) by the Department of Parks and Wildlife (DPaW).

1.3.8 Vegetation, Flora and Fauna Conservation Categories

Listed TECs and priority ecological communities (PECs) are allocated a conservation category, which are outlined in Appendix A. Two TECs and 30 PECs have been recorded within the Pilbara bioregion (DPaW 2013a; DPaW 2013b). Western Australian flora conservation categories are also described in Appendix A. Approximately 142 flora species of conservation significance have been listed for the Pilbara bioregion (DEC 2012).

Vertebrate fauna species listed via the *Environment Protection and Biodiversity Act 1999* (EPBC Act), WC Act and under the DPaW Priority list constitutes species as having conservation significance. The fauna conservation categories are described in Appendix A. A total of 101 fauna species of conservation significance have been listed for the Pilbara bioregion (DEC 2013a).

1.3.9 Introduced Flora Categories

Weeds of National Significance (WONS) as identified by the Australian Weed Strategy (Australian Weeds Committee 2012), declared pest categories and listed weed species priority ratings as identified by the *Biosecurity and Agriculture Management Act 2007* (BAM Act), and the Invasive Plant Prioritisation (IPP) Process for DEC (2011) are presented in Appendix B.

A total of 50 introduced flora species have been recorded within the Chichester (PIL1) subregion of the Pilbara bioregion (Western Australian Herbarium 2013).

1.3.10 Land Tenure and Use

The survey area is located in the Shire of Ashburton, within the boundaries of the Millstream Chichester National Park. As such, the area is predominantly used for nature-based tourism. Surrounding land consists of pastoral lease, unallocated Crown land and water reserves.

2 Methodology

2.1 Desktop Study

2.1.1 Database Searches

A search for environmentally sensitive areas (ESA) in the vicinity of the survey area was conducted using the Native Vegetation Map Viewer (Department of Environment Regulation (DER 2013)) and Register of the National Estate (RNE) spatial database (Australian Government 2008).

Database searches were conducted to identify listed conservation significant ecological communities and flora and fauna species within or in close proximity to the survey area. Search details are summarised in Table 3.

Table 3: Database searches requested.

Database name	Date search results received	Search focus	Search area
Protected Matters Search Tool (DSEWPaC 2013c)	5 August 2013	Flora and fauna of National Environmental Significance (MNES)	10 km radius from a linear corridor defined by the coordinates 21°15'14" S, 117°00'14" E and 21°32'06" S, 117°16'01" E (GDA94).
Threatened and Priority Ecological Communities database (DPaW 2013c)	20 August 2013	Listed threatened and priority ecological communities.	50 km radius from a linear corridor defined by the coordinates 21°15'14" S, 117°00'14" E and 21°32'06" S, 117°16'01" E (GDA94).
Threatened and Priority Flora Database (TPFL) (DPaW 2013c)	19 August 2013	Declared rare (DRF) and priority flora species.	
Western Australian Herbarium flora (WAHerb)(DPaW 2013c)			
Threatened and Priority Flora Species List (TP list)(DPaW 2013c)			
<i>NatureMap</i> (DPaW 2013g)	5 August 2013	Terrestrial fauna and flora of conservation significance	20 km radius from a point defined by the coordinates 21°25'06" S and 117°04'50" E (GDA94).
BirdLife Australia (BirdLife Australia 2013)	19 August 2013	Bird species	1 degree square from a point defined by the coordinates 21°21'08" S and 117°10'13" E (GDA94).

The 30 PECs listed by the DEC for the Pilbara region (DEC 2013b) were reviewed to determine if any were analogous with ecological communities recorded in the survey area.

Conservation significant flora species returned from these database searches were categorised according to the following criteria for occurrence within the survey area:

- likely to occur – suitable habitat and previous records within 20 km
- potential to occur – suitable habitat and previous records within 20-50 km
- unlikely to occur – no preferable habitat identified in the survey area, or previous records >50 km.

Conservation significant fauna species returned from these database searches were categorised according to the following criteria for occurrence within the survey area:

- high – Species recorded within, or within 20 km of the survey area; suitable habitat occurs
- moderate – Species recorded outside survey area, but within 20 km; limited suitable habitat occurs
- low – Species rarely, or not recorded, within 20 km, and/or suitable habitat does not occur.

2.1.2 Literature Review

Very few vegetation and flora surveys, or fauna surveys have previously been conducted within the vicinity of the survey area. A small selection of the closest surveys, providing information most relevant for this assessment, were reviewed as part of this report:

Vegetation and Flora

- Astron, 2011, *Caliwingina Vegetation and Flora Survey*, Unpublished report to Rio Tinto, Perth.
- DEC, Millstream Park Council and Conservation Commission Western Australia, 2011, *Millstream Chichester National Park and Mungaroona Range Nature Reserve Management Plan No. 69 2011*, DEC, Perth.
- Ecoscape, 2012, *Mt Farquhar Level 2 Flora and Vegetation Survey*, Unpublished report to Fortescue Metals Group Ltd.

Fauna

- DEC, Millstream Park Council and Conservation Commission Western Australia, 2011, *Millstream Chichester National Park and Mungaroona Range Nature Reserve Management Plan No. 69 2011*, DEC, Perth.
- Ecoscape, 2011, *Pilbara Iron Ore Project – Blacksmith Vertebrate Fauna and Short Range Endemic Survey*, Unpublished report to Flinders Mine Limited.
- Ecoscape and Coffey Environments, 2010, *Vertebrate Fauna and Fauna Habitat Assessment for the Firetail Project*, Unpublished report to Fortescue Metals Group Limited.
- Biota, 2005, *Fauna Habitats and Fauna Assemblage of Mesa A and G, near Pannawonica*, Unpublished report to Robe River Iron Associates.
- Biota, 2006, *Fauna Habitats and Fauna Assemblage of the Mesa A Transport Corridor and Warramboe*, Unpublished report to Robe River Iron Associates.
- Biota, 2007, *Mesa K Targeted Fauna Survey*, Unpublished report to Pilbara Iron.

Published reference books were consulted to review habitat preferences of fauna species identified by the database searches.

2.2 Field Survey

The field survey was conducted between 6 to 9 September 2013. Although Millstream weather station (station 5012) has longterm rainfall and temperature information available, no rainfall data was recorded for May and August 2013 making it difficult to determine adequacy of season. Instead, the daily weather observations recorded at Roebourne Station (station 4035) were used to identify local rainfall preceding the survey. A total of 557 mm was recorded at Roebourne in the 12 months preceding the survey. This is 242.3 mm above the long-term mean of 314.7 mm at this site (BOM 2013). A significant rainfall event was received on 25 June 2013, with 275.8 mm recorded, which is 244.7 mm more than the average rainfall for June of 31 mm (Figure 3).

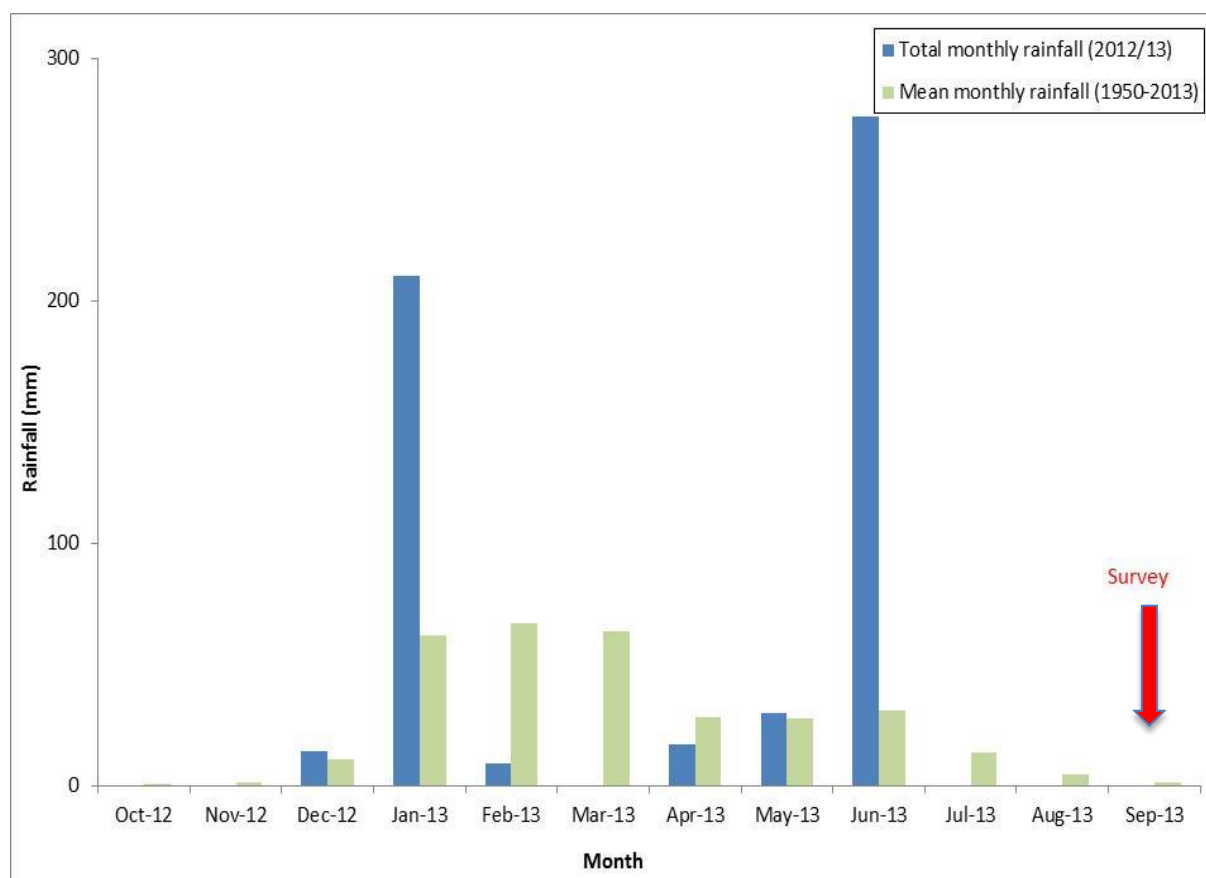


Figure 3: Mean (1950-2013) rainfall (mm) and recorded rainfall (mm) received at Roebourne Station in the 12 months preceding the survey (BOM 2013); black arrow indicates field survey timing.

2.2.1 Vegetation and Flora Field Assessment

The vegetation and flora field survey was undertaken in accordance with the requirements for a Level 1 assessment outlined in the EPA *Position Statement 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002) and *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a).

Information acquired during the desktop study assisted in the design of the field survey. Pre-survey planning involved the examination of 1: 10,000 scale aerial photography to identify potentially different landforms, habitat and vegetation types.

The field survey was conducted by Astron Botanist Daniel Roocke. A total of 23 relevés were surveyed from the intact vegetation immediately adjacent to the previously cleared survey area to assist with describing dominant vegetation associations. A representative flora species list was compiled from within the survey area. Relevé locations are illustrated in Appendix C, Figure C.1. The following information was collected at each relevé:

- **Location** – coordinates measured using a handheld global positioning system (GPS) (MGA50, GDA94). One set of coordinates taken from a central location of each relevé.
- **Recorder and date** – a list of the personnel involved in sampling that location and the survey date.
- **Species** – an inventory of vascular plant species present including introduced species. Species that could not be identified in the field were collected for later identification at the Astron herbarium or WA Herbarium.
- **Weeds** – the coordinates and density of any introduced flora.
- **Vegetation description** – vegetation was described according to the Aplin (1979) modification of the vegetation classification system of Specht (1970) and the National Vegetation Information System, level 5 (DSEWPac 2011) (Appendix E). At this level, vegetation is described to ‘association’ where up to three dominant genera for each of the upper, mid and ground strata are categorised based on dominant growth form, cover and height. The survey area comprises previously disturbed pads and an existing track, forming a narrow linear corridor. The vegetation in the surrounding intact areas (outside the survey area) were therefore included in the vegetation descriptions to provide context for the vegetation types, given the transmission line has been *in situ* for a number of years.
- **Vegetation condition** – assessed according to the vegetation condition classification adapted from Trudgen (1988) (Appendix E). The condition of vegetation both within the survey area and in the intact vegetation surrounding the survey area was assessed to provide context.
- **Habitat** – a broad description of the surrounding landscape based on landform, topography and soil.
- **Disturbances** – records of any obvious disturbances such as fire, tracks or grazing.
- **Photographs** – a photograph was taken of the intact vegetation surrounding the previously cleared tower pads and/ or track at each relevé location.

The survey area was accessed by vehicle and traversed on foot. An Arcpad geographic information system with the survey area uploaded, plus a hard copy of colour aerial photography on A3 maps at a scale of 1: 10,000 were used to locate the survey area and to assist in navigation as well as delineating vegetation boundaries.

A targeted search for threatened and priority flora was also conducted. This involved systematic traverses spaced approximately 5 - 8 m apart across each transmission pad and along transmission tracks.

Eleven tree inspection locations provided by Rio Tinto were inspected and assessed. All tree inspection areas were located within the current survey area boundaries. For each inspection point, the location of the nearest tree to that point, a photograph, species and the conservation significance (i.e. groundwater dependent ecosystem (GDE) species, flora of conservation significance or habitat tree) was recorded.

2.2.2 Fauna Assessment

The Level 1 fauna survey was undertaken in accordance with the EPA *Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b), *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and DEC 2010). In the context of a Level 1 survey, the major fauna habitat types and their condition were recorded, as well as opportunistic fauna observations, and an assessment for the potential for the survey area to support significant fauna species or habitat was conducted.

The field survey was conducted by Astron Senior Zoologist Dr Jessica Oates. The survey area was traversed by vehicle and on foot. Major fauna habitat types were described based on the landform and vegetation type. Habitat condition was assessed based on the presence of anthropogenic (human-induced) disturbances, and using the descriptors suggested by Thompson and Thompson (2010) (Appendix D). Habitats likely to support fauna species of conservation significance identified as potentially present from the literature and database searches were photographed and a GPS location recorded. All vertebrate fauna species observed opportunistically were recorded. Fauna habitat assessment locations are presented in Appendix C, Figure C.1.

2.3 Taxonomy and Nomenclature

2.3.1 Flora

Plant specimens that were not identified in the field were identified in Perth by Daniel Roocke, and confirmed by Astron Supervising Botanist, Janelle Atkinson. The nomenclature consistent with the current listing of scientific names recognised by the Western Australian Herbarium was used for the species list and associated species information collected. Data from each relevé were entered into a customised Access database.

2.3.2 Fauna

Nomenclature and sequence for amphibians, reptiles and mammals within this report is as per Western Australian Museum *Checklist of the Vertebrates of Western Australia*. Birds however are delineated according to Christidis and Boles (2008). Field guides and accepted scientific peer review references used for fauna identification are listed in Table 4.

Table 4: Fauna field guides and scientific references.

Group	Field guide / scientific reference
Amphibians	Cogger (2000), Tyler and Doughty (2009)
Reptiles	Cogger (2000), Wilson and Swan (2010)
Geckos	Storr et al. (1990), Wilson and Swan (2010)
Skinks	Storr et al. (1990), Wilson and Swan (2010)
Dragons	Storr et al. (1990), Wilson and Swan (2010)
Varanids	Storr et al. (1990), Wilson and Swan (2010)
Legless Lizards	Storr et al. (1990), Wilson and Swan (2010)
Snakes	Storr et al. (1990), Wilson and Swan (2010)
Birds	Simpson and Day (2010)
Mammals	Van Dyck and Strahan (2008), Menkhorst and Knight (2011)
Bats	Churchill (2008), Menkhorst and Knight (2011)

For species identified in the desktop assessment where there is doubt to their true taxonomy (through subsequent name changes or taxonomic reviews) every effort was made to determine the current scientific name for each taxon. In addition, some taxon names may be followed by 'sp.', meaning that the species name was not given in the data source or the identification is in doubt.

2.4 Limitations

No major limitations were encountered while conducting the vegetation, flora and fauna survey. Inaccessible terrain prevented the northern-most portion of transmission line track (approximately 720 m in length) from being surveyed, however all transmission pads were surveyed. Very few baseline vegetation, flora and fauna surveys have been conducted within close proximity to the survey area, however the broader Chichester region is reasonably well documented and this information was considered adequate to provide contextual information. This survey was carried out following above average monthly rainfall for June, 10 weeks preceding the field assessment. In comparison to other seasons and years, a high proportion of plants were flowering, and or fruiting, which allowed for high quality specimens to be collected for verification. Both personnel who completed the work are experienced in the identification of flora, fauna and fauna habitats of the Pilbara region.

3 Results

3.1 Desktop Study

3.1.1 Environmentally Sensitive Areas

Approximately half of the survey area lies within the RNE listed Chichester Range National Park (1977 boundary) (Government of Australia 2008). These areas are therefore recognised as an ESA (Western Australian Government 2005). The boundary for Chichester Range National Park has been amended since the original RNE listing and the survey area in its entirety now lies within the Millstream Chichester National Park.

3.1.2 Vegetation and Flora

No Commonwealth listed TECs were identified within 10 km of the survey area and no State recognised TECs were recorded within 50 km (DPaW 2013c; DSEWPaC 2013c). The state listed terrestrial PEC 'Four plant assemblages of the Wona Land System' (P1) has been previously recorded within the survey area (DPaW 2013c) and the 'Horseflat land system of the Roebourne Plains' (P3) PEC has been identified approximately 20 km north-west of the survey area.

The DPaW TPFL (DPaW 2013d), WAHerb (DPaW 2013e) and TP list (DPaW 2013f) database searches indicated that no threatened flora have been recorded within 50 km of the search area.

Thirty-three priority flora species have been previously recorded within 50 km of the survey area (Table 5) (DPaW 2013d, 2013e, 2013f, 2013g). Of these, nine are priority (P) one (P1) status, six are P2, 14 are P3 and four are P4 status. Based on habitat preferences, combined with previous location data and associated vegetation information, 13 of the listed priority flora species are considered to have the potential to occur within the survey area (Western Australian Herbarium 2013). The classification of likelihood of occurrence was conducted at a desktop level only and did not take into account any species recorded during the vegetation and flora survey. Database search results are provided in Appendix E.

Results of the literature review identified two P1, one P2, two P3 and five P4 flora species as having been previously recorded within approximately 70 km of the survey area (Table 6) (Astron 2011; Ecoscape 2012). The nearest records of priority flora are of *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3), *Goodenia nuda* (P4) and *Rhynchosia bungarensis* (P4) (Astron 2011). No TECs or PECs have been previously recorded from these surveys.

Table 5: Summary of priority flora recorded within 50 km of the survey area (TPFL (DPaW 2013d), WAHerb (DPaW 2013e), TP List (DPaW 2013f), NatureMap (DPaW 2013g)).

Species	Priority	Habit	Flowering Time	Habitat	Likely occurrence in survey area
<i>Euphorbia inappendiculata</i> subsp. <i>queenslandica</i>	1	Spreading procumbent herb.	No information available	Broad clay pan with dark reddish brown heavy clay with deep holes and cracks.	Potential
<i>Goodenia pallida</i>	1	Erect herb to 0.5 m high.	August	Red soils.	Unlikely
<i>Ipomoea racemigera</i>	1	Creeping annual herb, climber.	No information available	Flat bedded creekline in basalt uplands.	Potential
<i>Nicotiana heterantha</i>	1	Short-lived annual or perennial, herb, to 0.5 m high, forming low, spreading colonies.	March - September	Black clay, seasonally wet flats.	Unlikely
<i>Senna</i> sp. Millstream (E. Leyland s.n. 30/8/1990)	1	Open, glaucous and perfumed shrub to 1.2 m high.	No information available	Silt over cracking clay on dry creek bank.	Potential
<i>Sporobolus pulchellus</i>	1	Erect, tufted, ephemeral grass-like or herb, to 0.4 m high.	February - November	Deep sands, sandstone, sandy ironstone. Rocky hillsides, roadsides.	Unlikely
<i>Tecticornia globulifera</i>	1	Small spreading shrub to 0.5 m high.	No information available	Flat floodways, salt lakes. Red clayey sand or loam.	Unlikely
<i>Tecticornia</i> sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	Erect shrub to 0.6 m tall.	August	Red brown sandy clay.	Unlikely
<i>Teucrium pilbaranum</i>	1	Upright shrub, 0.2 m high.	May or September	Crab hole plain in a river floodplain, margin of calcrete table.	Unlikely
<i>Cladium procerum</i>	2	Densely tufted perennial, grass-like or herb (sedge).	November	Perennial pools.	Unlikely
<i>Euphorbia inappendiculata</i> subsp. <i>inappendiculata</i>	2	Spreading procumbent herb.	No information available	High in landscape, stony rich red clay. Cracking clay floodplain. Dark reddish brown silty cracking clay with ironstone small pebbles and rocks scattered on surface.	Potential

Species	Priority	Habit	Flowering Time	Habitat	Likely occurrence in survey area
<i>Gomphrena cucullata</i>	2	Spreading or erect annual, herb, to 0.25 m high.	February or May	Red sandy loam, clayey sand. Open floodplains.	Unlikely
<i>Paspalidium retiglume</i>	2	Tufted annual, grass-like or herb, to 0.5 m high.	No information available	Clay soils, self mulching crabhole plain on basalt upland.	Likely
<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	2	Compact shrub to 1 m high with numerous stems.	No information available	Cobbled slopes, outcrops, banks of creeks and edges of basalt screes. Red-brown gravelly loam amongst cobbles.	Potential
<i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	Erect to prostrate annual herb to 0.2 m high.	No information available	Floodplains, rangelands, plains. Brown clay loam between gravel to cobbles with pebble to cobble surface.	Potential
<i>Eragrostis crateriformis</i>	3	Annual, grass-like or herb, to 0.42 m high.	January - June	Creek banks, depressions. Clayey loam or clay soils.	Unlikely
<i>Eriochloa fatmensis</i>	3	Upright annual grass, to 0.3 m high.	No information available	Regularly flooded area, adjacent to river levees.	Unlikely
<i>Fimbristylis sieberiana</i>	3	Shortly rhizomatous tufted perennial, grass like or herb (sedge), 0.25-0.6 m high.	May - June	Mud, skeletal soil pockets, pool edges, sandstone cliffs.	Unlikely
<i>Glycine falcata</i>	3	Mat forming perennial, herb to 0.2 m high.	May - June	Black clayey sand, along drainage depressions in crabhole plains on river floodplains.	Unlikely
<i>Oldenlandia</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	3	Spreading annual herb.	March	Cracking clay, basalt. Gently undulating plains with large surface rocks, flat crabholed plains.	Likely
<i>Owenia acidula</i>	3	Small tree.	No information available	Floodplain, silt covering cracking clay soils, creeklines.	Unlikely
<i>Phragmites karka</i>	3	Erect rhizomatous reed to 2.5 m high.	No information available	Edges of pools in red-brown clay-loam, margin of permanently wet springs on coastal plain or grassland near creeks.	Unlikely

Species	Priority	Habit	Flowering Time	Habitat	Likely occurrence in survey area
<i>Phyllanthus aridus</i>	3	Erect, much-branched shrub, to 0.25 m high.	May - June	Sandstone, gravel, red sand.	Unlikely
<i>Solanum albotellatum</i>	3	Low herb or shrub to 0.2 m high.	No information available	Well-drained, black gravelly sandy loam soils Flat plains or open clay flats with ironstone rocks and pebbles scattered on surface.	Likely
<i>Swainsona thompsoniana</i> ^	3	Annual herb with erect central stem and prostrate side stems to 0.1 m high.	No information available	Gently sloping area to gently undulating. Red-brown cracking clay with scattered pebbles and cobbles on the surface. Also areas of orange-brown cracking clay or flat crabholed plains.	Likely
<i>Tecticornia medusa</i>	3	Erect shrub to 0.5 m high.	November	Flat floodplain. Red clayey sand.	Unlikely
<i>Terminalia supranitifolia</i>	3	Spreading tangled tree or shrub to 3 m high.	May, July or December	Sandy soils or among basalt rocks.	Unlikely
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	3	Tussocky perennial, grass-like or herb, to 0.9-1.8 m high.	August	Clay pan, grass plains.	Likely
<i>Vigna</i> sp. rockpiles (R. Butcher et al. RB 1400)	3	Slightly twining woody herb.	No information available	Base of high rockpile ridge. Skeletal brown/red soil. Silts in pockets between rocks and stones.	Unlikely
<i>Eremophila youngii</i> subsp. <i>lepidota</i>	4	Dense, spreading shrub, to 3 m high.	January, March, June or August - September	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	Potential
<i>Goodenia nuda</i>	4	Erect to ascending herb to 0.5 m high.	April - August	Alluvial soils over ironstone, flood plains.	Potential
<i>Livistona alfredii</i>	4	Tree-like monocot (palm).	July - September	Edges of permanent pools.	Unlikely

Species	Priority	Habit	Flowering Time	Habitat	Likely occurrence in survey area
<i>Rhynchosia bungalowensis</i>	4	Compact, prostrate shrub, to 0.5 m high.	No information available	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	Unlikely

The TP List database is searched using place names. As a result, many of the records obtained from this database may occur beyond 50 km of the survey area.

Table 6: Flora of conservation significance previously recorded in the vicinity of the survey area.

Author (year)	Survey area	Survey focus	Significant conservation values recorded within survey area boundary
Astron (2011b)	Caliwingina. Approximately 40 km south of the survey area.	Level 2 vegetation and flora survey.	<i>Indigofera</i> sp. Bungaroo Creek (S.van Leeuwen 4301) (P3) <i>Goodenia nuda</i> (P4) <i>Rhynchosia bungarensis</i> (P4) No TECs or PECs
Ecoscape (2012)	Mt Farquhar. Approximately 68 km south-south-west of the survey area.	Level 2 vegetation and flora survey.	<i>Genus</i> sp. Hamersley Range hilltops (s. van Leeuwen 4345) (now named <i>Pleurocarpaea gracilis</i>) (P1)* (now P3) <i>Sida</i> sp. Hamersley Range (K. Newby 10692) (P1) <i>Gompholobium karijini</i> (P2) <i>Indigofera</i> sp. Bungaroo Creek (S.van Leeuwen 4301) (P3) <i>Eremophila magnifica</i> subsp. <i>velutina</i> (P3) <i>Acacia bromilowiana</i> (P4) <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) <i>Goodenia nuda</i> (P4) <i>Ptilotus mollis</i> (P4) <i>Rhynchosia bungarensis</i> (P4) No TECs or PECs

* priority listing revised following completion of report.

^ species no longer listed on the priority flora list.

3.1.3 Fauna

The database searches and literature review identified a total of 268 terrestrial vertebrate fauna species recorded within the vicinity of the survey area (Appendix F). This included seven amphibian species, 93 reptile species, 124 bird species (including one introduced) and 44 mammal species (including 11 introduced), of which 23 species are deemed to have conservation significance.

Table 7 lists those species of conservation significance identified by the *NatureMap* (DPaW 2013g) and EPBC Protected Matters (DSEWPaC 2013c) database searches. The EPBC Protected Matters Search (DSEWPaC 2013c) identified five threatened terrestrial fauna species and eight migratory fauna species of national environmental significance within a 20 km radius of the survey area. The *NatureMap* (DPaW 2013g) search identified three schedule 1 species, two migratory species, one priority 1 species and six priority 4 species. The results of the database searches are in Appendix E.

Table 7: Conservation significant vertebrate fauna species identified by DPaW NatureMap (2013g) and DSEWPaC (2013c) database searches and previous surveys.

Species name	Common name	State conservation status	Commonwealth conservation status
Reptiles			
<i>Notoscincus butleri</i>	Lined soil-crevice skink	Priority 4	-
<i>Liasis olivaceus barroni</i>	Pilbara olive python	Schedule 1	Vulnerable
<i>Ramphotyphlops ganei</i>	Blind snake	Priority 1	
Birds			
<i>Apus pacificus</i>	Fork-tailed swift		Migratory
<i>Ardea ibis</i>	Cattle egret	Schedule 3	Migratory
<i>Ardea modesta</i>	Eastern great egret	Schedule 3	Migratory
<i>Haliaeetus leucogaster</i>	White-bellied sea eagle	Schedule 3	Migratory
<i>Pandion haliaetus</i>	Eastern osprey	Schedule 3	Migratory
<i>Hirundo rustica</i>	Barn swallow		Migratory
<i>Phaps histrionica</i>	Flock Bronzewing	Priority 4	
<i>Ardeotis australis</i>	Australian bustard	Priority 4	-
<i>Burhinus grallarius</i>	Bush stone-curlew	Priority 4	-
<i>Charadrius veredus</i>	Oriental plover, oriental dotterel		Migratory
<i>Glareola maldivarum</i>	Oriental pratincole		Migratory
<i>Merops ornatus</i>	Rainbow bee-eater		Migratory
<i>Neochmia ruficauda subclarescens</i>	Star finch	Priority 4	
Mammals			
<i>Dasyurus hallucatus</i>	Northern quoll	Schedule 1	Endangered
<i>Macrotis lagotis</i>	Greater bilby	Schedule 1	Vulnerable
<i>Notoryctes caurinus</i>	Northern marsupial mole	Schedule 1	Endangered
<i>Macroderma gigas</i>	Ghost bat	Priority 4	
<i>Rhinonicteris aurantia</i> (Pilbara Form)	Pilbara Leaf-nosed bat	Schedule 1	Vulnerable
<i>Pseudomys chapmani</i>	Western pebble-mound mouse	Priority 4	
<i>Leggadina lakedownensis</i>	Lakeland Downs mouse	Priority 4	

Key: EPBC Act = Environment Protection and Biodiversity Conservation Act 1999, WC Act = Wildlife Conservation Act 1950, VU = vulnerable, EN = Endangered and S1 = Schedule 1.

Additional conservation significant species were recorded from previous surveys and avian fauna records from Birdlife (2013) were also incorporated. Results of the literature review indicate that seven fauna species of conservation significance have been recorded from direct observation or secondary evidence adjacent to the survey area (Table 8).

Table 8: Fauna species of conservation significance recorded within the survey area during previous surveys.

Author (year)	Survey area	Survey focus	Significant conservation values recorded within survey area boundary
Ecoscope (2011)	Blacksmith Approximately 80 km south of the survey area.	Level 2 vertebrate fauna survey and targeted fauna survey	Five species of conservation significance were recorded: <ul style="list-style-type: none"> Pilbara olive python (<i>Liasis olivaceus barroni</i>) [VU EPBC Act, S1 WC Act] Blind snake (<i>Ramphotyphlops ganei</i>) [P1 DPaW] Rainbow bee-eater (<i>Merops ornatus</i>) [Mi EPBC Act, S3 WC Act] Northern quoll (<i>Dasyurus hallucatus</i>) [EN EPBC Act, S1 WC Act] Western pebble-mound mouse (<i>Pseudomys chapmani</i>) [P4 DPaW]
Biota (2005)	Mesa A and G Approximately 80 km west of the survey area.	Level 2 vertebrate fauna survey	Two species of conservation significance were recorded: <ul style="list-style-type: none"> Ghost bat (<i>Macrodermas gigas</i>) [P4 DPaW] Northern quoll (<i>Dasyurus hallucatus</i>) [EN EPBC Act, S1 WC Act]
Biota (2006)	Mesa A Transport Corridor and Warrambo	Level 2 vertebrate fauna survey	Six species of conservation significance were recorded: <ul style="list-style-type: none"> Fortescue grunter (<i>Leiopotherapon aheneus</i>) [P4 DPaW] Australian bustard (<i>Ardeotis australis</i>) [P4 DPaW] Star finch (<i>Neochmia ruficauda subclarescens</i>) [P4 DPaW] Ghost bat (<i>Macrodermas gigas</i>) [P4 DPaW] Northern quoll (<i>Dasyurus hallucatus</i>) [EN EPBC Act, S1 WC Act] Western pebble-mound mouse (<i>Pseudomys chapmani</i>) [P4 DPaW]
Ecoscope and Coffey (2010)	Firetail Approximately 100 km south east of the survey area.	Two-phase Level 2 vertebrate fauna survey	Five species of conservation significance were recorded: <ul style="list-style-type: none"> Pilbara olive python (<i>Liasis olivaceus barroni</i>) [VU EPBC Act, S1 WC Act] Bush stone-curlew (<i>Burhinus grallarius</i>) [P1 DPaW] Rainbow bee-eater (<i>Merops ornatus</i>) [Mi EPBC Act, S3 WC Act] Northern quoll (<i>Dasyurus hallucatus</i>) [EN EPBC Act, S1 WC Act] Western pebble-mound mouse (<i>Pseudomys chapmani</i>) [P4 DPaW]

Aquatic and marine species have been excluded from the report as they are highly unlikely to occur within the survey area. In addition, a number of records were presented through the results of *NatureMap* that are clearly not relevant to this assessment and have been deleted accordingly.

3.2 Vegetation and Flora

3.2.1 Vegetation

Fourteen vegetation associations were recorded and are described below. Broadly these vegetation associations are associated with three landform types; hills, plains and drainage tracts. The vegetation associations presented below represent the intact vegetation immediately surrounding the previously disturbed survey area. All but three photographs are of vegetation within the cleared pads and access tracks of the survey area. Each of the condition assessments represent the vegetation within the survey area. The data collected from each relevé is presented in Appendix G.

Hills

H1: Relevés MCNP-O.01 and MCNP-O.26

Vegetation description: *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* scattered low trees to low open woodland over mixed *Triodia* sp. hummock grassland.

Associated species: *Triodia wiseana*, *Triodia ?basedowii*, *Triodia* sp. (*epactia/pungens*), *Cymbopogon ambiguus*, *Hakea lorea*, *Indigofera monophylla*, *Ptilotus nobilis*.

Habitat: Crest of hills.

Vegetation condition: Good.



Plate 1: Vegetation association H2 – facing west from GPS co-ordinate 500201mE and 7645887mN (MGA Zone 50). Photograph shows cleared pad and surrounding vegetation.

H2: Relevé MCNP-O.72 and MCNP-O.78

Vegetation description: *Triodia wiseana* hummock grassland.

Associated species: *Indigofera monophylla*, *Themeda triandra*, *Senna notabilis*, *Trichodesma zeylanicum*, *Goodenia microptera*.

Habitat: Gentle slopes of low hill.

Vegetation condition: Recently burnt. Not assessed for condition.



Plate 2: Vegetation association H2 – facing north-east from GPS co-ordinate 520046mE and 7623097 mN (MGA Zone 50). Photograph shows cleared pad.

H3: Relevés MCNP-O.75, MVNP-O.82 and MCNP-O.86

Vegetation description: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees to low open woodland over *Acacia bivenosa* low open shrubland to shrubland over *Triodia wiseana* open hummock grassland to hummock grassland.

Associated species: *Triodia ?basedowii*, *Cymbopogon ambiguus*, *Gossypium australe*, *Senna artemisioides*, *Senna symonii*.

Habitat: Crest and upper slope of low hills.

Vegetation condition: Good.



Plate 3: Vegetation association H3 – facing south west from GPS co-ordinate 519099mE and 7623740mN (MGA Zone 50). Photograph outside of survey area.

H4: Relevés MCNP-O.68 and MCNP-O.69

Vegetation description: *Acacia inaequilatera* scattered tall shrubs to tall open shrubland over *Acacia ancistrocarpa* scattered shrubs to open shrubland over *Triodia wiseana* open hummock grassland. Sometimes recorded with **Cenchrus ciliaris* and **C. setiger* open tussock grassland.

Associated species: *Corymbia hamersleyana*, *Grevillea wickhamii*, *Indigofera monophylla*, *Themeda avenacea*, *Abutilon lepidum*, *Senna notabilis*.

Habitat: Gentle slope of low hill.

Vegetation condition: Good – Poor. Disturbance factors include the presence of introduced flora species, particularly **Cenchrus ciliaris* and **C. setiger*.



Plate 4: Vegetation association H4 – facing north east from GPS co-ordinate 517028mE and 7625136mN (MGA Zone 50). Photograph shows edge of cleared track and surrounding vegetation.

H5: Relevé MCNP-O.73

Vegetation description: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia xiphophylla* tall shrubland over *Triodia wiseana* and *Triodia* sp. (*epactia/pungens*) very open hummock grassland.

Associated species: *Acacia bivenosa*, *A. colei* var. *ileocarpa*, *Ptilotus obovatus*.

Habitat: Gently sloping low hill.

Vegetation condition: Good - Poor. Little regrowth of vegetation in some areas.



Plate 5: Vegetation association H5 – facing north from GPS co-ordinate 518454mE and 7624171mN (MGA Zone 50). Photograph shows cleared track and surrounding vegetation.

H6: Relevé MCNP-O.80

Vegetation description: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia monticola* tall open shrubland over *Acacia stellaticeps* low open shrubland over *Triodia wiseana* hummock grassland.

Associated species: Not recorded.

Habitat: Upper slope of low hill.

Vegetation condition: Good.



Plate 6: Vegetation association H5 – facing south from GPS co-ordinate 520617mE and 7622692mN (MGA Zone 50). Photograph shows vegetation surrounding pad.

H7: Relevé MCNP-O.48

Vegetation description: *Sorghum timorense* closed tussock grassland

Associated species: *Heliotropium crispatum*, *Rhynchosia minima*.

Habitat: Crest of low hill with broad gentle slopes.

Vegetation condition: Good – Poor.



Plate 7: Vegetation association H5 – facing east from GPS co-ordinate 510845 mE and 7629133 mN (MGA Zone 50). Photograph shows cleared track and pad, and surrounding vegetation.

Plains

P1: Relevé MCNP-O.43

Vegetation description: *Triodia wiseana* hummock grassland.

Associated species: *Acacia inaequilatera*, *Ptilotus nobilis*.

Habitat: Broad undulating plain.

Vegetation condition: Good.



Plate 8: Vegetation association P1 – facing south east from GPS co-ordinate 509033mE and 7630305 mN (MGA Zone 50). Photograph shows cleared track and pad, and surrounding vegetation.

P2: Relevé MCNP-O.45

Vegetation description: *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* very open hummock grassland and *Astrebla pectinata* open tussock grassland.

Associated species: *Rhynchosia minima*.

Habitat: Undulating plain between low hills.

Vegetation Condition: Good.



Plate 9: Vegetation association P2 – facing south east from GPS co-ordinate 509925mE and 7629743mN (MGA Zone 50). Photograph shows vegetation surrounding pad.

P3: Relevé MCNP-O.50, MCNP-O.63 and MCNP-O.66

Vegetation description: *Acacia xiphophylla* tall shrubland to tall open scrub over *Triodia wiseana* open hummock grassland or **Cenchrus setiger*, **C. ciliaris* and *Astrebla pectinata* open tussock grassland to tussock grassland.

Associated species: *Acacia ancistrocarpa*, *A. synchronica*, *Hakea lorea*, *Ptilotus gomphrenoides*, *Ptilotus nobilis*, *Atriplex semilunaris*.

Habitat: Undulating plain.

Vegetation Condition: Poor. Disturbance factors include the presence of introduced flora species, particularly **Cenchrus ciliaris* and **C. setiger*. Occasional **Vachellia farnesiana* plants observed.



Plate 10: Vegetation association P3– facing east from GPS co-ordinate 515528mE and 7626132mN (MGA Zone 50). Photograph shows edge of cleared pad and surrounding vegetation.

P4: Relevé MCNP-O.101

Vegetation description: *Corymbia hamersleyana* scattered low trees over *Triodia wiseana* very open hummock grassland.

Associated species: *Eucalyptus leucophloia* subsp. *leucophloia*, *Indigofera monophylla*

Habitat: Recently burnt plain between low hills.

Vegetation Condition: Recently burnt. Not assessed for condition.



Plate 11: Vegetation association P4– facing north east from GPS co-ordinate 524358mE and 7620187mN (MGA Zone 50). Photograph shows cleared pad.

P5: Relevé MCNP-O.107

Vegetation description: *Eucalyptus leucophloia* subsp. *leucophloia* and *Hakea lorea* low open woodland over *Acacia atkinsiana* and *Acacia maitlandii* shrubland over *Triodia wiseana* open hummock grassland.

Associated species: *Senna glutinosa* subsp. *pruinosa*.

Habitat: Undulating plain between rocky, gentle hills.

Vegetation Condition: Good.



Plate 12: Vegetation association P5 - facing south from GPS co-ordinate 526061mE and 7619047mN (MGA Zone 50). Photograph shows edge of cleared pad.

Drainage

D1: Relevé MCNP-O.74

Vegetation description: *Grevillea wickhamii*, *Acacia atkinsiana* and *Acacia monticola* shrubland over *Triodia* sp. (*epactia/pungens*) open hummock grassland.

Associated Species: *Acacia colei* var. *ileocarpa*.

Habitat: Broad drainage line.

Vegetation Condition: Good.



Plate 13: Vegetation association D1 – facing north from GPS co-ordinate 518751mE and 7623983mN (MGA Zone 50). Photograph shows cleared track and surrounding vegetation.

D2: Relevé MCNP-O.87, MCNP-O.90 and MVNP-O.110

Vegetation description: *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees to low open woodland over mixed *Acacia* sp. shrublands to open heath over mixed *Triodia* sp. very open hummock grasslands to open hummock grasslands.

Associated species: *Acacia ancistrocarpa*, *A. colei* var. *ileocarpa*, *A. monticola*, *A. bivenosa*, *Petalostylis labicheoides*, *Triodia wiseana*, *Triodia angusta*, *Triodia* sp. (*epactia/pungens*), *Goodenia stobbsiana*.

Habitat: Minor drainage line.

Vegetation condition: Good.



Plate 14: Vegetation association D2 – facing south east from GPS co-ordinate 526988mE and 7618425mN (MGA Zone 50). Photograph shows track and surrounding vegetation.

3.2.2 Vegetation Condition

Each of the transmission tower pads and associated tracks have been previously cleared and varying density of regrowth occurred throughout, often related to landform and soil substrate. Where there was regrowth associated with drainage lines on pads, it was typically quite dense but was a less mature representation of intact vegetation adjacent to the survey area. There was little bare ground in these areas.

The regrowth on hills within the survey area was generally representative of the surrounding vegetation, however spinifex (*Triodia* spp.) regrowth was slow and therefore had a much lower total foliar cover than in the adjacent intact vegetation. The dominant upper stratum species that would be expected in the climax community, typically *Acacia* species, were present yet immature. A number of colonising species also occurred in low density, including *Senna notabilis*, *Indigofera monophylla* and *Trichodesma zeylanicum*.

On the plains regrowth within the survey area varied between deep clay soils and shallow soils with stony substrate. Where areas were dominated by tussock grasses (typically *Sorghum plumosum*) on

clay soils, the regrowth within the disturbed survey area had a higher density of **Cenchrus* spp. (buffel grass and birdwood grass) than in the surrounding intact vegetation and was therefore in poorer condition. On the stony plains, regrowth of both upper and lower stratum species was generally slower and there was a lower foliar cover in the regrowth than in surrounding vegetation. In particular, *Acacia xiphophylla* was slow to re-establish and was absent from some disturbed areas.

As the vegetation structure has been completely altered through historical clearing, vegetation within the survey area ranged from 'poor' to 'good' condition (Trudgen 1988). The undulating plains, hills and slopes of the survey area were typically in 'good' condition as there was little evidence of degrading processes such as weed invasion or grazing from introduced herbivores. Introduced flora species had invaded some areas with clay soils and these areas were consequently rated as 'poor' condition. Weed species were also present in varying density within the perimeter of the disturbed area of some transmission pads and along associated tracks. There was occasional evidence of erosion between transmission pads. Four pads had been burnt within the past five years.

In contrast, vegetation adjacent to the disturbed survey area ranged from 'poor' to 'excellent' condition. Fire had burnt some surrounding vegetation in the vicinity of the eastern part of the survey area. Although the transmission corridor has been in situ for a number of years the clearing of vegetation within this corridor does not appear to have had significant impact on the structure or quality of vegetation surrounding.

3.2.3 Conservation Significance of Vegetation

The vegetation recorded in the survey area is generally considered widespread and representative of the vegetation expected on comparable landforms in the broader region (Van Vreeswyk et al 2004). There were no unusual flora assemblages recorded in any of the vegetation associations present in the survey area, nor were any of these associations notable for their elevated diversity of flora species.

3.2.3.1 Threatened Ecological Communities and Priority Ecological Communities

No TECs were recorded within the survey area. The PEC 'Four plant assemblages of the Wona Land System' and its buffer is mapped across the whole survey area. During this survey, vegetation association H7 was considered analogous with one of the four plant assemblages which comprise the PEC. This plant assemblage is described as 'Annual Sorghum grasslands on self mulching clays' and was represented by relevé MCNP-O.48.

3.2.3.2 Ecosystems 'At Risk' or of High Reservation Priority

None of the vegetation associations recorded within the survey area represent ecosystems considered 'at risk' or of medium to high reservation priority in the Chichester subregion (Kendrick and McKenzie 2001).

Three of the pre-European vegetation associations mapped in the survey area are listed as medium or high priority for reservation in the conservation estate, in the Chichester subregion. None of these pre-European vegetation associations accurately represent the vegetation that was recorded during this survey.

3.2.4 Flora

A total of 127 taxa from 28 families and 74 genera were recorded from relevés and opportunistically in the survey area. The dominant family was Fabaceae with 33 taxa represented. A species list for

the survey area is presented in Appendix H. Table 9 lists the taxa most frequently recorded in the survey area during the survey.

Table 9: Taxa most frequently recorded in the survey area.

Family	Number of taxa
Fabaceae	33
Poaceae	22
Amaranthaceae	13
Genus	Number of taxa
<i>Acacia</i>	15
<i>Ptilotus</i>	10
<i>Senna</i>	6

3.2.5 Conservation Significance of Flora

No flora listed as threatened under either the EPBC Act pursuant to the WC Act was recorded. No priority flora species were detected within the survey area.

3.2.6 Introduced Flora

Of the 127 flora species recorded in the survey area eight are weed species: **Aerva javanica* (kapok bush), **Cenchrus ciliaris* (buffel grass), **C. setiger* (birdwood grass), **Citrullus colocynth* (colocynth), **Flaveria trinervia* (speedy weed), **Malvastrum americanum* (spiked malvastrum), **Portulaca oleracea* (purslane) and **Vachellia farnesiana* (mimosa bush). **Portulaca oleracea* is considered naturalised in northern Western Australian (Hussey et al. 2007) (Table 10). None of these species is listed as declared pests under the BAM Act nor are they listed WONS (Australian Weeds Committee 2012). Descriptions of the introduced flora and the outcomes of the IPP Process assessment are provided in Appendix I, Tables I.1-I.3. Introduced flora locations within the survey area have been mapped and are also presented in Appendix I.

Table 10: Introduced flora species recorded in the survey area.

Species	Common name	Family	Number of individuals	Habitat
<i>*Aerva javanica</i>	Kapok bush	Amaranthaceae	170	Hillslopes, plains.
<i>*Cenchrus ciliaris</i>	Buffel grass	Poaceae	820	Floodplains, drainage lines, plains, hillslopes.
<i>*Cenchrus setiger</i>	Birdwood grass	Poaceae	3150	Floodplains, creeks.
<i>*Citrullus colocynth</i>	Colocynth	Cucurbitaceae	3	Undulating plains.
<i>*Flaveria trinervia</i>	Speedy weed	Asteraceae	3	Drainage lines, floodplains.
<i>*Malvastrum americanum</i>	Spiked malvastrum	Malvaceae	96	Floodplains, drainage lines, undulating plains.
<i>*Portulaca oleracea</i>	Purslane	Portulacaceae	225	Stony plains, clay plains.
<i>*Vachellia farnesiana</i>	Mimosa bush	Fabaceae	33	Drainage lines, floodplains

3.2.7 Tree Inspections

None of the 10 trees within the 11 inspection points were identified as being conservation significant. No trees existed within the vicinity of one location point, MCNP-4. Inspection data and photographs for all trees are presented in Appendix J.

3.3 Fauna

3.3.1 Fauna Habitats and Condition

Based on the field survey and the identified vegetation associations, six broad fauna habitat types were identified in the survey area. The habitats are broadly described as:

- Minor drainage lines (Plate 24): Scattered *Corymbia hamersleyana* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees over mixed dense *Acacia* tall shrubland over spinifex hummock grassland on red sandy clay soils.
- Major drainage line (Plate 25): Eucalypt woodland over *Melaleuca* low woodland over tussock grassland on red sandy clay loam soils.
- Undulating hills (hilltops and hillslopes) (Plate 26): Scattered *Corymbia hamersleyana* and/or *Eucalyptus leucophloia* subsp. *leucophloia* trees over *Acacia* low shrubland over open spinifex hummock grasslands on skeletal red stony soils.
- Spinifex stony plain (Plate 27): Sparse *Acacia* shrublands over open spinifex hummock or tussock grasslands on red-brown stony soils, with or without *Acacia xiphophylla*.
- Spinifex sand plain (Plate 28): *Acacia* open shrubland over spinifex hummock grassland on red sandy soils.
- Grasslands on alluvial plain (Plate 29): Grasslands of either *Triodia wiseana* hummock grassland, mixed *T. wiseana* hummock grassland and *Themeda triandra* tussock grassland or *Sorghum* sp. tussock grassland on red sandy clay loam soils.

Habitats in the survey area ranged from ‘disturbed’ to ‘high quality’ (Thompson and Thompson 2010) condition. The condition of the habitat depended on how well vegetation from the previous cleared transmission pad had regrown, presence of weeds and cattle. Habitats that were rated as ‘disturbed’ showed signs of disturbance through clearing of the pad, weed infestation from a number of different species, grazing and pastoral activities. Disturbance within the survey area was considered localised and not severe, and as such the area retains its connectivity with other surrounding habitats.



Plate 15: Minor drainage line habitat.



Plate 16: Major drainage line habitat.



Plate 17: Undulating hill (hilltops and slopes) habitat.



Plate 18: Spinifex stony plain habitat.



Plate 19: Spinifex sand plain habitat.



Plate 20: Grasslands on alluvial plain habitat.

3.3.2 Fauna Observations

A total of 30 fauna species, were recorded during the survey through direct observation or indirect evidence (Table 11). During the field survey 24 birds were identified by sight and/or voice calls, including one species of conservation significance, the Australian bustard (*Ardeotis australis*). Four mammal species and two reptile species were also observed either through direct observation or indirect evidence (Table 11), none of which has conservation significance.

Table 11: Fauna species recorded during the survey.

Species name	Common name	Observation type
Birds		
<i>Geopelia cuneata</i>	Diamond dove	Individual(s)
<i>Phaps chalcoptera</i>	Common bronzewing	Individual(s)
<i>Ocyphaps lophotes</i>	Crested pigeon	Individual(s)
<i>Haliastur sphenurus</i>	Whistling kite	Individual(s)
<i>Falco cenchroides</i>	Australian kestrel	Individual(s)
<i>Ardeotis australis</i>	Australian bustard	Individual(s)
<i>Eolophus roseicapilla</i>	Galah	Individual(s)
<i>Melopsittacus undulatus</i>	Budgerigar	Individual(s)
<i>Platycercus varius</i>	Mulga parrot	Individual(s)
<i>Smicronis brevirostris</i>	Weebill	Individual(s)
<i>Acanthagenys rufogularis</i>	Spiny-cheeked honeyeater	Individual(s)
<i>Epthianura tricolor</i>	Crimson chat	Individual(s)
<i>Lichenostomus virescens</i>	Singing honeyeater	Individual(s)
<i>Lichmera indistincta</i>	Brown honeyeater	Individual(s)
<i>Colluricincla harmonica rufiventris</i>	Grey shrike-thrush	Individual(s)
<i>Oreoica gutturalis</i>	Crested bellbird	Individual(s)
<i>Pachycephala rufiventris</i>	Rufous whistler	Individual(s)
<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike	Individual(s)
<i>Artamus personatus</i>	Masked woodswallow	Individual(s)
<i>Cracticus nigrogularis</i>	Pied butcherbird	Individual(s)
<i>Cracticus torquatus</i>	Grey butcherbird	Individual(s)
<i>Rhipidura leucophrys</i>	Willie wagtail	Individual(s)
<i>Corvus orru</i>	Torresian crow	Individual(s)
<i>Taeniopygia guttata</i>	Zebra finch	Individual(s)
Reptiles		
<i>Ctenophorus isolepis</i>	Military dragon	Individual(s)
<i>Ctenophorus caudicinctus</i>	Ring-tailed dragon	Individual(s)
Mammals		
<i>Macropus robustus erubescens</i>	Euro	Individual(s), scats, tracks
<i>Canis lupus dingo</i>	Dingo	Individual(s), scats, tracks
<i>Felis catus</i>	Cat	Individual(s)
<i>Bos taurus</i>	European cattle	Scats, tracks

All the vertebrate fauna species recorded in the survey area are known for the Pilbara bioregion and are typical for the Chichester subregion. No species were outside their expected distribution and were common and ubiquitous for the local vicinity.

3.3.3 Conservation Significance of Fauna

A brief habitat description for each of the Commonwealth and State listed terrestrial vertebrate fauna of conservation significance; and an assessment of the likelihood of the species occurring within the survey area, is provided in Table 12.

Of the conservation significant fauna identified during the desktop study, the lined soil-crevice skink (*Notoscincus butleri*), Pilbara olive python (*Liasis olivaceus barroni*), cattle egret (*Ardea ibis*), eastern great egret (*Ardea modesta*), white-bellied sea eagle (*Haliaeetus leucogaster*), eastern osprey (*Pandion haliaetus*), barn swallow (*Hirundo rustica*), oriental plover (*Charadrius veredus*), oriental pratincole (*Glareola maldivarum*), star finch (*Neochmia ruficauda subclarescens*), greater bilby (*Macrotis lagotis*) and northern marsupial mole (*Notoryctes caurinus*) all have a low likelihood of occurring in the survey area (Table 12).

There is a moderate likelihood of the blind snake (*Ramphotyphlops ganei*), fork-tailed swift (*Apus pacificus*), flock bronzewing (*Phaps histrionica*), bush stone-curlew (*Burhinus grallarius*), northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), Pilbara leaf-nosed bat (*Rhinonictes aurantia*) and Lakeland Down mouse (*Leggadina lakedownensis*). The northern quoll and two conservational significant bat species (ghost bat, Pilbara leaf-nosed bat) are only likely to use the survey area for foraging purposes; no suitable den sites or active roost caves were recorded in the survey area.

The Australian bustard (*Ardeotis australis*), rainbow bee-eater (*Merops ornatus*) and western pebble-mound mouse (*Pseudomys chapmani*) are considered to have a high likelihood of being present in the survey area (Table 12). Two individual Australian bustards were recorded during the survey and although no western pebble-mound mouse mounds were recorded in the survey area, they are likely to be adjacent to the survey area and use the survey area for foraging.

Table 12: Fauna habitat descriptions and likelihood of occurrence in the survey area.

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
Reptiles							
<i>Notoscincus butleri</i>	Lined soil-crevice skink			P4	Associated with spinifex dominated areas near creek and river margins	Low	Low
<i>Liasis olivaceus barroni</i>	Pilbara olive python		VU	S1	Generally rocky habitats in close association to permanent and semi-permanent water sources	Low	Low
<i>Ramphotyphlops ganei</i>	Blind snake			P4	Possibly associated with moist gorges and gullies (Wilson and Swan 2008), although it has been found on hill slopes.	Moderate	Moderate
Birds							
<i>Apus pacificus</i>	Fork-tailed swift	Mi	S3		Largely aerial species independent of the terrestrial environment	High	Moderate
<i>Ardea ibis</i>	Cattle egret	Mi	S3		Largely wetland species however can exploit drier open habitats more than other heron species	Low	Low
<i>Ardea modesta</i>	Eastern great egret	Mi	S3		Wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral)	Low	Low

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
<i>Haliaeetus leucogaster</i>	White-bellied sea eagle	Mi	S3		Coastal habitats and around terrestrial wetlands	Low	Low
<i>Pandion haliaetus</i>	Eastern osprey	Mi	S3		Littoral and coastal habitats and terrestrial wetlands	Low	Low
<i>Hirundo rustica</i>	Barn swallow	Mi			Open country in coastal lowlands, often near water, towns and cities and also in or over freshwater wetlands, <i>Melaleuca</i> woodland and tussock grassland	Low	Low
<i>Phaps histrionica</i>	Flock Bronzewing			P4	Mainly found on open Mitchell Grass grasslands but also in saltbush, bluebush and <i>Triodia</i> hummock grasslands, grassy woodlands, recently burnt areas, roadsides and agricultural lands	Moderate	Moderate
<i>Ardeotis australis</i>	Australian bustard			P4	Open or lightly wooded grasslands, <i>Triodia</i> hummock grassland, chenopod flats and plains	High	High – recorded during the survey
<i>Burhinus grallarius</i>	Bush stone-curlew			P4	Woodlands and dense shrublands including along ephemeral or permanent watercourses	Moderate	Moderate

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
<i>Charadrius veredus</i>	Oriental plover	Mi	S3		Breeding habitat includes arid grasslands and salt pans whereas non-breeding habitat includes grasslands, salt-fields and coastal areas	Low	Low
<i>Glareola maldivarum</i>	Oriental Pratincole	Mi			Open plains, floodplains or short grassland near terrestrial wetlands.	Low	Low
<i>Merops ornatus</i>	Rainbow bee-eater	Mi	S3		Lightly wooded, preferably sandy, country near water such as drainage channels and creek lines	High	High
<i>Neochmia ruficauda subclarescens</i>	Star finch (Western)			P4	Drainage lines and low lying areas with surface semi-permanent permanent water bodies, especially with well-developed reed beds	Low	Low
Mammals							
<i>Dasyurus hallucatus</i>	Northern quoll	EN	S1		Dissected rocky escarpments and rocky eucalypt woodland	Moderate	Moderate
<i>Macrotis lagotis</i>	Greater bilby, dalgyte	VU	S1		Sand or sandy-loam in hummock grassland (<i>Triodia</i>) and or <i>Acacia</i> shrublands	Low	Low
<i>Notoryctes caurinus</i>	Northern marsupial mole, karkarratul	VU	S1		Lives primarily underground of sand dunes and sandy soils along river flats	Low	Low

Scientific name	Common name	Conservation codes			Preferred habitat	Extent of habitat in the survey area	Likelihood in survey area
		EPBC	WC	DPaW			
<i>Macroderma gigas</i>	Ghost bat			P4	A wide range from rainforest, monsoon and vine scrub in the tropics to open woodlands and arid areas	Moderate (foraging)	Moderate (foraging)
<i>Rhinonictoris aurantia (Pilbara form)</i>	Pilbara Leaf-nosed Bat	VU	S1		Deep warm, humid caves or rock cracks	Moderate (foraging)	Moderate (foraging)
<i>Pseudomys chapmani</i>	Western pebble-mound mouse			P4	Gentle rocky slopes, hills and spurs with small pebble surface cover and sparse vegetation	High	High – although no mounds recorded
<i>Leggadina lakedownensis</i>	Lakeland Downs mouse			P4	Sandy soils and cracking clays in WA	Moderate	Moderate

HIGH

Species recorded within, or in proximity to, the survey area within 20 km; suitable habitat occurs

MODERATE

Species recorded outside survey area, but within 20 km; limited suitable habitat occurs

LOW

Species rarely, or not recorded, within 20 km, and/or suitable habitat does not occur

4 Discussion

The survey area occurs on low undulating hills and stony plains occurring at the southern extent of the Chichester Ranges. The low hills and plains are dominated by a shrub steppe of *Acacia* species over hard and soft spinifex grasslands. Creek lines and minor drainage tracts which intersect the survey area are characterised by a similar suite of flora species as the surrounding survey area but comprise a greater density of species.

The vegetation recorded in the survey area is considered typical of what might be expected on these landforms in the Pilbara bioregion and each of the vegetation associations mapped in the survey area has been generally described in the broader Chichester Range area (Van Vreeswyk et al 2004).

No Commonwealth or State listed TECs were recorded within the survey area (DPaW 2013c, DSEWPaC 2013c). The survey area in its entirety lies within the mapped buffer of the PEC, 'Four plant assemblages of the Wona Land System' (DPaW 2013c). Within this PEC there are four plant assemblages that are considered susceptible to known threats or have constituent rare/restricted species (DPaW 2013b). One mapped vegetation association (H7), which was represented by only one relevé (MVNP-O.48), was considered analogous with one of these plant assemblages: 'Annual *Sorghum* grasslands on self mulching clays'. This plant assemblage is considered to be restricted to the Pannawonica-Robe valley end of the Chichester Range (DPaW 2013b). The analogous vegetation association was observed as extending beyond the survey area boundaries and, given the relatively small size and previously disturbed nature of the application area, it is unlikely that any proposed activities will have a significant impact on this plant assemblage.

Although tracks and pads comprising the survey area have been previously cleared, the diversity of species that had regenerated reflected the intact surrounding vegetation and there was little evidence of other negative impacts such as grazing from introduced herbivores or weed invasion. The condition of vegetation adjacent to the survey corridor ranged from 'poor' to 'excellent'. There was evidence of a fire within five years of the survey in the eastern part of the alignment. Although the transmission corridor has been *in situ* for a number of years, the clearing of vegetation within this corridor does not appear to have had significant impact on the structure or quality of vegetation surrounding.

No threatened or priority flora were recorded in the survey area. Although only limited baseline flora surveys have been conducted within the vicinity of the survey area, the suite of flora species recorded was considered typical of what may be expected in the area (Van Vreeswyk et al 2004). Rainfall in the 12 months preceding the survey was approximately 242 mm above the long-term average, with 276 mm of rain received three months prior to the survey (BOM 2013). Given that the field survey was conducted following good seasonal rainfall, it is likely that of the 13 priority flora species considered to have the greatest potential to occur in the area, they would have been observed and recorded during the field survey if they were present.

None of the eight introduced flora species recorded in the survey area, **Aerva javanica* (kapok bush), **Cenchrus ciliaris* (buffel grass), **C. setiger* (birdwood grass), **Citrullus colocynthis* (colocynthis), **Flaveria trinervia* (speedy weed), **Malvastrum americanum* (spiked malvastrum), **Portulaca oleracea* (purslane) and **Vachellia farnesiana* (mimosa bush) are listed as declared pests under the BAM Act (DAFWA 2013) and none are listed WONS (Australian Weeds Committee 2012). **Portulaca oleracea* is considered a native species in the northern parts of Western Australia (Hussey et al. 2007). Six of the eight introduced flora species have each been rated as having a 'high' ecological impact and seven species as having 'rapid' level of invasiveness by the IPP process (DEC 2011). Four of the introduced flora species have been previously recorded within the Millstream-Chichester National Park (DEC 2011b), within which the survey area lies. It is recommended that to prevent

further weed incursion into the National Park that weed management and hygiene practices are considered during transmission line track repair and service pad maintenance activities.

The survey area supports six fauna habitat type, rated to be 'disturbed' to 'high quality' (Thompson and Thompson 2010), depending on the level of clearing, weed infestation and grazing by cattle. A range and abundance of fauna species are likely to utilise this habitat in the survey area, however, the total area proposed to be cleared (26.15 ha) is considered small at a regional scale, and the habitats recorded are widespread and common in the immediate vicinity of the survey area. The survey area is well connected to surrounding similar habitats and is not considered a critical linkage or corridor for fauna. Potential impacts of the proposed clearing on vertebrate fauna may include direct mortality of individuals (small reptiles or mammals) and loss of habitat through clearing.

The survey area does not contain any significant fauna habitat such as roosting caves, active den sites or major drainage lines with permanent water, which support conservation significant species such as the Pilbara olive python, Pilbara leaf-nosed bat, ghost bat and northern quoll. These species may utilise the survey area for foraging or dispersal purposes at intermittent times but are unlikely to be directly impacted by the project given that they are mobile species and likely to be transient to the area.

One species of conservation significance, the Australian bustard (*Ardeotis australis*) was recorded within the survey area. Two individuals were recorded within the grasslands on alluvial plain habitat. This species however is not confined to the survey area and is not likely to be directly impacted by the proposed clearing. Similarly, the rainbow bee-eater (*Merops ornatus*) and western pebble-mound mouse (*Pseudomys chapmani*) that were assessed as having a high likelihood of occurring within the survey area are also unlikely to be directly impacted, given these species are highly mobile and the relatively small size of the proposed clearing. No active pebble-mound mouse mounds were recorded within the survey area.

5 Assessment against the Department of Environment Regulation's 10 Clearing Principles

The proposal to clear vegetation within the Millstream Chichester transmission tower network survey area is considered below in terms of the DER's 10 Clearing Principles under Schedule 5 of the EP Act, which stipulate that native vegetation should not be cleared if:

1. It comprises a high level of biological diversity

The application area is 26.15 ha and is approximately 60 km south-east of Karratha. It lies within the Chichester subregions of the Pilbara IBRA bioregion.

Following excellent seasonal conditions, a Level 1 flora and vegetation survey of the application area was conducted by Astron in September 2013. A total of 127 vascular flora species representing 74 genera from 28 families were recorded.

Fourteen vegetation associations were also mapped and described for the survey area. The vegetation associations recorded are considered typical of what might be expected on these land forms in the Pilbara bioregion and each has been generally described in the broader Chichester Range area (Van Vreeswyk et al 2004).

The application area lies within the mapped buffer of the 'Four plant assemblages of the Wona Land System' PEC (DPaW 2013c). One vegetation association recorded within the application area during the field survey was considered analogous with the 'Annual Sorghum grasslands on self mulching clays' plant assemblage of this PEC. The analogous vegetation association extended beyond the application area boundaries and, given the relatively small size and previously disturbed nature of the application area, it is unlikely that any proposed activities will have a significant impact on this plant assemblage.

No threatened or priority flora species were recorded within the application area during the field survey (Astron 2013). Eight introduced flora species were recorded within the survey area, **Aerva javanica* (kapok bush), **Cenchrus ciliaris* (buffel grass), **C. setiger* (birdwood grass), **Citrullus colocynthis* (colocynthis), **Flaveria trinervia* (speedy weed), **Malvastrum americanum* (spiked malvastrum), **Portulaca oleracea* (purslane) and **Vachellia farnesiana* (mimosa bush).

Five fauna habitat types were recorded in the survey area: minor and major drainage line; spinifex stony plain; undulating hills; spinifex sand plain and grasslands on alluvial plains. These habitat types extended beyond the survey area and are not considered a critical linkage or corridor for fauna. Therefore the habitats within the survey area are unlikely to support a greater level of faunal diversity than the surrounding areas.

Based on the information presented above, the survey area does not contain a level of biodiversity that is restricted to the survey area; in addition the area of clearing (26.15 ha) is not significant in the local or regional context. Therefore, the proposed clearing is not likely to be at variance to this Principle.

2. It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

The survey area includes five broad fauna habitat types: minor and major drainage line; spinifex stony plain; undulating hills; spinifex sand plain and grasslands on alluvial plains. Three conservation significant fauna species have been assessed as having high potential of occurring within the survey area:

- *Ardeotis australis* Australian bustard (P4)
- *Merops ornatus* Rainbow bee-eater (Mi,S3)
- *Pseudomys chapmani* Western pebble-mound mouse (P4)

The Australian bustard was recorded during the survey. Although the rainbow bee-eater and western pebble-mound mouse (no mounds) were not recorded during the survey they are considered likely to utilise the survey area for foraging purposes or as a transient.

While the habitats within the survey area may be utilised by the conservation significant fauna species listed above, mainly as a part of a larger foraging area, the proposed area for clearing is small in a regional context, is contiguous and is considered unlikely to significantly impact on these species. The majority of the species listed are highly mobile and are likely to move away from the area being disturbed.

Based on the above information and the limited amount of clearing (26.15 ha), the proposed clearing is not likely to be at variance to the Principle.

3. It includes, or is necessary for the continued existence of, rare flora

No threatened flora species have been recorded within 50 km of the survey area (DPaW 2013d, 2013e, 2013f). A botanist from Astron traversed the survey area and did not observe any threatened flora; nor did the survey area contain suitable habitat for threatened flora.

Based on the results of a comprehensive survey of the proposed clearing area, the proposed clearing is not at likely to be variance to this Principle.

4. It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community

No TECs listed under the EPBC Act have been located within or adjacent to the survey area (DPaW 2013c, DSEWPaC 2013c). The state listed TEC '*Themeda grasslands on cracking clays (Hamersley Station, Pilbara)*' is the nearest known TEC to the application area. It is located approximately 80 km to the north-west of the application area and, at this distance it is unlikely that the proposed clearing will have an impact on this TEC. A field survey (Astron 2013) verified that no vegetation analogous to any Pilbara TEC is located within the survey area.

Given that no TECs occur within, or in close proximity, to the proposed clearing area, the proposed clearing is not likely to be at variance to this Principle.

5. It is significant as a remnant of native vegetation in an area that has been extensively cleared

The application area occurs within the Pilbara IBRA bioregion, the Shire of Ashburton and within pre-European vegetation associations 152, 173, 175, 587 and 607. All vegetation associations have greater than 99% of their pre-European extent remaining (Table 1) and therefore the proposal does not represent a significant amount of clearing at a local and regional scale.

Table 1: Extent of region and pre-European vegetation remaining (Government of Western Australia 2013a).

	Pre-European (ha)	Current extent (ha)	% Remaining	% Remaining in DPaW reserves
IBRA Bioregion				
Pilbara	17,808,657	17,733,584	99.58	8.41
Shire				
Shire of Ashburton	10,086,658	10,059,963	99.74	15.76
Pre-European Vegetation Association in IBRA bioregion				
152	177,946	177,845	99.94	7.29
173	1,752,521	1,747,678	99.72	13.66
175	507,860	507,467	99.92	4.83
587	580,729	580,697	99.99	20.98
607	120,789	120,600	99.84	12.86

The vegetation described and mapped within the application area by Astron (2013) been generally described in the broader Chichester Range area (Van Vreeswyk et al 2004). Clearing of the relatively small area of native vegetation within the application area will not significantly reduce the known pre-European extent.

The survey area is not within a highly-cleared landscape and is not a critical corridor for fauna dispersal.

Based on the above, the proposed clearing is not at variance to this Principle.

6. It is growing in, or in association with, an environment associated with a watercourse or wetland

There are no regionally significant wetlands or watercourses with permanent water within the application area. The Portland River and many of its drainage tributaries intersect the southern portion of the application area, while tributaries of the Harding River and Western Creek intersect the northern extent of the application area. The Portland River does contain some vegetation that grows in association with watercourses, such as *Eucalyptus victrix* (coolabah), however this vegetation, and that of the smaller drainage lines, is well represented within the broader region.

The proposed clearing is not likely to be at variance to this Principle.

7. The clearing of the vegetation is likely to cause appreciable land degradation

The application area has been mapped as intersecting the following seven land systems:

- Capricorn – this land system is characterised by hills and ridges of sandstone and dolomite supporting low shrublands or shrubby spinifex grasslands (Van Vreeswyk et al 2004). Soils are predominantly stony, with some red shallow loams and sands also present. The stoniness of the soils confers resistance to erosion (Van Vreeswyk et al 2004).
- McKay – this land system is characterised by hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands (Van Vreeswyk et al 2004). Stony soils are the principal soil type of this land system and they are not prone to degradation or erosion (Van Vreeswyk et al 2004).
- River – this land system is characterised by active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands (Van Vreeswyk et al 2004). The majority of soils in this land system are deep red/brown non-cracking clays and red loamy earths. This system is largely stabilised by buffel and spinifex and accelerated erosion is uncommon, however susceptibility to erosion is high or very high if vegetative cover is removed (Van Vreeswyk et al 2004).
- Robe – this land system is characterised by low limonite mesas and buttes supporting soft spinifex, and occasionally hard spinifex, grasslands (Van Vreeswyk et al 2004). Stony soils and shallow gravel soils comprise the majority of soils in this land system. It is not generally susceptible to vegetation degradation or erosion (Van Vreeswyk et al 2004).
- Rocklea – this land system is characterised by basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands (Van Vreeswyk et al 2004). Soils are mainly stony soils, red shallow loams and calcareous shallow loams. The system is considered to have very low erosion hazard (Van Vreeswyk et al 2004).
- Satirist – this land system is characterised by stony plains and low rises supporting hard spinifex grasslands, and gilgai plains supporting tussock grasslands (Van Vreeswyk et al 2004). Seventy percent of this land system is comprised of deep red/brown non-cracking clays and self-mulching cracking clays. As such, this system is not generally susceptible to erosion (Van Vreeswyk et al 2004).
- Wona – this land system is characterised by basalt upland gilgai plains supporting tussock grasslands and minor hard spinifex grasslands (Van Vreeswyk et al 2004). Self-mulching cracking clays and, deep red/brown non-cracking clays and red loamy earths form the major soil types of this system. It is not considered susceptible to erosion except if the stony mantle is removed (Van Vreeswyk et al 2004).

The removal of vegetation from the soils of the above land systems may result in some wind and water erosion, however given the general stony and clayey nature of the soils it is unlikely to be significant. In addition, the proposed clearing area is 26.15 ha and is not likely to cause appreciable land degraded.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

8. The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

The application area is located within the Millstream-Chichester National Park and as such, the proposed clearing would occur within a conservation area. However, vegetation, flora and fauna values of the application area are not unique to the proposed area of clearing; having been broadly described for the greater Chichester Range area (Van Vreeswyk et al 2004).

The proposed area of clearing (26.15 ha) is not significant in a local or regional context and is associated with pre-existing infrastructure. It is not expected that the proposed clearing will have a detrimental effect on the environmental values of the Millstream-Chichester National Park, as therefore the proposed clearing is not likely to be at variance to this Principle.

9. The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

The northern portion of the application area is located within the Harding Dam catchment area (Department of Water (DoW) 2008). Tributaries of Western Creek and Harding River which intersect the northern portion of the application area terminate in the Harding Dam. Harding Dam is located approximately 30 km north of the application area (DoW 2013). Due to the small area of clearing (26.15 ha) it is considered unlikely that the proposed clearing will impact the quality of water within the Harding Dam. The southern portion of the application area is intersected by one ephemeral river, the Portland River, and numerous narrow drainage tracts which form part of the Fortescue River catchment zone. There may be potential for increased run-off, with higher sedimentation, to flow towards the Harding Dam and Fortescue River system as a result of the proposed vegetation clearing. However, given the distance of the application area from the dam and Fortescue River this is unlikely to have a significant impact on the quality of surface or underground water.

The proposed clearing is not likely to be at variance to this Principle.

10. The clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding

Following cyclonic activity, localised natural flooding events may occur in the Pilbara region. Due to the regionally small amount of clearing (26.15 ha), the gentle decline of the surrounding plains away from the ranges, the frequent narrow drainage tracts which dissect the application area and scale of the works proposed, it is unlikely that the proposed clearing of vegetation will exacerbate the incidence or intensity of flooding in the area.

Therefore, the proposed clearing is not likely to be at variance to this Principle.

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Appendix A: Definitions, Categories and Criteria for Conservation Significant Flora, Vegetation and Fauna

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Table A.1: Categories of threatened ecological communities (DEC 2010).

PD: Presumed Destroyed
<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed.</p>
CR : Critically Endangered
<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <p>i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);</p> <p>ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.</p> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);</p> <p>ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;</p> <p>iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.</p> <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>

En: Endangered

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

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

- A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement **and either or both** of the following apply (i or ii):
 - i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);
 - ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
- B) Current distribution is limited, **and one or more** of the following apply (i, ii or iii):
 - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);
 - ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;
 - iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
- C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

VU: Vulnerable

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

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

- A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
- B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
- C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

Table A.2: Definitions and criteria for priority ecological communities (DEC 2010).

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

P1: Priority One – Poorly-known ecological communities
Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two – Poorly-Known ecological communities
Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three – Poorly-Known ecological communities
(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4: Priority Four
Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5: Priority Five – Conservation dependent ecological communities
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Table A.3: Definitions and Criteria for Threatened Ecological communities (DSEWPaC 2013).

Three categories exist for listing threatened ecological communities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). An ecological community may be categorised:

Categories of ecological communities	
Critically endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Table A.4: Conservation codes for Western Australian flora and fauna (DPaW 15 May 2013).

Code	Conservation category	Definition
X	Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice and Wildlife Conservation (Rare Flora) Notice under the <i>Wildlife Conservation Act 1950</i> . <ul style="list-style-type: none"> • Presumed Extinct Fauna • Presumed Extinct Flora (Declared Rare Flora – Extinct) 	Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
T	Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice and Wildlife Conservation (Rare Flora) Notice under the <i>Wildlife Conservation Act 1950</i> . <ul style="list-style-type: none"> • Threatened Fauna (Fauna that is rare or is likely to become extinct) • Threatened Flora (Declared Rare Flora - Extant) 	Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
IA	Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice under the <i>Wildlife Conservation Act 1950</i> . <ul style="list-style-type: none"> • Birds protected under an international agreement 	Birds that are subject to an agreement between governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction.
S	Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice under the <i>Wildlife Conservation Act 1950</i> . <ul style="list-style-type: none"> • Other specially protected fauna 	Fauna that is in need of special protection, otherwise than for the reasons mentioned in the above schedules.
<p>Threatened fauna and flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria:</p> <ul style="list-style-type: none"> • CR: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild. • EN: Endangered - considered to be facing a very high risk of extinction in the wild. • VU: Vulnerable - considered to be facing a high risk of extinction in the wild. 		

Table A.5: Priority species under Western Australian Wildlife Conservation Act 1950.

Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora and Priority Fauna Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These taxa require regular monitoring. Conservation Dependent species are placed in Priority 5.

<p>P1: Priority One – Poorly known taxa</p> <p>Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.</p>
<p>P2: Priority Two – Poorly known taxa</p> <p>Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.</p>
<p>P3: Priority Three – Poorly known taxa</p> <p>Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.</p>
<p>P4: Priority Four: Rare, near threatened and other taxa in need of monitoring</p> <p>(a) Rare. Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. (b) Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
<p>P5: Priority Five: Conservation dependent taxa</p> <p>Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxa becoming threatened within five years.</p>

Table A.6: Categories and definitions for EPBC Act listed flora and fauna species (DEWSPaC 2013).

Conservation category	Definition
Extinct	Taxa not definitely located in the wild during the past 50 years.
Extinct in the wild	Taxa known to survive only in captivity.
Critically endangered (CR)	Taxa facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (E)	Taxa facing a very high risk of extinction in the wild in the near future.
Vulnerable (V)	Taxa facing a high risk of extinction in the wild in the medium term.
Near threatened (NT)	Taxa that risk becoming Vulnerable in the wild.
Conservation dependant (CD)	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened.
Data deficient (insufficiently known) (DD)	Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.
Least concern (LC)	Taxa that are not considered threatened.

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Appendix B: Categories of Introduced Flora Species

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Table B.1: Declared pests categories as gazetted under the *Biosecurity and Agriculture Management Act 2007* (Department of Agriculture and Food 2013).

Category	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Table B.2: Invasive Plant Prioritisation (IPP) process rating system (DEC 2011).

Field	Description	Code	Code description
Potential Distribution	Area of potential habitat in the Region that could be occupied of the area at risk of invasion by the weed.	L	Limited (localised)
		M	Moderate
		H	High
		E	Extensive (widespread)
		U	Unknown
Current Distribution	Area of habitat in the Region currently occupied by the weed.	L	Limited (localised)
		M	Moderate
		H	High
		E	Extensive (widespread)
		U	Unknown
Survey Effort	Survey effort of IBRA.	Nil	0%
		Some	0 - 25%
		Patchy	25 – 50%
		Extensive	50 – 75%
		Complete	75 – 100%
Abundance	Density class across one or more IBRA regions in the DEC region.	Occasional	Light – scattered individual plants (< 10 populations or 1 – 10% of IBRA region)
		Common	Medium to scattered patches with isolated plants interspersed (>10 populations or 11 – 50% of IBRA region)
		Abundant	Heavy to large infestations (>100 populations or 51 – 100% of IBRA region)
Ecological Impact	Impact of species with the Region, from low impact (causes minimal disruption to ecological processes or loss of	L	Low impact species
		M	Medium impact species
		H	High impact species

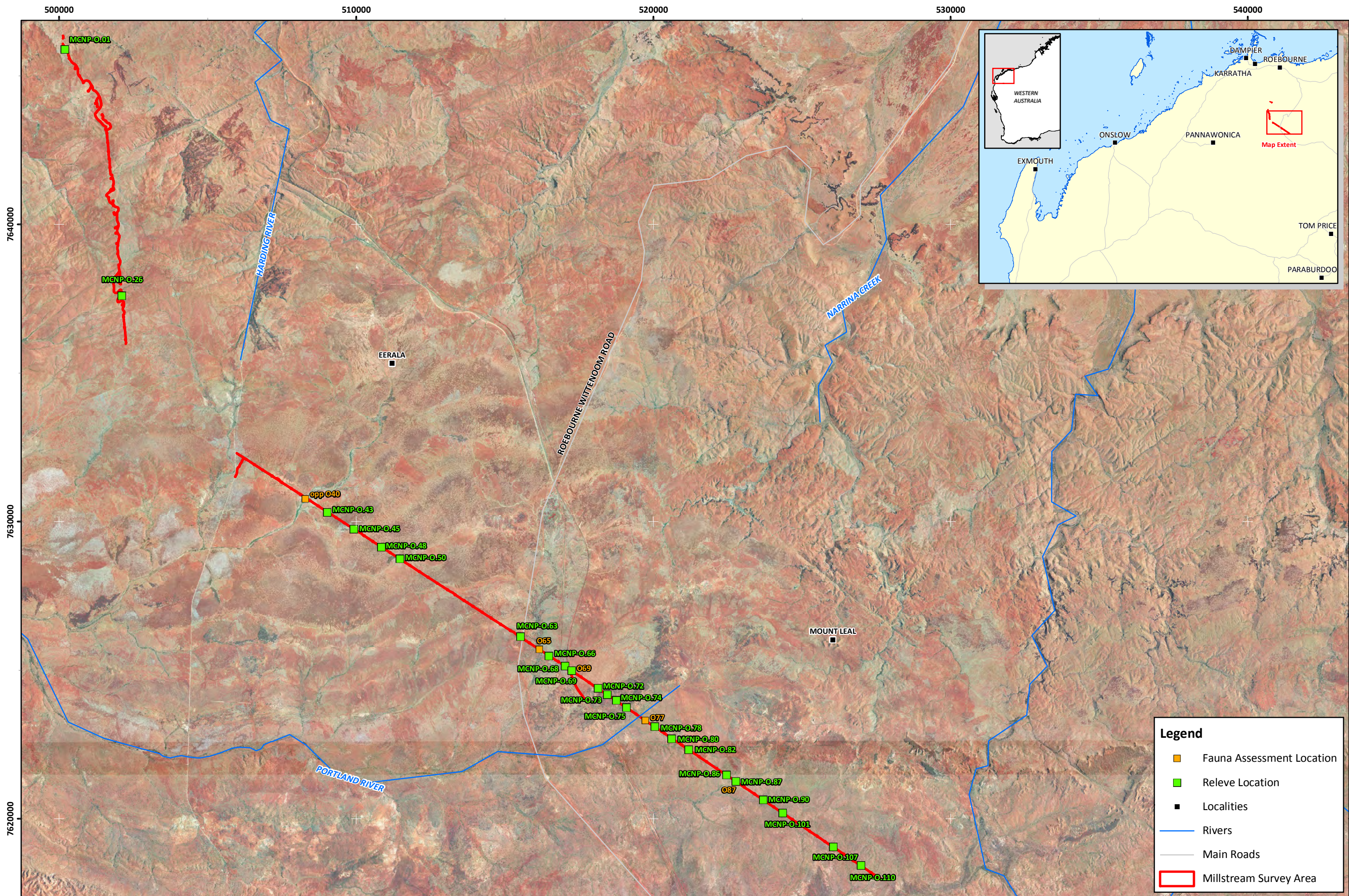
Field	Description	Code	Code description
	biodiversity) to high (causes acute disruptions of ecological processes, dominates and/or significantly alters the vegetation structure, composition and function of ecosystems).	U	Unknown
Impact attributes	List of known ecological impact attribute, based on Platt et al (2005).	1	Changed fire regime
		2	Changed nutrient conditions
		3	Changed hydrological patterns
		4	Changed soil erosion patterns
		5	Changed geomorphological processes
		6	Changed biomass distribution
		7	Changed light distribution
		8	Loss of biodiversity
		9	Substantially reduces regeneration opportunities of native plants
		10	Allelopathic effects
Invasiveness	Rate of spread of a weed in native vegetation, encompassing factors of establishment, reproductions (time to seeding, seed production, vegetative reproductions) and dispersal (wind, water, flying animals, ground animals, deliberate human spread, vehicles, produce contaminant).	S	Slow
		M	Moderate
		R	Rapid
		U	Unknown
Feasibility of Control	The longer a coordinated control program takes to achieve its desired goal, the more expensive and less feasible it becomes. Key factors to consider include how widespread a weed is, ease of finding infestations, difficulty of limiting the weeds dispersal, willingness of landholders and governments to control the weed, and commercial use of the plant.	L	Low feasibility infestation
		M	Moderate feasibility infestation
		H	High feasibility infestation
		U	Unknown
General Trend	General trend in distribution and abundance across the region.	Decreasing	
		Increasing	
		Stable	

Field	Description	Code	Code description
		Unknown	
Status	Define whether the species is outside the region, considered emerging (density class of occasional), established (density class of common or abundant) or unknown.	Outside	Occurs outside the region but known from WA
		Emerging	Density class of occasional
		Established	Density class of common or abundant
		Unknown	Current status in doubt or unknown

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Appendix C: Relevè and Fauna Assessment Locations

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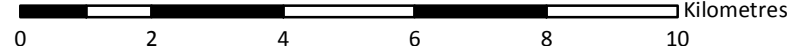
Rio Tinto Iron Ore
 Millstream Level 1 Survey and NVCP

Figure C.1: Relieve and Fauna Assessment Locations

Author: N Cadd

Drawn: H. Thornton

Datum: GDA 1994
 Projection: MGA Zone 50



Date: 15-11-2013

Figure Ref: 14233-13-GDR-1Rev0_131115_MillstreamNVCP_FigC1

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Appendix D: Vegetation Classification and Condition and Fauna Habitat Condition Scales

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Table D.1: Vegetation Classification System Specht (1970) as modified by Aplin (1979).

Stratum	70-100% cover	30-70% cover	10-30% cover	2-10% cover	<2% cover
Trees > 30 m	Tall closed forest	Tall open Forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees < 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Shrubs > 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs < 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Grasses, sedges, herbs	Closed tussock grassland/ sedgeland/ herbland	Tussock grassland/ sedgeland/ herbland	Open tussock grassland/ sedgeland/ herbland	Very open tussock grassland/ sedgeland/ herbland	Scattered tussock grasses / sedges / herbs

Table D.2: Summary of adapted Vegetation condition scale as adapted from Trudgen (1988).

Vegetation condition	Condition description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very Poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Table D.3: Fauna habitat condition scale (Thompson and Thompson 2010).

Habitat condition	Condition description
High Quality Fauna Habitat	These areas closely approximate the vegetation mix and quality that would have been in the area prior to any human induced disturbance. The habitat has connectivity with other habitats and is likely to support the most natural vertebrate fauna assemblage.
Very Good Fauna Habitat	These areas show minimal signs of human induced disturbance (e.g. grazing, clearing, fragmentation, weeds) and retain almost all of the characteristics of the habitat had it not been disturbed. The habitat has connectivity with other habitats, and fauna assemblages in these areas are likely to be minimally effected by disturbance.
Good Fauna Habitat	These areas show signs of human induced disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat had it not been disturbed. The habitat still retains some connectivity with other habitats but fauna assemblages in these areas are likely to be affected by disturbance. Fauna assemblages in these areas are likely to be similar to what might be expected in this habitat.
Disturbed Fauna Habitat	These areas show signs of human induced significant disturbance (e.g. mining, clearing, tracks and roads). Many of the trees, shrubs and undergrowth have died or have been cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain an abundance of weeds or have been damaged by vehicles or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.
Highly Degraded Fauna Habitat	These areas often have a significant human induced loss of vegetation, and / or a large number of vehicle tracks and / or have been completely cleared, and / or areas have been heavily grazed or farmed. There is limited or no fauna habitat connectivity. Fauna assemblages in these areas are likely to differ significantly from what existed prior to the disturbance, and are often depleted compared to what existed prior to the disturbance.

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Appendix E: Database Search Results

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Your Ref: **14233-13**
Our Ref: **37-0813FL**
Enquiries: Myrto Robert
Phone: (08) 9218 8760
Fax: (08)
Email: flora.data@dpaw.wa.gov.au

Astron Environmental Services

129 Royal Street
East Perth WA 6004

Attention: Janelle Atkinson

Dear Janelle Atkinson,

REQUEST FOR THREATENED AND PRIORITY FLORA INFORMATION

I refer to your request of 05 August 2013 for Threatened (Declared Rare) and Priority Flora information in the Millstream-Chichester National Park area. The search was conducted within 50km linear area of the coordinates you submitted.

A search was undertaken for this area of **(1)** the Department's *Threatened (Declared Rare) and Priority Flora* database (for results, *if any*, see "TPFL" – coordinates are GDA94), **(2)** the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, *if any*, see "WAHERB"- coordinates are GDA94 – see condition number 9 in the attached 'Conditions in Respect of Supply' and **(3)**, the Department's *Threatened and Priority Flora List* [this list is searched using 'place names'. This list, which may also be used as a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, *if any*, see "TP List"]. The results are attached electronically to this email.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point, which refers to the requirement to undertake field investigations for the accurate determination of Threatened and Priority flora occurrence at a site. *The information supplied should be regarded as an indication only of the Threatened and Priority flora that may be present and may be used as a target list in any surveys undertaken.*

The information provided does not preclude you from obtaining and complying with, where necessary, land clearing approvals from other agencies.

An invoice for \$300 (plus GST) to supply this information will be forwarded.

It would be appreciated if any populations of Threatened and Priority flora you encounter in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss Threatened and Priority flora management, please contact Dr Ken Atkins, Manager, Species and Communities Branch, on (08) 9334 0455.

Yours faithfully

Miss Myrto Robert

.....
A/THREATENED FLORA DATABASE OFFICER
for the Director General

19 August 2013

Species and Communities Branch

17 Dick Perry Ave, Technology Park, Kensington
Phone: (08) 9334 0455 Fax: (08) 9334 0278

Locked Bag 104, Bentley Delivery Centre, Bentley, Western Australia 6983

www.dpaw.wa.gov.au

DEPARTMENT OF PARKS AND WILDLIFE

THREATENED (DECLARED RARE) AND PRIORITY FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Director General, Department of Parks and Wildlife, Attention: Threatened Flora Database Officer, Species and Communities Branch.
2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Director General, Department of Parks and Wildlife.
3. Specific locality information for Threatened and Priority Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information may not be used in public reports without the written permission of the Director General, Department of Parks and Wildlife. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. Species and Communities Branch is to be contacted for guidance on the presentation of Threatened and Priority Flora information.
4. Note that the Department of Parks and Wildlife respects the privacy of private landowners who may have Threatened and Priority Flora on their property. Threatened and Priority Flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Parks and Wildlife.
5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Parks and Wildlife accepts no responsibility for this.
6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
7. **It should be noted that the supplied data do not necessarily represent a comprehensive listing of the Threatened and Priority Flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.**
8. Acknowledgment of the Department of Parks and Wildlife as source of the data is to be made in any published material. The unique reference number that is given upon the request for information should be quoted when referencing the data. Copies of all such publications are to be forwarded to the Department of Parks and Wildlife, Attention: The Manager, Species and Communities Branch.
9. The development of the PERTH Herbarium database was not originally intended for electronic mapping (eg. GIS ArcView). The latitude and longitude coordinates for each entry are not verified prior to being databased. It is only in recent times that collections have been submitted with GPS coordinates. Therefore, be aware when using this data in ArcView that some records may not plot to the locality description given with each collection.

Species and Communities Branch

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DECLARED RARE AND PRIORITY FLORA LIST

CONSERVATION CODES

for Western Australian taxa

T: **Threatened Flora** (Declared Rare Flora - Extant)
Schedule 1 under the *Wildlife Conservation Act 1950* Rare Flora Notice

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: **Presumed Extinct Flora** (Declared Rare Flora – Extinct)
Schedule 2 under the *Wildlife Conservation Act 1950* Rare Flora Notice

Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.

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

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

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

VU: **Vulnerable** - considered to be facing a high risk of extinction in the wild.

A list of the current rankings can be downloaded from DEC's [Listing of species and ecological communities](http://www.dec.wa.gov.au/content/view/full/852/2010/) webpage at <http://www.dec.wa.gov.au/content/view/full/852/2010/>

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Possibly threatened species that have not been adequately surveyed to be listed as Threatened are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora. Species that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.

1: Priority One: Poorly-known species

Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

2: Priority Two: Poorly-known species

Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.

3: Priority Three: Poorly-known species

Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

4: Priority Four: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

5: Priority Five: Conservation Dependent species

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

Recommendations for additions, deletions or changes to the Declared Rare and Priority Flora List should be forwarded to the Flora Administration Officer or Senior Botanist Species and Communities Branch, DEC.

Species and Communities Branch

17 Dick Perry Ave, Technology Park, Kensington

Phone: (08) 9334 0455 Fax: (08) 9334 0278

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ABBREVIATIONS USED IN THREATENED AND PRIORITY FLORA DATABASE

VESTING

AAP	Aboriginal Planning Authority
AGR	Chief Executive, Dep. of Agriculture
ALT	Aboriginal Land Trust
APB	Agricultural Protection Board of WA
BGP	Botanical Gardens & Parks Authority
BSA	Boy Scouts Association
CC	Conservation Commission – NPNCA - LFC
CGT	Crown Grant in Trust
COM	Commonwealth of Australia
CRO	Crown Freehold-Govt Ownership
CRW	Crown
DAG	Dep. of Agriculture
DOW	Dep. of Water
DPI	Dep. of Planning
EXD	Exec Direc CALM
FES	Fire and Emergency Services Aust.
HOW	Dep. of Housing/State Housing Commission
ILD	Industrial Lands Develop. Auth
LAC	LandCorp
LGA	Shire/LGA
MAG	Minister for Agriculture
MCB	Metropolitan Cemeteries Board
MED	Ministry of Education
MHE	Minister for Health
MIN	Minister for Mines
MPL	Ministry for Planning
MPR	Minister for Prisons
MRD	Main Roads WA
MTR	Minister for Transport
MWA	Minister for Water Resources
MWO	Minister for Works
NAT	Natural Trust of Australia WA
NON	Not Vested
PLB	Pastoral Lands Board
PRI	Private/Freehold
RAI	Public Transport Authority
REL	Religious Organisation
SPC	State Planning Commission
SYN	Synergy (ex Western Power)
SWA	State of Western Australia
TEL	Telstra
UNK	Unknown
WAT	Water Corporation
WEL	Minister Community Welfare
WRC	Water & Rivers Commission
XPL	Ex-Pastoral Lease

PURPOSES

ABR	Aboriginal Reserve
ACC	Access Track
AER	Aerodrome
AIR	Airport
ARS	Agricultural Research Station
BAP	Baptist Union of WA
CAM	Camping
CAR	Caravan park
CEM	Cemetery
CFA	Conservation of Fauna
CFF	Conservation Of Flora & Fauna
CFL	Conservation of Flora
CHU	Church
CMN	Communications
COM	Common
CON	Conservation Park
CPK	Car Park
CRM	Conservation & Resource Management
DEF	Defence
DRA	Drain

EDE	Educational Endowment
EDU	Educational purposes UWA
ENE	Enjoyment of Natural Environ.
EPL	Ex-pastoral Lease (Sect 33(2) CALM Act)
EPS	Explosives
EXC	Excepted from sale
EXL	Exploration Lease
EXP	Experimental Farm
FIR	Firing Range
FOR	State Forest
FP	Foreshore Purposes
GE	General Lease
GHA	Grain Handling
GOL	Golf
GRA	Gravel Pit
GVT	Government Requirements
HAR	Harbour Purposes
HEP	Heritage Purposes
HER	Heritage trail
HOS	Hospital
KEN	Kennels
LGA	LGA/Shire Requirements
LPR	Landscape Protection
MIN	Mining lease
MUN	Municipal Purposes
NPK	National Park
NRE	Nature Reserve
OTH	Other
PAR	Parkland (& Recreation)
PAS	Pastoral lease
PCR	Proposed for Conservation
PFF	Protection of Flora & Fauna
PFL	Protection of Flora
PIC	Picnic ground
PLA	Plantation
PMC	Protection of Meteorite Crater
POS	Public Open Space
PPA	Public parkland
PRS	Prison site
PUR	Purchase Lease
PUT	Public Utility
QUA	Quarry
RAC	Racecourse
RAD	Radio Station
REC	Recreation
REH	Rehabilitation/Re-establish Native Plants
RRE	Railway Reserve
RUB	Rubbish
SAL	Saleyards
SAN	Sand
SCH	School-site
SET	Settlers requirements
SHO	Showgrounds
SNN	Sanitary
SOI	Soil Conservation
STO	Stopping place
STK	Stock Route
TIM	Timber
TOU	Tourism
TOW	Town-site
TRA	Training Ground
TRI	Trig station
UCL	Unallocated Crown Land
UNK	Unknown
VER	Road Verge
VPF	Vermin Proof Fence
WAT	Water
WLS	Wildlife Sanctuary
WOO	Firewood

ABBREVIATIONS USED IN THE WESTERN AUSTRALIAN HERBARIUM DATABASE

Geocode Method - The method that was used to record the latitude and longitude.

Auto - Indicates that the coordinate data in the record was created automatically (i.e. by software), usually by creating a coordinate from information provided in the Nearest Named Place or Locality textual description fields.

GAP - Acronym for "Generalised Arbitrary Point" as used in HISPID. GAP indicates that the coordinate data was obtained manually from the Nearest Named Place or Locality textual description fields.

GPS - Acronym for "Global Positioning System". GPS indicates that the coordinate data in the record was obtained from a GPS unit by the collector of the specimen.

MAN - Shorthand for manual. MAN indicates that the coordinate data was created by hand using some method not allowed for by one of the other manual Geocode Method values, in particular, TOPO, GAP, or GPS.

TOPO - Shorthand for topographic map. TOPO indicates that the coordinate data was obtained by plotting textual locality details against a topographic map.

None - Indicates that no coordinate data has been supplied by the collector.

Unknown - Indicates that there is no known method for determining the coordinate data. Should be used if the collector provided no indication of how they sampled the specimen's coordinate data.

PREC (Precision) - precision ratings for coordinates.

Precision 1: Absolutely precise (to nearest 100m or nearest second) and must be GPS determined. For example 35°26'42"S 123°40'26"E

Precision 2: Falling within a diameter of 3km (ca 2 minutes) or if no GPS mentioned in collecting notes. (The location must be able to be pinpointed on a 1:250 000 map, a spot locality. For example 35°26'42"S 123°40'26"E

Precision 3: Falling within a diameter of 10km (ca 7 minutes) or for degrees and minutes, where seconds have not been given. For example 35°26'_"S 123°40'_"E

Precision 4: Falling within a diameter of ca 50km (30 minutes). For example 35°26'_"S 123°40'_"E

Precision 5: Where a location is a prescribed large geographical area within a state or only the state is given. Diameter is greater than 50km. For example 35°_"_"S 123°_"_"E

Precision 6: used when localities are New Holland, Eastern Australia or Not given. Fields will be left blank.

PopId	Nameid	Taxon	Cons Status	Pop Number	Gda94Lat	Gda94Long	Vesting	Purpose1	Purpose2	CountDate	
93388	16730	Eragrostis crateriformis		3	1	-21.330889	117.271472	CC	NPK	10/04/1997 0:00	
93389	16730	Eragrostis crateriformis		3	2	-21.206278	117.204278	CC	NPK	26/05/1997 0:00	
84466	882	Fimbristylis sieberiana		3	6	-21.590833	117.069722	CC	NPK	28/05/2008 0:00	
89158	7530	Goodenia nuda		4	5	-21.725389	117.507333	WAT	WAT	19/05/2004 0:00	
87111	4517	Owenia acidula		3	2	-21.628417	117.065694	WAT	WAT	23/09/1990 0:00	
91534	13895	Paspalidium retiglume		2	1	-21.643472	117.483417	WAT	WAT	19/05/1997 0:00	
91535	13895	Paspalidium retiglume		2	2	-21.411056	117.165083	MRD	VER	NPK	20/05/1997 0:00
91536	13895	Paspalidium retiglume		2	3	-21.38975	117.162083	CC	NPK	21/05/1997 0:00	
87222	4674	Phyllanthus aridus		3	6	-21.335444	117.263083	CC	NPK	24/05/1997 0:00	
94933	19898	Senna sp. Millstream (E. Leyland s.n. 30/8/1990)		1	1	-21.628361	117.065694	WAT	WAT	30/08/1990 0:00	
87522	5313	Terminalia supranitifolia		3	5	-21.057228	116.804201	RDL	PAS	6/07/1986 0:00	

Taxon	Status	DECRegion	DECDistrict	Distribution	FloweringPeriod
Cladium procerum	2	PILB	KARRATHA	Karijini N.P., Millstream-Chichester N.P.	Nov
Eremophila youngii subsp. lepidota	4	GOLD,MWST,PILB	KALGOORLIE,EXMOUTH,KARRATHA,GERALDTON	Exmouth, Fortescue Marsh, Paraburdoo, Mulga Downs Stn., Jigalong Creek, Giralia Stn., Minilya	Mar,Jun
Euphorbia inappendiculata	3	PILB	KARRATHA	Tambrey Stn, Mt Edgar, Lyndon Stn, Millstream, Barlee Range, Warralong Stn, Fortescue River	Jun
Fimbristylis sieberiana	3	KIMB,PILB	EAST KIMBERLEY,WEST KIMBERLEY,KARRATHA	Hamersley Range, Millstream, Fitzroy Crossing, King Leopold Range, Halls Creek, Little Sandy Desert	-
Goodenia pallida	1	PILB	KARRATHA	Fortescue	
Livistona alfredii	4	PILB	EXMOUTH,KARRATHA	Millstream, Cave Creek, Cape Range	Nov-Dec
Oldenlandia sp. Hamersley Station (A.A. Mitchell PRP 1479)	3	PILB	KARRATHA	Millstream-Chichester N.P., Hamersley Range, Caoolawanyah Stn	Mar-May, Jul
Owenia acidula	3	PILB	KARRATHA	Mardie Stn, Millstream, Collier Range, Winning Stn., Minilya Stn, Boolathana Stn, Qld, NSW	Aug
Phragmites karka	3	KIMB,PILB	EAST KIMBERLEY,WEST KIMBERLEY,KARRATHA	Millstream, Doongan Stn., Dampier Peninsula, Kununurra, Charnley River	
Senna sp. Millstream (E. Leyland s.n. 30/8/1990)	1	PILB	KARRATHA	Millstream	Aug
Solanum albotellatum	3	PILB	KARRATHA	Millstream Chichester N.P., Pannawonica, Hamersley Stn.	
Sporobolus pulchellus	1	PILB	KARRATHA	Pyramid Stn	
Swainsona thompsoniana	3	PILB	KARRATHA	Tom Price, Coolawanya, Millstream, Karijin NP, Hamersley Stn	Mar, Aug-Sep
Tecticornia globulifera	1	PILB	KARRATHA	Fortescue Marsh	
Tecticornia medusa	3	PILB	KARRATHA	Roy Hill, Fortescue Marsh	Nov
Tecticornia sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	1	GOLD,PILB	KALGOORLIE,KARRATHA	Fortescue Marsh, Roy Hill Stn, Little Sandy Desert	Jul-Aug
Teucrium pilbaranum	1	PILB	KARRATHA	Newman, Millstream-Chichester N.P., Mulga Downs Stn.	May/Sep
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	3	PILB	KARRATHA	Karratha, Millstream, Hamersley Stn, West Angelas, Coondewanna Flats	
Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	PILB	KARRATHA	Millstream-chichester N.P., Mt Welcome Stn.	

Bird list for one degree square containing the point 117.17027, -21.35218

Common Name	Scientific Name	Species Profile	Map	Species
Emu	<i>Dromaius novaehollandiae</i>	view	map	
Stubble Quail	<i>Coturnix pectoralis</i>		map	
Brown Quail	<i>Coturnix ypsilophora</i>	view	map	
Black Swan	<i>Cygnus atratus</i>	view	map	
Australian Wood Duck	<i>Chenonetta jubata</i>	view	map	
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	view	map	
Grey Teal	<i>Anas gracilis</i>	view	map	
Pacific Black Duck	<i>Anas superciliosa</i>	view	map	
Hardhead	<i>Aythya australis</i>	view	map	
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	view	map	
Common Bronzewing	<i>Phaps chalcoptera</i>	view	map	
Crested Pigeon	<i>Ocyphaps lophotes</i>	view	map	
Spinifex Pigeon	<i>Geophaps plumifera</i>		map	
Diamond Dove	<i>Geopelia cuneata</i>		map	
Peaceful Dove	<i>Geopelia striata</i>	view	map	
Tawny Frogmouth	<i>Podargus strigoides</i>	view	map	
Spotted Nightjar	<i>Eurostopodus argus</i>		map	
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	view	map	
Australasian Darter	<i>Anhinga novaehollandiae</i>	view	map	
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	view	map	
Great Cormorant	<i>Phalacrocorax carbo</i>	view	map	
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	view	map	
Australian Pelican	<i>Pelecanus conspicillatus</i>	view	map	
Black Bittern	<i>Ixobrychus flavicollis</i>	view	map	
White-necked Heron	<i>Ardea pacifica</i>	view	map	
Eastern Great Egret	<i>Ardea modesta</i>	view	map	
Intermediate Egret	<i>Ardea intermedia</i>		map	
White-faced Heron	<i>Egretta novaehollandiae</i>	view	map	
Little Egret	<i>Egretta garzetta</i>	view	map	
Nankeen Night-Heron	<i>Nycticorax caledonicus</i>	view	map	
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	view	map	
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	view	map	
Black-shouldered Kite	<i>Elanus axillaris</i>	view	map	
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	view	map	
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	view	map	
Whistling Kite	<i>Haliastur sphenurus</i>	view	map	
Black Kite	<i>Milvus migrans</i>	view	map	
Brown Goshawk	<i>Accipiter fasciatus</i>	view	map	
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	view	map	

Spotted Harrier	<i>Circus assimilis</i>	view	map
Wedge-tailed Eagle	<i>Aquila audax</i>	view	map
Little Eagle	<i>Hieraaetus morphnoides</i>	view	map
Nankeen Kestrel	<i>Falco cenchroides</i>	view	map
Brown Falcon	<i>Falco berigora</i>	view	map
Australian Hobby	<i>Falco longipennis</i>		map
Peregrine Falcon	<i>Falco peregrinus</i>	view	map
Purple Swamphen	<i>Porphyrio porphyrio</i>	view	map
Buff-banded Rail	<i>Gallirallus philippensis</i>	view	map
Baillon's Crake	<i>Porzana pusilla</i>		map
Black-tailed Native-hen	<i>Tribonyx ventralis</i>	view	map
Eurasian Coot	<i>Fulica atra</i>	view	map
Australian Bustard	<i>Ardeotis australis</i>	view	map
Bush Stone-curlew	<i>Burhinus grallarius</i>	view	map
Black-fronted Dotterel	<i>Elseya melanops</i>	view	map
Banded Lapwing	<i>Vanellus tricolor</i>	view	map
Little Button-quail	<i>Turnix velox</i>		map
Gull-billed Tern	<i>Gelochelidon nilotica</i>	view	map
Caspian Tern	<i>Hydroprogne caspia</i>	view	map
Whiskered Tern	<i>Chlidonias hybrida</i>	view	map
Galah	<i>Eolophus roseicapillus</i>	view	map
Little Corella	<i>Cacatua sanguinea</i>	view	map
Cockatiel	<i>Nymphicus hollandicus</i>	view	map
Australian Ringneck	<i>Barnardius zonarius</i>	view	map
Budgerigar	<i>Melopsittacus undulatus</i>	view	map
Bourke's Parrot	<i>Neopsephotus bourkii</i>	view	map
Pheasant Coucal	<i>Centropus phasianinus</i>	view	map
Horsfield's Bronze-Cuckoo	<i>Chalcites basalıs</i>	view	map
Black-eared Cuckoo	<i>Chalcites osculans</i>	view	map
Pallid Cuckoo	<i>Cacomantis pallidus</i>	view	map
Barking Owl	<i>Ninox connivens</i>	view	map
Southern Boobook	<i>Ninox novaeseelandiae</i>	view	map
Eastern Barn Owl	<i>Tyto javanica</i>	view	map
Blue-winged Kookaburra	<i>Dacelo leachii</i>	view	map
Red-backed Kingfisher	<i>Todiramphus pyrrhopygius</i>		map
Sacred Kingfisher	<i>Todiramphus sanctus</i>	view	map
Rainbow Bee-eater	<i>Merops ornatus</i>	view	map
Black-tailed Treecreeper	<i>Climacteris melanura</i>		map
Western Bowerbird	<i>Ptilonorhynchus guttatus</i>		map
White-winged Fairy-wren	<i>Malurus leucopterus</i>		map
Variiegated Fairy-wren	<i>Malurus lamberti</i>	view	map
Rufous-crowned Emu-wren	<i>Stipiturus ruficeps</i>		map

Striated Grasswren	<i>Amytornis striatus</i>		map
Weebill	<i>Smicrornis brevirostris</i>	view	map
Western Gerygone	<i>Gerygone fusca</i>		map
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>		map
Red-browed Pardalote	<i>Pardalotus rubricatus</i>		map
Striated Pardalote	<i>Pardalotus striatus</i>	view	map
Singing Honeyeater	<i>Lichenostomus virescens</i>	view	map
Grey-headed Honeyeater	<i>Lichenostomus keartlandi</i>		map
Grey-fronted Honeyeater	<i>Lichenostomus plumulus</i>		map
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	view	map
Yellow-throated Miner	<i>Manorina flavigula</i>	view	map
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	view	map
Crimson Chat	<i>Epthianura tricolor</i>	view	map
Brown Honeyeater	<i>Lichmera indistincta</i>	view	map
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	view	map
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	view	map
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	view	map
White-winged Triller	<i>Lalage sueurii</i>	view	map
Rufous Whistler	<i>Pachycephala rufiventris</i>	view	map
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	view	map
Crested Bellbird	<i>Oreoica gutturalis</i>	view	map
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	view	map
Masked Woodswallow	<i>Artamus personatus</i>		map
Black-faced Woodswallow	<i>Artamus cinereus</i>	view	map
Little Woodswallow	<i>Artamus minor</i>		map
Grey Butcherbird	<i>Cracticus torquatus</i>	view	map
Pied Butcherbird	<i>Cracticus nigrogularis</i>	view	map
Australian Magpie	<i>Cracticus tibicen</i>	view	map
Grey Fantail	<i>Rhipidura albiscapa</i>	view	map
Willie Wagtail	<i>Rhipidura leucophrys</i>	view	map
Little Crow	<i>Corvus bennetti</i>		map
Torresian Crow	<i>Corvus orru</i>	view	map
Magpie-lark	<i>Grallina cyanoleuca</i>	view	map
Hooded Robin	<i>Melanodryas cucullata</i>	view	map
Horsfields Bushlark	<i>Mirafra javanica</i>	view	map
Australian Reed-Warbler	<i>Acrocephalus australis</i>	view	map
Little Grassbird	<i>Megalurus gramineus</i>	view	map
Rufous Songlark	<i>Cincloramphus mathewsi</i>	view	map
Brown Songlark	<i>Cincloramphus cruralis</i>	view	map
Spinifexbird	<i>Eremiornis carteri</i>		map
Yellow White-eye	<i>Zosterops luteus</i>		map
Fairy Martin	<i>Petrochelidon ariel</i>	view	map

Tree Martin	<i>Petrochelidon nigricans</i>		map
Mistletoebird	<i>Dicaeum hirundinaceum</i>	view	map
Zebra Finch	<i>Taeniopygia guttata</i>	view	map
Star Finch	<i>Neochmia ruficauda</i>		map
Painted Finch	<i>Emblema pictum</i>		map
Australasian Pipit	<i>Anthus novaeseelandiae</i>	view	map
Crow & Raven species			map

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Source: Atlas of Australian Birds

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NatureMap Species Report

Created By Guest user on 05/08/2013

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 117°04' 50" E,21°25' 06" S
Buffer 20km

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
1.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
2.	25332 <i>Acanthophis wellsi</i> (Pilbara Death Adder)			
3.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
4.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
5.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
6.	24831 <i>Acrocephalus australis</i> subsp. <i>gouldi</i> (Australian Reed Warbler)			
7.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
8.	-16957 <i>Amniataba percoides</i>			
9.	30833 <i>Amphibolurus longirostris</i>			
10.	25647 <i>Amytornis striatus</i> (Striated Grasswren)			
11.	24540 <i>Amytornis striatus</i> subsp. <i>whitei</i> (Striated Grasswren)			
12.	-11838 <i>Aname mellosa</i>			
13.	24312 <i>Anas gracilis</i> (Grey Teal)			
14.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
15.	-16329 <i>Anguilla bicolor</i>			
16.	24332 <i>Anhinga melanogaster</i> subsp. <i>novaeollandiae</i> (Darter)			
17.	25318 <i>Antaresia perthensis</i> (Pygmy Python)			
18.	24599 <i>Anthus australis</i> subsp. <i>australis</i> (Australian Pipit)			
19.	33970 <i>Antipodogomphus hodgkini</i> (dragonfly)		P2	Y
20.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
21.	25559 <i>Ardea intermedia</i> (Intermediate Egret)			
22.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
23.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
24.	-11437 <i>Arrenurus harveyi</i>			Y
25.	-11887 <i>Arrenurus liliaceus</i>			Y
26.	-11883 <i>Arrenurus purpureus</i>			
27.	-12256 <i>Arrenurus tripartitus</i>			
28.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
29.	24352 <i>Artamus cinereus</i> subsp. <i>melanops</i> (Black-faced Woodswallow)			
30.	25567 <i>Artamus leucorhynchus</i> (White-breasted Woodswallow)			
31.	24354 <i>Artamus leucorhynchus</i> subsp. <i>leucopygialis</i> (White-breasted Woodswallow)			
32.	24355 <i>Artamus minor</i> (Little Woodswallow)			
33.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
34.	-12961 <i>Arthrorhabdus mjobergi</i>			
35.	-11547 <i>Arthrorhabdus paucispinus</i>			
36.	-11679 <i>Aspidobates pilbara</i>			Y
37.	-12085 <i>Austrostrophus stictopygus</i>			
38.	-11438 <i>Axonopsella pilbara</i>			Y
39.	24318 <i>Aythya australis</i> (Hardhead)			
40.	25331 <i>Brachyurophis approximans</i>			
41.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)		P4	
42.	24725 <i>Cacatua roseicapilla</i> subsp. <i>assimilis</i> (Galah)			
43.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
44.	24727 <i>Cacatua sanguinea</i> subsp. <i>westralensis</i> (Little Corella)			
45.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
46.	24039 <i>Canis lupus</i> subsp. <i>dingo</i> (Dingo)	Y		
47.	25015 <i>Carlia munda</i>			
48.	25017 <i>Carlia triacantha</i>			
49.	25600 <i>Centropus phasianinus</i> (Pheasant Coucal)			
50.	24430 <i>Centropus phasianinus</i> subsp. <i>highami</i> (Pheasant Coucal)			
51.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
52.	24373 <i>Charadrius melanops</i> (Black-fronted Dotterel)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
53.	25339 <i>Chelodina steindachneri</i> (Flat-shelled Turtle)			
54.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
55.	24833 <i>Cincloramphus cruralis</i> (Brown Songlark)			
56.	24834 <i>Cincloramphus mathewsi</i> (Rufous Songlark)			
57.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
58.	24835 <i>Cisticola exilis</i> subsp. <i>exilis</i> (Golden-headed Cisticola)			
59.	24395 <i>Climacteris melanura</i> subsp. <i>wellsi</i> (Black-tailed Treecreeper)			
60.	-12064 <i>Clynotis albobarbatus</i>			
61.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
62.	24613 <i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
63.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
64.	24363 <i>Coracina novaehollandiae</i> subsp. <i>subpallida</i> (Black-faced Cuckoo-shrike)			
65.	-13143 <i>Cormocephalus turneri</i>			
66.	24416 <i>Corvus bennetti</i> (Little Crow)			
67.	25593 <i>Corvus orru</i> (Torresian Crow)			
68.	24418 <i>Corvus orru</i> subsp. <i>ceciliae</i> (Western Crow)			
69.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
70.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
71.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
72.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
73.	30893 <i>Cryptoblepharus buchananii</i>			
74.	25020 <i>Cryptoblepharus plagiocephalus</i>			
75.	30892 <i>Cryptoblepharus ustulatus</i>			
76.	25458 <i>Ctenophorus caudicinctus</i> (Ring-tailed Dragon)			
77.	24865 <i>Ctenophorus caudicinctus</i> subsp. <i>caudicinctus</i> (Ring-tailed Dragon)			
78.	24876 <i>Ctenophorus isolepis</i> subsp. <i>isolepis</i> (Crested Dragon, Military Dragon)			
79.	25036 <i>Ctenotus duricola</i>			
80.	25043 <i>Ctenotus grandis</i> subsp. <i>titan</i>			
81.	25045 <i>Ctenotus helenae</i>			
82.	25463 <i>Ctenotus pantherinus</i> (Leopard Ctenotus)			
83.	25064 <i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i> (Leopard Ctenotus)			
84.	25070 <i>Ctenotus robustus</i>			
85.	25072 <i>Ctenotus rubicundus</i>			
86.	25073 <i>Ctenotus saxatilis</i> (Rock Ctenotus)			
87.	25077 <i>Ctenotus serventyi</i>			
88.	25090 <i>Cyclodomorphus melanops</i> subsp. <i>melanops</i> (Slender Blue-tongue)			
89.	25375 <i>Cyclorana maini</i> (Sheep Frog)			
90.	-17742 <i>Cyclorana</i> sp.			
91.	24322 <i>Cygnus atratus</i> (Black Swan)			
92.	25547 <i>Dacelo leachii</i> (Blue-winged Kookaburra)			
93.	24304 <i>Dacelo leachii</i> subsp. <i>leachii</i> (Blue-winged Kookaburra)			
94.	24091 <i>Dasykaluta rosamondae</i> (Little Red Kaluta)			
95.	24093 <i>Dasyurus hallucatus</i> (Northern Quoll)		T	
96.	24998 <i>Delma elegans</i>			
97.	25001 <i>Delma nasuta</i>			
98.	25002 <i>Delma pax</i>			
99.	25295 <i>Demansia psammophis</i> subsp. <i>cupreiceps</i> (Yellow-faced Whipsnake)			
100.	25297 <i>Demansia rufescens</i> (Rufous Whipsnake)			
101.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
102.	24926 <i>Diplodactylus conspicillatus</i> (Fat-tailed Gecko)			
103.	41404 <i>Diplodactylus galaxias</i> (Northern Pilbara Beak-faced Gecko)			
104.	24937 <i>Diplodactylus mitchelli</i>			
105.	41406 <i>Egernia cygnitis</i> (Western Pilbara Spiny-tailed Skink)			
106.	25094 <i>Egernia formosa</i>			
107.	25101 <i>Egernia pilbarensis</i> (Pilbara Skink)			
108.	24631 <i>Emblema pictum</i> (Painted Finch)			
109.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
110.	42404 <i>Eremiascincus isolepis</i>			
111.	24837 <i>Eremiornis carteri</i> (Spinifex-bird)			
112.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
113.	25621 <i>Falco berigora</i> (Brown Falcon)			
114.	24471 <i>Falco berigora</i> subsp. <i>berigora</i> (Brown Falcon)			
115.	25622 <i>Falco cenchroides</i> (Australian Kestrel)			
116.	25727 <i>Fulica atra</i> (Eurasian Coot)			
117.	25301 <i>Furina ornata</i> (Moon Snake)			
118.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
119.	42314 <i>Gavicalis virescens</i> (Singing Honeyeater)			
120.	24956 <i>Gehyra pilbara</i>			
121.	24958 <i>Gehyra punctata</i>			
122.	24957 <i>Gehyra purpurascens</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
123.	24959 <i>Gehyra variegata</i>			
124.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
125.	25585 <i>Geopelia striata</i> (Zebra Dove)			
126.	24403 <i>Geopelia striata</i> subsp. <i>placida</i> (Peaceful Dove)			
127.	24404 <i>Geophaps plumifera</i> (Spinifex Pigeon)			
128.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
129.	-17538 <i>Glossogobius giuris</i>			
130.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
131.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
132.	24297 <i>Hamirostra melanosternon</i> (Black-breasted Buzzard)			
133.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
134.	24492 <i>Hirundo nigricans</i> subsp. <i>nigricans</i> (Tree Martin)			
135.	-11973 <i>Holconia neglecta</i>			
136.	25562 <i>Ixobrychus flavicollis</i> (Black Bittern)			
137.	24347 <i>Ixobrychus flavicollis</i> subsp. <i>australis</i> (Australian Black Bittern)		P3	
138.	-11592 <i>Koenikea branacha</i>			
139.	-12825 <i>Koenikea rubipes</i>			Y
140.	-12785 <i>Koenikea setosa</i>			
141.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
142.	24217 <i>Leggadina lakedownensis</i> (Short-tailed Mouse, Karekanga)		P4	
143.	34042 <i>Leiopotherapon aheneus</i> (Fortescue Grunter)		P4	
144.	25125 <i>Lerista bipes</i>			
145.	25135 <i>Lerista flammicauda</i>			
146.	25155 <i>Lerista muelleri</i>			
147.	30925 <i>Lerista verhmensis</i>			
148.	25005 <i>Lialis burtonis</i>			
149.	25238 <i>Liasis olivaceus</i> subsp. <i>barroni</i> (Pilbara Olive Python)		T	
150.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
151.	24582 <i>Lichmera indistincta</i> subsp. <i>indistincta</i> (Brown Honeyeater)			
152.	25392 <i>Litoria rubella</i> (Little Red Tree Frog)			
153.	30933 <i>Lucasium stenodactylum</i>			
154.	30934 <i>Lucasium wombeyi</i>			
155.	-12069 <i>Lycosa gibsoni</i>			
156.	24180 <i>Macroderma gigas</i> (Ghost Bat)		P4	
157.	24135 <i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)			
158.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
159.	24544 <i>Malurus lamberti</i> subsp. <i>assimilis</i> (Variegated Fairy-wren)			
160.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
161.	24549 <i>Malurus leucopterus</i> subsp. <i>leuconotus</i> (White-winged Fairy-wren)			
162.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
163.	25665 <i>Melithreptus gularis</i> (Black-chinned Honeyeater)			
164.	24589 <i>Melithreptus gularis</i> subsp. <i>laetior</i> (Black-chinned Honeyeater)			
165.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
166.	25184 <i>Menetia greyii</i>			
167.	25187 <i>Menetia surda</i> subsp. <i>surda</i>			
168.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
169.	25545 <i>Mirafra javanica</i> (Horsfield's Bushlark, Singing Bushlark)			
170.	24302 <i>Mirafra javanica</i> subsp. <i>horsfieldii</i> (Horsfield's Bushlark, Singing Bushlark)			
171.	-13138 <i>Missulena rutraspina</i>			
172.	-12868 <i>Mituliodon tarantulinus</i>			
173.	25193 <i>Morethia ruficauda</i> subsp. <i>exquisita</i>			
174.	24223 <i>Mus musculus</i> (House Mouse)	Y		
175.	-16877 <i>Nematalosa erebi</i>			
176.	-15818 <i>Nematalosa</i> sp.			
177.	-16516 <i>Neoarius graeffei</i>			
178.	25685 <i>Neochmia ruficauda</i> (Star Finch)			
179.	24639 <i>Neochmia ruficauda</i> subsp. <i>clarescens</i> (Star Finch)			
180.	-16960 <i>Neosilurus hyrtlii</i>			
181.	24972 <i>Nephurus wheeleri</i> subsp. <i>cinctus</i>			
182.	-17329 <i>Netuma bilineata</i>			
183.	24095 <i>Ningau timealeyi</i> (Pilbara Ningau)			
184.	25747 <i>Ninox connivens</i> (Barking Owl)			
185.	25748 <i>Ninox novaeseelandiae</i> (Boobook Owl)			
186.	33986 <i>Nososticta pilbara</i> (dragonfly)		P2	Y
187.	25196 <i>Notoscincus butleri</i> (Lined Soil-crevice Skink)		P4	
188.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
189.	24350 <i>Nycticorax caledonicus</i> subsp. <i>hilli</i> (Rufous Night Heron)			
190.	42365 <i>Nyctophilus daedalus</i> (Northwestern Long-eared Bat)			
191.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
192.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
193.	24976 <i>Oedura marmorata</i> (Marbled Velvet Gecko)			
194.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
195.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
196.	24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
197.	25254 <i>Parasuta monachus</i>			
198.	24627 <i>Pardalotus rubricatus</i> (Red-browed Pardalote)			
199.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
200.	24628 <i>Pardalotus striatus</i> subsp. <i>murchisoni</i> (Striated Pardalote)			
201.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
202.	24658 <i>Petroica cucullata</i> (Hooded Robin)			
203.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
204.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
205.	24411 <i>Phaps histrionica</i> (Flock Bronzewing, Flock Pigeon)		P4	
206.	-12389 <i>Ptilbarascutigera incola</i>			
207.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
208.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
209.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
210.	24908 <i>Pogona minor</i> subsp. <i>mitchelli</i> (Dwarf Bearded Dragon)			
211.	25706 <i>Pomatostomus temporalis</i> (Grey-crowned Babbler)			
212.	24684 <i>Pomatostomus temporalis</i> subsp. <i>rubeculus</i> (Grey-crowned Babbler)			
213.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
214.	24766 <i>Porphyrio porphyrio</i> subsp. <i>melanotus</i> (Purple Swamphen)			
215.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
216.	24105 <i>Pseudantechinus roryi</i> (Rory's Pseudantechinus)			
217.	24106 <i>Pseudantechinus woolleyae</i> (Woolley's Pseudantechinus)			
218.	25261 <i>Pseudechis australis</i> (Mulga Snake)			
219.	24233 <i>Pseudomys chapmani</i> (Western Pebble-mound Mouse, Ngadji)		P4	
220.	24234 <i>Pseudomys delicatulus</i> (Delicate Mouse)			
221.	24235 <i>Pseudomys desertor</i> (Desert Mouse)			
222.	24237 <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)			
223.	25432 <i>Pseudophryne douglasi</i> (Gorge Toadlet)			
224.	24172 <i>Pteropus alecto</i> (Black Flying-fox)			
225.	42323 <i>Ptilotula keartlandi</i> (Grey-headed Honeyeater)			
226.	42341 <i>Ptilotula penicillatus</i> (White-plumed Honeyeater)			
227.	25270 <i>Ramphotyphlops ammodytes</i>			
228.	25276 <i>Ramphotyphlops ganei</i> (blind snake)		P1	
229.	25277 <i>Ramphotyphlops grypus</i>			
230.	25315 <i>Ramphotyphlops pilbarensis</i>			
231.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
232.	24179 <i>Rhinonictes aurantius</i> (Orange Leafnosed-bat)		T	
233.	24452 <i>Rhipidura fuliginosa</i> subsp. <i>preissi</i> (Grey Fantail)			
234.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
235.	24454 <i>Rhipidura leucophrys</i> subsp. <i>leucophrys</i> (Willie Wagtail)			
236.	24982 <i>Rhynchoedura ornata</i> (Western Beaked Gecko)			
237.	-11987 <i>Scolopendra laeta</i>			
238.	-12059 <i>Scolopendra morsitans</i>			
239.	24200 <i>Scotorepens greyii</i> (Little Broad-nosed Bat)			
240.	30948 <i>Smicromis brevirostris</i> (Weebill)			
241.	24116 <i>Sminthopsis macroura</i> (Stripe-faced Dunnart)			
242.	25656 <i>Stipiturus ruficeps</i> (Rufous-crowned Emu-wren)			
243.	24556 <i>Stipiturus ruficeps</i> subsp. <i>ruficeps</i> (Rufous-crowned Emu-wren)			
244.	24927 <i>Strophurus elderi</i>			
245.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
246.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
247.	24207 <i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
248.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
249.	30871 <i>Taeniopygia guttata</i> subsp. <i>castanotis</i> (Zebra Finch)			
250.	-12836 <i>Tarsotomus aleantis</i>			Y
251.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
252.	25202 <i>Tiliqua multifasciata</i> (Central Blue-tongue)			
253.	42351 <i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			
254.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
255.	24851 <i>Turnix velox</i> (Little Button-quail)			
256.	30814 <i>Tympanocryptis cephalus</i> (Pebble Dragon)			
257.	41428 <i>Uperoleia saxatilis</i> (Pilbara Toadlet)			
258.	-11488 <i>Urodacus megamastigus</i>			
259.	25209 <i>Varanus acanthurus</i> (Spiny-tailed Monitor)			
260.	25210 <i>Varanus breviceuda</i> (Short-tailed Pygmy Monitor)			
261.	25526 <i>Varanus tristis</i> (Racehorse Monitor)			
262.	25311 <i>Vermicella snelli</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
263.	24205 <i>Vespadelus finlaysoni</i> (Finlayson's Cave Bat)			
264.	24857 <i>Zosterops luteus</i> (Yellow White-eye)			
265.	24248 <i>Zyomys argurus</i> (Common Rock-rat)			

Conservation Codes

- T - Rare or likely to become extinct
- X - Presumed extinct
- IA - Protected under international agreement
- S - Other specially protected fauna
- 1 - Priority 1
- 2 - Priority 2
- 3 - Priority 3
- 4 - Priority 4
- 5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap Species Report

Created By Guest user on 05/08/2013

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 117°04' 50" E,21°25' 06" S
Buffer 20km

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
1.	4884 <i>Abelmoschus ficulneus</i>			
2.	19589 <i>Abutilon dioicum</i>			
3.	4895 <i>Abutilon lepidum</i>			
4.	16916 <i>Abutilon trudgenii</i>			
5.	3198 <i>Acacia acradenia</i>			
6.	3205 <i>Acacia adsurgens</i>			
7.	3209 <i>Acacia ampliceps</i>			
8.	3214 <i>Acacia ancistrocarpa (Fitzroy Wattle)</i>			
9.	3224 <i>Acacia arrecta</i>			
10.	3241 <i>Acacia bivenosa</i>			
11.	3260 <i>Acacia citrinoviridis</i>			
12.	13403 <i>Acacia coleii</i>			
13.	17013 <i>Acacia coleii var. coleii</i>			
14.	17014 <i>Acacia coleii var. ileocarpa</i>			
15.	13502 <i>Acacia coriacea subsp. pendens</i>			
16.	16174 <i>Acacia elachantha</i>			
17.	3377 <i>Acacia inaequilatera (Baderi)</i>			
18.	3434 <i>Acacia maitlandii (Maitland's Wattle)</i>			
19.	3447 <i>Acacia monticola (Gawar, Lilwardi)</i>			
20.	3506 <i>Acacia pyrifolia (Ranji Bush, Kandji)</i>			
21.	29016 <i>Acacia pyrifolia var. morrisonii</i>			
22.	29015 <i>Acacia pyrifolia var. pyrifolia</i>			
23.	15215 <i>Acacia retivenea subsp. clandestina</i>			
24.	13078 <i>Acacia sclerosperma subsp. sclerosperma</i>			
25.	3553 <i>Acacia spondylophylla</i>			
26.	19456 <i>Acacia stellaticeps</i>			
27.	13070 <i>Acacia synchronicia</i>			
28.	3573 <i>Acacia tenuissima</i>			
29.	3579 <i>Acacia trachycarpa (Minni Ritchi, Balgali)</i>			
30.	29992 <i>Acacia trachycarpa x tumida var. pilbarensis</i>			
31.	20319 <i>Acacia tumida var. pilbarensis</i>			
32.	3606 <i>Acacia xiphophylla</i>			
33.	7811 <i>Acanthospermum hispidum (Starburr)</i>	Y		
34.	17739 <i>Acetosa vesicaria</i>	Y		
35.	2645 <i>Achyranthes aspera (Chaff Flower)</i>			
36.	17422 <i>Adriana tomentosa var. tomentosa</i>			
37.	2646 <i>Aerva javanica (Kapok Bush)</i>	Y		
38.	3680 <i>Aeschynomene indica (Budda Pea)</i>			
39.	2651 <i>Alternanthera nana (Hairy Joyweed)</i>			
40.	2652 <i>Alternanthera nodiflora (Common Joyweed)</i>			
41.	2653 <i>Alternanthera pungens (Khaki Weed)</i>	Y		
42.	17147 <i>Alysicarpus muelleri</i>			
43.	2660 <i>Amaranthus cuspidifolius</i>			
44.	20018 <i>Amaranthus undulatus</i>			
45.	5277 <i>Ammannia baccifera</i>			
46.	19835 <i>Amphipogon sericeus</i>			
47.	2369 <i>Amyema benthamii</i>			
48.	2380 <i>Amyema miquelii (Stalked Mistletoe)</i>			
49.	2383 <i>Amyema preissii (Wireleaf Mistletoe)</i>			
50.	11874 <i>Amyema sanguinea var. sanguinea</i>			
51.	215 <i>Aristida latifolia (Feathertop Wiregrass)</i>			
52.	227 <i>Astrebla elymoides (Weeping Mitchell Grass)</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
53.	229 <i>Astrelba pectinata</i> (Barley Mitchell Grass)			
54.	2453 <i>Atriplex codonocarpa</i> (Flat-topped Saltbush)			
55.	33030 <i>Austrobryonia pilbarensis</i>			
56.	5183 <i>Bergia ammannioides</i>			
57.	5184 <i>Bergia pedicellaris</i>			
58.	2769 <i>Boerhavia burbidgeana</i>			
59.	2770 <i>Boerhavia coccinea</i> (Tar Vine, Wituka)			
60.	2772 <i>Boerhavia gardneri</i>			
61.	2773 <i>Boerhavia paludosa</i>			
62.	11167 <i>Bonamia erecta</i>			
63.	37721 <i>Bonamia</i> sp. <i>Dampier</i> (A.A. Mitchell PRP 217)			
64.	239 <i>Bothriochloa bladhii</i> (Forest Bluegrass)			
65.	12716 <i>Brachychiton acuminatus</i>			
66.	7047 <i>Buchnera linearis</i> (Blackrod)			
67.	11150 <i>Cajanus pubescens</i>			
68.	2976 <i>Capparis lasiantha</i> (Split Jack, Balqarda)			
69.	2981 <i>Capparis spinosa</i>			
70.	11670 <i>Capparis spinosa</i> var. <i>nummularia</i> (Coastal Caper)			
71.	6567 <i>Carissa lanceolata</i> (Conkerberry, Marnuwiji)			
72.	2949 <i>Cassutha capillaris</i>			
73.	259 <i>Cenchrus echinatus</i> (Burrgrass)	Y		
74.	6214 <i>Centella asiatica</i>			
75.	30 <i>Ceratopteris thalictroides</i>			
76.	2494 <i>Chenopodium murale</i> (Nettle-leaf Goosefoot)	Y		
77.	266 <i>Chloris barbata</i> (Purpletop Chloris)	Y		
78.	269 <i>Chloris pectinata</i> (Comb Chloris)			
79.	273 <i>Chrysopogon fallax</i> (Golden Beard Grass)			
80.	766 <i>Cladium procerum</i>		P2	
81.	2988 <i>Cleome viscosa</i> (Tickweed, Tjinduwadhu)			
82.	6729 <i>Clerodendrum floribundum</i> (Lollybush)			
83.	13692 <i>Clerodendrum floribundum</i> var. <i>angustifolium</i>			
84.	13694 <i>Clerodendrum floribundum</i> var. <i>floribundum</i>			
85.	13689 <i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>			
86.	2778 <i>Codonocarpus cotinifolius</i> (Native Poplar, Kundurangu)			
87.	12767 <i>Corchorus aestuans</i>			
88.	13659 <i>Corchorus laniflorus</i>			
89.	4862 <i>Corchorus parviflorus</i>			
90.	17661 <i>Corchorus tectus</i>			
91.	4865 <i>Corchorus tridens</i>			
92.	4867 <i>Corchorus walcottii</i> (Woolly Corchorus)			
93.	17083 <i>Corymbia deserticola</i> subsp. <i>deserticola</i>			
94.	17077 <i>Corymbia ferriticola</i>			
95.	17093 <i>Corymbia hamersleyana</i>			
96.	3774 <i>Crotalaria cunninghamii</i> (Green Birdflower, Bilbun)			
97.	20175 <i>Crotalaria cunninghamii</i> subsp. <i>sturtii</i>			
98.	19378 <i>Crotalaria dissitiflora</i> subsp. <i>benthamiana</i>			
99.	3780 <i>Crotalaria juncea</i> (Sunnhemp)	Y		
100.	3783 <i>Crotalaria medicaginea</i>			
101.	20179 <i>Crotalaria medicaginea</i> var. <i>neglecta</i>			
102.	11231 <i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>			
103.	33031 <i>Cucumis maderaspatanus</i>			
104.	7371 <i>Cucumis melo</i> (Ulcardo Melon)	Y		
105.	12039 <i>Cucumis melo</i> subsp. <i>agrestis</i> (Ulcardo Melon, Gagalum)	Y		
106.	17117 <i>Cullen cinereum</i>			
107.	17436 <i>Cullen graveolens</i>			
108.	17118 <i>Cullen leucanthum</i>			
109.	17119 <i>Cullen leucochaites</i>			
110.	17116 <i>Cullen martinii</i>			
111.	17120 <i>Cullen pogonocarpum</i>			
112.	6216 <i>CyclospERMUM leptophyllum</i>	Y		
113.	279 <i>Cymbopogon ambiguus</i> (Scentgrass)			
114.	282 <i>Cymbopogon procerus</i> (Lemon Grass)			
115.	6584 <i>Cynanchum floribundum</i> (Dumara Bush, Tjipa)			
116.	283 <i>Cynodon dactylon</i> (Couch)	Y		
117.	774 <i>Cyperus bifax</i> (Downs Nutgrass)			
118.	798 <i>Cyperus iria</i>			
119.	814 <i>Cyperus squarrosus</i>			
120.	818 <i>Cyperus vaginatus</i> (Stiffleaf Sedge)			
121.	7424 <i>Dampiera candidans</i>			
122.	3853 <i>Desmodium filiforme</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
123.	3856 <i>Desmodium muelleri</i>			
124.	303 <i>Dichanthium fecundum</i> (Curly Bluegrass)			
125.	13741 <i>Dichanthium sericeum</i> subsp. <i>humilius</i>			
126.	7166 <i>Dicliptera armata</i>			
127.	4745 <i>Diplopeltis eriocarpa</i> (Hairy Pepperflower)			
128.	11320 <i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>			
129.	4759 <i>Dodonaea coriacea</i>			
130.	31274 <i>Duperreya commixta</i>			
131.	11890 <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			
132.	14301 <i>Ehretia saligna</i> var. <i>saligna</i>			
133.	827 <i>Eleocharis geniculata</i>			
134.	357 <i>Enneapogon caeruleus</i> (Limestone Grass)			
135.	360 <i>Enneapogon lindleyanus</i> (Wiry Nineawn, Purple-head Nineawn)			
136.	365 <i>Enneapogon polyphyllus</i> (Leafy Nineawn)			
137.	375 <i>Eragrostis cumingii</i> (Cuming's Love Grass)			
138.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
139.	380 <i>Eragrostis eriopoda</i> (Woollybutt Grass, Wangurnu)			
140.	398 <i>Eragrostis tenellula</i> (Delicate Lovegrass)			
141.	399 <i>Eragrostis xerophila</i> (Knotty-butt Neverfail)			
142.	16696 <i>Eremophila fraseri</i> subsp. <i>fraseri</i>			
143.	17597 <i>Eremophila latrobei</i> subsp. <i>filiformis</i>			
144.	7234 <i>Eremophila longifolia</i> (Berrigan, Tulypurpa)			
145.	7237 <i>Eremophila maculata</i> (Native Fuchsia)			
146.	16363 <i>Eremophila maculata</i> subsp. <i>brevifolia</i> (Native Fuchsia)			
147.	400 <i>Eriachne aristidea</i>			
148.	403 <i>Eriachne benthamii</i> (Swamp Wanderrie)			
149.	404 <i>Eriachne ciliata</i> (Slender Wandarrrie Grass)			
150.	407 <i>Eriachne festucacea</i> (Plains Wandarrrie Grass)			
151.	413 <i>Eriachne mucronata</i> (Mountain Wanderrie Grass)			
152.	421 <i>Eriachne tenuiculmis</i>			
153.	35343 <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>			
154.	18088 <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>			
155.	14548 <i>Eucalyptus victrix</i>			
156.	15592 <i>Eucalyptus xerothermica</i>			
157.	11011 <i>Eulalia aurea</i>			
158.	4614 <i>Euphorbia alsiniflora</i> (Namana)			
159.	4617 <i>Euphorbia australis</i> (Namana)			
160.	4619 <i>Euphorbia biconvexa</i>			
161.	4620 <i>Euphorbia boophthona</i> (Gascoyne Spurge)			
162.	9048 <i>Euphorbia careyi</i>			
163.	17896 <i>Euphorbia drummondii</i> subsp. <i>drummondii</i>			
164.	4630 <i>Euphorbia inappendiculata</i>		P3	
165.	12097 <i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Desert Spurge)			
166.	4650 <i>Euphorbia wheeleri</i>			
167.	11416 <i>Evolvulus alsinoides</i> var. <i>decumbens</i>			
168.	11200 <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			
169.	31578 <i>Ficus aculeata</i> var. <i>indecora</i> (Ranji)			
170.	19648 <i>Ficus brachypoda</i>			
171.	1753 <i>Ficus platypoda</i> (Native Fig, Makartu)			
172.	1759 <i>Ficus virens</i> (Albayi)			
173.	12096 <i>Ficus virens</i> var. <i>virens</i>			
174.	843 <i>Fimbristylis cephalophora</i>			
175.	850 <i>Fimbristylis depauperata</i>			
176.	855 <i>Fimbristylis ferruginea</i>			
177.	859 <i>Fimbristylis littoralis</i>			
178.	862 <i>Fimbristylis microcarya</i>			
179.	878 <i>Fimbristylis rara</i>			
180.	882 <i>Fimbristylis sieberiana</i>		P3	
181.	14318 <i>Flaveria</i> sp. Tom Price (M.E. Trudgen 11246)			
182.	35558 <i>Flaveria trinervia</i> (Speedy Weed)	Y		
183.	4654 <i>Flueggea virosa</i>			
184.	12013 <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> (Dogwood, Guwal)			
185.	18361 <i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>			
186.	18363 <i>Gomphrena canescens</i> subsp. <i>canescens</i>			
187.	2680 <i>Gomphrena cunninghamii</i>			
188.	12517 <i>Goodenia cusackiana</i>			
189.	7509 <i>Goodenia forrestii</i>			
190.	7514 <i>Goodenia havilandii</i>			
191.	7521 <i>Goodenia lamprosperma</i>			
192.	7526 <i>Goodenia microptera</i>			

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193.	12552 <i>Goodenia muelleriana</i>			
194.	12571 <i>Goodenia pascua</i>			
195.	7545 <i>Goodenia scaevolina</i> (Ngurubi)			
196.	10982 <i>Goodenia stobbsiana</i>			
197.	7556 <i>Goodenia tenuiloba</i>			
198.	4910 <i>Gossypium australe</i> (Native Cotton)			
199.	4918 <i>Gossypium robinsonii</i> (Wild Cotton)			
200.	19570 <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>			
201.	13440 <i>Grevillea wickhamii</i> subsp. <i>aprica</i>			
202.	19478 <i>Grevillea wickhamii</i> subsp. <i>hispidula</i>			
203.	6174 <i>Haloragis gossei</i>			
204.	23464 <i>Haloragis gossei</i> var. <i>inflata</i>			
205.	17299 <i>Heliotropium ammophilum</i>			
206.	6704 <i>Heliotropium conocarpum</i>			
207.	6705 <i>Heliotropium crispatum</i>			
208.	6706 <i>Heliotropium cunninghamii</i>			
209.	17305 <i>Heliotropium glanduliferum</i>			
210.	6712 <i>Heliotropium heteranthum</i>			
211.	17309 <i>Heliotropium pachyphyllum</i>			
212.	17313 <i>Heliotropium skeleton</i>			
213.	6718 <i>Heliotropium tenuifolium</i> (Mamukata)			
214.	29316 <i>Hibiscus austrinus</i>			
215.	29317 <i>Hibiscus austrinus</i> var. <i>austrinus</i>			
216.	4922 <i>Hibiscus brachychlaenus</i>			
217.	4925 <i>Hibiscus coatesii</i>			
218.	4930 <i>Hibiscus goldsworthii</i>			
219.	4933 <i>Hibiscus leptocladus</i>			
220.	11477 <i>Hibiscus sturtii</i> var. <i>platyclamys</i>			
221.	4944 <i>Hibiscus trionum</i> (Bladder Ketmia)			
222.	11897 <i>Hibiscus trionum</i> var. <i>vesicarius</i>			
223.	5215 <i>Hybanthus aurantiacus</i>			
224.	14587 <i>Indigostrum parviflorum</i>			
225.	3980 <i>Indigofera linifolia</i>			
226.	3981 <i>Indigofera linnaei</i> (Birdsville Indigo)			
227.	3982 <i>Indigofera monophylla</i>			
228.	3987 <i>Indigofera trita</i>			
229.	6623 <i>Ipomoea coptica</i>			
230.	6624 <i>Ipomoea costata</i> (Rock Morning Glory, Kanti)			
231.	6631 <i>Ipomoea lonchophylla</i> (Cowvine)			
232.	6633 <i>Ipomoea muelleri</i> (Poison Morning Glory, Yumbu)			
233.	11312 <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>			
234.	6637 <i>Ipomoea polymorpha</i>			
235.	12663 <i>Ischaemum albavillosum</i>			
236.	461 <i>Iseilema fragile</i>			
237.	465 <i>Iseilema vaginiflorum</i> (Red Flinders Grass)			
238.	3989 <i>Isotropis atropurpurea</i> (Poison Sage)			
239.	13553 <i>Jacquemontia pannosa</i>			
240.	12059 <i>Jasminum didymum</i> subsp. <i>lineare</i> (Desert Jasmine)			
241.	5024 <i>Keraudrenia nephrosperma</i>			
242.	19989 <i>Lepidium didymum</i>	Y		
243.	3035 <i>Lepidium pedicellosum</i>			
244.	19124 <i>Leptochloa fusca</i> subsp. <i>fusca</i>			
245.	1039 <i>Livistona alfredii</i> (Millstream Fan-palm)		P4	
246.	37480 <i>Lobelia arnhemiaca</i>			
247.	4060 <i>Lotus australis</i> (Austral Trefoil)			
248.	4061 <i>Lotus cruentus</i> (Redflower Lotus)			
249.	6136 <i>Ludwigia perennis</i>			
250.	2551 <i>Maireana melanocoma</i> (Pussy Bluebush)			
251.	4962 <i>Malvastrum americanum</i> (Spiked Malvastrum)	Y		
252.	13363 <i>Malvastrum coromandelianum</i>	Y		
253.	74 <i>Marsilea drummondii</i> (Common Nardoo)			
254.	75 <i>Marsilea exarata</i>			
255.	76 <i>Marsilea hirsuta</i> (Nardoo)			
256.	5875 <i>Melaleuca argentea</i> (Silver Cadjeput, Bandaran)			
257.	5879 <i>Melaleuca bracteata</i> (River Teatree)			
258.	5908 <i>Melaleuca eleuterostachya</i>			
259.	5915 <i>Melaleuca glomerata</i>			
260.	5933 <i>Melaleuca linophylla</i>			
261.	5051 <i>Melhania oblongifolia</i>			
262.	5053 <i>Melochia pyramidata</i>	Y		

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263.	39840 <i>Merremia dissecta</i> var. <i>dissecta</i>	Y		
264.	7082 <i>Mimulus gracilis</i>			
265.	29851 <i>Mollugo molluginea</i>			
266.	6201 <i>Myriophyllum verrucosum</i> (Red Water Milfoil)			
267.	138 <i>Najas marina</i> (Prickly Water Nymph)			
268.	139 <i>Najas tenuifolia</i> (Water Nymph)			
269.	3614 <i>Neptunia dimorphantha</i> (Sensitive Plant)			
270.	3617 <i>Neptunia monosperma</i>			
271.	6971 <i>Nicotiana benthamiana</i> (Tjuntiwari)			
272.	11331 <i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>			
273.	11856 <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			
274.	6979 <i>Nicotiana simulans</i>			
275.	38421 <i>Notoleptopus decaisnei</i>			
276.	19830 <i>Nymphaea macrosperma</i>			
277.	7338 <i>Oldenlandia crouchiana</i>			
278.	7339 <i>Oldenlandia galioides</i>			
279.	19640 <i>Oldenlandia</i> sp. <i>Hammersley Station (A.A. Mitchell PRP 1479)</i>		P3	
280.	6651 <i>Operculina aequisejala</i>			
281.	6652 <i>Operculina brownii</i> (Potato Vine, Bara)			
282.	4517 <i>Owenia acidula</i> (Gruie)		P3	
283.	503 <i>Panicum decompositum</i> (Native Millet, Kaltu-kaltu)			
284.	3673 <i>Parkinsonia aculeata</i> (Parkinsonia)	Y		
285.	518 <i>Paspalidium clementii</i> (Clements Paspalidium)			
286.	13895 <i>Paspalidium retiglume</i>		P2	
287.	14096 <i>Passiflora foetida</i> var. <i>hispida</i>	Y		
288.	13494 <i>Pentalepis trichodesmoides</i>			
289.	3674 <i>Petalostylis cassioides</i>			
290.	3675 <i>Petalostylis labicheoides</i> (Slender Petalostylis)			
291.	1042 <i>Phoenix dactylifera</i> (Date Palm)	Y		
292.	556 <i>Phragmites karka</i> (Tropical Reed, Gamagurd)		P3	
293.	6734 <i>Phyla nodiflora</i> var. <i>nodiflora</i>	Y		
294.	4680 <i>Phyllanthus maderaspatensis</i>			
295.	4684 <i>Phyllanthus reticulatus</i>			
296.	5230 <i>Pimelea ammocharis</i>			
297.	8168 <i>Pluchea rubelliflora</i>			
298.	2901 <i>Polycarpaea holtzei</i>			
299.	2903 <i>Polycarpaea longiflora</i>			
300.	6653 <i>Polymeria ambigua</i> (Morning Glory)			
301.	110 <i>Potamogeton drummondii</i>			
302.	20426 <i>Potamogeton tepperi</i>			
303.	113 <i>Potamogeton tricarinatus</i> (Floating Pondweed)			
304.	8192 <i>Pterocaulon sphacelatum</i> (Apple Bush)			
305.	8193 <i>Pterocaulon sphaeranthoides</i>			
306.	2690 <i>Ptilotus aevroides</i>			
307.	2696 <i>Ptilotus astrolasius</i>			
308.	2698 <i>Ptilotus auriculifolius</i>			
309.	2699 <i>Ptilotus axillaris</i> (Mat Mulla Mulla)			
310.	2704 <i>Ptilotus calostachyus</i> (Weeping Mulla Mulla)			
311.	2706 <i>Ptilotus carinatus</i>			
312.	2711 <i>Ptilotus clementii</i> (Tassel Top)			
313.	2725 <i>Ptilotus fusiformis</i>			
314.	2728 <i>Ptilotus gomphrenoides</i>			
315.	2731 <i>Ptilotus helipteroides</i> (Hairy Mulla Mulla)			
316.	2734 <i>Ptilotus incanus</i>			
317.	41001 <i>Ptilotus nobilis</i> subsp. <i>nobilis</i> (Yellow Tails)			
318.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
319.	2755 <i>Ptilotus rotundifolius</i> (Royal Mulla Mulla)			
320.	2582 <i>Rhagodia eremaea</i> (Thorny Saltbush)			
321.	4191 <i>Rhynchosia minima</i> (Rhynchosia)			
322.	12088 <i>Rostellularia adscendens</i> var. <i>clementii</i>			
323.	11609 <i>Rostellularia adscendens</i> var. <i>pogonantha</i>			
324.	116 <i>Ruppia polycarpa</i>			
325.	30434 <i>Salsola australis</i>			
326.	6483 <i>Samolus junceus</i>			
327.	6484 <i>Samolus repens</i> (Creeping Brookweed)			
328.	14027 <i>Samolus</i> sp. <i>Millstream (M.I.H. Brooker 2076)</i>			
329.	2357 <i>Santalum lanceolatum</i> (Northern Sandalwood, Yarnguli)			
330.	12578 <i>Scaevola acacioides</i>			
331.	599 <i>Schizachyrium fragile</i> (Senale Redgrass)			
332.	16257 <i>Schoenoplectus subulatus</i>			

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333.	989 <i>Schoenus falcatus</i>			
334.	2603 <i>Sclerolaena cornishiana</i> (Cartwheel Burr)			
335.	2606 <i>Sclerolaena cuneata</i> (Yellow Bindii)			
336.	2616 <i>Sclerolaena glabra</i>			
337.	2617 <i>Sclerolaena hostilis</i>			
338.	12279 <i>Senna artemisioides</i> subsp. <i>helmsii</i>			
339.	12280 <i>Senna artemisioides</i> subsp. <i>oligophylla</i>			
340.	18346 <i>Senna glutinosa</i>			
341.	12307 <i>Senna glutinosa</i> subsp. <i>glutinosa</i>			
342.	12309 <i>Senna glutinosa</i> subsp. <i>pruinosa</i>			
343.	12308 <i>Senna glutinosa</i> subsp. <i>x luerssenii</i>			
344.	12312 <i>Senna notabilis</i>			
345.	19898 <i>Senna</i> sp. <i>Millstream</i> (E. Leyland s.n. 30/8/1990)		P1	
346.	12319 <i>Senna venusta</i>			
347.	4196 <i>Sesbania cannabina</i> (Sesbania Pea)			
348.	4198 <i>Sesbania formosa</i> (White Dragon Tree)			
349.	606 <i>Setaria dielsii</i> (Diels' Pigeon Grass)			
350.	31758 <i>Sida arsinia</i>			
351.	4976 <i>Sida echinocarpa</i>			
352.	4977 <i>Sida fibulifera</i> (Silver Sida)			
353.	31859 <i>Sida</i> sp. <i>Articulation below</i> (A.A. Mitchell PRP 1605)			
354.	33698 <i>Sida</i> sp. <i>Pilbara</i> (A.A. Mitchell PRP 1543)			
355.	16617 <i>Sida</i> sp. <i>spiciform panicles</i> (E. Leyland s.n. 14/8/90)			
356.	16948 <i>Sida</i> sp. <i>verrucose glands</i> (F.H. Mollemans 2423)			
357.	4989 <i>Sida spinosa</i> (Spiny Sida)			
358.	7002 <i>Solanum diversiflorum</i>			
359.	7009 <i>Solanum gabriellae</i>			
360.	7029 <i>Solanum phlomoides</i>			
361.	7036 <i>Solanum sturtianum</i> (Thargomindah Nightshade)			
362.	622 <i>Sorghum timorense</i>			
363.	629 <i>Sporobolus australasicus</i> (Fairy Grass)			
364.	635 <i>Sporobolus virginicus</i> (Marine Couch)			
365.	7098 <i>Stemodia grossa</i> (Marsh Stemodia, Mindjaara)			
366.	7099 <i>Stemodia kingii</i>			
367.	8234 <i>Streptoglossa adscendens</i>			
368.	8235 <i>Streptoglossa bubakii</i>			
369.	8236 <i>Streptoglossa cylindriceps</i>			
370.	8237 <i>Streptoglossa decurrens</i>			
371.	8238 <i>Streptoglossa liatroides</i>			
372.	8240 <i>Streptoglossa odora</i>			
373.	12492 <i>Striga squamigera</i>			
374.	7729 <i>Styloidium fluminense</i>			
375.	3182 <i>Stylobasium spathulatum</i> (Pebble Bush)			
376.	12356 <i>Swainsona formosa</i>			
377.	4237 <i>Swainsona oliveri</i>			
378.	4244 <i>Swainsona stenodonta</i>			
379.	4280 <i>Tephrosia rosea</i> (Flinders River Poison, Bungoo'dah)			
380.	41825 <i>Tephrosia rosea</i> var. <i>Fortescue creeks</i> (M.I.H. Brooker 2186)			
381.	19531 <i>Tephrosia rosea</i> var. <i>clementii</i>			
382.	15947 <i>Tephrosia</i> sp. <i>B Kimberley Flora</i> (C.A. Gardner 7300)			
383.	42442 <i>Tephrosia</i> sp. <i>NW Eremaean</i> (S. van Leeuwen et al. PBS 0356)			
384.	39426 <i>Tephrosia</i> sp. <i>Pilbara</i> (A.L. Payne PRP 1393)			
385.	4283 <i>Tephrosia stipuligera</i>			
386.	5300 <i>Terminalia canescens</i> (Joolal)			
387.	19366 <i>Teucrium pilbaranum</i>		P1	
388.	17820 <i>Themeda</i> sp. <i>Hammersley Station</i> (M.E. Trudgen 11431)		P3	
389.	673 <i>Themeda triandra</i>			
390.	2942 <i>Tinospora smilacina</i> (Snakevine, Oondala)			
391.	32444 <i>Tortula atrovirens</i>			
392.	6278 <i>Trachymene oleracea</i>			
393.	19043 <i>Trachymene oleracea</i> subsp. <i>oleracea</i>			
394.	2825 <i>Trianthema cussackiana</i>			
395.	4377 <i>Tribulus hirsutus</i>			
396.	4381 <i>Tribulus platypterus</i> (Cork Hopbush)			
397.	4383 <i>Tribulus terrestris</i> (Caltrop)	Y		
398.	6727 <i>Trichodesma zeylanicum</i> (Camel Bush, Kumbalin)			
399.	7381 <i>Trichosanthes cucumerina</i>			
400.	704 <i>Triodia wiseana</i> (Limestone Spinifex)			
401.	4873 <i>Triumfetta appendiculata</i>			
402.	14694 <i>Triumfetta clementii</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
403.	4878 <i>Triumfetta johnstonii</i>			
404.	14942 <i>Triumfetta maconochieana</i>			
405.	4881 <i>Triumfetta plumigera</i>			
406.	98 <i>Typha domingensis</i> (Bulrush, Djandjid)			
407.	29268 <i>Urochloa occidentalis</i>			
408.	29269 <i>Urochloa occidentalis</i> var. <i>occidentalis</i>			
409.	7125 <i>Utricularia australis</i>			
410.	30716 <i>Vachellia farnesiana</i> (Mimosa Bush)	Y		
411.	17793 <i>Vallisneria annua</i>			
412.	17868 <i>Vallisneria nana</i>			
413.	7654 <i>Velleia connata</i> (Cup Velleia)			
414.	4846 <i>Ventilago viminalis</i> (Supplejack, Barndaragu)			
415.	4323 <i>Vigna lanceolata</i> (Maloga Vigna, Wega)			
416.	11576 <i>Vigna lanceolata</i> var. <i>lanceolata</i>			
417.	31391 <i>Vigna</i> sp. <i>Hamersley Clay</i> (A.A. Mitchell PRP 113)			
418.	17910 <i>Washingtonia filifera</i>	Y		

Conservation Codes

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



EPBC Act Protected Matters Report

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

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

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

Report created: 05/08/13 16:44:44

[Summary](#)

[Details](#)

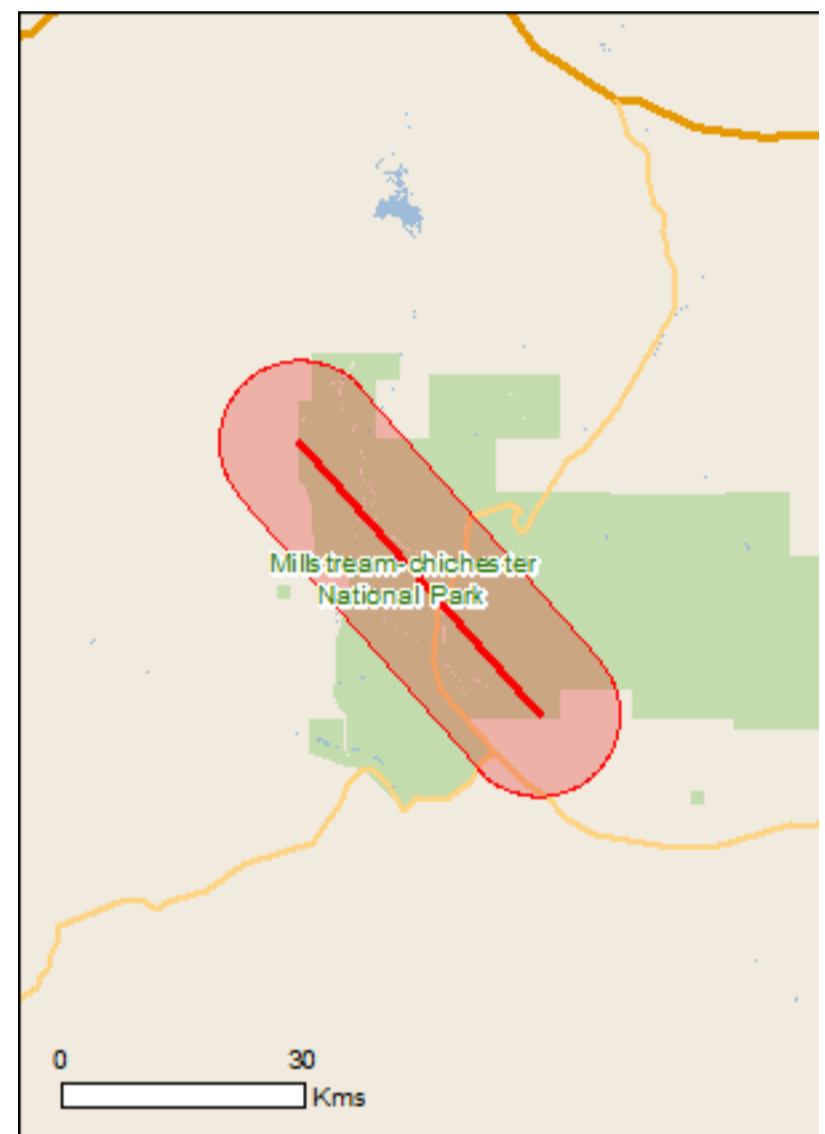
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

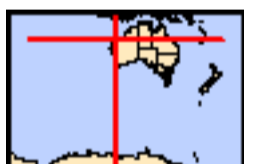
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	5
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	9
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

Place on the RNE:	2
State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	13
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Mammals		
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Notoryctes caurinus Karkarratul, Northern Marsupial Mole [295]	Endangered	Species or species habitat may occur within area
Rhinonicteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Liasis olivaceus barroni Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		
[Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		habitat may occur within area Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Extra Information

Places on the RNE [\[Resource Information \]](#)

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Chichester Range National Park (1977 boundary)	WA	Registered
Indigenous		
Plateau Hill Quarry Site	WA	Registered

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Millstream-Chichester	WA

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

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

Name	Status	Type of Presence
Birds		
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area

Name	Status	Type of Presence within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area

Coordinates

-21.25389 117.00389,-21.53528 117.26722

Caveat

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

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Sheet_no	Taxon	Cons_code	Site	Vegetation	Locality	Lat	Long	Coll_Date
PERTH 02076403	Cladium procerum	2	Next running water.		Western Millstream Outlet	-21.58972	117.06639	15 12 1974
PERTH 01740857	Cladium procerum	2	Water's edge of creek from Crystal Pool.		Millstream	-21.58972	117.06639	26 09 1969
PERTH 07837828	Cladium procerum	2	Flood zone of creek. Low rise and gentle slopes. Soil: Red-brown gravelly, pebbly loam, with gravel/pebble surface.	With Cyperus and Typha and Date Palms. Triodia wiseana hummock grassland. Triodia wiseana 20-30 cm 25-35%. There were few Acacia arida along the flowline. The Eucalyptus vitrix occurred in the lower area only. Associated annuals: Eriachne pulchella ssp. dominii, Cleome viscosa, Sporobolus	Homestead walk at Millstream. Site number: 565. 7.4 km south-east of Mount Sabine, Millstream-Chichester National Park, Fortescue Botanical District	-21.59083	117.06972	28 05 2008
PERTH 06657206	Eragrostis crateriformis	3	Damp, loam, east facing creek-bank, about 1 m high (part of the bank of the west branch of Narrina Creek). Soil: Dark brown, damp, clayey loam.	Scattered shrubs of Flueggea virosa ssp. melanthesoides and Acacia trachycarpa over Cenchrus ciliaris, Cenchrus setigerus , Triodia pungens mixed tussock, hummock grassland. Flueggea virosa ssp. melanthesoides < 1%; Acacia trachycarpa < 1%; Triodia pung	Site number: 18. 2.2 km east-north-east of Black Hill Pool, Millstream-Chichester National Park, Fortescue Botanical District	-21.20628	117.20427	26 05 1997
PERTH 06657214	Eragrostis crateriformis	3				-21.33087	117.27146	10 04 1997
PERTH 887102	Eriochloa fatmensis	3			Bamba Pool, Harding River	-20.95	117.11667	16 09 1981
PERTH 02276429	Fimbristylis sieberiana	3			Ganya and Dogger Gorge	-21.55	116.88333	24 03 1976
PERTH 1607405	Fimbristylis sieberiana	3	Soft mud at edge of pool.		Palm Pool - Millstream - Fortescue River	-21.58333	117	22 05 1976
PERTH 07837844	Fimbristylis sieberiana	3	On flats in flood zone away from creek. Clay flat. Red-brown silty loamy clay.	Cladium procerum and open areas. With Themeda sp. Hamersley Station to 1.3 m, PFC 35% over grasses and herbs.	Homestead walk at Millstream. Mount McLeod, Pilbara, MMW Site 3, WPT 4	-21.59083	117.06972	28 05 2008
PERTH 08307725	Glycine falcata	3	Plain. 0-10% quartz rocks. Red sand.	Triodia angusta Hummock grassland. With Triodia epactia, Cenchrus ciliaris, Sclerolaena costata, Chrysopogon fallax, Evolvulus alsinoides var. villosicalyx, Fimbristylis dichotoma, Sida fibulifera, Indigofera colutea.	Karratha - ca 16.5 km SE	-21.01666	116.8	17 05 2011
PERTH 08455384	Gomphrena cucullata	2	Flat bedded creekline in a basalt upland.	Eriachne tussock grassland.	Ca 55 km NW of Coolawanyah Homestead on Roebourne road	-20.84731	116.97905	16 07 2012
PERTH 04328493	Ipomoea racemigera	1			[Near Millstream (Homestead), Fortescue River, Fortescue District]	-21.45833	117.34639	01 04 1995
PERTH 1079565	Livistona alfredii	4			Near Millstream [Homestead], Fortescue River, Fortescue District	-21.59	117.06667	13 08 1974
PERTH 1079549	Livistona alfredii	4			Longreach, Millstream [Homestead], Fortescue River	-21.59	117.06667	13 08 1974
PERTH 1079638	Livistona alfredii	4			Millstream [Homestead], Fortescue River	-21.59	117.06667	21 08 1932
PERTH 1079573	Livistona alfredii	4	Gentle, brown loam. Riverine.	Palm and Melaleuca thickets.	Millstream Chichester National Park, South banks of Fortescue River, 300 m towards Livistona Pool	-21.57055	117.05361	20 06 2003
PERTH 07183615	Livistona alfredii	4	Dry bed of river.		Millstream [Homestead]	-21.59	117.06667	24 09 1969
PERTH 1079603	Livistona alfredii	4	Common along creek.	In Open Tall Woodland of Corymbia terminalis, Eucalyptus camaldulensis and Melaleuca argentea over Open Scrub of Acacia bivenosa over Mid-Dense Hummock of Triodia sp.	Palm Valley, Millstream - Chichester National Park,	-21.57416	116.95944	18 11 1998
PERTH 05329183	Livistona alfredii	4	Common along creek.	In Open Tall Woodland of Corymbia terminalis, Eucalyptus camaldulensis and Melaleuca argentea over Open Scrub of Acacia bivenosa over Mid-Dense Hummock of Triodia sp.	Palm Valley, Millstream - Chichester National Park,	-21.57416	116.95944	18 11 1998
PERTH 05329272	Livistona alfredii	4	Riverine overflow bed of rock and stones.	In Open Tall Woodland of Corymbia terminalis, Eucalyptus coolabah and E. camaldulensis over Open Scrub of Acacia monticola.	400 m E of Robe River Rion rail bridge, Fortescue River,	-21.47638	116.82056	18 11 1998
PERTH 05329167	Livistona alfredii	4			Millstream [Homestead], Fortescue River	-21.59	117.06667	03 03 1962
PERTH 1079581	Livistona alfredii	4			[Near Millstream (Homestead), Fortescue River, Fortescue District]	-21.59	117.06667	13 08 1974
PERTH 1079557	Livistona alfredii	4	River bed of stony red loam.	Tall Forest of Eucalyptus coolabah and E. camaldulensis over Low Woodland A of Acacia amplexiceps over Tall Grass.	Millstream/Yarraloola Road crossing the Fortescue River,	-21.63277	117.11889	19 11 1998
PERTH 05329213	Livistona alfredii	4	River bed of stony red loam.	Tall Forest of Eucalyptus coolabah and E. camaldulensis over Low Woodland A of Acacia amplexiceps over Tall Grass.	Millstream/Yarraloola Road crossing the Fortescue River,	-21.63277	117.11889	19 11 1998
PERTH 05329248	Livistona alfredii	4	Riverine overflow bed of rocky red gravel.	In Open Tall Forest of Corymbia terminalis over Scrub of Acacia monticola over Open Tall Grass of Ennopogon sp. and Hummock Grass of Triodia sp.	Below lookout overlooking Crossing Pool, Fortescue River, Millstream Chichester National Park,	-21.58666	117.09278	18 11 1998
PERTH 05329205	Livistona alfredii	4	Riverine overflow bed of rocky red gravel.	In Open Tall Forest of Corymbia terminalis over Scrub of Acacia monticola over Open Tall Grass of Ennopogon sp. and Hummock Grass of Triodia sp.	Below lookout overlooking Crossing Pool, Fortescue River, Millstream Chichester National Park,	-21.58666	117.09278	18 11 1998
PERTH 05329256	Livistona alfredii	4	River bank of stony red soft clay.	In Dense Tall Forest of Eucalyptus camaldulensis and melaleuca argentea over Thicket of Acacia bivenosa and A. maitlandii over Mid Dense Hummock Grass of Triodia sp.	200 m W of the concrete river crossing, Fortescue River, Millstream Chichester National Park,	-21.57138	117.04444	18 11 1998
PERTH 05329191	Livistona alfredii	4	River bank of stony red soft clay.	In Dense Tall Forest of Eucalyptus camaldulensis and melaleuca argentea over Thicket of Acacia bivenosa and A. maitlandii over Mid Dense Hummock Grass of Triodia sp.	200 m W of the concrete river crossing, Fortescue River, Millstream Chichester National Park,	-21.57138	117.04444	18 11 1998
PERTH 05329264	Livistona alfredii	4			Millstream Pools, Millstream-Chichester National Park	-21.58305	117.09167	28 07 1990
PERTH 01414062	Livistona alfredii	4	Riverine deltas and floodplains.	With Cajepats, Euc. camaldulensis.	Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510647	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510655	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510663	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510671	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510698	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510701	Livistona alfredii	4			Millstream Station	-21.58333	117.06667	20 10 1974
PERTH 06510809	Livistona alfredii	4			Millstream Station, Fortescue River	-21.58333	117.06667	20 10 1974
PERTH 06510817	Livistona alfredii	4	Creek with permanent running water with basalt base.	Woodland of Eucalyptus camaldulensis, Phoenix dactylifera and this species.	Millstream Station, Fortescue River	-21.58333	117.06667	20 10 1974
PERTH 04754131	Livistona alfredii	4	Riverine overflow bed of rock and stones.	In Open Tall Forest of Corymbia terminalis, Eucalyptus coolabah and Melaleuca argentea over Scrub of Acacia sp. over Open Tall Grass of Enneapogon sp. and Hummock Grass of Triodia sp.	Below lookout overlooking Crossing Pool, Fortescue River, Millstream-Chichester National Park,	-21.55805	117.57083	04 09 1996
PERTH 05329175	Livistona alfredii	4	Riverine overflow bed of rock and stones.	In Open Tall Forest of Corymbia terminalis, Eucalyptus coolabah and Melaleuca argentea over Scrub of Acacia sp. over Open Tall Grass of Enneapogon sp. and Hummock Grass of Triodia sp.	Below lookout overlooking Crossing Pool, Fortescue River, Millstream-Chichester National Park,	-21.55333	116.96806	18 11 1998
PERTH 05329280	Livistona alfredii	4	Raised area in a ?saline floodplain.	Eucalyptus vitrix low open woodland over Tecticornia indica subsp. leiostachya low open heath with Trianthema triquetra herbland. Associated Species: Acacia amplexiceps, Stenodia grossa, Eucalyptus camaldulensis var. obtusa.	Site: emu32. 300 m W of the Tom Price Railway Rd, approx. 2.3 km S of the intersection with Cooya Pooya Rd and 28 km south of Roebourne	-21.55333	116.96806	18 11 1998
PERTH 08433607	Nicotiana heterantha	1				-21.02277	117.09169	05 04 2008

PERTH 04861159	Oldenlandia sp. Hamersley Station (A.A. Mitchell PRP 1479)	3	Gently undulating basalt plain with self mulching, cracking clay soil and large basalt rocks on surface.	Tussock grassland of <i>Astrelbia Pectinata</i> and <i>Aristida latifolia</i> and many vines.	23.1 km from Mount Florence Homestead on a bearing of 324 deg. on track going N from Tampanna Bore on Coolawayah Station Cond site C224,	-21.62138	117.73417	04 09 1996
PERTH 06395090	Oldenlandia sp. Hamersley Station (A.A. Mitchell PRP 1479)	3	Drainage swale/plain. Red loam/ironstone.	Grasses surrounded by spinifex grassland.	3.9 km S of Hamersley Iron Railway crossing on Roebourne-Wittenoom Road	-21.43333	117.16667	14 07 2002
PERTH 01854526	Owenia acidula	3	Floodplain, silt covering cracking clay soil. Soil: Cobbly red-brown cracking clay.	With <i>Santalum lanceolatum</i> . <i>Neptunia dimorphantha</i> , <i>Sida fibulifera</i> and <i>Rhynchosia</i> sp. Barowanna Hill (MET 15,623) low open heath over <i>Streptoglossa bubakii</i> very open herbland. <i>Sida fibulifera</i> 20 cm 5-10% (20); <i>Rhynchosia</i> sp. Barowanna Hill (MET 15,623); <i>Streptoglossa bubakii</i> 30 c	Millstream Creek crossing Panawonnica road. 1:50 000 map. Millstream 067081 Site number: 426B. 9.5 km south-south-west of Mount Herbert, Millstream-Chichester National Park, Fortescue Botanical District	-21.58972	117.06639	23 09 1990
PERTH 06625622	Paspalidium retiglume	2	Gentle slope to the south +. Soil: Red-brown clay/loam with some gravel, sub-cracking with cracking patches scattered through it. Also some very pebbly patches.	<i>Rhynchosia</i> cf. <i>minima</i> low open shrubland over <i>Triodia longiceps</i> hummock grassland. <i>Triodia longiceps</i> 40-80 cm > 50%; <i>Rhynchosia</i> cf. <i>minima</i> 50-60 cm > 10%. The <i>Rhynchosia</i> cf. <i>minima</i> was near the cracking clay, none away from it. This site contains a mo	Site number: 144. 1 km south-south-west of Erallinya Pool, Hamersley Ranges, Fortescue Botanical District	-21.38974	117.16207	21 05 1997
PERTH 06625630	Paspalidium retiglume	2	Large patch about 100 m x 20 m. Soil: Orange-brown cracking clay, not as cobbly as sites 404A and 404C.	<i>Sida fibulifera</i> low shrubland over <i>Streptoglossa bubakii</i> open herbland. <i>Streptoglossa bubakii</i> (5)-35 cm < 5-20%; <i>Sida fibulifera</i> 30 cm < 10-20% (varies). The <i>Iseilema</i> aff. <i>fragile</i> was common. The <i>Iseilema vaginiflorum</i> was not common. The <i>Desmodium</i> mu	Site number: 404D. 10.5 km south-south-west of Mount Herbert, Millstream-Chichester National Park, Fortescue Botanical District	-21.64347	117.48342	19 04 1997
PERTH 06625614	Paspalidium retiglume	2	Cobble slope above site 59. Some outcrop. Soil: Red-brown gravelly loam amongst cobbles.	<i>Cullen lachnostachys</i> , <i>Corchorus</i> sp. Millstream (A.S. George 3488) low open shrubland over <i>Triodia wiseana</i> open hummock grassland with scattered <i>Euphorbia wheeleri</i> . <i>Cullen lachnostachys</i> 0.5-0.8 m 1-2% (to 3%+); <i>Corchorus</i> sp. Millstream (A.S. George 348	Site number: 60. 10.5 km west-south-west of High Table Hill, Millstream-Chichester National Park, Fortescue Botanical District	-21.41105	117.16451	20 05 1997
PERTH 06717632	<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	2				-21.23152	117.24959	13 04 1997
PERTH 07928203	<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	2	Banks of creeks and edges of basalt screes.		40 km S of Pyramid Homestead	-21.36666	117.33333	20 08 1989
PERTH 00399353	<i>Phragmites karka</i>	3	on edge of tributary creek Banks and pools of freshwater to 1 m.		Millstream Chinderwarriener Pool, Millstream - Chichester National Park	-21.58972	117.06639	26 09 1969
PERTH 01774972	<i>Phragmites karka</i>	3	Banks of permanent pool in major river floodplain.	Open woodland of <i>Eucalyptus camaldulensis</i> , with an understorey of <i>Sporobolus</i> sp. and <i>Acacia ampliceps</i> .	Deep Reach Pool, Millstream	-21.58305	117.09167	30 07 1990
PERTH 05068940	<i>Phragmites karka</i>	3	Fine red-brown soil. Riverine.		Deep Reach Picnic Area, Millstream-Chichester National Park	-21.61611	117.10805	06 09 1996
PERTH 07216823	<i>Phragmites karka</i>	3	On edge of pool in red-brown clay-loam.	<i>Eucalyptus camaldulensis</i> var. <i>obtusata</i> woodland over <i>Acacia ampliceps</i> and <i>Cynodon dactylon</i> with <i>Passiflora foetida</i> , <i>Cyperus vaginatus</i> and <i>Typha orientalis</i> .	Deepreach pool, Millstream.	-21.60522	117.10712	02 06 2004
PERTH 07837615	<i>Phragmites karka</i>	3	On edge of pool in red-brown clay-loam.	<i>Eucalyptus camaldulensis</i> var. <i>obtusata</i> woodland over <i>Acacia ampliceps</i> and <i>Cynodon dactylon</i> with <i>Passiflora foetida</i> , <i>Cyperus vaginatus</i> and <i>Typha orientalis</i> .	Deepreach pool, Millstream.	-21.60666	117.10583	27 05 2008
PERTH 07883617	<i>Phragmites karka</i>	3		Fringing vegetation of <i>Eucalyptus camaldulensis</i> , <i>Livistona alfredi</i> , <i>Schoenoplectus</i> sp., <i>Acacia ampliceps</i> etc.	Millstream - Chichester National Park, western edge of Deep Pool, Fortescue River	-21.60666	117.10583	27 05 2008
PERTH 08258805	<i>Phragmites karka</i>	3	Section of moderate to large creek between low ridges. Along the east edge of the bed there was a flowing stream 1-2 m across, probably permanent as it had patches of <i>Typha domingensis</i> . The main part of the bed and the stream and pools were treated sep	<i>Eucalyptus camaldulensis</i> var. <i>obtusata</i> open forest over <i>Acacia coriacea</i> ssp. <i>pendens</i> and <i>Acacia holosericea</i> high open shrubland over <i>Stemodia grossa</i> , <i>Cullen leucanthum</i> and <i>Lobelia quadrangularis</i> open herbland over <i>Cyperus vaginatus</i> sedgeland. Main part of	Site number: 271. (Permanent quadrat = MET 2). 7.1 km west of Mount Richthofen, Millstream-Chichester National Park, Fortescue Botanical District	-21.6075	117.10444	26 09 2006
PERTH 06713408	<i>Rhynchosia bungarensis</i>	4			Millstream Creek crossroad Panawonnica Road	-21.4721	117.36245	15 05 1997
PERTH 01697730	<i>Senna</i> sp. Millstream (E. Leyland s.n. 30/8/1990)	1	Silt over cracking clay on dry creek bank.		Mount McLeod	-21.58972	117.06639	30 08 1990
PERTH 08294488	<i>Solanum albotestellatum</i>	3	Open clay flats. Floodplain; calcrete debris on edge of terrace. Zero slope. Coarse fragments common to maximum size of 200 mm. Very slight bedrock outcrop. Red brown silty clay loam, average depth 41.4 cm.	Associated species: <i>Aristida latifolia</i> . High Shrubland of <i>Acacia xiphophylla</i> , <i>Acacia inaequilatera</i> & <i>Carissa lanceolata</i> over Low Open Shrubland of <i>Ptilotus obovatus</i> over Scattered Hummock Grass over Tussock Grassland of <i>Eriachne</i> sp. over Open Bunch Grassland of <i>Chrysopogon</i> sp. over Scattered S	Site: PW07, East side of road, 11.1 km W of Jnc with main Millstream Chichester National Park entry road on Millstream â€” Panawonnica Road, 14.6 km NNE of Mt Flora, 72.9 km E of Panawonnica, Pilbara IBRA	-21.01666	116.8	20 05 2011
PERTH 08221650	<i>Solanum albotestellatum</i>	3	Plain, red-brown cracking clay loam.	Tussock grassland.	ca 30 km W of Millstream along Millstream - Panawonnica Road	-21.64242	117.03717	16 08 2004
PERTH 07800932	<i>Solanum albotestellatum</i>	3	On road shoulder. Well-drained, black gravelly sandy loam. Flat 3 plain.	In <i>Triodia</i> Hummock grassland.	16 km S of Barowanna Hill	-21.64944	117.03028	26 09 2006
PERTH 03700623	<i>Solanum albotestellatum</i>	3	Crabhole country, heavy clay.		54 km NE of Panawonnica (Panawonnica rail)	-21.58333	117.16667	24 03 1984
PERTH 07681747	<i>Solanum albotestellatum</i>	3	Floodplain; calcrete debris on edge of terrace. Zero slope. Coarse fragments common to maximum size of 200 mm. Very slight bedrock outcrop. Red brown silty clay loam, average depth 41.4 cm.	High Shrubland of <i>Acacia xiphophylla</i> , <i>Acacia inaequilatera</i> & <i>Carissa lanceolata</i> over Low Open Shrubland of <i>Ptilotus obovatus</i> over Scattered Hummock Grass over Tussock Grassland of <i>Eriachne</i> sp. over Open Bunch Grassland of <i>Chrysopogon</i> sp. over Scattered S	Site: PW07, East side of road, 11.1 km W of Jnc with main Millstream Chichester National Park entry road on Millstream â€” Panawonnica Road, 14.6 km NNE of Mt Flora, 72.9 km E of Panawonnica, Pilbara IBRA	-21.47844	116.81695	24 03 2007
PERTH 08221537	<i>Solanum albotestellatum</i>	3	Floodplain silt and clay. Zero slope. Coarse fragments common to maximum size of 200 mm. No bedrock exposed. Red brown silty clay loam, average depth 65.6 cm.	Scattered Shrubs of <i>Vachellia farnesiana</i> over Open Tussock Grassland of <i>Chrysopogon fallax</i> over Open Bunch Grassland of <i>Eriachne</i> sp. over Scattered Sedges over Herbs of <i>Ptilotus exaltatus</i> , <i>Salsola</i> sp. & <i>Flaveria trinervia</i> .	Site: PW17, 13.4 km N of Mt Flora, 25.1 km NW of Mt Ulric, 71.1 km E of Panawonnica, Pilbara IBRA	-21.64242	117.03717	16 08 2004
PERTH 08221529	<i>Solanum albotestellatum</i>	3	Crabholed plain.	<i>Eragrostis xerophila</i> and <i>Chrysopogon fallax</i> tussock grassland.	About 47 km W of Coolawayah Homestead on N margin of Fortescue floodplain, Sites I52 and C18	-21.64769	117.01906	16 08 2004
PERTH 04337840	<i>Solanum albotestellatum</i>	3	Flat open plain. Red-brown cracking clay. Good example of high altitude cracking clay.	<i>Astrelbia pectinata</i> , <i>Eragrostis xerophila</i> , <i>Brachyachne convergens</i> tussock grassland, <i>Streptoglossa bubakii</i> very open herbland. Condition very good.	28 km NE on Millstream Yarraloola Road from the intersection with Panawonnica Road, Proj. Code 537, Site BCW 03	-21.73777	117.35306	12 09 1995
PERTH 08344485	<i>Swainsona</i> sp. Hamersley Station (A.A. Mitchell 196)	3				-21.64735	117.03135	29 07 2009
PERTH 4580338	<i>Swainsona thompsoniana</i>	3	Cracking clay plain. Gently undulating basalt plain with self mulching, cracking clay soil and large basalt rocks on surface.	<i>Astrelbia pectinata</i> tussock grassland. Tussock grassland of <i>Astrelbia pectinata</i> and <i>Aristida latifolia</i> and many vines.	17.2 km WSW of Millstream Visitors Centre 23.1 km from Mount Florence Homestead on a bearing of 324 deg. on track going N from Tampanna Bore on Coolawayah Station, Cond Site C224,	-21.64916	116.88194	13 09 1995
PERTH 04999231	<i>Swainsona thompsoniana</i>	3	Very gentle slope. Soil: Red-brown cracking clay/loam, few pebbles.	<i>Triodia wiseana</i> open hummock grassland with <i>Crotalaria benthamiana</i> , <i>Vigna lanceolata</i> var. <i>latifolia</i> low open shrubland; <i>Triodia wiseana</i> 40 cm 20-25%; <i>Crotalaria benthamiana</i> 20-35 cm 5-10%; <i>Vigna lanceolata</i> var. <i>latifolia</i> 20 cm 1% (2%). The <i>Crotalaria</i>	Site number: 34. 5.2 km north of Black Hill Pool, Millstream-Chichester National Park, Fortescue Botanical District	-21.62138	117.73417	04 09 1996
PERTH 06623387	<i>Swainsona thompsoniana</i>	3	200 + m east of site 276.	<i>Brachyachne convergens</i> tussock grassland over <i>Streptoglossa bubakii</i> very open herbland. <i>Streptoglossa bubakii</i> > 5%. The <i>Streptoglossa bubakii</i> had patches up to 30% cover. Abundant <i>Brachyachne convergens</i> , but no <i>Rhynchosia</i> on this plot. Associated annual	Site number: 276A. 7 km west-north-west of Mount Richthofen, Millstream-Chichester National Park, Fortescue Botanical District	-21.28844	117.25836	11 04 1997
PERTH 06623352	<i>Swainsona thompsoniana</i>	3				-21.45808	117.36675	15 05 1997

PERTH 1061771	Terminalia supranitifolia	3	Rocky hill slope overlooking a river bed with a deep waterhole.		Above Munni Munni Creek, about 5 km due S of Cherrata Homestead (aban.) Yarraloola.	-21.05	116.8	06 07 1986
PERTH 04583728	Teucrium pilbaranum	1	Crabholed drainage floor on margin of calcrete table.	Open woodland of Eucalyptus victrix, with a tussock grass understorey of Eriachne benthhamii.	Howletts Well, about 11 km SE of Visitors Centre, Millstream National Park	-21.61611	117.10805	07 09 1996
PERTH 06110398	Teucrium pilbaranum	1	On river floor, next to a permanent pool. Red clay-loam.	Livistona alfreddii, Eucalyptus camaldulensis woodland over scattered herb.	Close to the middle of the N side of Crossing Pool, Millstream	-21.56666	117.08333	27 01 1976
PERTH 00489735	Themeda sp. Hamersley Station (M.E. Trudgen 11431)	3	Grass plain.		Millstream Station	-21.58305	117.06639	17 08 1966
PERTH 08376174	Themeda sp. Hamersley Station (M.E. Trudgen 11431)	3	Broad ironstone drainage line.	Eucalyptus victrix low open woodland over mixed closed tussock grassland. Associated species: Melaleuca glomerata, Acacia tumida, Stenodermis grossa, Cyperus vaginatus, Cenchrus ciliaris, Echinochloa colona.	83.54 km NW of Mt Shella, 73.95 km S of the intersection of North West Coastal Highway and Karratha Road	-21.55836	117.21213	15 04 2010
PERTH 08385890	Themeda sp. Hamersley Station (M.E. Trudgen 11431)	3	Red loam/clay, Low disturbance. Fire history: greater than 5 years. Mining lease.	Corymbia and Acacia over Cenchrus. With Acacia pyrifolia, A. bivenosa, Cenchrus ciliaris, Corymbia hamersleyana, Hybanthus aurantiacus, Triodia epactia, Triumfetta clementii.	Pilbara: Scholls Lease, ca 25 km S of Karratha	-20.92003	116.89108	03 04 2007
PERTH 07164149	Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	Flood plain. Rangeland. Brown dry rocky soil.	Bare areas.	21 km from NW Coastal Highway along railway line track at junction with road from Roebourne. Karratha	-20.94256	116.85495	27 07 2004
PERTH 07837704	Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	Narrow plain between a creek and a large ridge. On brown clay loam between gravel to cobbles with pebble to cobble surface.	Triodia longiceps scattered hummocks over Trianthema sp. associated with Ptilotus murrayi, Brachyachne prostrata, Dactyloctenium radulans and Trianthema triquetra.	3.9 km north east of Snake Creek turn-off on Roebourne-Wittenoom Road.	-21.32713	117.2625	27 05 2008
PERTH 03166627	Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	Rocky soil on flat plain.	Spinifex.	Beside a station track to a waterhole on the Maitland River (Cliff Springs), 5 km due ENE Zebra Hill, 5 km due W Maitland River	-21.18333	116.91667	11 03 1987
PERTH 06624251	Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	2	Area of mosaic of bare areas with herbs and Triodia angusta hummock grassland which extends both sides of the tract. Soil: Red-brown loam with some fine gravel. Water (a few cm) lies in places.	Triodia longiceps, Triodia pungens hummock grassland. Triodia longiceps 5-15%; Triodia pungens = 5%. Associated annuals: Gomphrena cunninghamii, Ptilotus murrayi var. murrayi, Trianthema aff. kimberleyi (MET 15,060), Polycarpha corymbosa, Indigastrium	Site number: 11. 5.7 km north-west of Mount Montagu, Millstream-Chichester National Park, Fortescue Botanical District	-21.34127	117.28194	09 04 1997
PERTH 08091382	Vigna sp. rockpiles (R. Butcher et al. RB 1400)	3	Rockpiles (including Riodia pockets) on a NW facing slope, medium sized blocky boulders. Coarse grained pink-brown rock with black oxidation on surface.	Ipomoea costata, Dichrostachys spicata, Eremophila longifolia open shrubland over Scaevola spinescens (narrow form), Rhagodia eremaea low open shrubland over Triodia angusta, Aristida nitidula very open hummock grassland. Associated species: Commicarpus	Site HD188, Harding Dam area, rockpiles SW of the dam, ca 500 m from carpark	-20.9824	117.1054	04 06 2000
PERTH 08091404	Vigna sp. rockpiles (R. Butcher et al. RB 1400)	3	Very, very gently sloping upper hill slope, on top of a flat topped hill. Facing SW high and exposed to strong winds. No protection from surrounding rockpiles. Very fine red loam with dense stony mantle. Small stones, 5-15 cm diameter. Very exposed slope	Ipomoea costata scattered shrubs over Triodia wiseana hummock grassland with Vigna sp. Harding Dam (HD189-12) very open lanes. Condition excellent, no weeds. Corchorus aff. sidoides (HD179-5), Dichanthium sericeum subsp. humilus, Dysphania rhadinostachy	Tabletop Mountain, 44 km SE of Karratha, one third of the way SE along SW facing side from the NW, Site HD189	-21.03497	117.10456	04 06 2000
PERTH 07905718	Vigna sp. rockpiles (R. Butcher et al. RB 1400)	3	Strongly undulating rockpile topography. Steep slope above Harding Dam. Gritty red sand between large rocks.	Very open Acacia shrubs over Ipomoea costata, Eremophila longifolia and Triodia hummock grassland.	Base of rockpile ca 200 m SE of workshop shed, off access track to Harding Dam. Access track is ca 650 m E of Cooya - Pooya Road, S of Roebourne	-20.98286	117.10189	28 05 2009

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Appendix F: Vertebrate Fauna Species List

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Table F.1: Vertebrate fauna species recorded from database searches and previous surveys.

Amphibians

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
Hylidae									
<i>Cyclorana maini</i>	Sheep Frog					x		x	
<i>Cyclorana platycephala</i>	Water-holding Frog								
<i>Litoria rubella</i>	Little Red Tree Frog					x		x	
Myobatrachidae									
<i>Pseudophryne douglasi</i>	Gorge Toadlet					x			
<i>Uperoleia russelli</i>	Northwest Toadlet							x	
<i>Uperoleia glandulosa</i>	Glandular Toadlet							x	
<i>Uperoleia saxatilis</i>	Pilbara Toadlet					x			
A=Naturemap, B=Protected Matters Search, C=Previous surveys, D=Current survey									

Reptiles

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
Agamidae									
<i>Amphibolurus longirostris</i>						x		x	
<i>Ctenophorus caudicinctus caudicinctus</i>	Ring-tailed Dragon					x		x	x
<i>Ctenophorus isolepis isolepis</i>						x		x	x
<i>Ctenophorus nuchalis</i>								x	
<i>Pogona minor minor</i>						x			
<i>Pogona minor mitchelli</i>						x		x	
<i>Tympanocryptis cephalus</i>	Pebble Dragon					x			
Diplodactylidae									
<i>Diplodactylus conspicillatus</i>	Fat-tailed Gecko					x		x	
<i>Diplodactylus galaxias</i>	Northern Pilbara Beak-faced Gecko					x			
<i>Diplodactylus mitchelli</i>						x			
<i>Diplodactylus savagei</i>								x	
<i>Lucasium stenodactylum</i>						x		x	
<i>Lucasium wombeyi</i>						x		x	
<i>Oedura marmorata</i>	Marbled Velvet Gecko					x		x	
<i>Rhynchoedura ornata</i>	Western Beaked Gecko					x			
<i>Strophurus elderi</i>						x		x	
<i>Strophurus wellingtonae</i>								x	
Carphodactylidae									
<i>Nephrurus levis pilbarensis</i>								x	
<i>Nephrurus wheeleri cinctus</i>						x			
Gekkonidae									
<i>Crenadactylus ocellatus</i>								x	
<i>Gehyra pilbara</i>						x		x	
<i>Gehyra punctata</i>						x		x	
<i>Gehyra purpurascens</i>						x			
<i>Gehyra variegata</i>						x		x	
<i>Heteronotia spelea</i>								x	

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
<i>Heteronotia binoei</i>	Bynoe's Gecko					x		x	
Pygopodidae									
<i>Delma butleri</i>								x	
<i>Delma elegans</i>						x		x	
<i>Delma nasuta</i>						x		x	
<i>Delma pax</i>						x		x	
<i>Lialis burtonis</i>						x		x	
<i>Pygopus nigriceps</i>								x	
Scincidae									
<i>Carlia munda</i>						x		x	
<i>Carlia tricantha</i>						x		x	
<i>Cryptoblepharus</i> sp.								x	
<i>Cryptoblepharus buehneri</i>						x			
<i>Cryptoblepharus plagiocephalus</i>						x			
<i>Cryptoblepharus ustulatus</i>						x		x	
<i>Ctenotus duricola</i>						x		x	
<i>Ctenotus grandis titan</i>						x		x	
<i>Ctenotus hanloni</i>								x	
<i>Ctenotus</i> aff. <i>helenae</i>								x	
<i>Ctenotus helenae</i>						x		x	
<i>Ctenotus pantherinus ocellifer</i>						x		x	
<i>Ctenotus robustus</i>						x			
<i>Ctenotus rubicundus</i>						x		x	
<i>Ctenotus saxatilis</i>	Rock Ctenotus					x		x	
<i>Ctenotus serventyi</i>						x			
<i>Cyclodomorphus melanops melanops</i>						x		x	
<i>Egernia cygnitos</i>	Western Pilbara Spiny-tailed Skink					x			
<i>Egernia formosa</i>						x		x	
<i>Egernia pilbarensis</i>	Pilbara Skink					x		x	
<i>Eremiascincus fasciolatus</i>								x	
<i>Eremiascincus isolepis</i>						x			

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
<i>Lerista bipes</i>						x		x	
<i>Lerista flammicauda</i>						x		x	
<i>Lerista muelleri</i>						x		x	
<i>Lerista verhmens</i>						x			
<i>Lerista zietsii</i>								x	
<i>Menetia greyii</i>						x		x	
<i>Menetia surda surda</i>						x			
<i>Morethia ruficauda exquisita</i>						x		x	
<i>Notoscincus butleri</i>					P4	x		x	
<i>Notoscincus ornatus</i>								x	
<i>Tiliqua multifasciata</i>	Central Blue-tongue					x		x	
Varanidae									
<i>Varanus acanthurus</i>	Spiny-tailed Monitor					x			
<i>Varanus brevicauda</i>	Short-tailed Pygmy Monitor					x		x	
<i>Varanus bushi</i>	Pilbara Mulga Monitor							x	
<i>Varanus eremius</i>								x	
<i>Varanus giganteus</i>	Perentie							x	
<i>Varanus panoptes panoptes</i>								x	
<i>Varanus pilbarensis</i>	Pilbara Rock Monitor							x	
<i>Varanus tristis tristis</i>	Racehorse Monitor					x			
Typhlopidae									
<i>Ramphotyphlops ammodytes</i>						x			
<i>Ramphotyphlops ganei</i>						x		x	
<i>Ramphotyphlops grypus</i>						x		x	
<i>Ramphotyphlops pilbarensis</i>						x		x	
Boidae									
<i>Antaresia perthensis</i>	Pygmy Python					x			
<i>Antaresia stimsoni</i>	Stimson's Python							x	
<i>Aspidites melanocephalus</i>	Black-headed Python							x	
<i>Liasis olivaceus barroni</i>	Pilbara Olive Python		VU	S1		x	x	x	

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
Elapidae									
<i>Acanthophis wellsi</i>	Pilbara Death Adder					x			
<i>Brachyuropsis approximans</i>						x			
<i>Demansia psammophis cupreiceps</i>						x			
<i>Demansia rufescens</i>	Rufous Whipsnake					x			
<i>Furina ornata</i>	Moon Snake					x		x	
<i>Parasuta monachus</i>						x		x	
<i>Pseudechis australis</i>	Mulga Snake					x		x	
<i>Pseudonaja nuchalis</i>	Gwarder							x	
<i>Pseudonaja modesta</i>	Ringed Brown Snake							x	
<i>Suta fasciata</i>	Rosen's Snake					x			
<i>Suta punctata</i>	Spotted Snake							x	
<i>Vermicella snelli</i>						x		x	
A=Naturemap, B=Protected Matters Search, C=Previous surveys, D=Current survey									

Birds

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
Casuariidae										
<i>Dromaius novaehollandiae</i>	Emu							x		x
Phasianidae										
<i>Coturnix ypsilophora</i>	Brown Quail					x				x
Anatidae										
<i>Cygnus atratus</i>	Black Swan					x				
<i>Chenonetta jubata</i>	Australian Wood Duck							x		x
<i>Anas gracilis</i>	Grey Teal					x				x
<i>Anas superciliosa</i>	Pacific Black Duck					x		x		x
<i>Aythya australis</i>	Hardhead					x				x
Podicipedidae										
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe					x		x		x
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe							x		
Columbidae										
<i>Phaps chalcoptera</i>	Common Bronzewing					x		x	x	x
<i>Phaps histrionica</i>	Flock Bronzewing				P4	x				
<i>Ocyphaps lophotes</i>	Crested Pigeon					x		x	x	x
<i>Geophaps plumifera</i>	Spinifex Pigeon					x		x		x
<i>Geopelia cuneata</i>	Diamond Dove					x		x	x	x
<i>Geopelia striata placida</i>	Peaceful Dove					x		x		x
Eurostopodidae										
<i>Eurostopodus argus</i>	Spotted Nightjar					x		x		x
Aegothelidae										
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar					x		x		x
Apodidae										
<i>Apus pacificus</i>	Fork-tailed Swift				Mi			x	x	
Anhingidae										
<i>Anhinga melanogaster</i>	Australasian Darter					x		x		x

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
<i>novaehollandiae</i>										
Phalacrocoracidae										
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant							x		x
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant					x		x		x
Pelecanidae										
<i>Pelecanus conspicillatus</i>	Australian Pelican					x		x		x
Ardeidae										
<i>Ardea pacifica</i>	White-necked Heron					x		x		x
<i>Ardea modesta</i>	Eastern Great Egret		Mi	S3		x	x	x		x
<i>Ardea ibis</i>	Cattle Egret		Mi	S3			x	x		
<i>Ardea intermedia</i>	Intermediate Egret					x				x
<i>Egretta novaehollandiae</i>	White-faced Heron							x		x
<i>Egretta garzetta</i>	Little Egret							x		x
<i>Ixobrychus flavicollis</i>	Black Bittern					x				x
<i>Nycticorax caledonicus hilli</i>	Nankeen Night-Heron					x				x
Threskiornithidae										
<i>Platalea flavipes</i>	Yellow-billed Spoonbill							x		x
Accipitridae										
<i>Elanus axillaris</i>	Black-shouldered Kite							x		x
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		Mi	S3			x			x
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard					x				x
<i>Haliastur sphenurus</i>	Whistling Kite					x		x	x	x
<i>Milvus migrans</i>	Black Kite							x		x
<i>Accipiter fasciatus</i>	Brown Goshawk					x		x		x
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk					x				x
<i>Circus assimilis</i>	Spotted Harrier					x		x		x
<i>Aquila audax</i>	Wedge-tailed Eagle					x		x		x
<i>Hieraetus morphnoides</i>	Little Eagle							x		x
<i>Pandion haliaetus</i>	Eastern Osprey		Mi	S3			x			
Falconidae										

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
<i>Falco cenchroides</i>	Nankeen Kestrel					x		x	x	x
<i>Falco berigora berigora</i>	Brown Falcon					x		x		x
<i>Falco longipennis</i>	Australian Hobby							x		x
Rallidae										
<i>Gallirallus philippensis</i>	Buff-banded Rail					x				x
<i>Porphyrio porphyrio melanotus</i>	Purple Swamphen					x				x
<i>Porzana tabuensis</i>	Spotless Crake					x				
<i>Fulica atra</i>	Eurasian Coot					x		x		x
Otididae										
<i>Ardeotis australis</i>	Australian Bustard				P4			x	x	x
Burhinidae										
<i>Burhinus grallarius</i>	Bush Stone-curlew				P4	x		x		x
Charadriidae										
<i>Charadrius veredus</i>	Oriental Plover		Mi	S3			x			
<i>Elseyornis melanops</i>	Black-fronted Dotterel					x		x		x
Glareolidae										
<i>Glareola maldivarum</i>	Oriental Pratincole		Mi	S3			x			
Turnicidae										
<i>Turnix velox</i>	Little Button-quail					x		x		x
Cacatuidae										
<i>Eolophus roseicapillus</i>	Galah					x		x	x	x
<i>Cacatua sanguinea westralensis</i>	Little Corella					x		x		x
<i>Nymphicus hollandicus</i>	Cockatiel					x		x		x
Psittacidae										
<i>Barnardius zonarius zonarius</i>	Australian Ringneck					x		x		x
<i>Psephotus varius</i>	Mulga Parrot								x	
<i>Melopsittacus undulatus</i>	Budgerigar					x		x	x	x
Cuculidae										
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo					x		x		x

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
<i>Cacomantis pallidus</i>	Pallid Cuckoo					x		x		x
<i>Centropus phasianinus highami</i>	Pheasant Coucal					x		x		x
Strigidae										
<i>Ninox connivens</i>	Barking Owl					x				x
<i>Ninox novaeseelandiae</i>	Southern Boobook					x		x		x
Halcyonidae										
<i>Dacelo leachii leachii</i>	Blue-winged Kookaburra					x		x		x
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher					x		x		x
<i>Todiramphus sanctus</i>	Sacred Kingfisher					x		x		x
Meropidae										
<i>Merops ornatus</i>	Rainbow Bee-eater		Mi	S3		x	x	x		x
Climacteridae										
<i>Climacteris melanura</i>	Black-tailed Treecreeper					x				x
Ptilonorhynchidae										
<i>Ptilonorhynchus guttatus</i>	Western Bowerbird							x		x
Maluridae										
<i>Malurus leucopterus leuconotus</i>	White-winged Fairy-wren					x		x		
<i>Malurus lamberti assimilis</i>	Variegated Fairy-wren					x		x		x
<i>Stipiturus ruficeps ruficeps</i>	Rufous-crowned Emu-wren					x		x		x
<i>Amytornis striatus whitei</i>	Striated Grasswren					x		x		x
Acanthizidae										
<i>Smicronis brevirostris</i>	Weebill					x		x	x	x
<i>Gerygone fusca</i>	Western Gerygone					x		x		x
<i>Acanthiza chrysoorhoa</i>	Yellow-rumped Thornbill							x		
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill					x				x
Pardalotidae										
<i>Pardalotus rubricatus</i>	Red-browed Pardalote					x		x		x
<i>Pardalotus striatus murchisoni</i>	Striated Pardalote					x		x		x
Meliphagidae										

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
<i>Lichenostomus virescens</i>	Singing Honeyeater					X		X	X	X
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater					X		X		X
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater					X		X		X
<i>Manorina flavigula</i>	Yellow-throated Miner					X		X		X
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater							X	X	X
<i>Epthianura tricolor</i>	Crimson Chat					X		X	X	X
<i>Lichmera indistincta indistincta</i>	Brown Honeyeater					X		X	X	X
<i>Certhionyx niger</i>	Black Honeyeater							X		
<i>Melithreptus gularis laetior</i>	Black-chinned Honeyeater					X		X		X
Pomatostomidae										
<i>Pomatostomus temporalis rubeculus</i>	Grey-crowned Babbler					X		X		X
Campephagidae										
<i>Coracina novaehollandiae subpallida</i>	Black-faced Cuckoo-shrike					X		X	X	X
<i>Lalage sueurii</i>	White-winged Triller					X		X		X
Pachycephalidae										
<i>Pachycephala rufiventris rufiventris</i>	Rufous Whistler					X		X	X	X
<i>Colluricincla harmonica rufiventris</i>	Grey Shrike-thrush					X		X	X	X
<i>Oreoica gutturalis</i>	Crested Bellbird					X		X	X	X
Artamidae										
<i>Artamus personatus</i>	Masked Woodswallow					X		X	X	X
<i>Artamus cinereus melanops</i>	Black-faced Woodswallow					X		X		X
<i>Artamus leucorhynchus leucopygialis</i>	White-breasted Woodswallow					X		X		X
<i>Artamus minor</i>	Little Woodswallow					X		X		X
<i>Cracticus torquatus</i>	Grey Butcherbird					X		X	X	X
<i>Cracticus nigrogularis</i>	Pied Butcherbird					X		X	X	X
<i>Cracticus tibicen</i>	Australian Magpie					X		X		X

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
Rhipiduridae										
<i>Rhipidura fuliginosa preissi</i>	Grey Fantail					x		x		x
<i>Rhipidura leucophrys leucophrys</i>	Willie Wagtail					x		x	x	x
Corvidae										
<i>Corvus bennetti</i>	Little Crow					x				x
<i>Corvus orru ceciliae</i>	Torresian Crow					x		x	x	x
Monarchidae										
<i>Grallina cyanoleuca</i>	Magpie-lark					x		x	x	x
Petroicidae										
<i>Melanodryas cucullata</i>	Hooded Robin					x		x		x
Alaudidae										
<i>Mirafrja javanica horsfieldii</i>	Horsfield's Bushlark					x				x
Cisticolidae										
<i>Cisticola exilis</i>	Golden-headed Cisticola					x				
Acrocephalidae										
<i>Acrocephalus australis gouldi</i>	Australian Reed-Warbler					x		x		x
Megaluridae										
<i>Cincloramphus mathewsi</i>	Rufous Songlark					x		x		x
<i>Cincloramphus cruralis</i>	Brown Songlark					x		x		x
<i>Eremiornis carteri</i>	Spinifexbird					x		x		x
Timaliidae										
<i>Zosterops luteus</i>	Yellow White-eye					x				x
Hirundinidae										
<i>Hirundo rustica</i>	Barn Swallow		Mi	S3			x			
<i>Petrochelidon ariel</i>	Fairy Martin							x		x
<i>Petrochelidon nigricans</i>	Tree Martin					x		x		x
Nectariniidae										
<i>Dicaeum hirundinaceum</i>	Mistletoebird					x		x		x
Estrildidae										

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D	E
			EPBC Act	WC Act	DPaW					
<i>Taeniopygia guttata castanotis</i>	Zebra Finch					x		x	x	x
<i>Neochmia ruficauda clarescens</i>	Star Finch				P4	x		x		x
<i>Emblema pictum</i>	Painted Finch					x		x		x
Passeridae										
<i>Passer montanus</i>	EurasianTree Sparrow	x					x			
Motacillidae										
<i>Anthus novaeseelandiae</i>	Australasian Pipit					x		x		x
A=Naturemap, B=Protected Matters Search, C=Previous surveys, D=Current survey, E=Birdatlas										

Mammals

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
Tachyglossidae									
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna					x		x	
Dasyuridae									
<i>Dasykaluta rosamondae</i>	Little Red Kaluta					x		x	
<i>Dasyurus hallucatus</i>	Northern Quoll		EN	S1		x	x	x	
<i>Ningauai timealeyi</i>	Pilbara Ningauai					x		x	
<i>Planigale ingrami</i>	Long-tailed Planigale							x	
<i>Planigale sp.</i>								x	
<i>Pseudantechinus roryi</i>	Rory's Pseudantechinus					x			
<i>Pseudantechinus woolleyae</i>	Woolley's Pseudantechinus					x		x	
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart					x		x	
<i>Sminthopsis youngsoni</i>								x	
Phalangeridae									
<i>Trichosurus vulpecula</i>	Brush-tailed Possum							x	
Thylacomyidae									
<i>Macrotis lagotis</i>	Bilby, Dalgyte		VU	S1			x		
Notoryctidae									
<i>Notoryctes caurinus</i>	Northern Marsupial Mole		EN	S1			x		
Macropodidae									
<i>Macropus robustus erubescens</i>	Euro, Biggada					x		x	x
Pteropodidae									
<i>Pteropus alecto</i>	Black Flying-fox					x			
Megadermatidae									
<i>Macroderma gigas</i>	Ghost Bat				P4	x		x	
Hipposideridae									
<i>Rhinonicteris aurantia</i>	Pilbara Leafnosed-bat		VU	S1		x	x		
Emballonuridae									
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat							x	

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
<i>Taphozous georgianus</i>	Common Sheath-tail-bat							x	
Vespertilionidae									
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat					x		x	
<i>Nyctophilus daedalus</i>	Northwestern Long-eared Bat					x			
<i>Nyctophilus bifax</i>								x	
<i>Scotorepens greyii</i>	Little Broad-nosed Bat					x		x	
<i>Vespadelus finlaysoni</i>	Finlayson's Cave Bat					x		x	
Molossidae									
<i>Chaerephon jobensis</i>	Northern Freetail-bat							x	
<i>Mormopterus beccarii</i>	Beccari's Freetail-bat							x	
Muridae									
<i>Leggadina lakedownensis</i>	Short-tailed Mouse				P4	x			
<i>Mus musculus</i>	House Mouse	x				x	x		
<i>Notomys alexis</i>	Spinifex Hopping-mouse							x	
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse				P4	x		x	
<i>Pseudomys delicatulus</i>	Delicate Mouse					x		x	
<i>Pseudomys desertor</i>	Desert Mouse					x		x	
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse					x		x	
<i>Rattus rattus</i>	Black Rat	x				x	x		
<i>Zyzomys argurus</i>	Common Rock-rat					x		x	
Leporidae									
<i>Oryctolagus cuniculus</i>	Rabbit	x					x		
Canidae									
<i>Canis lupus dingo</i>	Dingo	x				x		x	x
<i>Canis lupus familiaris</i>	Dog	x					x	x	
<i>Vulpes vulpes</i>	Red Fox	x					x		
Felidae									
<i>Felis catus</i>	Cat	x					x	x	x
Equidae									
<i>Equus asinus</i>	Donkey	x					x		

Scientific Name	Common Name	Introduced	Conservation Codes			A	B	C	D
			EPBC Act	WC Act	DPaW				
<i>Equus caballus</i>	Horse	x					x		
Camelidae									
<i>Camelus dromedarius</i>	Dromedary, Camel	x					x		
Bovidae									
<i>Bos taurus</i>	European Cattle	x							x
A=Naturemap, B=Protected Matters Search, C=Previous surveys, D=Current survey									

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Appendix G: Relevé Data

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RTIO Utilities Transmission Corridor

Site O.01

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 500201 mE

Northing: 7645887 mN

Habitat: Crest of ironstone hills.

Vegetation: *Corymbia hamersleyana* scattered low trees over *Triodia wiseana*, *Triodia ? basedowii* and *Triodia sp. (pungens/epactia)* hummock grassland and *Cymbopogon ambiguus* scattered tussock grasses.

Veg Condition: Excellent

Fire Age: >10

Notes:

Species List

Name

Eucalyptus leucophloia subsp. leucophloia

Cymbopogon ambiguus

Hakea lorea

Senna glutinosa subsp. pruinosa

Triodia ? basedowii

Triodia sp (epactia/pungens)

Triodia wiseana



Plate 1: Site O.01 facing south-west.

RTIO Utilities Transmission Corridor

Site O.26

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 502115 mE

Northing: 7637597 mN

Habitat: Ironstone hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* low open woodland over *Triodia wiseana* hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Indigofera monophylla*, *Ptilotus nobilis*.

Intact *Triodia wiseana* hummock grassland with *Cucumis maderaspatensis*.

Species List

Name

Corymbia hamersleyana

Cucumis maderaspatanus

Eucalyptus leucophloia subsp. *leucophloia*

Indigofera monophylla

Ptilotus nobilis

Triodia wiseana



Plate 2: Site O.26 facing west.

RTIO Utilities Transmission Corridor

Site O.43

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 509033 mE

Northing: 7630305 mN

Habitat: Undulating plain with gentle rocky slopes.

Vegetation: *Triodia wiseana* hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Species List

Name

Acacia inaequilatera

Ptilotus nobilis

Triodia wiseana



Plate 3: Site O.43 facing south.

RTIO Utilities Transmission Corridor

Site O.45

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 509925 mE

Northing: 7629743 mN

Habitat: Undulating plain between very low, gently sloped hills.

Vegetation: *Acacia inaequilatera* scattered tall shrubs over *Triodia wiseana* very open hummock grassland and *Astrebla pectinata* open tussock grassland.

Veg Condition: Excellent

Fire Age: >10

Species List

Name

Acacia inaequilatera

Astrebla pectinata

Rhynchosia minima

Triodia wiseana



Plate 4: Site O.45 facing south.

RTIO Utilities Transmission Corridor

Site O.48

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 510845 mE

Northing: 7629133 mN

Habitat: Crest of low hill with broad gentle slopes.

Vegetation: *Sorghum timorense* closed tussock grassland.

Veg Condition: Excellent

Fire Age: >10

Species List

Name

Heliotropium crispatum

Rhynchosia minima

Sorghum timorense



Plate 5: Site O.48 facing south-east.

RTIO Utilities Transmission Corridor

Site O.50

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 11/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 511474 mE

Northing: 7628750 mN

Habitat: Undulating plain.

Vegetation: *Acacia xiphophylla* tall open scrub over **Cenchrus setiger* and *Astrebla pectinata* open tussock grassland over *Ptilotus nobilis* scattered herbs.

Veg Condition: Poor

Fire Age: >10

Species List

Name

Acacia xiphophylla

Astrebla pectinata

Atriplex semilunaris

Cenchrus setiger

Ptilotus nobilis



Plate 6: Site O.50 facing north-west.

RTIO Utilities Transmission Corridor

Site O.63

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 515528 mE

Northing: 7626132 mN

Habitat: Broad plain between low hills.

Vegetation: *Acacia xiphophylla*, *Hakea lorea*, *Acacia synchronicia* and *Acacia ancistrocarpa* open shrubland over *Triodia wiseana* open hummock grassland.

Veg Condition: Good

Fire Age: >10

Species List

Name

Acacia ancistrocarpa

Acacia synchronicia

Acacia xiphophylla

Hakea lorea

Ptilotus gomphrenoides

Ptilotus nobilis

Triodia wiseana



Plate 7: Site O.63 facing north-west.

RTIO Utilities Transmission Corridor

Site O.66

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 516488 mE

Northing: 7625481 mN

Habitat: Pebbly clay pan on an undulating plain.

Vegetation: Acacia xiphophylla tall shrubland over Acacia ancistrocarpa scattered shrubs over *Cenchrus setiger and *Cenchrus ciliaris tussock grassland and Triodia wiseana open hummock grassland.

Veg Condition: Poor

Fire Age: >10

Notes: Associated species: *Salsola australis*, *Sclerolaena cuneata* and *Trianthema triquetra*, **Vachellia farnesiana*. High **Cenchrus* spp. population.

Species List

Name

Acacia ancistrocarpa

Acacia xiphophylla

Cenchrus ciliaris

Cenchrus setiger

Enchylaena tomentosa var. *tomentosa*

Salsola australis

Sclerolaena cuneata

Trianthema triquetra

Triodia wiseana

Vachellia farnesiana



Plate 8: Site O.66 facing south-east.

RTIO Utilities Transmission Corridor

Site O.68

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:**

Seasonal Conditions: E

MGA Zone: 50

Easting: 517028 mE

Northing: 7625136 mN

Habitat: West facing slope of gentle hill with eroded drainage line.

Vegetation: *Acacia inaequilatera* tall open shrubland over *Acacia ancistrocarpa* scattered shrubs over *Triodia wiseana* open hummock grassland and **Cenchrus ciliaris* and **Cenchrus setiger* open tussock grassland over *Ptilotus nobilis*, *Senna notabilis* and *Swainsona formosa* open herbland.

Veg Condition: Poor

Fire Age: >10

Notes: Associated species: *Themeda avenacea*.

Significant **Cenchrus* spp. Population.

Species List

Name

Abutilon lepidum

Acacia ancistrocarpa

Acacia inaequilatera

Cenchrus ciliaris

Cenchrus setiger

Ptilotus nobilis

Senna notabilis

Swainsona formosa

Themeda avenacea

Triodia wiseana



Plate 9: Site O.68 facing north-west.

RTIO Utilities Transmission Corridor

Site O.69

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:**

Seasonal Conditions: E

MGA Zone: 50

Easting: 517256 mE

Northing: 7624978 mN

Habitat: South west facing slope of a low hill

Vegetation: *Acacia inaequilatera* scattered tall shrubs over *Acacia ancistrocarpa* open shrubland over *Triodia wiseana* hummock grassland.

Veg Condition: Very good

Fire Age: >10

Notes: Associated species: *Corymbia hamersleyana*, *Grevillea wickhamii*, *Indigofera monophylla*, *Swainsona formosa*, *Cenchrus setiger*, *Ptilotus nobilis*.

Full recovery of Transmission Pad to Vegetation description.

Species List

Name

Acacia ancistrocarpa

Acacia inaequilatera

Cenchrus setiger

Corymbia hamersleyana

Grevillea wickhamii

Indigofera monophylla

Ptilotus nobilis

Swainsona formosa

Triodia wiseana



Plate 10: Site O.69 facing north-east.

RTIO Utilities Transmission Corridor

Site O.72

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 518141 mE

Northing: 7624391 mN

Habitat: South east facing slope of a low hill.

Vegetation: *Triodia wiseana* hummock grassland and *Themeda triandra* scattered tussock grasses.

Veg Condition: Excellent

Fire Age: 10

Species List

Name

Themeda triandra

Triodia wiseana



Plate 11: Site O.72 facing north-west.

RTIO Utilities Transmission Corridor

Site O.73

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 518454 mE

Northing: 7624171 mN

Habitat: Gently sloping low hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia xiphophylla* tall shrubland over *Triodia wiseana* and *Triodia* sp (*epactia/pungens*) very open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Ptilotus obovatus*, *Acacia bivenosa*.

Species List

Name

Acacia bivenosa

Acacia colei var. *ileocarpa*

Acacia xiphophylla

Eucalyptus leucophloia subsp. *leucophloia*

Ptilotus obovatus

Triodia sp (*epactia/pungens*)

Triodia wiseana



Plate 12: Site O.73 facing north.

RTIO Utilities Transmission Corridor

Site O.74

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 518751 mE

Northing: 7623983 mN

Habitat: Broad drainage line.

Vegetation: *Grevillea wickhamii*, *Acacia atkinsiana* and *Acacia monticola* shrubland over *Triodia* sp (*epactia/pungens*) open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Species List

Name

Acacia atkinsiana

Acacia colei var. *ileocarpa*

Acacia monticola

Eucalyptus leucophloia subsp. *leucophloia*

Grevillea wickhamii

Triodia sp (*epactia/pungens*)



Plate 13: Site O.74 facing south-east.

RTIO Utilities Transmission Corridor

Site O.75

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 519099 mE

Northing: 7623740 mN

Habitat: South facing slope of low hill.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia bivenosa* shrubland over *Triodia wiseana* hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Senna symonii*

Species List

Name

Acacia bivenosa

Eucalyptus leucophloia subsp. *leucophloia*

Triodia wiseana

Senna symonii



Plate 14: Site O.75 facing north-west.

RTIO Utilities Transmission Corridor

Site O.78

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 520046 mE

Northing: 7623097 mN

Habitat: Gentle slope of low hills.

Vegetation: *Indigofera monophylla* scattered shrubs over *Triodia ?wiseana* very open hummock grassland and *Senna notabilis*, *Goodenia microptera* and *Trichodesma zeylanicum* scattered herbs.

Veg Condition: Good

Fire Age: 2-5 years

Notes: Sterile and very young *Triodia*.

Fire impacts on the tree/shrub strata - significant bare ground.

Species List

Name

Goodenia microptera

Indigofera monophylla

Senna notabilis

Trichodesma zeylanicum

Triodia ? wiseana



Plate 15: Site O.78 facing north-east.

RTIO Utilities Transmission Corridor

Site O.80

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 520617 mE

Northing: 7622692 mN

Habitat: Adjacent to the top of low hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia monticola* tall open shrubland over *Acacia stellaticeps* low open shrubland over *Triodia wiseana* hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Transmission pad vegetation equivalent to surrounding vegetation.

Species List

Name

Acacia monticola

Acacia stellaticeps

Eucalyptus leucophloia subsp. *leucophloia*

Triodia wiseana



Plate 16: Site O.80 facing south.

RTIO Utilities Transmission Corridor

Site O.82

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 521190 mE

Northing: 7622326 mN

Habitat: Top of low hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia bivenosa* low open shrubland over *Triodia wiseana* hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Cymbopogon ambiguus*.

Species List

Name

Acacia bivenosa

Cymbopogon ambiguus

Eucalyptus leucophloia subsp. *leucophloia*

Gossypium australe

Triodia wiseana



Plate 17: Site O.82 facing north-west.

RTIO Utilities Transmission Corridor

Site O.86

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 522465 mE

Northing: 7621471 mN

Habitat: Crest of low hill.

Vegetation: *Acacia bivenosa* low open shrubland over *Triodia wiseana* and *Triodia ? basedowii* very open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Sclerolaena densiflora*, *Senna artemisioides*.

Transmission pad: significant coverage of *Acacia* and *Triodia* as per the surrounding vegetation.

Species List

Name

Acacia bivenosa

Sclerolaena densiflora

Senna artemisioides

Triodia ? basedowii

Triodia wiseana



Plate 18: Site O.86 facing north-east.

RTIO Utilities Transmission Corridor

Site O.87

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 522773 mE

Northing: 7621252 mN

Habitat: Narrow drainage line.

Vegetation: *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia monticola* and *Acacia colei* var. *ileocarpa* shrubland over *Triodia angusta* very open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Acacia bivenosa*.

Species List

Name

Acacia bivenosa

Acacia colei var. *ileocarpa*

Acacia monticola

Corymbia hamersleyana

Eucalyptus leucophloia subsp. *leucophloia*

Triodia angusta



Plate 19: Site O.87 facing south.

RTIO Utilities Transmission Corridor

Site O.90

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 523698 mE

Northing: 7620636 mN

Habitat: Broad shallow drainage between low hills.

Vegetation: *Corymbia hamersleyana* and *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia ancistrocarpa* open heath over *Triodia* sp (*epactia/pungens*) very open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Species List

Name

Acacia ancistrocarpa

Acacia monticola

Corymbia hamersleyana

Eucalyptus leucophloia subsp. *leucophloia*

Triodia sp (*epactia/pungens*)



Plate 20: Site O.90 facing north-east.

RTIO Utilities Transmission Corridor

Site O.101

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 524358 mE

Northing: 7620187 mN

Habitat: Recently burnt plain between low hills.

Vegetation: *Corymbia hamersleyana* scattered low trees over *Triodia wiseana* very open hummock grassland.

Veg Condition: Regeneration is Excellent.

Fire Age: <2 years

Notes: Significant burn effects. *Triodia* sp. very young and sterile.

Transmission Pad consistent with surrounding vegetation.

Species List

Name

Corymbia hamersleyana

Eucalyptus leucophloia subsp. *leucophloia*

Goodenia microptera

Indigofera monophylla

Triodia wiseana



Plate 21: Site O.101 facing north-east.

RTIO Utilities Transmission Corridor

Site O.107

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 526061 mE

Northing: 7619047 mN

Habitat: Undulating plain between rocky, gentle hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* and *Hakea lorea* low open woodland over *Acacia atkinsiana* and *Acacia maitlandii* shrubland over *Triodia wiseana* open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Senna glutinosa* subsp. *pruinosa*.

Species List

Name

Acacia atkinsiana

Acacia maitlandii

Eucalyptus leucophloia subsp. *leucophloia*

Hakea lorea

Senna glutinosa subsp. *pruinosa*

Triodia wiseana



Plate 22: Site O.107 facing south.

RTIO Utilities Transmission Corridor

Site O.110

Location: Millstream National Park

Type: Relevé

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

MGA Zone: 50

Easting: 526988 mE

Northing: 7618425 mN

Habitat: Very minor drainage between very low, rocky hills.

Vegetation: *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Petalostylis labicheoides* and *Acacia colei* var. *ileocarpa* shrubland over *Triodia wiseana* and *Triodia* sp (*epactia/pungens*) open hummock grassland.

Veg Condition: Excellent

Fire Age: >10

Notes: Associated species: *Acacia bivenosa*, *Goodenia stobbsiana* and *Ptilotus calostachyus*.

Regrowth on Transmission Pad consistent with surrounding vegetation.

Species List

Name

Acacia bivenosa

Acacia colei var. *ileocarpa*

Eucalyptus leucophloia subsp. *leucophloia*

Goodenia stobbsiana

Petalostylis labicheoides

Ptilotus calostachyus

Triodia sp (*epactia/pungens*)

Triodia wiseana



Plate 23: Site O.110 facing south.

RTIO Utilities Transmission Corridor

Site Opp

Location: Millstream National Park

Type: O

1st Observation: **Date:** 10/09/2013 **Described by:** DR/JO

Seasonal Conditions: E

Species List

Name

Abutilon lepidum

Abelmoschus ficulneus

Acacia acradenia

Acacia ancistrocarpa

Acacia arida

Acacia atkinsiana

Acacia bivenosa

Acacia colei var. ileocarpa

Acacia inaequilatera

Acacia maitlandii

Acacia monticola

Acacia pyrifolia

Acacia stellaticeps

Acacia synchronicia

Acacia tenuissima

Acacia xiphophylla

Aerva javanica

Alternanthera nana

Aristida contorta

Aristida holathera var. holathera

Aristida latifolia

Astrebla pectinata

Atriplex semilunaris

Boerhavia coccinea
Boerhavia repleta
Brachyachne convergens
Cassytha capillaris
Cenchrus ciliaris
Cenchrus setiger
Citrullus colocynthis
Cleome viscosa
Corchorus tridens
Corymbia hamersleyana
Cucumis maderaspatanus
Cullen leucochaites
Cullen martinii
Cymbopogon ambiguus
Cynanchum floribundum
Dampiera candidans
Dysphania kalpari
Enchylaena tomentosa var. tomentosa
Enneapogon caeruleus
Eriachne aristidea
Eriachne benthamii
Eriachne mucronata
Eucalyptus camaldulensis
Eucalyptus leucophloia
Eucalyptus leucophloia subsp. leucophloia
Eulalia aurea
Euphorbia australis
Euphorbia careyi
Flaveria trinervia
Gomphrena cunninghamii
Goodenia microptera
Goodenia muelleriana
Goodenia stobbsiana
Gossypium australe
Gossypium robinsonii
Grevillea pyramidalis
Grevillea wickhamii
Hakea lorea

Haloragis gossei

Heliotropium crispatum

Heliotropium ovalifolium

Hibiscus austrinus var. *austrinus*

Indigofera monophylla

Ipomoea muelleri

Lepidium pholidogynum

Malvastrum americanum

Melaleuca glomerata

Mirbelia viminalis

Neptunia dimorphantha

Oldenlandia crouchiana

Panicum decompositum

Petalostylis labicheoides

Phyllanthus maderaspatensis

Polycarpaea longiflora

Portulaca oleracea

Pterocaulon sphaeranthoides

Ptilotus astrolasius

Ptilotus axillaris

Ptilotus calostachyus

Ptilotus clementii

Ptilotus fusiformis

Ptilotus gomphrenoides

Ptilotus helipteroides

Ptilotus nobilis

Ptilotus obovatus

Ptilotus rotundifolius

Rhagodia eremaea

Rhynchosia minima

Salsola australis

Sclerolaena cuneata

Sclerolaena densiflora

Senna artemisioides

Senna glutinosa subsp. *glutinosa*

Senna glutinosa subsp. *pruinosa*

Senna notabilis

Sesbania cannabina

Sida echinocarpa

Sida sp. verrucose glands (F.H. Mollemans 2423)

Senna symonii

Solanum diversiflorum

Sorghum timorense

Stemodia kingii

Streptoglossa bubakii

Stylobasium spathulatum

Swainsona formosa

Tephrosia rosea

Tephrosia rosea var. *clementii*

Themeda avenacea

Themeda triandra

Trachymene pilbarensis

Trianthema triquetra

Tribulus hirsutus

Tribulus suberosus

Trichodesma zeylanicum

Triodia ? *basedowii*

Triodia angusta

Triodia sp (*epactia/pungens*)

Triodia wiseana

Triumfetta clementii

Urochloa occidentalis var. *occidentalis*

Vachellia farnesiana

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Appendix H: Vascular Flora Species List

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Table H.1. Vascular flora species recorded in the survey area.

Family	Name	Priority	Weed
Amaranthaceae	<i>Aerva javanica</i>		*
	<i>Alternanthera nana</i>		
	<i>Gomphrena cunninghamii</i>		
	<i>Ptilotus astrolasius</i>		
	<i>Ptilotus axillaris</i>		
	<i>Ptilotus calostachyus</i>		
	<i>Ptilotus clementii</i>		
	<i>Ptilotus fusiformis</i>		
	<i>Ptilotus gomphrenoides</i>		
	<i>Ptilotus helipteroides</i>		
	<i>Ptilotus nobilis</i>		
	<i>Ptilotus obovatus</i>		
	<i>Ptilotus rotundifolius</i>		
Aizoaceae	<i>Trianthema triquetra</i>		
Apiaceae	<i>Trachymene pilbarensis</i>		
Asclepiadaceae	<i>Cynanchum floribundum</i>		
Asteraceae	<i>Flaveria trinervia</i>		*
	<i>Streptoglossa bubakii</i>		
	<i>Pterocaulon sphaeranthoides</i>		
Boraginaceae	<i>Heliotropium crispatum</i>		
	<i>Heliotropium ovalifolium</i>		
	<i>Trichodesma zeylanicum</i>		
Brassicaceae	<i>Lepidium pholidogynum</i>		
Capparaceae	<i>Cleome viscosa</i>		
Caryophyllaceae	<i>Polycarpaea longiflora</i>		
Chenopodiaceae	<i>Atriplex semilunaris</i>		
	<i>Dysphania kalpari</i>		
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>		
	<i>Rhagodia eremaea</i>		
	<i>Salsola australis</i>		
	<i>Sclerolaena cuneata</i>		
	<i>Sclerolaena densiflora</i>		
Convolvulaceae	<i>Ipomoea muelleri</i>		
Cucurbitaceae	<i>Citrullus colocynthis</i>		*
	<i>Cucumis maderaspatensis</i>		
Euphorbiaceae	<i>Euphorbia australis</i>		
	<i>Euphorbia careyi</i>		
	<i>Phyllanthus maderaspatensis</i>		
Fabaceae	<i>Acacia acradenia</i>		

Family	Name	Priority	Weed
	<i>Acacia ancistrocarpa</i>		
	<i>Acacia arida</i>		
	<i>Acacia atkinsiana</i>		
	<i>Acacia bivenosa</i>		
	<i>Acacia colei</i> var. <i>ileocarpa</i>		
	<i>Acacia inaequilatera</i>		
	<i>Acacia maitlandii</i>		
	<i>Acacia monticola</i>		
	<i>Acacia pruinocarpa</i>		
	<i>Acacia pyrifolia</i>		
	<i>Acacia stellaticeps</i>		
	<i>Acacia synchronicia</i>		
	<i>Acacia tenuissima</i>		
	<i>Acacia xiphophylla</i>		
	<i>Cullen leucochaites</i>		
	<i>Cullen martinii</i>		
	<i>Indigofera monophylla</i>		
	<i>Mirbelia viminalis</i>		
	<i>Neptunia dimorphantha</i>		
	<i>Petalostylis labicheoides</i>		
	<i>Rhynchosia minima</i>		
	<i>Senna artemisioides</i>		
	<i>Senna artemisioides</i> subsp. <i>helmsii</i>		
	<i>Senna glutinosa</i> subsp. <i>glutinosa</i>		
	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>		
	<i>Senna notabilis</i>		
	<i>Senna symonii</i>		
	<i>Sesbania cannabina</i>		
	<i>Swainsona formosa</i>		
	<i>Tephrosia rosea</i>		
	<i>Tephrosia rosea</i> var. <i>clementii</i>		
	<i>Vachellia farnesiana</i>		*
Goodeniaceae	<i>Dampiera candidans</i>		
	<i>Goodenia microptera</i>		
	<i>Goodenia muelleriana</i>		
	<i>Goodenia stobbsiana</i>		
	<i>Hibiscus austrinus</i> var. <i>austrinus</i>		
	<i>Malvastrum americanum</i>		*
	<i>Sida echinocarpa</i>		
	<i>Sida</i> sp. verrucose glands (F.H. Mollemans 2423)		

Family	Name	Priority	Weed
Haloragaceae	<i>Haloragis gossei</i>		
Lauraceae	<i>Cassytha capillaris</i>		
Malvaceae	<i>Abutilon lepidum</i>		
	<i>Abelmoschus ficulneus</i>		
	<i>Corchorus tridens</i>		
	<i>Gossypium australe</i>		
	<i>Gossypium robinsonii</i>		
	<i>Triumfetta clementii</i>		
Myoporaceae	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>		
Myrtaceae	<i>Eucalyptus camaldulensis</i>		
	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>		
	<i>Eucalyptus leucophloia</i>		
	<i>Melaleuca glomerata</i>		
Nyctaginaceae	<i>Boerhavia coccinea</i>		
	<i>Boerhavia repleta</i>		
Poaceae	<i>Aristida contorta</i>		
	<i>Aristida holathera</i> var. <i>holathera</i>		
	<i>Aristida latifolia</i>		
	<i>Astrebla pectinata</i>		
	<i>Brachyachne convergens</i>		
	<i>Cenchrus ciliaris</i>		*
	<i>Cenchrus setiger</i>		*
	<i>Cymbopogon ambiguus</i>		
	<i>Enneapogon caeruleus</i>		
	<i>Eriachne aristidea</i>		
	<i>Eriachne benthamii</i>		
	<i>Eriachne mucronata</i>		
	<i>Eulalia aurea</i>		
	<i>Panicum decompositum</i>		
	<i>Sorghum timorense</i>		
	<i>Themeda avenacea</i>		
	<i>Themeda triandra</i>		
	<i>Triodia angusta</i>		
	<i>Triodia ? basedowii</i>		
	<i>Triodia</i> sp (<i>epactia/pungens</i>)		
	<i>Triodia wiseana</i>		
<i>Urochloa occidentalis</i> var. <i>occidentalis</i>			
Portulacaceae	<i>Portulaca oleracea</i>		*
Proteaceae	<i>Grevillea pyramidalis</i>		
	<i>Grevillea wickhamii</i>		

Family	Name	Priority	Weed
	<i>Hakea lorea</i>		
Rubiaceae	<i>Oldenlandia crouchiana</i>		
Scrophulariaceae	<i>Stemodia kingii</i>		
Solanaceae	<i>Solanum diversiflorum</i>		
	<i>Solanum lasiophyllum</i>		
Surianaceae	<i>Stylobasium spathulatum</i>		
Zygophyllaceae	<i>Tribulus hirsutus</i>		
	<i>Tribulus suberosus</i>		

Appendix I: Introduced Flora Species Locations, Descriptions and Map

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Table I.1: Locations of introduced flora recorded in the survey area.

Species	Estimated abundance	Density (%)	Easting (mE)	Northing (mN)
<i>Aerva javanica</i>	15	< 2 %	509026	7630334
	25	< 2 %	508456	7630704
	5	< 2 %	516819	7625285
	1	< 2 %	509205	7630213
	1	< 2 %	509053	7630299
	20	2 – 10 %	508622	7630595
	25	2 – 10 %	508533	7630649
	3	< 2 %	505930	7631500
	25	2 – 10 %	502194	7637026
	50	2 – 10 %	501949	7639367
<i>Cenchrus ciliaris</i>	15	< 2 %	511798	7628546
	250	2 – 10 %	511473	7628757
	50	< 2 %	509900	7629769
	100	< 2 %	509025	7630335
	50	< 2 %	508712	7630542
	100	< 2 %	508443	7630712
	100	< 2 %	506867	7631743
	10	< 2 %	515186	7626348
	20	2 – 10 %	514852	7626552
	25	2 – 10 %	506891	7631714
	100	30 – 70 %	505917	7631499
	<i>Cenchrus setiger</i>	100	2 – 10 %	516996
1000		2 – 10 %	516788	7625296
500		10 – 30 %	516489	7625484
500		2 – 10 %	516155	7625722
50		< 2 %	515822	7625912
250		2 – 10 %	515174	7626341
250		2 – 10 %	514857	7626553
250		2 – 10 %	514531	7626766
250		2 – 10 %	514230	7626958
100		< 2 %	517259	7624991
100		2 – 10 %	517003	7625159
100		30 – 70 %	516896	7625226
100		30 – 70 %	516788	7625296
100		2 – 10 %	516528	7625462
250		30 – 70 %	516496	7625481
25		< 2 %	515814	7625922
75		2 – 10 %	515181	7626345

Species	Estimated abundance	Density (%)	Easting (mE)	Northing (mN)
	50	2 – 10 %	514555	7626740
<i>Citrullus colocynth</i>	1	< 2 %	513930	7627152
	2	< 2 %	513615	7627358
<i>Flaveria trinervia</i>	2	< 2 %	509460	7630049
	1	< 2 %	508735	7630527
<i>Malvastrum americanum</i>	5	< 2 %	513926	7627158
	10	< 2 %	513315	7627553
	10	< 2 %	509593	7629967
	10	< 2 %	507510	7631328
	20	< 2 %	506574	7631924
	3	< 2 %	516174	7625693
	1	< 2 %	507317	7631439
	15	< 2 %	507393	7631390
	2	< 2 %	506899	7631712
	20	< 2 %	502088	7637793
	<i>Portulaca oleracea</i>	50	< 2 %	515836
10		< 2 %	515521	7626113
20		< 2 %	513330	7627550
10		< 2 %	512716	7627946
10		< 2 %	511134	7628968
25		< 2 %	508144	7630914
10		< 2 %	507811	7631128
20		< 2 %	507162	7631534
20		< 2 %	506857	7631728
20		< 2 %	515838	7625912
7		< 2 %	515533	7626132
5		< 2 %	515185	7626339
2		< 2 %	514843	7626551
6		< 2 %	514223	7626960
8		< 2 %	507498	7631316
2	< 2 %	507360	7631410	
<i>Vachellia farnesiana</i>	1	< 2 %	517745	7623965
	2	< 2 %	518246	7624313
	5	< 2 %	516552	7625450
	3	< 2 %	516184	7625688
	2	< 2 %	516156	7625712
	2	< 2 %	514417	7626833
	1	< 2 %	508773	7630495
	1	< 2 %	507495	7631322

Species	Estimated abundance	Density (%)	Easting (mE)	Northing (mN)
	10	< 2 %	506903	7631710
	5	< 2 %	506682	7631849
	1	< 2 %	506630	7631883

Table I.2: Description of introduced flora recorded in the survey area.

Species	Description	Habitat
<p>*<i>Aerva javanica</i> (kapok bush)</p> 	<p>Short-lived, soft-wooded perennial, broad-leaved, multi-stemmed, erect or diffuse herbs, up to 1.6 m high with white flowers between January and October (FloraBase).</p>	<p>Outcrops, coastal areas, in rocky or stony soil, gravelly soil, sand, loam, clay; occupying sand-dunes; floodplains; river-banks; creeklines; drainage-lines; and growing in disturbed native vegetation (FloraBase).</p>
<p>*<i>Cenchrus ciliaris</i> (buffel grass)</p> 	<p>Buffel grass is a tufted or sometimes stoloniferous perennial grass between 0.2 and 1.5 m in height with purple, ciliate flowers between February and October (WAHerb 2013).</p>	<p>Buffel grass occurs on roadsides, creeklines, river edges, and most Pilbara vegetation types (Hussey et al 2004).</p>
<p>*<i>Cenchrus setiger</i> (birdwood grass)</p> 	<p>An erect, stoloniferous perennial tussock grass, up to 0.8 m high with a compact green, spike-like inflorescence to 20 cm long produced in spring and summer (Hussey et al 2004).</p>	<p>Commonly occurs on sandy, rocky, stony loam, clay and wet soils; often in floodplains and disturbed areas such as graded roadsides (WAHerb 2013).</p>
<p>*<i>Citrullus colocynthis</i> (colocynth)</p> 	<p>A trailing perennial herb or climber with yellow flowers between January and October.</p>	<p>Commonly occurs on sandy, rocky, stony loam, clay and wet soils. Often found on disturbed areas and floodplains.</p>





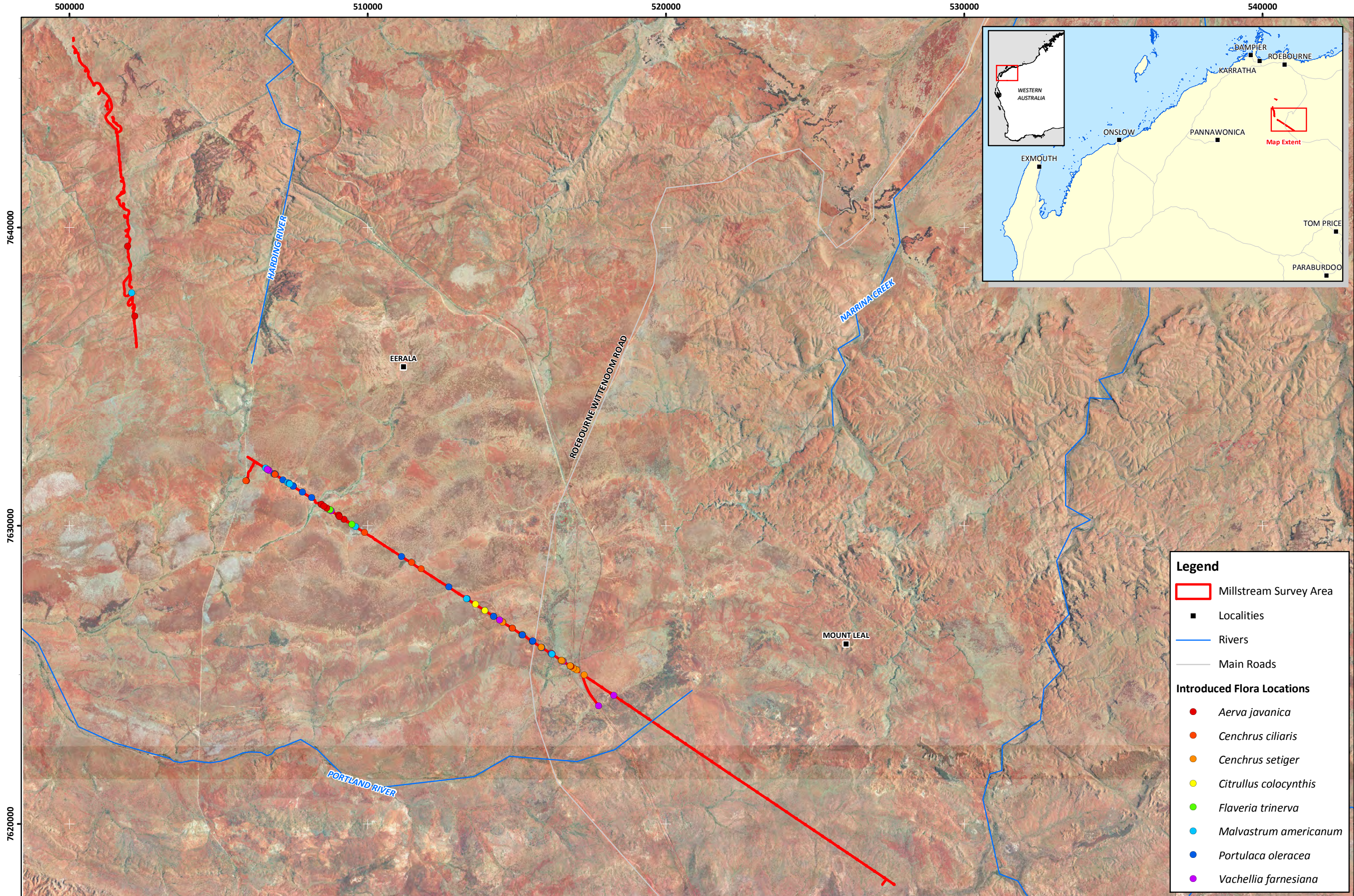
Species	Description	Habitat
<p>*<i>Flaveria trinervia</i> (speedy weed)</p> 	<p>Erect annual or short lived perennial herb, growing to 1 m high. Produces yellow flowers throughout the year.</p>	<p>Grows in a variety of soils, often with a high moisture content and generally in disturbed areas.</p>
<p>*<i>Malvastrum americanum</i> (spiked malvastrum)</p> 	<p>An erect perennial herb to 1.3 m high. Produces yellow-orange flowers from April to July (Florabase).</p>	<p>Occurs in a variety of habitats and soils, including orange/red/yellow sands, alluvial soils, cracking clays, limestone and calcrete. Most commonly associated with drainage lines, but also occurs on stony ridges, hillsides, and floodplains (Florabase).</p>
<p>*<i>Portulaca oleracea</i> (purslane)</p> 	<p>Succulent, prostrate, annual herb to 0.2 m high. Produces yellow flowers throughout the year (Florabase). Considered naturalised in the Pilbara region.</p>	<p>Occurs in a variety of soils, including clay loam, sand and stony soils. Often distributed in disturbed sites (Florabase).</p>
<p>*<i>Vachellia farnesiana</i> (mimosa bush)</p> 	<p>Erect, spreading, thicket-forming, thorny tree or shrub, to 4m high, bark dark grey, rough; leaves pinnate. Yellow flowers from June to August (FloraBase).</p>	<p>Stony sandy, clay or loam soils and gravel. In low-lying areas, river and creek banks and disturbed sites (FloraBase).</p>

Table I.3: Summary assessment of introduced flora species recorded in the survey area (DEC 2011a).

Species	Ecological impact (Low, Moderate, High, Unknown)	Current distribution (Low, Moderate, High, Unknown)	Potential distribution (Low, Moderate, High, Unknown)	Invasiveness (Rapid, Moderate, Slow)	General trend (Increasing, Stable, Decreasing, Unknown)	Status (Outside, Emerging, Established, Unknown)	Feasibility for control (Low, Moderate, High, Unknown)
* <i>Aerva javanica</i>	High	Moderate	Low	Rapid	Increasing	Established	High-Moderate
* <i>Cenchrus ciliaris</i>	High	High	High	Rapid	Increasing	Established	Low
* <i>Cenchrus setiger</i>	High	High	High	Rapid	Increasing	Established	Low
* <i>Citrullus colocynth</i>	Low	Low	Low	Rapid	Increasing	Established	Low
* <i>Cynodon dactylon</i>	High	High	High	Rapid	Increasing	Established	Low
* <i>Flaveria trinervia</i>	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
* <i>Malvastrum americanum</i>	High	High	Low	Rapid	Increasing	Established	Low
* <i>Portulaca oleracea</i>	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
* <i>Vachellia farnesiana</i>	High	High	Low	Rapid	Stable	Established	Low



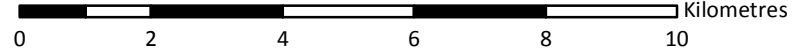
Rio Tinto Iron Ore
 Millstream Level 1 Survey and NVCP

Figure I.1: Introduced Flora Locations

Author: N Cadd

Drawn: H. Thornton

Datum: GDA 1994
 Projection: MGA Zone 50



Date: 15-11-2013

Figure Ref: 14233-13-GDR-1Rev0_131115_MillstreamNVCP_Fig11

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Appendix J: Tree Inspection Areas

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Site MCNP-1 508571 mE 7630625 mN
Species *Acacia inaequilatera*
Conservation Significance N/A

Photograph



Site MCNP-2 508549 mE 7630639 mN
Species *Acacia inaequilatera*
Conservation Significance N/A

Photograph



Site MCNP-3 523527 mE 7619093 mN
Species *Eucalyptus leucophloia* subsp. *leucophloia*
Conservation Significance N/A

Photograph



Site MCNP-5 502030 m E 7638448 mN
Species *Corymbia hamersleyana*
Conservation Significance N/A

Photograph



Site MCNP-6 526865 mE 7618502 mN
Species *Eucalyptus leucophloia* subsp. *leucophloia*
Conservation Significance N/A

Photograph



Site MCNP-7 525987 mE 7619093 mN
Species *Eucalyptus leucophloia* subsp. *leucophloia*
Conservation Significance N/A

Photograph



Site MCNP-8 502047 mE 7638078 mN
Species *Corymbia hamersleyana*
Conservation Significance N/A

Photograph



Site MCNP-9 502070 mE 7638078 mN
Species *Corymbia hamersleyana*
Conservation Significance N/A

Photograph



Site MCNP-10 511610 mE 7628651 mN
Species *Grevillia pyramidalis*
Conservation Significance N/A

Photograph



Site MCNP-10 511611 mE 7628651 mN
Species *Corymbia hamersleyana*
Conservation Significance N/A

Photograph

