Level 2 Fauna Assessment for the Mulga Downs Project Area

Version 3. February 2013

Prepared for:

Hancock Prospecting Pty Ltd
PO Locked Bag No. 2
WEST PERTH WA 6872

By:

Terrestrial Ecosystems
10 Houston Place
Mt Claremont WA 6010

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
Electronic	2012-0027-006-gt-V1	Draft	16 January 2013	Hancock Prospecting	GT
Electronic	2012-0027-006-gt-V2	Draft	25 January 2013	Hancock Prospecting	GT
Electronic	2012-0027-006-gt-V3	Final	6 February 2013	Hancock Prospecting	GT

DISCLAIMER

Front cover: Spiny-tailed Goanna (*Varanus acanthurus*)

TABLE OF CONTENTS

TERRESTRIAL ECOSYSTEMS

Charts

Plates

Tables

Figures

Appendices

EXECUTIVE SUMMARY

Hancock Prospecting Pty Ltd (HPPL) is proposing to develop the Mulga Downs project mine which is on the Mulga Downs pastoral lease on the western side of the Great Northern Highway and north of the Fortescue River valley. The assessed project area includes the proposed mining area, access tracks and haul road to the Great Northern Highway, borrow pits and a mining village. It is proposed that ore would be transported from the mine by the haul road to the Roy Hill Infrastructure (RHI) railway to be transported by rail to a berth at Port Hedland for shipping overseas.

The vertebrate fauna for the entire project area was included in this assessment. However, the assessment of potential impacts on the vertebrate fauna focussed on:

- the proposed mining area (~ 610ha),
- the borrow pits (~ 44ha),
- the main east-west access track (~ 142ha),
- the loop access track to the proposed mine village (~ 22ha),
- a proposed eastern mine village (~ 8.5ha); and
- a proposed western mine village (~ 9.1ha).

Should the location or size of any of these areas change then the impact assessment should be reviewed.

The field work component of this vertebrate fauna assessment included mapping habitat for Northern Quoll, a targeted survey for Northern Quolls, Pilbara Leaf-nosed Bats, Ghost Bats and Pilbara Olive Pythons; and a single generic Level 2 vertebrate fauna trapping program.

The proposed mining area and the east-west haul road to the Great Northern Highway are in the Jamindie land system (i.e. a relatively flat plain vegetated with varying densities of mulga woodland over bare ground, or a mosaic of low shrubs and annual grasses or spinifex), except for the eastern end of the proposed haul road which is in the Newman (i.e. rocky scree slopes, rocky hills, breakaways and plateaux that support occasionally low trees and varying densities of spinifex) and McKay (i.e. hills, ridges, plateaux remnants and breakaways vegetated with spinifex and an occasional low tree) land systems. The access loop road to the two alternative mining villages is mostly in the Newman land system and the two possible sites for a mine village are on the edge of the Boolgeeda (i.e. stony lower slopes and plains vegetated with spinifex) and Newman land systems. The proposed borrow pits are mostly near the boundary of the Jamindie and Newman land systems. The proposed mining area has been disturbed by exploration activity, and there are tracks, stock fencing, wind mills and other infrastructure used to operate a pastoral lease present in the project area.

From a fauna perspective, some sections of the project area have been degraded by grazing, existing tracks and exploration activity. Other areas provide high quality fauna habitat and show little disturbance from cattle or other anthropogenic influences. The project area supports a reptile and small mammal assemblage that contains less species and fewer individuals than is generally found elsewhere in the Pilbara in similar habitat and an avian assemblage that is comparable to that found in similar habitats elsewhere in the Pilbara. The amphibian fauna was not sampled due to a lack of rain in the period preceding the fauna survey, but it is likely to be similar to that recorded in other surveys in the bioregion.

Northern Quolls are present in the rocky hills and breakaways on the northern and eastern areas and Pebble-mound Mice are in the rocky undulating areas. Although not recorded, there is a possibility the project area also supports Pilbara Olive Pythons (*Liasis olivaceus barroni*), *Ramphotyphlops ganei* and *Ctenotus nigrilineatus*, Long-tailed Dunnarts (*Sminthopsis longicaudata*) and the Northern Short-tailed Mouse (*Leggadina lakedownensis*). Pilbara Leaf-nosed Bats and Ghost Bats were not recorded in the project area, and no suitable roosting habitat was found for Pilbara Leaf-nosed Bats, but potential roost sites were available for Ghost Bats.

The conservation significant Australian Bustard, Bush Stone-curlew and the Grey Falcon were recorded in the project area, and it is possible that Rainbow Bee-eater, Fork-tailed Swifts and Peregrine Falcons may infrequently be seen in the area.

The fauna habitats present in the project area are similar to those in adjacent areas; therefore the fauna assemblages in these habitats are also likely to be similar to that in the adjacent areas. Clearing the vegetation in the project area will almost certainly result in the loss of numerous reptiles, frogs and small mammals. Most of the birds, larger mammals, such as kangaroos, and some of the larger reptiles (e.g. goannas), will move out of the area and find new activity areas. This will result in some short-term adjustment for many individuals, including those forced to move and those in areas with new migrants. For the more sedentary species this will mean shifting activity areas and competing for resources and some individuals may not survive. For those individuals that are nomadic, transient and migratory, or without defined home ranges that are forced to shift into new areas, the impact will generally be non-significant. If the proposed disturbance and vegetation clearing program does not impact on the rocky areas and breakaways, then impacts on the Northern Quoll and other conservation significant fauna is likely to be low.

The potential impacts are associated with vegetation clearing, habitat fragmentation, the creation of a linear barrier and edge effects. As there are other existing and proposed projects in this IBRA subregion, these impacts are cumulative and will also be associated with the constant movement of trucks, light vehicles and other machinery from the mine to the rail line.

1 INTRODUCTION

1.1 Background and project location

Hancock Prospecting Pty Ltd (HPPL) is proposing to develop the Mulga Downs project mine which is on the Mulga Downs pastoral lease on the western side of the Great Northern Highway and north of the Fortescue River valley (Figure 1). The assessed project area includes the proposed mining area, access tracks and haul road to the Great Northern Highway, borrow pits and a mining village (Figure 2). It is proposed that ore would be transported from the mine by the haul road to the Roy Hill Infrastructure (RHI) railway to be transported by rail to a berth at Port Hedland for shipping overseas.

1.2 Scope of works

Terrestrial Ecosystems was commissioned to undertake a vertebrate fauna assessment that:

- mapped areas likely to support Northern Quoll, Mulgara and Bilby;
- conducted a targeted survey using motion sensitive cameras for Northern Quolls, and ultrasonic echolocation detections of Pilbara Leaf-nosed Bats and Ghost Bats calls and a search for Pilbara Olive Pythons; and
- trapped vertebrate fauna in the project area focussing on the Jamindie land system.

1.3 Objectives

The objectives of this fauna assessment were to:

- provide an indication of the vertebrate fauna assemblage (reptiles, amphibians, small mammals and birds) on and in the vicinity of the project area so that potential impacts on the fauna and fauna assemblage might be adequately assessed;
- map areas likely to support Northern Quoll, Mulgara and Bilby; and
- assess the impact and environmental risks associated with the proposed development on the fauna assemblage.

1.4 Assessed impact area

The vertebrate fauna for the entire project area was included in this assessment (i.e. area outlined in red dashes in Figure 2). However, the assessment of potential impacts on the vertebrate fauna focussed on:

- the proposed mining area (~ 610ha),
- borrow pits (~ 44ha),
- the main east-west access track and proposed haul road (~ 142ha),
- the loop access track to the proposed mine village (~ 22ha),
- a proposed eastern mine village (~ 8.5ha); and
- a proposed western mine village (~ 9.1ha).

Should the location or size of any of these areas change, then the impact assessment should be reviewed.

2 EXISTING ENVIRONMENT

2.1 Climate

The Pilbara bioregion experiences an arid-tropical climate with hot summers from October to April and mild winters from May to September (Gentilli 1972). Rainfall in the Pilbara is variable and recordings are highest at weather stations in and around the Hamersley Ranges, which lie at altitudes of up to 900m AHD (Beard 1975).

Averaged long-term data from the weather station at Wittenoom, which is the closest to the project area, is shown in Chart 1.

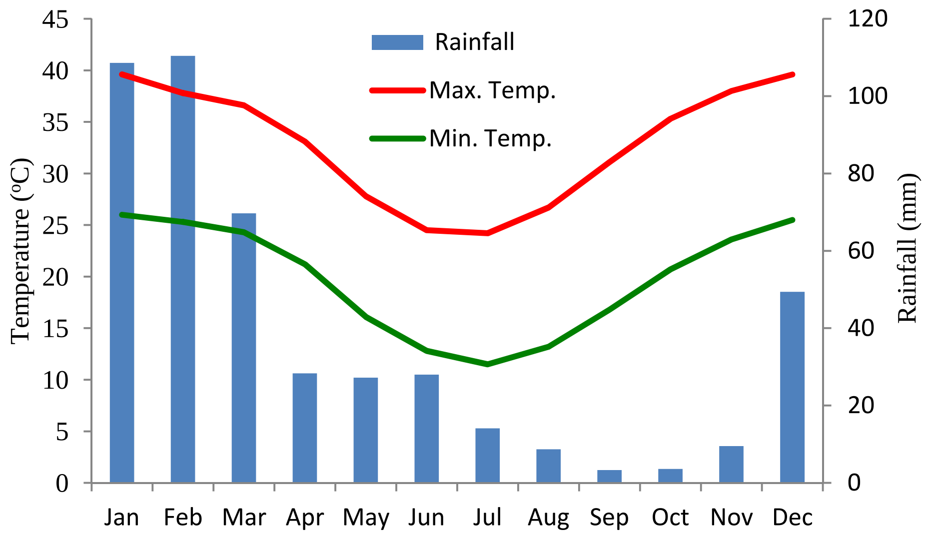


Chart 1. Average maximum and minimum monthly temperatures and rainfall at Wittenoom

(http://www.bom.gov.au/climate/averages/tables/cw_005026.shtml; 10/01/2013)

The Pilbara receives the majority of its annual rainfall between December and March (Chart 1). This rain is usually the result of moist tropical storms and decaying cyclones originating in the north-west or Kimberley that produce sporadic and drenching thunderstorms. Summer daily maximum temperatures may reach as high as the low 50's°C, while mean winter maximum is around 25°C (ranging from 14–35°C). Light frosts occasionally occur during July and August.

2.2 Topography

The Pilbara region comprises a significant proportion of the ancient continental shield of Western Australia, consisting of both Proterozoic and Archaean rocks. The latter constitutes the Pilbara Block, overlain by Proterozoic rock deposited in the Hamersley and Bangemall Basins. The Hamersley Basin occupies most of the southern part of the Pilbara Block and can be divided into three stratigraphic groups; the Fortescue, Hamersley and Turee Creek (Beard 1975, Jarvis 1979). Three major topographical units define most of the project area:

Chichester Plateau plateau of mainly basalts, including siltstone, mudstone, shale, dolomite and jaspilite; forming a watershed between numerous rivers flowing north through the Abydos Plain to the coast, and the Fortescue's drainage on the southern side;

Fortescue Valley occupying the lowland between the Chichester and Hamersley Plateau; the eastern portion drains into the Fortescue Marsh; and

Hamersley Plateau	rounded hills and ranges, mainly of jaspilite and dolomite with some shale, siltstone and volcanics.

2.3 Bioregions

The project area and haul road to the Great Northern Highway are almost entirely in the Pilbara IBRA subregion PIL2 Fortescue and on the southern boundary of PIL1 Chichester.

Fortescue (PIL2) -	was described by Kendrick (2002) as including an extensive salt marsh, the Fortescue River basin and the Millstream wetlands. The subregion contains extensive areas of cadjeput and river gums, samphire flats around the marsh, and River Gums line many of the drainage lines into the marsh. An extensive calcrete aquifer is the source of water in numerous permanent springs in the central Fortescue and is recharged during local flooding. The marsh drains via the Fortescue River to the west through the Goodiadarrie Hills. Surface water flows from the marsh into the lower Fortescue River only occur after major rainfall events. Kendrick (2002) described the climate as semi-desert tropical, with most rain falling in summer due to cyclonic events. The subregion area is 2,041,914ha.
Chichester (PIL1) -	was described by Kendrick and McKenzie (2002) as undulating archaean granite and basalt plains including significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* (formerly *Triodia pungens*) hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges. The climate is semi-desert-tropical and receives 300mm of rainfall annually. Drainage occurs to the north via numerous rivers (e.g. De Grey, Oakover, Nullagine, Shaw, Yule and Sherlock). Subregional area is 9,044,560ha.

2.4 Regional data

The frogs, reptiles, mammals and birds in the bioregion have been surveyed on many occasions for a variety of purposes. Surveys in the vicinity of the project area and which have been reviewed for this assessment include:

Biota Environmental Sciences (2002) *Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland - Vertebrate Fauna Survey*. Unpublished report for Hope Downs Management Services.

Biota Environmental Sciences (2004a) *Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage A Rail Corridor*. Unpublished report to the Fortescue Metals Group Ltd, Perth.

Biota Environmental Sciences (2004b) *Hope Downs Additional Rail Corridor - Chichester Range Vertebrate Fauna Survey*. Unpublished report for Hope Downs Management Services, Perth.

Biota Environmental Sciences (2005) *Fauna Habitats and Fauna Assemblages of the Proposed FMG Stage B Rail Corridor and Mindy Mindy; Christmas Creek; Mt Lewin and Mt Nicholas Mines Areas,* Unpublished report for Fortescue Metals Group; Perth.

Burbidge, A.A. (1971) *Results of a Biological Survey of the Millstream Area*. Department of Fisheries and Fauna, Western Australia, Report VII, Perth.

Coffey Environments (2008) *Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project*. Unpublished report for Fortescue Metals Group, Perth - March and November 2008 data.

Coffey Environments (2011) *Targeted Surveys - Northern Quolls, Mulgara and Pilbara Olive Pythons*. Unpublished report for Fortescue Metals Group, Perth.

Davis; R.A.; Wilcox; J.A.; Metcalf; B.M. Bamford; M.J. (2005). *Fauna survey of proposed Iron Ore Mine; Cloud Break*. Unpublished report for Fortescue Metals Group; Perth.

Ecologia Environment (2007) *RGP5 Level 2 Fauna Survey Chichester Deviation*. Unpublished report for BHPBIO; Perth.

Ecologia Environment (2010) *Solomon Project: Kings Area Vertebrate Fauna Assessment*, Unpublished report for Fortescue Metals Group, Perth.

Ecologia Environment (2011) *Cloudbreak Level 2 Terrestrial Vertebrate Fauna Assessment*. Unpublished report for Fortescue Metals Group, Perth.

How R A and Cooper N K (2002) Terrestrial small mammals of the Abydos Plain in the north-eastern Pilbara Western Australia. *Journal of the Royal Society of Western Australia* 85, 71-82.

How R A and Dell J (2004) Reptile assemblage of the Abydos Plain; north-eastern Pilbara Western Australia. *Journal of the Royal Society of Western Australia* 87, 85-95.

McKenzie, N.L. and Bullen, R.D. (2009) The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats. *Records of the Western Australian Museum,* Supplement 78, 123-155.
Pilbara Biological survey data provided by DEC.
Terrestrial Ecosystems (Terrestrial Ecosystems 2011b) *Level 2 Fauna Assessment for the Abydos Plain Section of the Roy Hill Infrastructure Rail Corridor between Port Hedland and the Roy Hill Mine (Chainage 92 to 180)*. Unpublished report for Roy Hill Infrastructure, Perth.
Unpublished data for FMG Solomon Rail corridor

Reports by Biota (2002, 2004a, b, 2005) for the Hope Downs and Fortescue Metals Group (FMG) rail corridors, by Ecologia (2007) for the Chichester Deviation and by Davis et al. (2005) for Cloudbreak are to the east of the project area. Reports by Coffey Environments (2008, 2011) for the Solomon project and Burbidge (1971) are to the north and west of the project area, and reports by How and Cooper (2002), How and Dell (2004) and Terrestrial Ecosystems (2011b) are for the Abydos Plain which is north-east of the project area.

3 METHODOLOGY

There were three aspects to this assessment:

- conservation significant fauna habitat mapping;
- targeted survey for Northern Quolls, Mulgara, Bilbies, Pilbara Leaf-nosed Bats, Ghost Bats and Pilbara Olive Pythons; and
- a generic vertebrate fauna trapping program.

3.1 Determination of survey sampling design and intensity

Prior to the development of the survey methodology, a review was undertaken of the factors likely to influence the survey design (Table 1).

Table 1. Factors likely to influence the survey design (adapted from EPA, 2004)

Factor	Relevance	Comment
Bioregion – level of existing survey knowledge of the region and associated ability to predict accurately.	The study area is located in the Chichester (PIL2) subregion of the Pilbara biogeographic region. A number of fauna surveys and assessments of similar size and scope have been undertaken in the region. The Jamindie Land System, which covers much of the project area, has been poorly surveyed.	The project area and the surrounds were not surveyed in the DEC Pilbara bioregional survey. Survey data in the vicinity of the project area comes from rail corridors and a mine sites to the east, in the Hamersley Range to the north-west and WAMs and Terrestrial Ecosystems survey of the Abydos Plain.
Landform special characteristics/specific fauna/specific context of the landform characteristics and their distribution and rarity in the region.	Landforms in the study area are typical of that along the northern boundary of the Fortescue River, with a flat mulga woodland running into a rocky hilly area on the northern boundary. There are no salt lakes or wetlands present in the project area.	Survey sites were primarily in the Jasmindie land systems which had been poorly surveyed elsewhere in the Pilbara.
Life forms, life cycles, types of assemblages and seasonality (e.g. migration) of species likely to be present.	The survey was undertaken during late spring/early summer. The site is not used by a large number of migratory species.	The proposed impact area supports a relatively uniform fauna habitat. A second season survey would have sampled species not active during the survey period.
Level of existing knowledge and results of previous regional sampling (e.g. species accumulation curves, species/area curves).	Vertebrate fauna in the project area and surrounds have not been adequately surveyed.	Survey data in the vicinity of the project area mostly comes from different land systems.
Number of different habitats or degree of similarity between habitats within a survey area.	The project area was dominated by three habitat types. There were no salt lakes or wetlands present in the project area.	Most of the proposed disturbance will occur in the mulga woodland on the plain (figure 2). This was the area that was surveyed in the trapping program.
Climatic constraints (e.g. temperature or rainfall that preclude certain sampling methods).	The Pilbara bioregion experiences hot summers with rainfall peaks that result from decaying cyclones and summer thunderstorms. Summer rainfall is unpredictable.	The survey was conducted in late spring/early summer at a time suitable to catch/observe a representative sample of most vertebrate fauna except amphibians.
Sensitivity of the environment to the proposed activities.	Habitat in the project area is well represented in the surrounding area. There are no sensitive environments in the project area.	There were no sensitive areas present in the project area. The project area was both systematically and opportunistically sampled.
Size, shape and location of the proposed activities.	The project area is approximately 20km by 6km with a haul road corridor of approximately 10km from the project area to the Great Northern Highway.	The proposed disturbance area is approximately 825ha. EPA (2004) Guidance Statement No 56 suggests a Level 2, two season survey is required for an area of this size in this location.
Scale and impact of the proposal.	The location and scale of the project warrants a Level 2 survey, in accordance with EPA guidelines.	A large scale mining project located in the Pilbara bioregion requires a Level 2 survey unless there are adequate data to describe the fauna assemblage in the intended impact areas.

3.2 Fauna habitat assessment

The fauna habitat assessment was undertaken for the entire project area. This field assessment had three foci:

- assessing fauna habitat types and their condition;
- recording evidence of conservation significant fauna; and
- assessing the possible presence of Northern Quoll, Mulgara and Bilbies within the project area, so that mitigation and management strategies might be implemented to reduce potential impacts.

Fauna assessors stopped at multiple locations within the project area and recorded a suite of data about the fauna habitat and its condition. This information included a description of the habitat structure, habitat condition, landform, soils and vegetation and time since last fire. The following data were recorded at each location as part of the habitat assessment:

Observer's name
Coordinates of the location as UTM (WGS 84)
Fire history – options

    > 5 years
    1-5 years
    < 1 year

Landform – options

Beach	Lake / lake edge
Clay plain	Lower slope
Cliff	Mid slope
Creek line	Ridge
Dam	River
Drainage line	Rocky outcrop / breakaway
Dune crest	Salt lake
Dune slope	Sand dune
Dune swale	Sand plain
Escarpment	Stony plain
Flat	Swamp
Gorge	Undulating
Gully	Upper slope
Intertidal / mangrove	Wetland
	Water hole

Habitat quality – options

- *High quality fauna habitat* – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.
- *Very good fauna habitat* - These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had 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 showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.
- *Disturbed fauna habitat*– These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or have been damaged by vehicle 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 loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Fauna assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.

*Habitat structur*e - options

Upper stratum

- Tall open woodland
- Tall woodland
- Open woodland
- Woodland
- Open forest
- Closed forest
- Tall closed forest
- Tall open forest
- Scattered tall trees
- Scattered trees
- Scattered low trees
- Low closed forest
- Low open forest
- Low woodland
- Low open woodland

Middle stratum

- Shrubland
- Tall shrubland
- Tall open shrubland
- Low shrubland
- Scattered low shrubs
- Low open shrubland
- Scattered tall shrubs
- Closed heath
- Open heath
- Low closed heath
- Low open heath
- Tall closed scrub
- Tall open scrub
- Scattered tall shrubs
- Open shrubland
- Scattered shrubs

Lower stratum

- Closed hummock grassland
- Mid-dense hummock grassland
- Hummock grassland
- Open hummock grassland
- Scattered hummock grassland
- Closed tussock grassland / sedgeland / herbland
- Tussock grass land / sedgeland / herbland
- Open tussock grassland / sedgeland / herbland
- Scattered tussock / grasses / sedges / herbs
- Very open tussock grassland / herbland

Soil Type – options

- Sand
- Loamy sand
- Clayey sand
- Sandy loam
- Loam
- Silty loam
- Sandy clay loam
- Clay loam
- Silty clay loam
- Clay
- Rock
- Peat / organic
- Stony

Soil Colour –options

- Black
- Brown
- Grey
- Orange
- Red
- White
- Yellow

Surface stones - options

- None
- Pebbles (0-50mm)
- Cobbles (51-250mm)
- Boulders (>250mm)
- Rocks

Potential for conservation significant species to be found in the area

- Yes
- No

Impact of clearing on conservation significant species – options

- Low
- Low - moderate
- Moderate
- Moderate - high
- High
- Extreme

Translocation of conservation significant fauna required:

- No
- Yes

3.3 Targeted survey for Northern Quolls, Mulgara, Bilbies, Pilbara Leaf-nosed Bats, Ghost Bats and Pilbara Olive Pythons

3.3.1 Northern Quolls

Fifty Reconyx HC500 motion sensitive cameras were set on two occasions each for a period of five days (i.e. 500 camera nights of data collection). A baited pod containing a mixture of rolled oats, peanut butter, sardines/meat bait, soaked in fish oil and highly absorbent material was located approximately 3m in front of each camera. This bait remained an attractant for an extended period of time because of the fish oil and the highly absorbent material and the inability of animals to actually access the bait. The location of the cameras is shown in Figure 3 and Table 2.

Table 2. Location of motion sensitive cameras (UTM: WGS 84)

Site code	Zone	Easting	Northing	Site code	Zone	Easting	Northing
1-1	50	682845	7550708	2-1	50	660139	7553874
1-2	50	682799	7550455	2-2	50	661824	7552757
1-3	50	670017	7554850	2-3	50	664400	7554027
1-4	50	669607	7555124	2-4	50	665153	7554226
1-5	50	669363	7554024	2-5	50	665338	7554746
1-6	50	668896	7552671	2-6	50	664630	7553693
1-7	50	670832	7553865	2-7	50	664591	7554677
1-8	50	670110	7554862	2-8	50	665388	7554624
1-9	50	670652	7553970	2-9	50	665358	7554506
1-10	50	668784	7552992	2-10	50	664550	7554247
1-11	50	670742	7553509	2-11	50	665062	7554196
1-12	50	682878	7549999	2-12	50	656351	7555663
1-13	50	681889	7550211	2-13	50	659094	7555647
1-14	50	682798	7550361	2-14	50	656812	7550999
1-15	50	670799	7553551	2-15	50	664386	7554485
1-16	50	682563	7550095	2-16	50	660163	7553900
1-17	50	670749	7553550	2-17	50	665327	7554734
1-18	50	670704	7553803	2-18	50	664287	7553790
1-19	50	669245	7553788	2-19	50	664572	7554077
1-20	50	682226	7550259	2-20	50	658915	7555516
1-21	50	670920	7553127	2-21	50	664339	7553775
1-22	50	669224	7553729	2-22	50	665023	7554207
1-23	50	670726	7553936	2-23	50	665193	7554395
1-24	50	670144	7554815	2-24	50	664602	7554252
1-25	50	669209	7553653	2-25	50	664666	7554277
1-26	50	682809	7550575	2-26	50	659009	7556423
1-27	50	669991	7554708	2-27	50	664411	7554123
1-28	50	669221	7553616	2-28	50	664484	7554202
1-29	50	682418	7550074	2-29	50	660154	7554003
1-30	50	669455	7554930	2-30	50	665191	7554331
1-31	50	669411	7554017	2-31	50	664821	7554324
1-32	50	670482	7554324	2-32	50	665185	7554285
1-33	50	668815	7552938	2-33	50	664641	7553528
1-34	50	670515	7554176	2-34	50	664396	7554509
1-35	50	670033	7554783	2-35	50	664731	7554279
1-36	50	670139	7554712	2-36	50	665011	7554255
1-37	50	670485	7554267	2-37	50	665112	7554204
1-38	50	670874	7553185	2-38	50	664773	7553715
1-39	50	670022	7554737	2-39	50	664450	7554082
1-40	50	670686	7553940	2-40	50	664580	7554640
1-41	50	668925	7552645	2-41	50	664679	7554095
1-42	50	682119	7550323	2-42	50	660489	7554003
1-43	50	682823	7549975	2-43	50	661701	7553321
1-44	50	668857	7552908	2-44	50	664321	7554058
1-45	50	682528	7550464	2-45	50	658913	7556435
1-46	50	682465	7549959	2-46	50	661812	7552875
1-47	50	668770	7552449	2-47	50	664652	7554146
1-48	50	670789	7553754	2-48	50	665370	7554554
1-49	50	681853	7550153	2-49	50	656815	7551002
1-50	50	682810	7550492	2-50	50	660483	7554075

3.3.2 *Pilbara Leaf-nose Bats and Ghost Bats*

Five ultra-sonic bat call detectors (SM2BAT+) were set up on 10 occasions overnight. The units were set to automatically turn on at sunset and off at sunrise each day. The location of the echolocation detectors is shown in Figure 3 and Table 3.

Table 3. Location of bat survey sites (UTM: WGS 84)

Site code	Zone	Easting	Northing
BAT1	50	657258	7554494
BAT2	50	657664	7554346
BAT3	50	658060	7554198
BAT4	50	658435	7554063
BAT5	50	658824	7553917
BAT6	50	659605	7553630
BAT7	50	660401	7553338
BAT8	50	661533	7552882
BAT9	50	662438	7552199
BAT10	50	664271	7552270
BAT11	50	665108	7551706
BAT12	50	666147	7551093
BAT13	50	667336	7550696
BAT14	50	668323	7550359
BAT15	50	669368	7550082
BAT16	50	670610	7549748
BAT17	50	671523	7549311
BAT18	50	672682	7548546
BAT19	50	673741	7547938
BAT20	50	674950	7547832
BAT21	50	670157	7550480
BAT22	50	670243	7550650
BAT23	50	669240	7550584
BAT24	50	668594	7551089
BAT25	50	669239	7552581

Site code	Zone	Easting	Northing
BAT26	50	668465	7549490
BAT27	50	667535	7548212
BAT28	50	669969	7548847
BAT29	50	669333	7547957
BAT30	50	670446	7548140
BAT31	50	664747	7548417
BAT32	50	665626	7549655
BAT33	50	664529	7550556
BAT34	50	662587	7550180
BAT35	50	663271	7551162
BAT36	50	662247	7551892
BAT37	50	660440	7551348
BAT38	50	659046	7552141
BAT39	50	658634	7551662
BAT40	50	657172	7552957
BAT41	50	656805	7550997
BAT42	50	657839	7550217
BAT43	50	659390	7549117
BAT44	50	661597	7548348
BAT45	50	655216	7552497
BAT46	50	655004	7553715
BAT47	50	656040	7554441
BAT48	50	656976	7555600
BAT49	50	656610	7556650
BAT50	50	660135	7553865

3.3.3 *Bilbies, Mulgara, Pilbara Olive Pythons*

In conjunction with the fauna habitat mapping, the entire project area was searched for evidence of Bilbies, Mulgara and Pilbara Olive Pythons.

Bilbies dig a burrow, leave a characteristic scratching and scats (Thompson and Thompson 2008b), and tracks are recognisable in soft sand, so their presence is easily recognised by a zoologist that has experience in determining their presence in the Pilbara.

Mulgara dig a burrow that often has multiple entrances in sand or sandy clay soils in areas vegetated by spinifex (Thompson and Thompson 2007a). These burrows are recognisable by a zoologist that has experience in determining their presence in the Pilbara.

It is not possible to systematically trap for Pilbara Olive Pythons. This cryptic species is most often seen at night and occasionally seen during the day and are generally found around rocky areas, rocky outcrops and cliffs, particularly in the vicinity of watercourses and water holes, but they also shelter in logs, flood debris, caves, tree hollows and thick vegetation (Burbidge 2004, Pearson 2007). They are generally opportunistically sighted and even species-specific searches in the right conditions often fail to detect their presence when they are in the area. Scats and shed skins are occasionally located in places that support a resident population or an individual. Fauna surveyors looked for Pilbara Olive Pythons during diurnal and nocturnal searches; and searched for their scats and shed skins during the habitat assessment and nocturnal spotlighting.

3.4 Trapping survey

The survey method adopted for the trapping program was aligned with the Terrestrial Ecosystems' interpretation of EPA's Guidance Statement No. 56 (EPA 2004), Position Statement No. 3 (EPA 2002) and the Technical Guide on terrestrial fauna assessments (EPA/DEC 2010).

Published data (Thompson and Thompson 2005, Thompson et al. 2010) suggest that spring and summer are the optimum time periods for vertebrate fauna surveys in the arid regions of Western Australia. The *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA / DEC 2010) recommended that surveys for the Pilbara are conducted between September and April for reptiles, immediately after rain events for amphibians and birds and most times of the year for mammals. Thompson and Thompson (2010) showed how ambient maximum temperatures affected fauna trapping rates in the Pilbara, with the hotter periods catching many more individuals and species than the cooler period.

Survey sites were established between 4 - 7 November 2012, and traps were opened on 8 November and closed on 15 November 2012. Fauna survey sites were selected so that they sampled a representative set of the fauna habitats within the proposed impact areas with a focus on the Jamindie Land System.

Fifteen survey sites were established (Figure 3). Each site consisted of four trapping lines. Each trap line consisted of three 20L buckets, three pipes (500mm deep, 150mm wide) and six funnel traps spread along a 30m, 250mm high fly-wire drift fence (Plate 1). In addition, three aluminium box traps (100x90x330mm) were set along each trapping line. Aluminium box traps were baited with a mixture of sardines, oats and peanut butter.

All 20L buckets contained pieces of white polystyrene in the bottom to help reduce trap deaths due to heat stress. During thunderstorms or significant rainfall events when the traps were open, the polystyrene floated and provided caught animals a raft if the pit-traps filled with water. Polystyrene was not necessary in the PVC pipes as the sun is only directly overhead for a small time. All funnel traps were covered with two shade cloth covers to minimise heat stress. Aluminium box traps were placed under shade to ensure that they were protected from solar radiation.

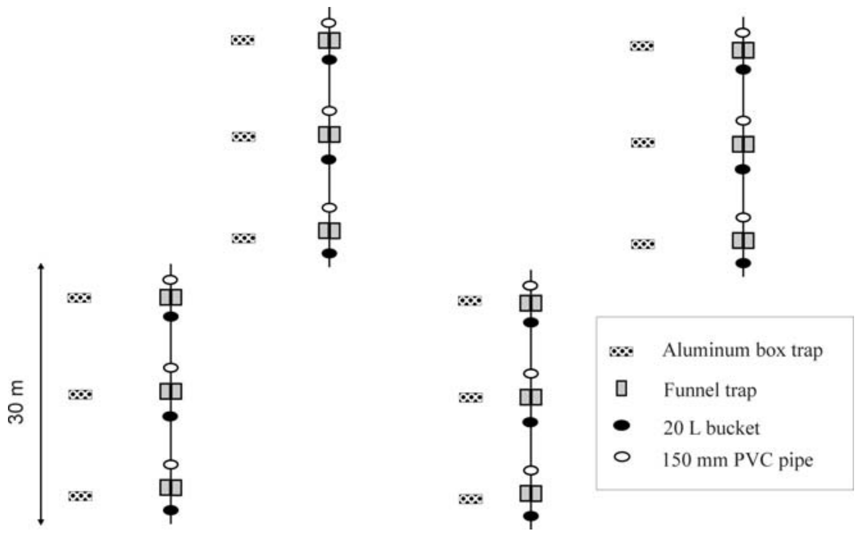


Plate 1. Layout of a single trapping site

A total of 2,520 pit-trap nights, 1,260 aluminium box trap-nights and 2,520 funnel trap-nights were used to sample the small vertebrate fauna. All traps were cleared within 4 hours of sunrise each day. The coordinates for trapping sites are shown in Table 4.

Table 4. Location of trapping sites (UTM: WGS 84)

Site code	Zone	Easting	Northing
1	50	656820	7553838
2	50	657599	7553581
3	50	658431	7553685
4	50	658651	7552632
5	50	660067	7552864
6	50	661193	7552410
7	50	661854	7552226
8	50	662675	7552081
9	50	663631	7551693
10	50	664864	7551023
11	50	666053	7550251
12	50	667305	7550651
13	50	667147	7549872
14	50	656456	7552477
15	50	656953	7551633

Hand foraging has limited usefulness in vertebrate fauna surveys as it cannot be replicated or repeated systematically on multiple occasions and can be quite destructive on the fauna habitat. However, hand foraging can be useful for supplementing lists of species that are not regularly caught by trapping. A limited amount of hand foraging was conducted throughout the survey area in each of the habitat types. Hand searching included digging out holes, removing bark from logs and trees, and turning over rocks.

Searches at night using spotlights were undertaking on three occasions (10/11/12, 11/11/12, 13/11/12) for a total of 11 person hours. This was mostly done in a vehicle travelling at about 5-10km per hour along the various tracks in the project area and in the rocky ranges on foot using head torches.

3.4.1 Avian survey

Avifauna surveys were carried out from before sunrise until early-mid afternoon and opportunistically throughout the survey period (9-14 November 2012). Areas searched for birds are shown in Table 5. Twenty minutes was spent searching for birds in 2-3ha using a wandering transect method (Thompson and Thompson 2010).

Table 5. Location of avian survey sites (UTM: WGS 84)

Site code	Zone	Easting	Northing
MD-001	50	656773	7554711
MD-002	50	656576	7554024
MD-003	50	656607	7553379
MD-004	50	656644	7552793
MD-005	50	656645	7552077
MD-006	50	656863	7551248
MD-007	50	656170	7550972
MD-008	50	655742	7551649
MD-009	50	655362	7552179
MD-010	50	654853	7551806
MD-011	50	654784	7553748
MD-012	50	655439	7554757
MD-013	50	654582	7552825
MD-014	50	655800	7552926
MD-015	50	657870	7553950
MD-016	50	658804	7553247
MD-017	50	660265	7553171
MD-018	50	659747	7552444
MD-019	50	661414	7552353
MD-020	50	660468	7551390
MD-021	50	657314	7552468
MD-022	50	658705	7552004
MD-023	50	658190	7551309
MD-024	50	657509	7550356
MD-025	50	659125	7550550
MD-026	50	659663	7549254
MD-027	50	660569	7550519
MD-028	50	681884	7550587
MD-029	50	682946	7550538
MD-030	50	682750	7550067
MD-031	50	682097	7550196
MD-032	50	681176	7550332
MD-033	50	681349	7549974
MD-034	50	664398	7552412
MD-035	50	664586	7553232
MD-036	50	664654	7553944
MD-037	50	664310	7554224
MD-038	50	664646	7554602
MD-039	50	665194	7555058
MD-040	50	665947	7554761
MD-041	50	665391	7554280
MD-042	50	665787	7553770
MD-043	50	665770	7553209
MD-044	50	665296	7552575
MD-045	50	666279	7551900
MD-046	50	667974	7551253
MD-047	50	669050	7552199
MD-048	50	669069	7553469
MD-049	50	669023	7554591
MD-050	50	670529	7554725
MD-051	50	671483	7554359
MD-052	50	670883	7552882
MD-053	50	670858	7551659
MD-054	50	670555	7550004
MD-055	50	671599	7549705
MD-056	50	672269	7549327
MD-057	50	673299	7548647
MD-058	50	673638	7549181
MD-059	50	672842	7548009
MO-060	50	671647	7548451
MD-061	50	672721	7549963
MD-062	50	670251	7548237
MD-063	50	670836	7549075
MD-064	50	669471	7549775

Site code	Zone	Easting	Northing
MD-065	50	669284	7548893
MD-066	50	668371	7548236
MD-067	50	668386	7550075
MD-068	50	667913	7549205
MD-069	50	667177	7548402
MD-070	50	667516	7550117
MD-071	50	666865	7549511
MD-072	50	666205	7548898
MD-073	50	666502	7550658
MD-074	50	665451	7549604
MD-075	50	664305	7548301
MD-076	50	665428	7551115
MD-077	50	664418	7550819
MD-078	50	663888	7549716

Site code	Zone	Easting	Northing
MD-079	50	663414	7551295
MD-080	50	662543	7550154
MD-081	50	662187	7549438
MD-082	50	662701	7552447
MD-083	50	662066	7551539
MD-084	50	661427	7550656
MD-085	50	656616	7556697
MD-086	50	656669	7555860
MD-BORE1	50	656790	7551024
MD-BORE2	50	661765	7548151
MD-CP1	50	656781	7551128
MD-CP2	50	659984	7548855
MD-CP3	50	668352	7550345
MD-CP4	50	664252	7552276

3.4.2 Database searches

Several databases were consulted in the preparation of the potential list of vertebrate species that could be found in the project area. A search of the Terrestrial Ecosystems' database was undertaken to develop a list of birds, reptiles, mammals and amphibians that have been recorded in previous surveys in the region. A search of the Department of Environment and Conservation's (DEC) Threatened and Priority Fauna database via information available in NatureMap was undertaken to identify potential threatened or priority species in the region and a search of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) *EPBC Act (1999)* online database was also undertaken to identify species of conservation interest to the Commonwealth government potentially in the project area. Large database search areas enable a regional fauna list to be compiled so that fauna recorded in a specific habitat can be compared with lists for the broader region.

Other more general texts were also used to provide supplementary information including Tyler et al. (2000) for frogs; Storr et al. (1983, 1990, 1999, 2002) for reptiles; Johnstone and Storr (1998, 2004) for birds, and van Dyck and Strahan (2008) for mammals. In addition, a number of published and unpublished reports on fauna surveys have been used to provide a regional context for the small vertebrate assemblages sampled in the survey area.

Collectively, these sources of information were used to create lists of species expected to utilise the project area and the broader region. It should be noted that these lists will include species that have been recorded in the general region but are vagrants and they will not generally be found in the project area due to a lack of suitable habitat (e.g. shore birds). Vagrants can be recorded almost anywhere. Many of the bird, mammal, reptile and amphibian species have specific habitat requirements that may be present in the general area but not in the specific survey area. As the ecology of many of these species is often not well understood it can sometimes be difficult to indicate those species whose specific habitat requirements are not present in the survey area. As a consequence, many species will be included in the lists produced from database searches but will not be present in the actual project area.

There are errors in most databases, including NatureMap and the WAM collection. These errors occur because of a mis-identification of individuals, taxonomic name changes and incorrect coordinates being entered in to the database. Terrestrial Ecosystems was unable to verify the primary records, so it has used the information provided. Readers should therefore appreciate that species lists and fauna surveys reported in the tables and appendices may include these errors.

3.5 Data analysis

The diversity for the trapped fauna assemblage can be measured in numerous ways (Hayek and Buzas 1997, Magurran 2004). The four most common attributes are species richness, evenness, a single diversity score and relative abundance. These metrics are interrelated and there are a diverse number of analytical tools available to quantify these metrics and similarity among the trapped assemblages for each site. As there was a continuum of fauna habitat types present in the impact area (compared with discretely different habitat types), combining data from all trapping sites is probably the most appropriate approach to analysing the data; however, some metrics are provided on a site basis enabling readers to compare data with information in other reports.

3.5.1 Species richness and relative abundance

The actual number of species caught at each trapping site is one measure of species richness and is directly related to the trapping effort and number of individuals caught. Had the trapping effort been extended and more individuals caught it is highly probable that the number of species caught would increase (Colwell and Coddington 1994, Magurran 2004). Species accumulation curves were used to estimate species richness for the trapping data based on 1,000 captures for the combined sample and 20,000 bird observations.

3.5.2 Evenness

Smith and Wilson (1996), supported by Magurran (2004), reported their measure of evenness (E_{var}) to be the most satisfactory overall. E_{var} was calculated for each of the survey sites using Species, Diversity and Richness software (Pisces Conservation Ltd 2010, V4.1).

3.5.3 Diversity

Log series diversity (Fisher’s alpha) was used to measure diversity because of its good discriminating ability and low sensitivity to sample size (Kempton and Taylor 1974, Magurran 1988, Hayek and Buzas 1997). Log series diversity was calculated using Species, Diversity and Richness software (Pisces Conservation Ltd 2010, V4.1). Shannon Wiener and Simpson indices are also provided for each site for comparison with other reports.

3.5.4 Similarity

Having established that there were significant differences among the trapped assemblages at each site Terrestrial Ecosystems wished to indicate the extent to which the sites were similar. The Morisita-Horn index was used to compare similarity between combinations of fauna assemblages at each site. The quantitative Morisita-Horn similarity index was selected because it is not strongly influenced by either species richness or sample size (Wolda 1981) and it was recommended by Magurran (2004); however, readers should be aware that it is heavily influenced by the abundance of the most abundant species.

3.5.5 Species accumulation curves

Species accumulation curves, or collectors’ curves, plot the cumulative number of species discovered in a defined sampling area with increasing levels of survey effort (Thompson et al. 2007). Species accumulation curves provide a measure of species inventory efficacy and completeness, and can be used to compare surveys based upon standardized sampling protocols (Moreno and Halffter 2000). Soberón and Llorente (1993) suggested that species accumulation curves lend rigour to fauna inventories.

Species accumulation curves were prepared to demonstrate the adequacy of the survey effort. For the trapping data, captures were randomly allocated across the trapping period and 10,000 iterations were used to average the curve. For the bird data, site survey results were used and 10,000 iterations were used to average the curve. Non-linear regression curves were then calculated using the Beta-P model (Thompson et al. 2003) in NLREG software (Sherrod 2001) for the combined trapping and avian data. Species accumulation curves were plotted with the ordinate axis as species richness and the abscissa the number of individuals caught.

3.6 Local environmental conditions during the survey periods

Wittenoom has the closest Bureau of Meteorology weather station that collected and published temperature and rainfall data during the survey period. Daily ambient weather conditions in Wittenoom during the survey period are shown in Table 6. Dates shaded in grey show the days when traps were open.

Table 6. Daily minimum and maximum temperature and rainfall at Wittenoom for the survey period

Date	Min. Ta (°C)	Max Ta. (°C)	Rain fall (mm)
5/11/12	19.2	34.5	0
6/11/12	21.8	35.7	0
7/11/12	24.3	37	0
8/11/12	22.1	37	0
9/11/12	22.6	36.2	0
10/11/12	20.8	39.2	0
11/11/12	25.5	40.4	0
12/11/12	24.1	39.8	0
13/11/12	22.8	40.4	0
14/11/12	26.7	42.1	0
15/11/12	31.4	43.2	0

3.7 Survey staff

Dr Scott Thompson was the team leader and coordinated the overall field assessment. Dr Scott Thompson and Ray Turnbull undertook the fauna habitat assessment on two ATVs. Dr Sean Doody, Dr Scott Thompson, Ray Turnbull, Liam Hogg, Tom Ciantar and Michael Pusey undertook the trapping program and Ray Turnbull undertook the avian survey. Dr Kyle Armstrong undertook the analysis of bat echolocation data. The remaining data analysis was undertaken by Dr G Thompson and the report prepared by Drs G. and S. Thompson. The qualifications and experience of the survey personnel is shown in Table 7.

All fauna trapping was conducted under a DEC Regulation 17 licence issued to Dr Graham Thompson (Licence Number SF008886).

Table 7. Survey personnel and qualifications

Name	Qualifications	Experience	Survey role
Dr Scott Thompson	BSc., MSc. (Env. Mngt), PhD (Env. Sc./Mngt).	> 10 years	Survey coordinator and principal zoologist
Dr Graham Thompson	Post Grad. Dip. (Zool.), PhD (Zoology)	> 20 years	Principal zoologist
Dr Sean Doody	BSc, MSc, PhD.	> 20 years	Senior field assistant
Dr Kyle Armstrong	PhD (Zoology)	> 15 years	Chiropterologist
Liam Hogg	BSc (Hons)	> 6 years	Field assistant
Ray Turnbull	B Nat Sc, GDip Ornithology	> 6 years	Senior field assistant
Tom Ciantar	BSc, BEng.	< 1 year	Field assistant
Michael Pusey		< 1 year	Field assistant

3.8 Animal ethics

Environmental consultants in WA are currently not required to obtain approval from an established animal ethics committee to undertake terrestrial vertebrate fauna surveys. Nevertheless, the fauna survey procedures and protocols utilised during this terrestrial vertebrate trapping survey were approved by the Edith Cowan University Animal Ethics Committee (see http://www.ecu.edu.au/GPPS /ethics/assets/General_Terrestrial_Fauna_Surveys_ Protocol.pdf).

To minimise fauna deaths due to heat stress, all funnel traps had shade covers and all buckets contained two pieces of polystyrene. Polystyrene sheets insulate against heat and float, providing a raft for small individuals when pit-traps filled with water (Thompson and Thompson 2009). Aluminium box traps were placed underneath vegetation. Traps were cleared every day commencing at first light with the last traps cleared within 4 hours of sunrise. Ant powder was placed around and in pit, funnel and aluminium box traps where ants were an obvious problem.

3.9 Taxonomy and nomenclature

Taxonomy and nomenclature for fauna species used in this report generally follow the Australian Faunal Directory (http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/groups) for amphibians, reptiles and mammals, except bats, Christidis and Boles (2008) for birds and Armstrong and Readon (2006) for bats. Terrestrial Ecosystems has presumed that the identifications and nomenclature referred to in the appendices or in other consultants' reports used to provide a local and regional comparison were correct at the time this report was prepared. Terrestrial Ecosystems has not verified any of these listed species with the Australian Faunal Directory.

3.10 Limitations

The survey methods used were specifically designed to encompass the proposed impact areas.

Different trap types sample the small vertebrate assemblage differently (Thompson et al. 2005, Thompson and Thompson 2007b). Unlike many of the earlier terrestrial fauna surveys undertaken to support environmental impact assessments (EIAs) and the DEC Pilbara regional biological survey, this trapping program used funnel traps in conjunction with other trapping methods which resulted in a more complete survey of the vertebrate fauna. The consequence is that this survey had the potential to catch more individuals of some species than other surveys undertaken in the region, and this needs to be considered when comparing the trapping data recorded during earlier surveys. Large reptiles and mammals are infrequently caught in the traps used; however, their size is such they are more likely to be seen than many smaller cryptic species. Larger nocturnal species are generally seen while spotlighting. Bat recordings using five ultrasonic echolocation recorders were undertaken for approximately 12 hours, so as to include sunset to sunrise at 50 sites.

Weather during the survey period was suitable for terrestrial fauna surveys, with maximum daily temperature approximately 40^{o}C and with no rain. The site had a significant amount of rain within 4 weeks of the survey period.

The EPA Guidance for Assessment of Environmental Factors: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia, No. 56 (EPA 2004) suggested that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in Table 8.

Table 8. Survey constraints and limitations

Possible limitations	Constraint	Comment
Competency and experience of the consultants carrying out the survey	No	The scientists who lead the field investigations and prepared this report have appropriate training and experience in conducting Level 2 vertebrate fauna assessments. Less experienced field staff were supervised by a competent scientist.
Scope	No	The scope of the survey was prepared in consultation with the client and was appropriate for the size of the project area and the potential for impacting on fauna and fauna assemblages.
Proportion of fauna identified, recorded and/or collected	No	Based on regional comparisons, desktop review of species found in this part of the Pilbara and species accumulation curves prepared for the trapped fauna assemblage, it is likely that most of the relatively abundant trappable/observable terrestrial fauna have been recorded.
Sources of information	No	Vertebrate fauna information was available from surveys conducted at other sites in the region, published and unpublished reports and Terrestrial Ecosystems fauna survey database. The survey effort and survey period for some of these surveys was not optimum, which significantly impacts on the capacity of these data to represent the fauna assemblages in the areas surveyed.
Proportion of the task achieved	No	The survey and assessment fulfils the objectives stated.
Timing/weather/ season/cycle	No	The survey was undertaken in early summer. Weather during the survey period was typical of the region and appropriate for this kind of survey.
Disturbances which affected results of the survey	Yes, Negligible	Much of the area had suffered from stock grazing over many years and exploration. These disturbances have been taken into account in preparing this assessment.
Intensity of survey effort	No	Typically, a two season survey is required in this bioregion and when there are insufficient fauna data available for the project area. Traps have been left *in-situ* should a second survey be required. The survey effort generally exceeds that of comparable fauna survey undertaken to support EIA in the Pilbara.
Completeness	No	The trapping survey covered the potential impact area. The fauna habitat assessment was completed for the entire project area and avian and targeted conservation significant fauna surveys covered the entire area and focussed on determining whether species were present rather than their relative abundance.
Resources	No	Adequate resources were available.
Remoteness and/or access problems	No	The rocky hilly northern sections of the project area were largely inaccessible. It was for this reason the ATVs were used for the fauna habitat assessment and to place of cameras in this area.
Availability of contextual information on the region	No	NatureMap, DEC's Threatened and Priority species database, published and unpublished reports of surveys conducted at other sites in the region and Terrestrial Ecosystems database were available.

Negligible – less than 20%; Moderate – 20-60%; significant – greater than 60%

4 RESULTS

4.1 Land systems

The proposed mine and haul road corridor are in the following land systems (Van Vreeswyk et al. 2004; see Figure 2):

Boolgeeda	stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands.
Jamindie	stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey.
McKay	hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands.
Newman	rugged jaspililite plateaux, ridges and mountains supporting hard spinifex grasslands.

The project area is mostly in the Jamindie and Newman land systems. The Jamindie land system in the project area is a relatively flat plain vegetated with varying densities of mulga woodland over bare ground, or a mosaic of low shrubs and annual grasses or spinifex. The northern area and the eastern end of the haul road corridor are mostly in the Newman land system that contains rocky scree slopes, rocky hills, breakaways and plateaux that supports occasional low trees and varying densities of spinifex. The eastern end of the proposed haul is in the McKay land system that consists of hills, ridges, plateaux remnants and breakaways vegetated with spinifex and an occasional low tree. North of the Newman land system and on the northern boundary of the project area is the Boolgeeda land system of stony lower slopes and plains vegetated with spinifex. Land systems are a mosaic of vegetation with patches of bare ground and denser vegetation along the ephemeral creek lines. On the flat plain the density of spinifex was patchy and varied appreciably. Spinifex was present on most of the stony scree slopes, but mostly absent or sparse on the rocky breakaways and stony surfaced plateaux. Plates 1a-f provide an indication of the range of fauna habitats surveyed.

The proposed mining area and the east-west haul road to the Great Northern Highway are in the Jamindie land system, except for the eastern end of the proposed haul road which is in the Newman and McKay land systems. The access loop road to the two alternative mining villages is mostly in the Newman land system and the two possible sites for a mine village are on the edge of the Boolgeeda and Newman land systems. Proposed borrow pits are mostly near the boundary of the Jamindie and Newman land systems.

The proposed mining area has been disturbed by exploration activity (Plates 1g-h), and there are tracks, stock fencing, wind mills and other infrastructure used to operate a pastoral lease present in the project area.

Plate 1a. Open Mulga woodland with an understorey of spinifex – Jamindie land system

Plate 1b. Open Mulga woodland with an understorey of spinifex – Jamindie land system

Plate 1c. Open Mulga woodland an understorey of scattered grasses and annuals – Jamindie land system

Plate 1d. Open Mulga woodland an understorey of scattered grasses and annuals – Jamindie land system

Plate 1e. Rocky scree slopes and rocky hills – Newman land system

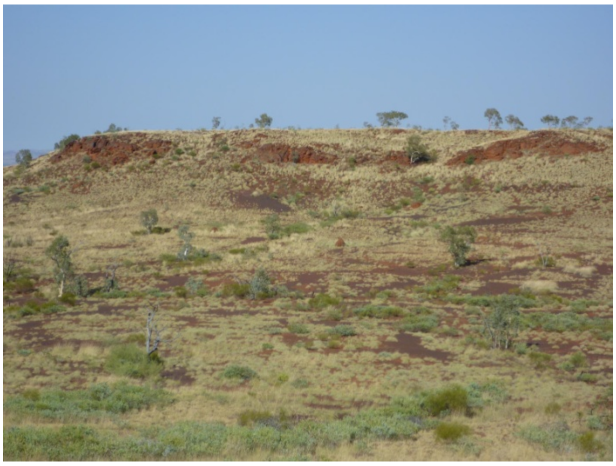


Plate 1f. Rocky scree slopes and rocky hills – Newman land system

Plate 1g. Highly disturbed areas

Plate 1h. Highly disturbed areas

TERRESTRIAL ECOSYSTEMS

Appendix D provides the results of the fauna habitat assessment and Figure 5 shows the location for each of these assessment sites. What is noticeable from Appendix D is the relative lack of variation within each of these fauna habitat types.

4.2 Amphibians

No amphibians were caught in the Mulga Downs survey. This was to be expected as the maximum daily ambient temperature each day was about 40°C, it was often windy and there was no rain. Most of the amphibians likely to be found in the project area burrow into the ground during periods when there is no surface water, with the exception of *Litoria rubella*, which find deep crevices to avoid evaporative water loss and desiccation. Amphibians potentially found in the project area are shown in Table 9. *Litoria rubella* was recorded around the exploration camp opportunistically.

Table 9. Amphibians potentially recorded in the vicinity of the Mulga Downs project area

Family	Species	Common Name
Hylidae	*Cyclorana australis*	Giant Frog
	Cyclorana maini	Sheep Frog
	Cyclorana platycephala	Water-holding Frog
	Litoria rubella	Little Red Tree Frog
Limnodynastidae	*Neobatrachus aquilonius*	Northern Burrowing Frog
	Neobatrachus sutor	Shoemaker Frog

Family	Species	Common Name
	Notaden nichollsi	Desert Spadefoot
	Platyplectrum spenceri	Centralian Burrowing Frog
Myobatrachidae	*Uperoleia glandulosa*	Glandular Toadlet
	Uperoleia rugosa	
	Uperoleia russelli	Northwest Toadlet

4.3 Reptiles

Table 10 shows the number of reptiles and reptile species caught in each trap type. Funnel traps and bucket pit-traps were the most effective traps for catching reptiles, with snakes and large skinks being mostly caught in funnel traps and geckos being caught in bucket pit-traps. *Varanus panoptes* and *V. giganteus* were seen during the survey but were not caught in traps because of their size. Skinks and geckos were by far the most abundant reptile families caught. Few elapids and varanids were caught, which is as expected for carnivorous predators. No conservation significant reptiles were caught during the trapping program. Reptiles potentially found in the project area are shown in Table 11. Additional survey sites, a longer survey period and a second survey would almost certainly increase the number of reptile species recorded in the impact area.

Table 10. Reptiles caught in various trap types in the Mulga Downs survey

Family	Species	Aluminium box trap	Bucket pit-trap	Pipe pit-trap	Funnel trap	Total
Agamidae	*Amphibolorus longirostris*				2	2
	Ctenophorus caudicinctus		5	3	1	9
	Ctenophorus isolepis		5		5	10
	Ctenophorus reticulatus		1			1
	Diporiphora amphiboluroides		3	6		9
	Pogona minor		3	3	1	7
Elapidae	*Brachyurophis approximans*		4	1	1	6
	Demansia psammophis				2	2
	Furina ornata				1	1
	Pseudechis australis				1	1
	Pseudonaja mengdeni				1	1
	Pseudonaja modesta				3	3
Gekkonidae	*Diplodactylus conspicillatus*		2			2
	Diplodactylus pulcher		12	7	2	21
	Diplodactylus savagei		2			2
	Gehyra variegata		45	12	12	69
	Heteronotia binoei		2	2	6	10
	Lucasium stenodactylus		12	6	2	20
	Lucasium wombeyi		2			2
	Nephrurus wheeleri			3	1	4
	Rhynchoedura ornata		30	11	2	43
Scincidae	*Carlia munda*		4	2	6	12

TERRESTRIAL ECOSYSTEMS

Family	Species	Aluminium box trap	Bucket pit-trap	Pipe pit-trap	Funnel trap	Total
	Cryptoblepharus buchananii			1		1
	Ctenotus helenae		1		5	6
	Ctenotus pantherinus	1	3	3	30	37
	Ctenotus saxatilis	1	5	3	47	56
	Lerista muelleri		7		5	12
	Menetia greyi		9	2	5	16
	Tiliqua multifasciata	1	3		3	7
Typhlopidae	*Ramphotyphlops ammodytes*		1			1
Varanidae	*Varanus acanthurus*			1	2	3
	Varanus brevicauda		2		1	3
	Varanus bushi		1			1
	Varanus tristis	1			1	2
	No species	**4**	**24**	**16**	**26**	**34**
	Number of individuals	**4**	**164**	**66**	**148**	**382**

Table 11. Reptiles potentially recorded in the vicinity of the Mulga Downs project area

Family	Species	Common Name
Agamidae	*Amphibolurus longirostris*	
	Ctenophorus caudicinctus	Ring-tailed Dragon
	Ctenophorus femoralis	Dune Dragon
	Ctenophorus isolepis	Crested Dragon
	Ctenophorus nuchalis	Central Netted Dragon
	Ctenophorus reticulatus	
	Diporiphora amphiboluroides	
	Diporiphora valens	
	Diporiphora winneckei	Blue-lined Dragon
	Pogona minor	Bearded Dragon
	Tympanocryptis cephalus	Pebble Dragon
Boidae	*Antaresia perthensis*	Pygmy Python
	Antaresia stimsoni	Stimson's Python
	Aspidites melanocephalus	Black-headed Python
	Aspidites ramsayi	Woma
	Liasis olivaceus barroni	Pilbara Olive Python
Carphodactylidae	*Nephrurus laevissimus*	
	Nephrurus levis	
	Nephrurus wheeleri	
	Underwoodisaurus milii	Barking Gecko
Diplodactylidae	*Crenadactylus ocellatus*	Clawless Gecko
	Diplodactylus conspicillatus	Fat-tailed Gecko
	Diplodactylus galaxias	
	Diplodactylus mitchelli	
	Diplodactylus pulcher	
	Diplodactylus savagei	
	Lucasium stenodactylus	
	Lucasium wombeyi	
	Oedura marmorata	Marbled Velvet Gecko
	Strophurus ciliaris	
	Strophurus elderi	
	Strophurus jeanae	
	Strophurus strophurus	
	Strophurus wellingtonae	
	Strophurus wilsoni	
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder
	Brachyurophis approximans	
	Demansia olivacea	Olive Whipsnake
	Demansia psammophis	Yellow-faced Whipsnake
	Demansia rufescens	Rufous Whipsnake
	Furina ornata	Moon Snake
	Parasuta monachus	
	Pseudechis australis	Mulga Snake
	Pseudonaja mengdeni	Gwardar
	Pseudonaja modesta	Ringed Brown Snake
	Simoselaps anomalus	Desert Banded Snake
	Simoselaps bertholdi	Jan's Banded Snake
	Suta fasciata	Rosen's Snake
	Suta punctata	Spotted Snake
	Vermicella snelli	
Gekkonidae	*Christinus marmoratus*	Marbled Gecko
	Gehyra pilbara	
	Gehyra punctata	
	Gehyra purpurascens	
	Gehyra variegata	

Family	Species	Common Name
	Heteronotia binoei	Bynoe's Gecko
	Heteronotia spelea	Desert Cave Gecko
	Rhynchoedura ornata	Beaked Gecko
Pygopodidae	*Delma borea*	
Scincidae	*Carlia munda*	
	Carlia triacantha	
	Cryptoblepharus buchananii	
	Cryptoblepharus ustulatus	
	Ctenotus ariadnae	
	Ctenotus brooksi	
	Ctenotus calurus	
	Ctenotus duricola	
	Ctenotus grandis	
	Ctenotus hanloni	
	Ctenotus helenae	
	Ctenotus hilli	
	Ctenotus iapetus	
	Ctenotus leonhardii	
	Ctenotus nasutus	
	Ctenotus nigrilineatus	
	Ctenotus pantherinus	Leopard Skink
	Ctenotus piankai	
	Ctenotus quattuordecimlineatus	
	Ctenotus robustus	
	Ctenotus rubicundus	
	Ctenotus rufescens	
	Ctenotus rutilans	
	Ctenotus saxatilis	Rock Skink
	Ctenotus schomburgkii	
	Ctenotus serventyi	
	Ctenotus uber	
	Cyclodomorphus branchialis	
	Cyclodomorphus melanops	Slender Blue-tongue
	Egernia formosa	
	Egernia pilbarensis	Pilbara Skink
	Eremiascincus fasciolatus	Narrow-banded Sand Swimmer
	Eremiascincus isolepis	
	Eremiascincus musivus	
	Eremiascincus richardsonii	Broad-banded Sand Swimmer
	Lerista bipes	
	Lerista clara	
	Lerista flammicauda	
	Lerista frosti	
	Lerista ips	
	Lerista jacksoni	
	Lerista labialis	
	Lerista macropisthopus	
	Lerista muelleri	
	Lerista neander	
	Lerista petersoni	
	Lerista rolfei	
	Lerista separanda	
	Lerista verhmens	
	Lerista zietzi	
	Liopholis striata	Night Skink

Family	Species	Common Name
	Lygisaurus foliorum	
	Menetia greyii	
	Menetia surda	
	Morethia ruficauda	
	Notoscincus butleri	
	Notoscincus ornatus	
	Proablepharus reginae	
	Tiliqua multifasciata	Central Blue-tongue
Typhlopidae	*Ramphotyphlops ammodytes*	
	Ramphotyphlops ganei	
	Ramphotyphlops grypus	
	Ramphotyphlops hamatus	
	Ramphotyphlops pilbarensis	
	Ramphotyphlops waitii	
	Ramphotyphlops yirrikalae	
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor
	Varanus brevicauda	Short-tailed Pygmy Monitor
	Varanus bushi	Pilbara Mulga Monitor
	Varanus eremius	Pygmy Desert Monitor
	Varanus giganteus	Perentie
	Varanus gouldii	Bungarra or Sand Monitor
	Varanus panoptes	Yellow-spotted Monitor
	Varanus pilbarensis	Pilbara Rock Monitor
	Varanus tristis	Racehorse Monitor
Cheluidae	*Chelodina steindachneri*	Flat-shelled Turtle

4.4 Mammals

Seven species of mammals were caught, including two undescribed Planigales (Table 12) which we have referred to as *Planigale* sp. as it was not possible to distinguish between undescribed species in the field. Gibson and McKenzie (2009) referred to these as *Planigale* sp. 1 and sp. 2 in the Pilbara biological survey data. Only three species of rodents were caught, however, an image of the Common Rock-rat (*Zyzomys argurus*) was recorded with a motion sensitive camera in one of the over hangs. The overall number of small mammals caught was very low. No conservation significant mammals were caught during the trapping program. All small mammals were caught in buckets or pipes used as pit-traps.

Pebble-mound Mice (*Pseudomys chapmani*) mounds were recorded at multiple locations (Table 13); most were active or recently active.

Table 12. Mammals caught in various trap types in the Mulga Downs survey

Family	Species	Aluminium box trap	Bucket pit-trap	Pipe pit-trap	Funnel trap	Total
Dasyuridae	*Ningaui timealeyi*		1	2		3
	Planigale sp.		2	10		12
	Sminthopsis macroura		1	5		6
Muridae	*Mus musculus*		11	7		18
	Pseudomys desertor		1	10		11
	Pseudomys hermannsburgensis		5	2		7
	No species		**6**	**6**		**6**
	Number of individuals		**21**	**36**		**57**

Table 13. Location of Pebble-mound Mice mounds

UTM Zone	UTM Easting	UTM Northing	Status
50	656323	7556834	Inactive
50	658701	7556987	Active
50	659189	7554300	Inactive
50	674864	7548362	Active
50	681157	7550284	Recent
50	681214	7550285	Active
50	681360	7550445	Active
50	681406	7550515	Active
50	681541	7550559	Inactive
50	679646	7549356	Active
50	679567	7549301	Active
50	662540	7553226	Active
50	662770	7552933	Inactive
50	667161	7551745	Active
50	666425	7552020	Active

Seven species of bats were recorded during this survey (*Chalinolobus gouldii, Chaerephon jobensi, Mormopterus beccarii, Saccolaimus flaviventris, Scotorepens greyii, Taphozous georgianus* and *Vespadelus finlaysoni;* Table 14). With the exception of *M. beccarii*, the remaining six species were wide-spread and recorded in all habitat types surveyed

Table 14. Bat echolocation calls recorded during the Mulga Downs survey

SM4/Date	*Cg*	*Cj*	*Mb*	*Sf*	*Sg*	*Tg*	*Vf*
Serial 7544							
6/11/12	Y	Y		Y	Y	Y	Y
7/11/12	Y	Y		Y	Y	Y	Y
8/11/12	Y	Y		Y	Y	Y	Y
9/11/12	Y	Y	Y	Y	Y	Y	Y
10/11/12	Y	Y		Y	Y		Y
Serial 7548							
6/11/12	Y	Y		Y	Y	Y	Y
7/11/12	Y			Y	Y	NC	Y
8/11/12	Y			Y	Y	Y	
9/11/12	Y	Y		Y	Y	Y	Y
10/11/12	Y			Y	Y	Y	Y
Serial 7686							
6/11/12	Y	Y	Y	Y	Y	Y	Y
Serial 10856							
6/11/12	Y	Y		Y	Y	Y	Y
7/11/12	Y	Y		Y	Y	Y	Y
8/11/12	Y	Y	Y	Y	Y	Y	Y
9/11/12	Y			Y	Y	Y	Y
10/11/12	Y	NC			Y		Y
11/11/12	Y			Y	Y		Y
12/11/12	Y	NC		Y	Y	Y	Y
13/11/12	Y	Y		Y	Y	Y	Y
Serial 10883							
6/11/12	Y	Y		Y	Y	Y	Y
7/11/12	Y	Y		Y	Y	Y	Y
8/11/12	Y	Y	NC	Y	Y	Y	Y
9/11/12	Y			Y	Y	Y	Y
10/11/12	Y	Y		Y	Y	Y	Y
11/11/12	Y	Y		Y	Y		Y
12/11/12	Y	Y		Y	Y	NC	Y
13/11/12	Y	NC		Y	Y	Y	Y
14/11/12	Y	NC		Y	Y		Y

Definition of confidence levels:

Y - Unambiguous identification of the species at the site based on measured call characteristics and comparison with available reference material. Greater confidence in this ID would come only after capture and supported by morphological measurements or submission of a voucher/tissue specimen to a museum.

NC – Need confirmation as either the call was of poor quality or the species is difficult to distinguish reliably from another species than has similar call.
*Cg - Chalinolobus gouldi*i - Gould’s wattled bat
Cj – Chaerephon jobensis – Northern free-tailed Bat
Mb – Mormopterus beccarii – Beccari’s Fee-tailed Bat
Sf – Saccolaimus flaviventris – Yellow-bellied Sheath-tail Bat
Sg - Scotorepens greyii - Little broad-nosed bat
Tg - Taphozous georgianus - Common sheath-tailed bat
Vf - Vespadelus finlaysoni - Finlayson’s cave bat

Mammals recorded in other surveys in the bioregion and potentially present in the project area are shown in Table 15.

Table 15. Mammals recorded during other surveys in the vicinity of the project area

Species	Common Name
Bos taurus	Cow
Camelus dromedarius	Dromedary
Canis lupus	Dingo / dog
Vulpes vulpes	Red Fox
Felis catus	House Cat
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat
Taphozous georgianus	Common Sheathtail Bat
Taphozous hilli	Hill's Sheathtail Bat
Rhinonicteris aurantia	Orange Leafnosed Bat
Macroderma gigas	Ghost Bat
Austronomus australis	White-striped Freetail Bat
Chaerephon jobensis	Northern Freetail Bat
Mormopterus beccarii	Beccari's Freetail Bat
Chalinolobus gouldii	Gould's Wattled Bat
Chalinolobus morio	Chocolate Wattled Bat
Nyctophilus bifax	
Nyctophilus daedalus	
Nyctophilus geoffroyi	Lesser Long-eared Bat
Scotorepens greyii	Little Broad-nosed Bat
Vespadelus finlaysoni	Inland Cave Bat
Vespadelus pumilus	Eastern Forest Bat
Dasycercus blythi	Brush-tailed Mulgara
Dasycercus cristicauda	Crest-tailed Mulgara
Dasykaluta rosamondae	Kaluta
Dasyurus hallucatus	Northern Quoll
Ningaui ridei	Wongai Ningaui
Ningaui timealeyi	Pilbara Ningaui
Planigale sp.	
Pseudantechinus macdonnellensis	Fat-tailed False Antechinus
Pseudantechinus roryi	Rory’s False Antechinus
Pseudantechinus woolleyae	Woolley's False Antechinus
Sminthopsis longicaudata	Long-tailed Dunnart
Sminthopsis macroura	Stripe-faced Dunnart
Sminthopsis ooldea	Ooldea Dunnart
Sminthopsis youngsoni	Lesser Hairy-footed Dunnart
Macropus robustus	Wallaroo or Euro
Macropus rufus	Red Kangaroo
Petrogale rothschildi	Rothschild's Rock-wallaby
Oryctolagus cuniculus	European Rabbit
Tachyglossus aculeatus	Short-beaked Echidna
Macrotis lagotis	Bilby
Equus asinus	Donkey
Equus caballus	Domestic Horse
Leggadina lakedownensis	Northern Short-tailed Mouse
Mus musculus	House Mouse
Notomys alexis	Spinifex Hopping Mouse
Pseudomys chapmani	Pebble-mound Mouse
Pseudomys delicatulus	Delicate Mouse
Pseudomys desertor	Desert Mouse
Pseudomys hermannsburgensis	Sandy Inland Mouse
Zyzomys argurus	Common Rock-rat

4.5 Birds

Sixty eight species of birds were detected after surveying 96 sites and incidental observations added another nine species to the list (Table 16). The average number of species seen at each site was 6.3. The Grey Falcon, Bush Stone-curlew and Australian Bustard are listed as conservation significant and were seen during the Mulga Downs avian survey or incidentally. Birds potentially seen in the project area are shown in Table 17. Many of the birds in Table 17 are shore or water birds and are unlikely to be seen in the project area, but they have come up in the database searches because of the project areas proximity to the Fortescue Marsh and a couple of permanent water bodies in the Hamersley Range.

Table 16. Birds recorded during the avian survey

Common Name	Species	No
Dromaius novaehollandiae	Emu	T
Coturnix ypsilophora	Brown Quail	2
Dendrocygna eytoni	Plumed Whistling-Duck	6000
Anas gracilis	Grey Teal	5
Phaps chalcoptera	Common Bronzewing	15
Ocyphaps lophotes	Crested Pigeon	114
Geopelia cuneata	Diamond Dove	401
Geopelia striata	Peaceful Dove	13
Podargus strigoides	Tawny Frogmouth	1
Eurostopodus argus	Spotted Nightjar	1
Aegotheles cristatus	Australian Owlet-nightjar	C
Elanus axillaris	Black-shouldered Kite	1
Lophoictinia isura	Square-tailed Kite	1
Haliastur sphenurus	Whistling Kite	2
Milvus migrans	Black Kite	1
Accipiter fasciatus	Brown Goshawk	3
Circus assimilis	Spotted Harrier	1
Aquila audax	Wedge-tailed Eagle	2
Falco cenchroides	Nankeen Kestrel	2
Falco berigora	Brown Falcon	6
Falco longipennis	Australian Hobby	1
Falco hypoleucos	Grey Falcon	1
Tribonyx ventralis	Black-tailed Native-hen	7
Ardeotis australis	Australian Bustard	1
Burhinus grallarius	Bush Stone-curlew	H
Turnix velox	Little Button-quail	18
Eolophus roseicapillus	Galah	319
Nymphicus hollandicus	Cockatiel	370
Barnardius zonarius	Australian Ringneck	6
Melopsittacus undulatus	Budgerigar	1703
Neopsephotus bourkii	Bourke's Parrot	10
Ninox novaeseelandiae	Southern Boobook	1
Tyto javanica	Eastern Barn Owl	1
Todiramphus pyrrhopygius	Red-backed Kingfisher	5
Todiramphus sanctus	Sacred Kingfisher	1
Ptilonorhynchus guttatus	Western Bowerbird	1
Malurus leucopterus	White-winged Fairy-wren	9
Malurus lamberti	Variegated Fairy-wren	50
Pyrrholaemus brunneus	Redthroat	1
Smicrornis brevirostris	Weebill	46
Acanthiza robustirostris	Slaty-backed Thornbill	11
Acanthiza uropygialis	Chestnut-rumped Thornbill	60

Common Name	Species	No
Pardalotus rubricatus	Red-browed Pardalote	3
Lichenostomus virescens	Singing Honeyeater	26
Lichenostomus keartlandi	Grey-headed Honeyeater	11
Lichenostomus penicillatus	White-plumed Honeyeater	93
Manorina flavigula	Yellow-throated Miner	32
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	33
Epthianura tricolor	Crimson Chat	37
Sugomel niger	Black Honeyeater	2
Lichmera indistincta	Brown Honeyeater	14
Pomatostomus temporalis	Grey-crowned Babbler	12
Pomatostomus superciliosus	White-browed Babbler	28
Coracina novaehollandiae	Black-faced Cuckoo-shrike	8
Lalage sueurii	White-winged Triller	50
Pachycephala rufiventris	Rufous Whistler	68
Colluricincla harmonica	Grey Shrike-thrush	C
Oreoica gutturalis	Crested Bellbird	10
Artamus personatus	Masked Woodswallow	46
Artamus cinereus	Black-faced Woodswallow	30

Common Name	Species	No
Artamus minor	Little Woodswallow	4
Cracticus torquatus	Grey Butcherbird	5
Cracticus nigrogularis	Pied Butcherbird	1
Cracticus tibicen	Australian Magpie	C
Rhipidura leucophrys	Willie Wagtail	40
Corvus orru	Torresian Crow	7
Grallina cyanoleuca	Magpie-lark	4
Petroica goodenovii	Red-capped Robin	13
Melanodryas cucullata	Hooded Robin	3
Cincloramphus mathewsi	Rufous Songlark	20
Eremiornis carteri	Spinifexbird	13
Petrochelidon ariel	Fairy Martin	1
Petrochelidon nigricans	Tree Martin	4
Dicaeum hirundinaceum	Mistletoebird	2
Taeniopygia guttata	Zebra Finch	150
Emblema pictum	Painted Finch	57
Anthus novaeseelandiae	Australasian Pipit	1

H – heard, T – tracks, C – camera

Table 17. Birds recorded during other avian surveys in the vicinity of the project area

Species	Common Name
Dromaius novaehollandiae	Emu
Coturnix pectoralis	Stubble Quail
Coturnix ypsilophora	Brown Quail
Dendrocygna eytoni	Plumed Whistling-Duck
Cygnus atratus	Black Swan
Chenonetta jubata	Australian Wood Duck
Malacorhynchus membranaceus	Pink-eared Duck
Anas gracilis	Grey Teal
Anas superciliosa	Pacific Black Duck
Aythya australis	Hardhead
Tachybaptus novaehollandiae	Australasian Grebe
Poliocephalus poliocephalus	Hoary-headed Grebe
Phaps chalcoptera	Common Bronzewing
Phaps histrionica	Flock Bronzewing
Ocyphaps lophotes	Crested Pigeon
Geophaps plumifera	Spinifex Pigeon
Geopelia cuneata	Diamond Dove
Geopelia striata	Peaceful Dove
Geopelia humeralis	Bar-shouldered Dove
Podargus strigoides	Tawny Frogmouth
Eurostopodus argus	Spotted Nightjar
Aegotheles cristatus	Australian Owlet-nightjar
Apus pacificus	Fork-tailed Swift
Anhinga melanogaster	Australasian Darter
Microcarbo melanoleucos	Little Pied Cormorant
Phalacrocorax carbo	Great Cormorant
Phalacrocorax sulcirostris	Little Black Cormorant
Phalacrocorax varius	Pied Cormorant
Pelecanus conspicillatus	Australian Pelican
Ephippiorhynchus asiaticus	Black-necked Stork
Ixobrychus flavicollis	Black Bittern
Ardea alba	Great Egret
Ardea pacifica	White-necked Heron
Butorides striatus	Striated Heron
Egretta novaehollandiae	White-faced Heron
Egretta garzetta	Little Egret
Nycticorax caledonicus	Nankeen Night Heron
Threskiornis molucca	Australian White Ibis
Threskiornis spinicollis	Straw-necked Ibis
Platalea flavipes	Yellow-billed Spoonbill
Elanus axillaris	Black-shouldered Kite

Species	Common Name
Lophoictinia isura	Square-tailed Kite
Hamirostra melanosternon	Black-breasted Buzzard
Haliaeetus leucogaster	White-bellied Sea-Eagle
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
Hieraaetus morphnoides	Little Eagle
Falco cenchroides	Nankeen Kestrel
Falco berigora	Brown Falcon
Falco berigora berigora	Brown Falcon
Falco longipennis	Australian Hobby
Falco hypoleucos	Grey Falcon
Falco subniger	Black Falcon
Falco peregrinus	Peregrine Falcon
Porphyrio porphyrio	Purple Swamphen
Porzana tabuensis	Spotless Crake
Tribonyx ventralis	Black-tailed Native-hen
Fulica atra	Eurasian Coot
Ardeotis australis	Australian Bustard
Burhinus grallarius	Bush Stone-curlew
Esacus magnirostris	Beach Stone-curlew
Himantopus himantopus	Black-winged Stilt
Charadrius ruficapillus	Red-capped Plover
Charadrius veredus	Oriental Plover
Elseyornis melanops	Black-fronted Dotterel
Erythrogonys cinctus	Red-kneed Dotterel
Numenius phaeopus	Whimbrel
Numenius madagascariensis	Eastern Curlew
Actitis hypoleucos	Common Sandpiper
Tringa brevipes	Grey-tailed Tattler
Tringa nebularia	Common Greenshank
Tringa stagnatilis	Marsh Sandpiper
Tringa glareola	Wood Sandpiper
Turnix pyrrhothorax	Red-chested Button-quail
Turnix velox	Little Button-quail
Stiltia isabella	Australian Pratincole

Species	Common Name
Sternula albifrons	Little Tern
Gelochelidon nilotica	Gull-billed Tern
Hydroprogne caspia	Caspian Tern
Chlidonias hybridus	Whiskered Tern
Chlidonias leucopterus	White-winged Black Tern
Thalasseus bergii	Crested Tern
Chroicocephalus novaehollandiae	Silver Gull
Eolophus roseicapillus	Galah
Cacatua sanguinea	Little Corella
Nymphicus hollandicus	Cockatiel
Tyto javanica	Eastern Barn Owl
Tyto alba	Barn Owl
Barnardius zonarius	Australian Ringneck
Psephotus varius	Mulga Parrot
Melopsittacus undulatus	Budgerigar
Neopsephotus bourkii	Bourke's Parrot
Neophema elegans	Elegant Parrot
Pezoporus occidentalis	Night Parrot
Centropus phasianinus	Pheasant Coucal
Chalcites basalis	Horsfield's Bronze-Cuckoo
Chalcites osculans	Black-eared Cuckoo
Cacomantis pallidus	Pallid Cuckoo
Ninox connivens	Barking Owl
Ninox novaeseelandiae	Southern Boobook
Dacelo leachii	Blue-winged Kookaburra
Todiramphus pyrrhopygius	Red-backed Kingfisher
Todiramphus sanctus	Sacred Kingfisher
Todiramphus chloris	Collared Kingfisher
Merops ornatus	Rainbow Bee-eater
Climacteris melanura	Black-tailed Treecreeper
Ptilonorhynchus maculatus	Spotted Bowerbird
Ptilonorhynchus guttatus	Western Bowerbird
Malurus splendens	Splendid Fairy-wren
Malurus leucopterus	White-winged Fairy-wren
Malurus lamberti	Variegated Fairy-wren
Stipiturus ruficeps	Rufous-crowned Emu-wren
Amytornis striatus	Striated Grasswren
Pyrrholaemus brunneus	Redthroat
Smicrornis brevirostris	Weebill
Gerygone fusca	Western Gerygone
Gerygone tenebrosa	Dusky Gerygone
Acanthiza robustirostris	Slaty-backed Thornbill
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza apicalis	Inland Thornbill
Aphelocephala leucopsis	Southern Whiteface
Acanthiza uropygialis	Chestnut-rumped Thornbill
Pardalotus rubricatus	Red-browed Pardalote
Pardalotus striatus	Striated Pardalote
Certhionyx variegatus	Pied Honeyeater
Lichenostomus virescens	Singing Honeyeater
Lichenostomus flavicollis	Yellow-throated Honeyeater
Lichenostomus keartlandi	Grey-headed Honeyeater
Lichenostomus ornatus	Yellow-plumed Honeyeater
Lichenostomus penicillatus	White-plumed Honeyeater
Purnella albifrons	White-fronted Honeyeater
Manorina flavigula	Yellow-throated Miner
Acanthagenys rufogularis	Spiny-cheeked Honeyeater
Conopophila whitei	Grey Honeyeater
Epthianura tricolor	Crimson Chat
Epthianura aurifrons	Orange Chat

Species	Common Name
Sugomel niger	Black Honeyeater
Lichmera indistincta	Brown Honeyeater
Melithreptus gularis	Black-chinned Honeyeater
Pomatostomus temporalis	Grey-crowned Babbler
Pomatostomus superciliosus	White-browed Babbler
Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush
Psophodes occidentalis	Chiming Wedgebill
Daphoenositta chrysoptera	Varied Sittella
Coracina maxima	Ground Cuckoo-Shrike
Coracina novaehollandiae	Black-faced Cuckoo-Shrike
Coracina tenuirostris	Cicadabird
Lalage sueurii	White-winged Triller
Pachycephala melanura	Mangrove Golden Whistler
Pachycephala rufiventris	Rufous Whistler
Colluricincla harmonica	Grey Shrike-thrush
Oreoica gutturalis	Crested Bellbird
Artamus leucorynchus	White-breasted Woodswallow
Artamus personatus	Masked Woodswallow
Artamus superciliosus	White-browed Woodswallow
Artamus cinereus	Black-faced Woodswallow
Artamus minor	Little Woodswallow
Cracticus torquatus	Grey Butcherbird
Cracticus mentalis	Black-backed Butcherbird
Cracticus nigrogularis	Pied Butcherbird
Cracticus tibicen	Australian Magpie
Rhipidura fuliginosa	New Zealand Fantail
Rhipidura albiscapa	Grey Fantail
Rhipidura phasiana	Mangrove Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Corvus coronoides	Australian Raven
Corvus bennetti	Little Crow
Corvus orru	Torresian Crow
Grallina cyanoleuca	Magpie-Lark
Petroica goodenovii	Red-capped Robin
Melanodryas cucullata	Hooded Robin
Peneonanthe pulverulenta	Mangrove Robin
Mirafra javanica	Horsfield's Bushlark
Cisticola exilis	Golden-headed Cisticola
Acrocephalus australis	Australian Reed-Warbler
Acrocephalus stentoreus	Clamorous Reed-Warbler
Cincloramphus mathewsi	Rufous Songlark
Cincloramphus cruralis	Brown Songlark
Eremiornis carteri	Spinifexbird
Zosterops lutea	Yellow White-eye
Cheramoeca leucosterna	White-backed Swallow
Hirundo neoxena	Welcome Swallow
Petrochelidon nigricans	Tree Martin
Petrochelidon ariel	Fairy Martin
Dicaeum hirundinaceum	Mistletoebird
Taeniopygia guttata	Zebra Finch
Neochmia ruficauda	Star Finch
Emblema pictum	Painted Finch
Anthus novaeseelandiae	Australasian Pipit
Oystercatcher haematopus	South Island Pied Oystercatcher

4.6 Opportunistic observations and spotlighting

Additional vertebrate fauna seen opportunistically, recorded on motion sensitive cameras and during spotlighting surveys included the *Varanus panoptes* (Yellow Spotted Goanna), *Gehyra punctata*, *Oedura marmorata*, *Egernia pilbara*, *Varanus giganteus* (Perentie), *Zyzomys argurus* (Rock Rat), *Pygopus nigriceps* and *Petrogale rothschildi* (Rothschild's Rock-wallaby). Perenties were in relatively high abundance in the hilly terrain. This species is mostly recorded in low abundance in the Pilbara.

4.7 Fauna assemblage structure

4.7.1 Trap type

Four trap types were deployed in this survey. Different trap types sample the small vertebrate assemblages differently (Thompson et al. 2005, Thompson and Thompson 2007b). In the Mulga Downs project area most species were caught in funnel traps and highest abundance of reptiles were caught in bucket pit-traps followed by funnel traps and pipe pit-traps (Table 10). Most mammals were caught in pipe pit-traps followed by bucket pit-traps (Table 12). As is often the case, the aluminium box traps and funnel traps failed to catch any small mammals, and the aluminium box traps only caught four individual reptiles, with *T. multifasciata* and *V. tristis* being attracted to the bait and the two skinks being attracted to the ants that are attracted to the bait. These trapping results differ with the conclusions of Thompson and Thompson (2007b) who reported funnel traps being important for capturing reptiles, but is similar to Thompson *et al*. (2005) who reported buckets and pipes as having a trapping bias and captured a different component of the fauna assemblage. If different trap types were not used, then the results may misrepresent the faunal assemblage that actually occurs on site.

4.8 Species accumulation curves

Species accumulation curves plot the cumulative number of species recorded in a defined sampling area with increasing levels of survey effort (Thompson et al. 2003, Thompson and Thompson 2007c). They can provide a measure of species inventory efficacy and completeness, can be used to compare surveys based upon standardized sampling protocols (Moreno and Halffter 2000) and can provide information about the assemblage structure (Thompson and Withers 2003).

4.8.1 Trappable vertebrate fauna

When the data from all sites were combined, 40 species of reptiles and small mammals were trapped in the project area. Species accumulation curve modelling predicted that 46 species would be caught if 1,000 individuals were recorded (Chart 2). Tables 11 and 15 indicate a range of other small vertebrates that could be caught in the project area. A second survey would probably add more species to the list.

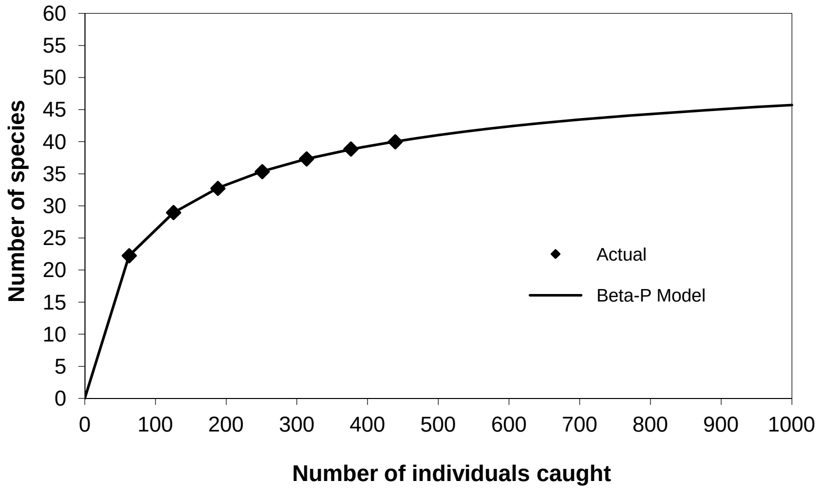


Chart 2. Species accumulation curves for the combined data from the trapping program

Sixty eight species were recorded in the systematic survey and another nine were either heard calling, were incidental observations, tracks were seen or images were captured by the motion sensitive cameras. Had 20,000 individuals been seen, then the species count would have increased to approximately 80 (Chart 3). So although 96 survey sites were sampled for a period of approximately 20 minutes, which generally far exceeds the survey effort for most Level 2 avian surveys, the survey probably only recorded three-quarters of the species likely to be observed in the project area under normal dry conditions. There are a large number of birds that are nomadic in the Pilbara, and these species move to an area when resources are plentiful and move on to another when resources are depleted. Table 17 indicates the possible range of species that could have been observed in the project area.

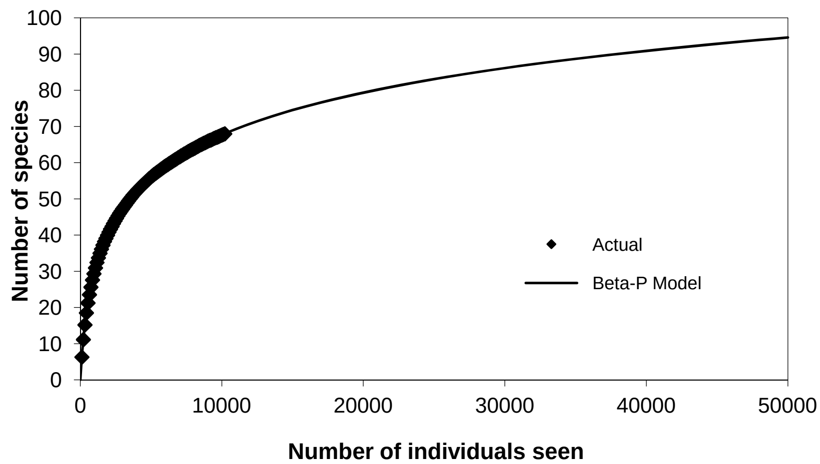


Chart 3. Species accumulation curves for the avian survey data

4.9 Diversity and evenness

Diversity scores indicated that vertebrate diversity varied appreciably among survey sites (Table 18). Sites 1, 3, 5 and 6 had the highest species richness (18) with sites 9, 10, 11, 13, 14 and 15 all recording eight of fewer species. Site 9 had the highest diversity score and Site 10 the lowest species richness and lowest diversity score. Sites with the highest quantity of bark and leaf litter and a greater density of spinifex understory generally had a higher diversity, as would be expected because of an increase number of micro-habitat niches available. No particular site had an unusually high species richness compared with other surveys undertaken in similar habitat in the Pilbara (How and Cooper 2002, How and Dell 2004, Terrestrial Ecosystems 2011b).

An evenness score of 1.0 is achieved when abundances of all species are equal. Evenness scores for the 15 sites were mostly above 0.8 which is highly unusual and reflects the relatively high number of species caught and the low number of individuals caught.

Table 18. Diversity and evenness indices and species richness for vertebrate fauna captures for trapping sites

Trapping site	Fisher's Alpha	Shannon-Wiener Index (H)	Simpson Index (D)	Evenness	# Species richness
Site 1	13.38	2.64	14.96	0.83	18
Site 2	5.36	2.17	8.18	0.79	12
Site 3	11.12	2.31	7.12	0.64	18
Site 4	10.71	2.59	16.24	0.88	16
Site 5	12.59	2.67	16.60	0.86	18
Site 6	10.09	2.60	12.76	0.81	18
Site 7	9.23	2.48	10.14	0.76	17
Site 8	6.65	2.36	10.07	0.81	14
Site 9	14.49	1.89	18.00	0.94	7
Site 10	2.50	1.51	5.46	0.90	5
Site 11	6.18	1.78	7.80	0.84	7
Site 12	12.67	2.32	14.62	0.87	12
Site 13	13.19	1.97	13.75	0.89	8
Site 14	9.28	1.33	10.00	0.92	4
Site 15	8.86	1.99	13.00	0.92	8
Overall	10.71	3.04	14.40	0.72	40

4.10 Similarity

A similarity score of 1.0 (range 0.0 – 1.0) indicates that the two sites being compared have identical fauna assemblages, where as a low score indicates that the fauna assemblages differ appreciably. The trapped fauna assemblages at each of the 15 survey sites were generally dissimilar with the majority of scores below 0.70 (Table 19). This is to be expected, as survey sites were in a flat Mulga woodland with a patchy understorey of scattered shrubs, spinifex or annual grasses or bare ground. Some sites contained large patches of bare ground and therefore would have caught fewer individuals; while others had up to 75% of the ground covered with litter or spinifex and would have caught a higher number of individuals.

Table 19. Similarity in the trapped fauna assemblage among each of the survey sites

Sites	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.80	0.65	0.59	0.70	0.55	0.68	**0.72**	0.42	0.37	0.55	0.60	0.44	0.28	0.44
2		0.48	0.60	0.57	0.54	0.75	**0.87**	0.29	0.31	0.51	0.68	0.33	0.25	0.28
3			0.62	**0.73**	**0.71**	0.38	0.45	0.45	0.48	0.61	0.37	0.54	0.38	0.60
4				**0.81**	**0.84**	0.58	0.60	0.41	0.45	0.50	0.52	0.48	0.27	0.57
5					**0.77**	0.57	0.53	0.50	0.36	0.58	0.58	0.49	0.36	0.61
6						0.53	0.57	0.38	0.36	0.60	0.54	0.37	0.26	0.48
7							**0.80**	0.16	0.12	0.26	0.65	0.15	0.21	0.18
8								0.17	0.13	0.30	**0.72**	0.14	0.23	0.19
9									0.60	0.67	0.24	**0.70**	0.50	0.67
10										0.45	0.09	0.67	0.39	0.58
11											0.25	0.60	0.26	0.55
12												0.20	0.30	0.29
13													0.33	**0.78**
14														0.36

4.11 Targeted search for Northern Quoll, Bilbies and Mulgara

The soils and vegetation in the project area are not typical of that in which Bilbies and Mulgara are found in the Pilbara. No Bilby burrows, diggings or scats and no Mulgara burrows were found during the fauna habitat assessment. The fauna habitat assessment included all the flat plains and areas that may be suitable for Bilbies and Mulgara. Terrestrial Ecosystems concluded that no Bilbies or Mulgara are present in the project area.

Pilbara Leaf-nosed Bats require a roost site that has high humidity as their evaporative water loss is high, and unlike other small bats, they do not enter torpor or cluster together to conserve heat or to minimise water loss. Ghost Bats in the Hamersley Range typically roost in caves beneath bluffs of low rounded hills composed of Marra Mamba geology and granite rock piles, but they have been recorded in a variety of caves and adits. Pilbara Leaf-nosed Bats and Ghost Bats were not recorded in the project area during the echolocation survey. Habitat that is considered suitable for Pilbara Leaf-nosed Bats (i.e. caves that have water in the bottom and a small entrance to maintain the relatively high humidity) were not recorded in the project area, although not all possible caves were investigated. Ghost Bats were not recorded in the project area during the echolocation survey but potential roost sites for this species were present in the project area.

An image of a single Northern Quoll was recorded using the motion sensitive cameras (WGS84; UTM 50 670920 7553127; Plate 7a; Figure 6) and four Northern Quoll scats were found in the project area (i.e. WGS84;UTM 50 667222 7553637, 50 670038 7554807, 50 665114 7554208, 50 682810 7550523; Plate 7b; Figure 6).

Plate 3a. Northern Quoll image

Plate 4b. Northern Quoll scat

Habitat suitable for Northern Quolls has been mapped (Figure 6), and includes all of the rocky areas on the northern edge of the project area, and the rocky outcrops on the eastern end of the haul road corridor to the Great Northern Highway.

No Pilbara Olive Pythons, their scats or skins were recorded during the survey; however, the habitat that is suitable for Northern Quolls is generally also be suitable for Pilbara Olive Pythons. There is likely to be a small number of these pythons present in the northern section of the project area.

4.12 Conservation significant fauna recorded or predicted to be found in the Mulga Downs project area

Searches of the *EPBC Act* online database (Appendix C) and NatureMap database indicated that 13 species (including seven migratory birds) listed under the *EPBC Act (1999)* and 14 species listed under the WA *Wildlife Conservation Act (1950)* have the potential to occur within the vicinity of the project area (Table 20). In addition, another 11 species are listed as Priority species with DEC. A brief description of the ecology of each of these species and their potential to be impacted in the project area follows the table below. Of those species listed, some will move into adjacent areas if disturbed, so the impacts on these species are unlikely to be significant.

Table 20. Conservation significant fauna and priority-listed vertebrate species potentially found in the vicinity of the project area

Species	Common Name	EPBC Act 1999	Schedule Species	Priority Species
Pezoporus occidentalis	Night Parrot	CR	Sc1	
Dasyurus hallucatus	Northern Quoll	EN	Sc1	
Rhinonicteris aurantia	Pilbara Leaf-nosed Bat	VU	Sc1	
Macrotis lagotis	Bilby	VU	Sc1	
Dasycercus cristicauda/blythi[1]	Mulgara	VU	Sc1	
Liasis olivaceus barroni	Pilbara Olive Python	VU	Sc1	
Falco hypoleucos	Grey Falcon		Sc1	
Apus pacificus	Fork-tailed Swift	M	Sc3	
Ardea alba	Great Egret	M	Sc3	
Ardea ibis	Cattle Egret	M	Sc3	
Charadrius veredus	Oriental Plover	M	Sc3	
Glareola maldivarum	Oriental Pratincole	M	Sc3	
Merops ornatus	Rainbow Bee-eater	M	Sc3	
Haliaeetus leucogaster	White-bellied Sea-eagle	M	Sc3	
Ramphotyphlops ganei				P1
Ctenotus nigrilineatus				P1
Burhinus grallarius	Bush Stone-curlew			P4
Ardeotis australis	Australian Bustard			P4
Neochmia ruficauda subclarescens	Star Finch (western)			P4
Falco peregrinus	Peregrine Falcon			P4
Macroderma gigas	Ghost Bat			P4
Sminthopsis longicaudata	Long-tailed Dunnart			P4
Leggadina lakedownensis	Northern Short-tailed Mouse			P4
Pseudomys chapmani	Western Pebble-mound Mouse			P4
Leiopotherapon aheneus	Fortescue Grunter			P4

CR = Critically endangered, EN = Endangered, V = Vulnerable, M = Migratory, Sc1 = Schedule 1, Sc3 = Schedule 3, P = Priority species

[1] *Dasycercus cristicauda* was placed on the *EPBC Act* threatened species list on 17 July 2000. Woolley (2005) has subsequently redefined that species into two species of 'Mulgara'; *D. blythi* and *D. cristicauda*, and has described the species under the *EPBC Act* (*D. cristicauda*) as *D. blythi*. Both species in the Pilbara are being considered *D. cristicauda* until the taxonomic issue has been resolved through the Australian Government Threatened Species Scientific Committee.

Night Parrot (*Pezoporus occidentalis*) - Critically Endangered under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950*

The Night Parrot appears to be a secretive, and probably nocturnal, ground dwelling species. Its geographical distribution is poorly understood, but it was probably distributed over much of the semi-arid and arid Australia (Garnett et al. 2011). Sightings in north-west Queensland in the early 1990s were in a broad cross section of the habitats available (Garnett et al. 1993). Recent sightings in the Pilbara in 1980 and 2005, central WA in 1979, north-eastern South Australia in 1979 and western Queensland in 1980, 1990, 1993 and 2006 (Garnett et al. 2011). Garnett et al. (2011) suggested that there were between 50-250 mature individuals in less than 5% of its previous range. The most recently published sighting of the Night Parrot was on the northern side of the Fortescue Marsh approximately 12km to the west of the Cloud Break mine site (Davis and Metcalf 2008). There have been numerous investigations to determine the existence and location of this little-known species (Davies et al. 1988, Garnett et al. 1993, Blyth et al. 1996, Blyth and Boles 1997).

Although the Night Parrot's patterns of movement are unknown, it is presumed to be nomadic. The SEWPaC SPRAT site (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59350) indicated that its preferred habitat is *Triodia* grasslands in stony or sandy environments or samphire and chenopod shrub lands. Wilson's (1937) summary of observations provided information on the Night Parrots preferred habitat and breeding sites. It seems to prefer spinifex, but has been recorded in samphire, comes to water after dark and builds its nest deep in spinifex tussocks. The nest has a runway and a tunnel entrance and clutches are two to four white eggs. Several reasons have been suggested for its decline, including habitat loss and degradation through clearing, grazing, altered fire regimes, reduced availability or quality of watering points and predation from feral species, in particular the cat (Garnett et al. 2011). There is no evidence to suggest that habitat destruction has been a major contributor to the decline of this species. Given that adult birds are likely to move away from the disturbance into adjacent areas, the most significant potential impact on this species is that nests containing eggs or chicks could be destroyed during the vegetation clearing process. There are no records of Night Parrots in the project area and no areas of dense spinifex or samphire near water holes, however, the potential impact on this species in the project area is unknown, but because of its scarcity in the Pilbara it is presumed to be very low.

Northern Quoll (*Dasyurus hallucatus*) - Endangered under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950*

The Northern Quoll is found in east and north Queensland, northern parts of the Northern Territory, the Kimberley and the Pilbara. Islands off the Western Australian coast that support Northern Quolls include Adolphus, Augustus, Bigge, Boongaree, Dolphin, Hidden, Koolan and Wollaston. In the Northern Territory, and to a lesser extent in north-eastern Australia, Northern Quoll populations have declined significantly due to their predation on Cane Toads. Oakwood (2008) suggested that they were most abundant in broken country, rocky areas and open eucalypt forest within 150km of the coast.

Rocky areas appear to support denser populations, and declines in Queensland have mainly occurred on the lowlands (Hill and Ward 2010). Rocky areas often offer greater habitat diversity and support higher floristic diversity and productivity, and may also be better protected from fire.

Oakwood (2008) reported males weigh between 400-900g and females between 300-500g, however recent captures in the Pilbara indicate that males can be up to 1.8kg and females up to 1.16kg (Rapallo 2010). The Northern Quoll diet consists mostly of invertebrates, but they also eat small reptiles and soft fruits. It is thought that most males in savannah areas die after breeding (Braithwaite and Griffiths 1994, Oakwood 2000), but in captivity, if breeding activity is restricted, males will live to breed in subsequent years. Many females also die after raising their first litter, but about a quarter survive to produce a litter in the second year. In rocky areas, Braithwaite and Griffiths (1994) reported the Northern Quoll living for 2-3 years, whereas in savannah areas they rarely live beyond the first mating. Mating occurs in winter, with young being carried by the female for 8-10 weeks after birth, after which the young stay with their mother until they are able to fend for themselves.

They are reported to den in hollow tree trunks, but will use other spaces such as rock crevices and openings in old termite mounds. In the Pilbara, the geographic distribution of Northern Quolls is considered fragmented and with its numbers in decline.

King (1989) reported activity areas for Northern Quoll ranged from 5-1109ha, and the longest movement was 3.5km over seven days in the Pilbara. Home range for females in the savannah areas of Kakadu National Park was about 35ha, with some overlap in foraging areas when population densities were 3-4 females/km^2, but at 1-2 females/km^2 there was no overlap (Oakwood 2002). Male home ranges were similar to those of females during the non-breeding season, but increased to in excess of 100ha when they were searching for females. Scats are often placed in prominent positions to mark territories. Braithwaite and Griffiths (1994) reported that a reduction in geographic distribution might be associated with cattle grazing and exotic disease. The Cane Toad may also contribute to a reduction in its geographic distribution.

Northern Quolls have been located in a variety of habitats in the Pilbara (How et al. 1991, Biota Environmental Sciences 2002, 2005, ATA Environmental 2007, Bamford Consulting Ecologists 2009b, a, Outback Ecology Services 2009, Ecologia Environment 2011a, Outback Ecology Services 2011, Terrestrial Ecosystems 2011a), but predominantly around gorges, rocky escarpments, ephemeral rivers and creek lines bordered by mature trees. It is therefore possible that Northern Quolls will be present in the project area in the rocky outcrops and ridge lines.

An image of a Northern Quoll image was captured on a motion sensitive camera and Northern Quoll scats were recorded at four locations. It is likely that there is a low density of Northern Quolls present in the hilly breakaway areas in the northern section of the project area (Figure 6).

Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia***)** - Vulnerable under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950*

Rhinonicteris aurantia comprises three populations in Australia (Armstrong 2002); a) the largest ranges through the northern most part of the Kimberley into the Northern Territory, b) the Pilbara, and c) a small population on the Queensland-Northern Territory border (Armstrong 2002). The Pilbara Leaf-nosed Bat is an orange, short furred, moderate-sized bat with relatively small ears and a fleshy nose leaf structure surrounding the nostrils. It weighs from 8–10g (Armstrong 2002, Van Dyck and Strahan 2008). Sexes are externally very similar (Armstrong 2002).

Armstrong (2001) reported populations of *R. aurantia* around Marble Bar, Nullagine, Hillside station, Soansville, Tom Price, Paraburdoo, Red Hill, Millstream, Fortescue and the Barlee Range. He went on to suggest that its geographic distribution was divided into three distinct areas: mines of the eastern Pilbara–George Ranges, Hamersley Ranges in small colonies, and in the Gascoyne Ranges (Armstrong 2001). However, more recently, McKenzie and Bullen (2009) reported that *R. aurantia* was more common than previously thought despite detectability constraints caused by their cryptic calls. The Commonwealth government's (2010) Survey Guidelines for Australian Threatened Bats reported known roost sites at Bamboo Creek mine, Klondyke Queen mine, Comet mine, Lalla Rookh mine, Copper Hills mine and caves in Barlee Range Nature Reserve. In addition, small colonies are thought to exist near where bats have been detected in flight during the Pilbara biological survey undertaken by DEC from acoustic recordings, near Yarrie, Pannawonica, Paraburdoo and Mt Vernon.

Pilbara Leaf-nosed Bats are often associated with water courses in and near gorges (Armstrong 2001). When roosts are found in mines, the structure and complexity determines the probability of their presence, with individuals mostly found in the deepest and most complex mines. Typically, they are found in mines that go below the water table and contain workings to the side of the main adit. It is likely that *R. aurantia* shift from some mines in summer as the micro-climate becomes unsuitable. The Pilbara Leaf-nosed Bat form aggregations in spring to breed before dispersing in September (Armstrong 2001). Pregnant females are present in the population in November and December and post-lactational females are present in March.

Baudinette et al. (2000) indicated that evaporative water loss for *R. aurantia* is very high with water being mostly lost across the skin. Armstrong (2001) reported microhabitat conditions in two caves occupied by *R. aurantia* in the Barlee Ranges as having ambient temperatures of 22-28°C in winter and 25-34°C in spring and humidity varied appreciably from 26-94% in winter and 11-74% in summer. This small bat is unable to enter torpor or maintain its body temperature for prolonged periods when exposed to low temperatures (Kulzer et al. 1970) and individuals do not cluster together to conserve heat (Jolly 1988). Roost site quality is therefore dependent on the frequency and volume of rain and the ability of caves and mine shafts to retain heat. Dispersal in summer or as conditions become unsuitable is probably dependent on the availability of alternative roosts.

Destruction of roosts through ground disturbing activities and changing the water table and thereby changing the humidity in roost caves may have a significant impact on this species. Armstrong (2001) indicated that exploration drilling and mining may also affect colony sizes, with individuals moving to less disturbed sites. Other potential impacts are collisions with vehicles and flooding of roosts. Natural predators include the Pilbara Olive Python and the Ghost Bat.

No Pilbara Leaf-nosed Bats were recorded in the survey and there are no records of them in Terrestrial Ecosystems fauna survey database being recorded in the vicinity of the project area. The closest records are approximately 60km south-east in the Hamersley Range.

Bilby (*Macrotis lagotis*) - Vulnerable under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950*

This nocturnal, medium sized, omnivorous, burrow dwelling marsupial was once wide-spread in Australian arid and semi-arid areas. Its geographical distribution has now contracted to a few small populations in southern Northern Territory, south-eastern Queensland, Sandy Deserts of Western Australia and the Pilbara. Bilby distribution is now largely restricted to the inland sandy deserts in two broad habitat types; mulga woodlands with lateritic red earth and spinifex grasslands with high fire frequency, again with the red earth (Johnson 1989, Southgate 1990). Its distribution appears limited by access to suitable burrowing habitat and areas of high plant and food production. Southgate et al. (2007) reported that the distribution of Bilbies in the Tanami Desert was related to substrate type, which is probably also true for the Pilbara.

It is possible that they are much more wide-spread in the Pilbara but much less abundant than the government conservation agencies believe (see Pavey 2006 for current geographic range) because of a lack of survey effort in the region.

Males can grow to 2.5kg, but females are smaller with a maximum weight of around 1.1kg (Johnson 2008). They have a diet of insects, seeds, bulbs, fruit and fungi and often leave a characteristic excavation of up to 10cm deep with the soil scattered in all directions or a ‘pot-hole’ in the ground (Thompson and Thompson 2008b).

In captivity, adults reach sexual maturity at about six months but continue to grow in size until about 18 months of age. Litters comprise one to three young and females continue to breed beyond the age of four years (Southgate et al. 2000). Females are polyoestrous, have an oestrus of 12–37 days and a gestation period of 14 days (McCracken 1990, Southgate and Possingham 1995). Litters range from one to three and young exit the pouch at 70–75 days. Young then remain in the burrow and are weaned a couple of weeks later. Females can breed from about six months of age.

Bilbies typically can use two to three burrows each night (Lavery and Kirkpatrick 1997) and are solitary or live in small groups of two to four individuals. Bilbies dig a burrow system that may be up to 3m long and 2m deep. Burrows can have a single or multiple entrances and can be located at the base of vegetation, termite mounds or rocks (Thompson and Thompson 2008b). They shelter in a burrow during the day and emerge well after dark to forage.

In the Channel Country of Queensland, Lavery and Kirkpatrick (1997) reported that fewer than half of the burrows located were in frequent use, and daily burrow use in a typical burrow aggregation ranged from one-third to two-thirds over a 45-day observation period. A new burrow was dug in each aggregation within 10 months.

Southgate et al. (2007) reported Bilbies as having low site fidelity and being highly mobile in the sandy deserts. Mature females moved up to 1.5km in a night and males used burrows 2.6km apart around the Granites (Southgate et al. 2007). Southgate and Possingham (1995) reported Bilbies in the Watarrka National Park moving 15km in a few weeks, with males regularly moving 2-3km and up to 5km between burrows on consecutive days. In contrast, Thompson and Thompson (2008b) reported Bilbies intensively foraging in an area of about 10ha around multiple burrows in the Pilbara. They will shift burrows and foraging areas when food resources are depleted. Bilbies reintroduced to a protective environment have a home range of about $0.18km^2$ for females and $3.16km^2$ for males (Moseby and O'Donnell 2003).

In the Pilbara, most burrows and diggings are located on red sandy soils in a spinifex meadow with occasional trees; however, they have also recently been recorded in open burnt habitat (Thompson and Thompson 2008b). They are susceptible, particularly juveniles, to predation in disturbed environments, and vulnerable to vehicle collisions at night. Because they live in small groups and their population is highly fragmented and dispersed in the Pilbara, the loss of a few individuals is of conservation significance.

How *et al*. (1991) recorded this species at numerous locations on the Abydos Plain, and Biota (2005) reported one being seen on Mulga Downs Station. ATA Environmental (2007) reported burrows and diggings at numerous locations along the FMG rail corridor from Port Hedland to Cloud Break. In 2007, active Bilby burrows were recorded either side of the FMG rail corridor access road to the north of the Marble Bar Road, but these burrows where inactive when they were inspected in 2008 (Thompson and Thompson 2008b).

Bilby numbers appear to be in significant decline, with only a few small scattered populations existing in the Pilbara. Fox predation is considered a primary reason for their long-term reduction (Abbott 2001). Changed fire regimes may also contribute to their decline, with a mosaic of successional changes being required to sustain a Bilby population (Southgate et al. 2007). Bilbies are likely to be killed in their burrows, where they are in areas to be cleared, unless active management strategies are implemented to remove them from the area.

No Bilby burrows, diggings or scats were recorded in the project area, and the habitat was generally unsuitable for this species.

Crest-tailed Mulgara (*Dasycercus cristicauda*) - Vulnerable under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950.*

Brush-tailed Mulgara (*Dasycercus blythi*) - Priority 4 with the DEC.

Woolley (2005) has recognised two species of 'Mulgara'; *Dasycercus blythi* and *D. cristicauda*. *Dasycercus blythi* has a non-crested tail, two upper premolars and six nipples; *D. cristicauda* has a crested tail, three upper premolars and eight nipples. Both species have a wide and overlapping distribution in arid Australia (Department of Sustainability Environment Water Population and Communities 2012). In 2010, the Commonwealth Government indicated that for the purposes of the *EPBC Act* all Mulgara in the Pilbara would be considered to be *D. cristicauda* until the taxonomic issue has been resolved by the Australian Government Threatened Species Scientific Committee. In May 2012, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC 2012) released a discussion paper on the possibility of delisting *Dasycercus hillier* and listing *D. blythi* under the *EPBC Act*, presumably as a vulnerable species.

These two species are sometimes sympatric, but probably utilise different parts of the habitat on a local scale when they are recorded in the same area. Currently, there are insufficient data to confidently separate the spatial ecology, burrows and reproductive biology of these two species. Information that follows is based on what is known for 'Mulgara' without distinguishing between the species.

Adult males are typically heavier than females (Gibson and Cole 1992, Dickman et al. 2001, also see Kortner et al. 2007), with females growing to 80g and males to 147g (Masters 1998, Dickman et al. 2001). Gibson and Cole (1992) reported pouched young in the winter and spring with lactating females as late as December. Litter sizes averaged five, but ranged from 2-6 (Gibson and Cole 1992, Masters 1998), with a single litter being produced each year (Dickman et al. 2001). Woolley (2008a) reported *D. blythi* females to carry up to six young in central

Australia when caught in September, and in captivity mating has been observed from mid-May to Mid-June and young have been born in June to August after a gestation of five to six weeks. The breeding biology is similar for *D. cristicauda*, but because females have eight nipples they can carry up to eight young (Woolley 2008b). Adult males mostly die after mating.

The Mulgara diet includes insects, arachnids and rodents as the main prey, but reptiles, centipedes and small marsupials are also consumed (Chen et al. 1998, Masters 1998).

The reported distribution of Mulgara in Western Australia includes much of the inland spinifex covered sandy desert and spinifex vegetated areas in the Pilbara and northern goldfields. Within these areas their distribution is patchy and it is most frequently confined to habitat dominated by mature spinifex (Gibson and Cole 1992, Masters 2003, Masters et al. 2003). Relative abundance seems to be positively associated with rainfall in the previous 12 to 24 months (Gibson and Cole 1992, Masters 1998, Dickman et al. 2001, Letnic and Dickman 2005). Significant population fluctuations appear to be a characteristic of the ecology of Mulgara (Manson 1994, Barrick Plutonic Gold Mine 2006). For example, Pearson (2003-04) reported significant fluctuations at Mt Keith with 99 being caught in 2001 and only 33 being caught in 2002 in a repeated survey. The recent burning of spinifex does not seem to be sufficient to cause Mulgara to move out of an area (Thompson and Thompson 2007a).

Mulgara are generally sedentary in contrast with some other small dasyurids and have high site fidelity and a low propensity for dispersal once a home range has been established (Masters 1998, Dickman et al. 2001, Masters 2003). Masters (2003) indicated home ranges vary in size from 1.0 to 14.4ha (mean 6.5ha), with some overlap, however, Kortner et al. (2007) reported home ranges for males to average 25.5ha and for females to average 10.8ha. Burrows are mostly used by a single individual, but males and females have been found together in a single burrow during the breeding season (Masters 2003, Thompson and Thompson 2007a). Kortner et al. (2007) reported that 10 of 68 burrows they monitored were used by multiple Mulgara and one individual returned to the same burrow on 32 of 52 days monitored. Masters (2003) reported individual's burrows in her study area were concentrated in a relatively small area, as the average maximum distance across a home range was about 440m. In the Pilbara, Thompson and Thompson (2007a, 2008a) reported catching nine Mulgara in an area of 22ha and 50 in 210ha, and about 200 trap-nights were required to catch each Mulgara in areas with a relatively high density.

Masters (2003) reported that both males and females use 2-9 burrows, but averaged about three, whereas Kortner et al. (2007) reported Mulgara used up to 15 burrows, with 47% of burrows used by an individual only once. Woolley (1990) described *D. cristicauda* burrows near Ayers Rock as having one large hole, around which there was loose soil, and either one or two smaller holes within 1m of the large hole. The tunnels to these pop holes were near vertical. Thompson and Thompson (2007a) indicated that burrows in the Pilbara contained between two and nine entrances, tunnels were mostly on a single level and to a depth of about 300mm. Kortner et al. (2007) reported Mulgara burrows in the Uluru National Park varied in complexity, some with only a single entrance but others had multiple entrances. The lumen for a burrow entrance was typically an arch over a flat bottom with a height of 70-80mm, and a width of 80-100mm at the base. Internal tunnels were mostly 50-70mm wide. Masters (2008) suggested that the complexity of burrows varies geographically with those in central Australia having a single entrance with two or three side tunnels and pop holes, and those in Queensland having more than one entrance, deeper branching tunnels and numerous pop holes. This difference may have been due to differences in species that were not recognised until recently.

Mulgara have been reported in the Fortescue rail corridor and on the eastern end of the Fortescue rail spur line to the Solomon project area which is north of the project area in a sandy habitat. Kortner et al. (2007) reported three Mulgara dying during their monitoring program, with two being killed by cats and the third by a fox. Given the small size and poor mobility of juveniles compared with adults when they are independent of their mother, it is likely that predation on juveniles is high.

Until many more individuals are caught, it is not possible to determine the geographic distribution of each species in Western Australia or more specifically the Pilbara, so the precautionary principle would indicate that they all be treated as the species with the highest conservation status (e.g. *D. cristicauda*).

No Mulgara burrows were recorded during the survey and the habitat is generally unsuitable for Mulgara.

Pilbara Olive Python (*Liasis olivaceus barroni*) - Vulnerable under the *EPBC Act 1999* and Schedule 1 under the *WA Wildlife Conservation Act 1950*

Kendrick (2001) reported this species as common and wide-spread in the Pilbara and one that should not be listed as threatened or declining. Pilbara Olive Pythons are found throughout the Pilbara and north as far as the Gregory Range. They are most often seen at night and are generally found around rocky areas, rocky outcrops and cliffs, particularly in the vicinity of watercourses and water holes, but they also shelter in logs, flood debris, caves, tree hollows and thick vegetation (Burbidge 2004, Pearson 2007). They are generally opportunistically sighted and even species-specific searches in the right conditions often fail to detect their presence when they are in the area.

Bamford Consulting Ecologists (2007, 2009a) recorded a Pilbara Olive Python at Pardoo and Abydos Iron project, Ecologia Environment (2011b) recorded an individual in the Brockman project area and the Valley of The Kings in the FMG Solomon project area, Biota Environmental Sciences (2004b) recorded an individual in the Chichester Range, FMG staff recorded an Pilbara Olive Python near its Glacier Valley project area and How and Dell (2004) recorded one in the Abydos Plain. Terrestrial Ecosystems recorded a Pilbara Olive Python near the entrance into the Wodgina mine site from the Great Northern Highway. A small number of Pilbara Olive Pythons are therefore likely to be found in the project area.

Pilbara Olive Pythons residing in vegetation, rock crevices or logs when it is being cleared are likely to be harmed, as they are unable to move away quickly enough. Habitat fragmentation could also impact on foraging areas and breeding activities (e.g. finding a suitable mate). Being slow moving mostly nocturnal snakes, they are also prone to be killed by vehicles on the roads and tracks at night.

Although Pilbara Olive Pythons were not seen during the survey, they have been recorded throughout the Hamersley Range and along the Fortescue River, so it is likely that they are present in the project area in low numbers.

Grey Falcon (*Falco hypoleucos*) – Schedule 1 under the *WA Wildlife Conservation Act 1950*

Johnstone and Storr (1998) recorded the geographic distribution of the Grey Falcon as the northern half of Western Australia, excluding the coastal area of the Pilbara. They went on to suggest that it is mostly found in lighted wooded coastal and riverine plains.

Multiple observations of Grey Falcons have been recorded in the vicinity of Fortescue Marsh and to the west of the Marsh. Adult birds can move away from a disturbance, but a buffer zone is required around any known nesting sites.

A single Grey Falcon was seen during the survey as an incidental observation. Grey Falcons will move away from a disturbance, and they are therefore unlikely to be significantly impacted on by ground disturbing activities or construction, other than a loss of foraging areas.

Peregrine Falcon (*Falco peregrinus*) - Schedule 4 under the *WA Wildlife Conservation Act 1950*

Johnstone and Storr (1998) reported the Peregrine Falcon as being widespread including on some off-shore islands, but was absent from most deserts. They went on to suggest it was mainly seen about cliffs along coasts, rivers and ranges and wooded watercourses and lakes, but Terrestrial Ecosystems has seen them in a variety of other habitats. Terrestrial Ecosystems' database records multiple sightings of this falcon in the vicinity of the Fortescue Marsh and Fortescue River running into and out of the Marsh.

Ground disturbance activities on a localised scale are unlikely to significantly impact on the Peregrine Falcon, however, should nesting sites be detected, then these should be protected while they are being used for breeding purposes.

The Peregrine Falcon was not recorded in the avian survey; however, it could be an infrequent visitor to the project area. Clearing vegetation is unlikely to be a significant impact as it will move to an adjacent area if disturbed.

Ctenotus nigrilineatus - Priority 1 with DEC

Two specimens of *C. nigrilineatus* were caught in the Abydos Plains survey by How and Dell (2004) but they were not caught in the Hope Downs survey, or any of the FMG rail corridor assessments. Although it has been infrequently caught, it could potentially be found within the project area. This species is possibly more widely distributed than the existing data would suggest, but has not been detected due to a lack of survey effort in the Pilbara. Where they are present, the clearing of vegetation is likely to be an impact on this species.

Ctenotus nigrilineatus was not recorded during the trapping program; however it has been recorded about 70km to the north-east of the project area and 100km to the west in the Hamersley Range. Therefore there is a low possibility it is present in the project area.

***Ramphotyphlops ganei* -** Priority 1 with DEC

Storr *et al*. (2002) reported this blind snake to occur near Newman, Pannawonica and Millstream, Biota (2004b) recorded it in its survey of the Hope Downs rail corridor and there is a museum record from the Chichester Range and Hamersley Range, so it could potentially be caught in the project area.

Ramphotyphlops ganei has a different scale pattern on the head and is relatively easily distinguished from the other species in the area. It is probably more abundant than the existing data would suggest due to a lack of survey effort in the Pilbara. Where they are present, the clearing of vegetation is likely to be an impact on this species.

Ramphotyphlops ganei was not recorded in the project area during the trapping survey but it has been recorded in the Hamersley and Chichester Ranges, so it could potentially be caught in the project area.

Bush Stone-curlew (*Burhinus grallarius)* - Priority 4 with DEC

Johnstone and Storr (1998) reported the Bush Stone-curlew as being found in the western half of Western Australia and the Kimberley, but they are absent from the sandy deserts and the interior east of Leonora and Southern Cross. Terrestrial Ecosystems' database contains multiple records of the Bush Stone-curlew on the Abydos Plain and the north-western end of the Fortescue Marsh.

A Bush Stone-curlew was heard calling one evening in the Mulga Downs exploration camp, so they are present in the project area in low abundance. Bush Stone-curlews will move away from a disturbance, and they are therefore unlikely to be significantly impacted on by ground disturbing activities or construction, other than a loss of foraging areas.

Australian Bustard (*Ardeotis australis*) - Priority 4 with DEC

The Australian Bustard is a large bird that exhibits sexual dimorphism, with males being large and heavier than females (Ziembicki 2010). Johnstone and Storr (1998) and Ziembicki (2010) reported the Australian Bustard as occurring in most parts of Western Australia, and is often found in lightly wooded grassland, sand plains vegetated with spinifex, chenopod flats, low heath and farming country. Typical of some arid and semi-arid species, the Australian Bustard moves around the inland of Australia in search of resources, often making long movements to places that are productive after good rains. In some areas, where seasonal conditions are predictable, bustards maybe sedentary or their movements follow a migratory pattern.

They also exhibit a strong affinity to fires, and are often seen at the fire front and in recently burnt areas (Ziembicki 2010). The Australian Bustard has an omnivorous diet consuming seeds, fruits, flowers, green shoots, invertebrate and small vertebrates (Ziembicki 2010). Such a diet enables them to be adaptive to locally abundant food resources. This large bird is hunted by indigenous people, who now use guns and are able to kill many more birds than was the case with the traditional weapons.

Threats to this species include hunting, introduced predators, most notably the fox, pesticides, habitat destruction and altered fire regimes (Ziembicki 2010). Australian Bustards were seen on numerous occasions during the trapping program and avian survey. Australian Bustards will move away from a disturbance, and they are therefore unlikely to be significantly impacted on by ground disturbing activities or construction, other than a loss of foraging areas.

Star Finch (*Neochmia ruficauda subclarescens*) - Priority 4 with DEC

Johnstone and Storr (1998) recorded the Star Finch being around the western end of the Ashburton, Fortescue and DeGrey Rivers in the Pilbara, and having a preference for long grass, rushes, shrubs around swamps, lagoons and permanent water bodies. Davis *et al*. (2005) recorded Star Finches at Minga Well and there are records from the western and eastern ends of the Fortescue Marsh and north of the Chichester Range. Johnstone and Storr (1998) reported the Star Finch to be locally common in the Pilbara, but patchily distributed. If it is within the project area, it will most likely be found around a permanent spring or a long-standing pool of water surrounding long grass and rushes.

Clearing vegetation around water holes and water courses is likely to have the most significant impact on this species, as it will reduce foraging habitat and breeding sites. These habitats can also offer important refuge for other arid adapted species, and are frequently used as the daily drinking location for the many seed eaters found in the Pilbara.

There was no suitable habitat for Star Finches in the project area, so it is highly unlikely that it is present.

Ghost Bat (*Macroderma gigas*) – Priority 4 with DEC

This is Australia’s only carnivorous bat, eating large insects, frogs, lizards, small birds and mammals. Tideman *et al*. (1985) reported Ghost Bats in the Northern Territory foraged, on average, 1.9km from their day roost, with a mean size of foraging area of 61ha. Their hunting behaviour utilised vantage points to detect prey with their eyes and ears, rather than echolocation. These vantage points were changed about every 15 min during foraging periods, with a mean distance of 360m between them. The Ghost Bat is an obligate troglodyte, and its survival is dependent on finding natural roosts in caves, crevices, deep overhangs and artificial roosts such as abandoned mines. Each population appears to have a regionally centralised maternity site and only 10 such sites were known to exist in the mid-1990s (Worthington-Wilmer et al. 1994). Populations are known to disperse in the non-breeding (dry) season (Toop 1985).

Armstrong and Anstee (2000), in their summary of the geographic distribution of *M. gigas* in the Pilbara, reported that they had been present in the Abydos Plain, Chichester Plateau, Gascoyne Ranges, George Ranges, Hamersley Plateau and Oakover Valley. However, more recently McKenzie and Bullen (2009) reported it as being more common in the Pilbara than previously thought despite detectability constraints caused by its cryptic call. Its preferred habitat in the Hamersley Ranges was caves beneath bluffs of low rounded hills composed of Marra Mamba geology and granite rock piles in the eastern Pilbara (Armstrong and Anstee 2000). Armstrong and Anstee (2000) reported that while the Marra Mamba iron formation was a good predictor of the occurrence of *M. gigas* in the Hamersley Range, essentially any cave beneath a bluff with sufficient depth could be considered a potential roost.

The most significant impact on Ghost Bats would be the destruction of a centralised maternity roost. As there is no knowledge of the location of these maternity roosts in the project area, all potential caves should be investigated before ground disturbance activity is approved.

Ghost Bats were not recorded in the echolocation survey, but they have been recorded at numerous locations in the Hamersley Range and north of the Chichester Range and there are suitable roosting sites in the project area, so it is possible that they are present in the project area.

Long-tailed Dunnart (*Sminthopsis longicaudata*) - Priority 4 with DEC

Burbidge et al. (2008) recorded the geographic distribution of the Long-tailed Dunnart to include the Pilbara, the Great Victoria Desert and into north-eastern South Australia and south-western Northern Territory. McKenzie et al. (2000) caught a number during their Carnarvon Basin regional survey, extending its geographic distribution in a westerly direction. Terrestrial Ecosystems' fauna database has a record of them being caught in PIL1 IBRA subregions.

Burbidge et al. (2008) recorded individuals being caught on plateaux of boulders and stones near breakaways and scree slopes, vegetated with mulga and spinifex. Terrestrial Ecosystems (2011c) has recently caught them in open mulga woodland, so knowledge of its preferred habitat is scant. As habitat in which it has been found is present along some sections of the project area, it is possible that the Long-tailed Dunnart is in the project area.

Where they are present, the clearing of vegetation is likely to be an impact on this species. Habitat fragmentation, changed fire regimes and the presence of introduced predators are also likely to be threatening processes for this species.

Long-tailed Dunnarts were not recorded in the trapping survey, but they have been recorded in similar habitat approximately 85km west, north-west of the project area, so it is possible that they are present in the project area.

Northern Short-tailed Mouse (*Leggadina lakedownensis*) –Priority 4 with DEC

The Northern Short-tailed mouse has a short tail, with grey-brown fur on the dorsal surface and white fur on the ventral surface, with rounded ears and a broad blunt muzzle (Breed and Ford 2007). Reid and Ford (2007) reported a distinctive larger form on Thevenard Island off the Pilbara coast.

Reid (2008) indicated that the Northern Short-tailed Mouse predominantly occurs in the central arid areas of Australia, including southern Northern Territory, northern South Australia and eastern Queensland. Reid (2008) reported that little is known of the biology and abundance of this species. Because of the paucity of data on this species' ecology and preferred habitat type, it is difficult to indicate areas where it might be significantly impacted. However, where they are present, the clearing of vegetation is likely to be an impact on this species. Habitat fragmentation, changed fire regimes and the presence of introduced predators are also likely to be threatening processes for this species.

Northern Short-tailed Mice were not recorded in the trapping survey, but they have been recorded in similar habitat approximately 85km west, north-west of the project area and the Chichester Range to the east, so it is possible that they are present in the project area.

Pebble-mound Mouse (*Pseudomys chapmani*) - Priority 4 with DEC

Pebble-mound mice surround the surface of their nesting burrows with a mound of similar sized pebbles. They carry these pebbles in their mouth and use their front feet to place them in position (Breed and Ford 2007). Start (2008) recorded the Pebble-mound Mouse as endemic to the Pilbara of Western Australia. Terrestrial Ecosystems' fauna database contains multiple records of this mouse and its mounds in the vicinity of the project area.

Pebble-mound Mice mounds appear to be abundant in the Pilbara, but only a small percentage appear active. This might indicate that our assessment of what is an active mound is understating the number of 'active' mounds, or that mounds remain obvious for decades and it appears that the number of Pebble-mound Mice are in decline because of the high number of inactive mounds.

Where they are present, ground disturbing activities, most notably vegetation clearing, will destroy mounds and presumably any mice living in these mounds when they are cleared.

Active and recently active Pebble-mound Mice mounds were recorded in the project area. Clearing active Pebble-mound Mice mounds normally results in the loss of any individuals within the mound.

Fortescue Grunter (*Leiopotherapon aheneus*) - Priority 4 with DEC

Merrick and Schmida (1984) described the Fortescue Grunter as a small species with a restricted geographic distribution. This is a schooling species that grows to about 20cm. Morgan and Gill (2004) reported the Fortescue Grunter being found in the Fortescue, Ashburton and Robe Rivers of the Pilbara. This fish is likely to be found throughout each of these river systems, including isolated pools that are infrequently joined after major rainfall events. Little is known of its ecology, but potential impacts are likely to include changing the water levels (i.e. drying of permanent water holes), flow regimes and the water chemistry. There were no suitable waterholes or semi-permanent water bodies in the project area, so the Fortescue Grunter is not present in the project area.

Fork-tailed Swift (*Apus pacificus*) - Migratory under the *EPBC Act 1999*

The Fork-tailed Swift breeds in north-east and mid-east Asia and winters in Australia and south New Guinea (Johnstone and Storr 1998). They arrive in the Kimberley in late September and in the Pilbara in November and the south-west in December, leaving late in April. Johnstone and Storr (1998) reported them as common in the Kimberley and uncommon to moderately common along the north-west, west and south-east coasts and scarce elsewhere. They are often, but not always, seen in large flocks and can be attracted to thunderstorms or cyclonic events.

A large number of Fork-tailed Swifts were sighted by Biota (2005) to the west of Cloud Break. Biota (2004) described them as common but patchy and seen along the storm front associated with ex-tropical cyclone Fay, primarily south of the Fortescue Marshes. Terrestrial Ecosystems (2011c) recorded them on the Abydos Plain in a recent survey of the RHI rail corridor. As this is a migratory species, ground disturbance activities on a localised scale are unlikely to significantly impact on Fork-tailed Swifts.

Although the Fork-tailed Swift was not recorded in the project area, it has been recorded in other surveys in the bioregion. Given its migratory pattern of behaviour it will not be significantly impacted by vegetation clearing or the proposed mining activity.

Rainbow Bee-eater (*Merops ornatus*) - Migratory under the *EPBC Act 1999*

Rainbow Bee-eaters are abundant in Australia, and found in many parts of Western Australia except the sandy deserts and dry arid interior. Johnstone and Storr (1998) described them as resident, breeding visitors and postnuptial nomads. They are generally migratory, moving south in late September and early October, having wintered from the Gascoyne to Indonesia. Rainbow Bee-eaters have been recorded in all months in the Pilbara, particularly around the fringes of the Fortescue Marsh.

Given their abundance and wide spread distribution, ground disturbance activities on a localised scale are unlikely to significantly impact on Rainbow Bee-eaters. However, where nest burrows are detected during fauna assessments, these should be avoided during the breeding period which is October to January.

This bird will readily move to adjacent areas if disturbed, so is unlikely to be significantly impacted by vegetation clearing and the proposed mining activity.

Great Egret (*Ardea alba*) - Migratory under the *EPBC Act 1999*

Herons and egrets all depend to some extent upon surface water for hunting. The Great Egret is the largest of the Australian egrets, and is an elegant, white wader dependent upon floodwaters, rivers, shallow wetlands and intertidal mud flats. It is also found in wet pastures and estuarine mangroves. Its diet consists of a range of small, aquatic invertebrates and small vertebrates (Firth 1976). McKilligan (2005) reported its as common and widespread in Australia, and it is most abundant in northern Australia.

Given the dependence of the Great Egret upon restricted habitats, clearing vegetation and development of these habitats are likely to have a local impact on this species. The species is also likely to be susceptible to secondary impacts, particularly changes in local hydrology, where this changes the water levels in local wetlands.

There are no suitable wetlands for this bird in the project area, so it is unlikely to be impacted by vegetation clearing and the proposed mining activity.

Cattle Egret (*Ardea ibis*) - Migratory under the *EPBC Act 1999*

The smallest of the Australian egrets, this species has undertaken an invasion of Australia from the north, where it was originally more common in the Indonesian archipelago than Australia (Simpson and Day 2004). This invasion may have been assisted by the opening up of farming land and irrigation schemes, providing the pasturelands and shallow wetlands in which it prefers to forage (McKilligan 2005). Johnstone and Storr (1998) noted the species' distribution in Western Australia as being mostly confined to the irrigation areas surrounding Kununurra, however, its migratory nature and current invasive tendencies suggest that it may occur elsewhere in the state, and may still be expanding its distribution.

Given the dependence of the Cattle Egret upon restricted habitats, land clearing and development of these habitats are likely to have a local impact on the species. This species is also likely to be susceptible to secondary impacts, particularly changes in local hydrology, where this changes the water levels in local wetlands or creeks. The widespread nature of the species, and the fact that it seems to represent an unassisted invasion of Australia suggests that the loss of habitats in the region is not likely to greatly impact the species nationally.

There are no suitable wetlands for this bird in the project area, so it is unlikely to be impacted by vegetation clearing and the proposed mining activity.

Oriental Plover (*Charadrius veredus*) - Migratory under the *EPBC Act 1999*

The Oriental Plover breeds in northern China and Mongolia (Bamford et al. 2008) and winters in northern Australia. It is found along the coastal region of the Pilbara and inland ephemeral wetlands (Johnstone and Storr 1998). Its preferred habitat includes sparsely vegetated plains, samphire flats, beaches and tidal flats.

A loss of habitat is likely to be the most significant threat to this species, but it is unlikely to be impacted by HPPL activities.

The Oriental Plover was not recorded during the avian survey, and there are no suitable wetlands for this bird in the project area, so it is unlikely to be impacted by vegetation clearing and the proposed mining activity.

Oriental Pratincole (*Glareola maldivarum*) - Migratory under the *EPBC Act 1999*

The Oriental Pratincole breeds in China and northern India and the south-east Asian peninsula. They winter in coastal grasslands and seasonal wetland in the north of Western Australia, and inland grasslands of the Northern Territory (Johnstone and Storr 1998, Bamford et al. 2008). This bird feeds on the wing and roosts on bare ground near water.

A loss of habitat is likely to be the most significant threat to this species, but it is unlikely to be impacted by HPPL activities.

The Oriental Pratincole was not recorded during the avian survey, but may be an infrequent visitor to the area so it is unlikely to be impacted by vegetation clearing and the proposed mining activity.

White-bellied Sea-eagle (*Haliaeetus leucogaster*) - Migratory under the *EPBC Act 1999*

The White-bellied Sea-eagle is mostly seen along the coasts and some of the wetland areas. It mostly breeds on the off-shore islands. Terrestrial Ecosystems' fauna database indicates that few have been seen in the vicinity of the Fortescue Marsh, which is east of the project area.

This species is unlikely to be seen in the project area due to a lack of suitable habitat, therefore it is unlikely to be significantly impacted by vegetation clearing and proposed mining activity.

Table 21. Likelihood of each conservation species being present and the potential impact on each species in the project area

Species	Common Name	EPBC Act 1999	Schedule Species	Priority Species	Present in the project area	Potential impacts *
Pseudomys chapmani	Western Pebble-mound Mouse			P4	Yes	The project area contains active Pebble-mound Mice mounds. These are mostly on the stony slopes and outside the proposed impact area. Given the abundance and wide spread distribution of Pebble-mound Mice in the Pilbara and the low success rate for relocations (Anstee and Armstrong 2001); there is little justification for relocating a small number of individuals from areas to be cleared. It is almost certain that some Pebble-mound Mice will be adversely impacted during the vegetation clearing process, but this is unlikely to have a significant impact on the survival of the species in the bioregion.
Burhinus grallarius	Bush Stone-curlew			P4	Yes	The Bush Stone-curlew was heard calling in the project area. They will readily move to adjacent areas once vegetation clearing and construction commences. Therefore, vegetation clearing in the project area is unlikely to cause a significant impact because of the abundance of similar habitat in adjacent areas.
Merops ornatus	Rainbow Bee-eater	M	Sc3		Yes	This species has been recorded at numerous locations in or near the project area. Rainbow Bee-eaters are able to move away from a disturbance. This species is migratory, abundant and wide-spread, and as a consequence, the development of the mine site and supporting infrastructure is unlikely to result in a significant impact on this species.
Ardeotis australis	Australian Bustard			P4	Yes	This large bird is in the project area. Clearing of vegetation is unlikely to significantly impact on this species as it will readily move to other areas which have similar habitat. The most significant impact on Australian Bustards would be destroying a nest containing eggs or chicks during the vegetation clearing process.
Falco hypoleucos	Grey Falcon			P4	Yes	The Grey Falcon was seen in the project area but is unlikely to be significantly impacted by the vegetation clearing or mining operations, as it will readily move to other areas once vegetation clearing and construction commences. The most significant impact on the Grey Falcon would be destroying a nest containing eggs or chicks during the vegetation clearing process.
Dasyurus hallucatus	Northern Quoll	EN	Sc1		Yes	This species is present in the project area and could be impacted if vegetation clearing and development is undertaken in the mapped habitat for Northern Quolls. However, if the impact area remains as shown in Figure 2 and the eastern mining village site is the option developed then the impact is likely to be low.
Liasis olivaceus barroni	Pilbara Olive Python	VU	Sc1		Maybe	The Pilbara Olive Python is potentially present in the project area. Creek lines and river edges, caves and overhangs and areas of permanent water have the highest potential to support resident Pilbara Olive Pythons. Potential impacts on Pilbara Olive Pythons include vegetation clearing, injuring or killing individuals on tracks and roads, being killed when mistaken for venomous snakes and injuring or killing pythons that have crawled into infrastructure. These impacts are unlikely to be significant when considered in a regional context, particularly, if the impact areas are as shown in Figure 1, as Pilbara Olive Pythons are unlikely to be found in these areas.
Macroderma gigas	Ghost Bat			P4	Maybe	Ghost Bats may forage in the project area, but were not recorded during the survey. The impact is only likely to be significant if a maternal roost is disturbed, which is highly unlikely given the proposed impact areas.

TERRESTRIAL ECOSYSTEMS

Species	Common Name	EPBC Act 1999	Schedule Species	Priority Species	Present in the project area	Potential impacts *
Ctenotus nigrilineatus				P1	Maybe	This small dark striped skink is known only from limited areas in the Pilbara and could be found in the project area. A potential impact on *C. nigrilineatus* is injuring or killing individuals during vegetation clearing. The project area does not constitute a major proportion of their known geographical distribution, so the potential impact is likely to be low.
Ramphotyphlops ganei				P1	Maybe	It is possible that *Ramphotyphlops ganei* could be found in the vicinity of the project area, and as a consequence, some individuals could be adversely impacted during vegetation clearing. However, this impact is unlikely to be significant in a bioregional context.
Sminthopsis longicaudata	Long-tailed Dunnart			P4	Maybe	The Long-tailed Dunnart has a preference for stony and rocky areas, breakaways and scree slopes, so it is possible that this Dunnart could be found in the project area, but it is unlikely to be found in the proposed impact areas due to a lack of suitable habitat.
Leggadina lakedownensis	Northern Short-tailed Mouse			P4	Maybe	If present in areas to be cleared, then it is likely to be adversely impacted. This impact is unlikely to significantly affect the long-term survival of this species, because it is probably abundant in adjacent areas of similar habitat.
Falco peregrinus	Peregrine Falcon		Sc4		Infrequently	It is possible that the Peregrine Falcon occurs in the vicinity of the project area. However, Peregrine Falcons are unlikely to depend on the project area for their survival and they have the capacity to move away from a disturbance. There would, however, be minor impact through loss of foraging areas.
Apus pacificus	Fork-tailed Swift	M	Sc3		Infrequently	A number of Fork-tailed Swifts have been seen in the Pilbara, but as this species mostly forages in the air, and will readily move away from a disturbance. It is unlikely to be impacted on by the proposed infrastructure developments.
Rhinonicteris aurantia	Pilbara Leaf-nosed Bat	VU	Sc1		Unlikely	Pilbara Leaf-nosed Bat and their preferred habitat were not recorded in the project area, so the potential impacts on this species are low.
Macrotis lagotis	Bilby	VU	Sc1		Unlikely	Bilbies were not recorded in the project area, so the potential impacts on this species are low.
Dasycercus cristicauda/blythi[1]	Mulgara	VU	Sc1		Unlikely	Mulgara were not recorded in the project area, so the potential impacts on this species are low.
Haliaeetus leucogaster	White-bellied Sea-eagle	M	Sc3		Unlikely	The White-bellied Sea-eagle is mostly a coastal species that has also been recorded in the vicinity of the Fortescue Marsh. It will readily move away from an area if it is disturbed. Clearing of vegetation in the project area is unlikely to have a significant impact on this species.
Neochmia ruficauda subclarescens	Star Finch (western)			P4	Unlikely	The Star Finch predominantly resides around ephemeral springs, semi-permanent or permanent creeks and ponds that are surrounded by reedy vegetation. There was no suitable habitat for the Star Finch in the project area, so potential impacts are likely to be low.
Ardea alba	Great Egret	M	Sc3		Unlikely	There was no suitable habitat for the Great Egret in the project area.
Ardea ibis	Cattle Egret	M	Sc3		Unlikely	There was no suitable habitat for the Cattle Egret in the project area.
Charadrius veredus	Oriental Plover	M	Sc3		Unlikely	There was no suitable habitat for the Oriental Plover in the project area.
Glareola maldivarum	Oriental Pratincole	M	Sc3		Unlikely	There was no suitable habitat for the Oriental Pratincole in the project area.

TERRESTRIAL ECOSYSTEMS

Species	Common Name	EPBC Act 1999	Schedule Species	Priority Species	Present in the project area	Potential impacts *
Pezoporus occidentalis	Night Parrot	CR	Sc1		Unlikely	The proposed mining area and haul road represent a small fraction of similar habitat in the Pilbara bioregion and there is no evidence to indicate that the project area is important habitat for the Night Parrot. This species may infrequently be seen in the general area, but the proposed vegetation clearing and development of a project area is unlikely to have a significant impact on this species as this species will readily move into adjacent areas. The most significant impact would be to destroy a nest containing eggs or chicks, for which the potential is low.
Leiopotherapon aheneus	Fortescue Grunter			P4	No	There was no suitable habitat for the Fortescue Grunter in the project area.

* Potential impact on a species is a judgement based on an assessment of its relative abundance in the project area; its potential to avoid being impacted by moving out of the area, its retreat site(s) and its ecology.

4.13 Physical and environmental impacts

The proposed disturbance area is approximately 825ha, with 610ha in the proposed mining area, 44ha in borrow pits, 142ha in access tracts and haul roads and 8.5ha in the proposed eastern mining village. The proposed mine is approximately 28km from the Great Northern Highway. There is widespread evidence of exploration disturbance, particularly in the proposed mining area, and as the mine and associated infrastructure will be situated in a long-standing pastoral lease, there are also well defined pastoral tracks and infrastructure in the project area.

There are numerous potential direct and indirect impacts associated with vegetation clearing, the development of mining operations, the associated infrastructure and the proposed haul road that could have a significant impact on the vertebrate fauna if appropriate management measures are not implemented. Potential direct and indirect un-mitigated impacts are described below.

4.13.1 Animal deaths during the clearing process and the destruction of burrows and retreat sites

Nocturnal species are unlikely to be active when most of the land clearing and construction work is taking place, resulting in these individuals being lost in their burrows, or when attempting to escape. Therefore, it is likely that clearing of vegetation and construction activities will result in the loss of most small fauna that retreat to burrows, such as reptiles and mammals in areas to be cleared.

Presuming the proposed disturbance area is as shown in Figure 2; conservation significant fauna potentially harmed during the vegetation clearing process include Long-tailed Dunnart, Northern Short-tailed Mouse, *R. ganei* and *C. nigrilineatus*. Pilbara Olive Pythons are potentially found in rocky habitats in the project area, but are unlikely to be found in the open Mulga woodland on the plain (Figure 6) which is where most of the vegetation clearing will occur. Although there is a low probability that Northern Quolls could be recorded outside of areas marked in Figure 6, they are much more likely to be in the marked areas. Presuming that HPPL opts to develop the eastern of the two mining village sites, then the potential impact on Northern Quolls is likely to be low. Pebble-mound Mice mounds were mostly found on the stony slopes and outside of the proposed impact areas, so the proposed development is unlikely to have a significant impact on this species.

4.13.2 Reduction or loss of activity areas or home ranges, and closure of burrows

Vegetation clearing and associated construction activities are likely to destroy reptile and mammal burrows that are currently in use, or could be used again. Loss of vegetation that forms part of the activity area or home range of individuals has the potential to force these animals into adjacent areas. These areas may offer fewer resources placing individuals under survival pressure. It could also cause individuals to move into the territories of other individuals increasing competition for resources. Forced relocations could increase the possibility of predation.

Although vegetation clearing seldom results in the death of avian species, clearing of vegetation reduces and alters their foraging areas. The loss of foraging areas shifts individuals into adjacent areas and increases completion for resources, with the inevitable result that some of the migrants and some of the residents fail to thrive in the altered environment and some could be lost.

4.13.3 Habitat fragmentation

In addition to vegetation clearing for the mine site, mine village, borrow pits and widening the track to a haul road, vehicle and machinery movement, lighting, noise and dust have the potential to fragment habitat. In addition, raised linear structures such as haul roads can partition existing activity areas and home ranges, isolate sections of established communities and may alter long and medium-term patterns of movement around established home ranges particularly for small mammals and reptiles. A reduction in the fauna population as a result of habitat fragmentation would initially be difficult to detect given the current knowledge of the spatial ecology for most of the small conservation significant mammals known to be in the area.

Clearing a mine site and linear corridors will increase habitat edges. Small mammals can respond both positively and negatively to edges depending on their ecological traits (Laurance 1991, 1994, Goosem and Marsh 1997, Goosem 2000). Edge and disturbance effects can lead to altered levels of predation, restricting or increasing fauna movements and altering assemblage structure (Oxley et al. 1974, Paton 1994, Baker et al. 1998, Temple 1998, Luck et al. 1999, Goosem 2001). The impact area is therefore likely to be larger than the cleared footprint.

4.13.4 Dust

Dust generated from construction activities and mining (road, camps, etc) can potentially degrade surrounding vegetation, reducing their ability to absorb sunlight and thus influencing photosynthetic rates. Degradation of these areas could make the habitat unsuitable for some fauna. The volume of traffic and speed of vehicles on access and haul roads will largely determine the impact of dust in any area.

4.13.5 Altered fire regimes

A change in fire regimes is often associated with increased human activity, leading to degradation of natural ecosystems. Linear infrastructures, such as haul roads, provide a barrier to naturally occurring fires and may alter the natural fire regimes that the fauna have evolved to accommodate. Recruitment of fauna into regenerating burnt areas can also be affected by linear barriers that stop fires and are along the edges of burnt areas.

4.13.6 Introduced fauna

The only introduced small vertebrate caught in the trapping survey was the House Mouse (*Mus musculus*). However, it is likely that dingo/wild dogs (*Canis lupus*) and feral cats (*Felis catus*) are present in the project area. An increase in human activity is often associated with an increase in the abundance of introduced species such as the house mouse, cat and dingos/wild dogs. This increase may often be due to a decline in habitat health, increased road kills and poor disposal of waste.

The house mouse, cat and wild dogs are wide-spread and well established in the Pilbara. In many situations they have become a ‘naturalised’ species in the Australian bush. Increases in dog or cat numbers can have a detrimental impact on native fauna because they predate on and compete with native species, severely disrupting the natural balance. Tracks and other linear clearings in the natural vegetation provide movement corridors for wild dogs and cats through the landscape, which can increase predation on native species in adjacent areas.

4.13.7 Road fauna deaths

An increase in road fauna deaths is likely to occur where new roads are constructed or upgraded; in particular, it could affect kangaroos, nocturnal birds and large ground-dwelling carnivorous predators. Most of the conservation significant vertebrate fauna potentially in the area, such as Bush Stone-curlew and the Pilbara Olive Python can be causalities of vehicle traffic, particularly if the roads are used at night. Species such as goannas and raptors are attracted to carrion on road verges, with the resulting increased propensity for these species to be killed by vehicles.

4.13.8 Anthropogenic activity

Unnatural noises, vibrations, artificial light sources and vehicle and human movement in an area may be sufficient to force individuals or fauna species to move from an area, or alter their activity periods. This form of disturbance is likely to occur around quarries and construction sites while the mine and haul road are under construction, and around the mine once it becomes operational. Once the mine is operational, the continual movement of haul trucks could force individuals to move from areas adjacent to the haul road. As a consequence, the impact area is often much larger than the cleared area.

4.13.9 Cumulative effects of vegetation clearing

Figure 7 shows the location of other major disturbance projects in the vicinity of the Mulga Downs project area. To the east of the project area is the long-standing BHP rail line which is currently being duplicated in sections. To the east of the BHP rail line is the FMG rail line that runs from Port Hedland to Cloudbreak. The Great

Northern Highway which runs from Newman to Port Hedland is also to the east of the project area. FMG has constructed a rail line from its Port Hedland-Cloudbreak line to its intended operations at Investigator and mine at Firetail (which is part of FMG's Solomon project). RHI is constructing a rail line from its berth at Port Hedland to its mine at Roy Hill. This line runs parallel with the FMG and BHP rail lines to the east of the project area. Aurizon (formerly Queensland Rail National) is also undertaking preliminary environmental and feasibility studies to construct a multi-user rail line from Port Hedland to mining operations south of the Fortescue Marsh. The exact route of this rail line is not known, but it is anticipated that it will run approximately parallel to the BHP, FMG and RHI lines to north of the Chichester Range, and will probably cross the Fortescue River near where the BHP line crosses and then it will run south-east along the southern side of the Fortescue Marsh parallel to the BHP line.

Of these disturbances, the FMG rail line to the Solomon project is the closest. It runs 10-15km north of the Mulga Downs project area and through Granitic, River, White Springs, Macroy Boolgeeda, Rocklea, McKay and Wona land systems. The BHP rail line in the vicinity of the project area crosses Macroy, River, McKay, Rocklea, Wona and Capricorn land systems. The disturbance area for the BHP line is approximately 100m wide and includes a raised rail line and a parallel vehicle access track. The FMG rail line runs approximately parallel to the proposed RHI rail line. The disturbance foot print for this rail line is approximately 80m wide and includes a raised rail line on coarse ballast and an access track. Borrow pits and laydown areas are distributed along these rail lines. FMG borrow pits and laydown areas that are no longer in use are currently being rehabilitated, whereas the RHI ones are currently being developed. These two rail lines cross Macroy, River, Granitic, Rocklea, Talga and Robe land systems.

4.14 Risk assessment

Fauna surveys to support Environmental Impact Assessments (EIA) are part of the environmental risk assessment undertaken to consider what potential impacts a development might have on the biodiversity of a particular area and region. Potential impacts on fauna from the proposed development are identified and briefly described above. The risk assessment is provisional on Hancock Prospecting clearing and under taking mining activities within the impact areas shown in Figure 2. Should the impact area change, then this assessment should be reconsidered. Tables 22, 23 and 24 provide a summary of the risk assessment associated with this project.

The assessment contained in Table 24 is supported by more detailed discussion in sections above. Only those species that were assessed as being potentially impacted during the construction and operation of the mine are included in the assessment in Table 24.

Any risk assessment is a product of the likelihood of an impact occurring and the consequences of that impact. Likelihood and consequences are categorised and described below. The assessed risk level (likelihood x consequences) is then calculated as the overall risk for the development. This is followed by an assessment of the acceptability of the risk associated with each of the impacts. Disturbances and vegetation clearing have an impact on the fauna at multiple scales – site, local, landscape and regional. Each of these is considered in the risk assessment.

Table 22. Fauna impact risk assessment descriptors

Likelihood		
Level	Description	Criteria
A	Rare	The environmental event may occur or one or more conservation significant species may be present in exceptional circumstances.
B	Unlikely	The environmental event could occur or one or more conservation significant species could be present at sometime.
C	Moderate	The environmental event should occur or one or more conservation significant species should be present at sometime.
D	Likely	The environmental event will probably occur or one or more conservation significant species will be present in most circumstances.
E	Almost certain	The environmental event is expected to occur or one or more conservation significant species is expected be present in most circumstances.
Consequences		
Level	Description	Criteria
1	Insignificant	Insignificant impact on fauna of conservation significance or regional biodiversity, and the loss of individuals will be insignificant in the context of the availability of similar fauna or fauna assemblages in the area.
2	Minor	Impact on fauna localised and no significant impact on species of conservation significance in the project area. Loss of species at the local scale.
3	Moderate	An appreciable loss of fauna in a regional context or a limited impact on species of conservation significance in the project area.
4	Major	Significant impact on conservation significant fauna or their habitat in the project area and/or regional biodiversity and/or a significant loss in the biodiversity at the landscape scale.
5	Catastrophic	Loss of species at the regional scale and/or a significant loss of species categorised as 'vulnerable' or 'endangered' under the *EPBC Act (1999)* at a regional scale.

Acceptability of Risk	
Level of risk	Management Action Required
Low	No action required.
Moderate	Avoid if possible, routine management with internal audit and review of monitoring results annually.
High	Externally approved management plan to reduce risks, monitor major risks annually with external audit and review of management plan outcomes annually. Will require a referral to the Commonwealth under the *EPBC Act 1999*.
Extreme	Unacceptable, project should be redesigned or not proceed.

Table 23. Levels of acceptable risk

		Likelihood				
		Rare or very low (A)	Unlikely or low (B)	Moderate (C)	Likely (D)	Almost certain (E)
Consequences	Insignificant (1)	Low	Low	Low	Low	Low
	Minor (2)	Low	Low	Low	Moderate	Moderate
	Moderate (3)	Low	Moderate	Moderate	High	High
	Major (4)	Moderate	Moderate	High	High	Extreme
	Catastrophic (5)	Moderate	High	High	Extreme	Extreme

Table 24. Risk assessment

Factor	Potential Impact	Inherent Risk		
		Likelihood	Consequence	Significance
Inadequate fauna survey data.	Unknown loss of fauna, fauna of conservation significance, fauna assemblage(s) in development site.	C	2	Low
Inadequate knowledge of potential impacts.	Unknown or poorly assessed impact(s) on fauna assemblage and conservation significant species.	B	2	Low
Inadequate bioregional data for contextual purposes.	Incomplete analysis of data and appreciation of impacts on biodiversity values in a regional context.	C	2	Low
Removal of habitat – site scale.	Almost complete loss of terrestrial fauna in cleared areas, severe impact on local fauna assemblage.	E	2	Moderate
Significant reduction of habitats – local scale.	Loss of fauna and fauna habitat and impacts on local fauna assemblage (excluding conservation significant species).	A	2	Low
Significant reduction of habitats – landscape scale.	Loss of fauna and fauna habitat and impacts on fauna in a landscape context (excluding conservation significant species).	A	1	Low
Significant reduction of habitats – regional scale.	Loss of fauna and fauna habitat and impacts on fauna in a bioregional context (excluding conservation significant species).	A	1	Low
Impact on resident conservation significant terrestrial species.	Loss of a localised population or a few individuals – *Pezoporus occidentalis*	A	4	Moderate
	Loss of a localised population or a few individuals – *Dasyurus hallucatus*	A	3	Low
	Loss of a localised population or a few individuals – *Liasis o. barroni*	B	2	Low
	Loss of a localised population or a few individuals – *D. cristicauda / blythi*	A	3	Low
	Loss of a localised population or a few individuals – *M. lagotis*	A	4	Moderate
	Loss of a localised population or a few individuals – *Rhinonicteris aurantia*	B	3	Moderate
	Loss of a localised population or a few individuals – *Ramphotyphlops ganei*	C	2	Low
	Loss of a localised population or a few individuals – *Ctenotus nigrilineatus*.	C	2	Low
	Loss of a localised population or a few individuals – *Sminthopsis longicaudata*	C	2	Low
	Loss of a localised population or a few individuals – *Pseudomys chapmani*	E	2	Moderate
	Loss of a localised population or a few individuals – *Leggadina lakedownensis*	C	2	Low
	Loss of a localised population or a few individuals – *Macroderma gigas*	B	2	Low
Resident avian species.	Loss of a localised population or a few individuals – *Falco hypoleucos*	A	2	Low
	Loss of a localised population or a few individuals – *Burhinus grallarius*	A	2	Low
	Loss of a localised population or a few individuals – *Neochmia r. subclarescens*	A	3	Low
Nomadic avian species.	Loss of a localised population or a few individuals – *Ardeotis australis*	A	2	Low
Migratory avian species.	Loss of a localised population or a few individuals – *Merops ornatus*	A	2	Low
	Loss of a localised population or a few individuals – *Apus pacificus*	A	2	Low
Anthropogenic activity.	Altered fire regimes adversely affecting fauna assemblages	B	2	Low
	Introduced fauna populations increasing	C	3	Moderate
	Road kills	E	2	Moderate

5 DISCUSSION

5.1 Adequacy of fauna surveys

Trapping sites were selected so that they focussed on the Jamindie land system (i.e. stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey), as this was the land system for which there are limited fauna survey data (Terrestrial Ecosystems 2012) and in which most of the vegetation clearing is proposed. Reasonable fauna survey data are available for the other land systems in the project area (i.e. Boolgeeda, McKay and Newman).

The EPA (2004) Guidance Statement No 56 indicates that a Level 2 vertebrate fauna survey is required for proposed disturbances greater than 50ha in the Pilbara. A Level 2 vertebrate fauna survey requires a two season survey to ensure that the vertebrate fauna have been adequately sampled and represented in the fauna assessment. This assessment is based on a single survey. Traps have been left *in-situ* should a second survey be required.

5.2 Fauna assemblages

5.2.1 Amphibians

No amphibians were recorded during the survey due to a lack of recent rain, although *L. rubella* was seen around the exploration camp. However, all of the frogs potentially in the project area are abundant and widespread in the Pilbara and none are of conservation significance. Table 9 indicates the amphibians that are potentially in the project area.

5.2.2 Reptiles

The fauna trapping program recorded 34 species of reptiles with an additional six seen during site searches. Based on visual sightings, there appeared to be an abundance of *Varanus giganteus* in the rocky hills. None of the species caught are of conservation significance. Other reptile species potentially caught in the project area are shown in Table 11. Conservation significant reptile species potentially caught in the project area include *Liasis olivaceus barroni*, *Ramphotyphlops ganei* and *Ctenotus nigrilineatus.*

5.2.3 Birds

A total of 77 avian species were recorded in the project area, with 68 of these in the systematic avian surveys (Table 16). The number of birds and number of bird species recorded in the project area was comparable to other surveys undertaken to support EIAs but was low for a survey done for research purposes. For example, Burbidge et al. (2010) recorded a mean of 19.1 (range 3 to 49) species per site in the DEC Pilbara bioregion survey, but each of the DEC sites were visited on multiple occasions, birds were observed for a longer period during each visit and the sites were 16ha. Burbidge et al. (2010) reported the lowest species richness on saline mud flats with samphire and highest values in riverine and clay pan areas that were surrounded by tall trees. Burbidge et al. (2010) concluded that the terrestrial bird assemblage across the Pilbara bioregion was relatively uniform, with areas of riparian vegetation supporting a significantly different avian community.

The conservation significant Australian Bustard, Bush Stone-curlew and Grey Falcon were recorded in the project area and it is possible that the Rainbow Bee-eater, Fork-tailed Swift and Peregrine Falcon are potentially in the project area. All of these birds will move away from a disturbance into adjacent areas, so potential impacts on these birds are likely to be low.

5.2.4 Mammals

Seven species of bats were recorded during this survey (*Chalinolobus gouldii, Chaerephon jobensi, Mormopterus beccarii, Saccolaimus flaviventris, Scotorepens greyii, Taphozous georgianus* and *Vespadelus finlaysoni*). All bat species are common in the Pilbara and all, other than *M. beccarii*, were recorded in all habitats in the project area. Three rodents and four dasyurids were trapped in the project area (Table 12). Active Pebble-mound Mice mounds were present in the project area (Table 13) and a Northern Quoll was recorded using motion sensitive cameras (Plates 7a; Figure 6) and Northern Quoll scats were recorded at four other locations (Figure 6). Other mammal species potentially caught in the project area are listed in Table 15.

The number of small mammals caught was very low compared to other surveys in the Abydos Plain (How and Cooper 2002, Thompson and Thompson 2008a) and elsewhere in the Pilbara. As an extreme comparison, Thompson and Thompson (2008a) caught 50 *Dasycercus blythi*, 395 *Dasykaluta rosamondae*, 179 *Mus musculus*, 27 *Pseudomys desertor* and 1212 *Pseudomys hermannsburgensis* using 9,900 baited aluminium box trap-nights in an area of 210ha on the northern end of the FMG rail line.

Other conservation significant mammals potentially in the survey area include the Long-tailed Dunnart (*Sminthopsis longicaudata*) and the Northern Short-tailed Mouse (*Leggadina lakedownensis*).

5.3 Biodiversity value of the project area at the species and ecosystem levels

The habitat quality in the project area varies from highly disturbed, as it has been an operational pastoral lease for many years and subject to intensive exploration activity to high quality in areas of low value to cattle and outside the exploration areas. The fauna habitats present in the project area are similar to those in adjacent areas; therefore the fauna assemblages in these habitats are also likely to be similar to that in the adjacent areas. Clearing the vegetation in the project area will almost certainly result in the loss of numerous reptiles, frogs and small mammals. Most of the birds, larger mammals, such as kangaroos, and some of the larger reptiles (e.g. goannas), will move out of the area and find new activity areas. This will result in some short-term adjustment for many individuals, including those forced to move and those in areas with new migrants. For the more sedentary species this will mean shifting activity areas and competing for resources and some individuals may not survive. For those individuals that are nomadic, transient and migratory, or without defined home ranges that are forced to shift into new areas, the impact will generally be non-significant.

Vegetation clearing for the purposes of developing the mine, associated infrastructure, haul roads and access tracks, etc, will result in the loss of habitat used by fauna. The impacts of this clearing will generally be localised when placed in a bioregional context.

The potential impacts are associated with vegetation clearing, habitat fragmentation, the creation of a linear barrier and edge effects. As there are other existing and proposed projects in this IBRA subregion, these impacts are cumulative and will also be associated with the constant movement of trucks, light vehicles and other machinery from the mine to the rail line.

5.3.1 Ecological functional value at the ecosystem level

From a fauna perspective, some sections of the project area have been degraded by grazing, existing tracks and exploration activity. Other areas provide high quality fauna habitat and show little disturbance from cattle or other anthropogenic influences. From a fauna perspective, the primary concern is the quantity of vegetation that is being cleared as a result of this development, the cumulative effects in a bioregional context and cumulative impacts in the land systems likely to be impacted by the proposed development. When viewed in a bioregional context, the project area does not have an unusually high ecological functional value.

5.3.2 Conservation significant fauna

If the proposed site for the western mining village is not developed and disturbance areas are outside of those areas marked as Northern Quoll habitat in Figure 6, the potential impact on Northern Quolls and Pilbara Olive Pythons should be low. The proposed haul road passes through four areas of potential Northern Quoll habitat (Figure 6). The two most western sections are as the proposed haul road crosses ephemeral creek lines that drain the hilly terrain that support Northern Quoll in the northern section of the project area. Widening the existing track to construct a haul road is unlikely to significantly impact on Northern Quolls in these locations. In the eastern end of the haul road corridor, the proposed route for the haul road is located on the lower ground between hills. Northern Quoll scats were located in this area, so they are present in this area. Given the relatively small area of potential impact on Northern Quolls associated with vegetation clearing in this area, any impacts are unlikely to be significant. If the haul road is used at night, then there is a possibility that Northern Quolls could be killed or injured as they cross the road. Such losses are unlikely to be frequent or significant in a bioregional context.

Active Pebble-mound Mice mounds are present in the project area, but are mostly on the stony slopes and outside of the proposed impact areas. Pebble-mound Mice are relative wide-spread and abundant in the Pilbara, and the loss of a small number of these mounds and their occupants is unlikely to be significant in a bioregional context.

The two terrestrial reptiles that are priority species with DEC, namely *Ramphotyphlops ganei* and *Ctenotus nigrilineatus*, could potentially be in the project area, although they were not caught in the fauna survey. Given the abundance of similar habitat in adjacent areas, the loss of a small number of these individuals during vegetation clearing is unlikely to be significant in a bioregional context.

The Long-tailed Dunnart (*Sminthopsis longicaudata*) and the Northern Short-tailed Mouse (*Leggadina lakedownensis*) maybe present in the project area but were not caught in the survey. Their possible loss of a small number of these individuals during vegetation clearing is unlikely to be significant in a bioregional context.

The two conservation significant bats, namely, Pilbara Leaf-nosed Bats and Ghost Bats were not recorded in the project area, and no suitable roosting habitat was found for Pilbara Leaf-nosed Bats, but potential roosting sites are available for Ghost Bats. If the disturbance is restricted to those areas shown in Figure 2, then potential impacts on these species of bat are likely to be low.

The Australian Bustard, Bush Stone-curlew and the Grey Falcon were recorded in the project area and are listed as conservation significant species. The Rainbow Bee-eater, Peregrine Falcon and the Fork-tailed Swift are also potential found in the project area. The Fork-tailed Swift is a migratory and nomadic species and if recorded in the project area, is unlikely to remain in the area for more than a couple of weeks. All of these bird species will readily move to adjacent areas if and when they are disturbed. Potential impacts on these species are therefore unlikely to be significant in a bioregional context.

Known locations of Mulgara, Northern Quolls, Bilbies and Pilbara Olive Pythons, Pilbara Leaf-nosed Bats and the Ghost Bats in the vicinity of the project area where plotted against the four land systems in the project area. Table 25 shows the land systems that are known to support Pilbara Olive Pythons and Northern Quolls. As indicated above the habitat in the project area was generally not suitable for Bilbies and Mulgara, the rocky hills, gorges and breakaways, as well as creek and river edges that support large mature trees containing hollows are typically the habitat in which Northern Quolls and Pilbara Olive Pythons are found.

The Boolgeeda and Jamindie land systems have been poorly surveyed, but inference can be drawn from the survey results of this assessment to indicate both land systems are unlikely to support Mulgara, Northern Quolls, Bilbies and Pilbara Olive Pythons, Pilbara Leaf-nosed Bats and the Ghost Bats.

Table 25. Conservation significant fauna in land systems in the assessed impact area

Land system	Pilbara Leaf-nosed Bat	Ghost Bat	Mulgara	Bilby	Pilbara Olive Python	Northern Quoll
Boolgeeda						
Jamindie						
McKay		X			X	X
Newman						X

TERRESTRIAL ECOSYSTEMS

6 CONCLUSION

The project area supports a reptile and small mammal assemblage that contains fewer species and a lower abundance than is generally found elsewhere in the Pilbara in similar habitat and an avian assemblage comparable to that found in similar habitats elsewhere in the Pilbara. The amphibian fauna was not sampled, but it is likely to be similar to that recorded in other surveys in the bioregion.

Northern Quolls are present in the rocky hills and breakaways in the northern section of the project area and eastern end of the haul road corridor. Pebble-mound Mice are present in the rocky undulating areas. Although not recorded, there is a possibility the project area also supports *Liasis olivaceus barroni*, *Ramphotyphlops ganei* and *Ctenotus nigrilineatus,* Long-tailed Dunnart (*Sminthopsis longicaudata*) and the Northern Short-tailed Mouse (*Leggadina lakedownensis*). Pilbara Leaf-nosed Bats and Ghost Bats were not recorded in the project area, and no suitable roosting habitat was found for Pilbara Leaf-nosed Bats, but potential roosting sites are available for Ghost Bats.

The Australian Bustard, Bush Stone-curlew and Grey Falcon were recorded in the project area, and it is possible that Rainbow Bee-eater, Fork-tailed Swifts and Peregrine Falcons may infrequently be seen in the project area. Potential impacts on these species will be low as they will readily move to adjacent areas when disturbed.

If the proposed disturbance is restricted to those potential impact areas as shown in Figure 2, which is largely outside areas mapped as Northern Quoll habitat and where Pilbara Olive Pythons are likely to occur, then the project is unlikely to significantly impact on these species.

The fauna habitats present in the project area are similar to those in adjacent areas; therefore the fauna assemblages in these habitats are also likely to be similar to that in the adjacent areas. Clearing the vegetation in the project area will almost certainly result in the loss of numerous reptiles, frogs and small mammals. Most of the birds, larger mammals, such as kangaroos, and some of the larger reptiles (e.g. goannas), will move out of the area and find new activity areas. This will result in some short-term adjustment for many individuals, including those forced to move and those in areas with new migrants. For the more sedentary species this will mean shifting activity areas and competing for resources and some individuals may not survive. For those individuals that are nomadic, transient and migratory, or without defined home ranges that are forced to shift into new areas, the impact will generally be non-significant.

The potential impacts are associated with habitat fragmentation, the creation of a linear barrier and edge effects. These are compounded by the cumulative effects of being another vegetation clearing in the Pilbara. In addition, there are impacts that are associated constant movement of trucks, light vehicles and other machinery from the mine to the rail line.

7 REFERENCES

Abbott, I. 2001. The Bilby *Macrotis lagotis* (Marsupialia: Peramelidae) in south-western Australia: original range limits, subsequent decline, and presumed regional extinction. Records of the Western Australian Museum 20:271-305.

Anstee, S. and K. Armstrong. 2001. The effect of familiarity and mound condition in translocations of the western pebble-mound mouse, *Pseudomys chapmani*, in the Pilbara region of Western Australia. Wildlife Research 28:135-140.

Armstrong, K. 2001. The distribution and roost habitat of the orange leaf-nosed bat, *Rhinonicteris aurantius*, in the Pilbara region of Western Australia. Wildlife Research 28:95-104.

Armstrong, K. 2002. Morphometric divergence among populations of *Rhinonicteris aurantius* (Chiroptera: Hipposideridae) in northern Australia. Australian Journal of Zoology 50:649-669.

Armstrong, K. and S. D. Anstee. 2000. The Ghost bat in the Pilbara: 100 years on. Australian Mammalogy 22:99-101.

Armstrong, K. N. and T. Reardon. 2006. Standardising common names of bats in Australia. The Australasian Bat Society Newsletter 27:6-9.

ATA Environmental. 2007. Assessment of the Conservation Significant Vertebrate Fauna for the Proposed Rail Corridor and Associated Borrow Pits. Perth.

Baker, J., R. L. Goldingay, and R. J. Whelan. 1998. Powerline easement through forests: a case study of impacts on avifauna. Pacific Conservation Biology 4:79-89.

Bamford Consulting Ecologists. 2007. Fauna Assessment of the Pardoo Direct Shipping Ore Project Atlas Iron Ltd. Perth.

Bamford Consulting Ecologists. 2009a. Fauna Assessment of the Abydos DSO Project Atlas Iron Ltd. Perth.

Bamford Consulting Ecologists. 2009b. Fauna Assessment of the BC Iron Nullagine Iron Ore Project. Perth.

Bamford, M. J., D. Watkins, W. J. Bancroft, G. Tischler, and J. Wahl. 2008. Migratory Shorebirds of the East Asian - Australasian Flyway: Population Estimates and Internationally Important Sites. Wetlands International - Oceania, Canberra.

Barrick Plutonic Gold Mine. 2006. Management Plan for the Protection of the Mulgara. Perth.

Baudinette, R. V., S. K. Churchill, K. A. Christian, J. E. Nelson, and P. J. Hudson. 2000. Energy, water balance and roost microenvironment in three Australian cave-dwelling bats (Microchiroptera). Journal of Comparative Physiology B 170:439-446.

Beard, J. S. 1975. Pilbara. Explanatory notes to Sheet 5, 1:1 000 000 series vegetation survey of Western Australia., University of Western Australia Press, Perth.

Biota Environmental Sciences. 2002. Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland - Vertebrate Fauna Survey. Perth.

Biota Environmental Sciences. 2004a. Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage A Rail Corridor. Fortescue Metals Group, unpublished report, Perth.

Biota Environmental Sciences. 2004b. Hope Downs Additional Rail Corridor - Chichester Range: Vertebrate Fauna Survey. Unpublished report for Hope Downs Management Services Pty Ltd, Perth.

Biota Environmental Sciences. 2005. Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage B Rail Corridor and Mindy Mindy, Christmas Creek, Mt Lewin and Mt Nicholas Mine Areas. Fortescue Metals Group, unpublished report, Perth.

Blyth, J. and W. Boles. 1997. Report on an expedition to the Murchison, Gascoyne and East Pilbara areas to search for Night Parrots November 8-23 1997. Unpublished report.

Blyth, J., A. Burbidge, P. Kendrick, and W. Boles. 1996. Report on an expedition to the Western Desert and East Pilbara areas to search for Night Parrots (*Pezoporus occidentalis*) November 12-29 1996. Unpublished report.

Braithwaite, R. W. and A. D. Griffiths. 1994. Demographic variation and range contraction in the Northern Quoll, *Dasyurus hallucatus* (Marsupialia : Dasyuridae). Wildlife Research 21:203-217.

Breed, B. and F. Ford. 2007. Native Mice and Rats. CSIRO Publishing, Collingwood, Victoria.

Burbidge, A. A. 1971. Results of a Biological Survey of the Millstream Area. Department of Fsiheries and Fauna, Western Australia, Report VII, Perth.

Burbidge, A. A. 2004. Threatened Animals of Western Australia. Department of Conservation and Land Management, Perth.

Burbidge, A. A., N. L. McKenzie, and P. J. Fuller. 2008. Long-tailed Dunnart *Sminthopsis longicaudata*. Pages 148-150 *in* S. van Dyck and R. Strahan, editors. The Mammals of Australia. Reed New Holland, Sydney.

Burbidge, A. H., R. E. Johnstone, and D. J. Pearson. 2010. Birds in a vast arid upland: avian biogeographical patterns in the Pilbara region of Western Australia. Records of the Australian Museum Supplement 78:247-270.

Chen, X., C. R. Dickman, and M. B. Thompson. 1998. Diet of the mulgara, *Dasycercus cristicauda* (Marsupialia: Dasyuridae), in the Simpson Desert, central Australia. Wildlife Research 25:233-242.

Christidis, L. and W. E. Boles. 2008. Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Collingwood, Victoria.

Coffey Environments. 2008. Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project. Perth.

Coffey Environments. 2011. Targeted Surveys - Northern Quolls, Mulgara and Pilbara Olive Pythons Solomon Rail Project. Perth.

Colwell, R. K. and J. A. Coddington. 1994. Estimating terrestrial biodiversity through extrapolation. Philosophical Transactions of the Royal Society of London, Series B. 345:101-118.

Davies, S., M. Bamford, and M. Bamford. 1988. The Night Parrot: a search in the Lake Disappointment area, September 1987. RAOU Report No. 49; RAOU, Melbourne.

Davis, R. A. and B. M. Metcalf. 2008. The Night Parrot (*Pezoporus occidentalis*) in northern Western Australia: a recent sighting from the Pilbara region. Emu 108:223-236.

Davis, R. A., J. A. Wilcox, B. M. Metcalf, and M. J. Bamford. 2005. Fauna survey of proposed Iron Ore Mine, Cloud Break, for Fortescue Metals Group. Unpublished report for Fortescue Metals Group, Perth.

Department of Environment Water Hertiage and the Arts. 2010. Survey Guidelines for Australia's Threatened Bats. Canberra.

Department of Sustainability Environment Water Population and Communities. 2012. Invitation to comment on the proposed delisting of *Dasycercus hillieri* and listing *Dasycercus blythi* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Canberra.

Dickman, C. R., A. S. Haythornthwaite, G. H. McNaught, P. S. Mahon, B. Tamayo, and M. Letnic. 2001. Population dynamics of three species of dasyurid marsupials in arid central Australia: a 10 year study. Wildlife Research 28:493-506.

Ecologia Ecological Consultants. 2011. Cloudbreak Level 2 Terrestrial Vertebrate Fauna Assessment. Perth.

Ecologia Environment. 2010. Solomon Project: Kings Area Vertebrate Fauna Assessment. Perth.

Ecologia Environment. 2011a. Mount Webber Iron Ore Project Northern Quoll Survey. Perth.

Ecologia Environment. 2011b. Rail Proposal Area, Level 2 Vertebrate Fauna Assessment. Perth.

Ecologia Environmental Consultants. 2007. RGP5 Rail Duplication Project: Chichester Deviation Short Range Endemic Invertebrate Survey and a Targeted Survey for the Trapdoor Spider, *Aurecocrypta* sp., Perth.

Environmental Protection Authority. 2002. Terrestrial Biological Surveys as an Element of Biodiversity Protection: Position Statement No. 3. Environment Protection Authority, Perth.

Environmental Protection Authority. 2004. Guidance for the Assessment of Environmental Factors. Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia No. 56. Perth.

Environmental Protection Authority and Department of Environment and Conservation (Eds Hyder, B. M., Dell, J. and Cowan, M.A.),. 2010. Technical Guide - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment. Environmental Protection Authority, Perth.

Firth, H. J. 1976. The Complete Book of Australian Birds. Readers Digest Services Pty Ltd, Sydney.

Garnett, S., G. Crowley, R. Duncan, N. Baker, and P. Doherty. 1993. Notes on live Night Parrot sightings in north-western Queensland. Emu 93:292-296.

Garnett, S. T., J. K. Szabo, and G. Dutson. 2011. The Action Plan for Australian Birds 2010. CSIRO, Collingwood, Melbourne.

Gentilli, J. 1972. Australian Climate Patterns. Nelson, Melbourne.

Gibson, D. F. and J. R. Cole. 1992. Aspects of the ecology of the Mulgara, *Dasycercus cristicauda*, (Marsupialia: Dasyuridae) in the Northern Territory. Australian Mammalogy 15:105-112.

Gibson, L. A. and N. L. McKenzie. 2009. Environmental associations of small ground-dwelling mammals in the Pilbara region, Western Australia. Records of the Australian Museum Supplement 78:91-122.

Goosem, M. 2000. Effects of tropical rainforest roads on small mammals: edge changes in community composition. Wildlife Research 27:151-163.

Goosem, M. 2001. Effects of tropical rainforest roads on small mammals; inhibition of crossing movements. Wildlife Research 28:351-364.

Goosem, M. W. and H. Marsh. 1997. Fragmentation of small mammal community by a powerline corridor through tropical rainforest. Wildlife Research 24:613-629.

Hayek, L. C. and M. A. Buzas. 1997. Surveying natural populations. Columbia University Press, New York.

Hill, B. M. and S. J. Ward. 2010. National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*., Darwin.

How, R. A. and N. K. Cooper. 2002. Terrestrial small mammals of the Abydos Plain in the north-eastern Pilbara, Western Australia. Journal of the Royal Society of Western Australia 85:71-82.

How, R. A. and J. Dell. 2004. Reptile assemblage of the Abydos Plain, north-eastern Pilbara, Western Australia. Journal of the Royal Society of Western Australia 87:85-95.

How, R. A., J. Dell, and N. K. Cooper. 1991. Vertebrate fauna. Records of the Western Australian Museum Supplement No. 37:78-125.

Jarvis, N. T. 1979. Western Australia. An Atlas of Human Endeavour 1829-1979. Education and Lands Survey Departments, Western Australia, Perth.
Johnson, K. A. 1989. Thylacomidae. Pages 625-635 *in* D. W. Walton and B. J. Richardson, editors. Fauna of Australia. Mammalia. Australian Government Publishing, Canberra.
Johnson, K. A. 2008. Bilby. Pages 191-193 *in* S. van Dyck and R. Strahan, editors. The mammals of Australia. Reed Australia, Sydney.
Johnstone, R. E. and G. M. Storr. 1998. Handbook of Western Australian Birds. Volume 1 - Non-Passerines (Emu to Dollarbird). Western Australian Museum, Perth.
Johnstone, R. E. and G. M. Storr. 2004. Handbook of Western Australian Birds, Volume II Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth.
Jolly, S. 1988. Five colonies of the orange horseshoe bat, *Rhinonycteris aurantius* (Chiroptera: Hipposideridae), in the Northern Territory. Australian Wildlife Research 15:41-49.
Kempton, R. A. and L. R. Taylor. 1974. Log-series and log-normal parameters as diversity discriminants for the *Lepidoptera*. Journal of Animal Ecology 43:381-399.
Kendrick, P. 2002. Pilbara 2 (PIL2 - Fortescue Plains subregion). A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Perth.
Kendrick, P. and N. L. McKenzie. 2002. Pilbara 1 (PIL1 - Chichester subregion). Pages 547-558 A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management.
Kendrick, P. G. 2001. Pilbara 3 (PIL3 - Hamersley subregion). Pages 568-580 A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Perth.
King, D. R. 1989. An assessment of the hazard posed to Northern Quolls (*Dasyurus hallucatus*) by aerial baiting with 1080 to control dingoes. Australian Wildlife Research 16:569-574.
Kortner, G., C. R. Pavey, and F. Geiser. 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.
Kulzer, E., J. E. Nelson, J. L. McKean, and F. P. Mohres. 1970. Untersuchungen uber die temperaturregulation australischer Fledermause (Microchiroptera). Zeitschrift fuer Vergleichende Physiologie 69:426-438.
Laurance, W. F. 1991. Edge effects in tropical forest fragments: application of a model for design of nature reserves. Biological Conservation 57:205-219.
Laurance, W. F. 1994. Rainforest fragmentation and the structure of small mammal communities in tropical Queensland. Biological Conservation 69:23-32.
Lavery, H. T. and T. H. Kirkpatrick. 1997. Field management of the bilby *Macrotis lagotis* in an area of south-western Queensland. Biological Conservation 79:271-281.
Letnic, M. and C. R. Dickman. 2005. The responses of small mammals to patches regenerating after fire and rainfall in the Simpson Desert, central Australia. Austral Ecology 30:24-39.
Luck, G. W., H. P. Possingham, and D. C. Paton. 1999. Bird responses at inherent and induced edges in the Murray Mallee, South Australia. 1. Differences in abundance and diversity. Emu 99:157-169.
Magurran, A. E. 1988. Ecological Diversity and Its Measurement. Princeton University Press, Princeton, New Jersey.
Magurran, A. E. 2004. Measuring Biological Diversity. Blackwell, Oxford.
Manson, J. 1994. The implications of home range variation between sexes and seasons in an arid dwelling dasyurid, the Mulgara (Dasycercus cristicauda). University of Western Australia, Perth.
Masters, P. 1998. The Mulgara *Dasycercus cristicauda* (Marsupialia: Dasyuridae) at Uluru National Park, Northern Territory. Australian Mammalogy 20:403-404.
Masters, P. 2003. Movement patterns and spatial organisation of the mulgara, *Dasycercus cristicauda* (Marsupialia: Dasyuridae), in central Australia. Wildlife Research 30:339-344.
Masters, P. 2008. Crest-tailed Mulgara. Pages 49-50 *in* S. Van Dyck and R. Strahan, editors. The Mammals of Australia. Reed New Holland, Sydney.
Masters, P., C. R. Dickman, and M. Crowther. 2003. Effects of cover reduction on Mulgara *Dasycercus cristicauda* (Marsupialia: Dasyuridae), rodent and invertebrate populations in central Australia: Implications for land management. Austral Ecology 28:658-665.
McCracken, H. E. 1990. Reproduction in the greater bilby, *Macrotis lagotis* (Reid) - a comparison with other perameloids. Pages 199-204 *in* J. H. Seebeck, P. R. Brown, R. L. Walllis, and C. M. Kemper, editors. Bandicoots and Bilbies. Surrey Beatty and Sons, Chipping Norton, NSW.
McKenzie, N. L. and R. D. Bullen. 2009. The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats. Records of the Australian Museum Supplement 78:123-155.
McKenzie, N. L., N. Hall, and W. P. Muir. 2000. Non-volant mammals of the southern Carnarvon Basin, Western Australia. Records of the Western Australian Museum Supplement No 61:479-510.

McKilligan, N. 2005. Herons, Egrets and Bitterns. Their Biology and Conservation in Australia. CSIRO, Collingwood, Victoria.
Merrick, J. R. and G. E. Schmida. 1984. Australian Freshwater Fishes Biology and Management. J. R. Merrick, North Ryde, Australia.
Moreno, C. E. and G. Halffter. 2000. Assessing the completeness of bat biodiversity inventories using species accumulation curves. Journal of Applied Ecology 37:149-158.
Morgan, D. L. and H. S. Gill. 2004. Fish fauna in inland waters of the Pilbara (Indian Ocean) Drainage Division of Western Australia - evidence for three subprovinces. Zootaxa 636:1-43.
Moseby, K. E. and E. O'Donnell. 2003. Reintroduction of the greater bilby, *Macrotis lagotis* (Reid) (Marsupialia: Thylacomyidae), to northern South Australia: survival, ecology and notes on reintroduction protocols. Wildlife Research 30:15-27.
Oakwood, M. 2000. Reproduction and demography of the northern quoll, *Dasyurus hallucatus*, in the lowland savanna of northern Australia. Australian Journal of Zoology 48:519-539.
Oakwood, M. 2002. Spatial and social organisation of a carnivorous marsupial *Dasyurus hallucatus* (Marsupialia : Dasyuridae). Journal of Zoology (London) 257:237-248.
Oakwood, M. 2008. Northern Quoll. Pages 57-59 *in* S. van Dyck and R. Strahan, editors. The Mammals of Australia. Reed New Holland, Sydney.
Outback Ecology Services. 2009. Wodgina DSO Project Terrestrial Vertebrate Fauna Assessment. Perth.
Outback Ecology Services. 2011. Mt Dove DSO Project Vertebrate Fauna Assessment. Perth.
Oxley, D. J., M. B. Fenton, and G. R. Carmody. 1974. The effects of roads on populations of small mammals. Journal of Applied Ecology 11:51-59.
Paton, P. W. C. 1994. The effect of edge on avian nest success: How strong is the evidence? Conservation Biology 8:17-26.
Pavey, C. 2006. Recovery plan for the Greater Bilby, *Macrotis lagotis*, 2006-2011., Northern Territory Department of Natural Resources, Environment and the Arts, Darwin.
Pearson, D. 2003-04. Mulgaras and mining. Landscope 19:26-31.
Pearson, D. 2007. Pilbara Olive Python *Liasis olivaceus barroni*. Pages 174-181 *in* M. Swan, editor. Keeping and Breeding Australian Pythons. Mike Swan Herp. Books, Melbourne, Victoria.
Pisces Conservation Ltd. 2010. Species diversity and richness II. Pisces Conservation Ltd, England.
Rapallo. 2010. Targeted Survey of the Poondano Project Area for Populations of the Northern Quoll (*Dasyurus hallucatus*). Perth.
Reid, J. R. W. 2008. Northern Short-tailed Mouse. Pages 582-583 *in* S. Van Dyck and R. Strahan, editors. Mammals of Australia. Reed New Holland, Sydney.
Sherrod, P. H. 2001. Nonlinear Regression Analysis Program. Brentwood, Tennessee.
Simpson, K. and N. Day. 2004. Field Guide to Australian Birds. Penguin Books, Melbourne.
Smith, B. and J. B. Wilson. 1996. A consumer's guide to evenness measures. Oikos 76:70-82.
Soberón, J. and J. Llorente. 1993. The use of species accumulation functions for the prediction of species richness. Conservation Biology 7:480-488.
Southgate, R., P. Christie, and K. Bellchambers. 2000. Breeding biology of captive, reintroduced and wild greater bilbies, *Macrotis lagotis* (Marsupialia : Peramelidae). Wildlife Research 27:621-628.
Southgate, R., R. Paltridge, P. Masters, and S. Carthew. 2007. Bilby distribution and fire: a test of alternative models of habitat suitability in the Tanami Desert, Australia. Ecography 30:759-776.
Southgate, R. and H. Possingham. 1995. Modelling the reintroduction of the Greater Bilby *Macrotis lagotis* using the metapopulation model analysis of the likelihood of extinction (Alex). Biological Conservation 73:151-160.
Southgate, R. A. 1990. Habitat and diet of the *Bilby Macrotis lagotis in* J. H. Seebeck, P. R. Brown, R. L. Wallis, and C. M. Kemper, editors. Bandicoots and Bilbies. Surrey Beatty and Sons, Sydney.
Start, A. N. 2008. Western Pebble-mouse. Pages 621-622 *in* S. Van Dyck and R. Strahan, editors. Mammals of Australia. Reed New Holland, Sydney.
Storr, G., L. Smith, and R. Johnstone. 1983. Lizards of Western Australia. II: Dragons and Monitors. Western Australian Museum, Perth, Western Australia.
Storr, G., L. Smith, and R. Johnstone. 1990. Lizards of Western Australia. III: Geckos and Pygopods. Western Australian Museum, Perth.
Storr, G., L. Smith, and R. Johnstone. 1999. Lizards of Western Australia. I: Skinks. Western Australian Museum, Perth.
Storr, G., L. Smith, and R. Johnstone. 2002. Snakes of Western Australia. Western Australian Museum, Perth.
Temple, S. A. 1998. The edge of the cut: implications for wildlife populations. Journal of Forestry 96:22-26.
Terrestrial Ecosystems. 2011a. Assessment of the presence of Northern Quoll (*Dasyurus hallucatus*) on the Abydos-Woodstock Section of the Roy Hill Infrastructure Railway (Chainage 92 to 180). Perth.

Terrestrial Ecosystems. 2011b. Conservation Significant Vertebrate Fauna Species Habitat Assessment Roy Hill Infrastructure Rail Corridor from Port Hedland to Chainage 262. Perth.

Terrestrial Ecosystems. 2011c. Level 2 Fauna Risk Assessment for the Granny Deeps Project Area. Perth.

Terrestrial Ecosystems. 2012. Preliminary Vertebrate Fauna Investigation for the Mulga Downs Project. Perth.

Thompson, G. G. and S. A. Thompson. 2007a. Shape and spatial distribution of Mulgara (*Dasycercus cristicauda*) burrows, with comments on their presence in a burnt habitat and a translocation protocol. Journal of the Royal Society of Western Australia 90:195-202.

Thompson, G. G. and S. A. Thompson. 2007b. Usefulness of funnel traps in catching small reptiles and mammals, with comments on the effectiveness of the alternatives? Wildlife Research 34:491-497.

Thompson, G. G. and S. A. Thompson. 2007c. Using species accumulation curves to estimate trapping effort in fauna surveys and species richness. Austral Ecology 32:564-569.

Thompson, G. G. and S. A. Thompson. 2008a. Abundance and spatial distribution of five small mammals at a local scale. Australian Mammalogy 30:65-70.

Thompson, G. G. and S. A. Thompson. 2008b. Greater Bilby (*Macrotis lagotis*) burrows, diggings and scats in the Pilbara. Journal of the Royal Society of Western Australia 91:21-25.

Thompson, G. G. and S. A. Thompson. 2009. Comparative temperature in funnel and pit traps. Australian Journal of Zoology 57:311-316.

Thompson, G. G., S. A. Thompson, and G. R. Finlayson. 2010. Spatial and temporal variations in the trapped terrestrial vertebrate fauna of the Hamersley Range, Western Australia. Journal of the Royal Society of Western Australia 93:51-64.

Thompson, G. G., S. A. Thompson, P. C. Withers, and J. Fraser. 2007. Determining adequate trapping effort and species richness using species accumulation curves for environmental impact assessments. Austral Ecology 32:570-580.

Thompson, G. G. and P. C. Withers. 2003. Effect of species richness and relative abundance on the shape of the species accumulation curve. Austral Ecology 28:355-360.

Thompson, G. G., P. C. Withers, E. R. Pianka, and S. A. Thompson. 2003. Assessing biodiversity with species accumulation curves; inventories of small reptiles by pit-trapping in Western Australia. Austral Ecology 28:361-383.

Thompson, S. A. and G. G. Thompson. 2005. Temporal variation in reptile assemblages in the Goldfields of Western Australia. Journal of the Royal Society of Western Australia 88:25-36.

Thompson, S. A. and G. G. Thompson. 2010. Terrestrial Vertebrate Fauna Assessments for Ecological Impact Assessment. Terrestrial Ecosystems, Perth.

Thompson, S. A., G. G. Thompson, and P. C. Withers. 2005. Influence of pit-trap type on the interpretation of fauna diversity. Wildlife Research 32:131-137.

Tidemann, C. R., D. M. Priddel, J. E. Nelson, and J. D. Pettigrew. 1985. Foraging behaviour of the Australian Ghost Bat, *Macroderma gigas* (Microchiroptera: Megadermatidae). Australian Journal of Zoology 33:705-713.

Toop, G. J. 1985. Habitat requirements, survival strategies and ecology of the ghost bat, *Macroderma gigas* Dobson (Microchiroptera, Megadermatidae) in central coastal Queensland. Macroderma 1:37-41.

Tyler, M. J., L. A. Smith, and R. E. Johnstone. 2000. Frogs of Western Australia. Western Australian Museum, Perth.

Van Dyck, S. and R. Strahan. 2008. The Mammals of Australia. Reed New Holland Sydney.

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

Wilson, H. 1937. Notes on the Night Parrot, with references to recent occurrences. Emu 37:79-87.

Wolda, H. 1981. Similarity indices, sample size and diversity. Oecologia 50:296-302.

Woolley, P. A. 1990. Mulgaras, *Dasycercus cristicauda* (Marsupialia: Dasyuridae); their burrows, and records of attempts to collect live animals between 1966 and 1979. Australian Mammalogy 13:61-64.

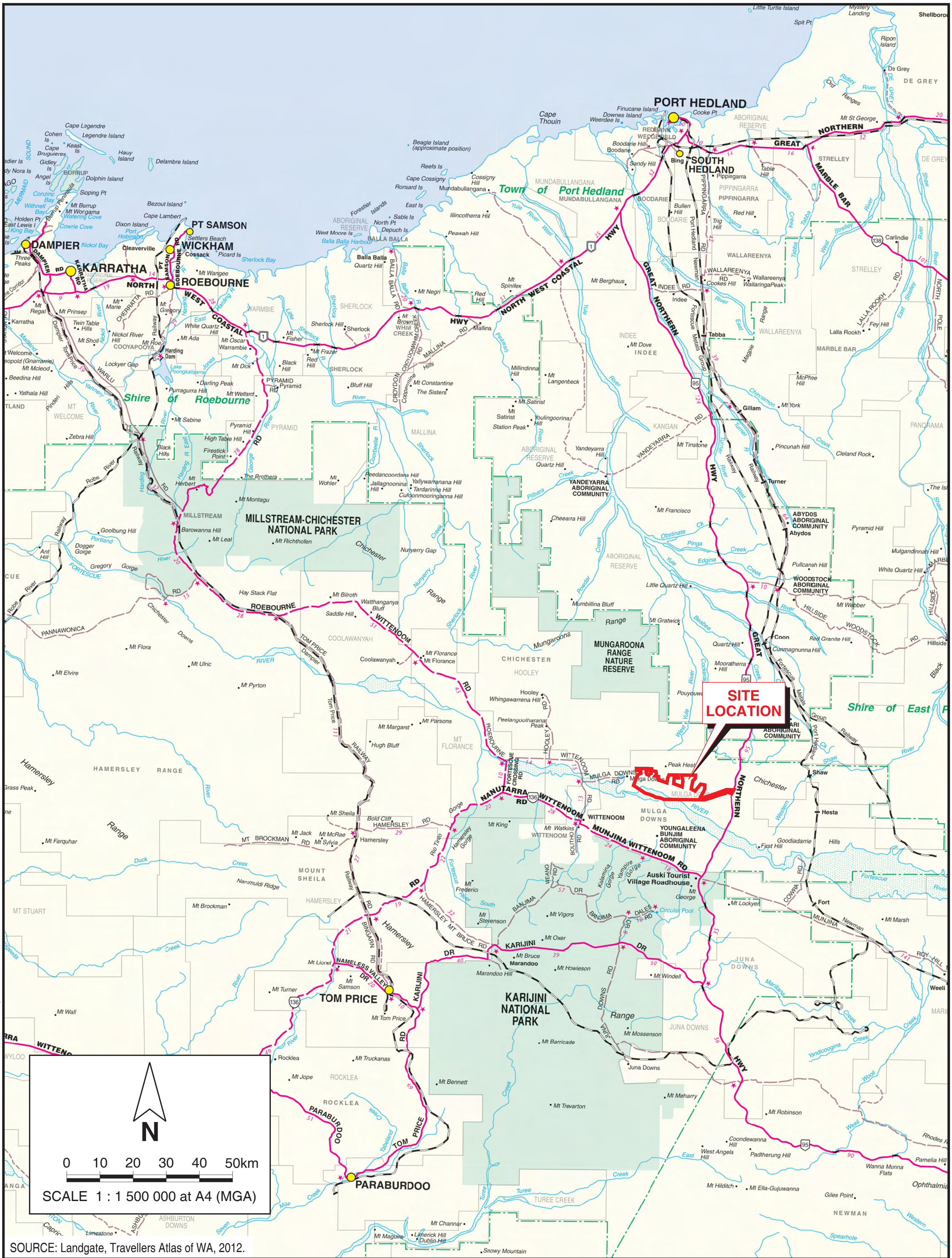
Woolley, P. A. 2005. The species of *Dasycercus* Peters, 1875 (Marsupialia: Dasyuridae). Memoirs of Museum Victoria 62:213-221.

Woolley, P. A. 2008a. Brush-tailed Mulgara. Pages 47-48 *in* S. van Dyck and R. Strahan, editors. The Mammals of Australia. Reed New Holland, Sydney.

Woolley, P. A. 2008b. Crest-tailed Mulgara. Pages 49-50 *in* S. Van Dyck and R. Strahan, editors. The Mammals of Australia. New Holland, Sydney.

Worthington-Wilmer, J., C. Moritz, L. Hall, and J. Toop. 1994. Extreme population structure in the threatened Ghost Bat, *Macroderma gigas*: Evidence from mitochondrial DNA. Proceedings of the Royal Society London 257:193-198.

Ziembicki, M. 2010. Australian Bustard. CSIRO Publishing, Collingwood, Victoria.



PINPOINT CARTOGRAPHICS (08) 9562 7136 2012-0027-MD-f01.dgn

TERRESTRIAL ECOSYSTEMS

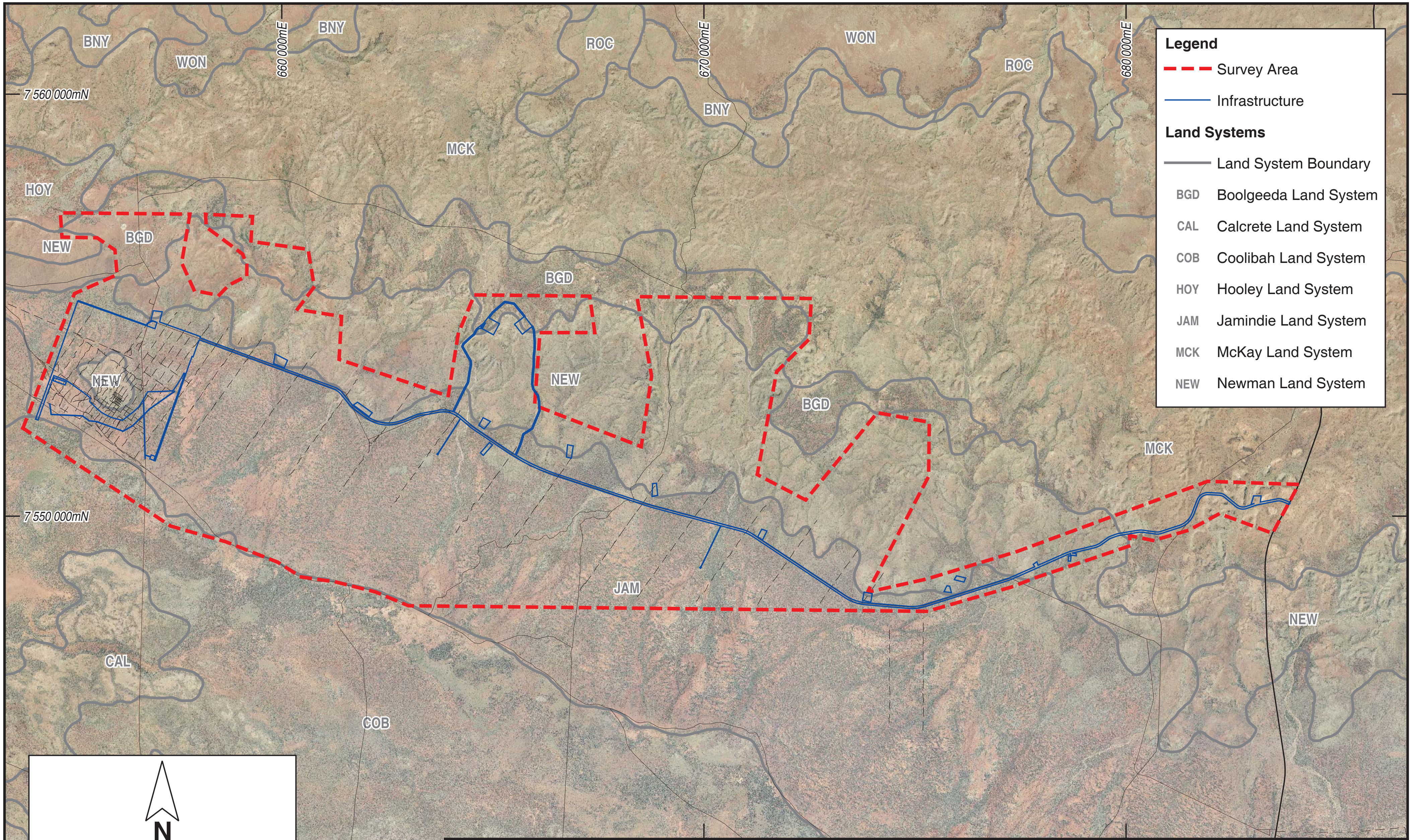
Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

Figure 1

REGIONAL LOCATION

Drawn: S. Thompson | Date: 19 Dec 2012 | Job: 2012-0027

PINPOINT CARTOGRAPHICS (08) 9562 7136 2012-0027-MD-f02.dgn



AERIAL PHOTOGRAPH: flown August 2004.
LAND SYSTEMS SOURCE: Department of Agriculture, September 2009.

TERRESTRIAL ECOSYSTEMS

Drawn: S. Thompson | Date: 19 Dec 2012

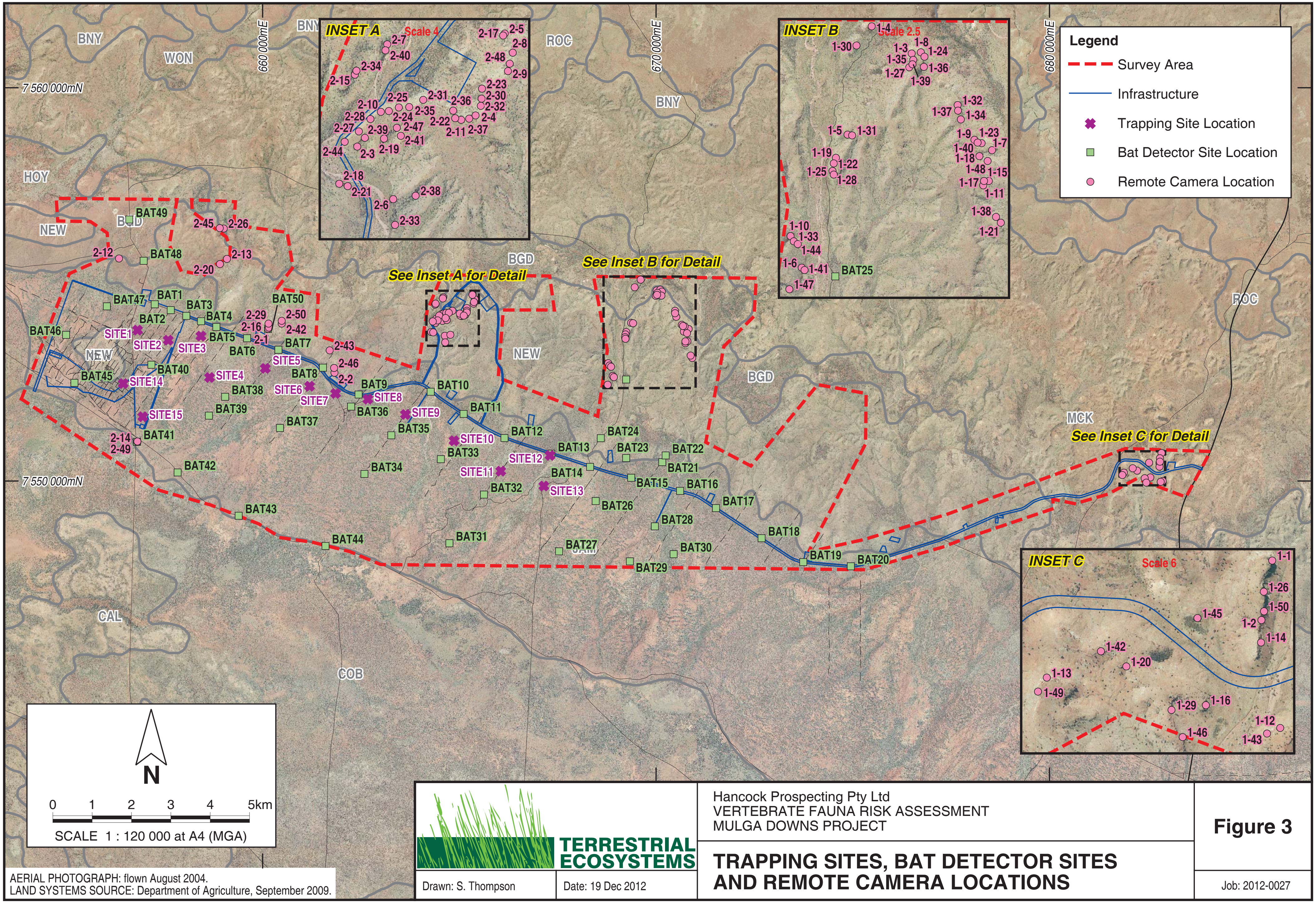
Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

SURVEY AREA AND LAND SYSTEMS

Figure 2

Job: 2012-0027

PINPOINT CARTOGRAPHICS (08) 9562 7136 2012-0027-MD-f03.dgn



AERIAL PHOTOGRAPH: flown August 2004.
LAND SYSTEMS SOURCE: Department of Agriculture, September 2009.

TERRESTRIAL ECOSYSTEMS

Drawn: S. Thompson | Date: 19 Dec 2012

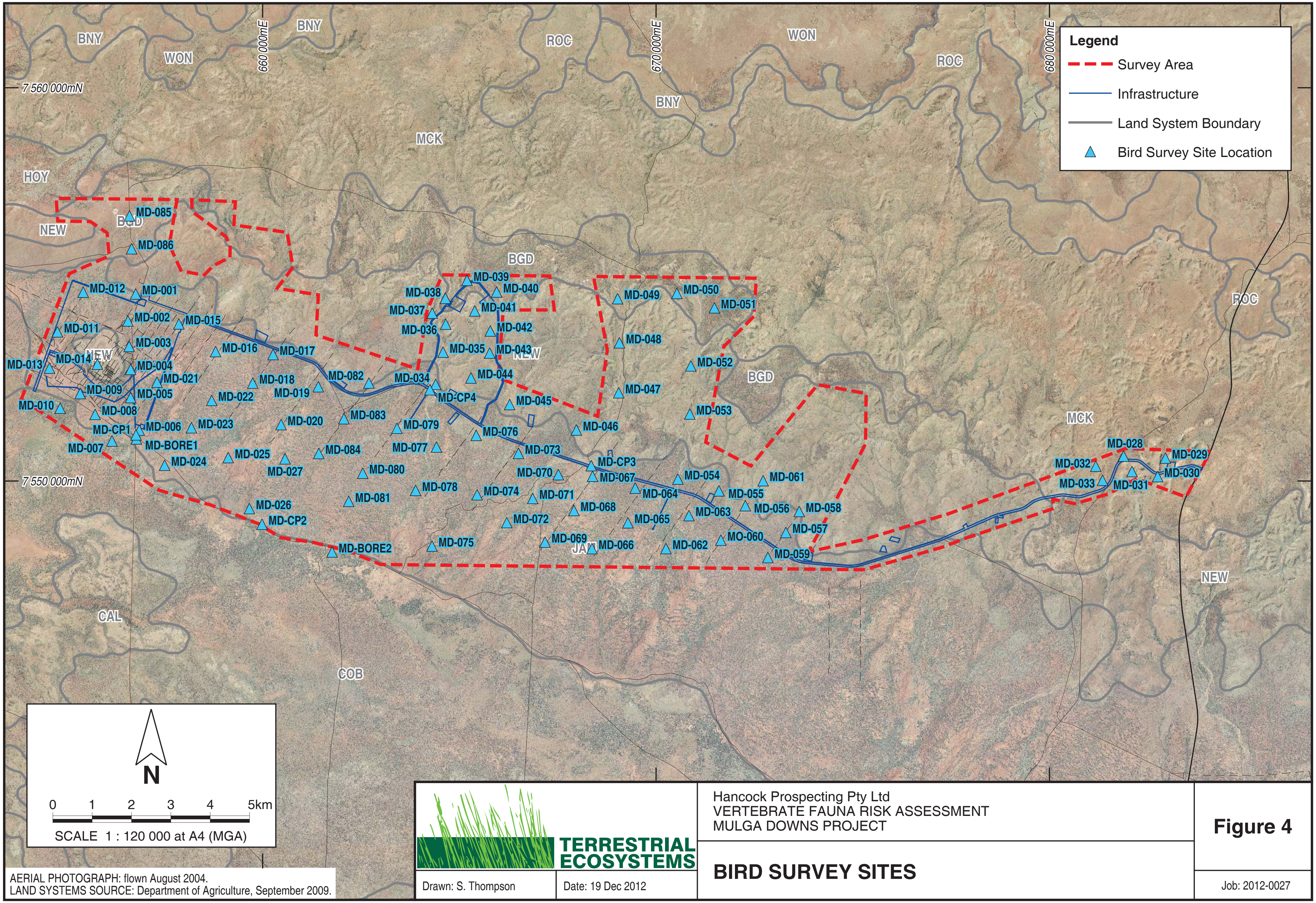
Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

TRAPPING SITES, BAT DETECTOR SITES AND REMOTE CAMERA LOCATIONS

Figure 3

Job: 2012-0027

PINPOINT CARTOGRAPHICS (08) 9562 7136 2012-0027-MD-f04.dgn



TERRESTRIAL ECOSYSTEMS

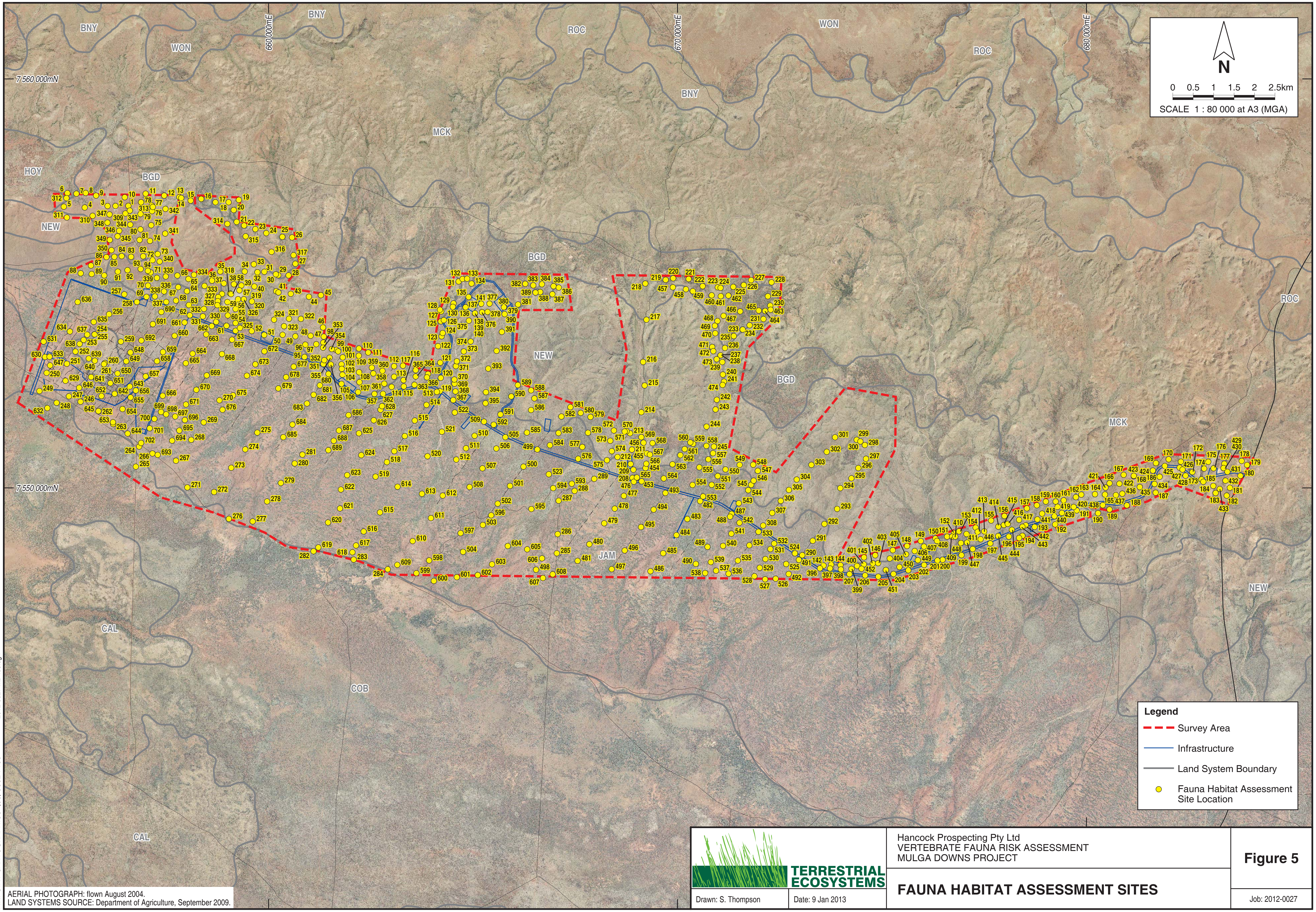
Drawn: S. Thompson | Date: 19 Dec 2012

Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

BIRD SURVEY SITES

Figure 4

Job: 2012-0027



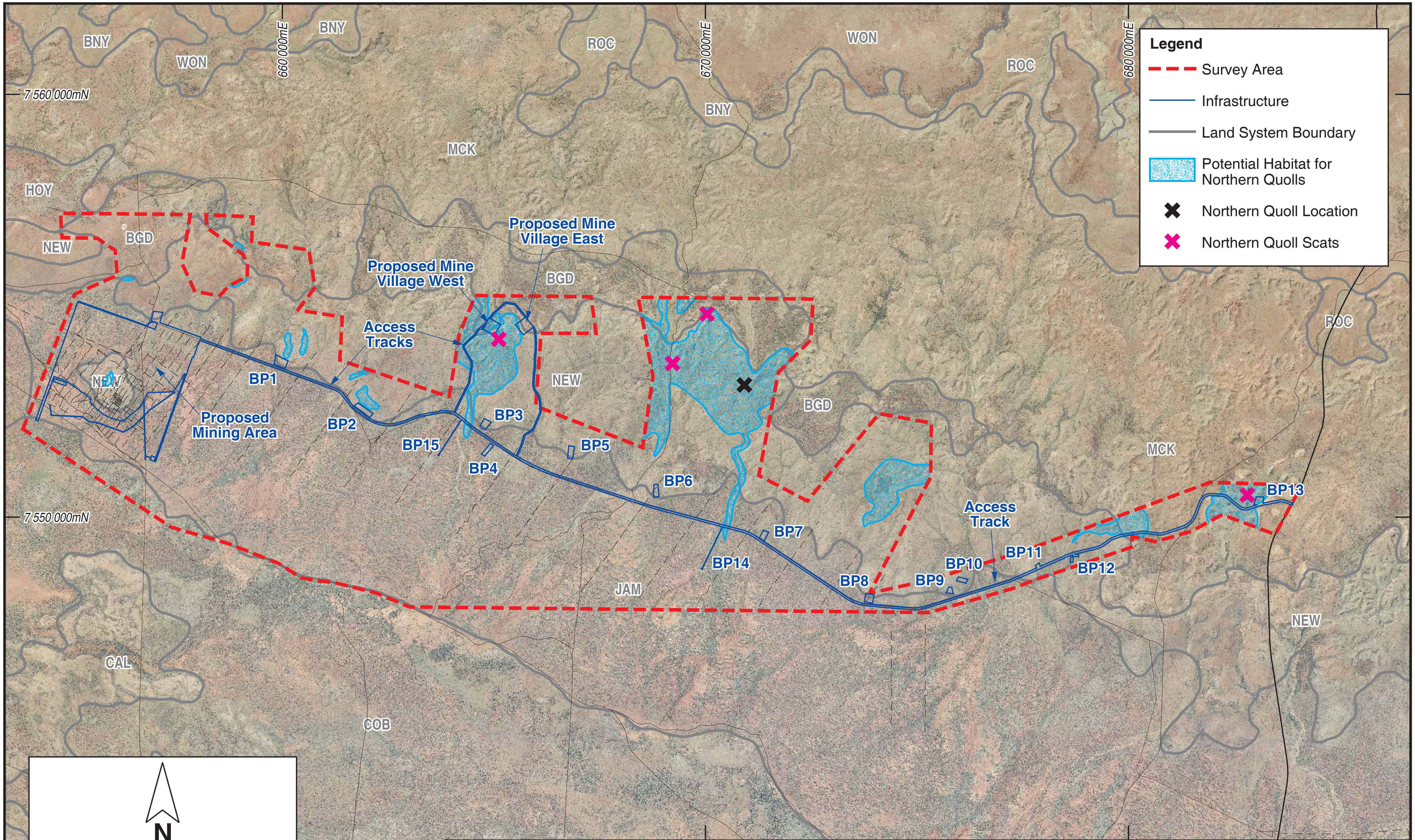
Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

Figure 5

FAUNA HABITAT ASSESSMENT SITES

Drawn: S. Thompson | Date: 9 Jan 2013 | Job: 2012-0027

PINPOINT CARTOGRAPHICS (08) 9562 7136 2012-0027-MD-f06.dgn



AERIAL PHOTOGRAPH: flown August 2004.
LAND SYSTEMS SOURCE: Department of Agriculture, September 2009.

TERRESTRIAL ECOSYSTEMS

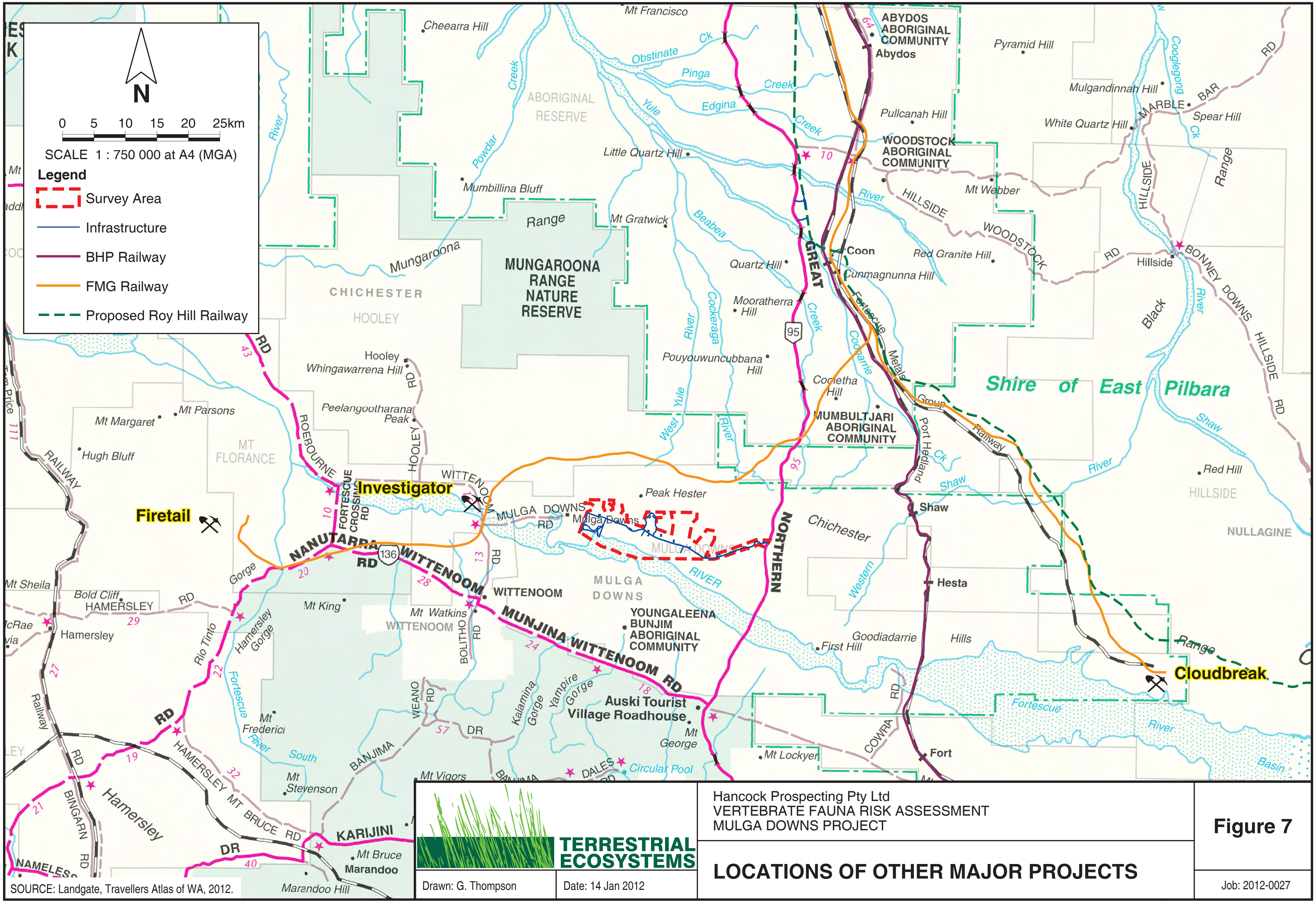
Hancock Prospecting Pty Ltd
VERTEBRATE FAUNA RISK ASSESSMENT
MULGA DOWNS PROJECT

POTENTIAL HABITAT FOR NORTHERN QUOLLS

Figure 6

Drawn: S. Thompson | Date: 22 Jan 2013 | Job: 2012-0027

PINPOINT CARTOGRAPHICS (08) 9562 7136   2012-0027-MD-f07.dgn



SOURCE: Landgate, Travellers Atlas of WA, 2012.

Appendix A
Vertebrate Fauna Recorded in Biological Surveys in the Bioregion
Mulga Downs project area

Appendix A(1). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
Birds																																				
Casuariidae	*Dromaius novaehollandiae*	Emu																						5				X								
Phasianidae	*Coturnix ypsilophora*	Brown Quail																									2									
Anatidae	*Dendrocygna eytoni*	Plumed Whistling-Duck																										150								
	Anas gracilis	Grey Teal																										10								
	Anas superciliosa	Pacific Black Duck																									6	4								
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe																									2									
Columbidae	*Phaps chalcoptera*	Common Bronzewing																		7	8	1	1	1		3	5							1		
	Phaps histrionica	Flock Bronzewing																																		
	Ocyphaps lophotes	Crested Pigeon																		16	12	13	31	8	22	27	5	4	4	14			5	59	1	4
	Geophaps plumifera	Spinifex Pigeon																		1	2	15			17		42	4								
	Geopelia cuneata	Diamond Dove																		20	3	17	1	15	10	4	20							11	6	
	Geopelia striata	Peaceful Dove																								1		2						2		
Podargidae	*Podargus strigoides*	Tawny Frogmouth																				1														
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																									2	1								
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar																		1	1						2									
Apodidae	*Apus pacificus*	Fork-tailed Swift																									2									
Ardeidae	*Ardea pacifica*	White-necked Heron																									1									
	Egretta novaehollandiae	White-faced Heron																									1									
Accipitridae	*Elanus axillaris*	Black-shouldered Kite																								8	2									
	Lophoictinia isura	Square-tailed Kite																				1					1									
	Haliastur sphenurus	Whistling Kite																									2	1					1			
	Accipiter fasciatus	Brown Goshawk																									1									
	Circus assimilis	Spotted Harrier																									1									
	Aquila audax	Wedge-tailed Eagle																									3									
	Hieraaetus morphnoides	Little Eagle																					1				2									
Falconidae	*Falco cenchroides*	Nankeen Kestrel																			2	1					2					1				
	Falco berigora	Brown Falcon																				3			1	1						1				
	Falco hypoleucos	Grey Falcon																									21									
Rallidae	*Porphyrio porphyrio*	Purple Swamphen																										1								
	Porzana tabuensis	Spotless Crake																									6									
	Fulica atra	Eurasian Coot																										7								
Otididae	*Ardeotis australis*	Australian Bustard																		2			3	1	2		3					3				
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew																									1	X								
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel																									3	10								
Scolopacidae	*Tringa glareola*	Wood Sandpiper																									2									
Turnicidae	*Turnix velox*	Little Button-quail																		1		1	1	3		1	1									

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
Cacatuidae	*Eolophus roseicapillus*	Galah																		25	16	23	16			18	55	10	5		1			23		
	Cacatua sanguinea	Little Corella																				25				4	72	4		12	4					
	Nymphicus hollandicus	Cockatiel																		6	4	15				2	16									
Tytonidae	*Tyto javanica*	Eastern Barn Owl																									3									
Psittacidae	*Barnardius zonarius*	Australian Ringneck																			12	8	11	2	7	21		1	2			1		1		
	Melopsittacus undulatus	Budgerigar																		1		5				3	20									
	Neopsephotus bourkii	Bourke's Parrot																																2		
Cuculidae	*Centropus phasianinus*	Pheasant Coucal																		1						1	2									
	Chalcites basalis	Horsfield's Bronze-Cuckoo																		1					1			1								
	Cacomantis pallidus	Pallid Cuckoo																		4	2	3				5							1			
Strigidae	*Ninox novaeseelandiae*	Southern Boobook																									1									
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra																								7	2	1								
	Todiramphus pyrrhopygius	Red-backed Kingfisher																				3	1	2		20				1						
	Todiramphus sanctus	Sacred Kingfisher																								2	2	2			1					
Meropidae	*Merops ornatus*	Rainbow Bee-eater																		2	1	15		3	4	10	9	3								
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird																		2		6	1	2	1		3									
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren																				7	14			30	8	1		3		16	6		2	1
	Malurus lamberti	Variegated Fairy-wren																		26	35	26	1	2	40	23	9	1		11	9	5		2	10	
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat																															2		1	
	Smicrornis brevirostris	Weebill																		12	2	13	12		5		2			4	10					
	Gerygone fusca	Western Gerygone																						4												
	Acanthiza robustirostris	Slaty-backed Thornbill																						2											4	
	Acanthiza apicalis	Inland Thornbill																		4	2			1	13											
	Acanthiza uropygialis	Chestnut-rumped Thornbill																			3		4	1	5	1	14		3					24	9	4
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																				4		4	1		3			9	3					
	Pardalotus striatus	Striated Pardalote																		1	2	8														
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater																		33	12	44	37	54	37	47	23	1		2	1	4	1	12	2	1
	Lichenostomus keartlandi	Grey-headed Honeyeater																			13	23	3	14	5		25			7	14		6			
	Lichenostomus penicillatus	White-plumed Honeyeater																								26	26	2	14							
	Manorina flavigula	Yellow-throated Miner																		20	15	8	20	5	14		7		1	4	2			1		
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater																		2		1	13	21	16	39	5	1						6	1	
	Conopophila whitei	Grey Honeyeater																		1																
	Epthianura tricolor	Crimson Chat																		3																
	Lichmera indistincta	Brown Honeyeater																				5	1	3	7	2	13								1	
	Melithreptus gularis	Black-chinned Honeyeater																				10								3						
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler																								4		9				1				6
	Pomatostomus superciliosus	White-browed Babbler																		4	2		10	8	42		1							1		
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella																																3		
Campephagidae	*Coracina maxima*	Ground Cuckoo-Shrike																			2	3					2									

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
	Coracina novaehollandiae	Black-faced Cuckoo-Shrike																		2	11	4	9	8	2	3	6	4		6	2	3	4	1	2	
	Lalage sueurii	White-winged Triller																		3		3		1		1	2									
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler																		33	21	13	9	49	38	29	4	2	1	3	9	2	1	14	12	1
	Colluricincla harmonica	Grey Shrike-thrush																		12	15	30		11	14	8	2				5					
	Oreoica gutturalis	Crested Bellbird																		3	8	20	17	26	16	7	1	1				3	4	5	3	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow																		19	18	37	35	5	16	19	13		1	1		13	1			
	Artamus minor	Little Woodswallow																		6	8	6					1									
	Cracticus torquatus	Grey Butcherbird																		6	6	5	15	11	10	21	2					1	3	2	3	2
	Cracticus mentalis	Black-backed Butcherbird																											1	3	1	1	2			
	Cracticus nigrogularis	Pied Butcherbird																		4	18	21	13	10	10	10	2									
	Cracticus tibicen	Australian Magpie																			1	10				1										
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail																		8	18	9	8	17	11	6	6	4	2	1	4	2		8	3	
Corvidae	*Corvus bennetti*	Little Crow																								1		2								
	Corvus orru	Torresian Crow																		2	1	9	1	1	6	4	2	1		4	1	2	5	1		
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark																			4	1					5							4		
Petroicidae	*Petroica goodenovii*	Red-capped Robin																						4	3	2								1		
	Melanodryas cucullata	Hooded Robin																		6	10	3	5	3	6	1	1							1		
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark																									4	1				4				
Acrocephalidae	*Acrocephalus australis*	Australian Reed-Warbler																									7									
	Cincloramphus mathewsi	Rufous Songlark																								1	2									
	Eremiornis carteri	Spinifexbird																		6	21	5				25	3	1		2	6		1			
Hirundinidae	*Hirundo neoxena*	Welcome Swallow																									1									
	Petrochelidon nigricans	Tree Martin																									4									
	Petrochelidon ariel	Fairy Martin																									6									
Estrildidae	*Taeniopygia guttata*	Zebra Finch																		12	6	22	14	118	251	208	178					1		1		
	Neochmia ruficauda	Star Finch																									2									
	Emblema pictum	Painted Finch																		30	2					2	727			1						
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit																		1							1	1				1		1		
Mammals																																				
Bovidae	*Bos taurus*	Cow																								10	41	50								
Canidae	*Canis lupus familiaris*	Dog																		1				1				X								
Felidae	*Felis catus*	House Cat																			1															
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat																				X									X					X
	Taphozous georgianus	Common Sheathtail Bat																					X	X			X									
Megadermatidae	*Macroderma gigas*	Ghost Bat																			X															
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat																				X	X			X						X				
	Mormopterus beccarii	Beccari's Freetail Bat																		X			X						X							
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat																		X	X	X	X	X	X	X	X		X	X	X	X	X		X	X
	Nyctophilus geoffroyi	Lesser Long-eared Bat																				X	X		X	X					X	X				

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
	Scotorepens greyii	Little Broad-nosed Bat																		X	X	X	X	X	X	X	X		X	X	X	X				X
	Vespadelus finlaysoni	Inland Cave Bat																		X	X	X	X		X	X	X		X		X	X				X
Dasyuridae	*Dasykaluta rosamondae*	Kaluta		4	2	4	8	10	11	1													3	6	2	26				3		2				
	Dasyurus hallucatus	Northern Quoll					1																													
	Ningaui timealeyi	Pilbara Ningaui		6	3	7	4		4	12										1	6					10				1	1	3	2			
	Planigale sp.									1											1								1							
	Pseudantechinus roryi	Rory Cooper's False Antechinus		1	1		1																													
	Pseudantechinus woolleyae	Woolley's False Antechinus								1																										
	Sminthopsis macroura	Stripe-faced Dunnart						1														2			2				1							
	Sminthopsis youngsoni	Lesser Hairy-footed Dunnart		1																																
Macropodidae	*Macropus robustus*	Wallaroo or Euro																					1	1			3				1					
	Macropus rufus	Red Kangaroo																										5				1				
Leporidae	*Oryctolagus cuniculus*	European Rabbit																		1	1															
Equidae	*Equus asinus*	Donkey																										20								
Muridae	*Leggadina lakedownensis*	Lakeland Downs Mouse																									2									
	Mus musculus	House Mouse	37	10	24	10	10	5		4											5		1			3										
	Notomys alexis	Spinifex Hopping Mouse																					1													
	Pseudomys chapmani	Western Pebble-mound Mouse																		X				X		X	X	X								
	Pseudomys delicatulus	Delicate Mouse	1				1			1																										
	Pseudomys desertor	Desert Mouse																		3	3	2	2	2	3	15										
	Pseudomys hermannsburgensis	Sandy Inland Mouse		21	10	3	13	8	11	2										3		9	8	8	5	11										
	Zyzomys argurus	Common Rock-rat								4											8						1									
Amphibians																																				
Hylidae	*Cyclorana australis*	Giant Frog																																		
	Cyclorana maini	Sheep Frog									12	39	2	10	1	1	3	2	3																	
	Litoria rubella	Little Red Tree Frog									34	11							3							1	1	6						15		
Limnodynastidae	*Platyplectrum spenceri*	Centralian Burrowing Frog									8	82		3	1	2	3	4																		
Myobatrachidae	*Uperoleia glandulosa*	Glandular Toadlet									1	2																								
	Uperoleia russelli	Northwest Toadlet									20	81	1	12	6				4																	
Reptiles																																				
Agamidae	*Amphibolurus longirostris*										4	4		1			1		2		1	5	1		1		2		1		2					
	Diporiphora amphiboluroides																								1		1									
	Ctenophorus caudicinctus	Ring-tailed Dragon									19		2	1					5	6	1	17	5	26	23		12					1	2		3	3
	Ctenophorus isolepis	Crested Dragon									9		10	2	3	9	6	8		2							2									
	Ctenophorus nuchalis	Central Netted Dragon									6		1	4	8	4	5		1					1												
	Ctenophorus reticulatus	Western Netted Dragon																				1			1											
	Diporiphora winneckei	Blue-lined Dragon									1		1			1																				
	Pogona minor	Bearded Dragon									2		2	1		3	1			1				1		2						1	1		2	
	Tympanocryptis cephalus	Pebble Dragon																										1								

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
Boidae	*Antaresia perthensis*	Pygmy Python									1																									
	Antaresia stimsoni	Stimson's Python									3		1		1										1		2	1								
	Aspidites melanocephalus	Black-headed Python																									1									
	Liasis olivaceus barroni	Pilbara Olive Python									1																									
Carphodactylidae	*Nephrurus levis pilbarensis*										2	1	6		6	2	3																			
	Nephrurus wheeleri																			2		1	1										1			
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko												4	3	9	7		1										4		1	1	1			9
	Diplodactylus pulcher																															1			1	
	Diplodactylus savagei																				3									2	1					
	Lucasium stenodactylus											1	2	6	2	6	1	3	3			1		4					4	1						1
	Lucasium wombeyi																							1	2						1					
	Oedura marmorata	Marbled Velvet Gecko																									1									
	Strophurus elderi												1		1	1		1	2		2										1		1			
	Strophurus wellingtonae																					1	1	1	1								1	1		
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder									1		1								3	1														
	Brachyurophis approximans													1						1	1		1	1					1	2	1		2			
	Demansia psammophis	Yellow-faced Whipsnake									3											2		3												
	Demansia rufescens	Rufous Whipsnake																		1		1		1	1	1										
	Furina ornata	Moon Snake									1																			1						
	Pseudechis australis	Mulga Snake									4		1	1					1							2	6					1				
	Pseudonaja mengdeni	Gwardar									2			1			1					1		1												2
	Pseudonaja modesta	Ringed Brown Snake													1											1										
Gekkonidae	*Gehyra pilbara*										64	1		2																						
	Gehyra punctata										55								3		10										1					
	Gehyra variegata										10	4				7			2	20	2	2	2	21	7	4	3	7	18	15	10	2	18	11	22	42
	Heteronotia binoei	Bynoe's Gecko									1	6	1	1	1	1			4	9	15	3	1	2		4		2	5	13	9	3	12	4	4	1
	Heteronotia spelea	Desert Cave Gecko									1																1				1					
	Rhynchoedura ornata	Beaked Gecko									1		1	1	1	4			4			1	1	2		1						1				3
Pygopodidae	*Delma elegans*																				3															
	Delma nasuta																			1	1					1										
	Delma pax										1	1						1	2	1	1	1				1			1	1	1					1
	Delma tincta														1					1						1										
	Lialis burtonis										1	2		1	2	3			4	2				1			1							1		
	Pygopus nigriceps																						1			1					1		1			
Scincidae	*Bellatorias frerei*										11																									
	Carlia munda										1	8								8		4	1	8	3	8	3		1	4	3					1
	Carlia triacantha																												1	1					1	
	Cryptoblepharus buchananii										9													1												
	Cryptoblepharus sp.																																	1		

		Surveys	A								B									C								D								
Family	**Species**	**Common Name**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**Opportunistic**	**WS1**	**WS10**	**WS2**	**WS3**	**WS4**	**WS5**	**WS6**	**WS8**	**CH01**	**CH02**	**CH03**	**CH04**	**CH05**	**CH06**	**CH07**	**Opportunistic**	**Opportunistic**	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**
	Ctenotus duricola												6	1	2	4	10	5					1													
	Ctenotus grandis											1	20	61	48	37	5	45	14				5			8										
	Ctenotus helenae										3	1	7	9	6	4	2	13	5	4		4		1		1			1			3			1	
	Ctenotus nigrilineatus										2																									
	Ctenotus pantherinus	Leopard Skink									1	1	19	1	2	11	7	8				2	1	2	6	10						2	1		6	
	Ctenotus rubicundus																				4	1														
	Ctenotus saxatilis	Rock Skink									51	7	1	3				2	27	4	22	53	28	20	11	16			1	14	22		8		1	2
	Ctenotus serventyi												2			3																				
	Ctenotus uber																			3																
	Cyclodomorphus melanops	Slender Blue-tongue										1								1	1				1											
	Egernia depressa	Pygmy Spiny-tailed Skink									1																									
	Egernia formosa																											1								
	Eremiascincus richardsonii	Broad-banded Sand Swimmer									1																	3								
	Lerista bipes										1	16		1	11	5	10	7																		
	Lerista macropisthopus																												1							
	Lerista muelleri										1	6		1					3	1	2	1	1	1	1											
	Lerista sp.																													1		1	2	2	1	2
	Liopholis striata	Night Skink											5		3	7	6	6																		
	Menetia greyii											1	2					2		1	2								2	1			5	1		1
	Morethia ruficauda														2	2					2															
	Notoscincus ornatus										1	1																								
	Proablepharus reginae																	1	3		1	2														
	Tiliqua multifasciata	Central Blue-tongue									1		4		5	5	2	4	1				1	1	1	4				3		3		1		
Typhlopidae	*Ramphotyphlops ammodytes*											1			3				1		1									2			1			1
	Ramphotyphlops grypus																2						1			1										
	Ramphotyphlops pilbarensis													2																						
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor									12	1	1	1	1	2		1	4	1	2	4	4	3	14	3				1						
	Varanus brevicauda	Short-tailed Pygmy Monitor											9	2			4	2																	1	
	Varanus bushi	Pilbara Mulga Monitor																		1					1									1	1	
	Varanus caudolineatus																			2							1									1
	Varanus eremius	Pygmy Desert Monitor									1				1	1	1									1										
	Varanus giganteus	Perentie									1		1															2								
	Varanus gouldii	Bungarra or Sand Monitor									1		1	1	1	3	1		1										1							
	Varanus panoptes	Yellow-spotted Monitor										1															1					1				
	Varanus pilbarensis	Pilbara Rock Monitor									2																									
	Varanus tristis	Racehorse Monitor									3									1	2		2				2				2					
Cheluidae	*Chelodina steindachneri*	Flat-shelled Turtle									X	X																1				X				

A How R A and Cooper N K (2002) Terrestrial small mammals of the Abydos Plain in the north-eastern Pilbara Western Australia. *Journal of the Royal Society of Western Australia* 85, 71-82.

B How R A and Dell J (2004) Reptile assemblage of the Abydos Plain; north-eastern Pilbara Western Australia. *Journal of the Royal Society of Western Australia* 87, 85-95.

C	Ecologia Environment (2007) *RGP5 Level 2 Fauna Survey Chichester Deviation*. Unpublished report for BHPBIO; Perth.
D	Ecologia Environment (2011) *Cloudbreak Level 2 Terrestrial Vertebrate Fauna Assessment*. Unpublished report for Fortescue Metals Group, Perth.
X	Present only

Appendix A(2). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A															B																				
Family	**Species**	**Common Name**	**Minga Well**	**Moojarri Well**	**OB1**	**OB1A**	**OB2**	**OB3**	**OB4**	**OB5**	**Site A**	**Site B**	**Site C**	**Site D**	**Site E**	**Site G**	**Site H**	**Opportunistic**	**Ph2 Bat 1**	**Tr Ph2 Bat10**	**Tr Ph2 Bat 8**	**Tr Ph2 Bat 9**	**Tr Ph2 S7**	**Tr Ph2 S8**	**Unknown**	**VK Ph 2 S20**	**VK Ph2 Bat 7**	**VK Ph2 S17**	**VK Ph2 S18**	**VK Ph2 S19**	**VK Ph2 S20**	**VQ Ph2 Bat 4**	**VQ Ph2 S10**	**VQ Ph2 S9**	**Zi Ph2 S1**	**Zi Ph2 S2**	**Zi Ph2 S3**	**Zi Ph2 S4**
Birds																																						
Casuariidae	*Dromaius novaehollandiae*	Emu	X	X														1																				
Phasianidae	*Coturnix ypsilophora*	Brown Quail																5																				
Anatidae	*Anas gracilis*	Grey Teal	X																																			
Columbidae	*Phaps chalcoptera*	Common Bronzewing	X																					2							3		1		6	2	3	1
	Phaps histrionica	Flock Bronzewing																																				
	Ocyphaps lophotes	Crested Pigeon	X	X	X					X								16					1	4				6			34			5	2		4	5
	Geophaps plumifera	Spinifex Pigeon																2					6					2	2	1			1			2	1	1
	Geopelia cuneata	Diamond Dove																6																1			1	2
	Geopelia striata	Peaceful Dove																10						7							2				4			2
	Geopelia humeralis	Bar-shouldered Dove																																				
Podargidae	*Podargus strigoides*	Tawny Frogmouth																1																				
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar	X															6																		1		
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar																1																				
Apodidae	*Apus pacificus*	Fork-tailed Swift																																	33			
Ardeidae	*Ardea pacifica*	White-necked Heron																						2														
	Egretta novaehollandiae	White-faced Heron	X	X																																		
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis	X																																			
Accipitridae	*Lophoictinia isura*	Square-tailed Kite																										1										
	Haliastur sphenurus	Whistling Kite	X		X																																	1
	Accipiter fasciatus	Brown Goshawk																1					2	1							7							
	Accipiter cirrocephalus	Collared Sparrowhawk																						2							1							
	Aquila audax	Wedge-tailed Eagle																																			2	1
Falconidae	*Falco cenchroides*	Nankeen Kestrel																4										2										
	Falco berigora	Brown Falcon																3					3	2														
	Falco longipennis	Australian Hobby																3					1	1														
Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen	X																																			
Otididae	*Ardeotis australis*	Australian Bustard	X							X																												
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover	X																																			
	Elseyornis melanops	Black-fronted Dotterel	X	X																																		
	Erythrogonys cinctus	Red-kneed Dotterel	X																																			
Turnicidae	*Turnix velox*	Little Button-quail								X																												
Cacatuidae	*Eolophus roseicapillus*	Galah	X	X	X													41					54															
	Cacatua sanguinea	Little Corella	X	X														61					10	63							5		2	1				
	Nymphicus hollandicus	Cockatiel	X															12																				
Psittacidae	*Barnardius zonarius*	Australian Ringneck	X	X														1					1	3				1			9		2	2	21			4
	Melopsittacus undulatus	Budgerigar																34					27							3	8		1	10	23		11	

		Surveys	A															B																				
Family	**Species**	**Common Name**	**Minga Well**	**Moojarri Well**	**OB1**	**OB1A**	**OB2**	**OB3**	**OB4**	**OB5**	**Site A**	**Site B**	**Site C**	**Site D**	**Site E**	**Site G**	**Site H**	**Opportunistic**	**Ph2 Bat 1**	**Tr Ph2 Bat10**	**Tr Ph2 Bat 8**	**Tr Ph2 Bat 9**	**Tr Ph2 S7**	**Tr Ph2 S8**	**Unknown**	**VK Ph 2 S20**	**VK Ph2 Bat 7**	**VK Ph2 S17**	**VK Ph2 S18**	**VK Ph2 S19**	**VK Ph2 S20**	**VQ Ph2 Bat 4**	**VQ Ph2 S10**	**VQ Ph2 S9**	**Zi Ph2 S1**	**Zi Ph2 S2**	**Zi Ph2 S3**	**Zi Ph2 S4**
	Neopsephotus bourkii	Bourke's Parrot	X	X																																		
	Pezoporus occidentalis	Night Parrot	X																																			
Cuculidae	*Centropus phasianinus*	Pheasant Coucal																2						1														
	Cacomantis pallidus	Pallid Cuckoo																1																				
Strigidae	*Ninox novaeseelandiae*	Southern Boobook																2																				
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra	X															19						5							1							
	Todiramphus pyrrhopygius	Red-backed Kingfisher																													1		1				1	
	Todiramphus sanctus	Sacred Kingfisher																13						5							2				1			
Meropidae	*Merops ornatus*	Rainbow Bee-eater	X		X				X									25					3	7					4	2	42			1	1	6	8	
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird																8					12	25				20	2		15				3		5	3
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			X	X																						4	3		3							
	Malurus lamberti	Variegated Fairy-wren			X				X									12					16	12				8		5	10		11	14	5	9	7	12
	Amytornis striatus	Striated Grasswren																											2				1				2	
Acanthizidae	*Smicrornis brevirostris*	Weebill																8					29	13				8	3	17	12		11	18	14	11	10	7
	Gerygone fusca	Western Gerygone				X												1																				
	Acanthiza robustirostris	Slaty-backed Thornbill	X			X																																
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																																	1			
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	X		X		X			X								4					5	5				6	1	17			1	4	1			1
	Lichenostomus keartlandi	Grey-headed Honeyeater							X	X								8					8	38				2	1	6	17		4	2	5	53	16	11
	Lichenostomus ornatus	Yellow-plumed Honeyeater																18						45							27		1	1	4			
	Lichenostomus penicillatus	White-plumed Honeyeater	X																																			
	Manorina flavigula	Yellow-throated Miner								X								2					10	4				1		3	6			3		9	2	7
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater	X		X																									2	1							
	Epthianura aurifrons	Orange Chat	X																																			
	Sugomel niger	Black Honeyeater																						12						1	3					1	2	
	Lichmera indistincta	Brown Honeyeater																7					4	73				2		3	128		3	2	6	13	18	6
	Melithreptus gularis	Black-chinned Honeyeater								X													2	2												3		
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler	X															18													14				5	2		
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike	X		X					X								33					6	48				3	2	3	6		1	5	5	1		
	Lalage sueurii	White-winged Triller																6																				1
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	X		X					X								4					2	10						5	11		4	9	7	5	2	11
	Colluricincla harmonica	Grey Shrike-thrush			X													2					3	7				2	1	2	1			7	13	3	6	5
	Oreoica gutturalis	Crested Bellbird			X	X				X								2					1							1			1	4			6	4
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			X	X												2												1			1			4	10	
	Artamus minor	Little Woodswallow																										2							1	7	8	2
	Cracticus torquatus	Grey Butcherbird		X	X					X																												
	Cracticus nigrogularis	Pied Butcherbird		X														6					1	2				3	1		4		5	7	17	1	3	15
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	X		X					X								6					2	6				1		1	4		1	2	3	3	2	3
Corvidae	*Corvus bennetti*	Little Crow		X																				2														

		Surveys	A															B																				
Family	**Species**	**Common Name**	**Minga Well**	**Moojarri Well**	**OB1**	**OB1A**	**OB2**	**OB3**	**OB4**	**OB5**	**Site A**	**Site B**	**Site C**	**Site D**	**Site E**	**Site G**	**Site H**	**Opportunistic**	**Ph2 Bat 1**	**Tr Ph2 Bat10**	**Tr Ph2 Bat 8**	**Tr Ph2 Bat 9**	**Tr Ph2 S7**	**Tr Ph2 S8**	**Unknown**	**VK Ph 2 S20**	**VK Ph2 Bat 7**	**VK Ph2 S17**	**VK Ph2 S18**	**VK Ph2 S19**	**VK Ph2 S20**	**VQ Ph2 Bat 4**	**VQ Ph2 S10**	**VQ Ph2 S9**	**Zi Ph2 S1**	**Zi Ph2 S2**	**Zi Ph2 S3**	**Zi Ph2 S4**
	Corvus orru	Torresian Crow		X	X													3					3	14					2		2		1		9	4		
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark	X	X						X								8						3														
Petroicidae	*Petroica goodenovii*	Red-capped Robin			X																																	
	Melanodryas cucullata	Hooded Robin			X																		2	1							4			1	4	5	1	
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark																1																				
	Eremiornis carteri	Spinifexbird																1					3	4				2	11	4	1		10	15	17	17	4	18
Hirundinidae	*Petrochelidon nigricans*	Tree Martin																						1							1							
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird																													1							
Estrildidae	*Taeniopygia guttata*	Zebra Finch	X	X	X					X								239					10	16				136	24		17		18	65			12	
	Neochmia ruficauda	Star Finch	X																																			
	Emblema pictum	Painted Finch																17					19	77				8		15	89		7	6	11	5	59	18
Mammals																																						
Bovidae	*Bos taurus*	Cow																5																				
Canidae	*Canis lupus*	Dingo																						4														
Felidae	*Felis catus*	House Cat																1																				
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat																	X		X	X				X						X	X					
	Taphozous georgianus	Common Sheathtail Bat																	X			X	X			X	X	X		X		X	X					X
	Taphozous hilli	Hill's Sheathtail Bat																		X	X							X										
Megadermatidae	*Macroderma gigas*	Ghost Bat																				X			X		X											
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat																			X	X	X			X												
	Mormopterus beccarii	Beccari's Freetail Bat																			X	X																
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat																	X		X	X	X			X				X					X			
	Nyctophilus geoffroyi	Lesser Long-eared Bat	1																																			
	Scotorepens greyii	Little Broad-nosed Bat	3																X	X	X	X	X			X		X							X			X
	Vespadelus finlaysoni	Inland Cave Bat																	X	X	X	X	X			X	X	X		X		X	X		X			X
Dasyuridae	*Dasykaluta rosamondae*	Kaluta													1														1							2		3
	Dasyurus hallucatus	Northern Quoll																							2													
	Ningaui sp.																						1	1				1			1			2			1	
	Ningaui timealeyi	Pilbara Ningaui											1			1		1					1	1					1				6			1		
	Planigale sp.													1																								
	Pseudantechinus sp.	Sandstone False Antechinus																																1				
	Sminthopsis macroura	Stripe-faced Dunnart									1												1															
Macropodidae	*Macropus robustus*	Wallaroo or Euro																1													1					2		
	Macropus rufus	Red Kangaroo																2																				
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna																1																				
Muridae	*Mus musculus*	House Mouse																						3														
	Pseudomys chapmani	Pebble-mound Mouse																X							X													
	Pseudomys desertor	Desert Mouse									1		3																						1			
	Zyzomys argurus	Common Rock-rat															1	3																				

		Surveys	A															B																				
Family	**Species**	**Common Name**	**Minga Well**	**Moojarri Well**	**OB1**	**OB1A**	**OB2**	**OB3**	**OB4**	**OB5**	**Site A**	**Site B**	**Site C**	**Site D**	**Site E**	**Site G**	**Site H**	**Opportunistic**	**Ph2 Bat 1**	**Tr Ph2 Bat10**	**Tr Ph2 Bat 8**	**Tr Ph2 Bat 9**	**Tr Ph2 S7**	**Tr Ph2 S8**	**Unknown**	**VK Ph 2 S20**	**VK Ph2 Bat 7**	**VK Ph2 S17**	**VK Ph2 S18**	**VK Ph2 S19**	**VK Ph2 S20**	**VQ Ph2 Bat 4**	**VQ Ph2 S10**	**VQ Ph2 S9**	**Zi Ph2 S1**	**Zi Ph2 S2**	**Zi Ph2 S3**	**Zi Ph2 S4**
Amphibians																																						
Hylidae	*Cyclorana maini*	Sheep Frog																101													1							
	Litoria rubella	Little Red Tree Frog	1															23																				
Myobatrachidae	*Uperoleia rugosa*																														98							
Reptiles																																						
Agamidae	*Amphibolurus longirostris*												1			2								1				1		2	1			2	5	1		
	Ctenophorus caudicinctus	Ring-tailed Dragon							1					2	10		2													1							6	2
	Ctenophorus isolepis	Crested Dragon																6					6											2				
	Ctenophorus reticulatus	Western Netted Dragon									1																											
	Pogona minor	Bearded Dragon																											1									
Boidae	*Antaresia stimsoni*	Stimson's Python																5										1			1							
	Aspidites melanocephalus	Black-headed Python	1															1																				
	Liasis olivaceus barroni	Pilbara Olive Python																3																				
Carphodactylidae	*Nephrurus wheeleri*																												1						2			
Diplodactylidae	*Crenadactylus ocellatus*	Clawless Gecko																													1							1
	Diplodactylus conspicillatus	Fat-tailed Gecko																1						5					5					5				
	Lucasium wombeyi																							1				2		1					1			
	Oedura marmorata	Marbled Velvet Gecko																6													1							
	Strophurus elderi																																1					
	Strophurus wellingtonae																													1								
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder																										1										
	Brachyurophis approximans																												1	2	2			3	1			
	Demansia psammophis	Yellow-faced Whipsnake																					3	1							1			1				
	Demansia rufescens	Rufous Whipsnake																					1															
	Furina ornata	Moon Snake																1						1											1			
	Parasuta monachus																							1														
	Pseudechis australis	Mulga Snake																1											2		1							
	Pseudonaja mengdeni	Gwardar																1						1										1				
	Pseudonaja modesta	Ringed Brown Snake																																	1			
Gekkonidae	*Gehyra punctata*																	3																				
	Gehyra purpurascens																	1																				
	Gehyra variegata				1		1			1		2		2																2	3							
	Heteronotia binoei	Bynoe's Gecko										1	4	3				4					1					3	1	3	7		1			3		3
	Heteronotia spelea	Desert Cave Gecko															1	1																				
Pygopodidae	*Delma elegans*																	1																				
	Delma nasuta																																			1		
	Delma pax																													1	3		3			1		
	Lialis burtonis																							1														
Scincidae	*Carlia munda*												1		2	1							2	11				1	5	2	26		1	5	5	2		1

		Surveys	A															B																				
Family	**Species**	**Common Name**	**Minga Well**	**Moojarri Well**	**OB1**	**OB1A**	**OB2**	**OB3**	**OB4**	**OB5**	**Site A**	**Site B**	**Site C**	**Site D**	**Site E**	**Site G**	**Site H**	**Opportunistic**	**Ph2 Bat 1**	**Tr Ph2 Bat10**	**Tr Ph2 Bat 8**	**Tr Ph2 Bat 9**	**Tr Ph2 S7**	**Tr Ph2 S8**	**Unknown**	**VK Ph 2 S20**	**VK Ph2 Bat 7**	**VK Ph2 S17**	**VK Ph2 S18**	**VK Ph2 S19**	**VK Ph2 S20**	**VQ Ph2 Bat 4**	**VQ Ph2 S10**	**VQ Ph2 S9**	**Zi Ph2 S1**	**Zi Ph2 S2**	**Zi Ph2 S3**	**Zi Ph2 S4**
	Carlia triacantha																						2	1				1			2			2				
	Cryptoblepharus buchananii															1																						
	Cryptoblepharus ustulatus																	1																				
	Ctenotus duricola																											1			4		3			1	2	1
	Ctenotus grandis																							5					29				8	27				
	Ctenotus helenae																						11	3				5					2	29		2	5	1
	Ctenotus pantherinus	Leopard Skink													3								6	2						1				1		1	1	1
	Ctenotus rubicundus																1																					
	Ctenotus rutilans																													1								
	Ctenotus saxatilis	Rock Skink											1				1	1					6	8				9	7	1	5		24	20	15	8	6	2
	Cyclodomorphus melanops	Slender Blue-tongue											2																									1
	Egernia formosa																	2																				
	Eremiascincus fasciolatus	Narrow-banded Sand Swimmer																													1							
	Lerista muelleri															4												1		1					1			
	Menetia greyii										1	1						2													2		3	1	1	2		
	Morethia ruficauda																2	1													5					1		
	Tiliqua multifasciata	Central Blue-tongue										1		1	1			1											1					2				
Typhlopidae	*Ramphotyphlops ammodytes*														1																							
	Ramphotyphlops ganei																														1							
	Ramphotyphlops grypus													1																								
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor													2		1											3		2	1		1	1		1	4	
	Varanus brevicauda	Short-tailed Pygmy Monitor										1		1																				3				
	Varanus bushi	Pilbara Mulga Monitor						1		2						1								1														
	Varanus eremius	Pygmy Desert Monitor																																6				
	Varanus giganteus	Perentie																1																				
	Varanus panoptes	Yellow-spotted Monitor																1																1				
	Varanus pilbarensis	Pilbara Rock Monitor																										1										
	Varanus tristis	Racehorse Monitor											1																					1		1		

A Davis; R.A.; Wilcox; J.A.; Metcalf; B.M. Bamford; M.J. (2005). *Fauna survey of proposed Iron Ore Mine; Cloud Break*. Unpublished report for Fortescue Metals Group; Perth.

B Ecologia Environment (2010) *Solomon Project: Kings Area Vertebrate Fauna Assessment*, Unpublished report for Fortescue Metals Group, Perth.

X Present Only

Appendix A(3). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A	B																													
Family	**Species**	**Common Name**		**FMG Firetail**	**FMG Serenity**	**FMG Valley**	**FMG Valley**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**					
Birds																																	
Casuariidae	*Dromaius novaehollandiae*	Emu			1																												
Phasianidae	*Coturnix pectoralis*	Stubble Quail		2																													
	Coturnix ypsilophora	Brown Quail			2																												
Anatidae	*Anas superciliosa*	Pacific Black Duck			2																												
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1		1	1																										
	Ocyphaps lophotes	Crested Pigeon			2	7	6	1																									
	Geophaps plumifera	Spinifex Pigeon		22	6	13	3	7																									
	Geopelia cuneata	Diamond Dove		11	7	12	5																										
	Geopelia striata	Peaceful Dove		33		1	6																										
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant		2																													
Accipitridae	*Elanus axillaris*	Black-shouldered Kite			2	1	1																										
	Haliastur sphenurus	Whistling Kite					1																										
	Accipiter fasciatus	Brown Goshawk					2																										
	Accipiter cirrocephalus	Collared Sparrowhawk		1																													
Falconidae	*Falco cenchroides*	Nankeen Kestrel			1																												
	Falco berigora	Brown Falcon				3	2																										
Turnicidae	*Turnix velox*	Little Button-quail			3	1																											
Cacatuidae	*Cacatua sanguinea*	Little Corella		5																													
	Nymphicus hollandicus	Cockatiel		10																													
Psittacidae	*Barnardius zonarius*	Australian Ringneck		19	25	7	1																										
	Melopsittacus undulatus	Budgerigar			25	46	15	18																									
Cuculidae	*Centropus phasianinus*	Pheasant Coucal		2																													
	Chalcites basalis	Horsfield's Bronze-Cuckoo		6	8	4	11	1																									
	Cacomantis pallidus	Pallid Cuckoo		1	5		1																										
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra		22	2	5																											
	Todiramphus sanctus	Sacred Kingfisher		72			1																										
Meropidae	*Merops ornatus*	Rainbow Bee-eater		12	5	7	24	5																									
Climacteridae	*Climacteris melanura*	Black-tailed Treecreeper			2																												
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird		1	3	2	15																										
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			2	15																											
	Malurus lamberti	Variegated Fairy-wren		31	25	46	19	15																									
	Amytornis striatus	Striated Grasswren		6		5		2																									
Acanthizidae	*Smicrornis brevirostris*	Weebill		37	71	69	67	17																									
	Gerygone fusca	Western Gerygone			2																												
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote		7	19	4																											
	Pardalotus striatus	Striated Pardalote		2	9	1																											

		Surveys	A	B																								
Family	**Species**	**Common Name**		**FMG Firetail**	**FMG Serenity**	**FMG Valley**	**FMG Valley**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater		1	32	20	54																					
	Lichenostomus keartlandi	Grey-headed Honeyeater		22	51	5	1	11																				
	Lichenostomus penicillatus	White-plumed Honeyeater		85	9	1	2																					
	Manorina flavigula	Yellow-throated Miner		12	36	9	15	1																				
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater		1	1		4																					
	Lichmera indistincta	Brown Honeyeater			8	2																						
	Melithreptus gularis	Black-chinned Honeyeater						3																				
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler		23	2	5																						
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella			7																							
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike		10	6	9	17	2																				
	Lalage sueurii	White-winged Triller		4	13	1	3																					
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler		65	20	13	16	5																				
	Colluricincla harmonica	Grey Shrike-thrush		63	12	30	11	10																				
	Oreoica gutturalis	Crested Bellbird		16	14	21	18	2																				
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			24	4	8																					
	Artamus minor	Little Woodswallow		4		2	2	2																				
	Cracticus torquatus	Grey Butcherbird		4	1		2																					
	Cracticus nigrogularis	Pied Butcherbird		8	16	2	6	3																				
	Cracticus tibicen	Australian Magpie			3	2	2																					
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail		15	14	3	2	3																				
Corvidae	*Corvus orru*	Torresian Crow		1		1	10																					
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark		6	1		2																					
Petroicidae	*Melanodryas cucullata*	Hooded Robin			4	2	2																					
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark			3		5																					
	Eremiornis carteri	Spinifexbird		2	25	8	24	12																				
Hirundinidae	*Petrochelidon nigricans*	Tree Martin			5		4																					
	Dicaeum hirundinaceum	Mistletoebird		21	3		6																					
Estrildidae	*Taeniopygia guttata*	Zebra Finch		6	50	7		4																				
	Emblema pictum	Painted Finch		2	55	12	2	17																				
Mammals																												
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara	2																									
	Dasycercus cristicauda	Crest-tailed Mulgara	1																									
	Dasykaluta rosamondae	Kaluta																						1				
	Dasyurus hallucatus	Northern Quoll	1																									
	Planigale ingrami	Long-tailed Planigale							4	2						2	3	1		2	1						3	
	Sminthopsis macroura	Stripe-faced Dunnart																						11	1	4		
Muridae	*Mus musculus*	House Mouse																									6	
	Pseudomys desertor	Desert Mouse							3			1				5		2						5	2	1	7	
	Pseudomys hermannsburgensis	Sandy Inland Mouse							1	1						1	5	1		2	2	1		2	4	1	3	

		Surveys	A	B																								
Family	**Species**	**Common Name**		**FMG Firetail**	**FMG Serenity**	**FMG Valley**	**FMG Valley**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**
	Zyzomys argurus	Common Rock-rat									1		1	1	1			2	1									
Amphibians																												
Hylidae	*Cyclorana maini*	Sheep Frog																						4	2			
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet														2	1	1						7	5	1	1	
	Uperoleia sp.	Tanami Toadlet																										
Reptiles																												
Agamidae	*Amphibolurus longirostris*								2	3						3	1							1	2		1	2
	Ctenophorus caudicinctus	Ring-tailed Dragon								2		6		3		5	1	1	1	2	6	1		2	1	10	1	1
	Ctenophorus isolepis	Crested Dragon																	1					2	3			
	Pogona minor mitchelli	Bearded Dragon										1												1				
Boidae	*Antaresia stimsoni*	Stimson's Python								2		1				4	4							1			2	
Carphodactylidae	*Nephrurus wheeleri cinctus*															1												
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko																						12	8		3	
	Diplodactylus sp.																										2	
	Lucasium wombeyi									4		1					3				8	3		2			1	
	Strophurus elderi																										1	
	Strophurus jeanae																			1								
	Strophurus wellingtonae																								6			
Elapidae	*Brachyurophis approximans*								4			1				1	4	2			1		1				1	
	Demansia psammophis	Yellow-faced Whipsnake																		1								
	Demansia rufescens	Rufous Whipsnake								1	1						1			1				1				
	Furina ornata	Moon Snake													1	1		2				1						
	Parasuta monachus																	1										
	Pseudechis australis	Mulga Snake																		1	1							
	Pseudonaja mengdeni	Gwardar							1							1		1										
	Pseudonaja modesta	Ringed Brown Snake																			1							
Gekkonidae	*Gehyra variegata*										3			1		2								1				
	Heteronotia binoei	Bynoe's Gecko							1	2		3			1	2		3		3	1	7	1	1	2	1		
Pygopodidae	*Delma elegans*																	1										
	Delma nasuta															2												1
	Delma pax									1												3				1		
	Lialis burtonis																	1				1			1			
	Pygopus nigriceps															1			1									
Scincidae	*Carlia munda*								2	7					2	8	8	12	1	2	1			21	6		7	1
	Ctenotus duricola									6	3	2		1	1			1		9	3	1		1	1	5		
	Ctenotus grandis								7			1				4	6			1				6	10	1	2	1
	Ctenotus helenae								2	2		2				2	7	4		3				22	15	11	17	4
	Ctenotus pantherinus	Leopard Skink							2	11		2				3	3	5		14		3		9	5	3	5	2
	Ctenotus saxatilis	Rock Skink							12	3	15	10	13	8	3	11	12	17	1	14	4	14	8	3		3	1	3

		Surveys	A	B																								
Family	**Species**	**Common Name**		**FMG Firetail**	**FMG Serenity**	**FMG Valley**	**FMG Valley**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**
	Ctenotus sp.																	1										
	Cyclodomorphus melanops	Slender Blue-tongue														2	1		1	1	2							1
	Egernia formosa																						1					
	Eremiascincus fasciolatus	Narrow-banded Sand Swimmer									1																	
	Lerista verhmens																						1	3	1		1	
	Lerista zietzi																1		1		1					1		
	Menetia greyii										1							1	2	2	2		2	4	2		1	
	Morethia ruficauda exquisita																	2		1								
Typhlopidae	*Ramphotyphlops ammodytes*																										1	
	Ramphotyphlops grypus															1				1	2						1	
	Ramphotyphlops pilbarensis																							1				
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor								3	5	3	3	9	4					3	4	6	3			2		5
	Varanus brevicauda	Short-tailed Pygmy Monitor							2															10	3	7	5	2
	Varanus bushi	Pilbara Mulga Monitor								1														1		1	1	1
	Varanus eremius	Pygmy Desert Monitor																								3		
	Varanus panoptes	Yellow-spotted Monitor							2							1				1							1	
	Varanus sp.									1																	1	

A Coffey Environments (2011) *Targeted Surveys - Northern Quolls, Mulgara and Pilbara Olive Pythons*. Unpublished report for Fortescue Metals Group, Perth.

B Coffey Environments (2008) *Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project*. Unpublished report for Fortescue Metals Group, Perth - March 2008 data.

X Present Only

Appendix A(4). Vertebrate fauna assessments in the vicinity of the project area

		Survey	A																								
Family	**Species**	**Common Name**	**FMGVK14**	**FMGVK15**	**FMGVK16**	**FMGVK17**	**FMGVK18**	**FMGVK19**	**FMGVK2**	**FMGVK20**	**FMGVK3**	**FMGVK4**	**FMGVK5**	**FMGVK6**	**FMGVK7**	**FMGVK8**	**FMGVK9**	**FMGVQ1**	**FMGVQ10**	**FMGVQ2**	**FMGVQ3**	**FMGVQ4**	**FMGVQ5**	**FMGVQ6**	**FMGVQ7**	**FMGVQ8**	**FMGVQ9**
Birds																											
Turnicidae	*Turnix velox*	Little Button-quail																					1				
Mammals																											
Dasyuridae	*Dasykaluta rosamondae*	Kaluta										1									1			1			
	Ningaui timealeyi	Pilbara Ningaui															1										
	Planigale ingrami	Long-tailed Planigale				4		2	2	1	1	4	1		2	2	2	1	2	6	1	9	2		5	1	
	Planigale maculata	Common Planigale				1							1														
	Sminthopsis macroura	Stripe-faced Dunnart			1	3			10		3	4		2	4	1	4	9	4	4	1	5		2			4
Muridae	*Mus musculus*	House Mouse														1			2	1		1					1
	Pseudomys desertor	Desert Mouse			2	1			8		1	3	2	2	4	2	1			8	4	4	2	7	3	2	8
	Pseudomys hermannsburgensis	Sandy Inland Mouse			1	2			1			1	1		1	1		7		5		5		1	5	4	1
	Zyzomys argurus	Common Rock-rat												1										1			
Amphibians																											
Hylidae	*Cyclorana maini*	Sheep Frog							1		1		2		2	1											
	Litoria rubella	Little Red Tree Frog									1																
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet				1		11	2		5		2						17	1		1		1			
Reptiles																											
Agamidae	*Amphibolurus longirostris*								2		2	1	3			2	1		12		1		1			3	10
	Ctenophorus caudicinctus	Ring-tailed Dragon	1	3	2	3	1	2			4		7	2	5	5	4			1	1	2		5	5		1
	Ctenophorus isolepis	Crested Dragon							3		2		6					1				3				6	5
	Pogona minor mitchelli	Bearded Dragon						2					1		1											6	1
Boidae	*Antaresia stimsoni*	Stimson's Python									3								1	1	2			2	2	2	
Carphodactylidae	*Nephrurus wheeleri cinctus*																			1					2	1	
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko				1			5		14	2	6				1	2			2					3	
	Diplodactylus savagei						1				1																
	Lucasium wombeyi					3		3	2		1		2		1	1	1	1							1		
	Strophurus jeanae																				1					1	
	Strophurus wellingtonae							1												1				1	2	1	
Elapidae	*Brachyurophis approximans*				1	3		1	1			2	1	1			1		1								
	Demansia psammophis	Yellow-faced Whipsnake										1															
	Demansia rufescens	Rufous Whipsnake		2		1			2				1						1				1		1		
	Furina ornata	Moon Snake														1						1					3
	Parasuta monachus																									2	
	Pseudechis australis	Mulga Snake							1							1						1	1			2	
	Pseudonaja mengdeni	Gwardar									1																
	Pseudonaja modesta	Ringed Brown Snake						1	2																	1	
	Suta fasciata	Rosen's Snake																							1		
Gekkonidae	*Gehyra pilbara*						1							1													

		Survey	A																								
Family	**Species**	**Common Name**	**FMGVK14**	**FMGVK15**	**FMGVK16**	**FMGVK17**	**FMGVK18**	**FMGVK19**	**FMGVK2**	**FMGVK20**	**FMGVK3**	**FMGVK4**	**FMGVK5**	**FMGVK6**	**FMGVK7**	**FMGVK8**	**FMGVK9**	**FMGVQ1**	**FMGVQ10**	**FMGVQ2**	**FMGVQ3**	**FMGVQ4**	**FMGVQ5**	**FMGVQ6**	**FMGVQ7**	**FMGVQ8**	**FMGVQ9**
	Gehyra variegata										1			1												1	
	Heteronotia binoei	Bynoe's Gecko			1	4	3	9	1	1	3	2	4	2		1	2	1	4	1	2	8	2	2	1	1	4
Pygopodidae	*Delma elegans*																									1	
	Delma pax																1								1		
	Delma sp.						1																				
	Lialis burtonis				2				1						1												
	Pygopus nigriceps																1										
Scincidae	*Carlia munda*			1		2		5	10		9	2	7	2		1	1	3	21	11	1	5	1	8	4	9	6
	Carlia triacantha										1			1						1					1		
	Ctenotus duricola		1	1	5	4	1				2	3	1	3	5	3	5	11			1	1	6		8	5	
	Ctenotus grandis				3				6		2	2	7			1	2	1	2	14	4	15	3	9	6	4	10
	Ctenotus helenae			1					6		13	6	24	3	8	9	8	2	2	19	18	23	8	21	16	13	19
	Ctenotus pantherinus	Leopard Skink		1	15	7	2	1	2	1	10	6	8	2	1	3	3	25		6	4	16	6	6	6	5	2
	Ctenotus rutilans				1					2															1		
	Ctenotus saxatilis	Rock Skink	9	1	6	8	5	11	4	8	2	4	1	1		3	3			2		2		1	2	1	1
	Cyclodomorphus melanops	Slender Blue-tongue			2	3		1		3						1				1					3		2
	Lerista verhmens					1		1	1		3	1	3	1		1		2	1	1					1		
	Menetia greyii					1			4		5	2	5					1	1						1	1	3
	Proablepharus reginae																								1		
	Tiliqua multifasciata	Central Blue-tongue										1	1							3		3	3			3	
Typhlopidae	*Ramphotyphlops grypus*							1				1					1					1		1		1	
	Ramphotyphlops pilbarensis		1						1				2														1
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor	1	1	1	3	2	3	1	5				1	3	3	1		1	2	1	3	3	2	1		1
	Varanus brevicauda	Short-tailed Pygmy Monitor		1	1	1			7		10	4	2		2	8	7	7		3	10	2	2	1	10	15	7
	Varanus bushi	Pilbara Mulga Monitor	1			1							2														
	Varanus eremius	Pygmy Desert Monitor							4		3					1	2			2	3	3		1		2	1
	Varanus panoptes	Yellow-spotted Monitor			1						1			2	1					1	1	1				1	
	Varanus sp.					1					1																

A Coffey Environments (2008) *Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project*. Unpublished report for Fortescue Metals Group, Perth - March 2008 data.

Appendix A(1). Vertebrate fauna assessments in the vicinity of the project area

		Survey	A																													
Family	**Species**	**Common Name**	**FMG Firetail**	**FMG Serenity Valley**	**FMG Valley of the Kings**	**FMG Valley of the Queens**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**	**FMGVK14**				
Birds																																
Phasianidae	*Coturnix ypsilophora*	Brown Quail				1																										
Columbidae	*Phaps chalcoptera*	Common Bronzewing	3			3	2																									
	Ocyphaps lophotes	Crested Pigeon	5	9	1	3																										
	Geophaps plumifera	Spinifex Pigeon	3	6	4	5	7																									
	Geopelia cuneata	Diamond Dove	2	3	2	2																										
	Geopelia striata	Peaceful Dove			2	3																										
Podargidae	*Podargus strigoides*	Tawny Frogmouth		2	1		1																									
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar		1																												
Falconidae	*Falco berigora*	Brown Falcon		2		1																										
Otididae	*Ardeotis australis*	Australian Bustard				1																										
Cacatuidae	*Eolophus roseicapillus*	Galah		3		2																										
	Cacatua sanguinea	Little Corella	45			5	25																									
Psittacidae	*Barnardius zonarius*	Australian Ringneck	2	6	2	1																										
Cuculidae	*Centropus phasianinus*	Pheasant Coucal	1	1	1	1	3																									
	Chalcites basalis	Horsfield's Bronze-Cuckoo	1																													
	Cacomantis pallidus	Pallid Cuckoo	1																													
Strigidae	*Ninox novaeseelandiae*	Southern Boobook		4		1																										
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra	1																													
	Todiramphus pyrrhopygius	Red-backed Kingfisher	2	5		1																										
	Todiramphus sanctus	Sacred Kingfisher	2	2	1																											
	Todiramphus chloris	Collared Kingfisher	7																													
Meropidae	*Merops ornatus*	Rainbow Bee-eater	3				7																									
Climacteridae	*Climacteris melanura*	Black-tailed Treecreeper		2																												
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird	2	6																												
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren		6		3	6																									
	Malurus lamberti	Variegated Fairy-wren	23	9	28	18	5																									
	Amytornis striatus	Striated Grasswren					4																									
Acanthizidae	*Smicrornis brevirostris*	Weebill	73	6	59	25																										
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote			1																											
	Pardalotus striatus	Striated Pardalote			2																											
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater		3	3	4																										
	Lichenostomus keartlandi	Grey-headed Honeyeater	20	21	5	7	4																									
	Lichenostomus penicillatus	White-plumed Honeyeater	35	2	13	20	7																									

		Survey	A																									
Family	**Species**	**Common Name**	**FMG Firetail**	**FMG Serenity Valley**	**FMG Valley of the Kings**	**FMG Valley of the Queens**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**	**FMGVK14**
	Manorina flavigula	Yellow-throated Miner	16	13	3	15																						
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			2	3																						
	Lichmera indistincta	Brown Honeyeater	1	1		10																						
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler				6																						
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike	6		4	7	1																					
	Lalage sueurii	White-winged Triller		4	3	2	6																					
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	10		15	6																						
	Colluricincla harmonica	Grey Shrike-thrush	10	4	14	3	2																					
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		13	2	1																						
	Artamus minor	Little Woodswallow	1		1	3																						
	Cracticus nigrogularis	Pied Butcherbird	2	3	6	5																						
	Cracticus tibicen	Australian Magpie		3	1	4																						
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	6	1	7	4																						
Corvidae	*Corvus orru*	Torresian Crow	1			1																						
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark	2		3	2																						
Petroicidae	*Melanodryas cucullata*	Hooded Robin		1																								
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark	1	5		2	1																					
	Cincloramphus cruralis	Brown Songlark		1		1																						
	Eremiornis carteri	Spinifexbird	1	3	4	3																						
Hirundinidae	*Petrochelidon ariel*	Fairy Martin				2																						
Estrildidae	*Taeniopygia guttata*	Zebra Finch	3	20	20	30																						
	Emblema pictum	Painted Finch		3																								
Mammals																												
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll						1										1			1							
	Ningaui timealeyi	Pilbara Ningaui									1								2			1						
	Planigale ingrami	Long-tailed Planigale						2							1	1			3		1			1				
	Planigale maculata	Common Planigale														1												
	Sminthopsis macroura	Stripe-faced Dunnart						4									1							1	2			
Muridae	*Mus musculus*	House Mouse																								1		
	Pseudomys desertor	Desert Mouse																	1					3		2		
	Pseudomys hermannsburgensis	Sandy Inland Mouse						1	1							1								1	1	1		
	Zyzomys argurus	Common Rock-rat								2											1	1						
Reptiles																												
Agamidae	*Amphibolurus longirostris*																							2				
	Ctenophorus caudicinctus	Ring-tailed Dragon									3							1	2	1	3	1			6			

		Survey	A																									
Family	**Species**	**Common Name**	**FMG Firetail**	**FMG Serenity Valley**	**FMG Valley of the Kings**	**FMG Valley of the Queens**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**	**FMGVK14**
	Ctenophorus isolepis	Crested Dragon																						7				
	Pogona minor mitchelli	Bearded Dragon						1									1				1							
Boidae	*Antaresia stimsoni*	Stimson's Python																							1			
Carphodactylidae	*Underwoodisaurus milii*	Barking Gecko															1											
Diplodactylidae	*Diplodactylus savagei*																					1						
	Lucasium wombeyi												1						1	1	1	1						
	Oedura marmorata	Marbled Velvet Gecko															1											
	Strophurus strophurus																							1				
	Strophurus wellingtonae										1													3				
Elapidae	*Brachyurophis approximans*										2					1			2									
	Demansia psammophis	Yellow-faced Whipsnake																	1								1	
	Furina ornata	Moon Snake																									1	
	Parasuta monachus																						1					
	Pseudonaja mengdeni	Gwardar						1								1										2		
	Vermicella snelli																			1	1							
Gekkonidae	*Gehyra punctata*									1				1														
	Gehyra variegata														4											1		
	Heteronotia binoei	Bynoe's Gecko						1			2				1	3	1		3		1	1		1	7	9	5	2
Pygopodidae	*Delma elegans*																										1	
	Delma nasuta														1							1						
	Delma pax							2																2		1		
	Lialis burtonis										1								1									
	Pygopus nigriceps										1							2										
Scincidae	*Carlia munda*							5							5	3	1			2			9	6			1	
	Carlia triacantha													2												1		
	Ctenotus duricola								6		1								4	2	1				2		1	
	Ctenotus grandis															3							2					
	Ctenotus helenae							3	2		1				4	1			1	1			3	1	1	2		
	Ctenotus pantherinus	Leopard Skink						1	1										1	1								
	Ctenotus pantherinus ocellifer	Leopard Skink							8		4										1				1	1		
	Ctenotus saxatilis	Rock Skink						5		8	1	7	5	2	3	6	10		6	1	6	1			1		1	7
	Ctenotus sp.																											1
	Cyclodomorphus melanops melanops	Slender Blue-tongue																	1									
	Lerista muelleri																						2					
	Lerista verhmens																						2					

		Survey	A																									
Family	**Species**	**Common Name**	**FMG Firetail**	**FMG Serenity Valley**	**FMG Valley of the Kings**	**FMG Valley of the Queens**	**FMG Zion**	**FMGFT1**	**FMGFT10**	**FMGFT11**	**FMGFT12**	**FMGFT13**	**FMGFT14**	**FMGFT15**	**FMGFT2**	**FMGFT3**	**FMGFT4**	**FMGFT5**	**FMGFT6**	**FMGFT7**	**FMGFT8**	**FMGFT9**	**FMGVK1**	**FMGVK10**	**FMGVK11**	**FMGVK12**	**FMGVK13**	**FMGVK14**
	Lerista zietzi							2							1				1									
	Menetia greyii																2			2			3					
	Morethia ruficauda exquisita															1	2									1		
Typhlopidae	*Ramphotyphlops grypus*								1								1			1	1				1			
	Ramphotyphlops pilbarensis							1	1																			
	Ramphotyphlops sp.																		1									
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor							1	2	1	3	3	2				1										2
	Varanus brevicauda	Short-tailed Pygmy Monitor																					1	2	1	2	1	
	Varanus bushi	Pilbara Mulga Monitor																						1				
	Varanus eremius	Pygmy Desert Monitor						1																2			2	
	Varanus tristis	Racehorse Monitor							1																			

A Coffey Environments (2008) *Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project*. Unpublished report for Fortescue Metals Group, Perth - November 2008 data.

Appendix A(5). Vertebrate fauna assessments in the vicinity of the project area

		Survey	A																											
Family	**Species**	**Common Name**	**FMGVK15**	**FMGVK16**	**FMGVK17**	**FMGVK18**	**FMGVK19**	**FMGVK2**	**FMGVK20**	**FMGVK3**	**FMGVK4**	**FMGVK5**	**FMGVK6**	**FMGVK7**	**FMGVK8**	**FMGVK9**	**FMGVQ1**	**FMGVQ10**	**FMGVQ13**	**FMGVQ14**	**FMGVQ15**	**FMGVQ2**	**FMGVQ3**	**FMGVQ4**	**FMGVQ5**	**FMGVQ6**	**FMGVQ7**	**FMGVQ8**	**FMGVQ9**	**Unknown**
Birds																														
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																						1						
Mammals																														
Dasyuridae	*Dasykaluta rosamondae*	Kaluta																	1								1			
	Planigale ingrami	Long-tailed Planigale		2					1	2	2	1	3		3	2	1			1			3	2			2	1		
	Planigale maculata	Common Planigale									2		1			1														
	Sminthopsis macroura	Stripe-faced Dunnart			2			2					2		1		6	1					3	2		3			1	
Muridae	*Mus musculus*	House Mouse															1													
	Pseudomys desertor	Desert Mouse		2				1				1				1	2					4		1	1	13	3	1	3	
	Pseudomys hermannsburgensis	Sandy Inland Mouse												1			5					2		4		2	1	2		
Amphibians																														
Myobatrachidae	*Uperoleia glandulosa*	Glandular Toadlet																10												
Reptiles																														
Agamidae	*Amphibolurus longirostris*												1					1										1	1	
	Ctenophorus caudicinctus	Ring-tailed Dragon	1	2	1	2						2	1		2	1	1	1					1			1	1			1
	Ctenophorus isolepis	Crested Dragon						1		1		3											1			1		2	1	
	Pogona minor mitchelli	Bearded Dragon									2	1																1		
Boidae	*Antaresia stimsoni*	Stimson's Python						1																						
Carphodactylidae	*Nephrurus wheeleri cinctus*																						2							
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko																					1	1				3		
	Lucasium stenodactylus									1	1	3																		
	Lucasium wombeyi									1		1																		
	Strophurus jeanae				1																									
	Strophurus wellingtonae						1																		1			2		
Elapidae	*Brachyurophis approximans*											2										1								
	Pseudechis australis	Mulga Snake				2		1																						
	Pseudonaja mengdeni	Gwardar																				1		1						1
	Suta fasciata	Rosen's Snake										1																		
	Vermicella snelli											1																		
Gekkonidae	*Gehyra pilbara*						2																							
	Gehyra punctata			1			1													1	1				1					
	Gehyra variegata				1		1	1		5		1						3			1									
	Heteronotia binoei	Bynoe's Gecko	2	8	8	4	4	3	1	1	2		1		1	9	1	1	1			5	1	5	6	2				
Pygopodidae	*Delma elegans*				1																1									
	Delma pax			1	1				1							1		1								1	1			
	Lialis burtonis				1										1							1		1			1		1	
Scincidae	*Carlia munda*				1			6		1	1	1	1	3				19				2		3	1	1	1	2	4	
	Carlia sp.															1														

		Survey	A																											
Family	**Species**	**Common Name**	**FMGVK15**	**FMGVK16**	**FMGVK17**	**FMGVK18**	**FMGVK19**	**FMGVK2**	**FMGVK20**	**FMGVK3**	**FMGVK4**	**FMGVK5**	**FMGVK6**	**FMGVK7**	**FMGVK8**	**FMGVK9**	**FMGVQ1**	**FMGVQ10**	**FMGVQ13**	**FMGVQ14**	**FMGVQ15**	**FMGVQ2**	**FMGVQ3**	**FMGVQ4**	**FMGVQ5**	**FMGVQ6**	**FMGVQ7**	**FMGVQ8**	**FMGVQ9**	**Unknown**
	Ctenotus duricola		1	3	1	1				4	2	1	2	2	4	3	4					1	1	1	9		4	5	1	
	Ctenotus grandis							1																		1				
	Ctenotus grandis titan											3			3							8	4	4		3	3	1	5	
	Ctenotus helenae							3		7	3	3	2	3	4	3	3	3				7	9	14	1	12	7	11	13	
	Ctenotus leonhardii				2																									
	Ctenotus pantherinus	Leopard Skink		3	2			1		4	4			1	3	1	3					1			4		7	2		
	Ctenotus saxatilis	Rock Skink	3	6	3	1	3		2		1						2			2		9	1	1	1			1		
	Ctenotus sp.													1				1												
	Cyclodomorphus melanops	Slender Blue-tongue			3																		1							
	Lerista muelleri						1	1		1	1	1			1			1						1		2				
	Lerista verhmens																	1									1		1	
	Lerista zietzi				1		1				1											1								
	Menetia greyii			1			2	2		3	1	2			1			1									1		2	
	Morethia ruficauda exquisita				1		2																	1						
	Proablepharus reginae												1		1							1	1	1		1		3		
	Tiliqua multifasciata	Central Blue-tongue		1							1														1					
Typhlopidae	*Ramphotyphlops grypus*																									2	2	1		
	Ramphotyphlops sp.											1																		
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor		3		1	1		1		2				1				1			1	2	2	3	1	3		2	
	Varanus brevicauda	Short-tailed Pygmy Monitor						3		5	2	1	1	3	3	1	1					1		3		1	7	6	3	
	Varanus bushi	Pilbara Mulga Monitor		1											1									1	1					
	Varanus eremius	Pygmy Desert Monitor		2	2					3					1		2						1			2	1	2	2	
	Varanus tristis	Racehorse Monitor						1		1																				

A Coffey Environments (2008) *Level 2 Terrestrial Vertebrate Fauna Assessment for the Solomon Project*. Unpublished report for Fortescue Metals Group, Perth- November 2008 data.

Appendix A(6). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A																		B				
Family	**Species**	**Common Name**	**FMG09**	**FMG10**	**FMG12**	**FMG13**	**FMG14**	**FMG15**	**FMG16**	**FMG17**	**FMG18**	**FMG19**	**FMG20f**	**FMG21**	**FMG22**	**FMG23**	**FMG24**	**FMG25**	**FMG25f**	**FMG26f**	**Opportunistic**	**FMR67**	**FMR69**	**FMR71**	**FMR73**	**FMR75**
Birds																										
Casuariidae	*Dromaius novaehollandiae*	Emu	1	1									1				1			1						
Phasianidae	*Coturnix pectoralis*	Stubble Quail				4																				
Anatidae	*Anas superciliosa*	Pacific Black Duck														6					6					
Columbidae	*Phaps chalcoptera*	Common Bronzewing																					1			
	Ocyphaps lophotes	Crested Pigeon	2	2			2	2							5		2		1				1	2		
	Geophaps plumifera	Spinifex Pigeon									5	6			3		3		1							
	Geopelia cuneata	Diamond Dove								1		1				6								2	5	
Podargidae	*Podargus strigoides*	Tawny Frogmouth														2					1					
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																			2					
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar								1											1					
Apodidae	*Apus pacificus*	Fork-tailed Swift	96	3	10								7			1										
Anhingidae	*Anhinga melanogaster*	Australasian Darter																			1					
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork									1					1										
Ardeidae	*Egretta novaehollandiae*	White-faced Heron															1									
Accipitridae	*Elanus axillaris*	Black-shouldered Kite				1																				
	Lophoictinia isura	Square-tailed Kite				1																				
	Hamirostra melanosternon	Black-breasted Buzzard				1																				
	Haliastur sphenurus	Whistling Kite	1			3		1		1			1						2							
	Milvus migrans	Black Kite				1																				
	Accipiter fasciatus	Brown Goshawk																						3		
	Accipiter cirrocephalus	Collared Sparrowhawk						1																		
	Circus assimilis	Spotted Harrier				1									1											
	Circus approximans	Swamp Harrier				1																				
	Aquila audax	Wedge-tailed Eagle	1																							
	Hieraaetus morphnoides	Little Eagle			1																					
Falconidae	*Falco cenchroides*	Nankeen Kestrel		1						1									1	1						
	Falco berigora	Brown Falcon				2							3	2	1		1						1			
	Falco longipennis	Australian Hobby				1																				
	Falco hypoleucos	Grey Falcon																			3					
	Falco peregrinus	Peregrine Falcon									1															
Otididae	*Ardeotis australis*	Australian Bustard			1	7														1						
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew																			2					
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt																			1					
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel														2	5									
Turnicidae	*Turnix velox*	Little Button-quail	1			4							2									1				
Cacatuidae	*Eolophus roseicapillus*	Galah			2			2			20		2						6			1	2			

		Surveys	**A**																			**B**				
Family	**Species**	**Common Name**	**FMG09**	**FMG10**	**FMG12**	**FMG13**	**FMG14**	**FMG15**	**FMG16**	**FMG17**	**FMG18**	**FMG19**	**FMG20f**	**FMG21**	**FMG22**	**FMG23**	**FMG24**	**FMG25**	**FMG25f**	**FMG26f**	**Opportunistic**	**FMR67**	**FMR69**	**FMR71**	**FMR73**	**FMR75**
	Cacatua sanguinea	Little Corella			6												39									
	Nymphicus hollandicus	Cockatiel	6				7						2		3											
Psittacidae	*Barnardius zonarius*	Australian Ringneck																					1			
	Melopsittacus undulatus	Budgerigar	2	2	5	20	66	7		11	7	10	4	15		6	24		11	13			1			
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo		2									1	1	1											
	Cacomantis pallidus	Pallid Cuckoo					2			1							1									
Strigidae	*Ninox novaeseelandiae*	Southern Boobook																			1					
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra																			1					
	Todiramphus pyrrhopygius	Red-backed Kingfisher												1			2									
	Todiramphus sanctus	Sacred Kingfisher														1	3									
Meropidae	*Merops ornatus*	Rainbow Bee-eater														4	7									
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			2	17	4						28	1	2				3	2		9			1	
	Malurus lamberti	Variegated Fairy-wren	2				2	4		8	4					4	5					2	4	3		
	Amytornis striatus	Striated Grasswren														2	3			1						
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat																								
	Smicrornis brevirostris	Weebill	5	7													10						3	4	1	4
	Gerygone fusca	Western Gerygone																					1	1		
	Acanthiza robustirostris	Slaty-backed Thornbill								9																
	Acanthiza uropygialis	Chestnut-rumped Thornbill					11	1		24			1									3				
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																						1		
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	1	6	1		6	10		10	4	5	4	1	2				2	2		1	5	1	3	
	Lichenostomus keartlandi	Grey-headed Honeyeater																						3		3
	Lichenostomus penicillatus	White-plumed Honeyeater						1								12	8									
	Manorina flavigula	Yellow-throated Miner		4			10	2		3		2			2				5				3	8		
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			3		11	5		12				1								2	4			
	Epthianura tricolor	Crimson Chat											113	19												
	Sugomel niger	Black Honeyeater		8																						
	Lichmera indistincta	Brown Honeyeater	16	43											1	4	4						2	6		1
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler						7																		
Eupetidae	*Cinclosoma castaneothorax*	Chestnut-breasted Quail-thrush						1																		
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella					7	6																		
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike		2	2							1				4	6			1				1		
	Lalage sueurii	White-winged Triller					14	10					1													
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler		1			8	7		10						1						3	3	4	1	
	Oreoica gutturalis	Crested Bellbird		1			6	1		7		2										1	2			
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			2	1	16	12		1		5	20	3	2					3						
	Cracticus torquatus	Grey Butcherbird			1		5	1		6												3	3			
	Cracticus nigrogularis	Pied Butcherbird	1	2		2	2					3	1		1	3	1			3		1	1			
	Cracticus tibicen	Australian Magpie															1									

		Surveys	A																		B				
Family	**Species**	**Common Name**	**FMG09**	**FMG10**	**FMG12**	**FMG13**	**FMG14**	**FMG15**	**FMG16**	**FMG17**	**FMG18**	**FMG19**	**FMG20f**	**FMG21**	**FMG22**	**FMG23**	**FMG24**	**FMG25**	**FMG25f**	**FMG26f**	**Opportunistic**	**FMR67**	**FMR69**	**FMR71**	**FMR73**	**FMR75**
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	1		3		9	4		6			1	1		2	1					1	2	1	2	
Corvidae	*Corvus bennetti*	Little Crow																						11		
	Corvus orru	Torresian Crow	3	3	1	2	7			1	2		1	1	1	3	3		1	2			1			
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark					12	1		1				1		3	5									
Petroicidae	*Petroica goodenovii*	Red-capped Robin								3																
	Melanodryas cucullata	Hooded Robin						2		2																
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark				9					9		1	3												
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark			1								1		1					1						
	Cincloramphus cruralis	Brown Songlark				7							11													
	Eremiornis carteri	Spinifexbird										6			1				2	6		2	2			
Hirundinidae	*Petrochelidon ariel*	Fairy Martin																			1					
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird													1		1									
Estrildidae	*Taeniopygia guttata*	Zebra Finch	7	17	14	1	9	11		8		4	218	27	8	6	12		5	11		5	2	18	3	
	Neochmia ruficauda	Star Finch																								
	Emblema pictum	Painted Finch										10			7	2	1			10			8	10		4
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit			1						2															
Mammals																										
Camelidae	*Camelus dromedarius*	Dromedary																		1						
Canidae	*Canis lupus*	Dingo				1		1												5						
Felidae	*Felis catus*	House Cat	1	1	1																					
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat										X														
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat										X						X								
	Scotorepens greyii	Little Broad-nosed Bat						X				X						X								
	Vespadelus finlaysoni	Inland Cave Bat																X								
Dasyuridae	*Dasycercus cristicauda*	Crest-tailed Mulgara																			1					
	Dasykaluta rosamondae	Kaluta																	2							
	Dasyurus hallucatus	Northern Quoll																			1					
	Ningaui ridei	Wongai Ningaui	4	1	1																					
	Ningaui timealeyi	Pilbara Ningaui					1		1			1		3	2					1						
	Planigale sp.							1		2			1		1											
	Sminthopsis macroura	Stripe-faced Dunnart		1	1									3												
	Sminthopsis youngsoni	Lesser Hairy-footed Dunnart		2																						
Macropodidae	*Macropus robustus*	Wallaroo or Euro												8												
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna																			1					
Equidae	*Equus asinus*	Donkey						1																		
Muridae	*Leggadina lakedownensis*	Lakeland Downs Mouse											2													
	Mus musculus	House Mouse						2																		
	Pseudomys delicatulus	Delicate Mouse														1										
	Pseudomys desertor	Desert Mouse	1											1												

		Surveys	A																		B				
Family	**Species**	**Common Name**	**FMG09**	**FMG10**	**FMG12**	**FMG13**	**FMG14**	**FMG15**	**FMG16**	**FMG17**	**FMG18**	**FMG19**	**FMG20f**	**FMG21**	**FMG22**	**FMG23**	**FMG24**	**FMG25**	**FMG25f**	**FMG26f**	**Opportunistic**	**FMR67**	**FMR69**	**FMR71**	**FMR73**	**FMR75**
	Pseudomys hermannsburgensis	Sandy Inland Mouse	1	6	10	1	1							1												
	Zyzomys argurus	Common Rock-rat			1																					
Amphibians																										
Hylidae	*Cyclorana australis*	Giant Frog																			2					
	Cyclorana maini	Sheep Frog		1	10	182	418	22	35	6				9		16	74		6	148						
	Litoria rubella	Little Red Tree Frog												2		25	1			3						
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot														3	1			4						
	Platyplectrum spenceri	Centralian Burrowing Frog														6	39		4	77						
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet														14	26			3						
Reptiles																										
Agamidae	*Amphibolurus longirostris*															1										
	Diporiphora amphiboluroides										1															
	Ctenophorus caudicinctus	Ring-tailed Dragon					2							2	3	1										
	Ctenophorus isolepis		2	2	5															1						
	Tympanocryptis cephalus	Pebble Dragon											1													
Boidae	*Antaresia perthensis*	Pygmy Python									1										1					
	Antaresia stimsoni	Stimson's Python																			10					
	Aspidites melanocephalus	Black-headed Python																			4					
Carphodactylidae	*Nephrurus levis pilbarensis*																		1		1					
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko		4	6	1									1											
	Lucasium stenodactylus		3		1					2	4				1				1		1					
	Lucasium wombeyi													3												
	Strophurus elderi														1				3							
	Strophurus jeanae				4																					
	Strophurus wellingtonae				1						1	2		1												
Elapidae	*Brachyurophis approximans*																1									
	Demansia psammophis cupreiceps				1					3	2		1													
	Demansia rufescens	Rufous Whipsnake																			1					
	Furina ornata	Moon Snake						1									1									
	Pseudechis australis	Mulga Snake											1								6					
	Suta fasciata	Rosen's Snake													1											
	Suta punctata	Spotted Snake																			1					
Gekkonidae	*Gehyra variegata*					1						5														
	Heteronotia binoei	Bynoe's Gecko								1				3	1				1							
Pygopodidae	*Delma nasuta*							1								2				1						
	Delma pax		1					2						2		1			2	1						
	Delma tincta									1		1		3	2	2	1			1						
	Lialis burtonis				1									1		1			1							
Scincidae	*Carlia munda*						1			6				1			4									

		Surveys	A																			B				
Family	**Species**	**Common Name**	**FMG09**	**FMG10**	**FMG12**	**FMG13**	**FMG14**	**FMG15**	**FMG16**	**FMG17**	**FMG18**	**FMG19**	**FMG20f**	**FMG21**	**FMG22**	**FMG23**	**FMG24**	**FMG25**	**FMG25f**	**FMG26f**	**Opportunistic**	**FMR67**	**FMR69**	**FMR71**	**FMR73**	**FMR75**
	Carlia triacantha			1	1			1	4				1													
	Ctenotus ariadnae		1	2																						
	Ctenotus duricola								1					2	1				2							
	Ctenotus grandis titan			5	2											1	2		1							
	Ctenotus helenae			1			2					1		1	2											
	Ctenotus pantherinus	Leopard Skink		1	1									2					1							
	Ctenotus rubicundus													1												
	Ctenotus saxatilis	Rock Skink												1	1		3									
	Ctenotus schomburgkii					1																				
	Ctenotus uber					1								1												
	Cyclodomorphus melanops	Slender Blue-tongue		5										4	3											
	Lerista bipes		2												2	1				2						
	Lerista muelleri			1						1	3	2														
	Menetia greyii		3				1	1		3	1	1								1						
	Notoscincus ornatus ornatus						1																			
	Proablepharus reginae							1						2												
	Tiliqua multifasciata	Central Blue-tongue							1					1		1				1						
Typhlopidae	*Ramphotyphlops ammodytes*			2	3	3	1	1		3	1	3			2	1										
	Ramphotyphlops grypus														1											
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor												1	1											
	Varanus brevicauda	Short-tailed Pygmy Monitor															2									
	Varanus eremius	Pygmy Desert Monitor		1	1												1									
	Varanus panoptes rubidus					1															1					
Cheluidae	*Chelodina steindachneri*	Flat-shelled Turtle																		1						

A Biota Environmental Services (2004a) *Fauna Habitats and Fauna Assemblage of the Proposed FMG Stage A Rail Corridor*. Unpublished report to the Fortescue Metals Group Ltd, Perth.

B Biota Environmental Sciences (2005) *Fauna Habitats and Fauna Assemblages of the Proposed FMG Stage B Rail Corridor and Mindy Mindy; Christmas Creek; Mt Lewin and Mt Nicholas Mines Areas*, Unpublished report for Fortescue Metals Group; Perth.

X Present only

Appendix A(7). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A																	B
Family	**Species**	**Common Name**	**HDD01F**	**HDD02**	**HDD03**	**HDD04F**	**HDD05**	**HDD06**	**HDD07**	**HDD08**	**HDD09**	**HDD16**	**HDKA005**	**HDKA006**	**HDRT009**	**HDRT011**	**HDRT012**	**HDRT013**	**Opportunistic**	**Hamersley Gorge**
Birds																				
Casuariidae	*Dromaius novaehollandiae*	Emu							1											
Anatidae	*Anas superciliosa*	Pacific Black Duck					10													
Columbidae	*Phaps chalcoptera*	Common Bronzewing								2						1				
	Ocyphaps lophotes	Crested Pigeon			2												1			X
	Geophaps plumifera	Spinifex Pigeon			4	1	2		8		2	10				2	16	1		X
	Geopelia cuneata	Diamond Dove		13	5	9	133	31	8	3		20				2	481	31		X
	Geopelia striata	Peaceful Dove								1	3	1				5				X
Podargidae	*Podargus strigoides*	Tawny Frogmouth				1				2										X
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar				1						1								X
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican														1				
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork														1				
Ardeidae	*Ardea pacifica*	White-necked Heron														3				X
	Egretta novaehollandiae	White-faced Heron					1													X
	Nycticorax caledonicus	Nankeen Night Heron								2						3				
Accipitridae	*Haliastur sphenurus*	Whistling Kite							1	2						4				X
	Milvus migrans	Black Kite			1															
	Accipiter fasciatus	Brown Goshawk		1			1			2						3				
	Accipiter cirrocephalus	Collared Sparrowhawk			1											1				
	Circus assimilis	Spotted Harrier		1					1							1				
	Aquila audax	Wedge-tailed Eagle			1															X
	Hieraaetus morphnoides	Little Eagle			1	1														
Falconidae	*Falco cenchroides*	Nankeen Kestrel		3	1	2		3			2	1						2		
	Falco berigora	Brown Falcon		4	3				1											X
	Falco longipennis	Australian Hobby			2															
Otididae	*Ardeotis australis*	Australian Bustard		4	2				1											
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew																2		
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel					5									16	2			
Turnicidae	*Turnix velox*	Little Button-quail		1	1															
Cacatuidae	*Eolophus roseicapillus*	Galah			8					2						2	3			X
	Cacatua sanguinea	Little Corella		58	3		3									11	2	1		X
	Nymphicus hollandicus	Cockatiel																		X
Tytonidae	*Tyto alba*	Barn Owl		1																
Psittacidae	*Barnardius zonarius*	Australian Ringneck				3				2						8				X
	Psephotus varius	Mulga Parrot																		
	Melopsittacus undulatus	Budgerigar			13					1		2					12	3		X
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo							1		1							1		

		Surveys	A																	B
Family	**Species**	**Common Name**	**HDD01F**	**HDD02**	**HDD03**	**HDD04F**	**HDD05**	**HDD06**	**HDD07**	**HDD08**	**HDD09**	**HDD16**	**HDKA005**	**HDKA006**	**HDRT009**	**HDRT011**	**HDRT012**	**HDRT013**	**Opportunistic**	**Hamersley Gorge**
	Cacomantis pallidus	Pallid Cuckoo						1									1			
Strigidae	*Ninox connivens*	Barking Owl														2				
	Ninox novaeseelandiae	Southern Boobook																2		X
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra					6			6						8	1			X
	Todiramphus pyrrhopygius	Red-backed Kingfisher					2				1						1	5		
	Todiramphus sanctus	Sacred Kingfisher					2			1						1	1			
Meropidae	*Merops ornatus*	Rainbow Bee-eater			1	1	10			7	1	3				1	5			X
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird				4	2													
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren		3					9						4			2		
	Malurus lamberti	Variegated Fairy-wren			4	3	13		9	15	14	13				9	13			X
Acanthizidae	*Smicrornis brevirostris*	Weebill					2		5	1	8									
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote				2	2		6	4	2					1				
	Pardalotus striatus	Striated Pardalote								3						1	1			
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater		8	3				4		2	4								
	Lichenostomus keartlandi	Grey-headed Honeyeater										9								
	Lichenostomus penicillatus	White-plumed Honeyeater			6	11	49	10	1	67		10			2	35	17	5		X
	Manorina flavigula	Yellow-throated Miner			6	5			8	21	7	12				17	3	2		
	Epthianura tricolor	Crimson Chat															7			
	Sugomel niger	Black Honeyeater			1				4		3				1					
	Lichmera indistincta	Brown Honeyeater			2	12	3	1	16	12	23	35				3				X
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler								9		2				15				
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike		2	2	3	10	3	13	3		1				9	2	2		
	Lalage sueurii	White-winged Triller			1		6	30	13		4						17	6		
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush			11	4											1			
		Crested Bellbird							1											
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		10	7	3	6	6	9		3					4	21	7		
	Cracticus nigrogularis	Pied Butcherbird		3	7	5	1	5		1							4	4		X
	Cracticus tibicen	Australian Magpie			2			5	4		2							7		X
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail			3	5	8	8	3	1	3	7				6	3	6		X
Corvidae	*Corvus coronoides*	Australian Raven																		X
	Corvus bennetti	Little Crow																		X
	Corvus orru	Torresian Crow			3		5			3		1				4	1			
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark					10		1	11		5				16	4	1		X
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark		22																
Acrocephalidae	*Acrocephalus australis*	Australian Reed-Warbler					4													
	Cincloramphus mathewsi	Rufous Songlark		5	4		1									1	1			
	Cincloramphus cruralis	Brown Songlark		17																
	Eremiornis carteri	Spinifexbird			3				1								1			

		Surveys	A																	B
Family	**Species**	**Common Name**	**HDD01F**	**HDD02**	**HDD03**	**HDD04F**	**HDD05**	**HDD06**	**HDD07**	**HDD08**	**HDD09**	**HDD16**	**HDKA005**	**HDKA006**	**HDRT009**	**HDRT011**	**HDRT012**	**HDRT013**	**Opportunistic**	**Hamersley Gorge**
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird							1	1						2				
Estrildidae	*Taeniopygia guttata*	Zebra Finch		31	35	7	31	18	40	8	10	74			3	22	79	12		X
	Neochmia ruficauda	Star Finch					11					11				15				
	Emblema pictum	Painted Finch		4	52	16	4	5	30	18	12	44			5	21	3	6		X
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit					2	1									7	8		X
Mammals																				
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat											X	X						
	Mormopterus beccarii	Beccari's Freetail Bat											X							
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat											X	X						
	Scotorepens greyii	Little Broad-nosed Bat												X						
	Vespadelus finlaysoni	Inland Cave Bat											X	X						
Amphibians																				
Hylidae	*Cyclorana maini*	Sheep Frog					2													
	Litoria rothii	Northern Laughing Tree Frog				1	11			21		1								
Limnodynastidae	*Platyplectrum spenceri*	Centralian Burrowing Frog								1										
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet					66			1										
Reptiles																				
Agamidae	*Ctenophorus caudicinctus caudicinctus*	Ring-tailed Dragon				1	4	12	7	4	1							2	3	
	Ctenophorus nuchalis	Central Netted Dragon							1										1	
	Diporiphora valens																		1	
	Pogona minor	Bearded Dragon			1														2	
	Tympanocryptis cephalus	Pebble Dragon		1																
Boidae	*Antaresia perthensis*	Pygmy Python																	1	
	Liasis olivaceus barroni	Pilbara Olive Python																	1	
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko																	1	
	Diplodactylus mitchelli			2																
	Diplodactylus savagei							4												
	Lucasium stenodactylus								1		3									
	Oedura marmorata	Marbled Velvet Gecko				17		2												
Elapidae	*Austrelaps superbus*														1					
	Demansia psammophis cupreiceps			1					1											
	Pseudechis australis	Mulga Snake																	1	
	Pseudonaja modesta	Ringed Brown Snake			1															
	Suta fasciata	Rosen's Snake			1	1														
	Suta punctata	Spotted Snake									1									
Gekkonidae	*Gehyra punctata*		1			4		1	3											
	Gehyra variegata					1	1	1												
	Heteronotia binoei	Bynoe's Gecko						5												

		Surveys	A																B
Family	**Species**	**Common Name**	**HDD01F**	**HDD02**	**HDD03**	**HDD04F**	**HDD05**	**HDD06**	**HDD07**	**HDD08**	**HDD09**	**HDD16**	**HDKA005**	**HDKA006**	**HDRT009**	**HDRT011**	**HDRT012**	**HDRT013**	**Opportunistic**	**Hamersley Gorge**
	Heteronotia spelea	Desert Cave Gecko				1														
	Rhynchoedura ornata	Beaked Gecko									1									
Pygopodidae	*Delma nasuta*								1											
	Delma pax				2		2	1											2	
	Delma tincta				1															
	Lialis burtonis							1												
Scincidae	*Carlia munda*				2			1		2										
	Carlia triacantha			2																
	Ctenotus duricola								1		2									
	Ctenotus grandis titan								1		1									
	Ctenotus helenae			1					1	1	1									
	Ctenotus pantherinus ocellifer	Leopard Skink													1					
	Ctenotus robustus			1																
	Ctenotus rubicundus							1												
	Ctenotus saxatilis	Rock Skink			4			7	1	8	2								1	
	Egernia formosa					1														
	Lerista sp.							1	1		1									
	Morethia ruficauda exquisita							1			1	1								
Typhlopidae	*Ramphotyphlops ganei*							1												
	Ramphotyphlops grypus										3									
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor			1															
	Varanus eremius	Pygmy Desert Monitor													1					
	Varanus giganteus	Perentie																	1	
	Varanus panoptes panoptes																		1	
	Varanus tristis tristis						1													

A Biota Environmental Sciences (2004b) *Hope Downs Additional Rail Corridor - Chichester Range Vertebrate Fauna Survey*. Unpublished report for Hope Downs Management Services, Perth.

B Burbidge, A.A. (1971) *Results of a Biological Survey of the Millstream Area*. Department of Fisheries and Fauna, Western Australia, Report VII, Perth.

X Present only

Appendix A(8). Vertebrate fauna assessments in the vicinity of the project area

		Survey	**A**																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
Birds																													
Casuariidae	*Dromaius novaehollandiae*	Emu													1		2		1						1		4		5
Anatidae	*Chenonetta jubata*	Australian Wood Duck																											3
	Anas gracilis	Grey Teal																									2		11
	Anas superciliosa	Pacific Black Duck																									21		96
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe																											11
Columbidae	*Phaps chalcoptera*	Common Bronzewing																3		1							1		2
	Ocyphaps lophotes	Crested Pigeon													8	20	12	3		15			1		1	1	3		38
	Geophaps plumifera	Spinifex Pigeon												1							6	6			7				47
	Geopelia cuneata	Diamond Dove													23		9	22	1	23					2		9		84
	Geopelia striata	Peaceful Dove																									17		1
	Geopelia humeralis	Bar-shouldered Dove																											1
Podargidae	*Podargus strigoides*	Tawny Frogmouth																											15
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar																											53
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar																									1		1
Anhingidae	*Anhinga melanogaster*	Australasian Darter																											12
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant																											13
	Phalacrocorax sulcirostris	Little Black Cormorant																			30		40				1		357
	Phalacrocorax varius	Pied Cormorant																											4
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican																			5								14
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork																									1		5
Ardeidae	*Ardea alba*	Great Egret																									1		11
	Ardea pacifica	White-necked Heron																											6
	Butorides striatus	Striated Heron																											5
	Egretta novaehollandiae	White-faced Heron																		1	1						17		87
	Egretta garzetta	Little Egret																									1		18
	Nycticorax caledonicus	Nankeen Night Heron																									5		13
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis																											7
	Threskiornis spinicollis	Straw-necked Ibis																									5		1
Accipitridae	*Elanus axillaris*	Black-shouldered Kite																		1	1		2			1			9
	Hamirostra melanosternon	Black-breasted Buzzard																											2
	Haliastur sphenurus	Whistling Kite																1		1							7		21
	Haliastur indus	Brahminy Kite																											13
	Milvus migrans	Black Kite															1												3
	Accipiter fasciatus	Brown Goshawk																1											7
	Circus assimilis	Spotted Harrier																											4
	Aquila audax	Wedge-tailed Eagle																			2								3

		Survey	A																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
	Hieraaetus morphnoides	Little Eagle																											6
Falconidae	*Falco cenchroides*	Nankeen Kestrel																2		1			1			4	2	4	20
	Falco berigora	Brown Falcon																1								1	1	2	41
	Falco longipennis	Australian Hobby																											4
	Falco peregrinus	Peregrine Falcon																					1						1
Otididae	*Ardeotis australis*	Australian Bustard																1	1						2			1	11
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew																											5
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt																											53
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover																											5
	Elseyornis melanops	Black-fronted Dotterel																									6		76
Scolopacidae	*Numenius phaeopus*	Whimbrel																											97
	Numenius madagascariensis	Eastern Curlew																											1
	Actitis hypoleucos	Common Sandpiper																											10
	Tringa brevipes	Grey-tailed Tattler																											4
Turnicidae	*Turnix velox*	Little Button-quail												1					1	1	2		1		1	2		5	6
Laridae	*Gelochelidon nilotica*	Gull-billed Tern																											25
	Hydroprogne caspia	Caspian Tern																											3
	Thalasseus bergii	Crested Tern																											2
	Chroicocephalus novaehollandiae	Silver Gull																											38
Cacatuidae	*Eolophus roseicapillus*	Galah													6		4				14						16		59
	Cacatua sanguinea	Little Corella																									701		528
	Nymphicus hollandicus	Cockatiel													41		63	6	11	11	7				4		20	674	201
Psittacidae	*Barnardius zonarius*	Australian Ringneck													5		3	8	2	1	6			3	4		5		8
	Psephotus varius	Mulga Parrot																											1
	Melopsittacus undulatus	Budgerigar												3	11	1	19	1				1					13	20	15
Cuculidae	*Centropus phasianinus*	Pheasant Coucal																											1
	Chalcites basalis	Horsfield's Bronze-Cuckoo																1	1						3	1	6	2	2
	Chalcites osculans	Black-eared Cuckoo																2	1						1				2
	Cacomantis pallidus	Pallid Cuckoo																1				1			2		5	1	3
Strigidae	*Ninox novaeseelandiae*	Southern Boobook																									2		6
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra																											10
	Todiramphus pyrrhopygius	Red-backed Kingfisher																			1						2		11
	Todiramphus sanctus	Sacred Kingfisher																											2
Meropidae	*Merops ornatus*	Rainbow Bee-eater															1	7	7	10	14						12		20
Ptilonorhynchidae	*Ptilonorhynchus guttatus*	Western Bowerbird																											2
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren																		1					4	6		4	27
	Malurus lamberti	Variegated Fairy-wren										3			13	5	6	24	21	14	3				2	2			34
	Stipiturus ruficeps	Rufous-crowned Emu-wren																						6		4			3
Acanthizidae	*Smicrornis brevirostris*	Weebill											1					2	23	7	15	10							1

		Survey	A																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
	Gerygone fusca	Western Gerygone											2		2	1	2	10	1										
	Gerygone tenebrosa	Dusky Gerygone																											10
	Acanthiza robustirostris	Slaty-backed Thornbill													3														
	Acanthiza uropygialis	Chestnut-rumped Thornbill													10		2	42	30			1							
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																		1	1						2		3
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater										1	2		8	1	4	20	23	9	1	1	5	3	7	11	1	4	44
	Lichenostomus keartlandi	Grey-headed Honeyeater																							2				13
	Lichenostomus penicillatus	White-plumed Honeyeater																		9	20						37		27
	Manorina flavigula	Yellow-throated Miner													17	1	4	1		5	5		4				7		36
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater													3	1	8	13	10	4	1								4
	Epthianura tricolor	Crimson Chat																										6	21
	Sugomel niger	Black Honeyeater																											14
	Lichmera indistincta	Brown Honeyeater																		8					2	1			30
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler																6									4		1
	Pomatostomus superciliosus	White-browed Babbler													6		5	19	10										
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike													5	3	2	2		3	3						1	2	26
	Lalage sueurii	White-winged Triller													2		1			1							3	3	8
Pachycephalidae	*Pachycephala melanura*	Mangrove Golden Whistler																											11
	Pachycephala rufiventris	Rufous Whistler													5		2	8	6		2	3					5		12
	Colluricincla harmonica	Grey Shrike-thrush																3	8	2	3	4							
	Oreoica gutturalis	Crested Bellbird															2	6	6		2				2				3
Artamidae	*Artamus personatus*	Masked Woodswallow																		10									
	Artamus superciliosus	White-browed Woodswallow																											11
	Artamus cinereus	Black-faced Woodswallow													1	1	11		7								4	4	107
	Artamus minor	Little Woodswallow																	6	11	4		4		22				
	Cracticus torquatus	Grey Butcherbird													2		4	8	6	3									4
	Cracticus nigrogularis	Pied Butcherbird															3	1	1	1	2	1			1		4		17
	Cracticus tibicen	Australian Magpie																		1							1		10
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail																2											
	Rhipidura phasiana	Mangrove Grey Fantail																											10
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail													4	1	7	5	4	6	6	3	2		1	1	13	2	43
Corvidae	*Corvus bennetti*	Little Crow																											8
	Corvus orru	Torresian Crow													2						2		2				2		1
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark																		4	2						20		41
Petroicidae	*Petroica goodenovii*	Red-capped Robin													4		2		4										2
	Melanodryas cucullata	Hooded Robin																		1			2						
	Peneonanthe pulverulenta	Mangrove Robin																											6
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark															1						24	8					10
Acrocephalidae	*Acrocephalus australis*	Australian Reed-Warbler																			5								5

		Survey	A																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
	Cincloramphus mathewsi	Rufous Songlark															1				1						1		2
	Cincloramphus cruralis	Brown Songlark																									1		4
	Eremiornis carteri	Spinifexbird																	3						2	5		3	1
Timaliidae	*Zosterops lutea*	Yellow White-eye																											95
Hirundinidae	*Petrochelidon nigricans*	Tree Martin												3				2			3								8
	Petrochelidon ariel	Fairy Martin																						4			3		1
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird											1							2									1
Estrildidae	*Taeniopygia guttata*	Zebra Finch										1	1		20	3	51		4	99	67		7	88	22	5	75	28	401
	Emblema pictum	Painted Finch																		14	33	2	2	2		2	28		53
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit																											1
Haematopodidae	*Oystercatcher haematopus*	South Island Pied Oystercatcher																											5
Mammals																													
Canidae	*Canis lupus*	Dingo													1			1	3		2	2		2	1	1	4		3
	Vulpes vulpes	Red Fox																											1
Felidae	*Felis catus*	House Cat																	1								2		3
Megadermatidae	*Macroderma gigas*	Ghost Bat						X																					
Molossidae	*Austronomus australis*	White-striped Freetail Bat			X	X	X				X																		
	Chaerephon jobensis	Northern Freetail Bat	X						X																				
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	X	X					X	X	X																		
	Scotorepens greyii	Little Broad-nosed Bat	X			X	X				X																		
	Vespadelus finlaysoni	Inland Cave Bat	X	X		X	X	1			X																		
Dasyuridae	*Dasykaluta rosamondae*	Kaluta												1		1	1	2				1			2	3			
	Dasyurus hallucatus	Northern Quoll																									1		3
	Ningaui timealeyi	Pilbara Ningaui										1	3	3		3	1	6			1	2		2	1	3		3	
	Sminthopsis macroura	Stripe-faced Dunnart																						1					
	Sminthopsis youngsoni	Lesser Hairy-footed Dunnart																								1			
Macropodidae	*Macropus robustus*	Wallaroo or Euro																					1						13
	Macropus rufus	Red Kangaroo															3	1		2			20	1					3
	Petrogale rothschildi	Rothschild's Rock-wallaby																											3
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna																											1
Thylacomyidae	*Macrotis lagotis*	Bilby																											3
Equidae	*Equus asinus*	Donkey																1	1							2			
Muridae	*Leggadina lakedownensis*	Lakeland Downs Mouse																			2		10	4					
	Mus musculus	House Mouse										1			1				1	1								2	
	Notomys alexis	Spinifex Hopping Mouse										1																	
	Pseudomys chapmani	Pebble-mound Mouse																											7
	Pseudomys desertor	Desert Mouse										2	3	4		2	1		1	2								1	
	Pseudomys hermannsburgensis	Sandy Inland Mouse										6	1	3		1	3	1	7		1				5	2		2	

		Survey	A																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
	Zyzomys argurus	Common Rock-rat																				2							
Amphibians																													
Hylidae	*Cyclorana australis*	Giant Frog																											2
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet																		1									
Reptiles																													
Agamidae	*Amphibolurus longirostris*																			15							2		1
	Diporiphora amphiboluroides														1														
	Ctenophorus caudicinctus	Ring-tailed Dragon														1	5	2			1								11
	Ctenophorus isolepis isolepis																4												2
	Ctenophorus nuchalis	Central Netted Dragon																											3
	Ctenophorus reticulatus	Western Netted Dragon													1		2												
	Pogona minor minor	Bearded Dragon														2	1		1		1								1
Boidae	*Antaresia stimsoni*	Stimson's Python										1																	4
	Aspidites melanocephalus	Black-headed Python																											1
	Aspidites ramsayi	Woma (southwest pop)																											2
Carphodactylidae	*Nephrurus wheeleri cinctus*																												1
Diplodactylidae	*Lucasium stenodactylus*																												1
	Oedura marmorata	Marbled Velvet Gecko																				2							
	Strophurus wellingtonae																												1
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder											1	1															
	Demansia psammophis												1								1						1		
	Furina ornata	Moon Snake																											1
	Pseudonaja mengdeni	Gwardar										1					1												
	Suta fasciata	Rosen's Snake													1														1
	Suta punctata	Spotted Snake																											3
Gekkonidae	*Gehyra punctata*																			1									3
	Gehyra variegata														1		4			1									5
	Heteronotia binoei	Bynoe's Gecko														1			1	1									8
	Heteronotia spelea	Desert Cave Gecko																											1
	Rhynchoedura ornata	Beaked Gecko													1		1												
Pygopodidae	*Delma nasuta*												2																4
	Delma tincta														1											2			
	Lialis burtonis											2																	2
	Pygopus nigriceps nigriceps												1																
Scincidae	*Carlia munda*												2		1	1	1			1									2
	Carlia triacantha																3					1							
	Cryptoblepharus plagiocephalus																						1						
	Ctenotus duricola													1												1			
	Ctenotus pantherinus ocellifer	Leopard Skink											1		1	2	5		1		1	1				1		1	3

		Survey	**A**																										
Family	**Species**	**Common Name**	**C6s**	**D2**	**D3**	**D4**	**D5**	**E1e**	**E2**	**E3**	**E4**	**HAC4**	**HAC5**	**HAC6**	**HAC7**	**HAC8**	**HAC9**	**HAD1**	**HAD2**	**HAD3**	**HAD4**	**HAD5**	**HAD6**	**HAE1**	**HAE2**	**HAE3**	**HAE4**	**HAE5**	**Opportunistic**
	Ctenotus robustus																						4						
	Ctenotus saxatilis	Rock Skink																	1										4
	Ctenotus uber johnstonei																2												
	Cyclodomorphus melanops	Slender Blue-tongue											1	3															21
	Egernia depressa	Pygmy Spiny-tailed Skink																											1
	Lerista muelleri																		2										7
	Menetia greyii													1	1		3		1					2					2
	Morethia ruficauda exquisita																				1								1
	Proablepharus reginae																								2				
	Tiliqua multifasciata	Central Blue-tongue																	1										
Typhlopidae	*Ramphotyphlops ammodytes*											1				1													
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor																											1
	Varanus bushi	Pilbara Mulga Monitor																											1
	Varanus eremius	Pygmy Desert Monitor										2				1												1	1
	Varanus tristis tristis																		1										

A Biota Environmental Sciences (2002) *Proposed Hope Downs Rail Corridor from Weeli Wolli Siding to Port Hedland - Vertebrate Fauna Survey*. Unpublished report for Hope Downs Management Services.

Appendix A(9). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A																									B		
Family	**Species**	**Common Name**	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**	**PE07**	**PE08**	**PE09**	**PE10**	**PE11**	**PE12**	**RHNW01**	**RHNW02**	**RHNW03**	**RHNW04**	**RHNW05**	**RHNW06**	**RHNW07**	**RHNW08**	**RHNW09**	**RHNW10**	**RHNW11**	**RHNW12**	**RHNW13**	**RHNW52**	**RHNW53**	**RHNW54**
Birds																														
Casuariidae	*Dromaius novaehollandiae*	Emu																								X				
Phasianidae	*Coturnix pectoralis*	Stubble Quail																								X				
Columbidae	*Phaps chalcoptera*	Common Bronzewing				X																								
	Ocyphaps lophotes	Crested Pigeon	X	X		X	X	X									X	X	X	X	X				X		X			
	Geophaps plumifera	Spinifex Pigeon								X	X				X								X	X						
	Geopelia cuneata	Diamond Dove																			X			X		X				
	Geopelia striata	Peaceful Dove								X																				
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar				X												X												
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar									X								X											
Accipitridae	*Elanus axillaris*	Black-shouldered Kite																X												
	Haliastur sphenurus	Whistling Kite					X											X								X				
	Accipiter cirrocephalus	Collared Sparrowhawk														X														
	Circus assimilis	Spotted Harrier									X																			
	Aquila audax	Wedge-tailed Eagle		X	X																									
Falconidae	*Falco cenchroides*	Nankeen Kestrel				X	X											X												
	Falco berigora	Brown Falcon		X								X																		
	Falco longipennis	Australian Hobby																X		X				X						
Otididae	*Ardeotis australis*	Australian Bustard																X								X				
Turnicidae	*Turnix velox*	Little Button-quail										X											X				X			
Cacatuidae	*Eolophus roseicapillus*	Galah						X		X	X		X				X	X	X					X						
	Cacatua sanguinea	Little Corella					X											X	X											
	Nymphicus hollandicus	Cockatiel						X		X																				
Psittacidae	*Barnardius zonarius*	Australian Ringneck		X		X		X		X							X	X		X					X					
	Melopsittacus undulatus	Budgerigar						X		X			X				X							X						
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo															X													
Meropidae	*Merops ornatus*	Rainbow Bee-eater	X					X	X	X	X			X							X						X			
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren		X		X		X															X			X				
	Malurus lamberti	Variegated Fairy-wren						X							X			X		X	X			X	X		X			
	Stipiturus ruficeps	Rufous-crowned Emu-wren									X																			
	Amytornis striatus	Striated Grasswren							X	X					X															
Acanthizidae	*Smicrornis brevirostris*	Weebill				X	X	X	X		X				X	X	X	X			X			X						
	Gerygone fusca	Western Gerygone		X																										
	Acanthiza robustirostris	Slaty-backed Thornbill																			X			X	X					
	Acanthiza uropygialis	Chestnut-rumped Thornbill						X			X									X					X					
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote															X				X		X	X						
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater		X		X	X	X			X	X	X	X			X	X	X	X	X		X		X		X			
	Lichenostomus keartlandi	Grey-headed Honeyeater							X	X			X		X	X								X						
	Lichenostomus penicillatus	White-plumed Honeyeater				X		X		X				X			X	X			X			X						

		Surveys	A																									B		
Family	**Species**	**Common Name**	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**	**PE07**	**PE08**	**PE09**	**PE10**	**PE11**	**PE12**	**RHNW01**	**RHNW02**	**RHNW03**	**RHNW04**	**RHNW05**	**RHNW06**	**RHNW07**	**RHNW08**	**RHNW09**	**RHNW10**	**RHNW11**	**RHNW12**	**RHNW13**	**RHNW52**	**RHNW53**	**RHNW54**
	Manorina flavigula	Yellow-throated Miner						X				X	X	X		X	X	X					X		X					
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater				X	X	X			X						X	X			X									
	Epthianura tricolor	Crimson Chat										X	X																	
	Lichmera indistincta	Brown Honeyeater				X		X	X	X	X						X				X			X						
	Melithreptus gularis	Black-chinned Honeyeater													X															
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler																		X					X					
Campephagidae	*Coracina maxima*	Ground Cuckoo-Shrike											X																	
	Coracina novaehollandiae	Black-faced Cuckoo-Shrike				X	X			X				X			X	X	X	X			X	X		X				
	Lalage sueurii	White-winged Triller																X						X						
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler				X	X	X								X	X	X		X	X			X	X					
	Colluricincla harmonica	Grey Shrike-thrush				X				X										X				X						
	Oreoica gutturalis	Crested Bellbird					X	X								X	X			X			X		X					
Artamidae	*Artamus cinereus*	Black-faced Woodswallow	X	X	X			X		X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X			
	Cracticus torquatus	Grey Butcherbird							X								X		X	X					X					
	Cracticus nigrogularis	Pied Butcherbird												X				X	X	X	X	X	X		X	X				
	Cracticus tibicen	Australian Magpie										X																		
Rhipiduridae	*Rhipidura fuliginosa*	New Zealand Fantail						X																						
	Rhipidura leucophrys	Willie Wagtail	X	X	X		X	X	X	X	X					X	X	X	X	X	X			X	X	X	X			
Corvidae	*Corvus bennetti*	Little Crow				X				X										X			X			X	X			
	Corvus orru	Torresian Crow	X	X			X			X			X					X	X	X				X						
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark								X				X				X	X						X					
Petroicidae	*Petroica goodenovii*	Red-capped Robin																							X					
	Melanodryas cucullata	Hooded Robin																		X				X						
	Peneonanthe pulverulenta	Mangrove Robin																												
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark	X		X												X		X			X								
Acrocephalidae	*Eremiornis carteri*	Spinifexbird				X				X	X					X											X			
Hirundinidae	*Petrochelidon ariel*	Fairy Martin																						X						
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird						X													X									
Estrildidae	*Taeniopygia guttata*	Zebra Finch	X	X		X	X		X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X			
	Emblema pictum	Painted Finch							X	X	X				X				X				X	X						
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit										X							X							X				
Mammals																														
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat																										X	X	X
	Taphozous georgianus	Common Sheathtail Bat																										X	X	X
Megadermatidae	*Macroderma gigas*	Ghost Bat																											X	
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat																										X		X
Molossidae	*Mormopterus beccarii*	Beccari's Freetail Bat																												X
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat																											X	X
	Nyctophilus geoffroyi	Lesser Long-eared Bat																										X		X
	Scotorepens greyii	Little Broad-nosed Bat																										X	X	X
	Vespadelus finlaysoni	Inland Cave Bat																										X	X	X

		Surveys	A																									B		
Family	**Species**	**Common Name**	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**	**PE07**	**PE08**	**PE09**	**PE10**	**PE11**	**PE12**	**RHNW01**	**RHNW02**	**RHNW03**	**RHNW04**	**RHNW05**	**RHNW06**	**RHNW07**	**RHNW08**	**RHNW09**	**RHNW10**	**RHNW11**	**RHNW12**	**RHNW13**	**RHNW52**	**RHNW53**	**RHNW54**
Dasyuridae	*Dasykaluta rosamondae*	Kaluta		1		1			1		1	1				3	2	1	1					1			2			
	Ningaui timealeyi	Pilbara Ningaui		3		5		3	4		3		1	2	1		1	4			1		1	2			11			
	Planigale sp.		4	1	9	1	2		3	7	2		1	3	3	3		1	5	3	3	10	1	2	1	1				
	Sminthopsis longicaudata	Long-tailed Dunnart							1																					
	Sminthopsis macroura	Stripe-faced Dunnart	1		1	1	3					3					3	1	1	3		3	1		2	3				
Muridae	*Leggadina lakedownensis*	Lakeland Downs Mouse					1					2										9	1							
	Mus musculus	House Mouse													1	1	4		1						1					
	Pseudomys chapmani	Pebble-mound Mouse													2	2							2							
	Pseudomys delicatulus	Delicate Mouse															2													
	Pseudomys desertor	Desert Mouse	1	2											1		2	1				1	4				2			
	Pseudomys hermannsburgensis	Sandy Inland Mouse									1					1	4						1				1			
	Zyzomys argurus	Common Rock-rat														1														
Amphibians																												
Hylidae	*Cyclorana maini*	Sheep Frog		1																										
Reptiles																												
Agamidae	*Amphibolurus longirostris*			1			2			2											2									
	Ctenophorus caudicinctus	Ring-tailed Dragon		2		3	2	1	1	2	3	1	2	3	1	2					1	1	2	1						
	Ctenophorus isolepis	Crested Dragon		2													1										1			
	Ctenophorus nuchalis	Central Netted Dragon										1																		
	Ctenophorus reticulatus	Western Netted Dragon	1		2																					1				
	Tympanocryptis sp.		1	1	1		1					1								1										
Carphodactylidae	*Nephrurus wheeleri*																				1									
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko		2				1			1						2													
	Diplodactylus galaxias				7		1					3										1		1						
	Diplodactylus mitchelli				4		1					1										2								
	Diplodactylus savagei														4															
	Lucasium sp.			1		1											1			1					1	1				
	Lucasium wombeyi												4	2	1	1					1									
	Oedura marmorata	Marbled Velvet Gecko												1																
	Strophurus jeanae																1													
	Strophurus wellingtonae															2	1			1	2									
Elapidae	*Brachyurophis approximans*														1									1						
Gekkonidae	*Gehyra fenestra*									1				1										2						
	Gehyra pilbara								1																					
	Gehyra punctata								2	1	1		1	1									1	3						
	Gehyra sp.							1	1										1	1	1			1	1		1			
	Heteronotia binoei	Bynoe's Gecko				2		2	2	1		1	3		3	1			1	1	1		5	1	1	1	2			
	Rhynchoedura ornata	Beaked Gecko		1			1	1		1			1																	
Pygopodidae	*Delma elegans*									1														1						
	Delma nasuta			1																							1			
	Delma pax					1																								

		Surveys	A																									B		
Family	**Species**	**Common Name**	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**	**PE07**	**PE08**	**PE09**	**PE10**	**PE11**	**PE12**	**RHNW01**	**RHNW02**	**RHNW03**	**RHNW04**	**RHNW05**	**RHNW06**	**RHNW07**	**RHNW08**	**RHNW09**	**RHNW10**	**RHNW11**	**RHNW12**	**RHNW13**	**RHNW52**	**RHNW53**	**RHNW54**
	Delma tincta				1																	1				1				
	Lialis burtonis															1	1							1						
Scincidae	*Carlia munda*			1		2		1		1						1		7		1	1			1			2			
	Carlia triacantha											1					1						1	1			1			
	Crenadactylus sp.														2															
	Ctenotus ariadnae																1													
	Ctenotus grandis																										2			
	Ctenotus hanloni																2													
	Ctenotus helenae			3		1		2			1		2				1	2		1			1			2	2			
	Ctenotus leonhardii															1				1										
	Ctenotus pantherinus	Leopard Skink		7		2					1	1	2			1							1							
	Ctenotus robustus											1										1								
	Ctenotus rubicundus																1							1						
	Ctenotus rutilans															2														
	Ctenotus saxatilis	Rock Skink			1	2		1	2	3	1			1	2	1					1		2	2						
	Ctenotus sp.										1						2						1			1	1			
	Ctenotus uber																			2										
	Cyclodomorphus melanops	Slender Blue-tongue		2					1						1															
	Lerista muelleri														1	3			1	1	1	1		1						
	Lerista sp.																	6									2			
	Lerista verhmens																						1	1						
	Lerista zietzi														2	2														
	Liopholis striata	Night Skink																		1										
	Menetia greyii		4		7		1										1	3	4	1				1						
	Menetia surda			1		3			1				1																	
	Morethia ruficauda								1	1				1	1	1								1			1			
	Notoscincus butleri										1																			
	Notoscincus ornatus																										1			
	Proablepharus reginae										1																			
	Tiliqua multifasciata	Central Blue-tongue		1						1																				
Typhlopidae	*Ramphotyphlops ammodytes*							2					1								3									
	Ramphotyphlops ganei																				2			1						
	Ramphotyphlops grypus									1				1									1							
	Ramphotyphlops waitii																		1											
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor							1					1	1	3							1	1						
	Varanus brevicauda	Short-tailed Pygmy Monitor		1	1						1			1									1				1			
	Varanus eremius	Pygmy Desert Monitor									1																			
Varanidae	*Varanus tristis*	Racehorse Monitor													1															

A Pilbara Biological survey data provided by DEC.

B McKenzie, N.L. and Bullen, R.D. (2009) The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats. *Records of the Western Australian Museum*, Supplement 78, 123-155.

Appendix A(10). Vertebrate fauna assessments in the vicinity of the project area

		Surveys	A																											B
Family	**Species**	**Common Name**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**34**	**35**	**36**	**37**	**38**	**39**	**Bat1**	
Birds																														
Meropidae	*Merops ornatus*	Rainbow Bee-eater																												1
Otididae	*Ardeotis australis*	Australian Bustard																												3
Mammals																														
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat																											1	
	Scotorepens greyii	Little Broad-nosed Bat																											1	
	Vespadelus finlaysoni	Inland Cave Bat																											1	
Dasyuridae	*Dasykaluta rosamondae*	Kaluta						1			1			1			1					1								
	Ningaui timealeyi	Pilbara Ningaui			1		1											2												
	Planigale sp.					1					1								1						1	1	1	1		
	Sminthopsis macroura	Stripe-faced Dunnart			4	1																								
	Sminthopsis youngsoni	Lesser Hairy-footed Dunnart																			1	1								
Muridae	*Pseudomys chapmani*	Pebble-mound Mouse															1													23
	Pseudomys desertor	Desert Mouse		2						1		1	1		1		1	1			2			2	1					
	Pseudomys hermannsburgensis	Sandy Inland Mouse													1			2			1									
Amphibians																														
Hylidae	*Cyclorana australis*	Giant Frog							1																		1			
	Cyclorana maini	Sheep Frog	143	90	59	27	25	5	2	5	6	32	4	17	31	46	37	43	28	22	9	2	17	10	3	4	32	39		
	Litoria rubella	Little Red Tree Frog																									1			
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot	4	46	3		21					1											20	11	8	25	22	57		
	Platyplectrum spenceri	Centralian Burrowing Frog	26	33	19		10				1	10		2	3	1	6	2	4	2	1		1	3		1	5	11		
Myobatrachidae	*Uperoleia glandulosa*	Glandular Toadlet	11	31	7		11												1						3	3				
	Uperoleia russelli	Northwest Toadlet	1	3			2			1											1									
Reptiles																														
Agamidae	*Amphibolurus longirostris*																	1												
	Ctenophorus caudicinctus	Ring-tailed Dragon		1	1						1												2		1					
	Ctenophorus isolepis	Crested Dragon	1									7	1	3		1								2				2		
	Ctenophorus nuchalis	Central Netted Dragon																							1					
	Diporiphora winneckei	Blue-lined Dragon										2													1					
	Pogona minor	Bearded Dragon									1																	1		
	Pogona minor mitchelli	Bearded Dragon												1																
Boidae	*Antaresia stimsoni*	Stimson's Python													1			1												
Carphodactylidae	*Nephrurus levis pilbarensis*						1											1	1								1	2		
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko	1				1	1	2	10	5	3	16	8	1					1	2	2	2	3	3	1	1	1		
	Lucasium stenodactylus											3				1		3					3	3	7	1	3			
	Strophurus elderi													2				3	2								1			
	Strophurus jeanae												3	1																
Elapidae	*Brachyurophis approximans*			1															1						1	1				
	Demansia psammophis	Yellow-faced Whipsnake			1	1																			1					
	Furina ornata	Moon Snake								2																				

		Surveys	A																										B
Family	**Species**	**Common Name**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**34**	**35**	**36**	**37**	**38**	**39**	**Bat1**	
	Parasuta monachus														1															
	Pseudechis australis	Mulga Snake		1			1											1												
	Pseudonaja mengdeni	Gwardar		1									2																	
	Pseudonaja modesta	Ringed Brown Snake												1																
	Suta fasciata	Rosen's Snake															1													
Gekkonidae	*Gehyra pilbara*											1						1		1		1				2				
	Gehyra punctata																							1		1				
	Gehyra variegata							2						1				1		1		4			1					
	Heteronotia binoei	Bynoe's Gecko	1		1	2	4	5	1	4	1			5	1	2	1	4	3	1		1		1			1	1		
	Rhynchoedura ornata	Beaked Gecko								2		1	1		1	1	2	1		1		1			6					
Pygopodidae	*Delma fraseri*				1			1														1								
	Delma pax																								1					
	Lialis burtonis							1								1			1											
	Pygopus nigriceps																				1									
Scincidae	*Carlia munda*																		1											
	Ctenotus ariadnae		1	5	2	2	2	3	2	4	3	1		2	3	2					1				1		1	2		
	Ctenotus duricola		1				1																			4	1			
	Ctenotus grandis		4	10		2	12		1	1	1			3	1	2	1		3	2	1		3	3	6	1	6	2		
	Ctenotus helenae			2	3	2			3	14	4	1	2	5	2	1	1	2	1	2	4	1	1	3	1			1		
	Ctenotus leonhardii										1																			
	Ctenotus pantherinus	Leopard Skink	2	1		4			5	6	3		1	1	3		1	1		2	2			3		4				
	Ctenotus piankai		2		1	3			1		1	1	2		2	1	3						4	1		2	2	2		
	Ctenotus saxatilis	Rock Skink	5		2			6	5	2								1	8	1					6	4	1	1		
	Ctenotus schomburgkii																		1											
	Cyclodomorphus melanops	Slender Blue-tongue			4					2																				
	Lerista bipes			4						11	13									1			1	2	4	1	16	20		
	Lerista labialis											2																		
	Menetia greyii			1																					1			1		
	Morethia ruficauda exquisita									1	1															2	1	1		
	Notoscincus ornatus																							1	1					
	Proablepharus reginae													3					1					1	1		1	1		
	Tiliqua multifasciata	Central Blue-tongue	1	1		1								1	2		2				1							1		
Typhlopidae	*Ramphotyphlops ammodytes*			1			1											1					1	1						
	Ramphotyphlops grypus						1				1							1	1							1				
	Ramphotyphlops pilbarensis																				1									
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor			1															1	1	2		2						
	Varanus brevicauda	Short-tailed Pygmy Monitor	1					2		2														1						
	Varanus eremius	Pygmy Desert Monitor					1			1																				
	Varanus gouldii	Bungarra or Sand Monitor					1																							

A Terrestrial Ecosystems (2011a) *Level 2 Fauna Assessment for the Abydos Plain Section of the Roy Hill Infrastructure Rail Corridor between Port Hedland and the Roy Hill Mine (Chainage 92 to 180).* Unpublished report for Roy Hill Infrastructure, Perth.

B Unpublished data for FMG Solomon Rail corridor.

Appendix A(11). Vertebrate fauna assessments in the vicinity of the project area

		Survey	A																																
Family	**Species**	**Common Name**	**Birds 1**	**Birds 10**	**Birds 100**	**Birds 101**	**Birds 102**	**Birds 103**	**Birds 104**	**Birds 105**	**Birds 106**	**Birds 107**	**Birds 11**	**Birds 12**	**Birds 13**	**Birds 14**	**Birds 15**	**Birds 16**	**Birds 17**	**Birds 18**	**Birds 2**	**Birds 3**	**Birds 4**	**Birds 5**	**Birds 50**	**Birds 56**	**Birds 57**	**Birds 58**	**Birds 59**	**Birds 6**	**Birds 60**	**Birds 61**	**Birds 67**	**Birds 68**	**Birds 69**
Birds																																			
Anatidae	*Anas gracilis*	Grey Teal																		4															
Columbidae	*Phaps chalcoptera*	Common Bronzewing							1	1			1																						
	Geophaps plumifera	Spinifex Pigeon													1																				
	Geopelia cuneata	Diamond Dove	15	1	1	10	6	1								2				3	5	5	6	2		1			10	10		1	1	10	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron								1																									
Accipitridae	*Haliastur sphenurus*	Whistling Kite															2																		
Falconidae	*Falco cenchroides*	Nankeen Kestrel								2							3																		
	Falco berigora	Brown Falcon		2																		1				2									
Otididae	*Ardeotis australis*	Australian Bustard													1																				
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel							1	3				3						1															
Turnicidae	*Turnix velox*	Little Button-quail			2																1									1					
Cacatuidae	*Eolophus roseicapillus*	Galah												10																	2				
	Cacatua sanguinea	Little Corella									1																								
Psittacidae	*Barnardius zonarius*	Australian Ringneck								2																									
	Melopsittacus undulatus	Budgerigar		2	3	10		2	10				20			2	10			1			10	2					2	4			10	15	3
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo						2															1										1		
	Cacomantis pallidus	Pallid Cuckoo								1												1													
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra					1		1	1				1						1													1	1	
	Todiramphus sanctus	Sacred Kingfisher								1				1						1										1					
Meropidae	*Merops ornatus*	Rainbow Bee-eater					1																			1				1				11	
Ptilonorhynchidae	*Ptilonorhynchus maculatus*	Spotted Bowerbird					1																												
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren							5		2																								
	Malurus lamberti	Variegated Fairy-wren																	4																
	Amytornis striatus	Striated Grasswren			2																														
Acanthizidae	*Smicrornis brevirostris*	Weebill																																4	
	Gerygone fusca	Western Gerygone																												1					
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																													1		2	1	
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	1		2						1	1									1		1	1		1									
	Lichenostomus keartlandi	Grey-headed Honeyeater																											2	2	2				
	Lichenostomus penicillatus	White-plumed Honeyeater							1	2			1	2						1													2	5	
	Manorina flavigula	Yellow-throated Miner					1			1																									
	Lichmera indistincta	Brown Honeyeater																								2		4	8		1		2		
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler											4																						
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike								3			1							1			1			2			2						
	Lalage sueurii	White-winged Triller																								2			3					1	
Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird																	2					1											1
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		1															1			2													
	Cracticus nigrogularis	Pied Butcherbird					1		1	1			1													1	1				1		1	1	1

		Survey	A																																
Family	**Species**	**Common Name**	**Birds 1**	**Birds 10**	**Birds 100**	**Birds 101**	**Birds 102**	**Birds 103**	**Birds 104**	**Birds 105**	**Birds 106**	**Birds 107**	**Birds 11**	**Birds 12**	**Birds 13**	**Birds 14**	**Birds 15**	**Birds 16**	**Birds 17**	**Birds 18**	**Birds 2**	**Birds 3**	**Birds 4**	**Birds 5**	**Birds 50**	**Birds 56**	**Birds 57**	**Birds 58**	**Birds 59**	**Birds 6**	**Birds 60**	**Birds 61**	**Birds 67**	**Birds 68**	**Birds 69**
	Cracticus tibicen	Australian Magpie					1			1																									
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail						1												1															
Corvidae	*Corvus orru*	Torresian Crow		2						2	1						2																		
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark								1			2	1						1						2							1		
Petroicidae	*Melanodryas cucullata*	Hooded Robin																1																	
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark									1																								
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark													3		3																		
	Cincloramphus cruralis	Brown Songlark																																	
	Eremiornis carteri	Spinifexbird	2																								1								
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		2									2			1					20	5						10		15				1	
	Petrochelidon ariel	Fairy Martin																											4						
Estrildidae	*Taeniopygia guttata*	Zebra Finch		5		1		1							2	1		2	1			25	10	5		2			5	10		4	12	14	10
	Emblema pictum	Painted Finch		2							2				2			2	2	2			2	2	2		2	3	2	4			2	3	4
Motacilidae	*Anthus novaeseelandiae*	Australasian Pipit													1		1																		

A Terrestrial Ecosystems (2011a) *Level 2 Fauna Assessment for the Abydos Plain Section of the Roy Hill Infrastructure Rail Corridor between Port Hedland and the Roy Hill Mine (Chainage 92 to 180)*. Unpublished report for Roy Hill Infrastructure, Perth.

Appendix A(12). Vertebrate fauna assessments in the vicinity of the project area

		Survey	A																													
Family	**Species**	**Common Name**	**Birds 7**	**Birds 70**	**Birds 71**	**Birds 72**	**Birds 73**	**Birds 74**	**Birds 75**	**Birds 76**	**Birds 77**	**Birds 78**	**Birds 79**	**Birds 8**	**Birds 80**	**Birds 81**	**Birds 82**	**Birds 83**	**Birds 84**	**Birds 85**	**Birds 86**	**Birds 9**	**Birds 90**	**Birds 91**	**Birds 92**	**Birds 93**	**Birds 94**	**Birds 95**	**Birds 96**	**Birds 97**	**Birds 98**	**Birds 99**
Birds																																
Columbidae	*Ocyphaps lophotes*	Crested Pigeon																1														
	Geopelia cuneata	Diamond Dove				2	1		1	1	1			2		3			1		2						2	8			3	
Falconidae	*Falco berigora*	Brown Falcon										1					2		2												2	
Turnicidae	*Turnix pyrrhothorax*	Red-chested Button-quail																	1													
	Turnix velox	Little Button-quail											1	1																		
Cacatuidae	*Eolophus roseicapillus*	Galah																	5	10					2							
	Cacatua sanguinea	Little Corella																												5		
	Nymphicus hollandicus	Cockatiel						20										25									15			15		
Psittacidae	*Barnardius zonarius*	Australian Ringneck																											2			
	Melopsittacus undulatus	Budgerigar	4			1				1	4			1		5		9	3	2	6	10			12		9	6	50		2	
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo																	1													
	Cacomantis pallidus	Pallid Cuckoo				1						1																				
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra																											1			
	Todiramphus sanctus	Sacred Kingfisher																													1	
Meropidae	*Merops ornatus*	Rainbow Bee-eater										2														1						
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren										3	2	2																		3
	Stipiturus ruficeps	Rufous-crowned Emu-wren																													1	
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote																							1			1			1	
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater				2	2				1	1					2						1	1		1	1					1
	Lichenostomus penicillatus	White-plumed Honeyeater																										1	2			
	Manorina flavigula	Yellow-throated Miner		5		1		1							2					1					2	2			1			
	Lichmera indistincta	Brown Honeyeater		1	4								2		1				2						1	1		1				
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-Shrike															2								1			1				
	Lalage sueurii	White-winged Triller					3																				1		3		1	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush																										1				
	Oreoica gutturalis	Crested Bellbird					2	1									1			2												
Artamidae	*Artamus cinereus*	Black-faced Woodswallow							3																		2					
	Cracticus nigrogularis	Pied Butcherbird						1							1																	
Corvidae	*Corvus orru*	Torresian Crow										2	1		1																	
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark																	1													
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark										1				1	1		1													
Acrocephalidae	*Cincloramphus mathewsi*	Rufous Songlark			1			1		1		2				1			2								1	1	3			
Hirundinidae	*Petrochelidon nigricans*	Tree Martin				2	2														2											
Estrildidae	*Taeniopygia guttata*	Zebra Finch		1		10	5	10	4	1	1	1	4	4		6		5	20		1	10	10	10			2				2	2
	Emblema pictum	Painted Finch		1	1	1	2	1					2				1		2	2		6						1	1	5	15	

A Terrestrial Ecosystems (2011a) *Level 2 Fauna Assessment for the Abydos Plain Section of the Roy Hill Infrastructure Rail Corridor between Port Hedland and the Roy Hill Mine (Chainage 92 to 180).* Unpublished report for Roy Hill Infrastructure, Perth.

Appendix B
Definitions of Significant Fauna under the WA Wildlife Conservation Act 1950 and DEC Threatened and Priority Species List

Mulga Downs project area

APPENDIX B
DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE WESTERN AUSTRALIAN *WILDLIFE CONSERVATION ACT 1950*

In Western Australia, all native fauna species are protected under the Western Australian *Wildlife Conservation Act 1950-1979*. Fauna species that are considered rare, threatened with extinction or have a high conservation value are specially protected under the Act. In addition, some species of fauna are covered under the 1991 ANZECC convention, while certain birds are listed under the Japan and Australian Migratory Bird Agreement (JAMBA) and the China and Australian Migratory Bird Agreement (CAMBA).

Classification of rare and endangered fauna under the *Wildlife Conservation (Specially Protected Fauna) Notice 2012* recognises four schedules of taxa. These are:

Schedule 1 – fauna which are rare or likely to become extinct and are declared to be fauna in need of special protection;

Schedule 2 – fauna which are presumed to be extinct and are declared to be fauna in need of special protection;

Schedule 3 – birds which are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction which are declared to be fauna in need of special protection; and

Schedule 4 – fauna that are in need of special protection, for reasons other than mentioned in Schedules 1, 2 or 3.

In addition to the above classifications, DEC also classifies fauna under five different Priority codes:

Priority one – ***Taxa with few, poorly known populations on threatened lands*****.** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

Priority two – ***Taxa with few, poorly known populations on conservation lands, or taxa with several, poorly known populations not on conservation lands.*** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat from habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

Priority three – ***Taxa with several, poorly known populations, some on conservation lands*****.** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

Priority four – ***Taxa in need of monitoring***. Taxa which are considered to have been adequately surveyed or for which sufficient knowledge is available and which are not considered currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. Taxa which are declining significantly but are not yet threatened.

Priority five – ***Taxa in need of monitoring.*** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Appendix C
EPBC Act online search results for conservation significant species.

Mulga Downs project area

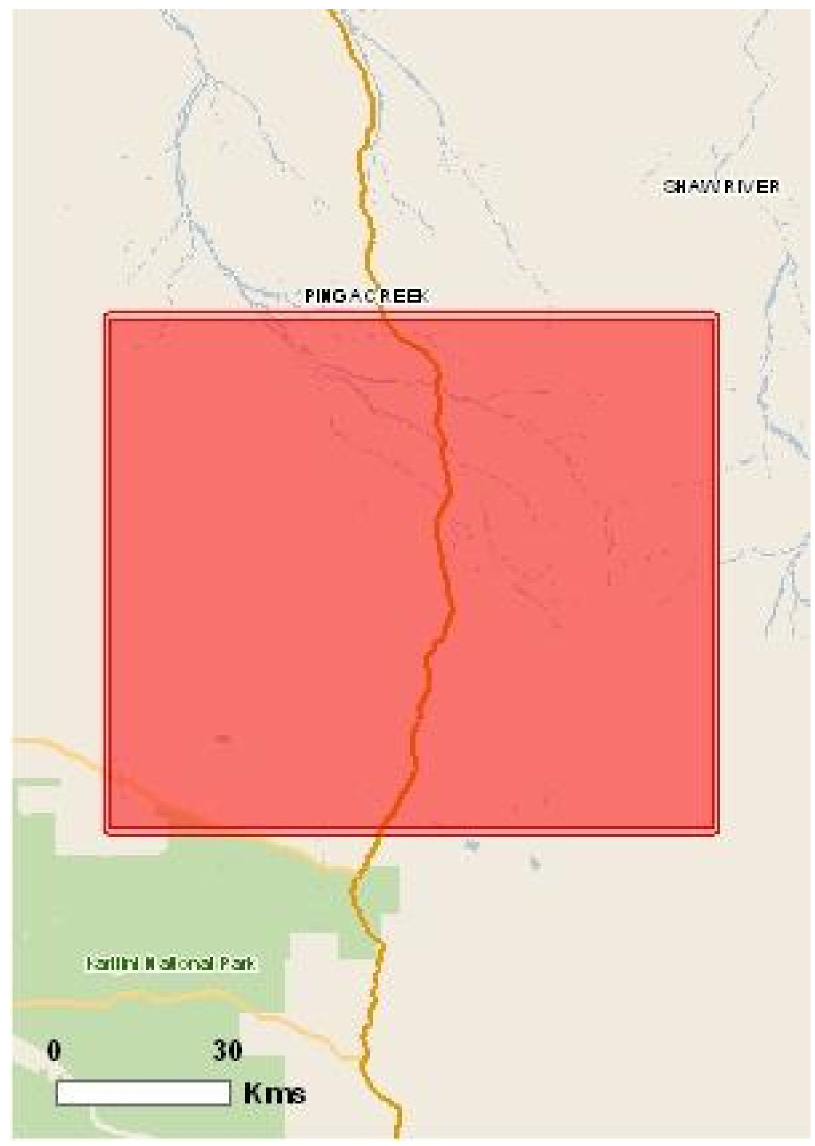
EPBC Act Protected Matters Report

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.

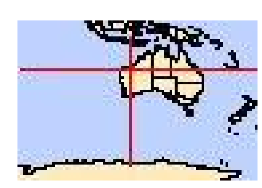
Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

Report created: 01/06/12 18:16:43



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

Coordinates
Buffer: 1.0Km



Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	7
Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	7
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

Place on the RNE:	6
State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	5
Nationally Important Wetlands:	2

Details

Matters of National Environmental Significance

Threatened Species [Resource Information]

Name	Status	Type of Presence
BIRDS		
Pezoporus occidentalis		
Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
MAMMALS		
Dasycercus cristicauda Mulgara [328]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat known to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Rhinonicteris aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
PLANTS		
Lepidium catapycnon Hamersley Lepidium, Hamersley Catapycnon [9397]	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

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 may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

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 may occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Black Range Dyke Section	WA	Indicative Place
Wittenoom Gorges Geological Area	WA	Indicative Place
Hamersley Range National Park (1977 boundary)	WA	Registered
Mungaroona Range Nature Reserve	WA	Registered
Indigenous		
Abydos - Woodstock Art Sites	WA	Registered
Historic		
Wayside Inn (former)	WA	Registered

State and Territory Reserves

[Resource Information]

Name	State
Karijini	WA
Mungaroona Range	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 Resouces Audit,

Name	Status	Type of Presence
Mammals		
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		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

Nationally Important Wetlands

[Resource Information]

Name	State
Fortescue Marshes	WA
Karijini (Hamersley Range) Gorges	WA

Coordinates

-21.5 119.25,-22.3 119.25,-22.3 118.3,-21.5 118.3,-21.5 119.25

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

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

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
-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.

Department of Sustainability, Environment, Water, Population and Communities
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix D
Results of the fauna habitat assessment.
Mulga Downs project area

Date: 2/11/2012 | Habitat Assessment #: 1 | Observer: ST

Zone: 50K | Easting: 656569 mE | Northing: 7556895 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open shrubland over open hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 2 Observer: ST

Zone: 50K Easting: 656255 mE Northing: 7556892 mN

Fire History: > 5 years Landform: Upper Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low open shrubland over open hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 3 | Observer: ST

Zone: 50K | Easting: 656063 mE | Northing: 7556892 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 4 Observer: ST

Zone: 50K Easting: 655503 mE Northing: 7556857 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 5 | Observer: ST

Zone: 50K | Easting: 654993 mE | Northing: 7556876 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 6 Observer: ST

Zone: 50K Easting: 655080 mE Northing: 7557209 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 7 | Observer: ST

Zone: 50K | Easting: 655300 mE | Northing: 7557194 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Woodland over tall shrubland over scattered grasses

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 8 | Observer: ST

Zone: 50K | Easting: 655525 mE | Northing: 7557211 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 9 Observer: ST

Zone: 50K Easting: 655781 mE Northing: 7557148 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over open hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 10	Observer: ST
Zone: 50K	Easting: 656483 mE	Northing: 7557108 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Good

Habitat Structure: Scattered low trees over open hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 11 Observer: ST

Zone: 50K Easting: 656994 mE Northing: 7557192 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 12 Observer: ST

Zone: 50K Easting: 657448 mE Northing: 7557145 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over tall open scrub over scattered hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 13 Observer: ST

Zone: 50K Easting: 657815 mE Northing: 7557109 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Open woodland over tall open scrub over tussock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 Habitat Assessment #: 14 Observer: ST

Zone: 50K Easting: 657865 mE Northing: 7557089 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Boulders (>250mm)

Date: 2/11/2012 Habitat Assessment #: 15 Observer: ST

Zone: 50K Easting: 658095 mE Northing: 7557026 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over tussock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Boulders (>250mm)

Date: 2/11/2012 Habitat Assessment #: 16 Observer: ST

Zone: 50K Easting: 658350 mE Northing: 7557065 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodand over tall open scrub over open hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 17 Observer: ST

Zone: 50K Easting: 658700 mE Northing: 7556986 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 18 | Observer: ST

Zone: 50K | Easting: 659021 mE | Northing: 7556983 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012	Habitat Assessment #: 19	Observer: ST
Zone: 50K	Easting: 659273 mE	Northing: 7557042 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 20 | Observer: ST

Zone: 50K | Easting: 659147 mE | Northing: 7556795 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 21 | Observer: ST

Zone: 50K | Easting: 659221 mE | Northing: 7556503 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 22 | Observer: ST

Zone: 50K | Easting: 659400 mE | Northing: 7556415 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 23 Observer: ST

Zone: 50K Easting: 659676 mE Northing: 7556328 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over closed hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 24 Observer: ST

Zone: 50K Easting: 659943 mE Northing: 7556229 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees open shrubland over closed hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 25	Observer: ST
Zone: 50K	Easting: 660335 mE	Northing: 7556138 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Scattered trees over open heath over mid-dense hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 26 Observer: ST

Zone: 50K Easting: 660572 mE Northing: 7556122 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over open heath over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 27 Observer: ST

Zone: 50K Easting: 660657 mE Northing: 7555481 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 28 | Observer: ST

Zone: 50K | Easting: 660488 mE | Northing: 7555196 mN

Fire History: > 5 years | Landform: Upper Slope | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 29 Observer: ST

Zone: 50K Easting: 660239 mE Northing: 7555200 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over open heath over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 30 Observer: ST

Zone: 50K Easting: 660178 mE Northing: 7555222 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 31 | Observer: ST

Zone: 50K | Easting: 659896 mE | Northing: 7555286 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 32 Observer: ST

Zone: 50K Easting: 659728 mE Northing: 7555273 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 33 | Observer: ST

Zone: 50K | Easting: 659637 mE | Northing: 7555465 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 34 | Observer: ST

Zone: 50K | Easting: 659416 mE | Northing: 7555293 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 35 | Observer: ST

Zone: 50K | Easting: 658820 mE | Northing: 7555290 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 36 Observer: ST

Zone: 50K Easting: 658615 mE Northing: 7555066 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 37 Observer: ST

Zone: 50K Easting: 658908 mE Northing: 7555002 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 38 Observer: ST

Zone: 50K Easting: 659149 mE Northing: 7554981 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Very Good

Habitat Structure: Open woodland over tall open scrub over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 39 Observer: ST

Zone: 50K Easting: 659332 mE Northing: 7554948 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered rees over open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 40 | Observer: ST

Zone: 50K | Easting: 659653 mE | Northing: 7554925 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 41 Observer: ST

Zone: 50K Easting: 660186 mE Northing: 7554810 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 42 | Observer: ST

Zone: 50K | Easting: 660243 mE | Northing: 7554779 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 43 | Observer: ST

Zone: 50K | Easting: 660542 mE | Northing: 7554745 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 44 | Observer: ST

Zone: 50K | Easting: 660987 mE | Northing: 7554675 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 45 Observer: ST

Zone: 50K Easting: 661280 mE Northing: 7554711 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over tall shrubland over closed hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 46 Observer: ST

Zone: 50K Easting: 661334 mE Northing: 7553921 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 47 Observer: ST

Zone: 50K Easting: 661349 mE Northing: 7553699 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 48 | Observer: ST

Zone: 50K | Easting: 661026 mE | Northing: 7553719 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 49 | Observer: ST

Zone: 50K | Easting: 660655 mE | Northing: 7553708 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 50 | Observer: ST

Zone: 50K | Easting: 660341 mE | Northing: 7553742 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 51 Observer: ST

Zone: 50K Easting: 659893 mE Northing: 7553741 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 52 | Observer: ST

Zone: 50K | Easting: 659587 mE | Northing: 7553836 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 53 | Observer: ST

Zone: 50K | Easting: 659193 mE | Northing: 7553839 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over open hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 54 | Observer: ST

Zone: 50K | Easting: 659194 mE | Northing: 7554031 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 55 | Observer: ST

Zone: 50K | Easting: 659193 mE | Northing: 7554373 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 56 Observer: ST

Zone: 50K Easting: 659252 mE Northing: 7554614 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 57 | Observer: ST

Zone: 50K | Easting: 659285 mE | Northing: 7554828 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 58 Observer: ST

Zone: 50K Easting: 659060 mE Northing: 7554757 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: O Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 59 Observer: ST

Zone: 50K Easting: 658991 mE Northing: 7554544 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 60 | Observer: ST

Zone: 50K | Easting: 659000 mE | Northing: 7554218 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 61 Observer: ST

Zone: 50K Easting: 658971 mE Northing: 7553964 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 62 | Observer: ST

Zone: 50K | Easting: 658076 mE | Northing: 7554222 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 63 | Observer: ST

Zone: 50K | Easting: 658051 mE | Northing: 7554470 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 64 Observer: ST

Zone: 50K Easting: 658003 mE Northing: 7554812 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 65 Observer: ST

Zone: 50K Easting: 658039 mE Northing: 7555110 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 66	Observer: ST
Zone: 50K	Easting: 657769 mE	Northing: 7555193 mN
Fire History: > 5 years	Landform: Undulating	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 67 Observer: ST

Zone: 50K Easting: 657790 mE Northing: 7554909 mN

Fire History: 1-5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 68 Observer: ST

Zone: 50K Easting: 657735 mE Northing: 7554580 mN

Fire History: 1-5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 69 | Observer: ST

Zone: 50K | Easting: 657014 mE | Northing: 7554672 mN

Fire History: 1-5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 70	Observer: ST
Zone: 50K	Easting: 657049 mE	Northing: 7554946 mN
Fire History: > 5 years	Landform: Undulating	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

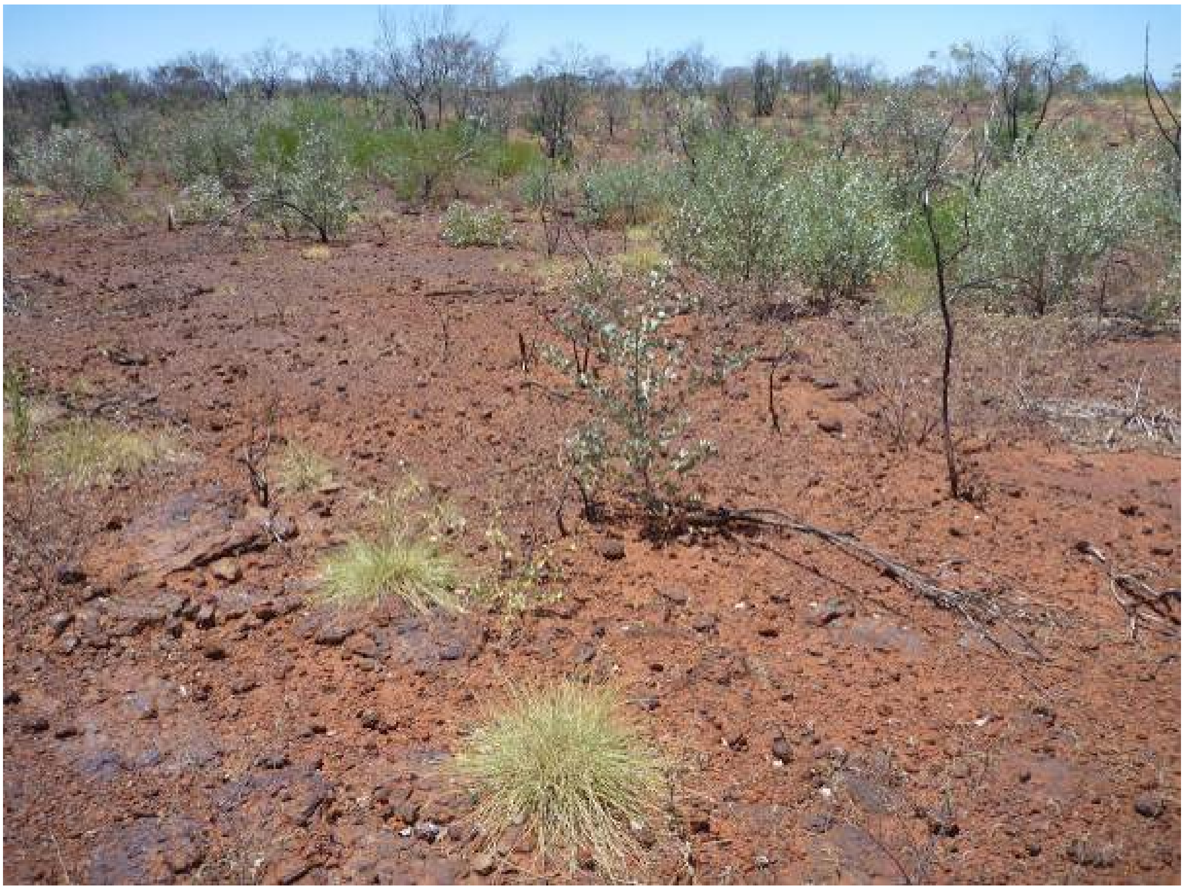
Date: 2/11/2012 | Habitat Assessment #: 71 | Observer: ST

Zone: 50K | Easting: 657116 mE | Northing: 7555267 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)



Date: 2/11/2012 | Habitat Assessment #: 72 | Observer: ST

Zone: 50K | Easting: 657163 mE | Northing: 7555568 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 73 Observer: ST

Zone: 50K Easting: 657287 mE Northing: 7555718 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 74 | Observer: ST

Zone: 50K | Easting: 657098 mE | Northing: 7556040 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 75 Observer: ST

Zone: 50K Easting: 657129 mE Northing: 7556422 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 76 | Observer: ST

Zone: 50K | Easting: 657149 mE | Northing: 7556766 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 77 Observer: ST

Zone: 50K Easting: 657147 mE Northing: 7556902 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 78 Observer: ST

Zone: 50K Easting: 656880 mE Northing: 7556982 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 79 Observer: ST

Zone: 50K Easting: 656868 mE Northing: 7556696 mN

Fire History: 1-5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 80 | Observer: ST

Zone: 50K | Easting: 656869 mE | Northing: 7556321 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012	Habitat Assessment #: 81	Observer: ST
Zone: 50K	Easting: 656845 mE	Northing: 7556062 mN
Fire History: > 5 years	Landform: Undulating	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 82 | Observer: ST

Zone: 50K | Easting: 656932 mE | Northing: 7555662 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 83 | Observer: ST

Zone: 50K | Easting: 656636 mE | Northing: 7555648 mN

Fire History: 1-5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 84 Observer: ST

Zone: 50K Easting: 656410 mE Northing: 7555666 mN

Fire History: 1-5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 85 Observer: ST

Zone: 50K Easting: 656228 mE Northing: 7555648 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 86 Observer: ST

Zone: 50K Easting: 656037 mE Northing: 7555643 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over grasses

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 87 | Observer: ST

Zone: 50K | Easting: 655658 mE | Northing: 7555436 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 88 Observer: ST

Zone: 50K Easting: 655406 mE Northing: 7555246 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 89 | Observer: ST

Zone: 50K | Easting: 655673 mE | Northing: 7555232 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 90 Observer: ST

Zone: 50K Easting: 655983 mE Northing: 7555197 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 91 Observer: ST

Zone: 50K Easting: 656311 mE Northing: 7555288 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 92 Observer: ST

Zone: 50K Easting: 656552 mE Northing: 7555323 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 93 Observer: ST

Zone: 50K Easting: 656872 mE Northing: 7555352 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 94 Observer: ST

Zone: 50K Easting: 657047 mE Northing: 7555308 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Woodland over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 95 | Observer: ST

Zone: 50K | Easting: 660877 mE | Northing: 7553201 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 96 | Observer: ST

Zone: 50K | Easting: 660899 mE | Northing: 7553504 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 97 | Observer: ST

Zone: 50K | Easting: 661167 mE | Northing: 7553512 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 98 | Observer: ST

Zone: 50K | Easting: 661340 mE | Northing: 7553553 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rocky | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 99 | Observer: ST

Zone: 50K | Easting: 661659 mE | Northing: 7553376 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 100 | Observer: ST

Zone: 50K | Easting: 661701 mE | Northing: 7553337 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 101 Observer: ST

Zone: 50K Easting: 661815 mE Northing: 7553189 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 102 | Observer: ST

Zone: 50K | Easting: 661782 mE | Northing: 7553023 mN

Fire History: > 5 years | Landform: Gully | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 103 | Observer: ST

Zone: 50K | Easting: 661789 mE | Northing: 7552910 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 104 | Observer: ST

Zone: 50K | Easting: 661805 mE | Northing: 7552767 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 105 | Observer: ST

Zone: 50K | Easting: 661783 mE | Northing: 7552543 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 106 Observer: ST

Zone: 50K Easting: 662189 mE Northing: 7552342 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Woodland over shrubland over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 107 | Observer: ST

Zone: 50K | Easting: 662223 mE | Northing: 7552586 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 108 Observer: ST

Zone: 50K Easting: 662212 mE Northing: 7552829 mN

Fire History: > 5 years Landform: Drainage line Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 109 Observer: ST

Zone: 50K Easting: 662205 mE Northing: 7553232 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 110 Observer: ST

Zone: 50K Easting: 662209 mE Northing: 7553410 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 111 Observer: ST

Zone: 50K Easting: 662434 mE Northing: 7553309 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 112 Observer: ST

Zone: 50K Easting: 663069 mE Northing: 7552973 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 113 | Observer: ST

Zone: 50K | Easting: 663070 mE | Northing: 7552719 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

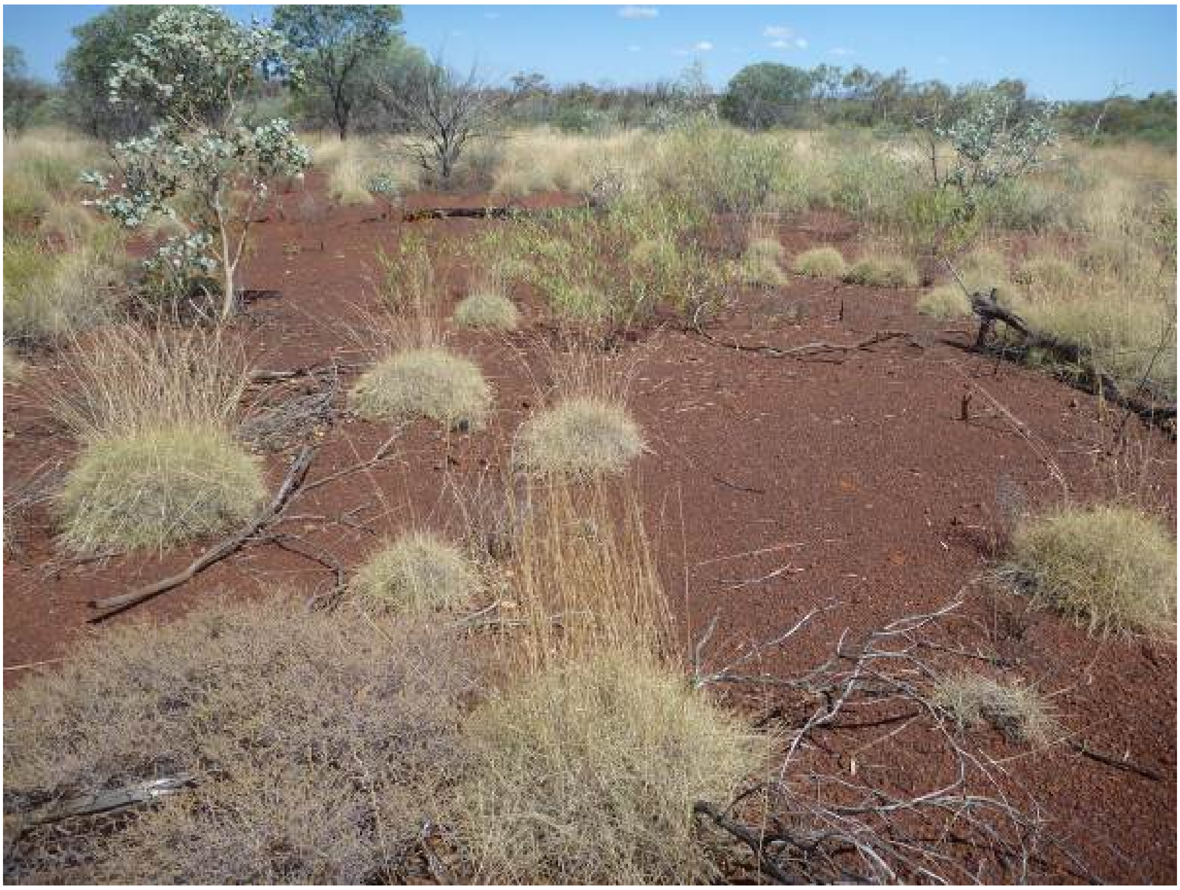
Date: 2/11/2012 Habitat Assessment #: 114 Observer: ST

Zone: 50K Easting: 663008 mE Northing: 7552469 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)



Date: 2/11/2012 Habitat Assessment #: 115 Observer: ST

Zone: 50K Easting: 663306 mE Northing: 7552478 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 116 Observer: ST

Zone: 50K Easting: 663300 mE Northing: 7552635 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 117 Observer: ST

Zone: 50K Easting: 663286 mE Northing: 7552988 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 118 | Observer: ST

Zone: 50K | Easting: 663901 mE | Northing: 7552786 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 119 | Observer: ST

Zone: 50K | Easting: 664187 mE | Northing: 7552363 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered tree over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 120 | Observer: ST

Zone: 50K | Easting: 664213 mE | Northing: 7552690 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered tree over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 121 | Observer: ST

Zone: 50K | Easting: 664197 mE | Northing: 7553061 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered tree over hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 122 | Observer: ST

Zone: 50K | Easting: 664144 mE | Northing: 7553465 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 123 | Observer: ST

Zone: 50K | Easting: 664230 mE | Northing: 7553706 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 124 Observer: ST

Zone: 50K Easting: 664258 mE Northing: 7553786 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: W Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 125 Observer: ST

Zone: 50K Easting: 664213 mE Northing: 7554071 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 Habitat Assessment #: 126 Observer: ST

Zone: 50K Easting: 664287 mE Northing: 7554103 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Rock

Date: 2/11/2012 Habitat Assessment #: 127 Observer: ST

Zone: 50K Easting: 664221 mE Northing: 7554315 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 128 | Observer: ST

Zone: 50K | Easting: 664192 mE | Northing: 7554357 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 129 | Observer: ST

Zone: 50K | Easting: 664521 mE | Northing: 7554512 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 130 | Observer: ST

Zone: 50K | Easting: 664506 mE | Northing: 7554427 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 131 Observer: ST

Zone: 50K Easting: 664647 mE Northing: 7555049 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: None

Date: 2/11/2012 Habitat Assessment #: 132 Observer: ST

Zone: 50K Easting: 664742 mE Northing: 7555110 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 133 | Observer: ST

Zone: 50K | Easting: 664854 mE | Northing: 7555117 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 134 | Observer: ST

Zone: 50K | Easting: 664961 mE | Northing: 7554996 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Woodland over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 135 | Observer: ST

Zone: 50K | Easting: 664892 mE | Northing: 7554668 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 136 Observer: ST

Zone: 50K Easting: 664816 mE Northing: 7554415 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 137 | Observer: ST

Zone: 50K | Easting: 664816 mE | Northing: 7554415 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 138 Observer: ST

Zone: 50K Easting: 665048 mE Northing: 7554269 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 139 Observer: ST

Zone: 50K Easting: 665048 mE Northing: 7554269 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 140 | Observer: ST

Zone: 50K | Easting: 665048 mE | Northing: 7554271 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 141 | Observer: ST

Zone: 50K | Easting: 665198 mE | Northing: 7554503 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 142 Observer: ST

Zone: 50K Easting: 673573 mE Northing: 7548100 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 143 | Observer: ST

Zone: 50K | Easting: 673759 mE | Northing: 7548122 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 144 Observer: ST

Zone: 50K Easting: 673987 mE Northing: 7548113 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 145 Observer: ST

Zone: 50K Easting: 674559 mE Northing: 7548301 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 146 | Observer: ST

Zone: 50K | Easting: 674835 mE | Northing: 7548352 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 147 | Observer: ST

Zone: 50K | Easting: 675265 mE | Northing: 7548478 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 148 | Observer: ST

Zone: 50K | Easting: 675614 mE | Northing: 7548578 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 149 | Observer: ST

Zone: 50K | Easting: 675948 mE | Northing: 7548699 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 150 Observer: ST

Zone: 50K Easting: 676310 mE Northing: 7548765 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 151 Observer: ST

Zone: 50K Easting: 676591 mE Northing: 7548809 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open forest over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 152 Observer: ST

Zone: 50K Easting: 676764 mE Northing: 7548897 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 153 | Observer: ST

Zone: 50K | Easting: 676884 mE | Northing: 7548936 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Woodland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 154 Observer: ST

Zone: 50K Easting: 677290 mE Northing: 7549029 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 155 Observer: ST

Zone: 50K Easting: 677669 mE Northing: 7549202 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over low shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 156 Observer: ST

Zone: 50K Easting: 677994 mE Northing: 7549313 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 157 Observer: ST

Zone: 50K Easting: 678543 mE Northing: 7549500 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 158 Observer: ST

Zone: 50K Easting: 678787 mE Northing: 7549573 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 159 | Observer: ST

Zone: 50K | Easting: 679007 mE | Northing: 7549665 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Boulders (>250mm)

Date: 3/11/2012 | Habitat Assessment #: 160 | Observer: ST

Zone: 50K | Easting: 679248 mE | Northing: 7549665 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 161 | Observer: ST

Zone: 50K | Easting: 679442 mE | Northing: 7549696 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 162 Observer: ST

Zone: 50K Easting: 679740 mE Northing: 7549773 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 163 Observer: ST

Zone: 50K Easting: 679874 mE Northing: 7549835 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 164 Observer: ST

Zone: 50K Easting: 680208 mE Northing: 7549844 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 165 Observer: ST

Zone: 50K Easting: 680453 mE Northing: 7549837 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 166 Observer: ST

Zone: 50K Easting: 680565 mE Northing: 7550113 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 167 Observer: ST

Zone: 50K Easting: 680910 mE Northing: 7550321 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 168 | Observer: ST

Zone: 50K | Easting: 681157 mE | Northing: 7550284 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 169 | Observer: ST

Zone: 50K | Easting: 681700 mE | Northing: 7550608 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 170 | Observer: ST

Zone: 50K | Easting: 682009 mE | Northing: 7550700 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 171 | Observer: ST

Zone: 50K | Easting: 682309 mE | Northing: 7550642 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 172 | Observer: ST

Zone: 50K | Easting: 682590 mE | Northing: 7550389 mN

Fire History: > 5 years | Landform: Undulating and Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 173 | Observer: ST

Zone: 50K | Easting: 682813 mE | Northing: 7550208 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 174 Observer: ST

Zone: 50K Easting: 682878 mE Northing: 7550472 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 175 Observer: ST

Zone: 50K Easting: 682981 mE Northing: 7550639 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Open forest over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 176 Observer: ST

Zone: 50K Easting: 683107 mE Northing: 7550478 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 177 Observer: ST

Zone: 50K Easting: 683374 mE Northing: 7550591 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 178 Observer: ST

Zone: 50K Easting: 683797 mE Northing: 7550660 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012

Habitat Assessment #: 179

Observer: ST

Zone: 50K

Easting: 683926 mE

Northing: 7550559 mN

Fire History: > 5 years

Landform: Undulating

Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown

Soil Type: Sand

Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 180 Observer: ST

Zone: 50K Easting: 683767 mE Northing: 7550296 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 181 | Observer: ST

Zone: 50K | Easting: 683508 mE | Northing: 7550004 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 182 | Observer: ST

Zone: 50K | Easting: 683430 mE | Northing: 7549813 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 183 Observer: ST

Zone: 50K Easting: 683158 mE Northing: 7549875 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 184 Observer: ST

Zone: 50K Easting: 683101 mE Northing: 7550047 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 185 | Observer: ST

Zone: 50K | Easting: 682860 mE | Northing: 7550151 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 186 | Observer: ST

Zone: 50K | Easting: 681792 mE | Northing: 7550272 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 187 | Observer: ST

Zone: 50K | Easting: 681693 mE | Northing: 7549882 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 188 Observer: ST

Zone: 50K Easting: 680989 mE Northing: 7549575 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 189 Observer: ST

Zone: 50K Easting: 680566 mE Northing: 7549474 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 190 | Observer: ST

Zone: 50K | Easting: 680283 mE | Northing: 7549381 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 191 | Observer: ST

Zone: 50K | Easting: 679763 mE | Northing: 7549449 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Low shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 192 | Observer: ST

Zone: 50K | Easting: 679232 mE | Northing: 7549107 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 193 Observer: ST

Zone: 50K Easting: 678731 mE Northing: 7549044 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (51-250)

Date: 3/11/2012 Habitat Assessment #: 194 Observer: ST

Zone: 50K Easting: 678437 mE Northing: 7548830 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 195 | Observer: ST

Zone: 50K | Easting: 678352 mE | Northing: 7548775 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 196 | Observer: ST

Zone: 50K | Easting: 678102 mE | Northing: 7548808 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 197 | Observer: ST

Zone: 50K | Easting: 677651 mE | Northing: 7548643 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 198 | Observer: ST

Zone: 50K | Easting: 677220 mE | Northing: 7548502 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Disturbed

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 199 Observer: ST

Zone: 50K Easting: 676946 mE Northing: 7548354 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 200 | Observer: ST

Zone: 50K | Easting: 676482 mE | Northing: 7548244 mN

Fire History: > 5 years | Landform: Creekline | Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 201 Observer: ST

Zone: 50K Easting: 676356 mE Northing: 7548225 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 202 Observer: ST

Zone: 50K Easting: 676030 mE Northing: 7548114 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 203 Observer: ST

Zone: 50K Easting: 675644 mE Northing: 7547986 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 204 Observer: ST

Zone: 50K Easting: 675281 mE Northing: 7547893 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 205 | Observer: ST

Zone: 50K | Easting: 674909 mE | Northing: 7547830 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 206 Observer: ST

Zone: 50K Easting: 674586 mE Northing: 7547861 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 207 Observer: ST

Zone: 50K Easting: 674205 mE Northing: 7547892 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 208 | Observer: ST

Zone: 50K | Easting: 668900 mE | Northing: 7550244 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 209 | Observer: ST

Zone: 50K | Easting: 668922 mE | Northing: 7550444 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 210 | Observer: ST

Zone: 50K | Easting: 668854 mE | Northing: 7550584 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 211 Observer: ST

Zone: 50K Easting: 668885 mE Northing: 7550934 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 212 Observer: ST

Zone: 50K Easting: 668530 mE Northing: 7550757 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 213 Observer: ST

Zone: 50K Easting: 668841 mE Northing: 7551337 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 214 Observer: ST

Zone: 50K Easting: 669113 mE Northing: 7551848 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 215 | Observer: ST

Zone: 50K | Easting: 669198 mE | Northing: 7552504 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 216 | Observer: ST

Zone: 50K | Easting: 669158 mE | Northing: 7553080 mN

Fire History: > 5 years | Landform: Ridgeg | Habitat Quality: Very Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

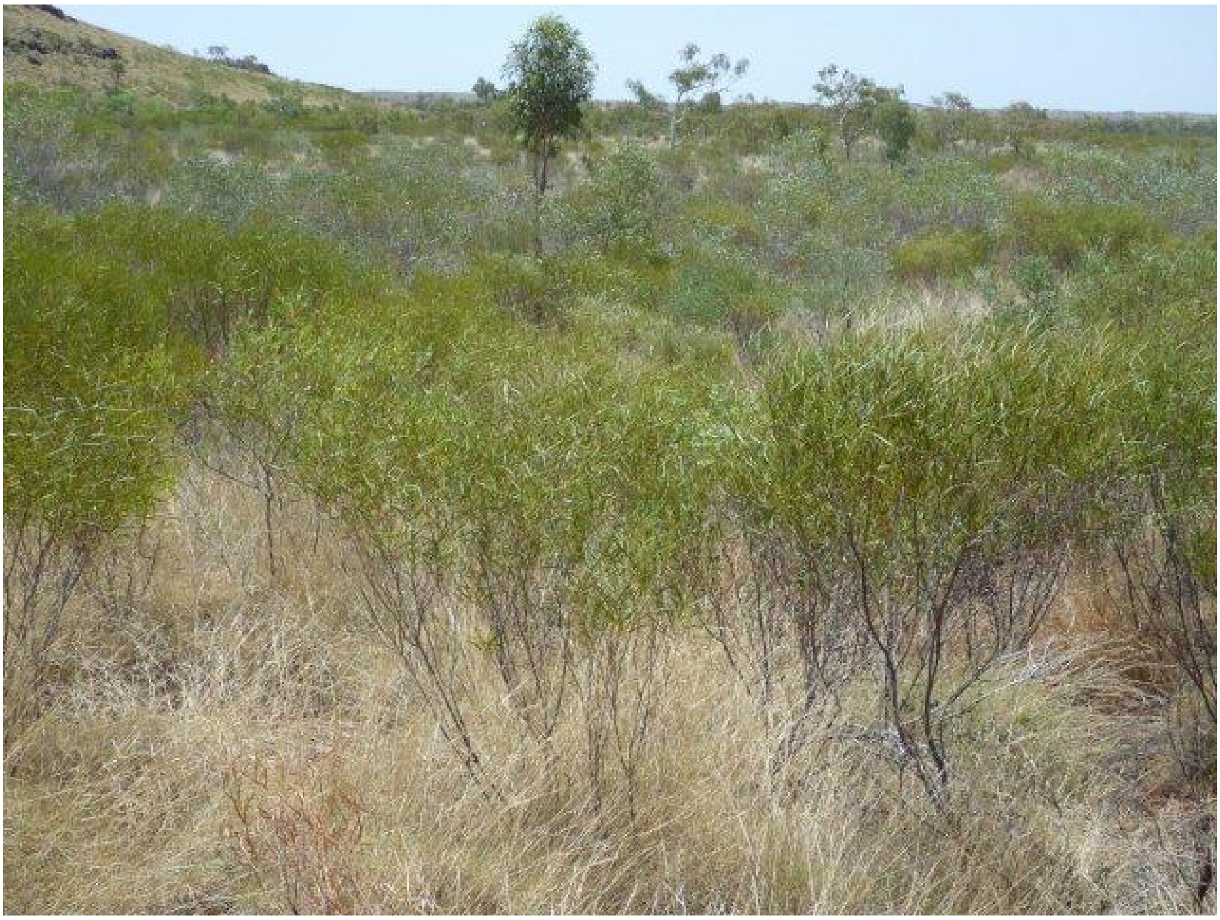
Date: 3/11/2012 Habitat Assessment #: 217 Observer: ST

Zone: 50K Easting: 669241 mE Northing: 7554114 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 3/11/2012 Habitat Assessment #: 218 Observer: ST

Zone: 50K Easting: 669213 mE Northing: 7554996 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 219 Observer: ST

Zone: 50K Easting: 669709 mE Northing: 7555089 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over scattered hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 220 Observer: ST

Zone: 50K Easting: 669892 mE Northing: 7555125 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 221 Observer: ST

Zone: 50K Easting: 670275 mE Northing: 7555110 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over scattered hummock grass

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 222 | Observer: ST

Zone: 50K | Easting: 670614 mE | Northing: 7554933 mN

Fire History: 1-5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 223 Observer: ST

Zone: 50K Easting: 670984 mE Northing: 7554906 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 224 | Observer: ST

Zone: 50K | Easting: 671054 mE | Northing: 7554892 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 225 | Observer: ST

Zone: 50K | Easting: 671364 mE | Northing: 7554915 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Ttall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 226 | Observer: ST

Zone: 50K | Easting: 671620 mE | Northing: 7554961 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 227 Observer: ST

Zone: 50K Easting: 671801 mE Northing: 7555080 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 228 Observer: ST

Zone: 50K Easting: 672296 mE Northing: 7555028 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 229 Observer: ST

Zone: 50K Easting: 672212 mE Northing: 7554685 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 230 | Observer: ST

Zone: 50K | Easting: 672268 mE | Northing: 7554457 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 231 | Observer: ST

Zone: 50K | Easting: 672103 mE | Northing: 7554130 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 232 | Observer: ST

Zone: 50K | Easting: 671762 mE | Northing: 7553975 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 233 Observer: ST

Zone: 50K Easting: 671591 mE Northing: 7553871 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 234 Observer: ST

Zone: 50K Easting: 671592 mE Northing: 7553873 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 235 | Observer: ST

Zone: 50K | Easting: 671379 mE | Northing: 7553711 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 236 | Observer: ST

Zone: 50K | Easting: 671161 mE | Northing: 7553420 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 237 | Observer: ST

Zone: 50K | Easting: 671049 mE | Northing: 7553239 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 238 | Observer: ST

Zone: 50K | Easting: 671050 mE | Northing: 7553241 mN

Fire History: > 5 years | Landform: River | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 239 Observer: ST

Zone: 50K Easting: 671096 mE Northing: 7553074 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 240 | Observer: ST

Zone: 50K | Easting: 671110 mE | Northing: 7552770 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over open hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 241 Observer: ST

Zone: 50K Easting: 671136 mE Northing: 7552599 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 242 Observer: ST

Zone: 50K Easting: 670960 mE Northing: 7552157 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 243 Observer: ST

Zone: 50K Easting: 670931 mE Northing: 7551916 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 | Habitat Assessment #: 244 | Observer: ST

Zone: 50K | Easting: 670711 mE | Northing: 7551496 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over closed tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 245 Observer: ST

Zone: 50K Easting: 670888 mE Northing: 7551012 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 12/11/2012 Habitat Assessment #: 246 Observer: ST

Zone: 50K Easting: 655402 mE Northing: 7552107 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over tall open scrub over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 247 Observer: ST

Zone: 50K Easting: 655117 mE Northing: 7552239 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall open scrub over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

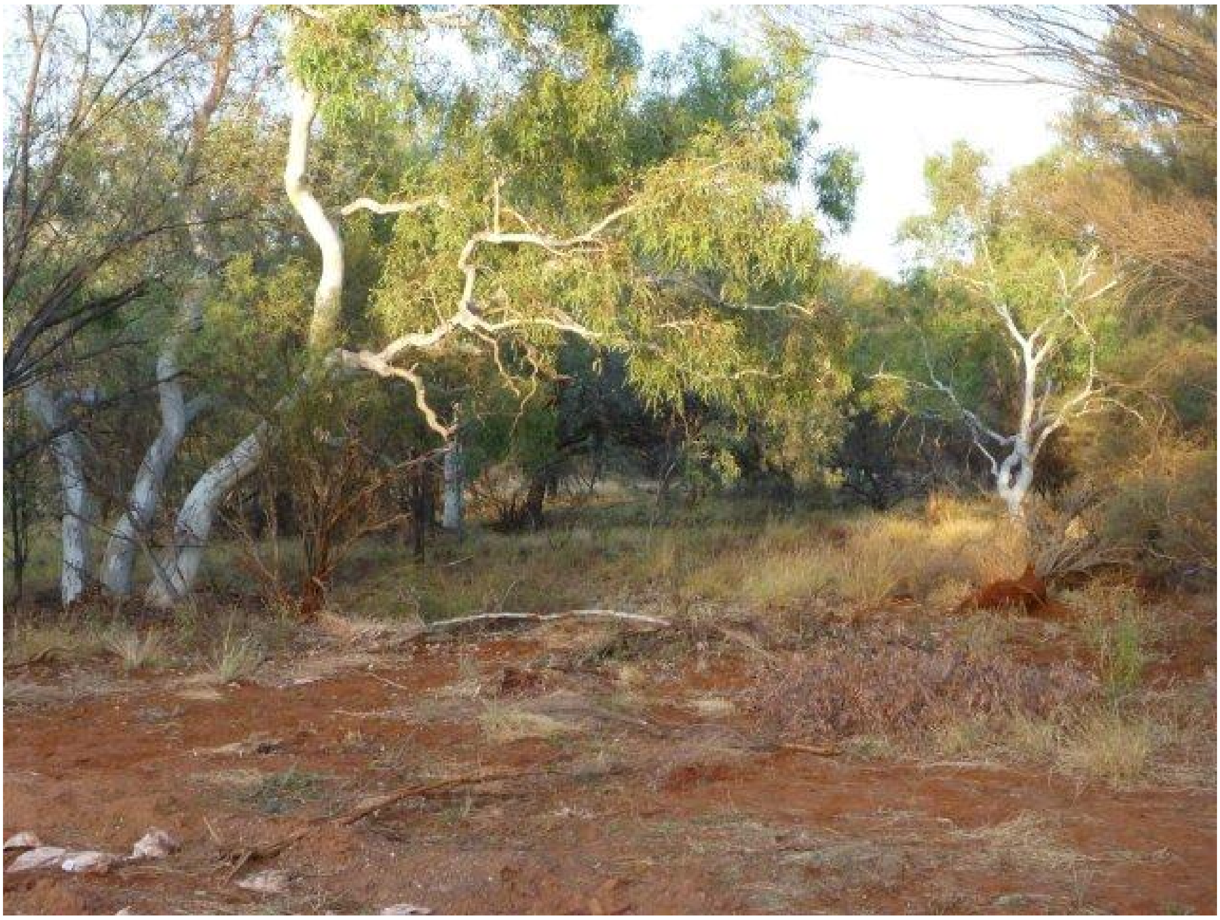
Date: 12/11/2012 Habitat Assessment #: 248 Observer: ST

Zone: 50K Easting: 654817 mE Northing: 7552080 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open forest over tall open scrub over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 12/11/2012 Habitat Assessment #: 249 Observer: ST

Zone: 50K Easting: 654395 mE Northing: 7552369 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall open scrub over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 250 Observer: ST

Zone: 50K Easting: 654571 mE Northing: 7552810 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 251 Observer: ST

Zone: 50K Easting: 655067 mE Northing: 7553034 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012	Habitat Assessment #: 252	Observer: ST
Zone: 50K	Easting: 655275 mE	Northing: 7553334 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Highly Degraded

Habitat Structure: Open woodland over tall shrubland over open tussock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

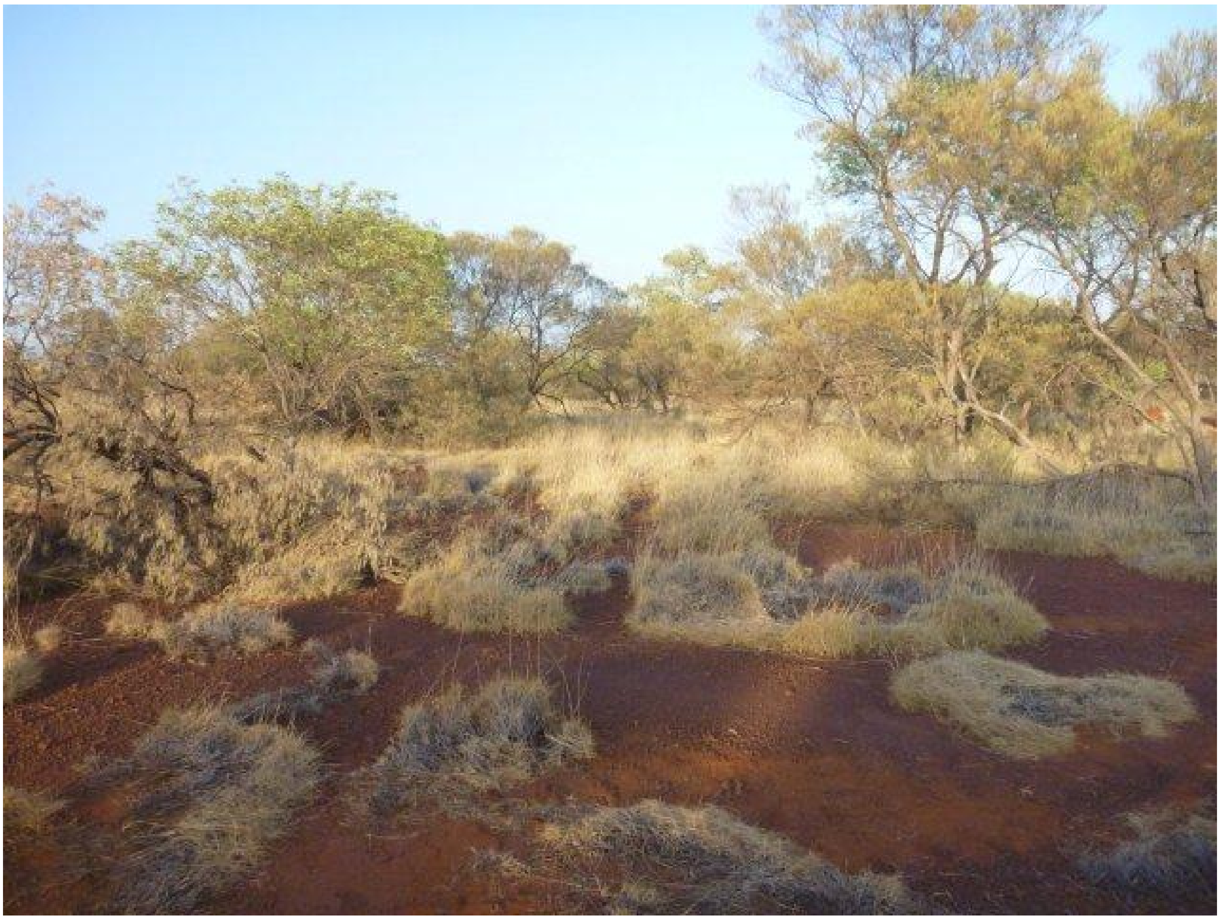
Date: 12/11/2012 Habitat Assessment #: 253 Observer: ST

Zone: 50K Easting: 655477 mE Northing: 7553618 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)



TERRESTRIAL ECOSYSTEMS

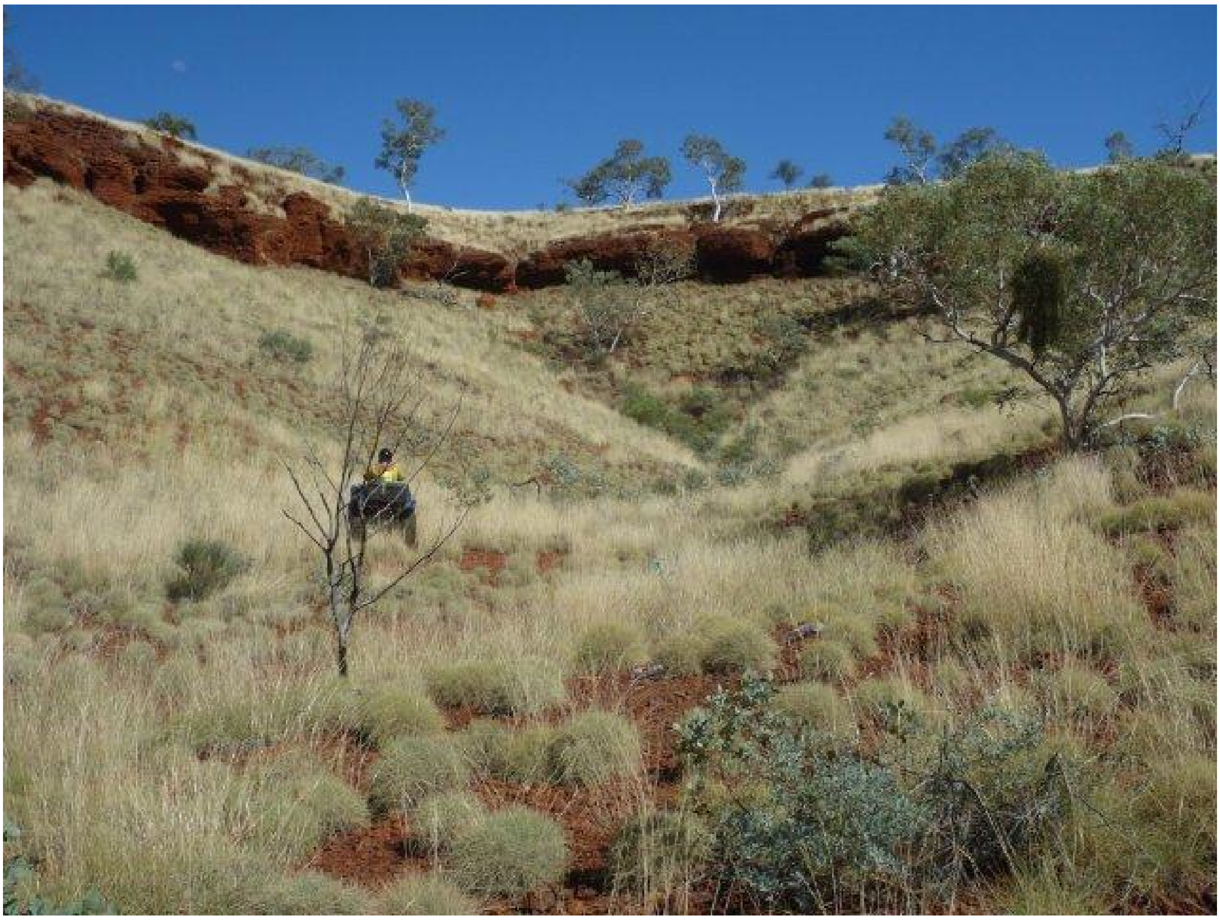
Date: 12/11/2012 | Habitat Assessment #: 254 | Observer: ST

Zone: 50K | Easting: 655746 mE | Northing: 7553756 mN

Fire History: > 5 years | Landform: Undulating/ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)



TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 255 Observer: ST

Zone: 50K Easting: 655745 mE Northing: 7553755 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 256 Observer: ST

Zone: 50K Easting: 656100 mE Northing: 7554247 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 257 Observer: ST

Zone: 50K Easting: 656472 mE Northing: 7554733 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 258 Observer: ST

Zone: 50K Easting: 656778 mE Northing: 7554546 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over mid dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 259 Observer: ST

Zone: 50K Easting: 656388 mE Northing: 7553577 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 260 Observer: ST

Zone: 50K Easting: 655995 mE Northing: 7553052 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 261 Observer: ST

Zone: 50K Easting: 655973 mE Northing: 7553026 mN

Fire History: > 5 years Landform: Upper Slope Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 262 Observer: ST

Zone: 50K Easting: 655843 mE Northing: 7551874 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 263 | Observer: ST

Zone: 50K | Easting: 656200 mE | Northing: 7551562 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 264 Observer: ST

Zone: 50K Easting: 656833 mE Northing: 7551008 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 265 Observer: ST

Zone: 50K Easting: 656754 mE Northing: 7550520 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 266 | Observer: ST

Zone: 50K | Easting: 657161 mE | Northing: 7550840 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 267 Observer: ST

Zone: 50K Easting: 657734 mE Northing: 7550663 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 268 Observer: ST

Zone: 50K Easting: 658106 mE Northing: 7551175 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 269 Observer: ST

Zone: 50K Easting: 658412 mE Northing: 7551602 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 270 Observer: ST

Zone: 50K Easting: 658797 mE Northing: 7552143 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 271 | Observer: ST

Zone: 50K | Easting: 658015 mE | Northing: 7550010 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 272 Observer: ST

Zone: 50K Easting: 658667 mE Northing: 7549900 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 273 Observer: ST

Zone: 50K Easting: 659086 mE Northing: 7550491 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 274 Observer: ST

Zone: 50K Easting: 659428 mE Northing: 7550942 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 275 Observer: ST

Zone: 50K Easting: 659724 mE Northing: 7551353 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 276 Observer: ST

Zone: 50K Easting: 659031 mE Northing: 7549241 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 277 Observer: ST

Zone: 50K Easting: 659612 mE Northing: 7549181 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 278 Observer: ST

Zone: 50K Easting: 659965 mE Northing: 7549667 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 279 Observer: ST

Zone: 50K Easting: 660299 mE Northing: 7550120 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012	Habitat Assessment #: 280	Observer: ST
Zone: 50K	Easting: 660638 mE	Northing: 7550599 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 281 Observer: ST

Zone: 50K Easting: 660828 mE Northing: 7550815 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 282 Observer: ST

Zone: 50K Easting: 661098 mE Northing: 7548448 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 283 | Observer: ST

Zone: 50K | Easting: 662080 mE | Northing: 7548246 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 284 Observer: ST

Zone: 50K Easting: 662914 mE Northing: 7548011 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 285 Observer: ST

Zone: 50K Easting: 667049 mE Northing: 7548401 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 286 | Observer: ST

Zone: 50K | Easting: 667070 mE | Northing: 7548871 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall open shrubland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 287 | Observer: ST

Zone: 50K | Easting: 667092 mE | Northing: 7549687 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 288 Observer: ST

Zone: 50K Easting: 667482 mE Northing: 7549926 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 289 Observer: ST

Zone: 50K Easting: 667965 mE Northing: 7550221 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 290 Observer: ST

Zone: 50K Easting: 673051 mE Northing: 7548353 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Schrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 291 Observer: ST

Zone: 50K Easting: 673308 mE Northing: 7548708 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 292 Observer: ST

Zone: 50K Easting: 673594 mE Northing: 7549118 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 293 Observer: ST

Zone: 50K Easting: 673905 mE Northing: 7549488 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 294 Observer: ST

Zone: 50K Easting: 673981 mE Northing: 7549993 mN

Fire History: > 5 years Landform: Rock Outcrop / Breakaway Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 295 Observer: ST

Zone: 50K Easting: 674252 mE Northing: 7550235 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 296 Observer: ST

Zone: 50K Easting: 674421 mE Northing: 7550485 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 297 Observer: ST

Zone: 50K Easting: 674608 mE Northing: 7550712 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 | Habitat Assessment #: 298 | Observer: ST

Zone: 50K | Easting: 674583 mE | Northing: 7551047 mN

Fire History: > 5 years | Landform: Rock Outcrop / Breakaway | Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012

Habitat Assessment #: 299

Observer: ST

Zone: 50K

Easting: 674381 mE

Northing: 7551175 mN

Fire History: > 5 years

Landform: Rock Outcrop / Breakaway

Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Brown

Soil Type: Stony

Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 300 | Observer: ST

Zone: 50K | Easting: 674471 mE | Northing: 7551135 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 | Habitat Assessment #: 301 | Observer: ST

Zone: 50K | Easting: 673853 mE | Northing: 7551238 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 302 Observer: ST

Zone: 50K Easting: 673650 mE Northing: 7550882 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 303 Observer: ST

Zone: 50K Easting: 673274 mE Northing: 7550565 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 304 Observer: ST

Zone: 50K Easting: 672914 mE Northing: 7550206 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 305 Observer: ST

Zone: 50K Easting: 672723 mE Northing: 7549951 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

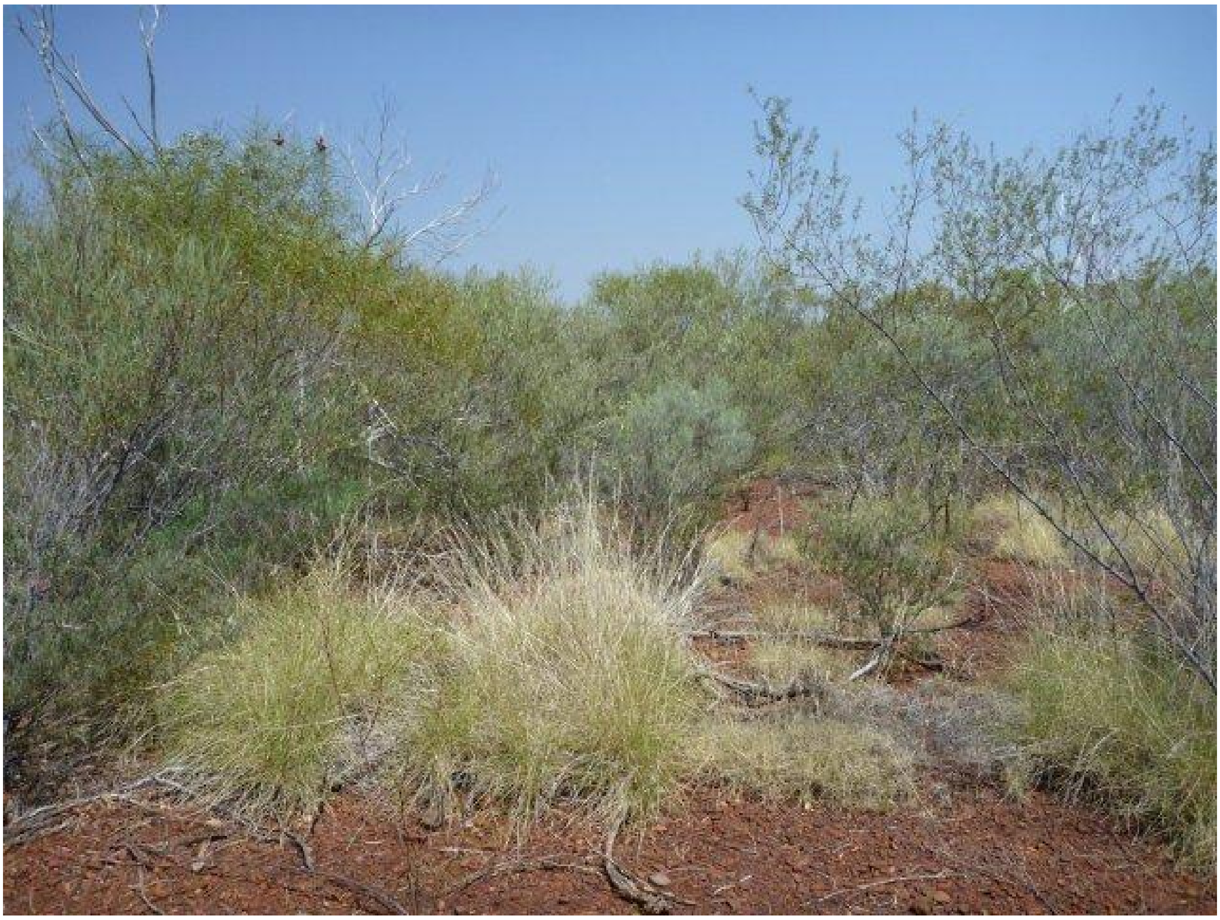
Date: 12/11/2012 Habitat Assessment #: 306 Observer: ST

Zone: 50K Easting: 672525 mE Northing: 7549682 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 12/11/2012 Habitat Assessment #: 307 Observer: ST

Zone: 50K Easting: 672315 mE Northing: 7549387 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 308 Observer: ST

Zone: 50K Easting: 672094 mE Northing: 7549080 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 309 | Observer: ST

Zone: 50K | Easting: 656499 mE | Northing: 7556709 mN

Fire History: 1-5 years | Landform: Drainage Line | Habitat Quality: Disturbed

Habitat Structure: Scattered trees over shrubs over tussock grassland

Soil Colour: Red | Soil Type: | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 310 Observer: RT

Zone: 50K Easting: 655699 mE Northing: 7556651 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Low open woodland over scattered low shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 311 | Observer: RT

Zone: 50K | Easting: 655069 mE | Northing: 7556610 mN

Fire History: 1-5 years | Landform: Ridge | Habitat Quality: Disturbed

Habitat Structure: Hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 Habitat Assessment #: 312 Observer: RT

Zone: 50K Easting: 655057 mE Northing: 7557084 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Very Good

Habitat Structure: Low woodland over h over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 313 Observer: RT

Zone: 50K Easting: 657169 mE Northing: 7556867 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Scattered shrubs over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 314 Observer: RT

Zone: 50K Easting: 658992 mE Northing: 7556454 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 315 Observer: RT

Zone: 50K Easting: 659438 mE Northing: 7556150 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scrub over open hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 316 Observer: RT

Zone: 50K Easting: 660072 mE Northing: 7555773 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 317 Observer: RT

Zone: 50K Easting: 660610 mE Northing: 7555692 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 318 Observer: RT

Zone: 50K Easting: 658858 mE Northing: 7554742 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Trees over open heath over open hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 319 Observer: RT

Zone: 50K Easting: 659084 mE Northing: 7554738 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over hummock grassland

Soil Colour: Red Soil Type: Loamy Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 320 | Observer: RT

Zone: 50K | Easting: 659590 mE | Northing: 7554559 mN

Fire History: 1-5 years | Landform: Lower Slope | Habitat Quality: Disturbed

Habitat Structure: Scattered low trees over open heath over scattered hummock grassland

Soil Colour: Red | Soil Type: Loamy Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 321 Observer: RT

Zone: 50K Easting: 660500 mE Northing: 7554137 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered shrubs over hummock grassland

Soil Colour: Red Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 322 Observer: RT

Zone: 50K Easting: 660789 mE Northing: 7554134 mN

Fire History: 1-5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (51-250mm)

Date: 2/11/2012 Habitat Assessment #: 323 Observer: RT

Zone: 50K Easting: 660379 mE Northing: 7553953 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over low open shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 324 Observer: RT

Zone: 50K Easting: 660132 mE Northing: 7554113 mN

Fire History: 1-5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered low trees over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 325 | Observer: RT

Zone: 50K | Easting: 659301 mE | Northing: 7553910 mN

Fire History: 1-5 years | Landform: Creekline | Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 326 | Observer: RT

Zone: 50K | Easting: 659397 mE | Northing: 7554612 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

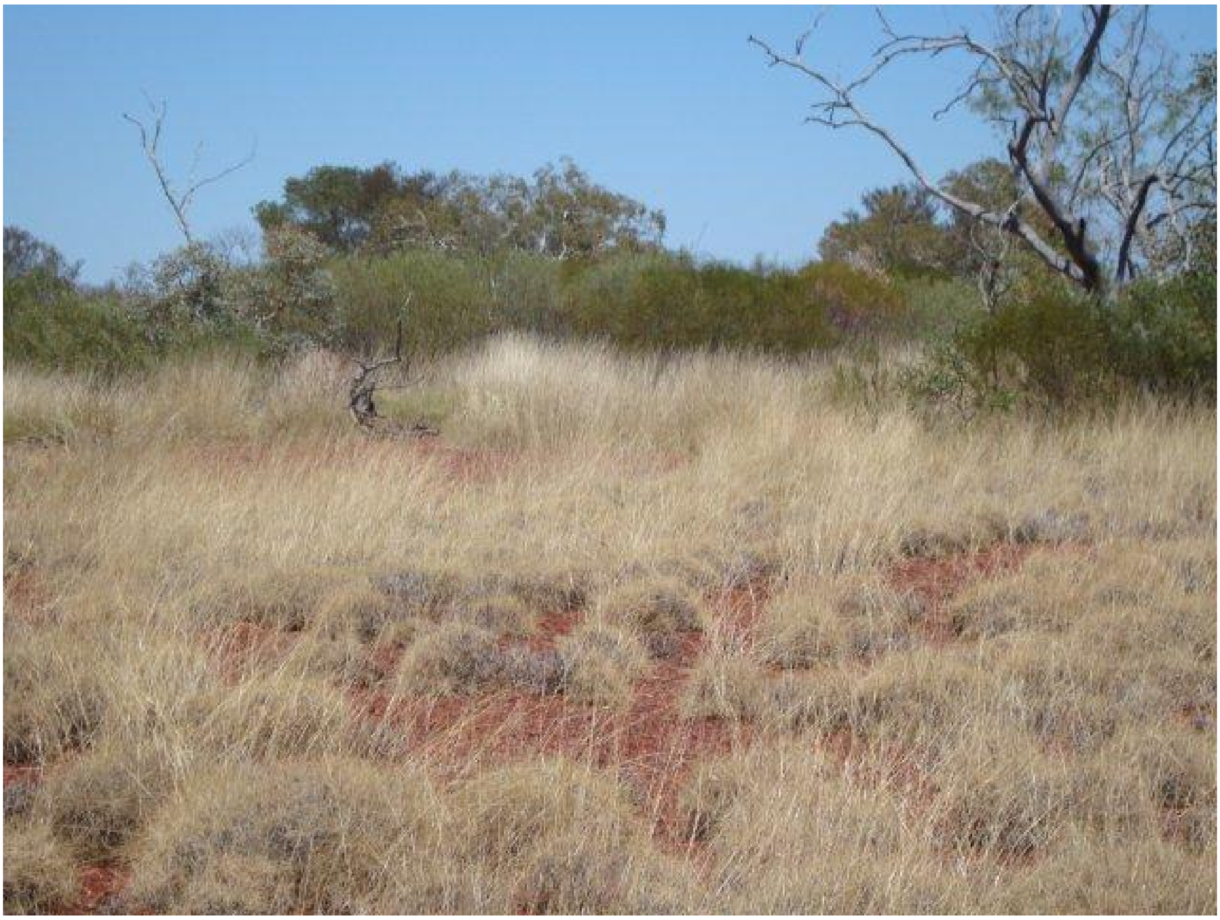
Date: 2/11/2012 | Habitat Assessment #: 327 | Observer: RT

Zone: 50K | Easting: 658768 mE | Northing: 7554664 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)



Date: 2/11/2012 Habitat Assessment #: 328 Observer: RT

Zone: 50K Easting: 658760 mE Northing: 7554566 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Good

Habitat Structure: Low open woodland o over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 329 Observer: RT

Zone: 50K Easting: 658748 mE Northing: 7554468 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over hummock grassland d

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 330 Observer: RT

Zone: 50K Easting: 658717 mE Northing: 7554058 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Scattered low trees over shrubs over hummock grassland d

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 331 Observer: RT

Zone: 50K Easting: 658393 mE Northing: 7554192 mN

Fire History: 1-5 years Landform: Drainage Line Habitat Quality: Disturbed

Habitat Structure: Scattered low trees over shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 332 | Observer: RT

Zone: 50K | Easting: 658421 mE | Northing: 7554377 mN

Fire History: 1-5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 333 Observer: RT

Zone: 50K Easting: 658434 mE Northing: 7554938 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 334 Observer: RT

Zone: 50K Easting: 658178 mE Northing: 7555211 mN

Fire History: > 5 years Landform: Gully Habitat Quality: Good

Habitat Structure: Low woodland over scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 335 Observer: RT

Zone: 50K Easting: 657486 mE Northing: 7555170 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

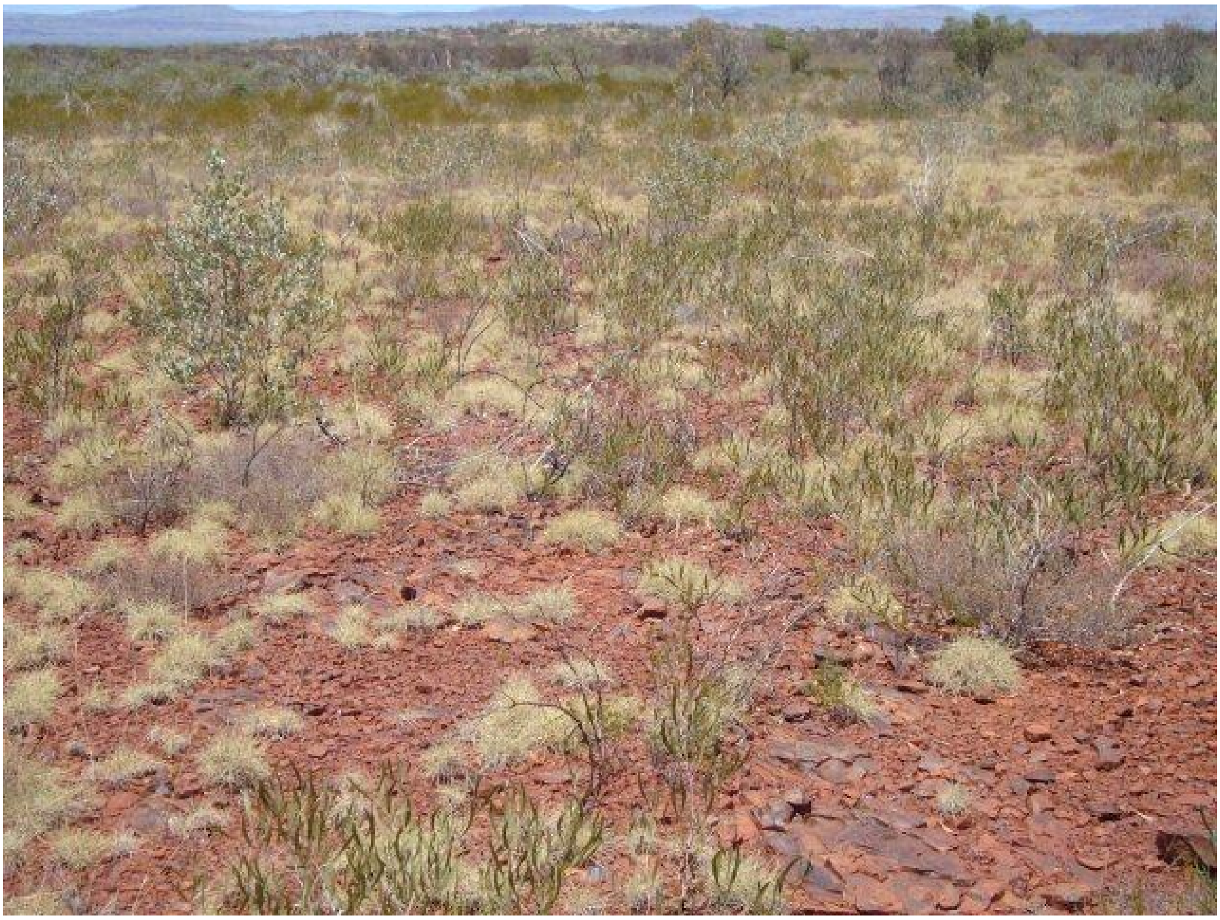
Date: 2/11/2012 | Habitat Assessment #: 336 | Observer: RT

Zone: 50K | Easting: 657445 mE | Northing: 7554803 mN

Fire History: 1-5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Low open shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (51-250mm)



Date: 2/11/2012 Habitat Assessment #: 337 Observer: RT

Zone: 50K Easting: 657496 mE Northing: 7554545 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Low open shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 338 Observer: RT

Zone: 50K Easting: 657223 mE Northing: 7554683 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Open heath over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 339 Observer: RT

Zone: 50K Easting: 657267 mE Northing: 7555134 mN

Fire History: 1-5 years Landform: Mid Slope Habitat Quality: Disturbed

Habitat Structure: Trees over low shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 340 | Observer: RT

Zone: 50K | Easting: 657338 mE | Northing: 7555536 mN

Fire History: 1-5 years | Landform: Mid Slope | Habitat Quality: Disturbed

Habitat Structure: Scattered trees over low shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 341 Observer: RT

Zone: 50K Easting: 657472 mE Northing: 7556221 mN

Fire History: 1-5 years Landform: Mid Slope Habitat Quality: Disturbed

Habitat Structure: Scattered trees over low shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 342 | Observer: RT

Zone: 50K | Easting: 657477 mE | Northing: 7556824 mN

Fire History: 1-5 years | Landform: Flat | Habitat Quality: Disturbed

Habitat Structure: Scattered trees over low open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 343 Observer: RT

Zone: 50K Easting: 656608 mE Northing: 7556779 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Scattered trees over low open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 344	Observer: RT
Zone: 50K	Easting: 656620 mE	Northing: 7556435 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Open shrubland over mid-dense hummock grassland

Soil Colour: Red	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 345 Observer: RT

Zone: 50K Easting: 656306 mE Northing: 7556153 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 346 | Observer: RT

Zone: 50K | Easting: 656347 mE | Northing: 7556286 mN

Fire History: 1-5 years | Landform: Flat | Habitat Quality: Disturbed

Habitat Structure: Scattered low trees over scattered hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 347 | Observer: RT

Zone: 50K | Easting: 656112 mE | Northing: 7556688 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Low open woodland over low shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 348 Observer: RT

Zone: 50K Easting: 656060 mE Northing: 7556487 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Disturbed

Habitat Structure: Scattered trees open shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 349 Observer: RT

Zone: 50K Easting: 656117 mE Northing: 7556062 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 350 Observer: RT

Zone: 50K Easting: 656155 mE Northing: 7555814 mN

Fire History: 1-5 years Landform: Drainage Line Habitat Quality: Disturbed

Habitat Structure: Scattered trees open shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 351 | Observer: RT

Zone: 50K | Easting: 661339 mE | Northing: 7553030 mN

Fire History: 1-5 years | Landform: Drainage Line | Habitat Quality: Good

Habitat Structure: Scattered low trees over tall shrubland over open hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 352 Observer: RT

Zone: 50K Easting: 661362 mE Northing: 7553124 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 353 Observer: RT

Zone: 50K Easting: 661330 mE Northing: 7553427 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 354 Observer: RT

Zone: 50K Easting: 661545 mE Northing: 7553393 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 355 Observer: RT

Zone: 50K Easting: 661491 mE Northing: 7553184 mN

Fire History: 1-5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 356 Observer: RT

Zone: 50K Easting: 661522 mE Northing: 7553018 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 357 Observer: RT

Zone: 50K Easting: 662588 mE Northing: 7552295 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 358 | Observer: RT

Zone: 50K | Easting: 662561 mE | Northing: 7552797 mN

Fire History: > 5 years | Landform: Mid Slope | Habitat Quality: Very Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 359 | Observer: RT

Zone: 50K | Easting: 662525 mE | Northing: 7552942 mN

Fire History: 1-5 years | Landform: Ridge | Habitat Quality: Disturbed

Habitat Structure: Low open shrubland over open hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 360	Observer: RT
Zone: 50K	Easting: 662784 mE	Northing: 7552862 mN
Fire History: > 5 years	Landform: Mid Slope	Habitat Quality: Very Good
Habitat Structure: Open woodland over hummock grassland		
Soil Colour: Red	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 361 Observer: RT

Zone: 50K Easting: 662831 mE Northing: 7552547 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 362 | Observer: RT

Zone: 50K | Easting: 662799 mE | Northing: 7552300 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall open shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 363 Observer: RT

Zone: 50K Easting: 663567 mE Northing: 7552519 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 364 | Observer: RT

Zone: 50K | Easting: 663599 mE | Northing: 7552723 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 365 Observer: RT

Zone: 50K Easting: 663599 mE Northing: 7552879 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 366 Observer: RT

Zone: 50K Easting: 663870 mE Northing: 7552705 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 367 | Observer: RT

Zone: 50K | Easting: 664515 mE | Northing: 7552149 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Shrubland over scattered hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 368 Observer: RT

Zone: 50K Easting: 664572 mE Northing: 7552359 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 369 Observer: RT

Zone: 50K Easting: 664546 mE Northing: 7552549 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 370 Observer: RT

Zone: 50K Easting: 664542 mE Northing: 7552651 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Good

Habitat Structure: Scattered trees over low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 371 Observer: RT

Zone: 50K Easting: 664580 mE Northing: 7552978 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open forest over scattered low shrubs over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 372 | Observer: RT

Zone: 50K | Easting: 664605 mE | Northing: 7553097 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over low open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 373 | Observer: RT

Zone: 50K | Easting: 664774 mE | Northing: 7553336 mN

Fire History: > 5 years | Landform: Gully | Habitat Quality: Very Good

Habitat Structure: Scattered trees over low open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 374 | Observer: RT

Zone: 50K | Easting: 664943 mE | Northing: 7553581 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 375 | Observer: RT

Zone: 50K | Easting: 664899 mE | Northing: 7554088 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 376 | Observer: RT

Zone: 50K | Easting: 665219 mE | Northing: 7554295 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Very Good

Habitat Structure: Scattered low trees over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 Habitat Assessment #: 377 Observer: RT

Zone: 50K Easting: 665402 mE Northing: 7554504 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Very Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 2/11/2012 | Habitat Assessment #: 378 | Observer: RT

Zone: 50K | Easting: 665355 mE | Northing: 7554303 mN

Fire History: > 5 years | Landform: Gully | Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 379 Observer: RT

Zone: 50K Easting: 665760 mE Northing: 7554417 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 380 Observer: RT

Zone: 50K Easting: 665756 mE Northing: 7554417 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Low open woodland over tall open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 381 Observer: RT

Zone: 50K Easting: 666100 mE Northing: 7554485 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012	Habitat Assessment #: 382	Observer: RT
Zone: 50K	Easting: 666275 mE	Northing: 7554989 mN
Fire History: > 5 years	Landform: Lower Slope	Habitat Quality: Very Good
Habitat Structure: Tall shrubs over hummock grassland		
Soil Colour: Red	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 383 Observer: RT

Zone: 50K Easting: 666471 mE Northing: 7554952 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 384 Observer: RT

Zone: 50K Easting: 666682 mE Northing: 7554977 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Disturbed

Habitat Structure: Scattered low trees over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 385 | Observer: RT

Zone: 50K | Easting: 666969 mE | Northing: 7554932 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 386 Observer: RT

Zone: 50K Easting: 667094 mE Northing: 7554898 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 387 Observer: RT

Zone: 50K Easting: 666939 mE Northing: 7554735 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 388 Observer: RT

Zone: 50K Easting: 666641 mE Northing: 7554792 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Disturbed

Habitat Structure: Scattered trees over scattered low shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 389 | Observer: RT

Zone: 50K | Easting: 666526 mE | Northing: 7554777 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Good

Habitat Structure: Scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 Habitat Assessment #: 390 Observer: RT

Zone: 50K Easting: 665772 mE Northing: 7554248 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Low open woodland over low open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 2/11/2012 | Habitat Assessment #: 391 | Observer: RT

Zone: 50K | Easting: 665705 mE | Northing: 7553813 mN

Fire History: > 5 years | Landform: Mid Slope | Habitat Quality: Good

Habitat Structure: Scattered low trees over low open shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 392 Observer: RT

Zone: 50K Easting: 665575 mE Northing: 7553350 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over tall open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 | Habitat Assessment #: 393 | Observer: RT

Zone: 50K | Easting: 665373 mE | Northing: 7552916 mN

Fire History: > 5 years | Landform: Ridge | Habitat Quality: Good

Habitat Structure: Tall open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 394 Observer: RT

Zone: 50K Easting: 665315 mE Northing: 7552342 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 2/11/2012 Habitat Assessment #: 395 Observer: RT

Zone: 50K Easting: 665305 mE Northing: 7552070 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall open shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 396 | Observer: RT

Zone: 50K | Easting: 673482 mE | Northing: 7548034 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubland over scattered hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 397 | Observer: RT

Zone: 50K | Easting: 673730 mE | Northing: 7548030 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubland over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 398 Observer: RT

Zone: 50K Easting: 673995 mE Northing: 7548006 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 399 Observer: RT

Zone: 50K Easting: 674256 mE Northing: 7548020 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 400 | Observer: RT

Zone: 50K | Easting: 674393 mE | Northing: 7548091 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 401 Observer: RT

Zone: 50K Easting: 674557 mE Northing: 7548131 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 402 Observer: RT

Zone: 50K Easting: 674779 mE Northing: 7548156 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered shrubs over closed hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 403 | Observer: RT

Zone: 50K | Easting: 674907 mE | Northing: 7548159 mN

Fire History: 1-5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered shrubs over open hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 404 Observer: RT

Zone: 50K Easting: 675189 mE Northing: 7548272 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 405 Observer: RT

Zone: 50K Easting: 675589 mE Northing: 7548377 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 406 Observer: RT

Zone: 50K Easting: 675800 mE Northing: 7548455 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 407 Observer: RT

Zone: 50K Easting: 676027 mE Northing: 7548566 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 408 Observer: RT

Zone: 50K Easting: 676346 mE Northing: 7548704 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Disturbed

Habitat Structure: Scattered trees over shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: None

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 409 Observer: RT

Zone: 50K Easting: 676713 mE Northing: 7548808 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 410 | Observer: RT

Zone: 50K | Easting: 676793 mE | Northing: 7548809 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Woodland over open shrubland

Soil Colour: Red | Soil Type: Sand | Surface Stone: None

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 411 Observer: RT

Zone: 50K Easting: 677065 mE Northing: 7548873 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Low open woodland over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 412 Observer: RT

Zone: 50K Easting: 677340 mE Northing: 7548927 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Low shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 413 Observer: RT

Zone: 50K Easting: 677502 mE Northing: 7548938 mN

Fire History: > 5 years Landform: Gully Habitat Quality: Good

Habitat Structure: Scattered low shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 414 Observer: RT

Zone: 50K Easting: 677845 mE Northing: 7549051 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 415 | Observer: RT

Zone: 50K | Easting: 677980 mE | Northing: 7549094 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubland over open tussock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: None

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 416 Observer: RT

Zone: 50K Easting: 678078 mE Northing: 7549122 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Oopen shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 417 Observer: RT

Zone: 50K Easting: 678354 mE Northing: 7549219 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over low open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 418 Observer: RT

Zone: 50K Easting: 678914 mE Northing: 7549373 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Low open shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 419 Observer: RT

Zone: 50K Easting: 679296 mE Northing: 7549536 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 420 | Observer: RT

Zone: 50K | Easting: 679688 mE | Northing: 7549533 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered trees over scattered low shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 421 Observer: RT

Zone: 50K Easting: 680469 mE Northing: 7550008 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 422 Observer: RT

Zone: 50K Easting: 680807 mE Northing: 7550103 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 423 Observer: RT

Zone: 50K Easting: 681156 mE Northing: 7550296 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 424 Observer: RT

Zone: 50K Easting: 681626 mE Northing: 7550423 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 425 Observer: RT

Zone: 50K Easting: 681917 mE Northing: 7550537 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 426 Observer: RT

Zone: 50K Easting: 682279 mE Northing: 7550494 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 427 Observer: RT

Zone: 50K Easting: 682351 mE Northing: 7550447 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 428 Observer: RT

Zone: 50K Easting: 682425 mE Northing: 7550299 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 429 Observer: RT

Zone: 50K Easting: 683354 mE Northing: 7550484 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 430 Observer: RT

Zone: 50K Easting: 683354 mE Northing: 7550485 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 431 Observer: RT

Zone: 50K Easting: 683449 mE Northing: 7550392 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 432 Observer: RT

Zone: 50K Easting: 683401 mE Northing: 7550175 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 433 Observer: RT

Zone: 50K Easting: 683260 mE Northing: 7549975 mN

Fire History: 1-5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over scattered low shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 434 Observer: RT

Zone: 50K Easting: 681667 mE Northing: 7550094 mN

Fire History: 1-5 years Landform: Drainage Line Habitat Quality: Disturbed

Habitat Structure: Scattered trees over scattered low shrubs over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 435 Observer: RT

Zone: 50K Easting: 681303 mE Northing: 7550020 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 436 Observer: RT

Zone: 50K Easting: 680876 mE Northing: 7549858 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Low open woodland over scattered low shrubs over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 437 Observer: RT

Zone: 50K Easting: 680720 mE Northing: 7549827 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over closed hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 438 Observer: RT

Zone: 50K Easting: 680399 mE Northing: 7549577 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Woodland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 439 | Observer: RT

Zone: 50K | Easting: 679401 mE | Northing: 7549387 mN

Fire History: > 5 years | Landform: Hill top | Habitat Quality: Good

Habitat Structure: Scattered low trees over shrubland over open hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 440 Observer: RT

Zone: 50K Easting: 679218 mE Northing: 7549306 mN

Fire History: > 5 years Landform: Mid slope Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 441 Observer: RT

Zone: 50K Easting: 678802 mE Northing: 7549228 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Disturbed

Habitat Structure: Scattered shrubs over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 442 | Observer: RT

Zone: 50K | Easting: 678515 mE | Northing: 7549085 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 443 | Observer: RT

Zone: 50K | Easting: 678436 mE | Northing: 7549048 mN

Fire History: > 5 years | Landform: Creekline | Habitat Quality: Good

Habitat Structure: Scattered shrubs over low shrubs

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 444 Observer: RT

Zone: 50K Easting: 678177 mE Northing: 7548974 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 445 Observer: RT

Zone: 50K Easting: 677843 mE Northing: 7548823 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 446 Observer: RT

Zone: 50K Easting: 677412 mE Northing: 7548744 mN

Fire History: > 5 years Landform: Gully Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 447 Observer: RT

Zone: 50K Easting: 677082 mE Northing: 7548663 mN

Fire History: 1-5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over low open shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 448 Observer: RT

Zone: 50K Easting: 676931 mE Northing: 7548651 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 449 Observer: RT

Zone: 50K Easting: 675878 mE Northing: 7548232 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 450 Observer: RT

Zone: 50K Easting: 675429 mE Northing: 7548066 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over scattered hummock grassland and shrubs

Soil Colour: Red Soil Type: Sand Surface Stone: None

Date: 3/11/2012 | Habitat Assessment #: 451 | Observer: RT

Zone: 50K | Easting: 675094 mE | Northing: 7547992 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 452 Observer: RT

Zone: 50K Easting: 674500 mE Northing: 7548025 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 453 Observer: RT

Zone: 50K Easting: 669121 mE Northing: 7550160 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 454 Observer: RT

Zone: 50K Easting: 669218 mE Northing: 7550485 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over closed hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

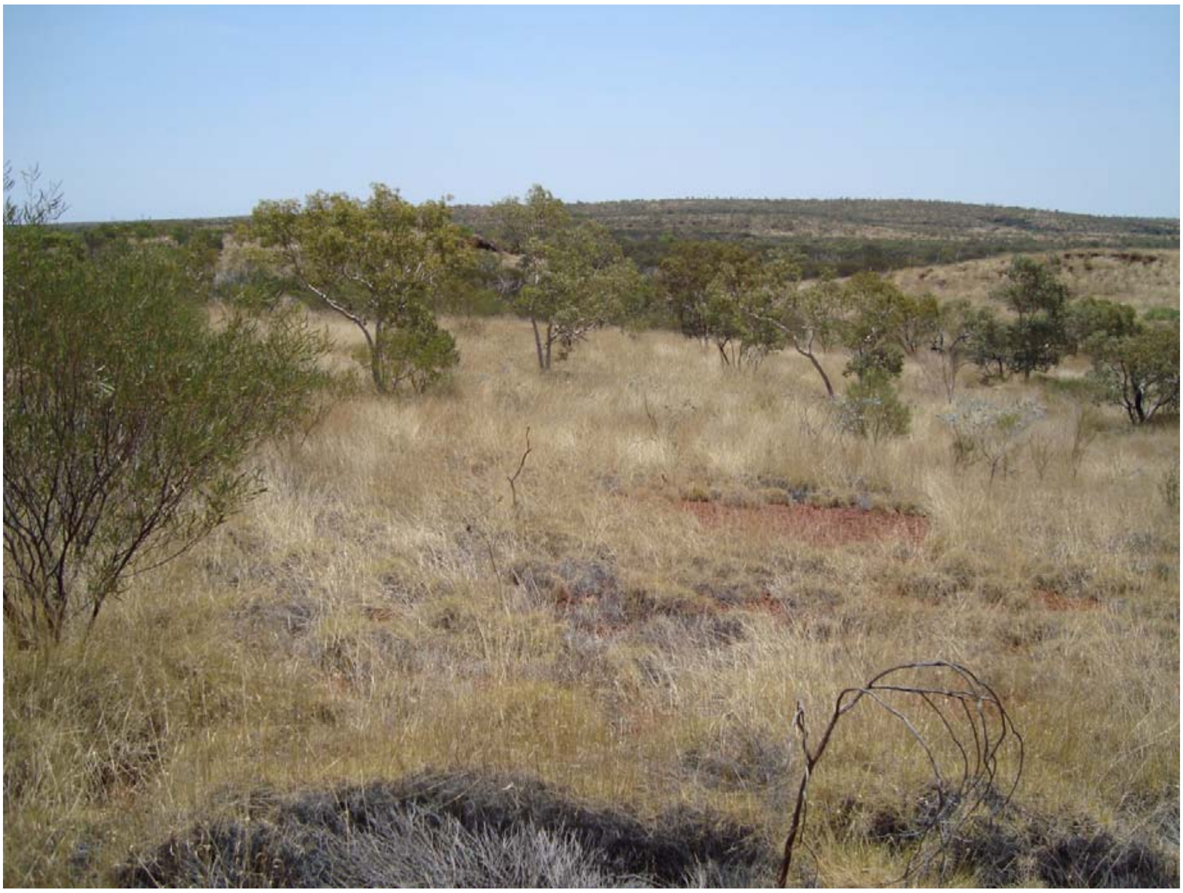
Date: 3/11/2012 Habitat Assessment #: 455 Observer: RT

Zone: 50K Easting: 669253 mE Northing: 7550839 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered trees over scattered shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 3/11/2012 | Habitat Assessment #: 456 | Observer: RT

Zone: 50K | Easting: 669167 mE | Northing: 7551103 mN

Fire History: > 5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Open woodland over scattered shrubs over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 457 Observer: RT

Zone: 50K Easting: 669885 mE Northing: 7554906 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered low trees over open shrubland over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 458 Observer: RT

Zone: 50K Easting: 670204 mE Northing: 7554855 mN

Fire History: > 5 years Landform: Escarpment Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered shrubs over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

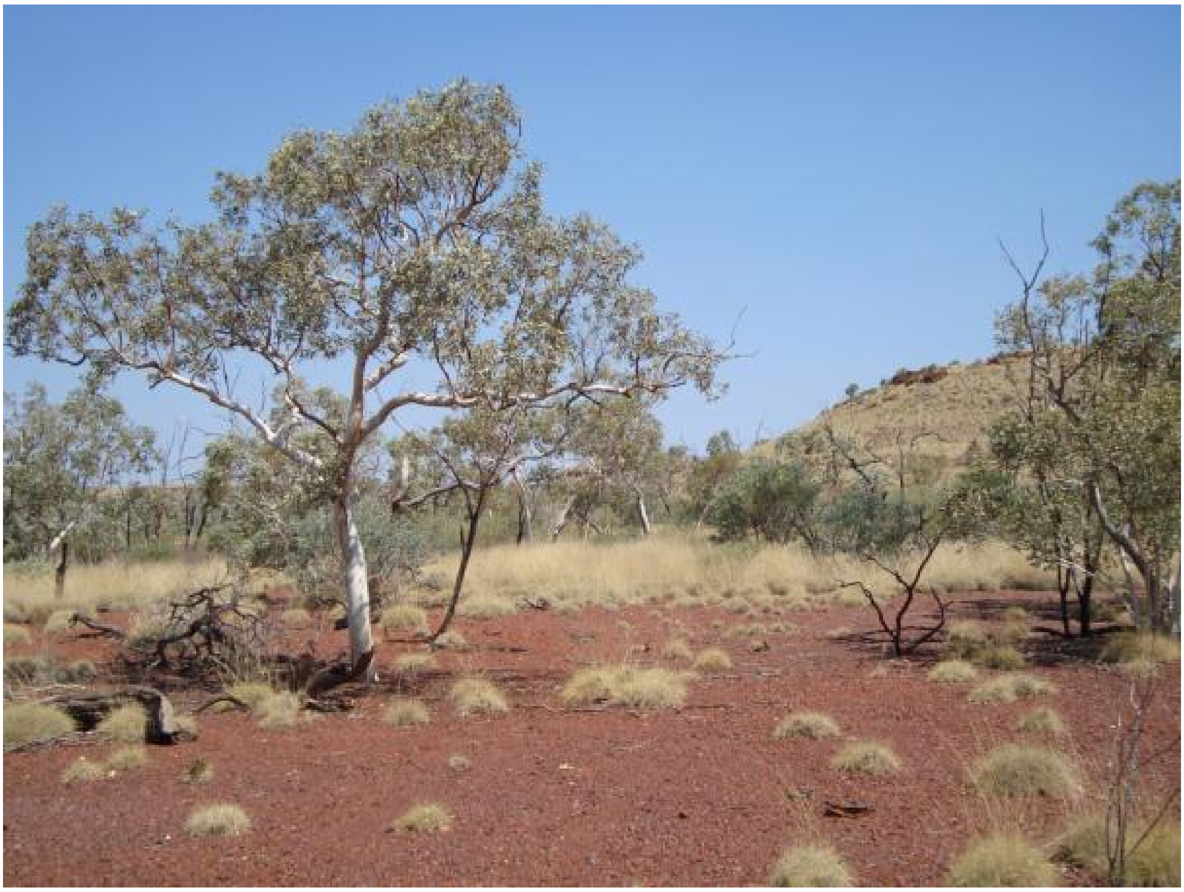
Date: 3/11/2012 Habitat Assessment #: 459 Observer: RT

Zone: 50K Easting: 670373 mE Northing: 7554811 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 3/11/2012 Habitat Assessment #: 460 Observer: RT

Zone: 50K Easting: 670833 mE Northing: 7554710 mN

Fire History: > 5 years Landform: Drainage Line Habitat Quality: Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 461 | Observer: RT

Zone: 50K | Easting: 671059 mE | Northing: 7554690 mN

Fire History: > 5 years | Landform: Creekline | Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 462 Observer: RT

Zone: 50K Easting: 671245 mE Northing: 7554702 mN

Fire History: > 5 years Landform: Lower Slope Habitat Quality: Good

Habitat Structure: Low woodland over shrubland over scattered hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 463 | Observer: RT

Zone: 50K | Easting: 672279 mE | Northing: 7554358 mN

Fire History: 1-5 years | Landform: Lower Slope | Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 | Habitat Assessment #: 464 | Observer: RT

Zone: 50K | Easting: 672143 mE | Northing: 7554325 mN

Fire History: 1-5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open heath over open hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 465 Observer: RT

Zone: 50K Easting: 671985 mE Northing: 7554337 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 466 Observer: RT

Zone: 50K Easting: 671534 mE Northing: 7554317 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubland over very open low shrubs

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 467 Observer: RT

Zone: 50K Easting: 671126 mE Northing: 7554209 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Scattered trees over tall open shrubland over open hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 3/11/2012 Habitat Assessment #: 468 Observer: RT

Zone: 50K Easting: 670978 mE Northing: 7554082 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over closed hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 | Habitat Assessment #: 469 | Observer: RT

Zone: 50K | Easting: 670913 mE | Northing: 7553965 mN

Fire History: > 5 years | Landform: Mid Slope | Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 470 Observer: RT

Zone: 50K Easting: 670922 mE Northing: 7553779 mN

Fire History: > 5 years Landform: Mid Slope Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 471 Observer: RT

Zone: 50K Easting: 670847 mE Northing: 7553446 mN

Fire History: > 5 years Landform: Gully Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 472 Observer: RT

Zone: 50K Easting: 670874 mE Northing: 7553343 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 3/11/2012 Habitat Assessment #: 473 Observer: RT

Zone: 50K Easting: 670957 mE Northing: 7553147 mN

Fire History: > 5 years Landform: Escarpment Habitat Quality: Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 3/11/2012 Habitat Assessment #: 474 Observer: RT

Zone: 50K Easting: 671103 mE Northing: 7552517 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Good

Habitat Structure: Open woodland over shrubland over mid-dense hummock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 10/11/2012 Habitat Assessment #: 476 Observer: LH

Zone: 50K Easting: 668930 mE Northing: 7550151 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 10/11/2012 Habitat Assessment #: 477 Observer: LH

Zone: 50K Easting: 668687 mE Northing: 7549803 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 478 Observer: LH

Zone: 50K Easting: 668466 mE Northing: 7549491 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 479 Observer: LH

Zone: 50K Easting: 668205 mE Northing: 7549136 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 10/11/2012 Habitat Assessment #: 480 Observer: LH

Zone: 50K Easting: 667844 mE Northing: 7548623 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Clay Surface Stone: Cobbles (51-250mm)

Date: 10/11/2012 Habitat Assessment #: 481 Observer: LH

Zone: 50K Easting: 667559 mE Northing: 7548217 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs

Soil Colour: Red Soil Type: Clay Surface Stone: Cobbles (51-250mm)

Date: 10/11/2012 Habitat Assessment #: 482 Observer: LH

Zone: 50K Easting: 670553 mE Northing: 7549675 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Woodland over scattered low shrubs over open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 483 Observer: LH

Zone: 50K Easting: 670239 mE Northing: 7549238 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over scattered low shrubs over open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 10/11/2012 | Habitat Assessment #: 484 | Observer: LH

Zone: 50K | Easting: 669973 mE | Northing: 7548847 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over open tussock grassland

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 | Habitat Assessment #: 485 | Observer: LH

Zone: 50K | Easting: 669648 mE | Northing: 7548401 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red | Soil Type: Clay | Surface Stone: Cobbles (51-250mm)

Date: 10/11/2012 Habitat Assessment #: 486 Observer: LH

Zone: 50K Easting: 669336 mE Northing: 7547962 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees

Soil Colour: Red Soil Type: Clay Surface Stone: Cobbles (51-250mm)

Date: 10/11/2012 Habitat Assessment #: 487 Observer: LH

Zone: 50K Easting: 671325 mE Northing: 7549365 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Woodland over low shrubland over open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 488 Observer: LH

Zone: 50K Easting: 671286 mE Northing: 7549298 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 10/11/2012 Habitat Assessment #: 489 Observer: LH

Zone: 50K Easting: 670735 mE Northing: 7548557 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 490 Observer: LH

Zone: 50K Easting: 670448 mE Northing: 7548142 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 491 Observer: LH

Zone: 50K Easting: 672967 mE Northing: 7548238 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 | Habitat Assessment #: 492 | Observer: LH

Zone: 50K | Easting: 672718 mE | Northing: 7547894 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over scattered tussock grasses

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 10/11/2012 Habitat Assessment #: 493 Observer: LH

Zone: 50K Easting: 669704 mE Northing: 7549875 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 494 Observer: LH

Zone: 50K Easting: 669417 mE Northing: 7549469 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 495 Observer: LH

Zone: 50K Easting: 669109 mE Northing: 7549042 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 Habitat Assessment #: 496 Observer: LH

Zone: 50K Easting: 668709 mE Northing: 7548469 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over very open tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 | Habitat Assessment #: 497 | Observer: LH

Zone: 50K | Easting: 668391 mE | Northing: 7548014 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over very open tussock grassland

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

Date: 10/11/2012 | Habitat Assessment #: 498 | Observer: LH

Zone: 50K | Easting: 666541 mE | Northing: 7547999 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over open shrubland over very open tussock grassland

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 499 Observer: LH

Zone: 50K Easting: 666571 mE Northing: 7550939 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

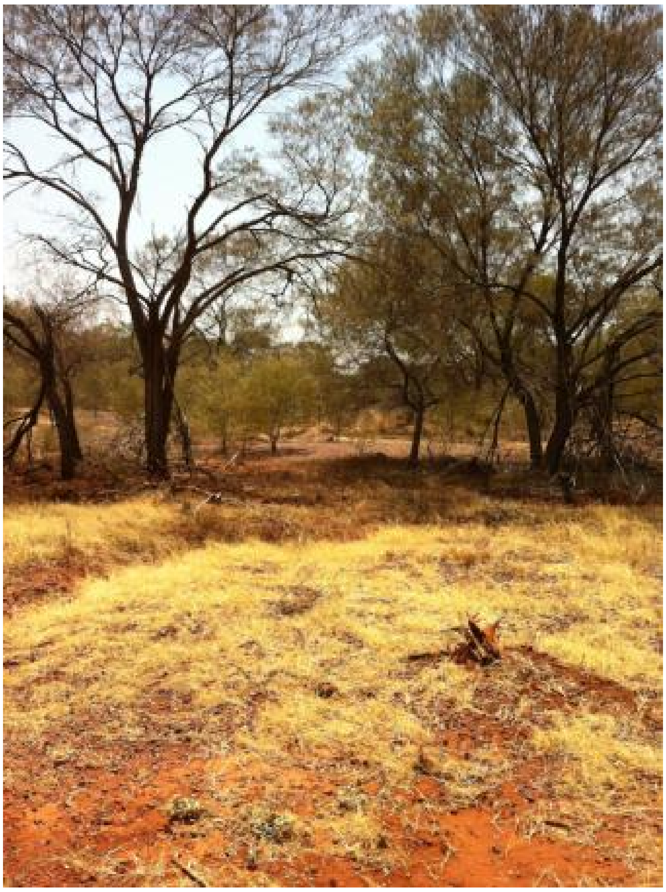
Date: 12/11/2012 Habitat Assessment #: 500 Observer: LH

Zone: 50K Easting: 666233 mE Northing: 7550519 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over open tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)



TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 501 Observer: LH

Zone: 50K Easting: 665905 mE Northing: 7550049 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered tall shrubs over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 502 Observer: LH

Zone: 50K Easting: 665602 mE Northing: 7549617 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Open woodland over scattered tall shrubs over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 503 Observer: LH

Zone: 50K Easting: 665239 mE Northing: 7549095 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered tall shrubs over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 504 Observer: LH

Zone: 50K Easting: 664755 mE Northing: 7548435 mN

Fire History: > 5 years Landform: Flatn Habitat Quality: Good

Habitat Structure: Open woodland over scattered tall shrubs over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 505 Observer: LH

Zone: 50K Easting: 665787 mE Northing: 7551241 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 506 Observer: LH

Zone: 50K Easting: 665569 mE Northing: 7550962 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 507 Observer: LH

Zone: 50K Easting: 665230 mE Northing: 7550479 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered tall shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

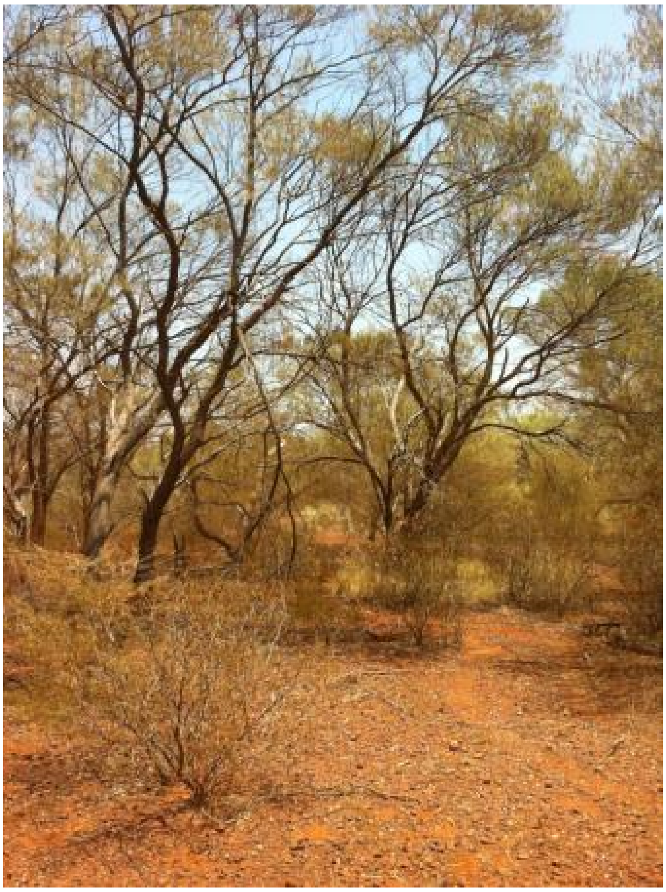
Date: 12/11/2012 Habitat Assessment #: 508 Observer: LH

Zone: 50K Easting: 664915 mE Northing: 7550021 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over open shrubland over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)



Date: 12/11/2012 | Habitat Assessment #: 509 | Observer: LH

Zone: 50K | Easting: 665266 mE | Northing: 7551618 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over low open shrubland over scattered tussock grasses

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 510 Observer: LH

Zone: 50K Easting: 665035 mE Northing: 7551275 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 511 Observer: MP

Zone: 50K Easting: 664829 mE Northing: 7550970 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 512 Observer: MP

Zone: 50K Easting: 664588 mE Northing: 7550691 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 513 Observer: MP

Zone: 50K Easting: 664116 mE Northing: 7552348 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over open shrubland over tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 514 Observer: MP

Zone: 50K Easting: 663862 mE Northing: 7552030 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low shrubland over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 | Habitat Assessment #: 515 | Observer: MP

Zone: 50K | Easting: 663572 mE | Northing: 7551649 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Open woodland over shrubland over scattered tussock grasses

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 516 Observer: MP

Zone: 50K Easting: 663329 mE Northing: 7551267 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered tall trees over shrubland over very open tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (51-250mm)

Date: 12/11/2012 | Habitat Assessment #: 517 | Observer: MP

Zone: 50K | Easting: 663074 mE | Northing: 7550898 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Scattered tall trees over scattered low shrubs over scattered tussock grasses

Soil Colour: Red | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 518 Observer: MP

Zone: 50K Easting: 662893 mE Northing: 7550631 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low shrubland over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 519 Observer: MP

Zone: 50K Easting: 662615 mE Northing: 7550276 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered shrubs over very open tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 520 Observer: MP

Zone: 50K Easting: 663885 mE Northing: 7550775 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over low shrubland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 521 Observer: MP

Zone: 50K Easting: 664237 mE Northing: 7551373 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over closed tussock grassland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 12/11/2012 Habitat Assessment #: 522 Observer: MP

Zone: 50K Easting: 664552 mE Northing: 7551844 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodalnd over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 12/11/2012 Habitat Assessment #: 523 Observer: MP

Zone: 50K Easting: 666851 mE Northing: 7550334 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 524 Observer: ST

Zone: 50K Easting: 672870 mE Northing: 7548398 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 525 | Observer: ST

Zone: 50K | Easting: 672658 mE | Northing: 7548139 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 526 Observer: ST

Zone: 50K Easting: 672400 mE Northing: 7547779 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 527 Observer: ST

Zone: 50K Easting: 672141 mE Northing: 7547766 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 528 Observer: ST

Zone: 50K Easting: 671882 mE Northing: 7547842 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 529 Observer: ST

Zone: 50K Easting: 672010 mE Northing: 7548046 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 530 Observer: ST

Zone: 50K Easting: 672147 mE Northing: 7548258 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 531 | Observer: ST

Zone: 50K | Easting: 672273 mE | Northing: 7548504 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 532 | Observer: ST

Zone: 50K | Easting: 672363 mE | Northing: 7548641 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Open woodland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 533 Observer: ST

Zone: 50K Easting: 671980 mE Northing: 7548927 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 534 | Observer: ST

Zone: 50K | Easting: 671758 mE | Northing: 7548596 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 535 Observer: ST

Zone: 50K Easting: 671476 mE Northing: 7548222 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 536 Observer: ST

Zone: 50K Easting: 671248 mE Northing: 7547899 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 537 Observer: ST

Zone: 50K Easting: 670943 mE Northing: 7547977 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 538 | Observer: ST

Zone: 50K | Easting: 670675 mE | Northing: 7547918 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 539 | Observer: ST

Zone: 50K | Easting: 670813 mE | Northing: 7548186 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 540 Observer: ST

Zone: 50K Easting: 671112 mE Northing: 7548581 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 541 Observer: ST

Zone: 50K Easting: 671315 mE Northing: 7548879 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 542 | Observer: ST

Zone: 50K | Easting: 671516 mE | Northing: 7549146 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 543 | Observer: ST

Zone: 50K | Easting: 671501 mE | Northing: 7549624 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 544 | Observer: ST

Zone: 50K | Easting: 671728 mE | Northing: 7549944 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 545 Observer: ST

Zone: 50K Easting: 671800 mE Northing: 7550076 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 546 Observer: ST

Zone: 50K Easting: 671862 mE Northing: 7550175 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Very Good

Habitat Structure: Tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 547 Observer: ST

Zone: 50K Easting: 671963 mE Northing: 7550417 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 548 | Observer: ST

Zone: 50K | Easting: 671849 mE | Northing: 7550566 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 549 Observer: ST

Zone: 50K Easting: 671520 mE Northing: 7550561 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 550 | Observer: ST

Zone: 50K | Easting: 671176 mE | Northing: 7550451 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 551 | Observer: ST

Zone: 50K | Easting: 670985 mE | Northing: 7550288 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 551 | Observer: ST

Zone: 50K | Easting: 670985 mE | Northing: 7550288 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 552 | Observer: ST

Zone: 50K | Easting: 670833 mE | Northing: 7550074 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 553 Observer: ST

Zone: 50K Easting: 670627 mE Northing: 7549793 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 554 Observer: ST

Zone: 50K Easting: 670368 mE Northing: 7550073 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 555 | Observer: ST

Zone: 50K | Easting: 670533 mE | Northing: 7550502 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over dense tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 556 Observer: ST

Zone: 50K Easting: 670755 mE Northing: 7550698 mN

Fire History: > 5 years Landform: Creek Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall open shrubland over closed tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 557 Observer: ST

Zone: 50K Easting: 670869 mE Northing: 7550846 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall open shrubland over closed tussock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

Date: 13/11/2012 Habitat Assessment #: 558 Observer: ST

Zone: 50K Easting: 670706 mE Northing: 7551026 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall open shrubland over closed tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 559 Observer: ST

Zone: 50K Easting: 670380 mE Northing: 7551079 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012	Habitat Assessment #: 560	Observer: ST
Zone: 50K	Easting: 670312 mE	Northing: 7551113 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense tussock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 561 Observer: ST

Zone: 50K Easting: 670175 mE Northing: 7550951 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 562 | Observer: ST

Zone: 50K | Easting: 670071 mE | Northing: 7550800 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubland over mid-dense tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 563 Observer: ST

Zone: 50K Easting: 669877 mE Northing: 7550576 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 564 Observer: ST

Zone: 50K Easting: 669664 mE Northing: 7550233 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 565 Observer: ST

Zone: 50K Easting: 669005 mE Northing: 7550255 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall open shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 566 Observer: ST

Zone: 50K Easting: 669238 mE Northing: 7550591 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 567 Observer: ST

Zone: 50K Easting: 669323 mE Northing: 7550813 mN

Fire History: > 5 years Landform: Lower slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 568 Observer: ST

Zone: 50K Easting: 669388 mE Northing: 7551095 mN

Fire History: > 5 years Landform: Upper Slope Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered shrubs over hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 569 | Observer: ST

Zone: 50K | Easting: 669114 mE | Northing: 7551242 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 570 Observer: ST

Zone: 50K Easting: 668758 mE Northing: 7551386 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 571 | Observer: ST

Zone: 50K | Easting: 668710 mE | Northing: 7551378 mN

Fire History: > 5 years | Landform: Creekline | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall open scrub over tussock grassland

Soil Colour: Brown | Soil Type: Stony | Surface Stone: Cobbles (51-250mm)

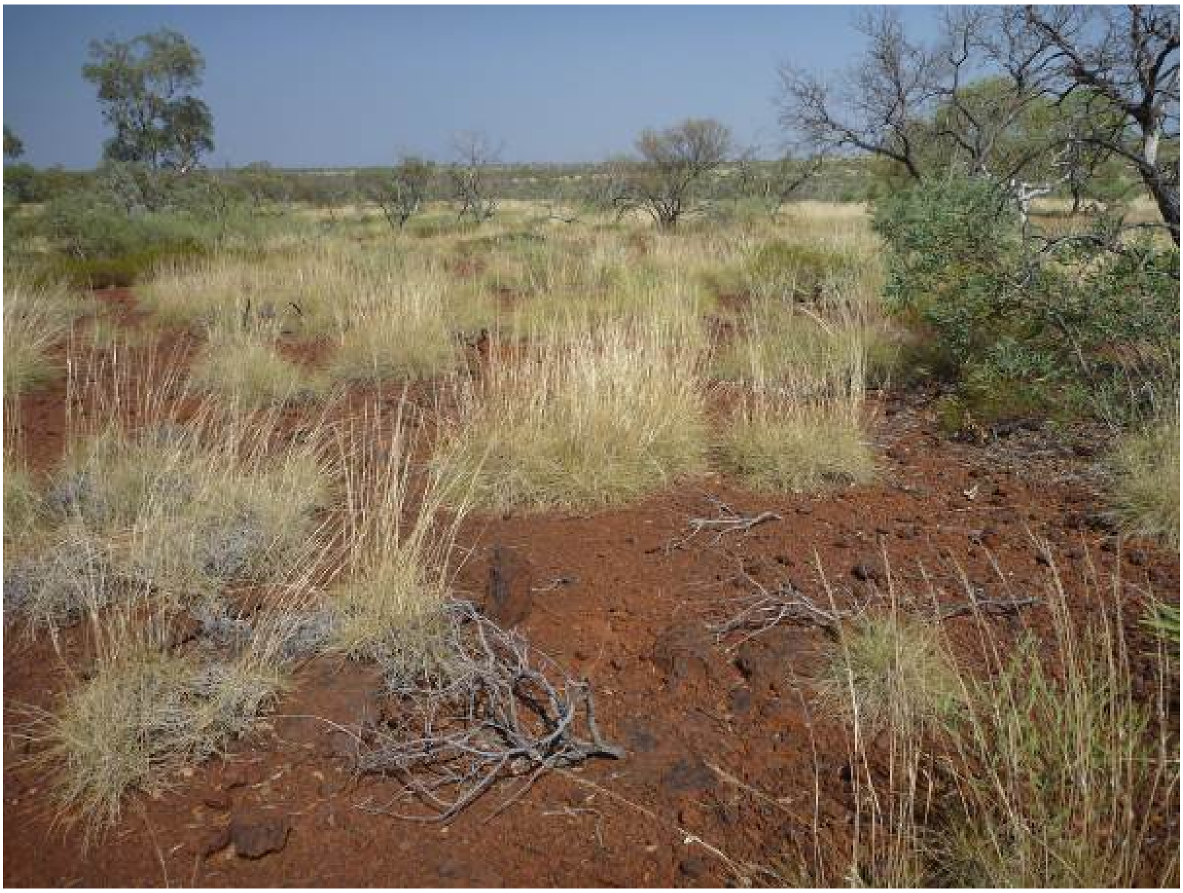
Date: 13/11/2012 Habitat Assessment #: 572 Observer: ST

Zone: 50K Easting: 668444 mE Northing: 7551403 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)



Date: 13/11/2012 Habitat Assessment #: 573 Observer: ST

Zone: 50K Easting: 668356 mE Northing: 7551151 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 574 | Observer: ST

Zone: 50K | Easting: 668394 mE | Northing: 7550899 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 575 Observer: ST

Zone: 50K Easting: 668274 mE Northing: 7550676 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 576 Observer: ST

Zone: 50K Easting: 667569 mE Northing: 7550712 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 577 Observer: ST

Zone: 50K Easting: 667674 mE Northing: 7551000 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 578 Observer: ST

Zone: 50K Easting: 667810 mE Northing: 7551350 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

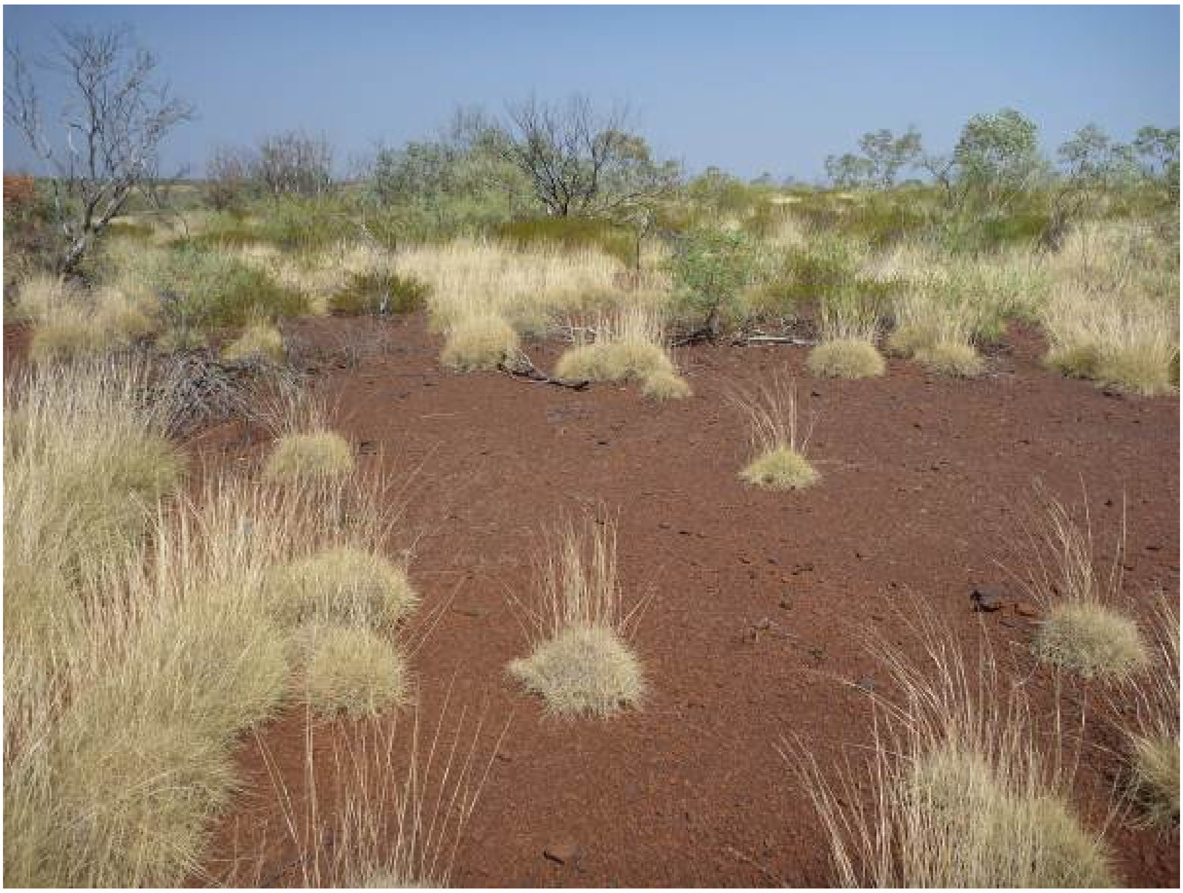
Date: 13/11/2012 | Habitat Assessment #: 579 | Observer: ST

Zone: 50K | Easting: 667871 mE | Northing: 7551736 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)



Date: 13/11/2012 | Habitat Assessment #: 580 | Observer: ST

Zone: 50K | Easting: 667630 mE | Northing: 7551834 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Rock | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 581 | Observer: ST

Zone: 50K | Easting: 667379 mE | Northing: 7551975 mN

Fire History: > 5 years | Landform: Undulating | Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Cobbles (51-250mm)

Date: 13/11/2012 Habitat Assessment #: 582 Observer: ST

Zone: 50K Easting: 667161 mE Northing: 7551745 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Tall shrubs over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 583 Observer: ST

Zone: 50K Easting: 667089 mE Northing: 7551344 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 584 Observer: ST

Zone: 50K Easting: 666880 mE Northing: 7551042 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 585 | Observer: ST

Zone: 50K | Easting: 666316 mE | Northing: 7551353 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 586 Observer: ST

Zone: 50K Easting: 666417 mE Northing: 7551905 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Rock Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 587 Observer: ST

Zone: 50K Easting: 666502 mE Northing: 7552187 mN

Fire History: > 5 years Landform: Creekline Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

Date: 13/11/2012 Habitat Assessment #: 588 Observer: ST

Zone: 50K Easting: 666420 mE Northing: 7552387 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Stony Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 589 Observer: ST

Zone: 50K Easting: 666095 mE Northing: 7552516 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 590 Observer: ST

Zone: 50K Easting: 665935 mE Northing: 7552238 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012	Habitat Assessment #: 591	Observer: ST
Zone: 50K	Easting: 665670 mE	Northing: 7551797 mN
Fire History: > 5 years	Landform: Flat	Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 592 Observer: ST

Zone: 50K Easting: 665506 mE Northing: 7551545 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 593 Observer: ST

Zone: 50K Easting: 667415 mE Northing: 7550104 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 594 Observer: ST

Zone: 50K Easting: 666963 mE Northing: 7549996 mN

Fire History: > 5 years Landform: River Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Cobbles (51-250mm)

Date: 13/11/2012 Habitat Assessment #: 595 Observer: ST

Zone: 50K Easting: 666428 mE Northing: 7549483 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 596 Observer: ST

Zone: 50K Easting: 665445 mE Northing: 7549330 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over scattered shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 597 Observer: ST

Zone: 50K Easting: 664695 mE Northing: 7548893 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 598 Observer: ST

Zone: 50K Easting: 663925 mE Northing: 7548227 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 599 Observer: ST

Zone: 50K Easting: 663616 mE Northing: 7547915 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 600 Observer: ST

Zone: 50K Easting: 664042 mE Northing: 7547726 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 601 | Observer: ST

Zone: 50K | Easting: 664603 mE | Northing: 7547817 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 602 Observer: ST

Zone: 50K Easting: 665114 mE Northing: 7547869 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall open shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 603 Observer: ST

Zone: 50K Easting: 665465 mE Northing: 7548131 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 604 | Observer: ST

Zone: 50K | Easting: 665849 mE | Northing: 7548579 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Open woodland over tall open shrubland over open tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 605 Observer: ST

Zone: 50K Easting: 666323 mE Northing: 7548498 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 606 Observer: ST

Zone: 50K Easting: 666686 mE Northing: 7548277 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 607 Observer: ST

Zone: 50K Easting: 666710 mE Northing: 7547796 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 608 Observer: ST

Zone: 50K Easting: 666947 mE Northing: 7547887 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 609 | Observer: ST

Zone: 50K | Easting: 663146 mE | Northing: 7548118 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered tall shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 610 Observer: ST

Zone: 50K Easting: 663523 mE Northing: 7548702 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 611 Observer: ST

Zone: 50K Easting: 663970 mE Northing: 7549261 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 612 | Observer: ST

Zone: 50K | Easting: 664259 mE | Northing: 7549809 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 613 Observer: ST

Zone: 50K Easting: 663750 mE Northing: 7549856 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 614 Observer: ST

Zone: 50K Easting: 663154 mE Northing: 7550030 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 615 Observer: ST

Zone: 50K Easting: 662723 mE Northing: 7549401 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 616 Observer: ST

Zone: 50K Easting: 662324 mE Northing: 7548934 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 617 Observer: ST

Zone: 50K Easting: 662140 mE Northing: 7548593 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Date: 13/11/2012 | Habitat Assessment #: 618 | Observer: ST

Zone: 50K | Easting: 662050 mE | Northing: 7548425 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 619 Observer: ST

Zone: 50K Easting: 661217 mE Northing: 7548544 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 620 | Observer: ST

Zone: 50K | Easting: 661453 mE | Northing: 7549155 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 621 Observer: ST

Zone: 50K Easting: 661745 mE Northing: 7549495 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 622 Observer: ST

Zone: 50K Easting: 661768 mE Northing: 7549962 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 623 Observer: ST

Zone: 50K Easting: 661922 mE Northing: 7550313 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered tress over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 | Habitat Assessment #: 624 | Observer: ST

Zone: 50K | Easting: 662265 mE | Northing: 7550798 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 625 Observer: ST

Zone: 50K Easting: 662209 mE Northing: 7551335 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 626 Observer: ST

Zone: 50K Easting: 662573 mE Northing: 7551654 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 627 Observer: ST

Zone: 50K Easting: 662737 mE Northing: 7551911 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over clumps of spinifex

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 628 Observer: ST

Zone: 50K Easting: 662776 mE Northing: 7552001 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 629 Observer: MP

Zone: 50K Easting: 655034 mE Northing: 7552618 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 630 Observer: MP

Zone: 50K Easting: 654531 mE Northing: 7553201 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 631 Observer: MP

Zone: 50K Easting: 654496 mE Northing: 7553579 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 632 Observer: MP

Zone: 50K Easting: 654590 mE Northing: 7551950 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 633 Observer: MP

Zone: 50K Easting: 654643 mE Northing: 7553208 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 634 Observer: MP

Zone: 50K Easting: 655140 mE Northing: 7553825 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 635 Observer: MP

Zone: 50K Easting: 655724 mE Northing: 7554056 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 636 Observer: MP

Zone: 50K Easting: 655333 mE Northing: 7554544 mN

Fire History: > 5 years Landform: Clay Plain Habitat Quality: Good

Habitat Structure: Open heath over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: None

Date: 13/11/2012 Habitat Assessment #: 637 Observer: MP

Zone: 50K Easting: 655564 mE Northing: 7553748 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

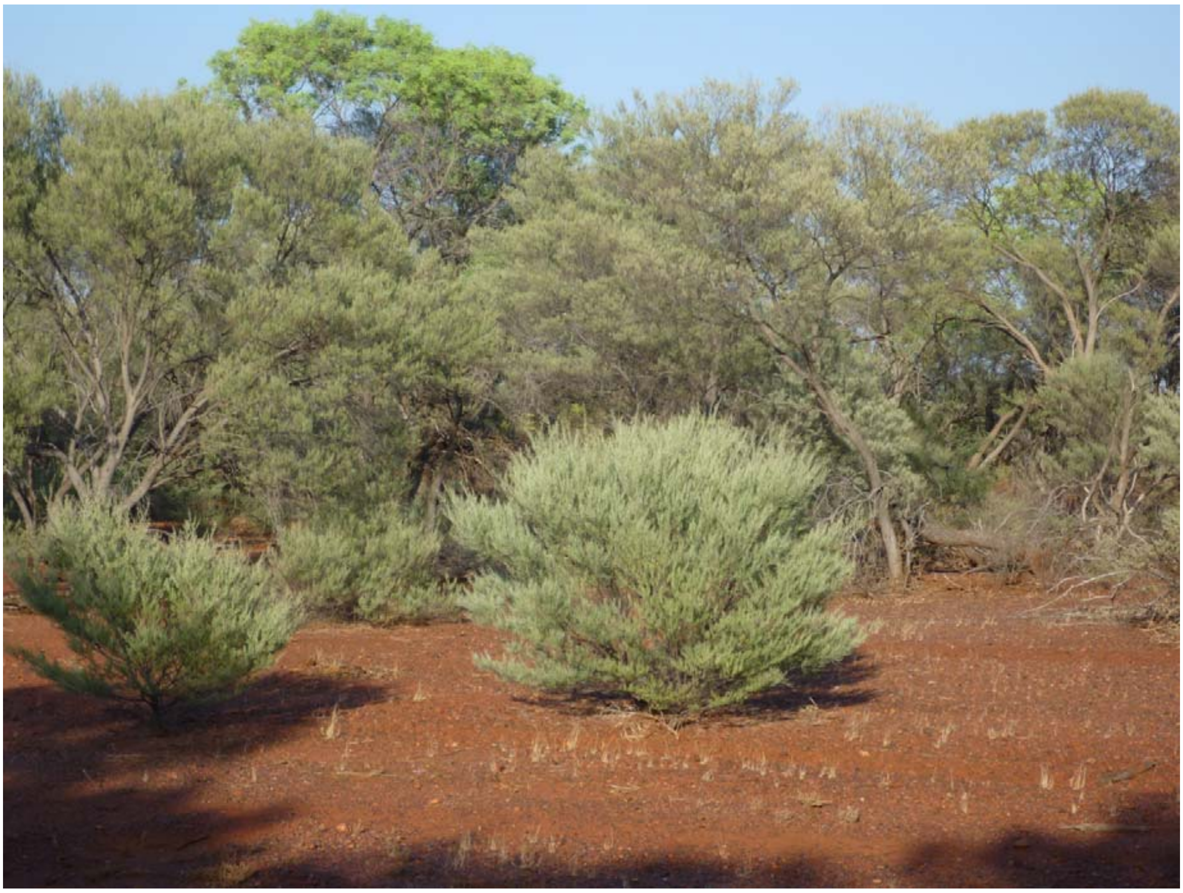
Date: 13/11/2012 Habitat Assessment #: 638 Observer: MP

Zone: 50K Easting: 655378 mE Northing: 7553520 mN

Fire History: > 5 years Landform: Ridge Habitat Quality: Good

Habitat Structure: Open woodland over scattered low shrubs

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)



Date: 13/11/2012 Habitat Assessment #: 639 Observer: MP

Zone: 50K Easting: 655604 mE Northing: 7553166 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 640 Observer: MP

Zone: 50K Easting: 655749 mE Northing: 7553110 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over scattered shrubs over closed tussock grassland

Soil Colour: Red Soil Type: Rock Surface Stone: Cobbles (51-250mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 Habitat Assessment #: 641 Observer: MP

Zone: 50K Easting: 655660 mE Northing: 7552709 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over scattered low shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Rock Surface Stone: Cobbles (51-250mm)

Date: 13/11/2012 Habitat Assessment #: 642 Observer: MP

Zone: 50K Easting: 656236 mE Northing: 7552300 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 643 | Observer: MP

Zone: 50K | Easting: 656608 mE | Northing: 7552480 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubs over scattered tussock grasses

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 644 Observer: MP

Zone: 50K Easting: 656554 mE Northing: 7551327 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 13/11/2012 | Habitat Assessment #: 645 | Observer: MP

Zone: 50K | Easting: 655838 mE | Northing: 7551878 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Woodland over open shrubland over scattered tussock grasses

Soil Colour: Red | Soil Type: Clay | Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 646 Observer: MP

Zone: 50K Easting: 655369 mE Northing: 7552450 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered low trees over low shrubland over scattered tussock grasses

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 13/11/2012 Habitat Assessment #: 647 Observer: MP

Zone: 50K Easting: 654656 mE Northing: 7552997 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over low shrubland over tussock grassland

Soil Colour: Red Soil Type: Clay Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 648 Observer: ST

Zone: 50K Easting: 656621 mE Northing: 7553311 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: None

Date: 14/11/2012 | Habitat Assessment #: 649 | Observer: ST

Zone: 50K | Easting: 656519 mE | Northing: 7553094 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 650 Observer: ST

Zone: 50K Easting: 656304 mE Northing: 7552796 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered shrubs over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 651 Observer: ST

Zone: 50K Easting: 656128 mE Northing: 7552559 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 652 Observer: ST

Zone: 50K Easting: 655915 mE Northing: 7552246 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over open scattered tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 653 Observer: ST

Zone: 50K Easting: 656194 mE Northing: 7551608 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered shrubs over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 654 Observer: ST

Zone: 50K Easting: 656428 mE Northing: 7551929 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 655 Observer: ST

Zone: 50K Easting: 656625 mE Northing: 7552212 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 | Habitat Assessment #: 656 | Observer: ST

Zone: 50K | Easting: 656752 mE | Northing: 7552382 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 657 Observer: ST

Zone: 50K Easting: 656994 mE Northing: 7552728 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 658 Observer: ST

Zone: 50K Easting: 657271 mE Northing: 7553100 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 659 Observer: ST

Zone: 50K Easting: 657419 mE Northing: 7553323 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 660 Observer: ST

Zone: 50K Easting: 657700 mE Northing: 7553721 mN

Fire History: > 5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012	Habitat Assessment #: 661	Observer: ST
Zone: 50K	Easting: 657944 mE	Northing: 7554043 mN
Fire History: 1-5 years	Landform: Undulating	Habitat Quality: Good
Habitat Structure: Scattered trees over open tussock grassland		
Soil Colour: Brown	Soil Type: Sand	Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 662 Observer: ST

Zone: 50K Easting: 658608 mE Northing: 7553955 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 663 Observer: ST

Zone: 50K Easting: 658475 mE Northing: 7553751 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs over open tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 664 Observer: ST

Zone: 50K Easting: 658143 mE Northing: 7553283 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 665 Observer: ST

Zone: 50K Easting: 657975 mE Northing: 7553050 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Disturbed

Habitat Structure: Open woodland over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 666 Observer: ST

Zone: 50K Easting: 657410 mE Northing: 7552252 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 667 Observer: ST

Zone: 50K Easting: 659108 mE Northing: 7553625 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 668 Observer: ST

Zone: 50K Easting: 658862 mE Northing: 7553271 mN

Fire History: 1-5 years Landform: Undulating Habitat Quality: Good

Habitat Structure: Shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 669 Observer: ST

Zone: 50K Easting: 658486 mE Northing: 7552752 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 670 Observer: ST

Zone: 50K Easting: 658234 mE Northing: 7552400 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 671 Observer: ST

Zone: 50K Easting: 657977 mE Northing: 7552041 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees and tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 | Habitat Assessment #: 672 | Observer: ST

Zone: 50K | Easting: 659895 mE | Northing: 7553338 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Tall shrubs over hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 673 Observer: ST

Zone: 50K Easting: 659675 mE Northing: 7553022 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 | Habitat Assessment #: 674 | Observer: ST

Zone: 50K | Easting: 659467 mE | Northing: 7552744 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 675 Observer: ST

Zone: 50K Easting: 659130 mE Northing: 7552263 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over smaller shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 676 Observer: ST

Zone: 50K Easting: 658874 mE Northing: 7551910 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over smaller shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 677 Observer: ST

Zone: 50K Easting: 660612 mE Northing: 7552964 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 678 Observer: ST

Zone: 50K Easting: 660427 mE Northing: 7552707 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall open shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 679 Observer: ST

Zone: 50K Easting: 660239 mE Northing: 7552431 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over smaller shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 680 Observer: ST

Zone: 50K Easting: 661464 mE Northing: 7552788 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 681 Observer: ST

Zone: 50K Easting: 661255 mE Northing: 7552505 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over mid-dense hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 682 Observer: ST

Zone: 50K Easting: 661104 mE Northing: 7552278 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 | Habitat Assessment #: 683 | Observer: ST

Zone: 50K | Easting: 660940 mE | Northing: 7552063 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 684 Observer: ST

Zone: 50K Easting: 660584 mE Northing: 7551548 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Scattered trees over shrubs and hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 685 Observer: ST

Zone: 50K Easting: 660361 mE Northing: 7551241 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over smaller shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 686 Observer: ST

Zone: 50K Easting: 661955 mE Northing: 7551779 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 687 Observer: ST

Zone: 50K Easting: 661722 mE Northing: 7551401 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 688 Observer: ST

Zone: 50K Easting: 661592 mE Northing: 7551151 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 689 Observer: ST

Zone: 50K Easting: 661463 mE Northing: 7550920 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over tall shrubland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 690 Observer: ST

Zone: 50K Easting: 657376 mE Northing: 7554304 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 691 Observer: ST

Zone: 50K Easting: 657169 mE Northing: 7554005 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 692 Observer: ST

Zone: 50K Easting: 656891 mE Northing: 7553606 mN

Fire History: 1-5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Open woodland over tall shrubland over hummock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 | Habitat Assessment #: 693 | Observer: ST

Zone: 50K | Easting: 657287 mE | Northing: 7550806 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Good

Habitat Structure: Scattered shrubs over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 694 Observer: ST

Zone: 50K Easting: 657640 mE Northing: 7551155 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 695 Observer: ST

Zone: 50K Easting: 657819 mE Northing: 7551403 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Tall shrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 696 Observer: ST

Zone: 50K Easting: 657952 mE Northing: 7551662 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over tall shrubland over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 697 Observer: ST

Zone: 50K Easting: 657716 mE Northing: 7551744 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Good

Habitat Structure: Scattered trees over shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 698 Observer: ST

Zone: 50K Easting: 657495 mE Northing: 7551800 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Open woodland over scrubs over tussock grassland

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 | Habitat Assessment #: 699 | Observer: ST

Zone: 50K | Easting: 657368 mE | Northing: 7551856 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 Habitat Assessment #: 700 Observer: ST

Zone: 50K Easting: 657209 mE Northing: 7551687 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs

Soil Colour: Brown Soil Type: Sand Surface Stone: Pebbles (0-50mm)

TERRESTRIAL ECOSYSTEMS

Date: 14/11/2012 Habitat Assessment #: 701 Observer: ST

Zone: 50K Easting: 657092 mE Northing: 7551456 mN

Fire History: > 5 years Landform: Flat Habitat Quality: Very Good

Habitat Structure: Tall shrubs over smaller shrubs

Soil Type: Sand Surface Stone: Pebbles (0-50mm)

Date: 14/11/2012 | Habitat Assessment #: 702 | Observer: ST

Zone: 50K | Easting: 656883 mE | Northing: 7551097 mN

Fire History: > 5 years | Landform: Flat | Habitat Quality: Very Good

Habitat Structure: Scattered trees over tall shrubland over tussock grassland

Soil Colour: Brown | Soil Type: Sand | Surface Stone: Pebbles (0-50mm)