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FORTESCUE METALS GROUP LIMITED
LEVEL 1 FLORA AND FAUNA ASSESSMENT
PROPOSED EXTENSION TO CLUB HAMILTON ACCOMMODATION

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FORTESCUE METALS GROUP LIMITED
LEVEL 1 FLORA AND FAUNA ASSESSMENT
CLUB HAMILTON EXTENSION AREA

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				Name	**Distributed To**	**Date**
1	A Craigie M Macdonald	C Macpherson	28.03.11	Carol Macpherson	Cath Bozanich, Todd Edwards	28.03.11
2	A Craigie R Tuckett N Jackett	C Macpherson E Fox	01.04.11	Elizabeth Fox Carol Macpherson	Todd Edwards	04.04.11

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ecologia Environment
1025 Wellington Street
WEST PERTH WA 6005
Phone: 08 9322 1944
Fax: 08 9322 1599
Email: admin@ecologia.com.au

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ACRONYMS

BOM	Bureau of Meteorology
DEC	Department of Environment and Conservation
DRF	Declared Rare Flora
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1950*
IBRA	Interim Biogeographic Regionalisation of Australia
FMG	Fortescue Metals Group
NVIS	National Vegetation Information System
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
WC Act	*Wildlife Conservation Act 1950*

EXECUTIVE SUMMARY

Fortescue Metals Group (FMG) is proposing to expand the capacity of accommodation at their Port Hedland Facility (Hamilton Motel). The proposed development area is located within the town of South Hedland and will necessitate the clearance of approximately 10.3 hectares. A Vegetation Clearance Permit will be required.

A database search was conducted to determine if there was potential impact to taxa listed under Commonwealth EPBC Act or State WC Act listings (including threatened species and Threatened Ecological Communities), DEC Declared Rare Flora (DRF) and Priority taxa.

The databases searches included:

- EPBC Act Protected Matters Search (including threatened species and Threatened Ecological Communities);
- DEC Species and Communities Branch TEC/PEC Search;
- DEC Rare and Priority Flora Search (which incorporates searches of the DEC Threatened Flora Database, WA Herbarium database and the Declared Rare and Priority Flora Species List for the area of interest);
- DEC Rare and Priority Fauna Search.

The database survey indicated that there are 10 Priority flora taxa and five conservation significant fauna species recorded within the a buffer of 50 km of the proposed development area.

A survey comprising both quadrat and transect based data collection was conducted by a botanist and zoologist on the 23rd March 2011. No priority flora, DRF, or conservation significant fauna were recorded.

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1 INTRODUCTION

Fortescue Metals Group (FMG) is proposing to expand the capacity of accommodation at their Port Hedland Facility (Hamilton Motel). The proposed development area is located within the township of South Hedland and will require the clearance of approximately 10.3 hectares (Figure 1.1).

To provide supporting information regarding the fauna, flora and vegetation present within the area and to ensure compliance with the *Environmental Protection Act 1986* and *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, FMG requested a search of selected databases and a survey of the proposed development area.

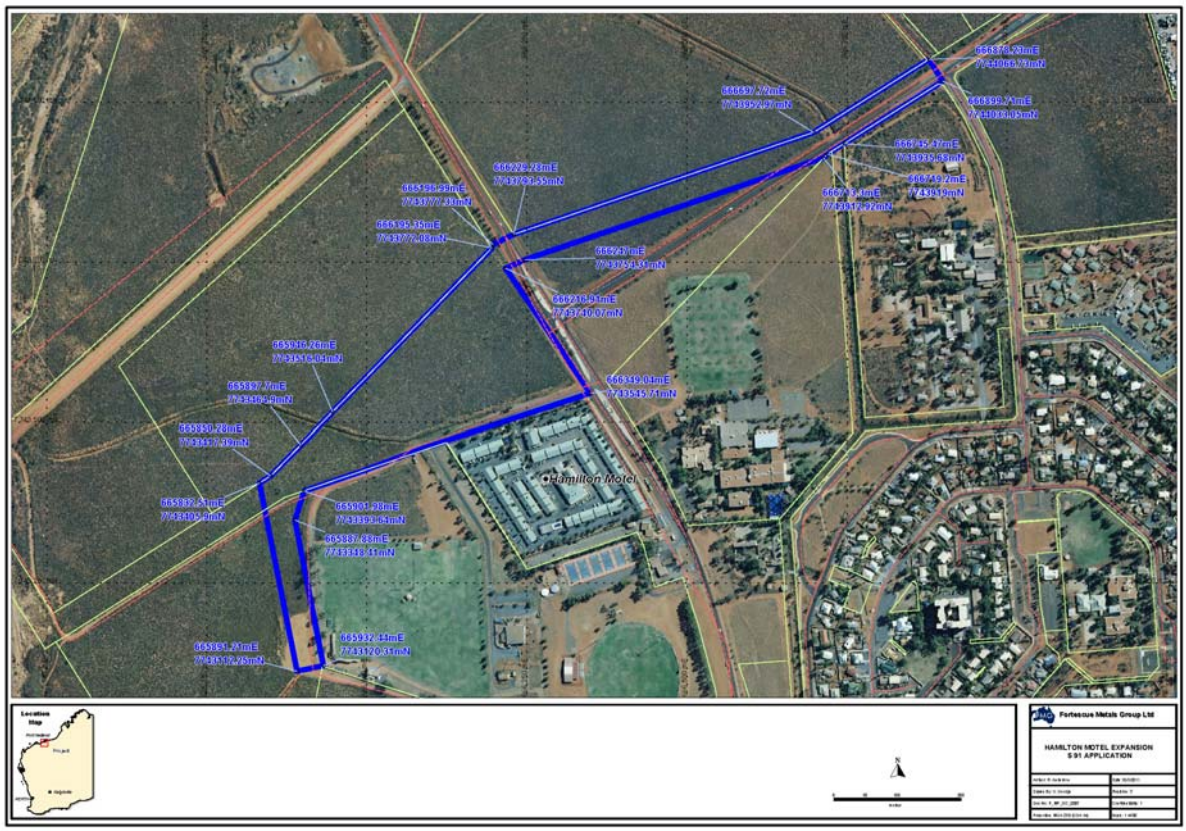


Figure 1.1 – Location of proposed development area.

1.1 LEGISLATIVE FRAMEWORK

Legislation relevant to the protection of biodiversity in Western Australia includes, but is not limited to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and the State *Wildlife Conservation Act 1950* (WC Act) and *Environment Protection Act 1986* (EP Act).

The Commonwealth EPBC Act was developed to provide protection for matters of national environmental significance. It includes provisions to protect threatened species and communities and the conservation of migratory species.

The State WC Act was developed to provide for the protection of wildlife in Western Australia. Under section 14 of this act, all flora and fauna are protected in Western Australia. In addition, the Minister has published a list of species in need of special protection (declare rare flora) because they are considered rare, likely to become extinct, or are presumed extinct. The current listing was published in Western Australian Government Gazette No. 28 on 23 February 2010.

The State EP Act was developed to ensure that impacts on native flora and fauna are considered in the assessment of development proposals. While the assessment of specific proposals is not within the scope of this report, the surveys undertaken conform to the requirements of the Environment Protection Authority's (EPA's) *Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002), *Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004) and *Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004).

1.2 SURVEY OBJECTIVES

FMG commissioned *ecologia* Environment (*ecologia*) to undertake a level 1 fauna, flora and vegetation survey of the proposed development area and to provide the following:

- A review of background information;
- An inventory of vegetation communities and flora species occurring in the study area;
- An inventory of fauna potentially occurring in the study area;
- An inventory of species of conservation significance recorded or likely to occur within and near the project area; and
- A map and detailed description of vegetation types in the study area.

2 EXISTING ENVIRONMENT

2.1 CLIMATE

Climate data is based on records from nearby Bureau of Meteorology (BOM) weather stations. Port Hedland Airport weather station (operating since 1942) is approximately 4.5 km north east of the proposed extension.

The region experiences an arid climate with hot humid summers and warm winters. The mean annual rainfall at Port Hedland Airport (1942-2010) is 310.9 mm. The majority of rain falls from January to March (Table 2.1). However, this rainfall is highly variable in time and space, with regular thunderstorms and occasional tropical cyclones during the wet season producing heavy but localised rainfall and flooding. Spring (September to November) is particularly dry. Summer temperatures across the Pilbara regularly reach over 40°C, with coastal areas typically experiencing less extreme temperatures than areas further inland.

Table 2.1 – Monthly Climate Statistics for Port Hedland Airport.

Port Hedland Airport (Site: 004032)				Commenced: 1942				Last Record: 2011				
Latitude: 20.37°S				Longitude: 118.63°E				Elevation: 6 m				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)												
36.4	36.2	36.8	35.2	30.6	27.6	27.1	29.1	32.3	34.8	36.2	36.6	33.2
Mean minimum temperature (°C)												
25.5	25.5	24.5	21.4	17.2	14.2	12.3	13.2	15.4	18.4	21.3	24.0	19.4
Mean rainfall (mm)												
59.4	93.2	48.7	23.0	27.2	21.2	11.1	5.0	1.3	0.9	2.5	18.4	310.9
Mean number of rain days												
3.5	5.5	2.9	1.2	2.1	1.9	1.1	0.6	0.2	0.2	0.3	1.2	20.7
Highest rainfall (mm)												
453.5	360	427.2	352.1	169.9	128.6	80.5	58.6	27.4	8.2	66.8	219	626.8
Mean 9am relative humidity (%)												
56	60	51	40	40	43	40	36	32	33	37	46	43
Mean 9am wind speed (km/h)												
14.6	14.4	15.1	16.9	19.9	20.8	20.8	20.2	18.4	17.9	16.0	15.2	17.5

Source: Bureau of Meteorology (April 2011)

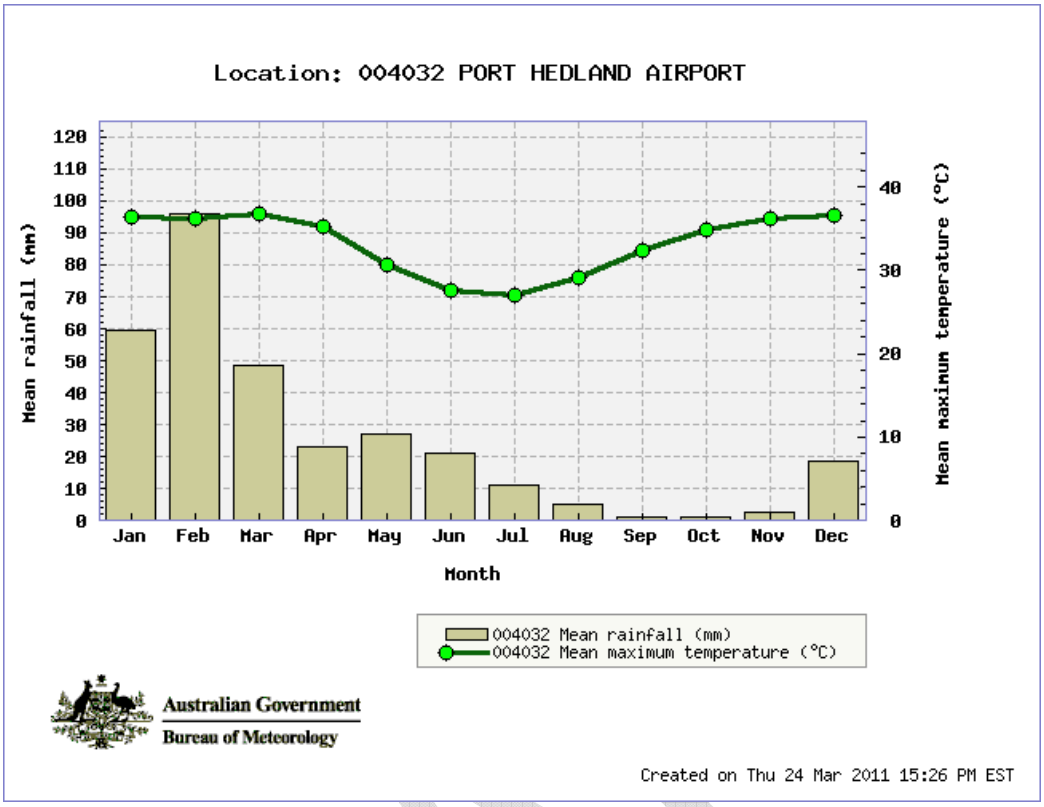


Figure 2.1 – Temperature and Rainfall for Port Hedland Airport

2.2 SOILS

The project area lies within the De Grey- Roebourne Lowlands Zone of the soil-landscape classification of Tille (2006). The zone is located in the northern Pilbara between Karratha and the De Grey River, and is made up of alluvial plains and sandplains (and some floodplains and stony plains) on alluvial and marine deposits over rocks of the northern Pilbara Craton. Soils are red deep sandy duplexes with red loamy earths and some red/brown non-cracking clays, cracking clays, red sandy earths and red deep loamy duplexes, supporting Spinifex grasslands with kanji and tussock grasslands (Tille 2006).

2.3 LAND SYSTEMS CLASSIFICATION

The Pilbara region was surveyed by a joint team from the Department of Agriculture, Western Australia and the Department of Land Administration (now Department of Land Information) between 1995 and 1999. An area of 181,723 km2 was surveyed and mapped into 20 broad land types comprised of 102 land systems. The classification was based on predominant biophysical features. At a more detailed level, the component land units of each land system are described by their landform features, soils and vegetation associations.

The study area lies entirely within the Uaroo Land System (Van Vreeswyk *et al.* 2004). This system is characterised by broad, level sandy surfaced plains, minor pebbly plains and tracts receiving sheet flow, relief mostly less than 10 m. They are subject to some sheet flow but because of their very sandy nature much of this is absorbed. Infrequent broad, shallow, usually unchannelled, drainage tracts with somewhat heavier textured soils may contribute minor through flow to surfaces further downslope. Geology is quaternary colluvium and alluvium.

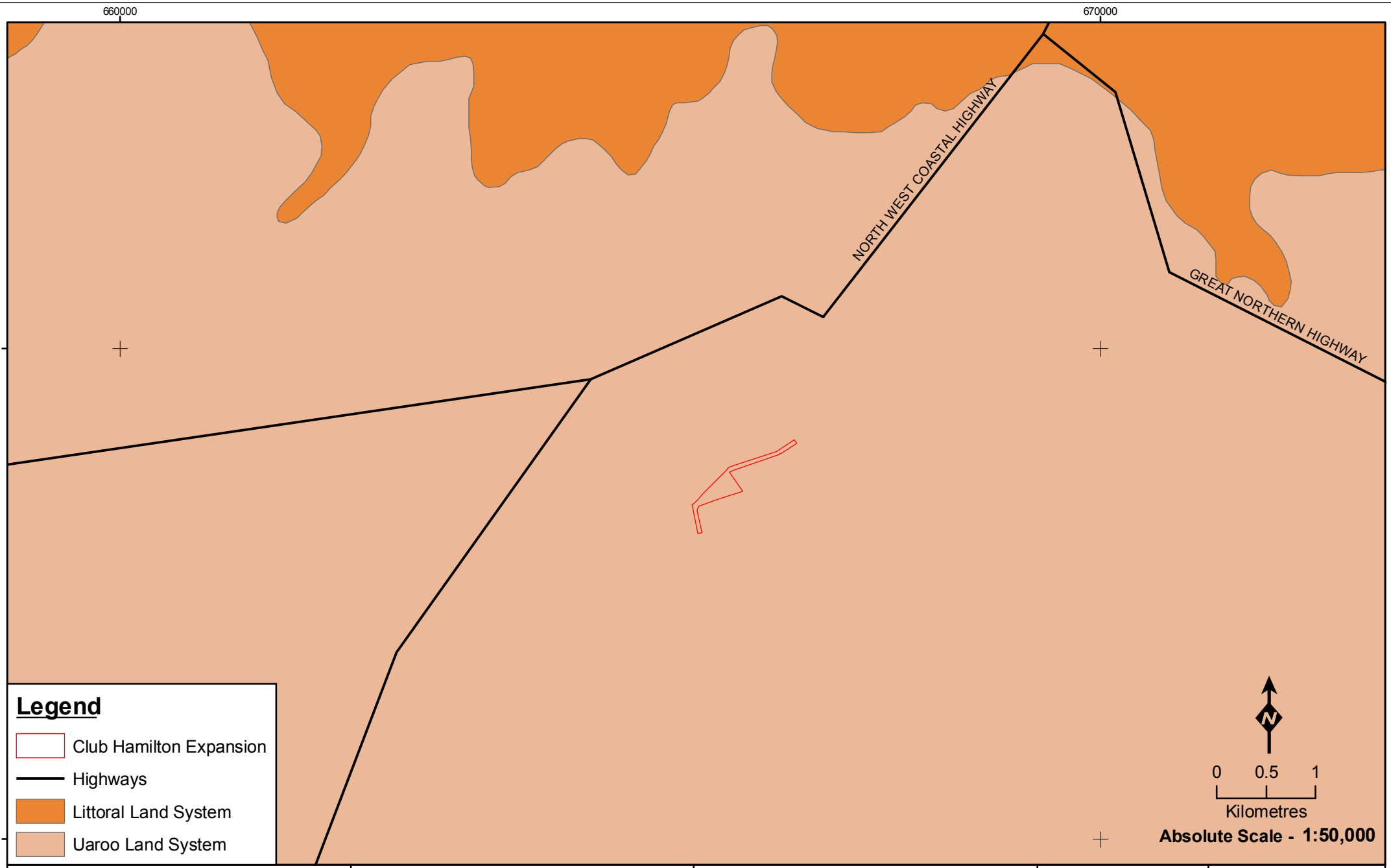
The vegetation is this system typically supports hard spinifex vegetation which is not preferred by grazing animals and soft spinifex which is moderately preferred when young such as for 2 or 3 years

following burning. Occasionally some erosion and pasture decline is evident on drainage tracts but generally the system is not susceptible to erosion or significant vegetation degradation. The landforms and associated vegetation are described in more detail in Table 2.2.

The Uaroo land system covers a total of 7,681 km^2, or 4.2% of the total area within the Pilbara land system survey, making it the 7^{th} most common system. It is widespread, occurring extensively from Port Hedland to east of Marble Bar, with another less extensive loci to the east of Onslow.

Table 2.2 – Characteristics of the Vegetation Units of the Uaroo Land System

Unit	Area %	Landform	Soil	Vegetation
1	<1	**Low hills** - isolated hills and ridges up to 1 km long, gently inclined to steep stony footslopes, relief up to 30 m above surrounding plains.	Stony soils (203).	Hummock grasslands of *Triodia wiseana, T.*spp. (hard spinifex) with isolated or very scattered shrubs (HSPG).
2	3	**Low rises** - gently undulating raised surfaces up to 1.5 km in extent, surface mantles of variable abundance grit and pebbles of quartz and granite, occasional outcrops of granite or other parent rock.	Red shallow sands (423) and red sandy earths (463).	Hummock grasslands of *Triodia pungens, T. epactia* (soft spinifex), with very scattered to scattered *Acacia* spp. shrubs (PSSG). Less frequently with *Triodia* spp. (hard spinifex) (PHSG).
3	8	**Pebbly plains** - level plains up to 3 km in extent, marginal to or as patches within sandy plains (unit 4), surface mantles of many to abundant pebbles of quartz and/or ironstone.	Red shallow sandy duplex soils (406), red shallow sands (423), red sandy earths (463) and calcareous shallow earths (521).	Hummock grasslands of *Triodia lanigera, T. plurinervata, T. wiseana* (hard spinifex) with isolated to scattered shrubs such as *Acacia inaequilatera* (kanji) and *A. ancistrocarpa* (shiny leaf wattle) (PHSG). Less frequently with *Triodia pungens* (soft spinifex) (PSSG).
4	82	**Sandy/loamy plains** - level plains up to 10 km or more in extent, microrelief often moundy on more sandy sites, no surface mantles.	Red sandy earths (463), red deep sands (445) and red loamy earths (544).	Hummock grasslands or shrubby hummock grasslands of *Triodia pungens, T. epactia, T. schinzii* (soft spinifex) or *T. lanigera, T.* spp. (hard spinifex) with isolated to scattered (occasionally moderately close) shrubs particularly *Acacia stellaticeps* (poverty bush), *A. inaequilatera* (kanji), *A. tumida* (pindan wattle) and occasional eucalypt and other trees PSSG, SSSG, PHSG, SHSG).
5	1	**Calcrete plains** - level surfaces associated with unit 4, up to 1 km in extent, surface mantles of abundant calcareous gravel.	Calcareous shallow loams (521) and red deep sandy duplex soils (405).	Hummock grasslands of *Triodia wiseana, T. lanigera* (hard spinifex) or *T. pungens* (soft spinifex) with isolated to scattered *Acacia* spp. shrubs (CASG).
6	6	**Tracts receiving sheet flow** – level tracts up to 2 km wide, slightly lower and extending downslope through unit 4 for many kilometres, unchannelled or occasionally with narrow creeklines, scour lines and scalds.	Red deep sandy duplex soils (405), red deep sands (445) and red sandy earths (463).	Hummock grasslands of *Triodia pungens* or *T.* spp. (soft or hard spinifex) with isolated to very scattered *Acacia* spp. shrubs (ASSG, AHSG). Also scattered tall shrublands /woodlands with *Acacia* and *Eucalyptus* spp. and hummock and tussock grass understoreys (DAHW, DESG).



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Land Systems of the Club Hamilton Expansion

Figure: 2.2
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Coordinate System
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Projection: Transverse Mercator
Datum: GDA 1994

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2.4 PILBARA BIOGEOGRAPHIC REGION

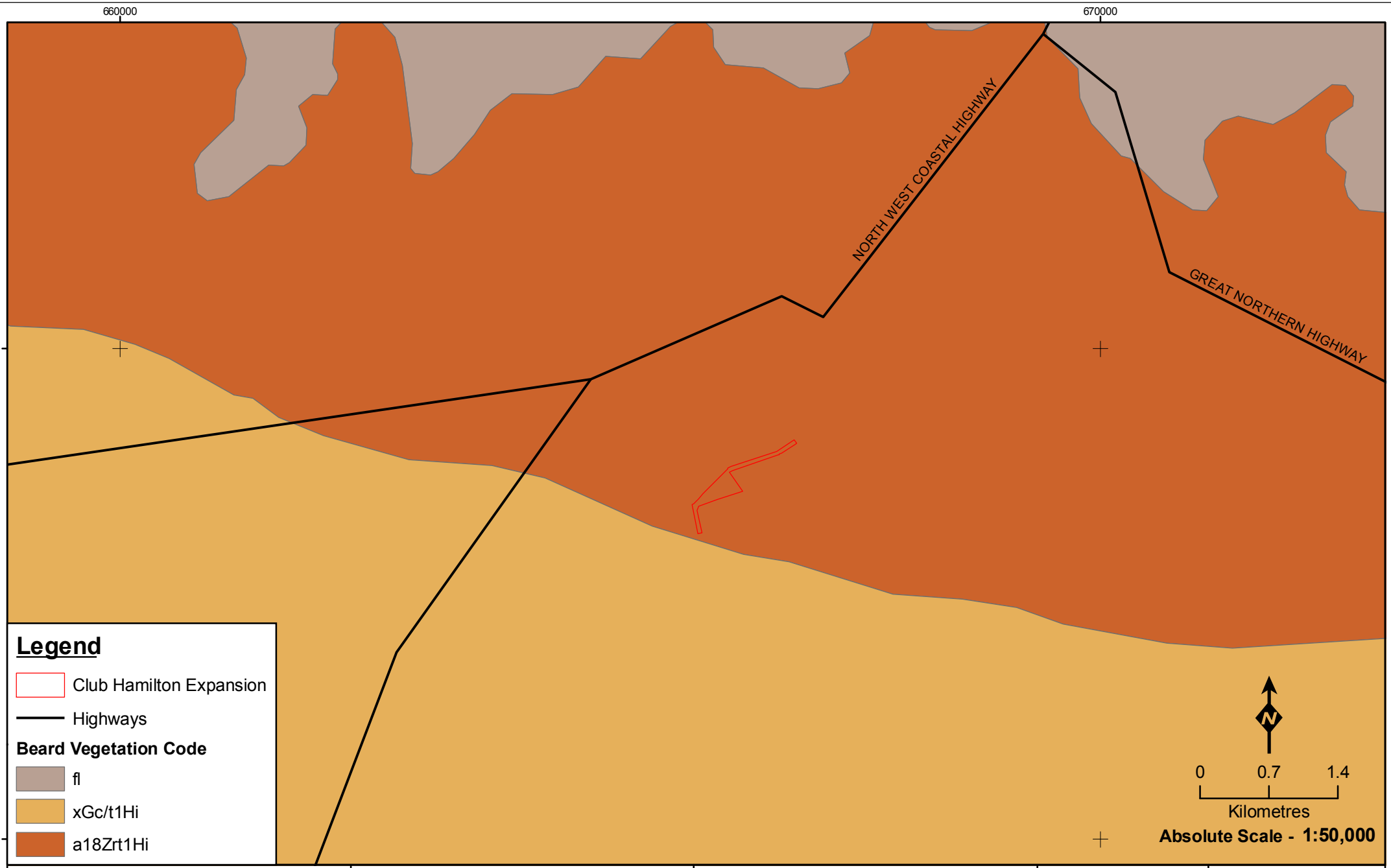
The Project Area lies within the Pilbara Biogeographic Region of the Interim Biogeographic Regionalisation of Australia (IBRA). The Pilbara region is further subdivided into the Hamersley, Fortescue Plains, Chichester and Roebourne subregions. The Project Area lies entirely with the Roebourne subregion which is comprised primarily of quaternary alluvial and older colluvial coastal and subcoastal plains. Vegetation is dominated by a grass savannah of mixed bunch and hummock grasses and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A*. *inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas (Kendrick and Stanley 2001).

2.5 BROAD SCALE VEGETATION UNITS

The Project Area falls within Beards (1975) Abydos Plain of the Fortescue Botanical District in the Pilbara. The vegetation mapping of Beard and Hopkins throughout Western Australia was subsequently digitised and reinterpreted to reflect the National Vegetation Information System (NVIS) standards (Shepherd *et al,* 2002). A single unit, $a_{18}Zrt_1Hi$ was mapped within the Project Area (Figure 2.3), although the area is adjacent to the boundary of this unit with xGc/t_1Hi. The dominant species and representation within the Pilbara of these units is summarised in Table 2.3.

Table 2.3 – Representation of Broad Vegetation Units in the Vicinity of the Project Area.

Beard Vegetation Description	Equiv. Beard Unit	Current Extent in WA (ha)	% Pre-European Extent Remaining	% Total within Project Area
Hakea lorea and *Owenia reticulata* woodland over *Acacia pyrifolia*, *Acacia pachycarpa*, *Acacia holosericea* and *Acacia tumida* shrubland over *Triodia pungens* hummock grassland and *Acacia translucens* shrubs.	$a_{18}Zrt_1Hi$		100	<0.001
Mosaic: *Acacia victoriae* and *Acacia bivenosa* shrubland over *Eriachne benthamii* tussock grassland; and *Acacia pyrifolia* shrubland over *Triodia pungens* hummock grassland.	xGc/t_1Hi		100	0



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Shepherd *et* al Vegetation Club Hamilton Expansion

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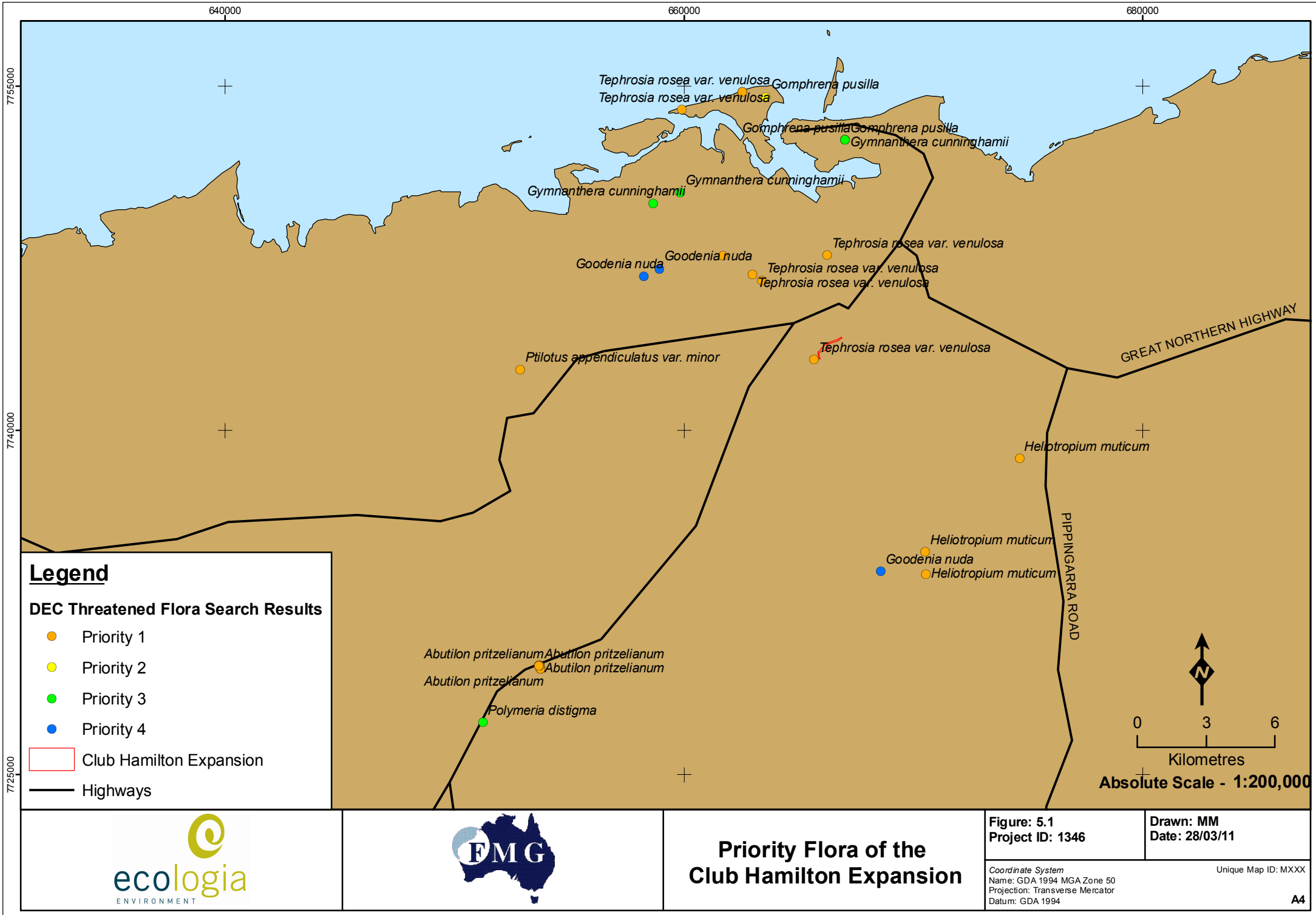
3 FLORA OF CONSERVATION SIGNIFICANCE PREVIOUSLY RECORDED IN THE VICINITY OF THE PROJECT AREA

A DEC Threatened Flora Database search (36-0311 FL) was conducted using a rectangular buffer of 50 km around the Project Area. There are no records of Declared Rare Flora, however 10 Priority flora taxa were present within the search area (Figure 1.1). The form, flowering period and habitat preferences of these taxa are summarised in Table 3.1.

Table 3.1 – Priority Flora Recorded within 40 km of the Proposed Development Area

Taxon	Cons. Stat.	Description	Fl.	Habitat (s)	Potential to occur in Project Area
Abutilon pritzelianum	P1	Erect, open shrub with large canes, 1–1.5 (3)m high . Orange to yellow flowers	Aug.	Red sand, red clay, shallow soiled granitic plains. Dunes, roadside, floodplain	Possible
Heliotropium muticum	P1	Open, spreading shrub with white flowers with very short but stiff, spiny hairs, growing up to 0.3 m tall	Aug.	Red silty sand, red-brown loam, bedrock. Floodplains and gentle to steep slopes	Possible
Ptilotus appendiculatus var. *minor*	P1	Herb or subshrub with numerous branched, prostrate stems forming close mats on ground surface. Leaves grey-green. Flowers white to pale ivory coloured.	Sept	Red-brown alluvial sand on old floodplain	Unlikely
Tephrosia rosea var. *venulosa*	P1	Sprawling to erect shrub to 1.7 m but more commonly <0.5m and up to1m across. Leaves grey-green hirsute underneath more or less green minutely pubescent on upper side. Flower standard wings and keel, pink to purple. Fruit silvery/grey	July Sept	Sand plain with red-brown sandy loam soils	High (recorded in similar vegetation)
Gomphrena pusilla	P2	Sprawling semi prostrate herb to 20cm, stems tinged maroon, flowers white, tinged mauve	Mar June	Behind foredune; fine beach sand, limestone.	Low
Gymnanthera cunninghamii	P3	Erect multi stemmed shrub (pale tubercules on brown stem) to 1.5m with pendulous foliage and milky sap. Varnished leaves. Green flowers	Jan-Dec	Brown-red sand, Swales seasonally inundated on saline bulldust, major drainage on dark red sandy clay loam, Base of low limestone ridge above mangrove flats, beach sand at base of dolerite hills	Low

Taxon	Cons. Stat.	Description	Fl.	Habitat (s)	Potential to occur in Project Area
Polymeria distigma	P3	Prostrate herb with runners to 1m long with some erect stems up to 10cm long. Lilac to pink flowers and dark green 'claw' shaped leaves	Apr-July	Brown sand on a plain on the edge of a disturbed area, dry, grey sandy clay, Brown dry rocky soil, Red sandy laterite over sandstone between dunes, cracking clay plain. Favours disturbed soil.	Possible
Pterocaulon sp. A Kimberley Flora (B.J. Carter 599)	P3	Compact, densely flowered shrub to c. 40 cm high. Flowers bright purple - mauve, semi globular	Apr-Aug	On near saline (on intertidal zone) sandy flats, plain, rangeland on brown dry sand, orange sand loam	Possible
Tephrosia bidwillii	P3	Erect perennial herb/shrub with orange flowers		Floodplain; alluvial silt and sand, growing between boulders near outcrop, alluvial plain	Possible
Goodenia nuda	P4	Erect spreading herb with yellow flowers, maroon centre	Apr-Aug	Brown-red sand – loam, floodplains, drainage lines, hill crests	Possible



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Priority Flora of the Club Hamilton Expansion

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Coordinate System
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Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: MXXX

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4 SURVEY OF PROJECT AREA

4.1 METHODOLOGY

A survey of the Project Area was conducted by a botanist and zoologist on the 23rd March 2011. Two quadrats of 2,500 m^2 were surveyed. Notes on vegetation structure, dominant species, surface soil, lithology and landform were recorded for each quadrat. The percentage cover of each species present was recorded using cover ranges consistent with National Vegetation Information System (NVIS) nomenclature. The quadrats were photographed and the position determined using a handheld GPS. The condition of vegetation was assessed using the scale of Trudgen (1991).

In addition a series of transects was conducted throughout the vegetation and species additional to those present within the quadrats. The coordinates of each species thus recorded was noted.

The presence of vertebrate fauna species observed either directly or by the presence of diggings or scats was recorded during a series of transects throughout the Project Area.

5 RESULTS

5.1 FLORA RECORDED DURING SURVEY

A total of 52 taxa from 18 families and 43 genera were recorded as detailed in Appendix A . No taxa of conservation significance were recorded.

5.2 VEGETATION UNITS RECORDED DURING SURVEY

Three vegetation units were identified:

1. Sandy plain: Low to medium height sparse *Acacia stellaticeps* heathland over open *Triodia schinzii* and hummock grassland and sparse *Themeda triandra* tussock grassland; and
2. Shallow drainage channel (probably artificial): Low to medium open *Acacia stellaticeps* heathland over open *Cenchrus ciliaris* tussock grassland.
3. Severe *Cenchrus ciliaris* invasion: Closed *Cenchrus ciliaris* tussock grassland.

The distribution of these units is detailed in Figure 5.1. The structure and composition of each vegetation unit is detailed in Appendix B.

5.3 VEGETATION CONDITION

The vegetation of much of the area was assessed as in very good condition. The major disturbance is the presence of *Cenchrus ciliaris* (Buffel grass) which is particularly prevalent at the edges of the site adjacent to the road and at the perimeter of the drainage channel. Some litter occurs along the drainage channel and along the roadsides.

5.4 FAUNA

The potential fauna assemblage of the survey area was determined using the results of database searches and records of previous surveys within 40 km of the survey area (Table 5.1). The potential fauna assemblage of the area comprises 26 native and 6 introduced mammal species, 180 bird species, 69 reptile species, and 8 amphibian species (Appendix C). Ten common bird species and one reptile species were observed during the survey, plus the tracks of a cat.

Table 5.1 – Biological Survey Reports and Fauna Databases Searched to Determine the Potential Vertebrate Fauna Assemblage of the Project Area.

Database	Search Details
Department of Environment and Conservation (DEC) Threatened Fauna Database	Records within 50 km of the project area
DEC NatureMap	Records within 40 km of the project area
Department of Sustainability, Environment, Water, Population and Community (DSEWPaC) protected matters database	Records within 10 km of the project area
ecologia Internal Database	Records within 40 km of the project area
RGP5 DMMAA. Port Hedland Harbour (Biota 2008a)	Records within 10 km of the project area
RGP5 Spoil Areas A & H (Biota 2008b)	Records within 10 km of the project area

5.5 FAUNA HABITATS

Based on a review of aerial photography and vegetation units recorded during the current survey, there are two broad fauna habitats present within the survey area:

1. Acacia Heathland
2. Drainage lines

5.5.1 Acacia Heathland

Acacia heathland is the dominant fauna habitat within the survey area, and comprises low to medium *Acacia* heathland over open spinifex hummock grassland and sparse tussock grassland.

Generally, bird diversity will be low due to the absence of trees. However, this habitat is suited to predominantly ground-dwelling species such as Australian Bustard, Little Button-quail, Spinifex Pigeon, Grey Shrike-thrush, Crested Bellbird, Spinifexbird, Australasian Pipit and Zebra Finch. The low height of this habitat will suit foraging raptors, which will hunt for reptiles, small mammals, and ground-dwelling birds.

The associated sandy substrate provides habitat for burrowing skinks and small mammals, potentially including the Brush-tailed Mulgara (EPBC Act Vulnerable), which has been recorded on three occasions within 5km of the survey area, although no burrows were observed within the survey area. Accumulations of leaf litter below the Acacias provide good habitat for reptiles such as *Lerista bipes* (a burrowing skink) and *Simoselaps anomalus* (a burrowing snake).

The hummock grassland and tussock grassland understorey provides cover for many small reptiles and mammals. Several feral animals, including House Mouse, Cat, Dog, and Fox, are likely to occur in the area due to the project area being adjacent to human habitation.

5.5.2 Drainage Lines

The survey area contains two minor drainage lines associated with low to medium open *Acacia* heathland over open tussock grassland.

Although it is unlikely any permanent water occurs within the drainage line, water will be present during periods of high rainfall (associated with the wet season). When water is present, opportunistic species including the Eastern Great Egret (*Ardea modesta*) and Glossy Ibis (*Plegadis falcinellus*), both EPBC Act Migratory, may forage within the drainage line.

Bird density and diversity is generally greatest near water sources, and several species are likely to show a strong preference for this habitat type, including the Rainbow Bee-eater (EPBC Act Migratory).

Insectivorous bats show a preference for foraging close to water, due to the abundance of insects around water bodies. However, no individuals will roost within the survey area due to the lack of hollow eucalypt branches or exfoliating bark.

5.6 FAUNA OF CONSERVATION SIGNIFICANCE

Based on database and literature searches from within 50 km of the survey area, there is the potential for 18 species of conservation significance to occur in the area (Table 5.2). However, based on the fauna habitats present, only 5 conservation significant species have a high or medium likelihood of occurrence within the survey area. These species are described in greater detail below

and summarised in Table 5.4. Species with a low likelihood of occurrence are summarised in Appendix D.

Table 5.2 – Conservation Significant Species Potentially Occuring within the Project Area.

Species	EPBC Act	WC Act	DEC
Northern Quoll	EN	S1	
Bilby	VU	S1	
Pilbara Leaf-nosed Bat	VU	S1	
Brush-tailed Mulgara	VU		
Cattle Egret	M	S3	
Rainbow Bee-eater	M	S3	
Eastern Great Egret	M	S3	
Eastern Reef Egret	M	S3	
Glossy Ibis	M	S3	
Eastern Osprey	M	S3	
White-bellied Sea-Eagle	M	S3	
Peregrine Falcon		S4	
Western Little Free-tailed Bat			P1
Woma			P1
Ghost Bat			P4
Western Pebble-mound Mouse			P4
Australian Bustard			P4
Star Finch (Western)			P4

The likelihood of a conservation significant species being present within the project was determined by examining the following:

- fauna habitats and their condition known to exist within the survey area;
- distance of previously recorded conservation significant species from the survey area;
- frequency of occurrence of conservation significant species records in the region; and
- time surpassed since conservation significant species were recorded within, or outside, the survey area.

For each conservation significant species potentially occurring in the survey area, the examined factors were collated, and assigned to their corresponding category (**Error! Reference source not found.**)

Table 5.3 – Likelihood of Occurrence Categories

RECORDED	Species previously recorded within survey area
HIGH	Species recorded within, or in proximity to, the survey area within 50 yrs; suitable habitat occurs
MEDIUM	Species recorded outside survey area, but within 100km; limited suitable habitat occurs
LOW	Species rarely, or not recorded, within 100km and/or suitable habitat does not occur

Table 5.4 – Conservation Significant Fauna with High or Medium Likelihood of Occurrence in the Survey Area.

COMMON & SCIENTIFIC NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE	REGIONAL IMPACTS
	EPBC Act	WC Act	DEC				
Mammals							
Brush-tailed Mulgara (*Dasycercus blythi*)	VU			Spinifex grassland	Three recent records within 5 km (DEC NatureMap)	**MEDIUM** Suitable habitat but no burrows observed	**LOW** Unlikely to be present in the project area
Western Little Free-tailed Bat (*Mormopterus loriae cobourgiana*)			P1	Mangrove stands, roosts in hollows in mature mangroves	Five recent records surrounding Port Hedland	**MEDIUM** Previous records nearby, mangroves nearby, but no suitable habitat within project area. May overfly project area.	**LOW** Areas of mangroves will not be affected by the proposal and no impacts to the species are anticipated
Birds							
Eastern Great Egret (*Ardea modesta*)	M	S3		Wetlands	Numerous records within 50 km of the project area (DEC NatureMap)	**MEDIUM** Species may hunt in drainage lines within project area.	**LOW** Only a small area of suitable habitat. Use of project area would be transient.
Rainbow Bee-eater (*Merops ornatus*)	M	S3		Open country, most vegetation types, dunes, banks.	Numerous records within 20 km of project area	**HIGH** Common within the region. Likely to hunt in the project area. Suitable breeding habitat present, but no breeding tunnels observed.	**LOW** Relatively common, although nomadic. Suitable habitat adjacent to project area.
Australian Bustard (*Ardeotis australis*)			P4	Open woodland and grassland	Five records within 20 km of the project area (DEC NatureMap)	**MEDIUM** Recorded in surrounded area, suitable habitat present	**LOW** Regionally common. Suitable habitat adjacent to project area.

5.6.1 Mammals

5.6.1.1 Brush-tailed Mulgara (*Dasycercus blythi*)

Conservation Status: EPBC Act Vulnerable

Distribution and Habitat: The Brush-tailed Mulgara has only recently been reclassified and separated from the genetically and morphologically distinct Crest-tailed Mulgara (*Dasycercus cristicauda*) (Woolley 2006). However, previous records did not distinguish between the two species, and as such there is some ambiguity over the exact distribution of both species. Currently, DSEWPaC treats the Brush-tailed Mulgara as conspecific with Crest-tailed Mulgara, listing both as Vulnerable.

Brush-tailed Mulgara occur in spinifex grasslands throughout much of the arid zone, digging burrows in flats between low sand dunes (Woolley 2008).

Ecology: Believed to be generally solitary, Brush-tailed Mulgara construct several single entranced, multi-tunnelled burrows within their home range (Woolley 2008). According to Koertner et al. (2007), home ranges and burrows encompass both mature spinifex and open regrowth areas and Brush-tailed Mulgara do not prefer one of either habitat type, but this might increase the risk of predation, especially following fire. Brush-tailed Mulgara are nocturnal hunters, feeding on arthropods and small vertebrates. Breeding is believed to occur in late winter to spring (Woolley 2008).

Likelihood of Occurrence: Mulgara burrows were recorded within 5 km of the survey area on three occasions in 2009. The extent of suitable habitat is unknown within the survey area, but due to the small size of the survey area, is it unlikely that a significant area of Mulgara habitat will be impacted.

5.6.1.2 Western Little Free-tailed Bat (*Mormopterus loriae cobourgiana*)

Conservation Status: DEC Priority 1

Distribution and Habitat: This small subspecies of bat is common in, but confined to, coastal and sub-coastal areas of the top-end of the Northern Territory and the semi-arid part of the tropical coastline of Western Australia, from Lake McLeod to Point Torment (Duncan *et al.* 1999).

Ecology: The Western Little Free-tailed Bat roosts in small spouts and crevices in the dead upper branches of mangroves (Milne *et al.* 2008). It emerges at dusk and forms swarms of up to 100 before dispersing to forage singly or in pairs. Its wings are adapted for speed not manoeuvrability hence it hunts its diet of flying insects in open spaces above the canopy or in gaps created by creeks or roads through the forests. It has also been know to scurry about on surfaces catching crawling insects (Milne *et al.* 2008). Females give birth to a single young in the summer wet season and lactate until March (Milne *et al.* 2008).

Likelihood of Occurrence: This species has been recently (2001-2005) recorded within the vicinity of Port Hedland. However, it is not expected to roost within the survey area due to the absence of mangroves, but may occasionally occur when overflying.

5.6.2 Birds

5.6.2.1 Eastern Great Egret (*Ardea modesta*)

Conservation Status: EPBC Act Migratory, WC Act Schedule 3

Distribution and Habitat: Eastern Great Egrets mainly inhabit shallow water bodies; both fresh (lakes, lagoons, swamps and floodwaters) and saline (mangrove creeks, estuaries and tidal pools) (Johnstone and Storr 1998). They occur across a large part of Western Australia, including the south-west, Kimberley and Pilbara (Johnstone and Storr 1998). The Great Egret is common to very common in the well-watered Kimberley flatlands, and scarce to moderately common elsewhere within its range (Johnstone and Storr 1998).

Ecology: This species' diet consists predominantly of small fish and crustaceans. They breed colonially in trees standing in water around wooded swamps and river pools, 4-13 m above water (Morcombe 2000). The nest is build as a rough, loose, shallow platform. Four eggs are laid in summer in the Kimberley and during the spring in regions further south (Johnstone and Storr 1998).

Likelihood of Occurrence: The Eastern Great Egret is only likely to occur within the survey area when water is presence in the drainage line. As the area of this habitat is very small, is is unlikely they regularly occur within the survey area.

5.6.2.2 Rainbow Bee-eater (*Merops ornatus*)

Conservation Status: EPBC Act Migratory

Distribution and Habitat: The Rainbow Bee-eater is scarce to common throughout much of Western Australia, except for the arid interior, preferring lightly wooded, preferably sandy, country near water (Johnstone and Storr 1998).

Ecology: In Western Australia the Rainbow Bee-eater can occur as a resident, breeding visitor, post-nuptial nomad, passage migrant or winter visitor. It nests in burrows usually dug at a slight angle on flat ground, sandy banks or cuttings, and often at the margins of roads or tracks (Simpson and Day 2004). Eggs are laid at the end of the metre long tunnel from August to January (Boland 2004). Bee-eaters are most susceptible to predation during breeding.

Likelihood of Occurrence: The Rainbow Bee-eater is common in the Pilbara region and has been recorded from almost all surveys within and surrounding the survey area (DEC 2011). The species will forage throughout the survey area and is may breed along the drainage line in sandy ground during spring.

5.6.2.3 Australian Bustard (*Ardeotis australis*)

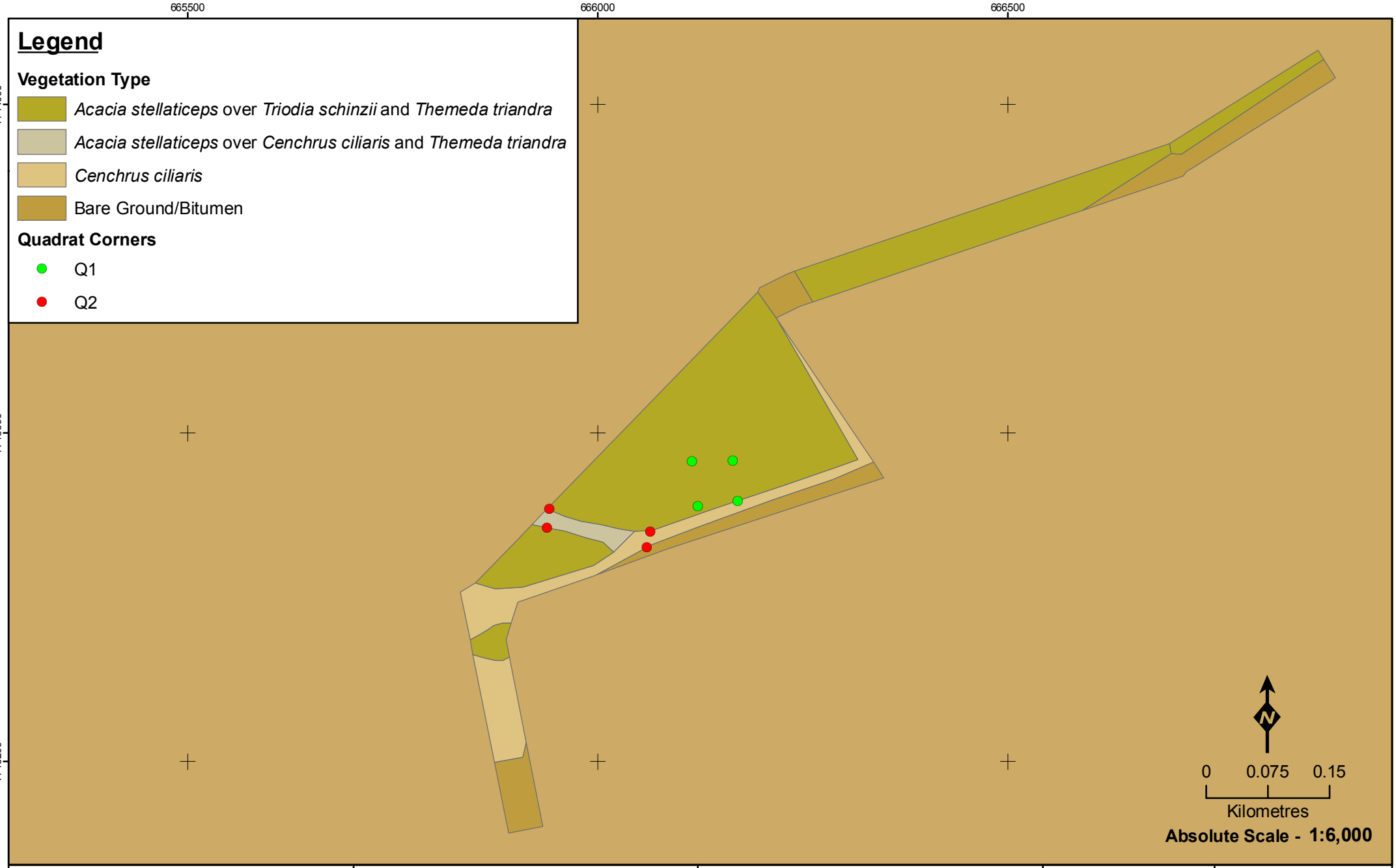
Conservation Status: DEC Priority 4

Distribution and Habitat: The Australian Bustard occurs Australia-wide and utilises a number of open habitats, including open or lightly wooded grasslands, chenopod flats, plains and heathlands (Johnstone and Storr 1998).

Ecology: It is a nomadic species, ranging over very large areas and its abundance varies locally and seasonally from scarce to common, largely dependent on rainfall and food availability. The bustard has an omnivorous diet, feeding on grasses, seeds, fruit, insects and small vertebrates.

Although the population size is still substantial, there has been a large historical decline in abundance, particularly south of the tropics, but also across northern Australia (Garnett and Crowley 2000). This is a result of hunting, degradation of its grassland habitat by sheep and rabbits and predation by foxes and cats (Frith 1976; Garnett and Crowley 2000). Bustards readily desert nests in response to disturbance by humans, sheep or cattle (Garnett and Crowley 2000).

Likelihood of Occurrence: Records of the Australian Bustard have been made surrounding the survey area (DEC 2011). Small numbers may occasionally forage throughout the survey area in low acacia heathland over hummock or tussock grassland.



ecologia ENVIRONMENT

EMG

Vegetation of the Club Hamilton Expansion

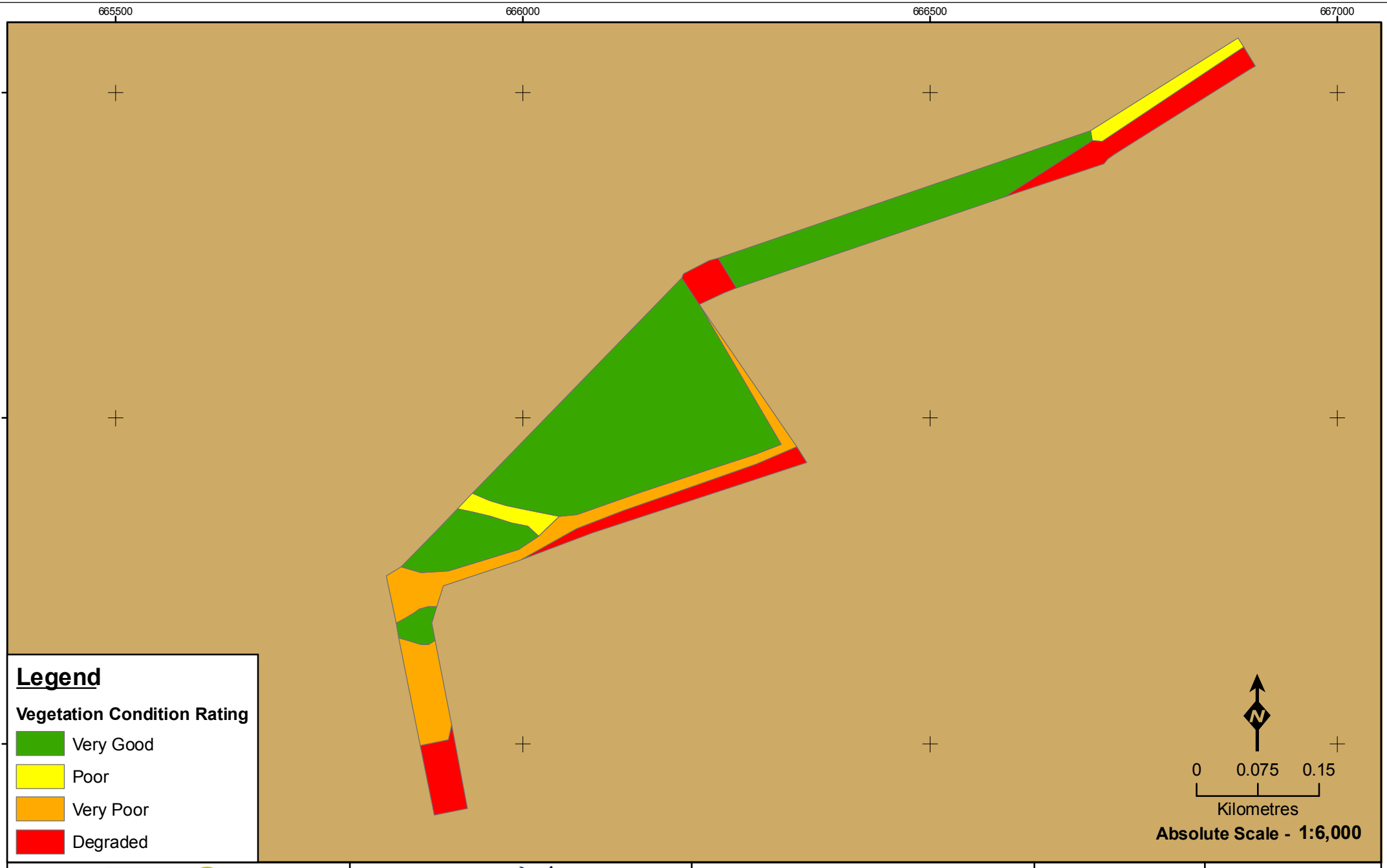
Figure: 4.1
Project ID: 1346

Drawn: MM
Date: 28/03/11

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: MXXX

A4



ecologia ENVIRONMENT

FMG

Vegetation Condition of the Club Hamilton Expansion

Figure: 4.2
Project ID: 1346

Drawn: MM
Date: 28/03/11

Coordinate System
Name: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: MXXX

A4

6 STUDY TEAM

This survey and report was planned and completed by:

1025 Wellington St

WEST PERTH WA 6005

Project staff		
Carol Macpherson	BSc. (Hon. Bioc.)	Principal Botanist
Andrew Craigie	Ph. D. (Bot.)	Botanist and Taxonomist
Elizabeth Fox	Ph. D. (Zool.)	Zoologist

Licences – "License to take flora for scientific purposes"		
The survey was conducted under the authorisation of the following licences issued by the Department of Environment and Conservation:		
Botanist	**Permit Number**	**Date of Expiry**
Andrew Craigie	SL008534	23rd March 2012

7 REFERENCES

Biota Environmental Sciences. 2008a. A Flora and Fauna Assessment of RGP5 DMMA A, Port Hedland Harbour. Unpublished report prepared for Sinclair Knight Merz.

Biota Environmental Sciences. 2008b. A flora and fauna assessment of RGP5 Spoil Areas A and H, Port Hedland Harbour. Unpublished report for Sinclair Knight Merz.

Boland, C. R. J. 2004. Breeding biology of Rainbow Bee-eaters (Merops ornatus): a migratory, colonial, cooperative bird. The Auk. 121 (3):811-823.

DEC. 2011. *NatureMap: Mapping Western Australia's Biodiversity*. Department of Environment and Conservation. URL: http://naturemap.dec.wa.gov.au.

Duncan, A., Baker, G. B., and Montgomery, N. 1999. The Action Plan for Australian Bats. Environment Australia, Canberra.

Environmental Protection Authority. 2002. Position Statement No. 3 Terrestrial Biological Surveys as an element of Biodiversity Protection.

Environmental Protection Authority. 2004. Guidance for the Assessment of Environmental Factors No. 51: Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia.

Frith, A. J. 1976. Readers Digest Complete Birds of Australia. Readers Digest, Sydney.

Garnett, S. T. and Crowley, G. M. 2000. The Action Plan for Australian Birds. Environment Australia, Canberra.

Johnstone, R. E. and Storr, G. M. 1998. Handbook of Western Australian Birds, Volume I - Non-Passerines (Emu to Dollarbird). Western Australian Museum, Perth.

Kendrick, P. and Stanley, F. 2001. Pilbara 4 (PIL4 - Roeburne subregion). A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions. Department of Environment and Conservation, Perth.

Koertner, G., Pavey, C. R., and Geiser, F. 2007. Spatial ecology of the mulgara in arid Australia: impact of fire history on home range size and burrow use. Journal of Zoology. 273:350-357.

Milne, D. J., Armstrong, K. N., and McKenzie, N. L. 2008. Western Little Free-tailed Bat, *Mormopterus loriae cobourgiana*. pp. 488-489 *in* Van Dyck, S., and Strahan, R., eds. The Mammals of Australia. Reed New Holland, Sydney.

Morcombe, M. 2000. Field Guide to Australian Birds. Steve Parish Publishing Pty Ltd., Archerfield, Australia.

Simpson, K. and Day, N. 2004. Field Guide to the Birds of Australia. Penguin Group, Camberwell.

Tille, P. 2006. Soil-landscapes of Western Australia's Rangelands and Arid Interior. Department of Agriculture and Food.

Van Vreeswyk, A. M. E., Payne, A. L., Leighton, K. A., and Hennig, P. 2004. An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture Technical Bulletin. 92.

Woolley, P. A. 2006. Studies on the Crest-tailed Mulgara *Dasycercus cristicauda* and the Brush-tailed Mulgara *Dasycercus blythi* (Marsupialia: Dasyuridae). Australian Mammalogy. 28:117-120.

Woolley, P. A. 2008. Brush-tailed Mulgara, *Dasycercus blythi*. pp. 47-48 *in* Van Dyck, S., and Strahan, R., eds. The Mammals of Australia. Reed New Holland, Sydney.

APPENDIX A FLORA SPECIES RECORDED DURING CURRENT SURVEY

Appendix A1 Species List

Family	Species	Q1	Q2	Opp. Obs.
Amaranthaceae	*Alternanthera angustifolia*	x		
	Ptilotus fusiformis var. *fusiformis*	x		
	Aerva javanica		x	
Apocynaceae	*Carissa lanceolata*	x		
Caryophyllaceae	*Polycarpaea corymbosa*	x		
Cleomaceae	*Cleome viscosa*	x	x	
Convolvulaceae	*Bonamia linearis*			x
	Evolvulus alsinoides var. *villosicalyx*	x	x	
	Evolvulus alsinoides var. *decumbens*	x	x	
	Ipomoea muelleri	x		
	Bonamia rosea	x	x	
Cucurbitaceae	*Cucumis maderaspatanus*		x	
	Citrullus lanatus			x
Euphorbiaceae	*Euphorbia wheeleri*	x		
Fabaceae	*Indigofera monophylla*			x
	Kennedia prorepens		x	
	Senna notabilis	x	x	
	Acacia trachycarpa			x
	Petalostylis labicheoides		x	
	Acacia stellaticeps	x	x	
	?*Prosopis* sp.			x
	Acacia pyrifolia			x
	Acacia colei			x
	Stylosanthes hamata		x	
	Acacia coriacea subsp. *sericophylla*		x	
Lauraceae	*Cassytha capillaries*	x	x	
Malvaceae	*Corchorus sidoides*		x	
	Abutilon macrum		x	
	Sida aff. sp. Pilbara (A.A. Mitchell 1543)	x	x	
	Gossypium australe			x
Molluginaceae	*Mollugo molluginea*			x
Myrtaceae	*Corymbia flavescens*		x	
	Eucalyptus aff. *pilbarensis*			x
Nyctaginaceae	*Boerhavia coccinea*		x	
Poaceae	*Aristida holathera* var. *holathera*	x	x	
	Paraneurachne muelleri	x		
	Triodia epactia		x	
	Themeda triandra	x	x	
	Sporobolus virginicus	x		
	Digitaria brownii	x		
	Paspalidium rarum		x	
	Cenchrus ciliaris	x	x	
	Triodia schinzii	x	x	
	Eragrostis setifolia	x		
	Dactyloctenium radulans			x
	Eriachne aff. *nervosa*		x	
	Cenchrus setiger		x	
Portulacaceae	*Portulaca pilosa*	x		

Solanaceae	*Solanum lasiophyllum*		x	
	Solanum phlomoides		x	
Violaceae	*Hybanthus aurantiacus*	x	x	
Zygophyllaceae	*Tribulopis angustifolia*	x	x	

APPENDIX B QUADRAT STRUCTURE AND COMPOSITION

Quadrat 1 structure and composition.

Described by	AC	**Date:**	23.03.2011	**Type:**	Q	50 X 50 m
Location	FMG Port Hedland Club Hamilton extension site					
		666115.157	**mE**	7743566.055	**mN**	
Habitat	Plain					
Soil	Red sand					
Rock Type	Gravel/Pebbles (<10%)					
Vegetation	*Acacia stellaticeps* and *Carissa lanceolata* low open shrubland over *Sida* sp. Pilbara (A.A.Mitchell 1543) and *Portulaca pilosa* and *Ptilotus fusiformis* var. *fusiformis* and *Polycarpaea corymbosa* and *Bonamia rosea* and *Cleome viscosa* and *Senna notabilis* and *Alternanthera angustifolia* isolated herbs and *Hybanthus aurantiacus* and *Euphorbia wheeleri* and *Ipomoea muelleri* and *Evolvulus alsinoides* var. *villosicalyx* and *Evolvulus alsinoides* var. *decumbens* and *Tribulopis angustifolia* isolated clumps of herbs over *Themeda triandra* sparse tussock grassland and *Cenchrus ciliaris* and *Paraneurachne muelleri* and *Digitaria brownii* and *Aristida holathera* var. *holathera* and *Sporobolus virginicus* and *Eragrostis setifolia* isolated clumps of tussock grasses over *Triodia schinzii* open tussock grassland over *Cassytha capillaries* isolated vines.					
Veg Condition	Very Good (minimal weed invasion)					
Fire Age	None evident					
Notes	Sparse leaf litter under shrubs. Buffel Grass (*Cenchrus ciliaris*) present in quadrat, but only few scattered plants.					

Quadrat 1 species list and strata:

Stratum	Cover	Species within each stratum
Shrubs < 1m	20 – 50%	*Acacia stellaticeps, Carissa lanceolata*
Herbs	<20%	*Sida* sp. Pilbara (A.A.Mitchell 1543), *Portulaca pilosa*, *Ptilotus fusiformis* var. *fusiformis*, *Polycarpaea corymbosa*, *Bonamia rosea*, *Cleome viscosa*, *Senna notabilis*, *Alternanthera angustifolia*, *aurantiacus*, *Euphorbia wheeleri*, *Ipomoea muelleri*, *Evolvulus alsinoides* var. *villosicalyx*, *Evolvulus alsinoides*, *decumbens* and *Tribulopis angustifolia*
Tussock grasses	20 – 50%	*Themeda triandra*, *Cenchrus ciliaris*, *Paraneurachne muelleri*, *Digitaria brownii*, *Aristida holathera* var. *holathera, Sporobolus virginicus* and *Eragrostis setifolia*
Hummock grasses	<20%	*Triodia schinzii*
Climbers	0 – 5%	*Cassytha capillaries*

Quadrat 1: Sparse *Acacia stellaticeps* heathland over open *Triodia schinzii* hummock grassland.

Quadrat 2 structure and composition.

Described by	AC	**Date:**	23.03.2011	**Type:**	Q	20 X 125 m
Location	FMG Port Hedland Club Hamilton extension site					
		665938.45	**mE**	7743484.44	**mN**	
Habitat	Plain					
Soil	Red sand					
Rock Type	Quartz gravel/pebbles and stones (<10%)					
Vegetation	*Acacia coriacea* subsp. *sericophylla* and *Corymbia flavescens* isolated clumps of low trees over *Acacia stellaticeps* open shrubland and *Corchorus sidoides* and *Solanum phlomoides* sparse shrubland and *Solanum lasiophyllum* and *Petalostylis labicheoides* isolated clumps of shrubs and *Aerva javanica* and *Sida* sp. Pilbara (A.A. Mitchell PRP 1543) isolated shrubs over *Stylosanthes hamata* and *Evolvulus alsinoides* var. *decumbens* and *Bonamia rosea* isolated clumps of herbs and *Boerhavia coccinea* and *Kennedia prorepens* and *Hybanthus aurantiacus* and *Corchorus sidoides* and *Abutilon macrum* and *Tribulopis angustifolia* and *Evolvulus alsinoides* var. *villosicalyx* and *Senna notabilis* and *Cleome viscosa* isolated herbs over *Cenchrus ciliaris* and *Themeda triandra* open tussock grassland and *Paspalidium rarum* and *Cenchrus setiger* and *Eriachne* aff. *nervosa* isolated clumps of tussock grasses and *Aristida holathera* var. *holathera* isolated tussock grasses over *Triodia schinzii* open hummock grassland and *Triodia epactia* isolated clumps of hummock grasses over *Cassytha capillaries* and *Cucumis maderaspatanus* isolated vines.					
Veg Condition	Poor (severe weed invasion, some litter, drainage channel probably man made)					
Fire Age	None evident					
Notes	Sparse leaf litter under shrubs. Buffel Grass (*Cenchrus ciliaris*) extensive along edges of drainage line.					

Quadrat 2 species list and strata:

Stratum	Cover	Species within each stratum
Trees < 10 m	0 – 5%	*Acacia coriacea* subsp. *sericophylla, Corymbia flavescens*
Shrubs < 1 m	20 – 50%	*Acacia stellaticeps, Corchorus sidoides, Solanum phlomoides, Solanum lasiophyllum, Petalostylis labicheoides, Aerva javanica, Sida* sp. Pilbara (A.A. Mitchell 1543)
Herbs	<20%	*Stylosanthes hamata*, *Evolvulus alsinoides* var. *decumbens*, *Bonamia rosea*, *Boerhavia coccinea*, *Kennedia prorepens*, *Hybanthus aurantiacus*, *Corchorus sidoides*, *Abutilon macrum*, *Tribulopis angustifolia*, *Evolvulus alsinoides* var. *villosicalyx*, *Senna notabilis*, *Cleome viscosa*
Tussock grasses	20 – 50%	*Cenchrus ciliaris*, *Themeda triandra*, *Paspalidium rarum*, *Cenchrus setiger*, *Aristida holathera* var. *holathera*, *Eriachne* aff. *nervosa*
Hummock grasses	<20%	*Triodia schinzii*, *Triodia epactia*
Climbers	0 – 5%	*Cassytha capillaries*, *Cucumis maderaspatanus*

Quadrat 2: Drainage line (man made): Open *Acacia stellaticeps* heathland over open *Cenchrus ciliaris* dominated grassland.

Vegetation Unit 3: *Cenchrus ciliaris* (Buffel grass) closed tussock grassland along roadside.

APPENDIX C REGIONAL FAUNA RECORDS

Appendix C1 Mammals

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
TACHYGLOSSIDAE										
Tachyglossus aculeatus	Echidna							•		
DASYURIDAE										
Antechinomys laniger	Kultarr							•		
Dasycercus blythi	Brush-tailed Mulgara	VU						•		•
Dasykaluta rosamondae	Little Red Kaluta							•		
Dasyurus hallucatus	Northern Quoll	EN	S1		•			•		•
Ningaui timealeyi	Pilbara Ningaui							•		
Pseudantechinus woolleyae	Woolley's Pseudantechinus							•		
Sminthopsis youngsoni	Lesser Hairy-footed Dunnart							•		
THYLACOMYIDAE										
Macrotis lagotis	Bilby	VU	S1					•		•
MACROPODIDAE										
Macropus robustus	Euro					•	•	•		
Macropus rufus	Red Kangaroo							•		
MEGADERMATIDAE										
Macroderma gigas	Ghost Bat			P4				•		
HIPPOSIDERIDAE										
Rhinonicteris aurantius	Pilbara Leaf-nosed Bat	VU	S1					•		•
EMBALLONURIDAE										
Taphozous georgianus	Common Sheathtail Bat							•		
MOLOSSIDAE										
Chaerophon jobensis	Northern Freetail Bat							•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
Mormopterus loriae cobourgiana	Western Little Free-tailed Bat			P1				•		
VESPERTILIONIDAE										
Nyctophilus arnhemensis	Arnhem Land Long-eared Bat							•		
Nyctophilus geoffroyi	Lesser Long-eared Bat							•		
Vespadelus finlaysoni	Finlayson's Cave Bat							•		
Notomys alexis	Spinifex Hopping-mouse							•		
Pseudomys chapmani	Western Pebble-mound mouse			P4				•		
Pseudomys delicatulus	Delicate Mouse							•		
Pseudomys hermannsburgensis	Sandy Inland Mouse							•		
Pseudomys nanus	Western Chestnut Mouse							•		
Zyzomys argurus	Common Rock-rat							•		
CANIDAE										
Canis lupus dingo	Dingo				•			•		
INTRODUCED MAMMALS										
**Mus musculus*	House Mouse							•		
**Oryctolagus cuniculus*	Rabbit									•
**Canis lupus familiaris*	Dog						•	•		
**Vulpes vulpes*	Red Fox					•	•	•		•
**Felis catus*	Cat						•	•		•
**Bos taurus*	Cow				•	•	•			

Appendix C2 Birds

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
CASUARIIDAE										
Dromaius novaehollandiae	Emu							•		
PHASIANIDAE										
Coturnix ypsilophora	Brown Quail							•		
ANATIDAE										
Dendrocygna eytoni	Plumed Whistling-duck							•		
Cygnus atratus	Black Swan							•		
Tadorna tadornoides	Australian Shelduck							•		
Malacorhynchus membranaceus	Pink-eared Duck							•		
Anas gracilis	Grey Teal				•			•		
Anas superciliosa	Pacific Black Duck				•			•		
Aythya australis	Hardhead							•		
PODICIPEDIDAE										
Tachybaptus novaehollandiae	Australasian Grebe							•		
Poliocephalus poliocephalus	Hoary-headed Grebe							•		
COLUMBIDAE										
**Columba livia*	Rock Dove							•		
Phaps chalcoptera	Common Bronzewing							•		
Ocyphaps lophotes	Crested Pigeon				•	•	•	•		
Geophaps plumifera	Spinifex Pigeon				•	•	•	•		
Geopelia cuneata	Diamond Dove				•			•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Geopelia striata	Peaceful Dove				•		•	•		
Geopelia humeralis	Bar-shouldered Dove							•		
PODARGIDAE										
Podargus strigoides	Tawny Frogmouth							•		
APODIDAE										
Apus pacificus	Fork-tailed Swift	M	S3							•
FREGATIDAE										
Fregata ariel	Lesser Frigatebird							•		
ANHINGIDAE										
Anhinga novaehollandiae	Australasian Darter							•		
PHALACROCORACIDAE										
Microcarbo melanoleucos	Little Pied Cormorant				•			•		
Phalacrocorax carbo	Great Cormorant							•		
Phalacrocorax sulcirostris	Little Black Cormorant							•		
Phalacrocorax varius	Pied Cormorant							•		
PELECANIDAE										
Pelecanus conspicillatus	Australian Pelican							•		
CICONIIDAE										
Ephippiorhynchus asiaticus	Black-necked Stork							•		
ARDEIDAE										
Ardea pacifica	White-necked Heron							•		
Ardea modesta	Eastern Great Egret	M	S3					•		•

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Ardea ibis	Cattle Egret	M	S3					•		•
Butorides striatus	Striated Heron							•		
Egretta garzetta	Little Egret					•	•	•		
Egretta sacra	Eastern Reef Egret	M	S3					•		
Nycticorax caledonicus	Nankeen Night Heron							•		
THRESKIORNITHIDAE										
Plegadis falcinellus	Glossy Ibis	M	S3					•		
Threskiornis molucca	Australian White Ibis						•	•		
Threskiornis spinicollis	Straw-necked Ibis							•		
Platalea regia	Royal Spoonbill							•		
ACCIPITRIDAE										
Pandion cristatus	Eastern Osprey	M						•		
Elanus axillaris	Black-shouldered Kite							•		
Haliaeetus leucogaster	White-bellied Sea-Eagle	M	S3		•			•		•
Haliastur sphenurus	Whistling Kite				•			•		
Haliastur indus	Brahminy Kite						•	•		
Milvus migrans	Black Kite							•		
Accipiter fasciatus	Brown Goshawk							•		
Accipiter cirrocephalus	Collared Sparrowhawk							•		
Circus assimilis	Spotted Harrier				•			•		
Circus approximans	Swamp Harrier					•	•	•		
Aquila audax	Wedge-tailed Eagle				•			•		
FALCONIDAE										

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Falco cenchroides	Nankeen Kestrel				•			•		
Falco berigora	Brown Falcon				•			•		
Falco longipennis	Australian Hobby							•		
Falco peregrinus	Peregrine Falcon		S4					•		
GRUIDAE										
Grus rubicunda	Brolga							•		
RALLIDAE										
Gallirallus philippensis	Buff-banded Rail							•		
Fulica atra	Eurasian Coot							•		
OTIDIDAE										
Ardeotis australis	Australian Bustard			P4				•		
BURHINIDAE										
Esacus magnirostris	Beach Stone-curlew							•		
HAEMATOPODIDAE										
Haematopus longirostris	Australian Pied Oystercatcher							•		
Haematopus fuliginosus	Sooty Oystercatcher							•		
RECURVIROSTRIDAE										
Himantopus himantopus	Black-winged Stilt				•			•		
Recurvirostra novaehollandiae	Red-necked Avocet							•		
Cladorhynchus leucocephalus	Banded Stilt							•		
CHARADRIIDAE										
Pluvialis fulva	Pacific Golden Plover	M	S3					•		
Pluvialis squatarola	Grey Plover	M	S3					•		•

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Charadrius leschenaultii	Greater Sand Plover	M	S3					•		•
Charadrius mongolus	Lesser Sand Plover	M	S3					•		•
Charadrius ruficapillus	Red-capped Plover							•		
Charadrius veredus	Oriental Plover	M	S3					•		•
Elseyornis melanops	Black-fronted Dotterel				•			•		
Erythrogonys cinctus	Red-kneed Dotterel							•		
Vanellus miles	Masked Lapwing							•		
SCOLOPACIDAE										
Gallinago stenura	Pin-tailed Snipe	M	S3					•		
Limosa limosa	Black-tailed Godwit	M	S3					•		•
Limosa lapponica	Bar-tailed Godwit	M	S3					•		•
Numenius minutus	Little Curlew	M	S3					•		•
Numenius phaeopus	Whimbrel	M	S3			•	•	•		•
Numenius madagascariensis	Eastern Curlew	M	S3	P4		•	•	•		•
Xenus cinereus	Terek Sandpiper	M	S3					•		•
Actitis hypoleucos	Common Sandpiper	M	S3					•		•
Tringa brevipes	Grey-tailed Tattler	M	S3					•		•
Tringa glareola	Wood Sandpiper	M	S3					•		
Tringa nebularia	Common Greenshank	M	S3					•		
Tringa stagnatilis	Marsh Sandpiper	M	S3					•		
Arenaria interpres	Ruddy Turnstone	M	S3					•		•
Limnodromus semipalmatus	Asian Dowitcher	M	S3					•		
Calidris tenuirostris	Great Knot	M	S3					•		•

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Calidris canutus	Red Knot	M	S3					•		•
Calidris alba	Sanderling	M	S3					•		
Calidris ruficollis	Red-necked Stint	M	S3					•		•
Calidris subminuta	Long-toed Stint	M	S3					•		
Calidris melanotos	Pectoral Sandpiper	M	S3					•		
Calidris acuminata	Sharp-tailed Sandpiper	M	S3					•		
Calidris ferruginea	Curlew Sandpiper	M	S3					•		•
Limicola falcinellus	Broad-billed Sandpiper	M	S3					•		•
Philomachus pugnax	Ruff	M	S3					•		
Phalaropus lobatus	Red-necked Phalarope	M	S3					•		
TURNICIDAE										
Turnix velox	Little Button-quail				•			•		
GLAREOLIDAE										
Glareola maldivarum	Oriental Pratincole	M	S3					•		•
Stiltia isabella	Australian Pratincole							•		
LARIDAE										
Sternula albifrons	Little Tern	M	S3				•	•		
Sternula nereis	Fairy Tern							•		
Gelochelidon nilotica	Gull-billed Tern							•		
Hydroprogne caspia	Caspian Tern	M	S3					•		
Chlidonias hybrida	Whiskered Tern							•		
Chlidonia leucopterus	White-winged Black Tern	M	S3					•		
Sterna hirundo	Common Tern	M	S3					•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Thalasseus bengalensis	Lesser Crested Tern	M	S3					•		
Thalasseus bergii	Crested Tern							•		
Larus pacificus	Pacific Gull							•		
Chroicocephalus novaehollandiae	Silver Gull							•		
CACATUIDAE (PSITTACIDAE)										
Eolophus roseicapillus	Galah				•			•		
Cacatua sanguinea	Little Corella				•			•		
Nymphicus hollandicus	Cockatiel				•			•		
PSITTACIDAE										
Barnardius zonarius	Australian Ringneck							•		
Purpureicephalus spurius	Red-capped Parrot							•		
Melopsittacus undulatus	Budgerigar				•			•		
CUCULIDAE										
(Centropodidae) *Centropus phasianinus*	Pheasant Coucal							•		
Chalcites basalis	Horsfield's Bronze-Cuckoo							•		
Chalcites lucidus	Shining Bronze-Cuckoo						•			
Cacomantis pallidus	Pallid Cuckoo							•		
STRIGIDAE										
Ninox novaeseelandiae	Southern Boobook							•		
TYTONIDAE										
Tyto javanica	Eastern Barn Owl							•		
HALCYONIDAE										

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Dacelo leachii	Blue-winged Kookaburra							•		
Todiramphus pyrrhopygius	Red-backed Kingfisher							•		
Todiramphus sanctus	Sacred Kingfisher				•			•		
Todiramphus chloris	Collared Kingfisher							•		
MEROPIDAE										
Merops ornatus	Rainbow Bee-eater	M	S3		•		•	•		•
CLIMACTERIDAE										
Climacteris melanura	Black-tailed Treecreeper							•		
PTILINORHYNCHIDAE										
Ptilonorhynchus guttatus	Western Bowerbird				•			•		
MALURIDAE										
Malurus lamberti	Variegated Fairy-wren							•		
Malurus leucopterus	White-winged Fairy-wren				•	•	•	•		
ACANTHIZIDAE										
Smicrornis brevirostris	Weebill						•	•		
Gerygone tenebrosa	Dusky Gerygone							•		
PARDALOTIDAE										
Pardalotus rubricatus	Red-browed Pardalote							•		
Pardalotus striatus	Striated Pardalote							•		
MELIPHAGIDAE										
Certhionyx variegatus	Pied Honeyeater							•		
Lichenostomus virescens	Singing Honeyeater				•	•	•	•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Lichenostomus keartlandi	Grey-headed Honeyeater							•		
Lichenostomus penicillatus	White-plumed Honeyeater				•		•	•		
Manorina flavigula	Yellow-throated Miner							•		
Epthianura tricolor	Crimson Chat							•		
Epthianura aurifrons	Orange Chat							•		
Sugomel niger	Black Honeyeater				•			•		
Lichmera indistincta	Brown Honeyeater				•		•	•		
POMATOSTOMIDAE										
Pomatostomus temporalis	Grey-crowned Babbler							•		
CAMPEPHAGIDAE										
Coracina novaehollandiae	Black-faced Cuckoo-shrike				•		•	•		
Lalage sueurii	White-winged Triller							•		
PACHYCEPHALIDAE										
Pachycephala melanura	Mangrove Golden Whistler							•		
Pachycephala lanioides	White-breasted Whistler					•	•	•		
Colluricincla harmonica	Grey Shrike-thrush							•		
Oreoica gutturalis	Crested Bellbird				•			•		
ARTAMIDAE										
Artamus leucorhynchus	White-breasted Woodswallow				•	•	•	•		
Artamus personatus	Masked Woodswallow							•		
Artamus cinereus	Black-faced Woodswallow				•			•		
Artamus minor	Little Woodswallow							•		
Cracticus nigrogularis	Pied Butcherbird				•			•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Cracticus tibicen	Australian Magpie							•		
RHIPIDURIDAE (DICRURIDAE)										
Rhipidura albiscapa	Grey Fantail							•		
Rhipidura phasiana	Mangrove Grey Fantail							•		
Rhipidura leucophrys	Willie Wagtail				•	•	•	•		
CORVIDAE										
Corvus bennetti	Little Crow							•		
Corvus orru	Torresian Crow				•		•	•		
MONARCHIDAE (DICRURIDAE)										
Grallina cyanoleuca	Magpie-lark				•		•	•		
PETROICIDAE										
Peneonanthe pulverulenta	Mangrove Robin							•		
ALAUDIDAE										
Mirafra javanica	Horsfield's Bushlark				•			•		
ACROCEPHALIDAE (SYLVIIDAE)										
Acrocephalus australis	Australian Reed-Warbler							•		
MEGALURIDAE (SYLVIIDAE)										
Cincloramphus mathewsi	Rufous Songlark							•		
TIMALIIDAE (ZOSTEROPIDAE)										
Zosterops luteus	Yellow White-eye							•		
HIRUNDINIDAE										
Cheramoeca leucosterna	White-backed Swallow							•		

Family and Species	Common name	EPBC	WCA	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	Protected Matters Database
Hirundo rustica	Barn Swallow	M	S3					•		•
Hirundo neoxena	Welcome Swallow							•		
Petrochelidon ariel	Fairy Martin				•			•		
Petrochelidon nigricans	Tree Martin				•			•		
ESTRILDIDAE										
Taeniopygia guttata	Zebra Finch				•	•	•	•		
Neochmia ruficauda subclarescens	Star Finch (western)			P4				•		
Emblema pictum	Painted Finch				•			•		
MOTACILLIDAE										
Anthus novaeseelandiae	Australasian Pipit				•	•	•	•		
Motacilla sp.	Yellow Wagtail sp.	M	S3					•		

Appendix C3 Reptiles

Family and Species	Common name	EPBC Act	WC Act	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
DIPLODACTYLIDAE										
Diplodactylus conspicillatus	Fat-tailed Gecko							•		
Lucasium stenodactylum	Sand-plain Gecko							•		
Rhynchoedura ornata	Beaked Gecko							•		
Strophurus ciliaris								•		
Strophurus elderi								•		
Strophurus jeanae								•		
CARPHODACTYLIDAE										
Nephrurus levis								•		
GEKKONIDAE										
Gehyra pilbara								•		
Gehyra punctata					•			•		
Gehyra purpurascens								•		
Gehyra variegata								•		
Hemidactylus frenatus	Asian House Gecko							•		
Heteronotia binoei	Bynoe's Gecko							•		
Heteronotia spelea	Desert Cave Gecko							•		
PYGOPODIDAE										
Delma haroldi								•		
Delma pax								•		
Delma tincta								•		
Lialis burtonis								•		

Family and Species	Common name	EPBC Act	WC Act	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
Pygopus nigriceps								•		
SCINCIDAE										
Carlia triacantha								•		
Cryptoblepharus buchananii								•		
Cryptoblepharus plagiocephalus	Fence Skink							•		
Ctenotus duricola								•		
Ctenotus grandis								•		
Ctenotus hanloni								•		
Ctenotus helenae								•		
Ctenotus pantherinus	Leopard Ctenotus				•			•		
Ctenotus piankai								•		
Ctenotus rufescens								•		
Ctenotus saxatilis	Rock Ctenotus				•			•		
Ctenotus serventyi								•		
Eremiascincus fasciolatus	Narrow-banded Sand-swimmer							•		
Lerista bipes								•		
Lerista clara	(L.muelleri group)							•		
Menetia greyii								•		
Morethia ruficauda					•			•		
Notoscincus ornatus								•		
Proablepharus reginae								•		
Tiliqua multifasciata	Central Blue-tongue							•		

Family and Species	Common name	EPBC Act	WC Act	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
AGAMIDAE										
Amphibolurus longirostris	Long-nosed Dragon				•	•	•	•		
Ctenophorus caudicinctus	Ring-tailed Dragon				•			•		
Ctenophorus isolepis	Central Military Dragon				•			•		
Ctenophorus nuchalis	Central Netted Dragon				•			•		
Diporiphora winneckei	Canegrass Dragon							•		
Pogona minor	Dwarf Bearded Dragon							•		
VARANIDAE										
Varanus acanthurus	Spiny-tailed Monitor							•		
Varanus brevicauda	Short-tailed Pygmy Monitor							•		
Varanus eremius	Pygmy Desert Monitor				•			•		
Varanus giganteus	Perentie				•					
Varanus gouldii	Gould's Monitor				•			•		
TYPHLOPIDAE										
Ramphotyphlops ammodytes								•		
Ramphotyphlops braminus	Flowerpot Snake							•		
Ramphotyphlops grypus	Beaked Blind Snake							•		
Ramphotyphlops pilbarensis	Pilbara Blind Snake							•		
BOIDAE										
Antaresia perthensis	Pygmy Python							•		
Antaresia stimsoni	Stimson's Python				•			•		
Aspidites melanocephalus	Black-headed Python							•		
Aspidites ramsayi	Woma		S4	P1				•	•	

Family and Species	Common name	EPBC Act	WC Act	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database	EPBC Act Protected Matters
COLUBRIDAE										
Fordonia leucobalia	White-bellied Mangrove Snake							•		
ELAPIDAE										
Acanthophis pyrrhus	Desert Death Adder							•		
Demansia psammophis	Yellow-faced Whipsnake							•		
Demansia rufescens	Rufous Whipsnake							•		
Ephalophis greyae						•	•			
Furina ornata	Moon Snake							•		
Pseudechis australis	Mulga Snake							•		
Pseudonaja mengdeni	Western Brown Snake							•		
Pseudonaja modesta	Ringed Brown Snake							•		
Simoselaps anomalus	Desert Banded Snake							•		
Suta punctata	Spotted Snake							•		

Appendix C4 Amphibians

Family and Species	Common name	EPBC Act	WC Act	DEC	*ecologia* internal database	RGP5 DMMAA, Port Hedland Harbour (Biota 2008a)	RGP5 Spoil Areas A & H, Port Hedland (Biota 2008b)	DEC NatureMap	DEC Threatened Fauna Database
HYLIDAE									
Cyclorana australis	Giant Frog							•	
Cyclorana maini	Sheep Frog							•	
Litoria rubella	Little Red Tree Frog				•			•	
LIMNODYNASTIDAE									
Neobatrachus aquilonius	Northern Burrowing Frog							•	
Notaden nichollsi	Desert Spadefoot							•	
Platyplectrum spenceri	Centralian Burrowing Frog							•	
MYOBATRACHIDAE									
Uperoleia glandulosa	Glandular Toadlet							•	
Uperoleia russelli	Northwest Toadlet							•	

APPENDIX D CONSERVATION SIGNIFICANT FAUNA WITH A LOW LIKELIHOOD OF OCCURRENCE IN THE PROJECT AREA

COMMON & SCIENTIFIC NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE
	EPBC Act	WC Act	DEC			
Mammals						
Northern Quoll (*Dasyurus hallucatus*)	EN	S1		Rocky areas, also eucalypt forest and woodland	Records from a quarry 15 km south	**LOW** No suitable habitat present
Bilby *Macrotis lagotis*	VU	S1		Spinifex hummock grassland and acacia scrub	There are two records from around Port Hedland (DEC NatureMap). One record is from 1969, the other record does not have a date.	**LOW** Suitable habitat but few local or recent records
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)	VU	S1		Roosts in hot, humid caves	Pilbara Leaf-nosed Bats have been recorded 25km east of the project area(DEC NatureMap)	**LOW** No suitable roosting habitat or nearby roost caves
Ghost Bat *Macroderma gigas*			P4	Caves, rockpiles and abandoned mines	Ghost Bats have been recorded 25km east of the project area(DEC NatureMap)	**LOW** No suitable roosting habitat or nearby roost caves
Western Pebble-mound Mouse *Pseudomys chapmani*			P4	Spurs and rocky hills with many small pebbles vegetated by spinifex	Numerous records within 50km, but all from rocky habitat	**LOW** No suitable habitat.
Birds						
Cattle Egret (*Ardea ibis*)	M	S3		Short grasses (especially damp pastures) and wetlands	Two records within 20 km of the project area (DEC NatureMap)	**LOW** No suitable habitat
Eastern Reef Egret *Egretta sacra*	M	S3			Numerous records within 20 km, but almost all are from coastal habitats (DEC NatureMap)	**LOW** No suitable habitat

COMMON & SCIENTIFIC NAME	CONSERVATION SIGNIFICANCE			HABITAT	PREVIOUS RECORDS	LIKELIHOOD OF OCCURRENCE
	EPBC Act	WC Act	DEC			
Glossy Ibis *Plegadis falcinellus*	M	S3			A single record 37 km north-east of the project area in 1998 (DEC NatureMap)	**LOW** Few local records and very little suitable habitat
Eastern Osprey *Pandion cristatus*	M	S3			Numerous records within 20 km of the project area, mainly from coastal habitats (DEC NatureMap)	**LOW** No suitable habitat
White-bellied Sea Eagle (*Haliaeetus leucogaster*)	M	S3		Coastal areas and offshore islands	Numerous records within 20 km, mainly from coastal habitats (DEC NatureMap)	**LOW** May occasionally overfly area, but no suitable habitat for hunting
Peregrine Falcon (*Falco peregrinus*)		S4		Most terrestrial especially rocky areas	A single record within 5 km of the project area (DEC NatureMap)	**LOW** No suitable habitat
Star Finch (Western) *(Neochmia ruficauda subclarescens*)			P4	Vegetation around watercourses.	Three recent records within 10km of project area	**LOW** No suitable habitat
Reptiles						
Woma (*Aspidites ramsayi*)			P1	Woodlands, heaths and shrublands, often with spinifex	Three records within 50km of project area	**LOW** Little suitable habitat in the project area